NOVATECH

Engineers, Planners & Landscape Architects

**Engineering**
- Land/Site Development
- Municipal Infrastructure
- Environmental/ Water Resources
- Traffic/ Transportation
- Recreational

**Planning**
- Land/Site Development
- Planning Application Management
- Municipal Planning
- Urban Design
- Expert Witness (LPAT)
- Wireless Industry

**Landscape Architecture**
- Streetscapes & Public Amenities
- Open Space, Parks & Recreation
- Community & Residential
- Commercial & Institutional
- Environmental Restoration

# Palladium II
# 2765 Palladium Drive

## Servicing and Stormwater Management Report

**Prepared for: Broadstreet Properties Inc.**

# Palladium II

# 2765 Palladium Drive

# City of Ottawa

# Servicing and Stormwater Management Report

Prepared By:

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

June /10/ 2026

Novatech File: 125091
Ref: R-2026-024

June 10, 2026

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

**Attention:** **Colette Gorni, MCIP RPP, Planner II, Development Review West**

**Reference:** **Palladium II – 2765 Palladium Drive**
**Servicing and Stormwater Management Report**
**Our File No.: 125091**

Please find enclosed the 'Servicing and Stormwater Management Report' for the above-noted development located in the City of Ottawa. This report is being submitted in support of the site plan application for the proposed development. Should you have any questions or require additional information, please contact the undersigned.

Yours truly,

**NOVATECH**

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



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

## Table of Contents

**1.0 INTRODUCTION ..... 1**
1.1 Existing Conditions ..... 1
1.2 Proposed Development ..... 1
**2.0 GEOTECHNICAL INVESTIGATION ..... 2**
**3.0 WATER SERVICING ..... 3**
3.1 Watermain Design Parameters ..... 3
3.2 Fire Demand ..... 3
3.3 Water Demand ..... 4
3.4 Water Boundary Conditions ..... 5
3.5 System pressure Modeling and Results ..... 5
**4.0 SANITARY SERVICING ..... 6**
4.1 Sanitary Design Parameters ..... 6
4.2 Proposed Development Flows ..... 6
4.3 Anticipated Block 242 Flows ..... 6
4.4 Downstream Capacity ..... 7
**5.0 STORM SERVICING ..... 7**
5.1 Downstream System ..... 8
**6.0 STORM DRAINAGE AND STORMWATER MANAGEMENT ..... 9**
6.1 Design Criteria ..... 9
6.2 Allowable Release Rate ..... 9
6.3 Stormwater Management Modeling ..... 9
*6.3.1 PCSWMM Model Parameters ..... 11*
*6.3.2 Stormwater Quantity Control ..... 14*
*6.3.3 Inlet Control Devices ..... 16*
6.4 PCSWMM Model Results ..... 16
*6.4.1 Summary of Peak Flows ..... 17*
*6.4.2 Major System Summary ..... 17*
6.5 Feedmill Creek SWM Study Requirements (5mm Rainfall Retention) ..... 18
6.6 Water Quality Treatment ..... 20
**7.0 EROSION AND SEDIMENT CONTROL ..... 20**
**8.0 CONCLUSIONS AND RECOMMENDATIONS ..... 21**
**9.0 CLOSURE ..... 22**

**Appendices**

Appendix A Pre - Consultation Meeting Minutes

Appendix B Water Servicing

Appendix C Sanitary Servicing

Appendix D Storm Servicing

Appendix E PCSWMM Modeling

Appendix F Drawings

**Tables**

Table 3.1: Watermain Design Parameters and Criteria ..... 3
Table 3.2: Domestic Water Demand Summary ..... 4
Table 3.3: Maximum Flow to be Considered from a Given Hydrant. ..... 4
Table 3.4: Water Boundary Conditions ..... 5
Table 3.5: Water Boundary Conditions and Hydraulic Analysis Summary ..... 5
Table 4.1: Sanitary Sewer Design Parameters ..... 6
Table 5.1: Storm Sewer Design Parameters ..... 8
Table 6.1: Subcatchment Parameters ..... 12
Table 6.2: Underground Storage (StormTech Chambers) ..... 14
Table 6.3: Underground Storage (Infiltration Trenches) ..... 15
Table 6.4: Inlet Control Devices ..... 16
Table 6.5: Peak Flow Comparison ..... 17
Table 6.6: Major System Ponding Depths ..... 18

**Figures**

Figure 1 Key Plan
Figure 2 Existing Conditions
Figure 3 Proposed Site Plan

## 1.0 INTRODUCTION

Novatech has been retained to prepare a Servicing and Stormwater Management Report for the proposed site plan located at 2765 Palladium Drive within the City of Ottawa. The proposed site is denoted as Part 3 of Block 242 and is presently named Palladium II. The purpose of this report is to support the site plan application for the subject development. **Figure 1 Key Plan** shows the site location.

### 1.1 Existing Conditions

The subject site is approximately 1.59 hectares (ha.) in size and is denoted as a part of Block 242, and a portion of Block 243 of the Subdivision located at 195 Huntmar Drive. It should be noted that the proposed development is only a portion Block 242 which had a total area of 2.27ha. The remainder of Block 242 is being developed as Palladium Phase I "670 Derreen Avenue" under City File Number D07-12-24-0140. The site is vacant and was cleared grubbed and pre-graded as part of the overall subdivision works. Historically, the south-west portion of Block 242 was an agricultural land site, while the remainder of the block consisted of unused land with predominant tree cover. A copy of the legal plan is included in **Appendix A** for reference.

The site is bound by Palladium Drive to the north-east, Derreen Avenue to the south-east, the proposed Palladium Phase I to the south-west, and a future commercial block to the north-west. The site is relatively flat and primarily drains from the north-east to the south-west with a +/- 1.0m grade differential across the site. **Figure 2** shows the existing site conditions.

The 195 Huntmar subdivision was designed by David Schafer Engineering Ltd. (DSEL) and design information is provided in the following report:

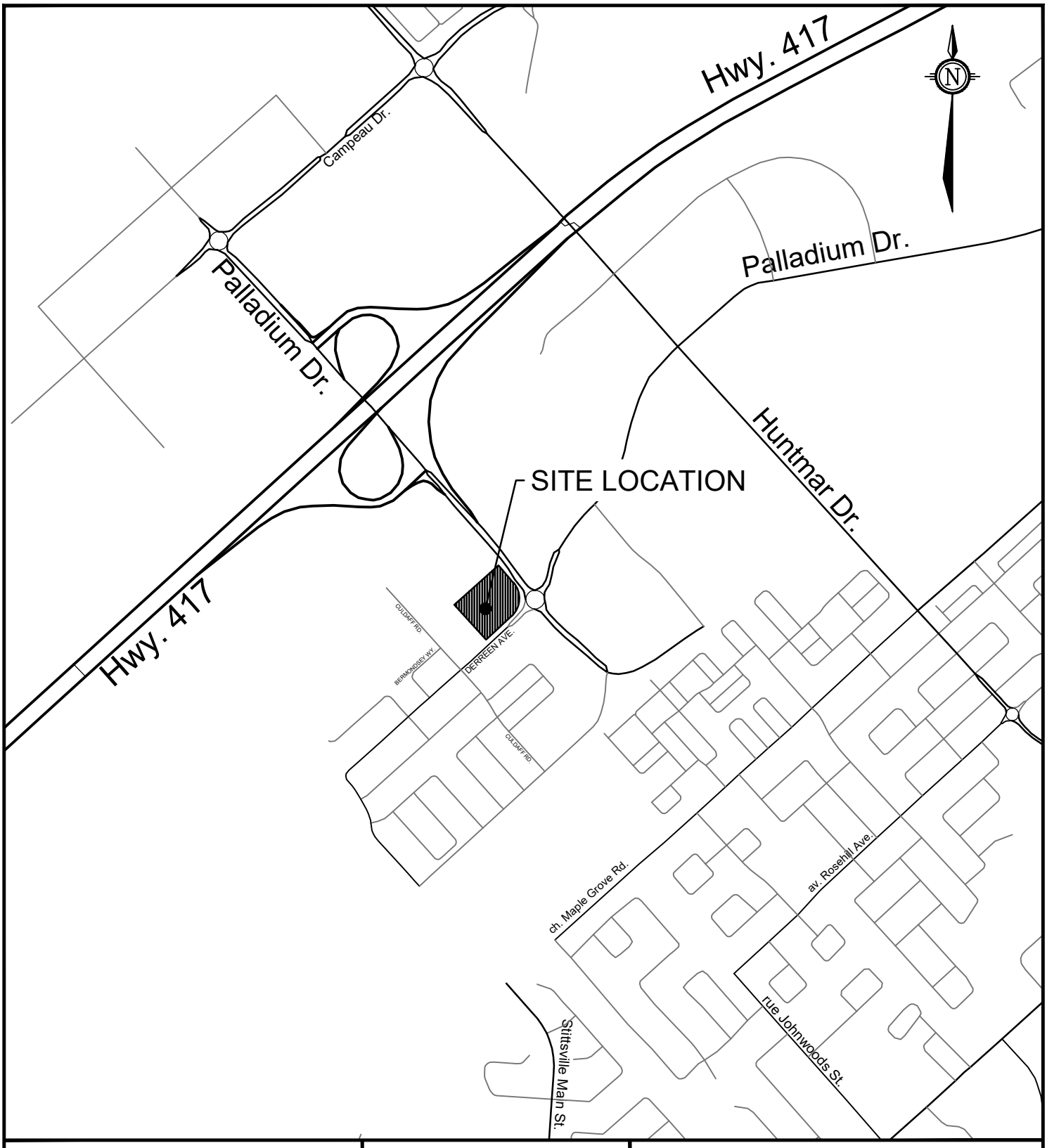
- 'Design Brief for 2325483 Ontario Ltd., 195 Huntmar Drive, City of Ottawa, Project No.: 12-624, prepared By DSEL dated July 2020, 2nd submission (Referenced as **DSEL Report**).

Additionally, the subdivision stormwater modelling was preformed by J.F. Sabourin and Associates Inc (JFSA), and design information is provided in the following report:

- 'Stormwater Management Report for the 195 Huntmar Drive Subdivision to Pond 7, City of Ottawa, Project No.: 12-624, prepared By JFSA dated July 2020, 2nd submission (Referenced as **JSFA Report**).

### 1.2 Proposed Development

It is proposed to develop the site with three (3) six (6) storey apartment buildings (denoted as Buildings A, B, and C) complete with a central above-ground parking area. The buildings will have one (1) level of underground parking beneath the proposed building footprints. The site will provide a total of 304 residential units. Vehicular and pedestrian access to the site will be provided from Palladium Phase I access off Derreen Avenue. **Figure 3** shows the site plan for the proposed development. Correspondence from the City pre-consultation meeting is also included in **Appendix A** for reference.





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 |


CITY OF OTTAWA
# 2765 PALLADIUM DRIVE

## KEY PLAN

| SCALE | | |
|---|---|---|
| N.T.S | | |
| DATE | JOB | FIGURE |
| MAR 2026 | 125091 | FIGURE 1 |

M:\2025\125091\CAD\Civil\125091-KP.dwg, KP, Feb 18, 2026 - 12:25pm, amusyaju

SHT8X11.DWG - 216mmx279mm

LEGEND

PROPOSED DEVELOPMENT BOUNDARY

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

# CITY OF OTTAWA
## 2765 PALLADIUM DRIVE

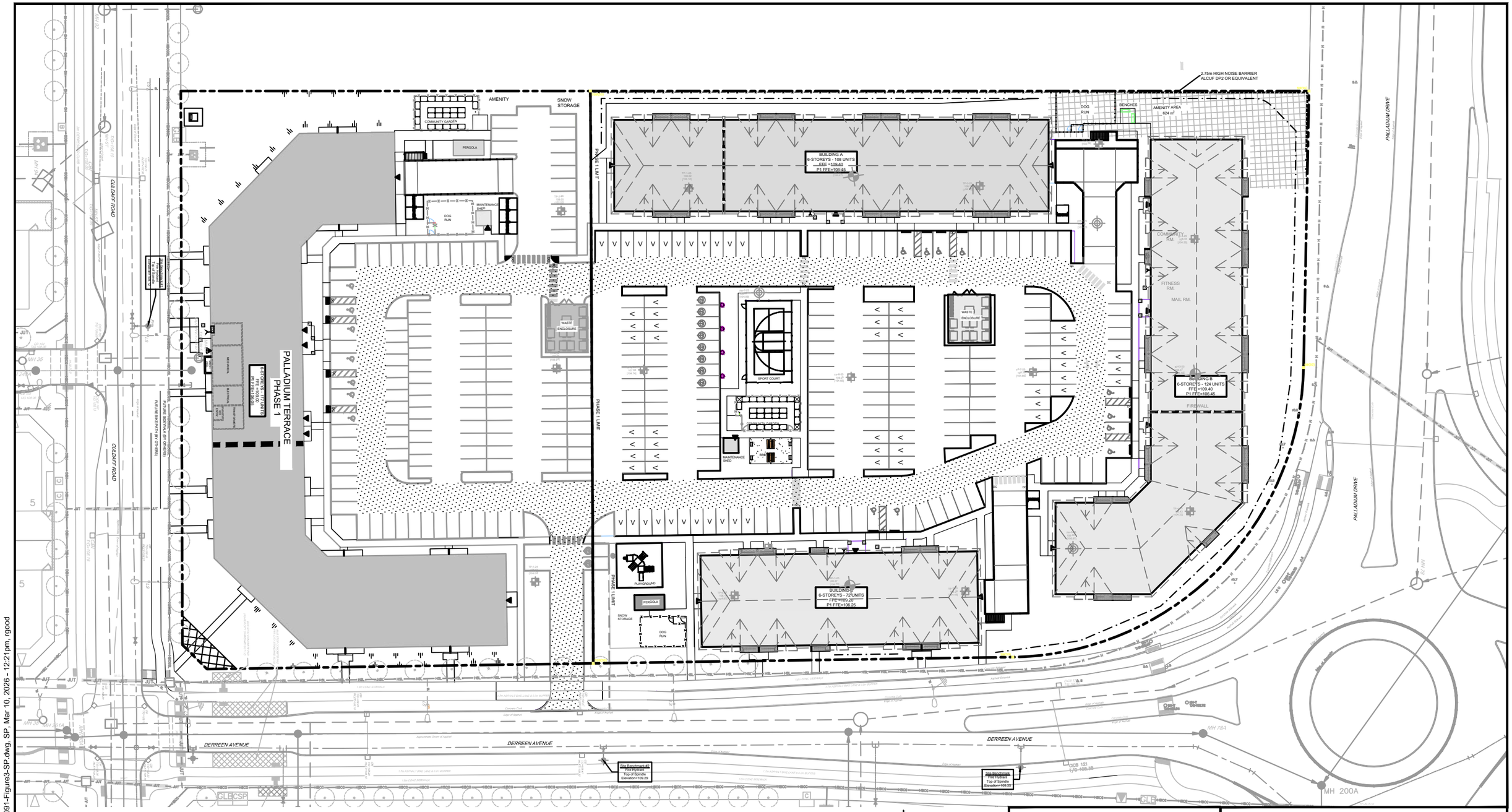
## EXISTING CONDITIONS

SCALE 1 : 1000 (0, 10, 20, 30, 40)

DATE MAR 2026 | JOB 125091 | FIGURE FIGURE 2

SHT11X17.DWG - 279mmX432mm

M:\2025\125091\CAD\Civil\Figures\Servicing\125091-Figure2-EX.dwg, Fig-2, Mar 10, 2026 - 11:03am, rgood




## LEGEND

PROPOSED DEVELOPMENT BOUNDARY


NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com


CITY OF OTTAWA

# 2765 PALLADIUM DRIVE

## PROPOSED SITE PLAN

SCALE 1 : 750 (0 10 20 30)

DATE JUNE 2026 | JOB 125091 | FIGURE FIGURE 3

M:\2025\125091\CAD\Civil\Figures\Servicing\125091-Figure3-SP.dwg, SP, Mar 10, 2026 - 12:21pm, rgood

SHT11X17.DWG - 279mmX432mm

## 2.0 GEOTECHNICAL INVESTIGATION

A geotechnical investigation was completed for the proposed development, and a report prepared entitled 'Geotechnical Investigation', Proposed Residential Development, 2765 Palladium Drive, Ottawa, Ontario, prepared by Paterson Group Inc. dated June 30, 2025 (PG7573-1). The following is a summary of the findings of the reports:

- Practical refusal to augering and excavation was encountered at each test hole at depths ranging from 1.5 to 4.1 m below ground surface.
- Three groundwater monitoring wells were installed in Boreholes (BH1-25, BH2-25, and BH3-25); no groundwater was observed in the monitoring wells. It should also be noted that groundwater levels are subject to seasonal fluctuations. Therefore, the groundwater levels could vary at the time of construction.
- Excavation side slopes above the groundwater level extending to a maximum vertical height of 3 m should be cut back at 1H:1V or flatter. The flatter slope is required for excavation below groundwater level. The subsurface soil is considered to be mainly a Type 2 and Type 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects.
- In sound bedrock, almost vertical side slopes can be constructed, provided all weathered and loose rock is removed or stabilized with rock anchors or other means determined by Paterson at the time of construction.
- Perimeter footings of heated structures are required to be insulated against frost, a minimum of 1.5m thick soil cover (or insulated equivalent) should be provided.
- Exterior unheated footing should be provided with a minimum 2.1m thick soil cover (or insulated equivalent).
- A temporary Ministry of Environment, Conservation and Parks (MECP) permit to take water (PTTW) may be required if more than 400,000 L/day of ground and/or surface water are to be pumped during the construction phase. At least 4 to 5 months should be allowed for completion of the application and issuance of the permit by the MECP.
- For typical ground or surface water volumes being pumped during the construction phase, typically between 50,000 to 400,000 L/day, it is required to register on the Environmental Activity and Sector Registry (EASR). A minimum of two to four weeks should be allotted for completion of the EASR registration and the Water Taking and Discharge Plan to be prepared by a Qualified Persons as stipulated under O.Reg. 63/16.

## 3.0 WATER SERVICING

The proposed site is located within the City of Ottawa Pressure Zone 3W. Existing municipal watermains are located within the Derreen Avenue right-of-way fronting the proposed site, which were constructed as part of the 195 Huntmar Subdivision. A 300 mm diameter PVC watermain currently exists within the Derreen Avenue right-of-way and will serve as the connection point for the proposed development.

### 3.1 Watermain Design Parameters

Water Demands have been calculated using criteria from Section 4 of the City of Ottawa Water Distribution Guidelines as follows:

**Table 3.1: Watermain Design Parameters and Criteria**

| **Domestic Demand Design Parameters** | **Design Parameters** |
|---|---|
| Unit Population: 1-Bed Apartments<br>2-bed Apartments<br>3 Bed Apartments | 1.4 people/unit<br>2.1 people/unit<br>3.1 people/unit |
| Average Day Demand | 280 L/c/d |
| Maximum Day Demand (MXDY) | Residential: 2.5 x Basic Day (> 500 Persons)<br>MOE Table 3-3 (<500 Persons) |
| Peak Hour Demand (PKHR) | Residential: 2.2 x Max Day (> 500 Persons)<br>MOE Table 3-3 (<500 Persons) |
| **Fire Demand (FF) Design** | **Design Flows** |
| Apartment Building<br>Hydrant spacing | per FUS 2020<br>Within 45m of the building Siamese |
| **System Pressure Criteria Design Parameters** | **Criteria** |
| Maximum Pressure (BSDY) Condition | < 80 psi occupied areas |
| Minimum Pressure (PKHR) Condition | > 40 psi |
| Minimum Pressure (MXDY+FF) Condition | > 20 psi |

### 3.2 Fire Demand

The required fire demand was calculated using the Fire Underwriters Survey 2020 (FUS) Guidelines and City of Ottawa ITSB-2014-02. Through correspondence with the Architect, it is understood that the proposed buildings are residential occupancy (Limited Combustible) and are composed of wood frame construction. The building will have an adequately designed fire system as per NFPA 13, complete with a standard water supply, a fully supervised system and 100% sprinkler coverage. Due to the size and combustible nature of the proposed building A and B a firewall is provided to split the building to lower the required fire demand to achievable levels. Correspondence with the Architect is included in **Appendix B** for reference.

### 3.3 Water Demand

The water demand and fire flow calculations are provided in **Appendix B** for reference. A summary of the water demand and required fire flow is provided in **Table 3.2**.

**Table 3.2: Domestic Water Demand Summary**

| Building | Population | Ave. Daily Demand (L/s) | Max. Daily Demand (L/s) | Peak Hour Demand (L/s) | Fire Flow (L/s) |
|---|---|---|---|---|---|
| A | 221.30 | 0.72 | 1.79 | 3.94 | 283 |
| B | 265.20 | 0.86 | 2.15 | 4.73 | 250 |
| C | 145.70 | 0.47 | 1.18 | 2.60 | 200 |
| **Total** | **632.2** | **2.05** | **5.12** | **11.27** | |

The proposed development demand exceeds 50 residential units and thus, will need to be serviced with two (2) services separated by an isolation valve. The proposed development will be serviced by an on-site private watermain that will connect to the municipal watermain within the Derreen Avenue right-of-way at two (2) locations to provide redundancy.

Additionally, the required site fire flow will be provided by three (3) proposed on-site private fire hydrants. All proposed hydrants within proximity of the development are Class AA rating (blue top). As per Appendix I of the Ottawa Water Design Guidelines the fire flow allowance from the existing hydrants was assumed to be as outlined in **Table 3.3**.

**Table 3.3: Maximum Flow to be Considered from a Given Hydrant.**

| Hydrant Class | Distance to building (m) | Contribution to Fire Flow | |
|---|---|---|---|
| | | (L/min) | (L/s) |
| AA | ≤75 | 5700 | 95 |
| | >75and ≥150 | 3800 | 63.33 |
| A | ≤75 | 3800 | 63.33 |
| | >75and ≥150 | 2850 | 47.50 |
| B | ≤75 | 1900 | 31.67 |
| | >75and ≥150 | 1500 | 25.00 |
| C | ≤75 | 800 | 13.33 |
| | >75and ≥150 | 800 | 13.33 |

### 3.4 Water Boundary Conditions

The above water demand information was submitted to the City for boundary conditions from the City's water model. These boundary conditions were used for analyzing the performance of the proposed and existing watermain systems for three theoretical conditions:

1) High Pressure check under Average Day conditions
2) Peak Hour demand
3) Maximum Day + Fire Flow demand.

Refer to **Table 3.4** for a summary of the proposed boundary conditions and hydraulic analysis.

**Table 3.4: Water Boundary Conditions**

| Criteria | Head (m) | Pressure[1] (psi) | Pressure Requirements (psi) |
|---|---|---|---|
| **Connection 1 - Derreen Ave West** | | | |
| Max HGL (Average Day) | 160.6 | 72.80 | < 80psi |
| Min HGL (Peak Hour) | 155.4 | 65.41 | > 40psi |
| Max Day + Fire Flow | 145.8 | 51.76 | > 20psi |
| **Connection 2 - Derreen Ave East** | | | |
| Max HGL (Average Day) | 160.6 | 72.80 | < 80psi |
| Min HGL (Peak Hour) | 155.4 | 65.41 | > 40psi |
| Max Day + Fire Flow | 146.9 | 53.32 | > 20psi |

[1]Pressure based on an elevation of 109.40m

### 3.5 System pressure Modeling and Results

The above boundary conditions were used to create a hydraulic model using EPANET for analyzing the performance of the proposed watermain system for three theoretical conditions: 1) High Pressure check under Average Day conditions, 2) Peak Hour Demand, 3) Maximum Day + Fire Flow Demand. The following **Table 3.5** provides a summary of the results from the hydraulic water model.

**Table 3.5: Water Boundary Conditions and Hydraulic Analysis Summary**

| Condition | Demand (L/s) | Min/Max Allowable Operating Pressures (psi) | Limits of Design Operating Pressures (psi) |
|---|---|---|---|
| High Pressure (Average Day) | 2.03 L/s | 80psi (Max) | 74 psi |
| Maximum Daily Demand and Fire Flow | 288.41 L/s | 20psi (Min) | 33 psi |
| Peak Hour | 11.18 L/s | 40psi (Min) | 66 psi |

Based on the preceding analysis the existing watermain system will provide adequate system pressures and flows to service the proposed development. If required booster pumps will be utilized by the internal mechanical system to ensure adequate pressures to the upper floors. Refer to **Appendix B** for detailed model results.

## 4.0 SANITARY SERVICING

There is an existing 450mm diameter sanitary sewer within the Derreen Avenue right-of-way fronting the proposed site, constructed as part of the 195 Huntmar Subdivision. It is proposed to service the development with a private 200 mm sanitary sewer that will connect to the existing 450 mm sanitary sewer within the Derreen Avenue right-of-way.

### 4.1 Sanitary Design Parameters

Sanitary flows for the proposed development were calculated using criteria from Section 4 of the City of Ottawa Sewer Design Guidelines, and the Ontario Building Code as follows:

**Table 4.1: Sanitary Sewer Design Parameters**

| Design Component | Design Parameter |
|---|---|
| Unit Population:<br>1-Bed Apartments<br>2-bed Apartments<br>3 Bed Apartments | <br>1.4 people/unit<br>2.1 people/unit<br>3.1 people/unit |
| Residential Flow Rate | Design = 280 L/cap/day |
| Residential Peaking Factor | Harmon Equation (min=2.0, max=4.0)<br>Harmon Correction Factor = 0.8m (Design) |
| Extraneous Flow Rate | Design = 0.33 L/s/ha |
| Minimum Pipe Size | 200mm (Res) |
| Minimum Velocity[1] | 0.6 m/s |
| Maximum Velocity | 3.0 m/s |
| Minimum Pipe Cover | 2.0 m (Unless frost protection provided) |

*[1]A minimum gradient of 0.65% is required for any initial sewer run with less than 10 residential connections.*

### 4.2 Proposed Development Flows

The proposed development will have a combination of one (1) bed, two (2) bed and three (3) bed apartments for a total of 304 units and a population of 627 persons. The proposed residential flow for the site was determined to be **6.78 L/s.** The extraneous flows for the **1.59 ha** development was calculated to be **0.53 L/s**. Thus, the peak sanitary flow including infiltration for the development is **7.31 L/s.** Detailed sanitary flow calculations are provided in **Appendix C** for reference.

### 4.3 Anticipated Block 242 Flows

The detailed design of the 195 Huntmar subdivision was completed by DSEL with details provided within the **DSEL Report.** The subdivision design assumed that Block 242 and 243 were to be commercial developments with an anticipated flow rate of commercial demand of **28000 L/ha/day,** with a peaking factor of 1.5 and an extraneous flow of **0.33 L/s/ha**, with an anticipated discharge to the Culdaff sanitary sewer.

Therefore, the flow allotment for the Phase 1 (**0.97 ha)** development was **0.32 L/s** (commercial) and **0.32 l/s** extraneous for a total anticipated flow of **0.78 L/s.**

The remaining **1.59 ha** of Block 242, which is current development, will instead be directed downstream to the existing 450 mm diameter sanitary sewer within the Derreen Avenue right-of-way. The anticipated flow from this portion of the block was previously estimated at **1.30 L/s** during Phase 1 design; however, updated calculations indicate a flow of **7.31 L/s**.

### 4.4 Downstream Capacity

The capacity of the downstream system was reviewed to ensure that there is adequate capacity within the downstream sewers for the proposed development. The proposed development will result in an increase of **6.01 L/s**.

The pipe run (75A-77A) was previously calculated to be at **81.2%** capacity with a flow of **120.83 L/s** including the Phase 1 sanitary flow. Accounting for the new proposed flows directed to the Derreen Avenue sanitary sewer, the revised design flow to the pipe run downstream of the proposed sanitary manhole is approximately **126.16 L/s** corresponding to a capacity utilization of approximately **84.8%**.

Further downstream the pipes within Derreen Avenue ultimately connect to sanitary sewers within Huntmar Drive. A review of all pipes up to the Huntmar Drive connection was performed and the highest pipe capacity utilization was **88.1%.** Detailed sanitary flow calculations are provided in **Appendix C** for reference.

Based on the above analysis, the downstream sewer system has capacity to convey the flows for the proposed development.

## 5.0 STORM SERVICING

There is a 1050 mm diameter storm sewer located within the Derreen Avenue right-of-way fronting the proposed development. There is also a 450 mm diameter storm sewer within Palladium Drive.

As part of the neighboring development a 900 mm diameter service stub was provided from the Culdaff Road sewer to service Block 242. Due to the configuration of the proposed site, it is proposed to service the site with storm sewer connections from the existing sewers in Derreen Avenue. It is also proposed to provide storage during storm events utilizing StormTech chambers under the parking area. Refer to the General Plan of Services drawing (125091-GP) for more details.

The design criteria used in sizing the storm sewers are summarized below in **Table 5.1.**

**Table 5.1: Storm Sewer Design Parameters**

| Parameter | Design Criteria |
|---|---|
| Local Roads | 2 Year Return Period |
| Storm Sewer Design | Rational Method |
| IDF Rainfall Data | Ottawa Sewer Design Guidelines |
| Initial Time of Concentration (Tc) | 10 min |
| Minimum Velocity | 0.8 m/s |
| Maximum Velocity | 3.0 m/s |
| Minimum Diameter | 250 mm |

Refer to **Appendix D** for detailed storm drainage area plans and storm sewer design sheets.

## 5.1 Downstream System

As noted within the Comments to the Committee of Adjustment document that was prepared regarding the severance of Block 242, Plan 4M-1687, dated June 1, 2023:

> *"The existing plans show drainage from Part 3 (2765 Palladium Drive) towards Parts 1 and 2 (425 Culdaff Road). At the time of Site Plan and/or Building Permit, the applicant will be required to regrade Part 3 (2765 Palladium Drive) or provide adequate on-site storm structures to contain drainage within 2765 Palladium Drive and discharge overland flow towards the City's right-of-way. Separate water and sewer connections to the municipal services along Derreen Avenue will also be required."*

The original subdivision design anticipated that the entirety of Block 242 would be directed to the provided storm sewer stub on Culdaff Road. Since the initial design, Block 242 has been severed into two (2) separate parcels: Phase 1 of the development at 425 Culdaff Road (0.97 ha), and the subject site located to the northwest (1.59 ha).

For the Phase 1 development at 425 Culdaff Road, stormwater runoff from approximately **0.62 ha** of the site will be conveyed to the storm sewer within Derreen Avenue, while runoff from the remaining **0.35 ha** will be conveyed to the Culdaff Road storm sewer. Stormwater runoff from the subject site (**1.59 ha**) will be directed to the storm sewer within Derreen Avenue.

The capacity of the existing system downstream of the proposed connections up to the existing SWM pond was reviewed to assess the impacts. The existing pipe runs (STMMH 81-83 and STMMH 83-84) adjacent to the site were previously utilizing **58%** and **60%** of the available pipe capacity. With the revised design, the pipes will flow at **83.7%** and **79.7%** capacity. The increase in utilization is still below the pipe capacity, and the system will continue to function as designed.

Please refer to **Appendix D** for report excerpts and storm sewer design sheets.

## 6.0 STORM DRAINAGE AND STORMWATER MANAGEMENT

The stormwater management strategy for the site is based on the established criteria from the City of Ottawa, the **DSEL Report** and the **JFSA Report**.

### 6.1 Design Criteria

The following stormwater management criteria for the proposed development were prepared in accordance with the City of Ottawa Sewer Design Guidelines (December 2025), Technical Bulletins, correspondence with the City of Ottawa, the **DSEL Report**, the **JFSA Report** and our knowledge of development requirements in the area.

*Minor System (Storm Sewers)*

- Control proposed development flows, up to and including the 100-year storm event, to an allowable release rate based on a 2-year storm with a C=0.8.
- Runoff from a 5mm rainfall shall be retained on site to meet retention requirements per the City of Ottawa's Feedmill Creek SWM Criteria Study.

*Major System*

- Provide on-site storage for storm runoff which exceeds the allowable minor system release rate from the site up to and including the 100-year design event;
- Ponding depths are not to exceed 0.35 m (static + dynamic) and are not to be within 0.30 m (vertical) to the nearest building opening;
- No surface ponding for storms up to and including the 2-year event.

*Quality Control*

- The downstream Pond 7 is designed to provide 80% TSS from the minor system. Additional stormwater quality treatment is not required.
- Provide guidelines to ensure that site preparation and construction is in accordance with the current Best Management Practices for Erosion and Sediment Control.

### 6.2 Allowable Release Rate

Based on the design parameters, the allowable release rate for the **1.59 ha** site is **272.2 L/s.** The design approach for stormwater quantity control is to calculate the flows from the uncontrolled areas and provide sufficient on-site storage in the controlled areas to attenuate the total post-development runoff (controlled and uncontrolled) to the allowable release rate prior to being discharged into the storm sewers within Derreen Avenue.

### 6.3 Stormwater Management Modeling

The City of Ottawa Sewer Design Guidelines (December 2025) requires hydrologic / hydraulic modeling for all dual drainage systems. The performance of the proposed storm drainage system was evaluated using the PCSWMM hydrologic / hydraulic model. The results of the analysis were used to:

- Determine the total runoff from the site (peak flow and runoff volume) for the design storm events.
- Size the required inlet control devices (ICDs) to ensure post development flow rates do not exceed the allowable release rates.

- Determine the required underground storage volumes.
- Calculate the storm sewer hydraulic grade line and ponding elevations for the 100-year storm event.

The post-development PCSWMM model schematic and output for the 100-year and stress-test events are provided in **Appendix E**.

**Area A-04, A05, A06, A08, A09, A10**

- Stormwater runoff from the above ground parking area will be conveyed to storm sewers within Derreen Avenue. These flows will be captured by catchbasins and conveyed by the proposed sewers to Derreen Avenue. Inflows to the minor system will be controlled by inlet control devices (ICD) within CB 3, CB 5, and CB 7. The required storage volume will be provided by the catch basin leads between structures and surface storage in the parking area. The surface storage will be limited to a maximum ponding depth of 0.30 m prior to spilling overland to Derreen Avenue.

**Area A-12:**

- Stormwater runoff from this community and snow storage area will be captured by proposed catch basin 10. Inflows to the minor system will be controlled by an inlet control device (ICD) and conveyed to the existing sewers in Derreen Avenue by the proposed private sewer system.

**Area R-02, R-03, R-04, R-06, R-09, R-10**

- Stormwater runoff from the building roofs facing the internal parking area will be captured by downspouts and conveyed directly to proposed storm sewers within the parking area. An ICD will restrict the flows, and an underground StormTech arch chamber system will provide the required storage volume and infiltration. The flows will ultimately be conveyed to the existing sewers in Derreen Avenue. If the system were to ever exceed capacity the flows would be conveyed overland through the proposed parking area to Derreen Avenue. For details on the roof downspouts refer to the mechanical plans.

**Area A-02, A-03, A-13:**

- Stormwater runoff from the underground parking garage accesses will be captured by trench drains located at the bottom of the ramps. The collected runoff will be conveyed through the internal mechanical systems to the private stormwater system, which will ultimately discharge to the municipal storm sewers within the Derreen Avenue right-of-way.

**Area R-05, R-07, R-08, R-11-R-14, A-14-A-17, A-7**

- Stormwater runoff from the Building B roof facing the north-east and Building C roof facing the south-east will be captured by downspouts and conveyed directly to the infiltration trench within the landscaped area. The infiltration trench design includes catchbasin, catchbasin manhole and landscape drain inlets to capture surface water from the landscaped area. An ICD will restrict the flows and promote infiltration prior to discharging to Derreen Avenue. If the capacity of the infiltration system is exceeded, flows would be conveyed overland to Derreen Avenue. Refer to the mechanical plans for details on the roof downspouts.

**Area R-01, A-01**

- Stormwater runoff from the roof of Building A, facing the north-west, will be captured by downspouts and conveyed directly to the infiltration trench within the landscaped area. The infiltration trench will be complete with catchbasin and landscape drain inlets to capture surface water from the landscaped area. An ICD will restrict the flows from the trench and promote infiltration prior to discharging to proposed storm sewer in the parking area. If runoff directed through the system exceeds capacity, flows will be conveyed overland to Derreen Avenue. Refer to the mechanical plans for details on the roof downspouts.

**Area D-01**

- Stormwater runoff from a small portion of the parking area and boulevard will be captured by the existing catchbasin installed as part of the Phase 1 development. The catch basin will be uncontrolled thus the additional flow will not impact the SWM design.

### 6.3.1 PCSWMM Model Parameters

*Design Storms*

The model uses the 6-hour Chicago Storm Distribution (10-minute time step) derived from the City of Ottawa IDF data presented in the City of Ottawa Sewer Design Guidelines (December 2025):

The 6-hour Chicago distribution generates the highest peak flows for both the minor and major systems and was determined to be the critical storm distribution for the design of the storm drainage system.

The proposed drainage system has also been stress tested using a 6-hour Chicago design storm that has a 20% higher intensity and total volume compared to the 100-year event.

*Modelling Parameters*

The hydrologic parameters for each subcatchment were developed based on the proposed land use and grading. Subcatchments were modeled using the standard SWMM5 runoff module with Horton's Equation for infiltration.

*PCSWMM Model Schematic, Output Data and Modeling Files*

The PCSWMM model schematic and output data for the 100-year and stress-test design events are provided in **Appendix E**. Digital versions of the PCSWMM modeling files have been provided with the submission package.

*Impervious Values*

Runoff coefficients for each subcatchment area were determined based on the proposed site plan. Refer to the Stormwater Management Plan (**Drawing 125091-SWM**) for details. Percent impervious values were calculated using the following formula:

$$\%imp = \frac{C - 0.2}{0.7}$$

*Subcatchment Areas*

For modeling purposes, the site has been divided into subcatchments based on the drainage areas tributary to each inlet of the existing and proposed storm sewer systems. The subcatchment areas are shown on the Stormwater Management Area Plan (**Drawing 125091-SWM**).

The site has been divided into thirty-one (31) drainage areas for the post-development condition. The hydrologic modeling parameters for each subcatchment were developed based on the Site Plan **(Figure 2**) and the Stormwater Management Plan specified above. Subcatchment parameters are provided in **Table 6.1**. The building roof is sloped and has no storage.

**Table 6.1: Subcatchment Parameters**

| Area ID | Catchment Area (ha) | Runoff Coefficient (C) | Percent Impervious (%) | Zero-Imperv. (%) | Flow Length (m) | Average Slope (%) |
|---|---|---|---|---|---|---|
| A-01 | 0.061 | 0.24 | 6% | 0% | 4 | 2.50 |
| A-02 | 0.021 | 0.90 | 100% | 0% | 8 | 2.00 |
| A-03 | 0.025 | 0.86 | 94% | 0% | 9 | 2.00 |
| A-04 | 0.148 | 0.81 | 87% | 0% | 18 | 2.50 |
| A-05 | 0.119 | 0.83 | 90% | 0% | 17 | 2.50 |
| A-06 | 0.099 | 0.84 | 91% | 0% | 16 | 2.50 |
| A-07 | 0.116 | 0.23 | 4% | 0% | 9 | 6.00 |
| A-08 | 0.147 | 0.82 | 89% | 0% | 21 | 2.00 |
| A-09 | 0.130 | 0.83 | 90% | 0% | 17 | 2.00 |
| A-10 | 0.082 | 0.80 | 86% | 0% | 14 | 2.50 |
| A-12 | 0.032 | 0.36 | 23% | 0% | 9 | 2.50 |
| A-13 | 0.036 | 0.83 | 90% | 0% | 13 | 2.00 |
| A-14 | 0.035 | 0.25 | 7% | 0% | 12 | 11.00 |
| A-15 | 0.019 | 0.22 | 3% | 0% | 3 | 20.00 |
| A-16 | 0.006 | 0.38 | 26% | 0% | 1 | 9.00 |
| A-17 | 0.007 | 0.32 | 17% | 0% | 1 | 3.50 |
| D-01 | 0.006 | 0.47 | 39% | 0% | 4 | 3.50 |
| R-01 | 0.090 | 0.90 | 100% | 100% | 10 | 3.00 |
| R-02 | 0.050 | 0.90 | 100% | 100% | 9 | 3.00 |
| R-03 | 0.039 | 0.90 | 100% | 100% | 10 | 3.00 |
| R-04 | 0.031 | 0.90 | 100% | 100% | 10 | 3.00 |
| R-05 | 0.070 | 0.90 | 100% | 100% | 10 | 3.00 |
| R-06 | 0.057 | 0.90 | 100% | 100% | 10 | 3.00 |
| R-07 | 0.031 | 0.90 | 100% | 100% | 9 | 3.00 |
| R-08 | 0.019 | 0.90 | 100% | 100% | 9 | 3.00 |
| R-09 | 0.041 | 0.90 | 100% | 100% | 9 | 3.00 |
| R-10 | 0.017 | 0.90 | 100% | 100% | 10 | 3.00 |
| R-11 | 0.017 | 0.90 | 100% | 100% | 9 | 3.00 |
| R-12 | 0.010 | 0.90 | 100% | 100% | 9 | 3.00 |
| R-13 | 0.023 | 0.90 | 100% | 100% | 9 | 3.00 |
| R-14 | 0.008 | 0.90 | 100% | 100% | 9 | 3.00 |

*Infiltration*

Infiltration losses for all catchment areas were modeled using Horton's infiltration equation, which defines the infiltration capacity of soil over the duration of a precipitation event using a decay function that ranges from an initial maximum infiltration rate to a minimum rate as the storm progresses. The default values as specified in the Sewer Design Guidelines were used for all catchments.

Horton's Equation:
$f(t) = f_c + (f_o - f_c)e^{-k(t)}$

Initial infiltration rate: $f_o$ = 76.2 mm/hr
Final infiltration rate: $f_c$ = 13.2 mm/hr
Decay Coefficient: k = 4.14/hr

*Depression Storage*

The default values for depression storage provided in the Ottawa Sewer Design Guidelines were used for all catchments. Rooftops were assumed to provide no depression storage (zero-impervious parameter).

| | |
|---|---|
| Depression Storage (pervious areas): | 4.67 mm |
| Depression Storage (impervious areas): | 1.57 mm |

*Subarea Routing*

Subarea routing for all subcatchments is set to "outlet" for all catchment areas.

*Equivalent Width*

The equivalent width parameter for all subcatchments is based on the measured flow length. Flow lengths were digitized in PCSWMM as described in Section 5.4.5.6 of the City of Ottawa Sewer Design Guidelines (December 2025).

*Inlet Control Devices*

Proposed inlet control devices (ICDs) are represented in the model as circular orifices. ICD information is indicated on the General Plan of Services (**Drawing 125091-GP**).

*Storage Rating Curves (Surface Ponding)*

The storage curves for ponding in the parking lot were calculated based on the Grading Plan (**Drawing 125091-GR**).

*Infiltration Trench Conduits*

Storage below the perforated pipes was not accounted for in the model to provide a more conservative approach as blockages beneath the trenches may occur resulting in no infiltration below the system. Infiltration trench storage beside and above the perforated pipes has been accounted for in the modeling using an equivalent width and assuming 30% porosity in the clearstone layer.

*Minor System Conduits (Bend / Exit Losses)*

The minor system network was created in Civil3D and imported into PCSWMM. The following exit losses have been inputted into the model. They represent the loss coefficient based on the bend angle, as per the Appendix 6-B in the City of Ottawa Sewer Design Guidelines (December 2025).

| Bend Angle | Loss Coefficient |
|---|---|
| 0 | 0.00 |
| 15 | 0.09 |
| 30 | 0.21 |
| 45 | 0.39 |
| 60 | 0.64 |
| 75 | 0.96 |
| 90 | 1.32 |

*Downstream Boundary Conditions (Outfalls)*

The 100-year Hydraulic Grade Line (HGL) elevations for the existing off-site storm sewer systems are indicated within the **JSFA Report** (refer to profiles provided in **Appendix D)**. The 100-year HGL at the proposed storm sewer outlet connecting to Derreen Avenue is **106.032 m**. This elevation has been used for both the 100-year and stress-test events. A 'normal' boundary condition is used for the 2-year and 5-year events.

### 6.3.2 Stormwater Quantity Control

Quantity control storage will be required to meet the allowable release rates for the site. The proposed building will have a pitched roof and will not provide any storage. As such, the required quantity control storage will be provided using a combination of surface and underground storage consisting of:

- StormTech chambers below the parking area in front of the proposed building
- Clearstone infiltration trenches along the rear perimeter of the building.
- Surface storage in the parking lot.

These storage elements have been represented in the PCSWMM model and summarized in the following sections.

*Groundwater Elevations*

The geotechnical investigation revealed no groundwater present at the time of testing in any of the installed boreholes. Therefore, it is anticipated that the elevations of the proposed underground storage systems will be above the groundwater table so this will not affect the available storage capacity.

*StormTech Chambers*

Underground storage will be provided in three different locations below the parking area using StormTech SC-800 arch-type chambers. They will be installed upstream of the ICDs on MH207, MH214, and MH220. The StormTech chambers will provide a total of **91.7** $m^3$ of underground storage as summarized in **Table 6.2**. Refer to **Drawing 125091-GP** for the proposed layout.

**Table 6.2: Underground Storage (StormTech Chambers)**

| Location | Chamber Model | No. of Chambers | Available Storage ($m^3$)* |
|---|---|---|---|
| MH207 | SC-800 | 9 | 34.0 |
| MH214 | | 9 | 34.0 |
| MH220 | | 6 | 23.7 |

*Includes 152 mm of stone above and 600 mm below the chambers assuming a void ratio of 40%

*Infiltration Trenches*

Infiltration trenches will be used to store runoff and promote infiltration from the rear yards and rear building rooftops. The infiltration system will consist of two separate trenches, one along the northern perimeter behind building A and the other along the perimeters of building B and C. Inlet control devices (ICDs) will be installed at the downstream end of each trench to promote storage in the infiltration trenches and control flows to the Derreen Avenue storm sewer.

The infiltration trenches will consist of 250 mm perforated pipes surrounded by clearstone wrapped in geotextile. The rainwater leaders from the rear of the building will connect directly to the 250 mm perforated pipe. A series of catchbasins and CBMH structures will collect surface runoff from the rearyard areas and direct it into the infiltration trenches. The layout of the infiltration trenches is shown on the General Plan of Services (**125091-GP**). The cross-section is shown on the Notes and Details (**125091-ND**).

The clearstone trenches will have dimensions of 1.25 m wide x 0.85 m deep. The clearstone will have a porosity of approximately 30%. To promote infiltration, the 250mm perforated pipes will be installed 0.30 m above the bottom of the clearstone. The infiltration storage below the bottom of the pipes is not accounted for in the model, so the active depth of the trenches is 0.55 m. The infiltration trench sections are represented in the model using an equivalent width of 0.35 m (1.25 m width x 30% porosity minus the cross-sectional area of the perforated pipe) to accurately reflect the storage volume provided. The model does not account for storage below the perforated pipe and does not simulate infiltration from the trenches.

The proposed infiltration trenches will provide a total active storage volume of 59.5 $m^3$ above the invert of the 250 mm perforated pipe as summarized in **Table 6.3**.

**Table 6.3: Underground Storage (Infiltration Trenches)**

| MH to MH (U/S to D/S) | Trench Dimensions | | | | | Storage Volumes ($m^3$) | | |
|---|---|---|---|---|---|---|---|---|
| | Pipe Dia. (mm) | Length (m) | Height (m) | Width (m) | Porosity | Perf. Pipe | Stone* | TOTAL |
| ***North Trench*** | | | | | | | | |
| LD1001 - CB1 | 250 | 68.295 | 0.55 | 1.25 | 0.3 | 1.1 | 13.8 | 14.9 |
| **Total Length (North) =** | | **69.1** | | | | | **Total Storage (North) =** | **14.9** |
| ***South Trench*** | | | | | | | | |
| LD1001-CB 8 | 250 | 49.745 | 0.55 | 1.25 | 0.3 | 1.1 | 9.9 | 11.0 |
| CB 8-CB 9 | 250 | 31.59 | 0.55 | 1.25 | 0.3 | 1.1 | 6.2 | 7.3 |
| CB 9 -CBMH 225 | 250 | 39.945 | 0.55 | 1.25 | 0.3 | 1.1 | 7.9 | 9.0 |
| CBMH 225-CBMH 224 | 250 | 15.7 | 0.55 | 1.25 | 0.3 | 1.1 | 2.9 | 4.0 |
| CBMH 224-CBMH 223 | 251 | 30.8 | 0.55 | 1.25 | 0.3 | 1.1 | 6.0 | 7.1 |
| CBMH223 - CBMH222 | 250 | 26.3 | 0.55 | 1.25 | 0.3 | 1.1 | 5.1 | 6.2 |
| **Total Length (South) =** | | **194.08** | | | | | **Total Storage (South) =** | **44.6** |
| ***Total Length (North + South) =*** | | ***263.18*** | | | | | ***Total Active Storage (North & South) =*** | ***59.5*** |

** Based on 30% porosity in the clear stone*

*Surface Storage*

Storage nodes in PCSWMM are used to simulate the available surface storage volume in the parking lot. The stage-storage curves are generated using Civil3D and then imported into PCSWMM. Storm events up to 2-year will be stored underground, ensuring there is no surface ponding within the parking area. Refer to **Section 6.4.2** for additional details.

### 6.3.3 Inlet Control Devices

All the catchbasins in the parking areas and roadway are located at low points. Inflows to the storm sewer are based on the ICD specified for the inlet and the maximum depth of ponding. ICDs have been sized to limit the ultimate outlet peak flows to the allowable release rate of **272.2 L/s**.

ICDs have been installed in the downstream catchbasin maintenance hole to limit peak flows from the upstream series of inlets, as well as take advantage of the storage provided by the upstream storm sewers.

The ICDs have been sized to ensure that surface ponding under 100-year and stress test storm events are lower than 0.35 m. Standard City of Ottawa ICD sizes and Tempest LMF ICDs have been used. ICD sizes and design flows are provided in **Table 6.4**.

**Table 6.4: Inlet Control Devices**

| Structure ID | ICD Data | | | 2-year Event(1) | | | 100-year Event(1) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Diameter (mm) | Invert | C/L Elevation | Max HGL (m) | Head (m) | ICD Flow Rate (L/s) | Max HGL (m) | Head (m) | ICD Flow Rate (L/s) |
| ***Parking Lot Area (Pipes & Stormtech Chambers)*** | | | | | | | | | |
| CB10 | 83 | 107.40 | 107.44 | 107.46 | 0.02 | **1.9** | 108.17 | 0.73 | **12.5** |
| CB3 | 152 | 107.00 | 107.08 | 108.31 | 1.23 | **54.7** | 108.63 | 1.55 | **59.3** |
| CB5 | 152 | 107.13 | 107.21 | 108.16 | 0.95 | **47.9** | 108.62 | 1.41 | **58.2** |
| CB7 | 127 | 107.19 | 107.25 | 108.26 | 1.01 | **34.3** | 108.72 | 1.47 | **41.4** |
| MH207 | LMF105 | 106.48 | 106.53 | 106.85 | 0.32 | **5.6** | 107.39 | 0.86 | **9.3** |
| MH214 | LMF105 | 106.62 | 106.67 | 106.99 | 0.32 | **5.7** | 107.50 | 0.83 | **9.1** |
| MH220 | LMF100 | 106.18 | 106.23 | 106.49 | 0.26 | **4.6** | 106.95 | 0.72 | **7.7** |
| ***Rearyard Area (Infiltration Trenches)*** | | | | | | | | | |
| CB1 | 83 | 106.66 | 106.70 | 107.14 | 0.45 | **9.8** | 108.15 | 1.46 | **17.7** |
| CBMH222 | 108 | 106.01 | 106.06 | 109.92 | 3.86 | **22.2** | 107.94 | 1.88 | **32.0** |
| | | | | | | | Total Controlled Flow from ICDs = | | **221.0** |

*(1) ICD head is calculated as the difference between the maximum HGL and the centreline elevation of the orifice.*

## 6.4 PCSWMM Model Results

The results of the post-development PCSWMM model demonstrate that the overall stormwater management strategy for the subject site will conform to the stormwater management criteria outlined in this report.

### 6.4.1 Summary of Peak Flows

The PCSWMM model was used to evaluate the performance of the proposed storm servicing and stormwater management strategy and ensure that peak flows are controlled to the 100-year allowable release rate of **272.2 L/s**.

The proposed ICDs have a combined 100-year peak flow rate of **221.0 L/s** (see **Table 6.4**). However, there are three catchment areas representing underground parking entrances that are uncontrolled through internal building services to the proposed minor system. The PCSWMM model calculates the total peak flow (controlled and uncontrolled) at the Derreen Avenue outlet.

**Table 6.5** compares the minor system release rates to the allowable release rate of the downstream storm sewer systems and demonstrates that the total minor system release rate is less than the allowable release rate for all storms up to and including the 100-year event. During the 100-year event, there will be less than a liter per second of direct runoff to Phase 1 from D-01. The allowable minor system release rate will be slightly exceeded during the stress test event due to the increased ponding depths which increases the head on the ICDs.

**Table 6.5: Peak Flow Comparison**

| Outlet | Peak Flow[(1)] (L/s) | | | | Allowable Release Rate (L/s) |
|---|---|---|---|---|---|
| | 2-year | 5-year | 100-year | Stress Test | |
| **Derreen Avenue** | 192.3 | 217.1 | 270.2 | 289.5 | **272.2** |

*[1)] PCSWMM model results for a 6-hour Chicago storm distribution*

### 6.4.2 Major System Summary

A summary of the modelled ponding depths during the 100-year storm and stress-test design events is provided below in **Table 6.6.** There is no surface ponding for the 2-year event. The model results indicate that ponding depths will not exceed 0.3 m during either the 100-year or stress test events.

The proposed SWM design provides sufficient storage to contain all runoff for storms up to and including the 100-year event. During the stress-test event, ponding will be contained within the parking lot areas, the infiltration trench does not exceed capacity, and the only overland flow will be from the small portion of direct runoff back towards Phase 1.

**Table 6.6: Major System Ponding Depths**

| Structure | T/G | Max. Static Ponding (Spill Depth) | | 100yr Event | | Stress-Test Event | |
|---|---|---|---|---|---|---|---|
| | | Elev. | Depth | Elev. | Depth | Elev. | Depth |
| | (m) | (m) | (m) | (m) | (m) | (m) | (m) |
| **Parking Lot** | | | | | | | |
| CB2 | 108.35 | 108.70 | 0.35 | 108.57 | 0 | 108.60 | 0.25 |
| CB3 | 108.35 | 108.65 | 0.30 | 108.54 | 0 | 108.57 | 0.22 |
| CB4 | 108.45 | 108.75 | 0.30 | 108.65 | 0.20 | 108.68 | 0.23 |
| CB5 | 108.45 | 108.73 | 0.28 | 108.62 | 0.17 | 108.65 | 0.20 |
| CB6 | 108.50 | 108.78 | 0.28 | 108.73 | 0.23 | 108.76 | 0.26 |
| CB7 | 108.60 | 108.75 | 0.15 | 108.72 | 0.12 | 108.75 | 0.15 |
| CB10 | 108.60 | 108.75 | 0.15 | 108.17 | 0 | 108.60 | 0 |
| **South Infiltration Trench** | | | | | | | |
| LD1001 | 108.71 | 108.71 | 0.00 | 107.97 | 0 | 108.30 | 0 |
| CB8 | 108.42 | 108.61 | 0.19 | 107.96 | 0 | 108.30 | 0 |
| CB9 | 108.57 | 108.96 | 0.39 | 107.96 | 0 | 108.29 | 0 |
| CBMH225 | 108.40 | 108.62 | 0.22 | 107.96 | 0 | 108.29 | 0 |
| CBMH224 | 108.49 | 108.62 | 0.13 | 107.95 | 0 | 108.28 | 0 |
| LD1002 | 108.60 | 108.69 | 0.09 | 107.95 | 0 | 108.28 | 0 |
| CBMH223 | 108.59 | 108.68 | 0.09 | 107.95 | 0 | 108.28 | 0 |
| LD1003 | 108.65 | 109.00 | 0.35 | 107.94 | 0 | 108.27 | 0 |
| CBMH222 | 108.57 | 108.90 | 0.33 | 107.94 | 0 | 108.27 | 0 |
| **North Infiltration Trench** | | | | | | | |
| LD1000 | 108.83 | 108.83 | 0.00 | 108.16 | 0 | 108.55 | 0 |
| CB1 | 108.70 | 109.00 | 0.30 | 108.16 | 0 | 108.55 | 0 |

## 6.5 Feedmill Creek SWM Study Requirements (5mm Rainfall Retention)

As per the Feedmill Creek Stormwater Management Study the proposed site has a 5 mm retention requirement. Based on the total site area of 1.594 ha, the required retention volume is **79.7 m$^3$**.

The required retention volume will be provided by a combination of depression storage in the parking lot and landscaped areas, as well as subsurface infiltration storage using clearstone below the outlets of the StormTech chambers and the infiltration trench. The proposed design provides a total of **80.8 m$^3$** of retention storage. Refer to **Table 6.7** for details.

**Table 6.7: 5mm Retention (as per Feedmill Creek SWM Study)**

| **Site Infiltration Requirement** | | |
|---|---|---|
| Total Site Area | 1.594 | ha |
| Retention Requirement | 5 | mm |
| **Total Retention Volume Required** | **79.7** | **$m^3$** |

**Depression Storage**

*Depression storage on paved and landscaped areas as per City guidelines.*
*Assume no depression storage on pitched roof or entrance ramp to parking*

| **Land Use** | | **Paved** | **Landscaped** |
|---|---|---|---|
| Area (ha) | | 0.520 | 0.350 |
| Depression Storage (mm) | | 1.57 | 4.67 |
| Depression Storage Vol ($m^3$) | | 8.2 | 16.3 |
| **Total Depression Storage Vol ($m^3$)** | | **24.5** | |

**Infiltration Storage**

*Storage in clearstone layer below Stormtech chambers and infiltration trenches.*

| **Storage Location** | **R-02 & R-03 Chambers** | **R-04 & R-06 Chambers** | **R-09 & R-10 Chambers** | **Trenches** |
|---|---|---|---|---|
| Length (m) | 8.9 | 8.9 | 8.9 | 263.18 |
| Width (m) | 4.7 | 4.7 | 3.3 | 1.25 |
| Depth (m) | 0.6 | 0.6 | 0.6 | 0.3 |
| Porosity | 0.4 | 0.4 | 0.4 | 0.3 |
| Infiltration Rate (mm/hr) | 15 | 15 | 15 | 15 |
| Drawdown Time (hrs) | 40 | 40 | 40 | 20 |
| Volume ($m^3$) | 9.9 | 9.9 | 7.0 | 29.6 |
| **Total Infiltration Vol ($m^3$)** | **57.1** | | | |
| **Total Retention Volume ($m^3$)** Depression + Infiltration Storage | **80.8** | | | |

*Drawdown Times for Infiltration*

Infiltration rates were not provided in the geotechnical report. However, in Phase 1 infiltration rates were determined to be varying between 15 and 97 mm/hr. For design purposes, an infiltration rate of 15 mm/hr was applied to drawdown calculations for the infiltration trenches. The drawdown time for the infiltration trenches is approximately **20 hrs**. The drawdown time for the clearstone below the StormTech chambers is approximately **40 hrs**.

### 6.6 Water Quality Treatment

The downstream Pond 7 has been designed to provide an Enhanced level of stormwater quality treatment (80% TSS removal) for the subject site. Additional stormwater quality treatment measures are not required.

## 7.0 EROSION AND SEDIMENT CONTROL

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

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

Erosion and sediment control measures should be inspected daily and after every rain event to determine maintenance, repair or replacement requirements. Sediments or granulars that enter site sewers shall be removed immediately by the contractor. These measures will be implemented prior to the commencement of construction and maintained in good order until vegetation has been established. Refer to the Erosion and Sediment Control Plan (drawing 125091-ESC) for additional information.

## 8.0 CONCLUSIONS AND RECOMMENDATIONS

*Watermain*

The analysis of the existing and proposed watermain network confirms the following:

- The site will be serviced by two (2) 200mm diameter PVC water services from the existing 300mm diameter watermain within Derreen Avenue.
- There are adequate pressures in the existing watermain infrastructure to meet the required domestic demands for the development.
- There are adequate flows and pressures to service the proposed site fire demand as calculated per the Fire Underwriters Survey (FUS).

*Sanitary Servicing*

The analysis of the existing and proposed sanitary system confirms the following:

- It is proposed to service the development with a 200mm diameter sanitary service from the existing mains within Derreen Avenue.
- It is anticipated there is adequate capacity within the existing sanitary infrastructure to service.

*Stormwater Management*

The following provides a summary of the storm sewer and stormwater management system:

- The proposed storm sewer system is to connect to the existing 1050mm diameter sewer within Derreen Avenue.
- Stormwater quantity control will be provided using a combination of underground and surface storage:
    - Underground storage will be provided using StormTech chambers below the parking area and infiltration trenches along the rear perimeter of the proposed buildings. The design provides sufficient underground storage to ensure no surface ponding for storms up to and including the 2-year event.
    - Surface storage is provided in ponding areas above catchbasins in the parking lot and swales. The site provides sufficient storage to ensure no overland flow leaves the site for storms up to and including the 100-year event.
- Minor system flows will be controlled using inlet control devices (ICDs) installed downstream of the underground storage systems.
- The site has been designed to retain the first 5mm of rainfall using a combination of depression storage and infiltration storage.
- Existing Pond 7 will provide an enhanced level of water quality treatment for the site and no additional water quality treatment is required.

*Erosion and Sediment control*

- Erosion and sediment control measures (i.e. filter fabric, catchbasin inserts, silt fences, etc.) will be implemented prior to construction and are to remain in place until vegetation is established.

## 9.0 CLOSURE

The preceding report is respectfully submitted for review and approval. Please contact the undersigned should you have questions or require additional information.

**NOVATECH**

Prepared by:

Aiden Mallany-Stanley, MASc, EIT.
Engineering Intern | Water Resources

Anthony Mestwarp, P.Eng
Project Manager |Land Development Engineering

Reviewed by:

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

# Appendix A
# Pre - Consultation Meeting Minutes

File No.: PC2025-0222

September 2, 2025

Brad McGregor
Broadstreet Properties
Via email: brad.mcgregor@broadstreet.ca

**Subject:** **Pre-Consultation: Meeting Feedback**
**Proposed Site Plan Control Application – 2765 Palladium Drive**

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on August 21, 2025.

## Pre-Consultation Preliminary Assessment

| | | | | |
|---|---|---|---|---|
| **1** ☐ | **2** ☒ | **3** ☐ | **4** ☐ | **5** ☐ |

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

## Next Steps

1. A review of the proposal and materials submitted for the above-noted pre-consultation has been undertaken. For your next submission, please submit the required Application Form, together with the necessary studies and/or plans to planningcirculations@ottawa.ca, copy (cc:) to the file lead and planning support.

2. In your subsequent pre-consultation or application submission, please ensure that all comments or issues detailed herein are addressed. A detailed cover letter stating how each issue has been addressed is requested with the submission materials. Please coordinate the numbering of your responses within the cover letter with the comment number(s) herein.

3. Please note, if your development proposal changes significantly in scope, design, or density it is recommended that a subsequent pre-consultation application be submitted.

## Supporting Information and Material Requirements

1. The attached **Study and Plan Identification List** outlines the information and material that has been identified, during this phase of pre-consultation, as either required (R) or advised (A) as part of a future complete application submission.

a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.

## Consultation with Technical Agencies

1. You are encouraged to consult with technical agencies early in the development process and throughout the development of your project concept. A list of technical agencies and their contact information is enclosed.

## Planning

Comments:

1. Refer to the comments provided as part of previous pre-con for the site (File No. PC2025-0163) for general comments related to applicable policy and zoning.

2. Coordination with 425 Culdaff Road development

    a. The applicant has an active site plan control application (File No. D07-12-24-0140) on the property directly abutting the subject site to the west, which has been deemed complete and circulated. The applicant was encouraged to coordinate the two developments to create efficiencies between the two developments and allow for the consolidation of accesses, more varied amenity spaces, etc. It is staff's understanding that the applicant intends to proceed with the approval of 425 Culdaff, with the plans as currently shown (does not show changes resulting from coordination with the subject site) as the application is nearing approval, with the intention of updating the plans in the future through either a site plan revision/permission to proceed to align with the comprehensive plan for the site.

    b. Please note that with the approach noted above, the phase 1 site will need to be completely zoning compliant. It will not be considered a phased development at the time of approval, as there is no active development application on the subject site.

3. Site Access

    a. Please remove the secondary access to the site/consolidate it with the access being proposed on phase 1 site. If the two sites are being coordinated and treated as one development, there is no need for two separate accesses along Derreen Avenue.

    b. Only other viable location for a secondary access into site may be on Culdaff may be through the phase 1 development due to traffic medians/proximity to the traffic circle. Applicant is encouraged to consider

site access further before proceeding with the approval of phase 1 if a secondary access into the site is desired.

c. Given the number of users of the proposed site access, consider removing/relocation parking spaces leading up to the driveway to reduce friction /queuing in this area.

4. Parking

   a. It is understood that the minor variance is being sought for resident parking on the site. More information on the minor variance process can be found here.

   b. Staff have concerns with the amount of surface parking being propsoed on the site. Is there an opportunity to increase the site of the undergound parkng garage to accomadate more of the required spaces?

5. Parkland dedication

   a. Refer to the parkland dedication comments in this letter.

   b. Staff have cooncerns about the visibility of the large surface parking lot from the public realm along Derreen Ave as a result of the introduction of a park along the street frontage. Seek opportunities to align the location of outdoor amenity space with the park to create a pleasant sight line from the street and reduce impacts to the public realm.

6. Section 37 requirements / Community Benefits Charge

    a. The former Section 37 regime has been replaced with a "Community Benefits Charge", By-law No. 2022-307, of 4% of the land value. This charge will be required for ALL buildings that are 5 or more storeys and 10 or more units and will be required at the time of building permit unless the development is subject to an existing registered Section 37 agreement. Questions regarding this change can be directed to Ranbir.Singh@ottawa.ca.

Required Applications:

7. A Site Plan Control (Complex) application – more information on process, timelines, fees, etc. can be found here.

**Urban Design**

Comments:

8. An Urban Design Brief is required. Please see attached customized Terms of Reference to guide the preparation.

    a. The Urban Design Brief should be structured by generally following the headings highlighted under Section 3 – Contents of these Terms of Reference.

9. Additional drawings and studies are required as shown on the SPIL. Please follow the terms of references ( Planning application submission information and materials | City of Ottawa) to prepare these drawings and studies. These include:

    a. Site Plan.

    b. Landscape Plan

    c. Building Elevations

    d. Conceptual Floorplans

Preliminary Design Comments:

10. Efforts should be made to consolidate the vehicular access proposed on Derreen Avenue with the Phase 1 development.

11. There is an opportunity to enhance the amenity offerings by consolidating or sharing facilities between the Phase 1 and 2 developments.

12. Like the Phase 1 development, staff are keen to see active entrances along public frontages with walkways and enhanced landscaping.

13. Efforts should be made to green the parking lot to reduce the urban heat island effect. Staff would be willing to support a further parking reduction for the inclusion of trees.

14. Staff are looking to see pedestrian connections between the Phase 1 and 2 developments enhanced.

15. Recognizing that the City is looking for parkland dedication on Phase 2 lands, please endeavor to provide alignment and strong connections between the proposed park and the outdoor amenity area.

16. Parking should be entirely screened from the public realm.

17. Staff look forward to reviewing Building Elevations and a detailed landscape strategy.

Feel free to contact Nader Kadri, Planner III, for follow-up questions.

**Engineering**

Comments:

18. The stormwater management criteria for the subject site are to be based on the following reports:

    a. Design Brief for 2325483 Ontario Ltd., 195 Huntmar Drive, City of Ottawa, Project No.: 12-624, prepared By DSEL dated July 2020, 2nd submission.

    b. Stormwater Management Report for the 195 Huntmar Drive Subdivision to Pond 7, City of Ottawa, Project No.: 12-624, prepared By JFSA dated July 2020, 2nd submission.

19. Flows to the storm sewer in excess of the 2-year storm release rate, up to and including the 100-year storm event, must be detained on site. For events greater than the 100-year storm event, spillage must be directed to the public ROW. Overland flow cannot discharge to neighbouring private property.

20. When underground storage is used, the release rate fluctuates from a maximum peak flow based on maximum head down to a release rate of zero. This difference is large and has a significant impact on storage requirements. We therefore require that an average release rate equal to 50% of the peak allowable rate shall be applied to estimate the required volume. Alternatively, the consultant may choose to use a dynamic computer model.

21. Quality Control: The downstream Pond 7 is designed to treat 80% TSS from the minor system. Additional stormwater quality treatment is not required.

22. Water Balance: Runoff from a 5mm rainfall shall be retained on site through infiltration. All soil assumptions made in the servicing report should be supported by the geotechnical report.

23. The sanitary sewer release rate, for the subject site, is to be in accordance with the following reports:

    a. Design Brief for 2325483 Ontario Ltd., 195 Huntmar Drive, City of Ottawa, Project No.: 12-624, prepared By DSEL dated July 2020, 2nd submission.

24. Any capacity/allotment allocated to the 2765 Palladium Drive property through previously developed and approved reports and/or plans should be appropriately partitioned due to the property being severed.

25. Given that this parcel was anticipated for commercial use in the 195 Huntmar subdivision approval, it is anticipated that the sanitary capacity allocated to this parcel will be exceeded given that a residential use is proposed. The servicing report should identify the proposed sanitary demand and confirm if capacity is available in the downstream sanitary sewer system.

26. New services must be grouped in a common trench to minimize the number of road cuts.

27. A monitoring maintenance hole for storm and sanitary sewers shall be required for all connections from a private sewer to a public sewer. Monitoring maintenance holes should be located in an accessible location on private property near the property line (i.e., not in a parking area).

28. 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 site developments serviced by:

    a. a connection of 150mm or larger or;

    b. when there are two or more private connections to the public watermain

29. The installation of a DMA chamber gives the City the ability to monitor and detect water loss at a subject site. The DMA chamber shall be installed at, or as close to the property line as possible, and shall be as per Standard Detail Drawing W3.3.

30. Residential areas serving 50 or more dwellings shall be connected with a minimum of two watermains, separated by an isolation valve, to avoid the creation of a vulnerable service area.

31. Water Boundary condition requests must include the location of the service (map or plan with connection location(s) indicated) and the expected loads required by the proposed development, including calculations. Please provide the following information:

a. Location of service

b. Type of development

c. The amount of fire flow required (per OBC or FUS).

d. Average daily demand: _l/s.

e. Maximum daily demand: _l/s.

f. Maximum hourly daily demand: _l/s.

32. Grading and Drainage: The proposed development shall follow the approved grading plan as per the 195 Huntmar Drive subdivision approval.

33. An MECP Environmental Compliance Approval will be required for this application unless the proposed development meets the following exemption criteria:

    a. Is designed to service one lot or parcel of land;

    b. Discharges into a storm sewer that is not a combined sewer;

    c. Does not service industrial land or a structure located on industrial land; and

    d. Is not located on industrial land. O.Reg. 525/98, s. 3; O.Reg. 40/15, s. 4.

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

Feel free to contact Julie Candow, Project Manager, for follow-up questions.

**Transportation**

Comments:

35. The two private approaches should be consolidated. If this is not feasible, explore increasing the spacing or restricting the types of movements.

36. Ensure that the development proposal complies with the Right-of-Way protection requirements - See Schedule C16 of the Official Plan.

37. Corner triangles as per OP Annex 1 - Road Classification and Rights-of-Way on the final plan will be required (measure on the property line/ROW protected line; no structure above or below this triangle). The development proponent should protect the corner triangles to accommodate protected intersections per policies 2.1.1 (e) & (f). The City requires the following corner triangles at these locations:

a. Arterial/Arterial, Arterial/Collector, or Collector/Collector: two overlapping 5 metre x 15 metre triangles

b. Arterial/Local, or Collector/Local: a 3 metre x 9 metre triangle, with the longer portion on the higher road segment

c. Local/Local, or Public Lane/Local: a 3 metre x 3 metre triangle

d. ROW and corner triangles must be unincumbered and conveyed at no cost to the City. Note that conveyance of the ROW/corner triangle will be required prior to registration of the SP agreement. Additional information on the conveyance process can be provided upon request.

e. Any requests for exceptions to ROW protection requirements must be discussed with Transportation Planning and concurrence provided by Transportation Planning management.

38. A TIA is warranted, please proceed to **Step 2: TIA Scoping report**. The application will not be deemed complete without Step 2 being submitted at least 14 calendar days prior to a Phase 3 pre-consultation or formal application. A **TIA Strategy report (Step 3)** with the Synchro files will be required at or prior to the formal application. Refer to the City of Ottawa website for the updated TIA process: Transportation Impact Assessment Guidelines | City of Ottawa.

Feel free to contact Mike Giampa, Transportation Project Manager, for follow-up questions.

**Environment**

Comments:

39. There are no triggers for an Environmental Impact Study. An EIS was completed for the subdivision and does not need to be updated; it provides some guidance regarding planting and encourages the use of locally appropriate native species of trees.

40. Bird-Safe Design Guidelines - Please review and incorporate bird safe design elements, where feasible. Some of the risk factors include glass and related design traps such as corner glass and fly-through conditions, ventilation grates and open pipes, landscaping, light pollution. More guidance and solutions are available in the guidelines which can be found here: https://documents.ottawa.ca/sites/documents/files/birdsafedesign_guidelines_en.pdf

41. Please consider if there are features that can be added reduce the urban heat island effect (see OP 10.3). The site has a lot of parking surrounded by buildings which can generate and trap heat. Look for ways to manage this for example, this impact can be reduced by adding large canopy trees on parking islands,

using permeable paving to increase tree rooting areas, using green roofs or vegetation walls, or incorporating building with low heat absorbing materials like white colour roofing material.

Feel free to contact Matthew Hayley, Environmental Planner, for follow-up questions.

**Forestry**

Comments:

42. Tree preservation / Tree Removal

    a. There are no existing trees – a TCR is not required

43. Tree planting requirements for the Landscape Plan

    a. Please ensure all retained trees are shown on the LP
    b. Minimum Setbacks
        i. Maintain 1.5m from sidewalk, MUP/cycle track, water service laterals.
        ii. Maintain 2.5m from curb.
        iii. Coniferous species require a minimum 4.5m setback from curb, sidewalk, or MUP/cycle track/pathway.
    b. Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing, except where otherwise approved in naturalization / afforestation areas.
    c. Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.
    d. Tree specifications
        i. Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
        ii. Maximize the use of large deciduous species wherever possible to maximize future canopy coverage.
    e. Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; if possible, include watering and warranty as described in the specification.
    f. No root barriers, dead-man anchor systems, or planters are permitted.
    g. No tree stakes unless necessary
    h. Hard surface planting
        i. If there are hard surface plantings, a planting detail must be provided.

ii. Curb style planter is highly recommended.

iii. No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.

iv. Trees are to be planted at grade.

i. Soil Volume - Please demonstrate as per the **Landscape Plan Terms of Reference** that the available soil volumes for new plantings will meet or exceed the following:

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

j. Sensitive Marine Clay - Please follow the City's 2017 Tree Planting in Sensitive Marine Clay guidelines.

k. The city requests that consideration be given to planting native species wherever there is a high probability of survival to maturity.

l. Efforts shall be made to provide as much future canopy cover as possible at a site level, through tree planting and tree retention. The Landscape Plan shall show/document that the proposed tree planting and retention will contribute to the City's overall canopy cover over time. Please provide a projection of the future canopy cover for the site to 40 years.

m. Page 7 of the Landscape Plan Terms of Reference requires applicants to submit a digital, georeferenced CAD or GIS file of the final approved LP. Please follow this link to review the submission requirements: https://documents.ottawa.ca/sites/documents/files/landscape_tor_en.pdf . The file can be sent to the Planning Forester or Planning File Lead.

Feel free to contact Mark Richardson, Forester, for follow-up questions.

**Parkland**

Comments:

44. A parkland dedication will be required for this site. This is based on the Parkland Dedication By-law No. 2022-280.

45. The amount of Parkland owing is calculated in the table below. Given that this is a change of use from a commercial to residential use, the previously anticipated 2% parkland dedication calculated at the time of the subdivision of 195 Huntmar Road 4M-1675, has been subtracted from the parkland owning at this time.

| **2765 Palladium Drive Parkland Calculation table** | | | | | |
|---|---|---|---|---|---|
| **Proposed Use** | **Units** | **Gross land area ( sq meters)** | **Parkland Dedication Rate** | **Parkland Dedication (sq meters)** | **Parkland Dedication based on 10% cap** |
| Residential<br><br>Apartments : 3 six story buildings | 306 units | 15,940 sq meters | 1ha per 600 units for land dedication | 306/600 =0.51 hectares 5100 sq meters | Parkland owing is<br><br>1594 sq meters |
| | | 15,940 sq meters | | | Minus 2% previous dedication based on commercial use – 318 sq meters |
| | | | | | Final parkland owing<br><br>1276 meters sq |

46. The parkland owing is 1276 square meters. This park land must be located to have road frontage on Derreen Avenue. The land must be rectangular in shape to allow ease of development. If possible, coordinating the location of the amenity space and the park would be advantageous to maximize the area of open green space on the site. Please refer to the Park and Pathway Manual 2nd edition for further information regarding Design Criteria for a Parkette.

47. The applicant will be required to prepare the park block to a clean and green state in anticipation of further development by the City once included in the city

capital budget. The applicant must provide services to the park block which will include:

a. A 300mm diameter storm sewer and Catch Basin/Manhole at 2m inside the park property line;

b. A 50mm diameter water line complete with water vault chamber at 2m inside the park property line as per city standard details for unit price contracts. Costs for the water vault chamber and water meter, if ultimately required, shall be paid for by the City or be included as part of the maximum park construction budget for the park;

c. 150mm diameter sanitary sewer and Manhole at 2m inside the park property line;

d. A 120/240 volt, 200 ampere single phase hydro service at 2m inside the park property line complete with electrical kiosk for park services as per city standard details for unit price contracts. The Owner is responsible for making all arrangements and coordinating the connection of the new hydro service, including costs and inspections, with the respective electrical agencies.

48. Electrical and water connections (minimum 50mm) are to be connected directly to the street line, including back flow preventors, shutoff valves, water and hydro meters and chambers.

49. A record of site conditions will be required for the park block and remediation of the site if required, will be at the expense of the applicant/owner.

Feel free to contact Diane Emmerson, Parks Planner, for follow-up questions.

**Other**

50. The High-Performance Development Standard (HPDS) is a collection of voluntary and required standards that raise the performance of new building projects to achieve sustainable and resilient design and will be applicable to Site Plan Control and Plan of Subdivision applications.

a. The HPDS was passed by Council on April 13, 2022, but is not in effect at this time, as Council has referred the 2023 HPDS Update Report back to staff with the direction to bring forward an updated report to Committee at a later date. The timing of an updated report to Committee is unknown at this time, and updates will be shared when they are available.

b. Please refer to the HPDS information at ottawa.ca/HPDS for more information.

51. Under the Affordable Housing Community Improvement Plan, a Tax Increment Equivalent Grant (TIEG) program was created to incentivize the development of affordable rental units. It provides a yearly fixed grant for 20 years. The grant helps offset the revenue loss housing providers experience when incorporating affordable units in their developments.

    a. To be eligible for the TIEG program you must meet the following criteria:

        i. the greater of five units OR 15 per cent of the total number of units within the development must be made affordable

        ii. provide a minimum of 15 per cent of each unit type in the development as affordable

        iii. enter into an agreement with the city to ensure the units maintain affordable for a minimum period of 20 years at or below the city-wide average market rent for the entire housing stock based on building form and unit type, as defined by the Canada Mortgage and Housing Corporation

        iv. must apply after a formal Site Plan Control submission, or Building Permit submission for projects not requiring Site Plan Control, and prior to Occupancy Permit issuance

    b. Please refer to the TIEG information *at Affordable housing community improvement plan / Plan d'améliorations communautaires pour le logement abordable for more details or contact the TIEG coordinator via email at affordablehousingcip@ottawa.ca.*

**Submission Requirements and Fees**

1. The attached **Study and Plan Identification List** outlines the information and material that has been identified as either required (R) or advised (A) as part of a future complete application submission.
    a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.
2. All of the above comments or issues should be addressed to ensure the effectiveness of the application submission review.

Should there be any questions, please do not hesitate to contact myself or the contact identified for the above areas / disciplines.

Yours Truly,
Colette Gorni

c.c. Emily Charby, Planner I

Nader Kadri, Planner III, Urban Design
Julie Candow, Infrastructure Project Manager
Alex Polyak, Senior Engineer
Mike Giampa, Transportation Project Manager
Matthew Hayley, Environmental Planner
Mark Richardson, Forester
Diane Emmerson, Parks Planner

TOPOGRAPHIC PLAN OF SURVEY OF

# PART OF BLOCK 242
# REGISTERED PLAN 4M-1687
# CITY OF OTTAWA

*FARLEY, SMITH & DENIS SURVEYING LTD. 2025*

Scale 1: 250

0 2.5 5 7.5 10 12.5 15 20 25 metres

## Metric Note

Distances and/or coordinates on this plan are in metres and can be converted to feet by dividing by 0.3048.

## Distance Note

Distances shown on this plan are ground distances and can be converted to grid distances by multiplying by the combined scale factor of 0.999935.

## Bearing Note

Bearings hereon are grid bearings derived from the Can-Net Real Time Network and are referred to the Central Meridian of MTM Zone 9 (76°30' West Longitude) Nad-83 (Original).

## Elevation Notes

1. Elevations shown are geodetic and are referred to Geodetic Datum CGVD-1928 :1978. (Monument No. 19770882)
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.

## Utility Notes

1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.

## Notes & Legend

| | | |
|---|---|---|
| —□— | Denotes | Survey Monument Planted |
| —■— | " | Survey Monument Found |
| SIB | " | Standard Iron Bar |
| SSIB | " | Short Standard Iron Bar |
| Meas | " | Measured |
| (P1) | " | Plan 4R-35406 |
| SG | " | Stantec Geomatics LTD |
| ○ MH-ST | " | Maintenance Hole (Storm) |
| ○ MH-S | " | Maintenance Hole (Sanitary) |
| ○ MH-T | " | Maintenance Hole (Traffic) |
| ⊖ VC | " | Valve Chamber (Watermain) |
| □ CBI | " | Catch Basin Inlet |
| ⊖ WV | " | Water Valve |
| ◇ FH | " | Fire Hydrant |
| Inv. | " | Invert |
| T/G | " | Top of Grate |
| C/L | " | Centreline |
| NTS | " | Not to Scale |
| M.A.S.S. | " | Metal Anti Slip Strip |
| +65.00 | " | Location of Elevations |
| +65.00 | " | Top of Concrete Curb |
| | " | Property Line |
| | " | Deciduous Tree - The Symbol shown denotes location and trunk diameter only. Size of its' root system/overhead canopy may be smaller/larger than the symbol size depicted on this plan. |

**WARNING** NO PERSON MAY COPY, REPRODUCE, DISTRIBUTE OR ALTER THIS PLAN IN WHOLE OR IN PART WITHOUT THE WRITTEN PERMISSION OF FARLEY, SMITH & DENIS SURVEYING LTD.
© FARLEY, SMITH & DENIS SURVEYING LTD., 2025.

## Surveyor's Certificate

I certify that :

1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the Regulations made under them.
2. The survey was completed on the 25th day of April, 2025.

May 21/25
Date

Daniel Robinson
Ontario Land Surveyor

This plan of survey relates to AOLS Plan Submission Form Number V-98794

*FARLEY, SMITH & DENIS SURVEYING LTD.*

ONTARIO LAND SURVEYORS
CANADA LAND SURVEYORS

Unit 275, 30 COLONNADE ROAD, OTTAWA, ONTARIO K2E 7J6
TEL. (613) 727-8226 E-mail: info@fsdsurveys.ca

FILE No. : 117-25

TOPO 24X36

J:\2025\117-25_2765 Palladium Dr_Derreen ave_topo\Final\117-25 2765 Palladium Dr_BL242 RP4M-1687_Topo_F.dwg

# Appendix B
# Water Servicing

## SITE INFORMATION

| | | | |
|---|---|---|---|
| **PROJECT DESCRIPTION** | 3-MULTIFAMILY RESIDENTIAL APARTMENT (6 STOREY) | | |
| **TOTAL UNITS** | 304 UNITS | | |
| **ROOF TYPE** | GABLE ROOF | | |
| **CIVIC ADDRESS** | 2765 PALLADIUM DRIVE | | |
| **MUNICIPALITY** | CITY OF OTTAWA | | |
| **ZONING** | CM2: MINOR CORRIDOR ZONE 2 | | |
| **LEGAL DESCRIPTION** | Part Block 242, Plan 4M1687, Part 3 on 4R35406 | | |
| **LOT AREA** | 15,940 $m^2$ | 3.94 ACRES | 1.59 HECTARES |
| **DENSITY** | 77.2 DU/ACRE | | |
| **FLOOR SPACE INDEX (FSI)** | 1.74 (2.0 MAX) | | |

## ZONING SUMMARY

| | REQUIRED | | PROPOSED | |
|---|---|---|---|---|
| **MAX. BUILDING HEIGHT** | 18 m | | 18 m | |
| **MIN. FRONT YARD S.B.** | 3.0 | m | 3.0 | m |
| **MIN. REAR YARD S.B.** | 7.5 | m | 7.5 | m |
| **MIN. INTERIOR SIDE YARD S.B.** | 3.0 | m | 3.0 | m |
| **MIN. CORNER SIDE YARD S.B.** | 3.0 | m | 3.0 | m |
| **MIN. LOT AREA** | No minimum | $m^2$ | 15,940 | $m^2$ |
| **MIN. LOT WIDTH** | No minimum | m | 144.63 | m |

## VEHICULAR PARKING

| | REQUIRED | UNITS/AREA | REQUIRED | PROPOSED |
|---|---|---|---|---|
| APARTMENT - REGULAR | 1.2 / UNIT | 304 | 365 | 274 |
| VISITORS | 0.2 / UNIT | 304 | 61 | 61 |
| **TOTAL PARKING STALLS** | | | **426** | ***326** |
| **OTHER PARKING PROVISIONS** | | | | |
| SMALL CAR | MAX 50% | | MAX 158 | 77 |
| ACCESSIBLE TYPE A | | | 5 | 5 |
| ACCESSIBLE TYPE B | | | 5 | 5 |
| EV INSTALLED | | | - | - |
| EV CAPABLE | 25% | 304 | 64 | 64 |

*** PARKING VARIANCE REQUIRED** 269/304 = 0.9

## BICYCLE PARKING

| | RATE | UNITS/AREA | REQUIRED | PROPOSED |
|---|---|---|---|---|
| APARTMENT BUILDING | .75 | 304 | 228 | 230 |
| **TOTAL BICYCLE** | | | **256** | **258** |
| **OTHER BICYCLE PROVISIONS** | | | | |
| INCLUSIVE | 5% ALL SPACES | - | 12 | 12 |
| SHORT TERM | 1 PER 20 DU | 304 | 16 | 16 |

## BUILDING INFORMATION

| BUILDING | STORIES | UNIT # | FOOTPRINT | GROSS BLDG AREA |
|---|---|---|---|---|
| **A** | **6** | **108** | 1,640.62 $m^2$ | 9,843.72 $m^2$ |
| **B** | **6** | **126** | 1,913.83 $m^2$ | 11,482.98 $m^2$ |
| **C** | **6** | **72** | 1,045.58 $m^2$ | 6,341.58 $m^2$ |
| **TOTAL** | | | 4,600.03 $m^2$ | 27,668.28 $m^2$ |

## UNIT BREAKDOWN

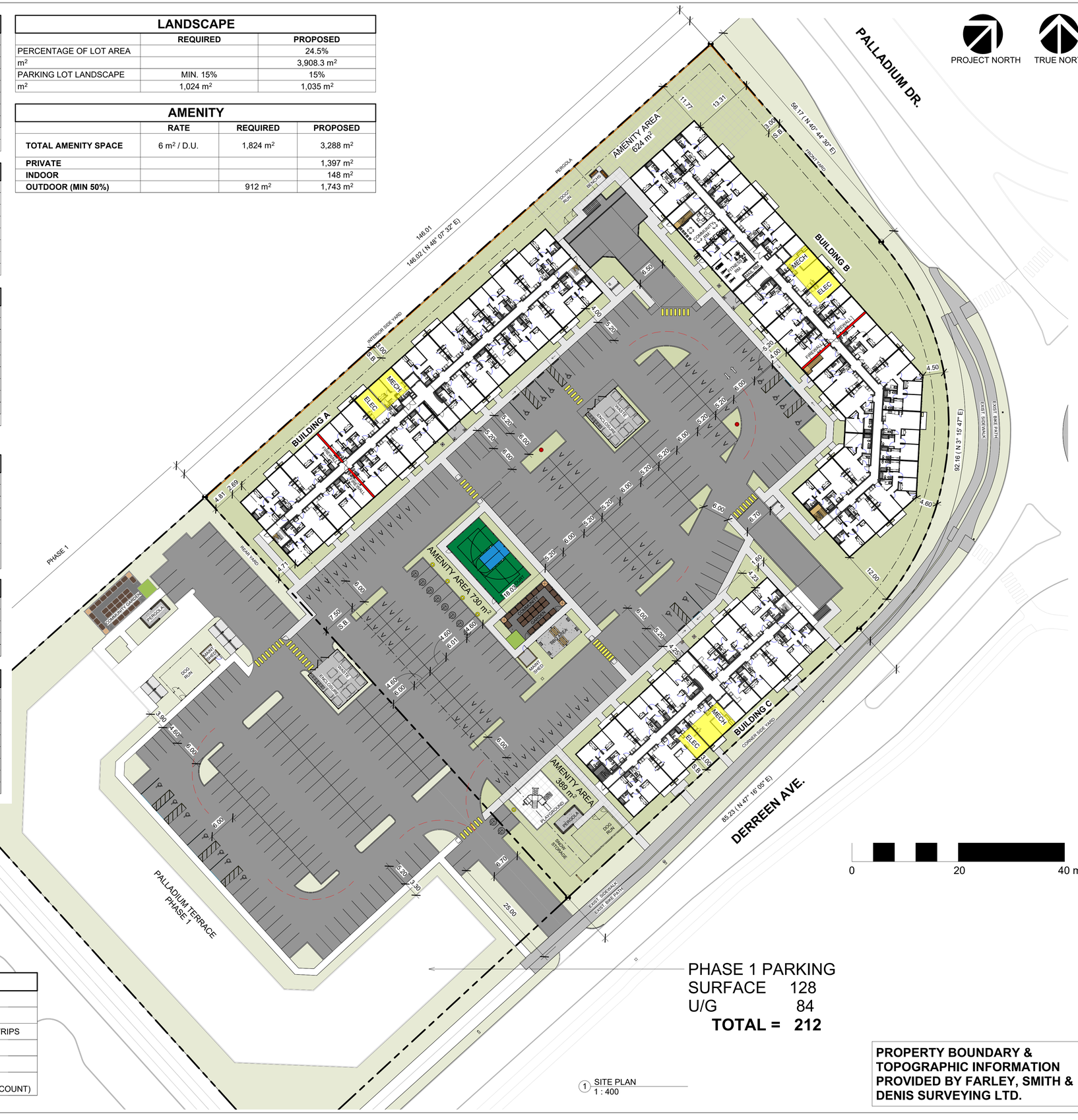
| | BUILDING A | BUILDING B | BUILDING C | | |
|---|---|---|---|---|---|
| | | | | | % |
| **STUDIO** | 12 | 12 | 12 | | 17% |
| **1 BED / 1BATH** | 13 | 31 | 13 | | 18% |
| **2 BED / 1 BATH** | 7 | 6 | 6 | | 8% |
| **2 BED / 2 BATH** | 64 | 45 | 29 | | 40% |
| **3 BED / 2 BATH** | 12 | 30 | 12 | | 17% |
| | 108 | 124 | 72 | | |
| **TOTAL** | **304 UNITS** | | | | |

## LANDSCAPE

| | REQUIRED | PROPOSED |
|---|---|---|
| PERCENTAGE OF LOT AREA | | 24.5% |
| $m^2$ | | 3,908.3 $m^2$ |
| PARKING LOT LANDSCAPE | MIN. 15% | 15% |
| $m^2$ | 1,024 $m^2$ | 1,035 $m^2$ |

## AMENITY

| | RATE | REQUIRED | PROPOSED |
|---|---|---|---|
| **TOTAL AMENITY SPACE** | 6 $m^2$ / D.U. | 1,824 $m^2$ | 3,288 $m^2$ |
| **PRIVATE** | | | 1,397 $m^2$ |
| **INDOOR** | | | 148 $m^2$ |
| **OUTDOOR (MIN 50%)** | | 912 $m^2$ | 1,743 $m^2$ |




PHASE 1 PARKING
SURFACE 128
U/G 84
**TOTAL = 212**

1 SITE PLAN
1 : 400

## LEGEND

| | | | |
|---|---|---|---|
| | PROPERTY LINE | | CHAINLINK FENCE |
| | SETBACK LINE | | LANDSCAPE AREA |
| | BUILDING OUTLINE | | CROSSWALK 1.5 X .45 STRIPS |
| | FIRE HYDRANT | | SIDEWALK LETDOWN |
| | EV CAPABLE CHARGER | | ACCESSIBLE PARKING |
| | WOODEN FENCE | | BIKE PARKING (NUMBER REPRESENTS COUNT) |

**PROPERTY BOUNDARY & TOPOGRAPHIC INFORMATION PROVIDED BY FARLEY, SMITH & DENIS SURVEYING LTD.**


BROADSTREET PROPERTIES LTD.
100 St Anns, Campbell River, B.C.
(T)250.286.8045 (F)250.286.8046
www.broadstreet.ca


SITE MAP:

PROJECT STATUS:

CONCEPT

Revision Schedule

| No. | Description | Revision Date |
|---|---|---|
| A | CONCEPT APPROVED | APR 29, 2025 |
| B | AMENITY REVIEW | JUNE 4, 2025 |
| C | SITE PLAN REVISION | JULY 4, 2025 |
| D | SITE PLAN REVISION - 2 | AUG 11, 2025 |
| E | SITE PLAN REVISION - 3 | NOV 10, 2025 |
| F | SITE PLAN REVISION - 4 | NOV 21, 2025 |
| G | SITE PLAN REVISION -5 | DEC 4, 2025 |
| H | SITE PLAN REVISION - 6 | DEC 15 2025 |
| I | SITE PLAN REVISION - 7 | JAN 26, 2026 |
| J | SITE PLAN REVISION - 8 | MAR 9 2026 |
| K | ISSUED FOR DEVELOPMENT PERMIT | APR 22 2026 |
| L | ISSUED FOR REVIEW | MAY/26/2026 |

SEAL: **ABELE**ARCHITECTURE
THOMAS C. ABELE, ARCHITECT OAA, T: 604 682-6818


TRADE CONTRACTORS SHALL VERIFY ALL DIMENSIONS AND REPORT ANY DISCREPANCIES OR INCONSISTENCIES TO SEYMOUR PACIFIC DEVELOPMENTS LTD., WITHOUT DELAY, FOR CLARIFICATION AND/OR CONFIRMATION. DO NOT SCALE DRAWINGS. DESIGNS REPRESENTED AND DRAWINGS USED AS INSTRUMENTS OF SERVICE SHALL REMAIN THE COPYRIGHT AND PROPERTY OF SEYMOUR PACIFIC DEVELOPMENTS LTD. ANY REPRODUCTION OR USE FOR ANY PURPOSE OTHER THAN THAT AUTHORIZED BY SEYMOUR PACIFIC DEVELOPMENTS LTD. IS PROHIBITED.

CONTRACTORS SHALL REMAIN FAMILIAR WITH, SHALL REFER TO, AND SHALL PERFORM IN ACCORDANCE WITH LOCAL LAWS, REGULATIONS AND BUILDING CODES. CONTRACTORS SHALL MAINTAIN GOOD INDUSTRY BUILDING AND SAFETY PRACTICES CONSISTENT WITH THE CONTRACT INTENT AND THE REQUIREMENTS OF JURISDICTIONAL AUTHORITIES.

ADDITIONAL CLAIMS AND COSTS RELATED TO NON-MATERIAL CHANGES WILL NOT BE ACCEPTED BY SEYMOUR PACIFIC DEVELOPMENTS LTD. NON-MATERIAL CHANGES ARE DEEMED TO BE PLAN CHANGES OR SPECIFICATION ADJUSTMENTS THAT DO NOT SUBSTANTIALLY AFFECT THE VALUE, TIME, COST AND QUALITY OF CONSTRUCTION.

CONTRACTORS SHALL MAKE EVERY REASONABLE EFFORT TO MAINTAIN SCHEDULE TARGETS AND PROVIDE GOOD EFFICIENCY, PROGRESS, WORKMANSHIP AND QUALITY TOWARD DEFICIENCY-FREE RESULTS.


PROJECT NAME:
PALLADIUM TERRACE - PHASE 2

PROJECT NUMBER:
VP 2508

ADDRESS:
2765 PALLADIUM DRIVE
OTTAWA, ON

DRAWING TITLE:
SITE PLAN

| | |
|---|---|
| DRAWN BY: | LM |
| CHECKED BY: | BM |
| DATE: | MAR 9, 2026 |
| SCALE: | As indicated |
| DRAWING #: | A1.00 |
| REV #: | L |

05/29/2026 11:48:06 AM

**From:** Brad McGregor <brad.mcgregor@broadstreet.ca>
**Sent:** Monday, March 2, 2026 1:42 PM
**To:** Anthony Mestwarp <a.mestwarp@novatech-eng.com>; Greg MacDonald <g.Macdonald@novatech-eng.com>; Jeffrey Kelly <j.kelly@novatech-eng.com>
**Cc:** Greg Winters <G.Winters@novatech-eng.com>; Robert Tran <r.tran@novatech-eng.com>; Anjush Musyaju <a.musyaju@novatech-eng.com>; Brad Byvelds <B.Byvelds@novatech-eng.com>; Ming Fang <m.fang@novatech-eng.com>; Nicole Thomson <n.thomson@novatech-eng.com>
**Subject:** RE: 125091 Palladium 2

Hi Anthony,

Please see the attached drawings and responses from the designer on these items:

1. Can you please send the roof plans and downspout locations for the buildings once available.
   See Attached PDF's for roof plans. Downs to be located on all letter grids. Additional Downs on Building B on GL 7 and 8
2. Can you please confirm the water entry and service entry locations, we have preliminary locations indicated on the attached.
   Can the water enter at the side of the building opposite the ramp so that the water meter can be located within the proposed mechanical space? Sanitary service at mid building should be good.
3. Can you confirm the required head room at the bottom of the parking garage access ramps. Presently the ramp for Building C is quite short and may need to be elongated to make the grades work.
   3.05M to top of main floor is typical
4. Can you please send confirmation of the building construction (presently we are assuming the same construction as per palladium I)
   a. Construction material - Type V same as Palladium 1
      i. Type V - Wood frame
      ii. Type IV - Mass Timber
      iii. Type III - Ordinary construction
      iv. Type II - Non-combustible construction
      v. Type I - Fire resistive construction (2 hrs)
   b. Provide confirmation of the building footprint similar to the attached plan prepared for the trinity (122179) site
      BLDG A: Parkade 1,640.6m2, Main Floor: 1,640.6m2, Upper Floors: 1,662.4m2
      BLDG B: Parkade 20,300.3m2, Main Floor: 20,300.3m2, Upper Floors: 20,326.2m2
      BLDG C: Parkade 11,254.5m2, Main Floor: 11,254.5m2, Upper Floors: 11,268.1m2

   c. Sprinkler system design
      i. Adequately Designed System (NFPA 13) NFPA 13
      ii. Standard Water Supply
      iii. Fully Supervised System
      iv. Area of sprinkler coverage (0-100%)

Let me know if you need anything else.

Thanks,

Brad McGregor, (he/him)
*Development Manager*

BROADSTREET PROPERTIES LTD.
SEYMOUR PACIFIC DEVELOPMENTS LTD.
570 Camiel Sys Street, Winnipeg, MB R2J 4K2
**T.** 431.478.0685 | **C.** 431.556.9131
**W.** www.broadstreet.ca | www.seymourpacific.ca

**From:** Anthony Mestwarp <a.mestwarp@novatech-eng.com>
**Sent:** February 27, 2026 3:04 PM
**To:** Greg MacDonald <g.Macdonald@novatech-eng.com>; Brad McGregor <brad.mcgregor@broadstreet.ca>; Jeffrey Kelly <j.kelly@novatech-eng.com>
**Cc:** Greg Winters <G.Winters@novatech-eng.com>; Robert Tran <r.tran@novatech-eng.com>; Anjush Musyaju <a.musyaju@novatech-eng.com>; Brad Byvelds <B.Byvelds@novatech-eng.com>; Ming Fang <m.fang@novatech-eng.com>; Nicole Thomson <n.thomson@novatech-eng.com>
**Subject:** RE: 125091 Palladium 2

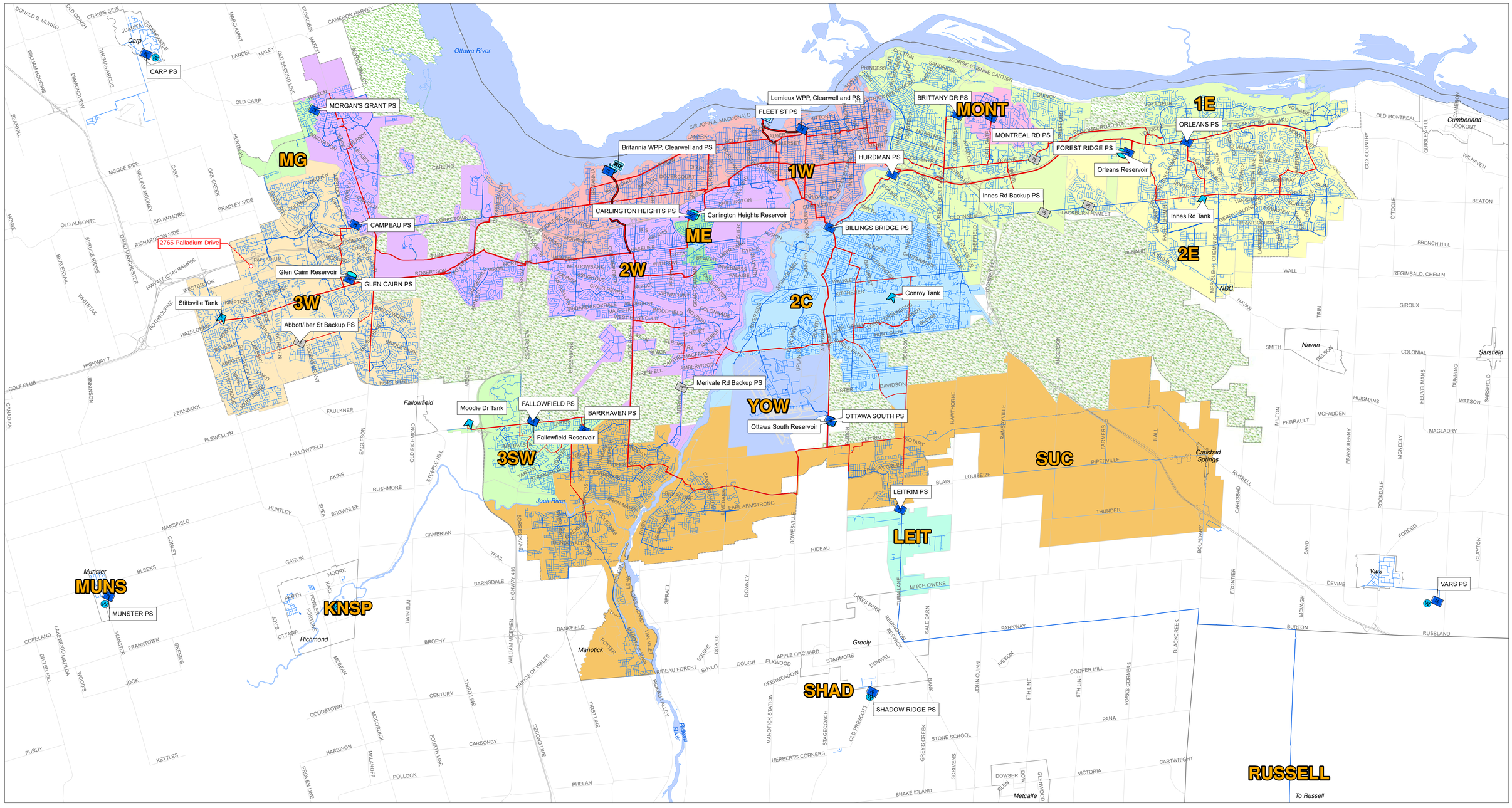
Hi Brad,

I hope you are doing well. Some coordination items for the Palladium II site.

1. Can you please send the roof plans and downspout locations for the buildings once available.
2. Can you please confirm the water entry and service entry locations, we have preliminary locations indicated on the attached.
3. Can you confirm the required head room at the bottom of the parking garage access ramps. Presently the ramp for Building C is quite short and may need to be elongated to make the grades work.
4. Can you please send confirmation of the building construction (presently we are assuming the same construction as per palladium I)
    a. Construction material
        i. Type V - Wood frame
        ii. Type IV - Mass Timber
        iii. Type III - Ordinary construction
        iv. Type II - Non-combustible construction
        v. Type I - Fire resistive construction (2 hrs)
    b. Provide confirmation of the building footprint similar to the attached plan prepared for the trinity (122179) site
    c. Sprinkler system design
        i. Adequately Designed System (NFPA 13)
        ii. Standard Water Supply
        iii. Fully Supervised System
        iv. Area of sprinkler coverage (0-100%)

Thanks,

**Anthony Mestwarp**, P.Eng., Project Manager | Land Development Engineering
**NOVATECH**
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext. 216




## Legend

- Water Purification Plant
- Well
- Clearwell
- Elevated Tank
- Reservoir
- Pump Station (Active)
- Pump Station (Backup)

**Backbone Watermain Diameter**

- 152 mm - 305 mm
- 406 mm - 508 mm
- 610 mm - 914 mm
- 1067 mm - 1372 mm
- 1524 mm - 1981 mm
- 2550 mm

**Distribution Watermain Diameter**

- ≤ 102 mm
- 152 mm - 305 mm
- 356 mm - 508 mm
- 610 mm - 914 mm
- 1372 mm

**Pressure Zones**

- 1E
- 1W
- 2C
- 2E
- 2W
- 3SW
- 3W
- EMR
- LEIT
- ME
- MG
- MONT
- SHADOW RIDGE
- SUC
- YOW
- Greenbelt

# Infrastructure Master Plan - Figure 1-1
## Water Distribution System Backbone Infrastructure

***Notes***

**1.** Coordinate System: NAD 1983 CSRS MTM 9

**2.** Data Sources: Original shapefiles provided by the City of Ottawa; hydraulic model exports.

N

0 5 Kilometers

(At original document size of 24x36)

1:70,000

Ottawa

# Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

## Boundary Condition Request

**Novatech Project #:** 125091
**Project Name:** Palladium Terrace- Phase 2
**Date:** 3/5/2026
**Input By:** Anjush Musyaju, EIT
**Reviewed By:** Anthony Mestwarp, P.Eng
**Drawing Reference:** Site Plan

**Legend:** Input by User | No Input Required | Calculated Cells →

**Reference:** Ottawa Design Guidelines - Water Distribution (2010 and TBs)
MOE Design Guidelines for Drinking-Water Systems (2008)
Fire Underwriter's Survey Guideline (2020)
Ontario Building Code, Part 3 (2012)

**Small System =** NO

| | # of Dwellings | Area (ha.) | Pop. Equiv. | Average Day Demand (L/s) | Maximum Day Demand (L/s) | Peak Hour Demand (L/s) | Basic Day Demand ($m^3$/day) |
|---|---|---|---|---|---|---|---|
| **Residential Input** | | | | | | | |
| Singles | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 |
| Semis / Townhomes | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 |
| Apartments (1-BR)/Studio | 86 | | 120.40 | 0.39 | 0.98 | 2.15 | 33.7 |
| Apartments (2-BR) | 164 | | 344.40 | 1.12 | 2.79 | 6.14 | 96.4 |
| Apartments (3-BR) | 54 | | 167.40 | 0.54 | 1.36 | 2.98 | 46.9 |
| **Industrial / Commercial / Institutional (ICI) Input** | | | | | | | |
| Industrial Area - Light | | | | 0.00 | 0.00 | 0.00 | 0.0 |
| Industrial Area - Heavy | | | | 0.00 | 0.00 | 0.00 | 0.0 |
| Commercial Area | | | | 0.00 | 0.00 | 0.00 | 0.0 |
| Institutional Area | | | | 0.00 | 0.00 | 0.00 | 0.0 |
| Other Area | | | | 0.00 | 0.00 | 0.00 | 0.0 |
| **Totals** | **304** | **0.00** | **632.20** | **2.05** | **5.12** | **11.27** | **177.0** |

### Summary

| | | |
|---|---|---|
| i. Type of Development and Units: | 3- Multifamily Residential Apartment (6 Storey) | |
| ii. Site Address: | 2765 Palladium Drive, Ottawa, ON | |
| iii. Proposed Water Service Connection Location(s): | | |
| iv. Average Day Flow Demand: | 2.05 | L/s |
| v. Peak Hour Flow Demand: | 11.27 | L/s |
| vi. Maximum Day Flow Demand: | 5.12 | L/s |
| vii. Required Fire Flow #1: | 17000 | L/min |
| viii. Required Fire Flow #2: | 15000 | L/min |
| ix. Required Fire Flow #3: | 12000 | L/min |

# Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

## Design Parameters

| Residential | | | | | |
|---|---|---|---|---|---|
| **Unit Type** | **Singles** | **Semis/ Towns** | **Apts (1-BR)** | **Apts (2-BR)** | **Apts (Avg)** |
| **Population Equiv.** | 3.4 | 2.7 | 1.4 | 2.1 | 3.1 |
| **Dailly Demand** | L/per person/day | | | | |
| **Average Demand** | 280 | | | | |
| **Basic Demand** | 280 | | | | |

| **Vulnerable Service Area (VSA)** |
|---|
| 50 |
| < 50 m³/day |
| > 50 m³/day |

| **Residential Peaking Factors** | | **Max Day (x Avg Day)** | **Peak Hour (x Avg Day)** |
|---|---|---|---|
| | **Pop.** | | |
| **Small System (If Applicable)** | 0 | 9.50 | 14.30 |
| | 30 | 9.50 | 14.30 |
| | 150 | 4.90 | 7.40 |
| *Modified* | 300 | 3.60 | *5.50* |
| | 450 | 3.00 | *5.50* |
| | 500 | 2.90 | *5.50* |
| **Large System (Default)** | > 500 | 2.50 | 5.50 |

| **Institutional / Commercial / Industrial** | | | | |
|---|---|---|---|---|
| **Industrial** | | **Commercial** | **Institutional** | **Other Use** |
| **Light** | **Heavy** | | | |
| L/gross ha/day | | | | L/m²/day |
| 35,000 | 55,000 | 28,000 | 28,000 | 5 |
| 10,000 | 17,000 | 17,000 | 17,000 | 3 |

| **ICI Peaking Factors** | **Max Day (x Avg Day)** | **Peak Hour (x Avg Day)** |
|---|---|---|
| | 1.50 | 2.70 |

PALLADIUM TERRACE
PHASE 1

BUILDING A
BUILDING B
BUILDING C

2HR FIREWALL

PERGOLA
DOG RUN
BENCHES
AMENITY AREA
625m²

44.48m
5.82m
20.76m
9.88m
51.37m
69.12m
15.85m
39.48m
31.00m
43.46m

PHASE 1 LIMIT

DERREEN AVENUE
GOULAFF ROAD
MH 200A
MH 78A

## LEGEND

- PROPERTY LINE
- PROPOSED ENTRANCE
- DC — PROPOSED DEPRESSED CURB
- 2HR FIREWALL


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


CITY OF OTTAWA
2765 PALLADIUM DRIVE

FUS SEPARATION

SCALE 1 : 750 (0, 10, 20, 30)
DATE MAR 2026
JOB 125091
FIGURE SEP

SHT11X17.DWG - 279mmX432mm

M:\2025\125091\CAD\Civil\Figures\Servicing\125091-SEP_OVERALL.dwg, SEP-A, Feb 26, 2026 - 2:41pm, amusyaju

# FUS - Fire Flow Calculations

Engineers, Planners & Landscape Architects

**Novatech Project #:** 125091
**Project Name:** Palladium Terrace- Phase 2
**Date:** 3/5/2026
**Input By:** Anjush Musyaju, EIT
**Reviewed By:** Anthony Mestwarp, P.Eng
**Drawing Reference:** 125091-SEP

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

**Building Description:** Multifamily Residential Apartment (6 Storey) -A (NE Side)
**Type V - Wood frame**

| 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 | Yes | 1.5 | 1.5 | |
| | | Type IV - Mass Timber | | Varies | | |
| | | Type III - Ordinary construction | | 1 | | |
| | | Type II - Non-combustible construction | | 0.8 | | |
| | | Type I - Fire resistive construction (2 hrs) | | 0.6 | | |
| 2 | **Floor Area** | | | | | |
| | **A** | Building Footprint ($m^2$) | 1243.22 | | | |
| | | Number of Floors/Storeys | 6 | | | |
| | | Protected Openings (1 hr) if C<1.0 | No | | | |
| | | Area of structure considered ($m^2$) | | | **7,459** | |
| | **F** | **Base fire flow without reductions** | | | | **29,000** |
| | | $F = 220\ C\ (A)^{0.5}$ | | | | |
| **Reductions or Surcharges** | | | | | | |
| 3 | **Occupancy hazard reduction or surcharge** | | **FUS Table 3** | **Reduction/Surcharge** | | |
| | **(1)** | Non-combustible | | -25% | -15% | **24,650** |
| | | 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% | **-12,325** |
| | | Standard Water Supply | Yes | -10% | -10% | |
| | | Fully Supervised System | Yes | -10% | -10% | |
| | | | | **Cumulative Sub-Total** | **-50%** | |
| | | **Area of Sprinklered Coverage ($m^2$)** | 7459.32 | 100% | | |
| | | | | **Cumulative Total** | **-50%** | |
| 5 | **Exposure Surcharge** | | **FUS Table 5** | | **Surcharge** | |
| | **(3)** | North Side | 3.1 - 10 m | | 20% | **4,930** |
| | | East Side | Sprinklered | | 0% | |
| | | South Side | >30m | | 0% | |
| | | West Side | 2Hr Firewall | | 0% | |
| | | | | **Cumulative Total** | **20%** | |
| **Results** | | | | | | |
| 6 | **(1) + (2) + (3)** | **Total Required Fire Flow, rounded to nearest 1000L/min** | | | **L/min** | **17,000** |
| | | (2,000 L/min < Fire Flow < 45,000 L/min) | | or | L/s | **283** |
| | | | | or | USGPM | 4,491 |

# FUS - Fire Flow Calculations

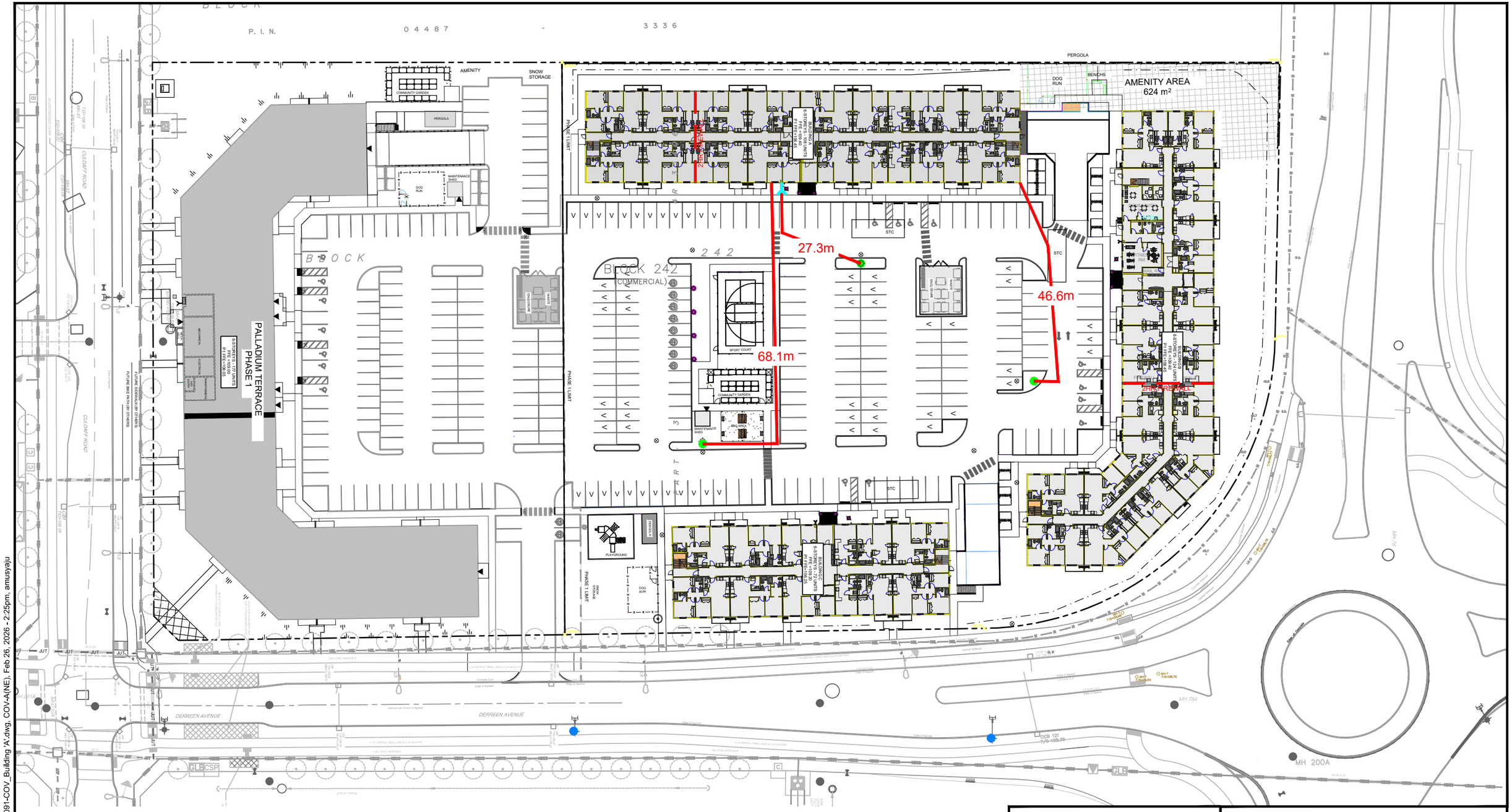
Engineers, Planners & Landscape Architects

**Novatech Project #:** 125091
**Project Name:** Palladium Terrace- Phase 2
**Date:** 3/5/2026
**Input By:** Anjush Musyaju, EIT
**Reviewed By:** Anthony Mestwarp, P.Eng
**Drawing Reference:** 125091-SEP

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

**Building Description:** Multifamily Residential Apartment (6 Storey) -A (SW Side)
**Type V - Wood frame**

| 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 | Yes | 1.5 | 1.5 | |
| | | Type IV - Mass Timber | | Varies | | |
| | | Type III - Ordinary construction | | 1 | | |
| | | Type II - Non-combustible construction | | 0.8 | | |
| | | Type I - Fire resistive construction (2 hrs) | | 0.6 | | |
| 2 | **Floor Area** | | | | | |
| | **A** | Building Footprint ($m^2$) | 419.15 | | | |
| | | Number of Floors/Storeys | 6 | | | |
| | | Protected Openings (1 hr) if C<1.0 | No | | | |
| | | Area of structure considered ($m^2$) | | | **2,515** | |
| | **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% | -15% | **14,450** |
| | | 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% | **-7,225** |
| | | Standard Water Supply | Yes | -10% | -10% | |
| | | Fully Supervised System | Yes | -10% | -10% | |
| | | | | **Cumulative Sub-Total** | **-50%** | |
| | | **Area of Sprinklered Coverage ($m^2$)** | 2514.9 | 100% | | |
| | | | | **Cumulative Total** | **-50%** | |
| 5 | **Exposure Surcharge** | | **FUS Table 5** | | **Surcharge** | |
| | **(3)** | North Side | 3.1 - 10 m | | 20% | **2,890** |
| | | East Side | 2Hr Firewall | | 0% | |
| | | South Side | >30m | | 0% | |
| | | West Side | >30m | | 0% | |
| | | | | **Cumulative Total** | **20%** | |
| **Results** | | | | | | |
| 6 | **(1) + (2) + (3)** | **Total Required Fire Flow, rounded to nearest 1000L/min** | | | **L/min** | **10,000** |
| | | (2,000 L/min < Fire Flow < 45,000 L/min) | | or | L/s | **167** |
| | | | | or | USGPM | 2,642 |




## LEGEND

- PROPERTY LINE
- PROPOSED SIAMESE CONNECTION
- EXISTING CLASS AA HYDRANT
- PROPOSED HYDRANT
- DISTANCE FROM HYDRANT TO SIAMESE CONNECTION/ BUILDING ENTRANCE


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


# CITY OF OTTAWA
# 2765 PALLADIUM DRIVE

## COVERAGE PLAN (A)

SCALE 1 : 750 (0 10 20 30)
DATE MAR 2026
JOB 125091
FIGURE COV-A (NE)

M:\2025\125091\CAD\Civil\Figures\Servicing\125091-COV_Building 'A'.dwg, COV-A(NE), Feb 26, 2026 - 2:25pm, amusyaju

SHT11X17.DWG - 279mmX432mm

# FUS - Fire Flow Calculations

NOVATECH
Engineers, Planners & Landscape Architects

**Novatech Project #:** 125091
**Project Name:** Palladium Terrace- Phase 2
**Date:** 3/5/2026
**Input By:** Anjush Musyaju, EIT
**Reviewed By:** Anthony Mestwarp, P.Eng
**Drawing Reference:** 125091-SEP-B

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

**Building Description:** Multifamily Residential Apartment (6 Storey) -B(NW)
**Type V - Wood frame**

| 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 | Yes | 1.5 | 1.5 | |
| | | Type IV - Mass Timber | | Varies | | |
| | | Type III - Ordinary construction | | 1 | | |
| | | Type II - Non-combustible construction | | 0.8 | | |
| | | Type I - Fire resistive construction (2 hrs) | | 0.6 | | |
| 2 | **Floor Area** | | | | | |
| | **A** | Building Footprint ($m^2$) | 1042.14 | | | |
| | | Number of Floors/Storeys | 6 | | | |
| | | Protected Openings (1 hr) if C<1.0 | No | | | |
| | | Area of structure considered ($m^2$) | | | 6,253 | |
| | **F** | **Base fire flow without reductions** | | | | **26,000** |
| | | **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% | **22,100** |
| | | Limited combustible | Yes | -15% | | |
| | | Combustible | | 0% | | |
| | | Free burning | | 15% | | |
| | | Rapid burning | | 25% | | |
| 4 | **Sprinkler Reduction** | | **FUS Table 4** | **Reduction** | | |
| | **(2)** | Adequately Designed System (NFPA 13) | Yes | -30% | -30% | **-11,050** |
| | | Standard Water Supply | Yes | -10% | -10% | |
| | | Fully Supervised System | Yes | -10% | -10% | |
| | | | | **Cumulative Sub-Total** | **-50%** | |
| | | **Area of Sprinklered Coverage ($m^2$)** | 6252.84 | 100% | | |
| | | | | **Cumulative Total** | **-50%** | |
| 5 | **Exposure Surcharge** | | **FUS Table 5** | | **Surcharge** | |
| | **(3)** | North Side | 3.1 - 10 m | | 20% | **4,420** |
| | | East Side | >30m | | 0% | |
| | | South Side | 2Hr Firewall | | 0% | |
| | | West Side | Sprinklered | | 0% | |
| | | | | **Cumulative Total** | **20%** | |
| **Results** | | | | | | |
| 6 | **(1) + (2) + (3)** | **Total Required Fire Flow, rounded to nearest 1000L/min** | | | **L/min** | **15,000** |
| | | (2,000 L/min < Fire Flow < 45,000 L/min) | | or | L/s | **250** |
| | | | | or | USGPM | 3,963 |

# FUS - Fire Flow Calculations

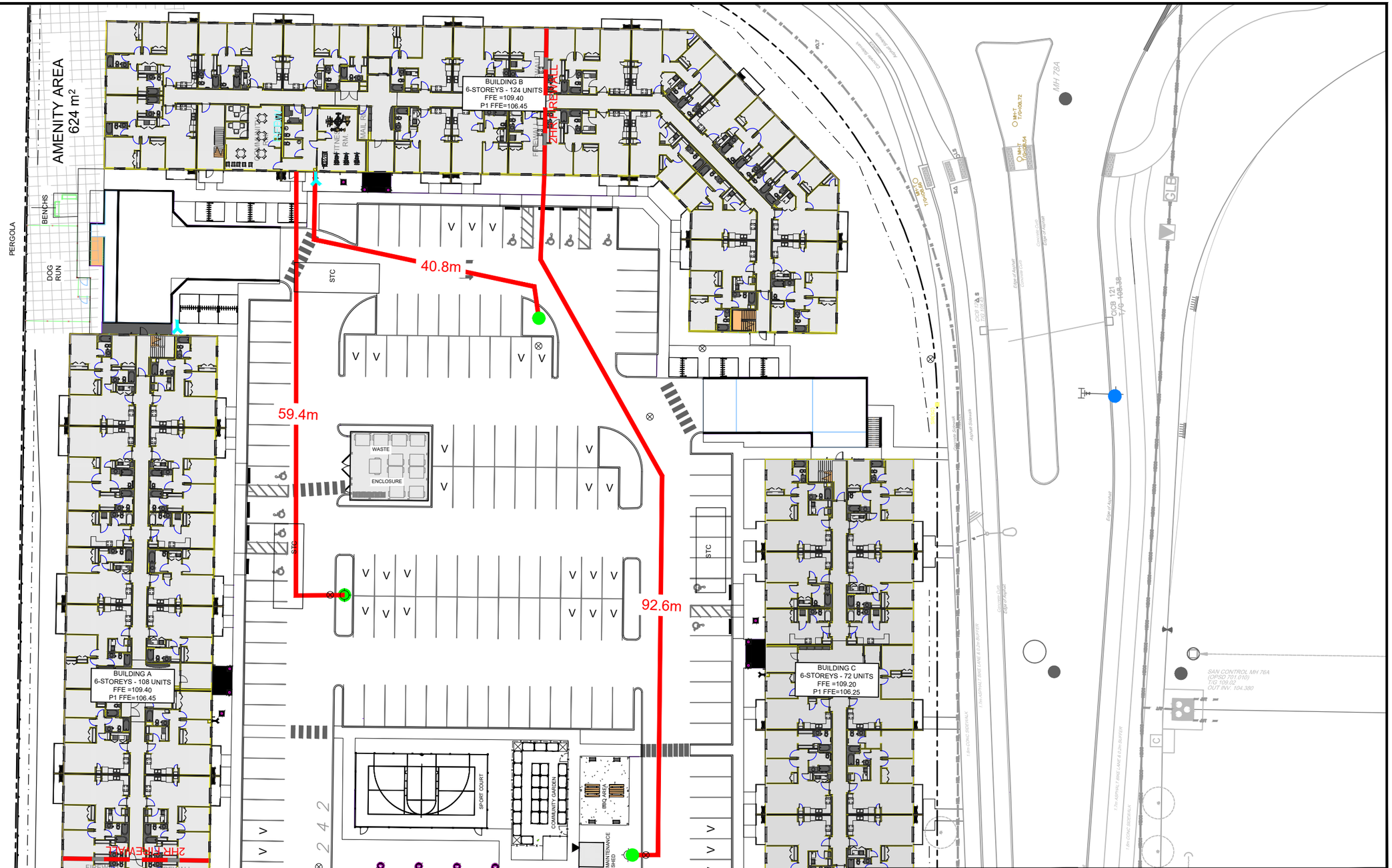
NOVATECH
Engineers, Planners & Landscape Architects

**Novatech Project #:** 125091
**Project Name:** Palladium Terrace- Phase 2
**Date:** 3/5/2026
**Input By:** Anjush Musyaju, EIT
**Reviewed By:** Anthony Mestwarp, P.Eng
**Drawing Reference:** 125091-SEP-B

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

**Building Description:** Multifamily Residential Apartment (6 Storey) -B(SE)
**Type V - Wood frame**

| 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 | Yes | 1.5 | 1.5 | |
| | | Type IV - Mass Timber | | Varies | | |
| | | Type III - Ordinary construction | | 1 | | |
| | | Type II - Non-combustible construction | | 0.8 | | |
| | | Type I - Fire resistive construction (2 hrs) | | 0.6 | | |
| 2 | **Floor Area** | | | | | |
| | **A** | Building Footprint ($m^2$) | 897.49 | | | |
| | | Number of Floors/Storeys | 6 | | | |
| | | Protected Openings (1 hr) if C<1.0 | No | | | |
| | | Area of structure considered ($m^2$) | | | **5,385** | |
| | **F** | **Base fire flow without reductions** | | | | **24,000** |
| | | **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% | **20,400** |
| | | 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% | **-10,200** |
| | | Standard Water Supply | Yes | -10% | -10% | |
| | | Fully Supervised System | Yes | -10% | -10% | |
| | | | | **Cumulative Sub-Total** | **-50%** | |
| | | **Area of Sprinklered Coverage ($m^2$)** | 5384.94 | 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 | Sprinklered | | 0% | |
| | | | | **Cumulative Total** | **0%** | |
| **Results** | | | | | | |
| 6 | **(1) + (2) + (3)** | **Total Required Fire Flow, rounded to nearest 1000L/min** | | | **L/min** | **10,000** |
| | | (2,000 L/min < Fire Flow < 45,000 L/min) | | or | L/s | **167** |
| | | | | or | USGPM | 2,642 |




## LEGEND

- PROPERTY LINE
- PROPOSED SIAMESE CONNECTION
- EXISTING CLASS AA HYDRANT
- PROPOSED HYDRANT
- DISTANCE FROM HYDRANT TO SIAMESE CONNECTION/ BUILDING ENTRANCE


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


# CITY OF OTTAWA
# 2765 PALLADIUM DRIVE

## COVERAGE PLAN (B)

SCALE 1 : 500 (0, 5m, 10m, 20m)

DATE MAR 2026 | JOB 125091 | FIGURE COV-B (NW)


M:\2025\125091\CAD\CivilFigures\Servicing\125091-COV_Building 'B'.dwg, COV-B(NW), Feb 26, 2026 - 2:27pm, amusyalu


SHT11X17.DWG - 279mmX432mm

# FUS - Fire Flow Calculations

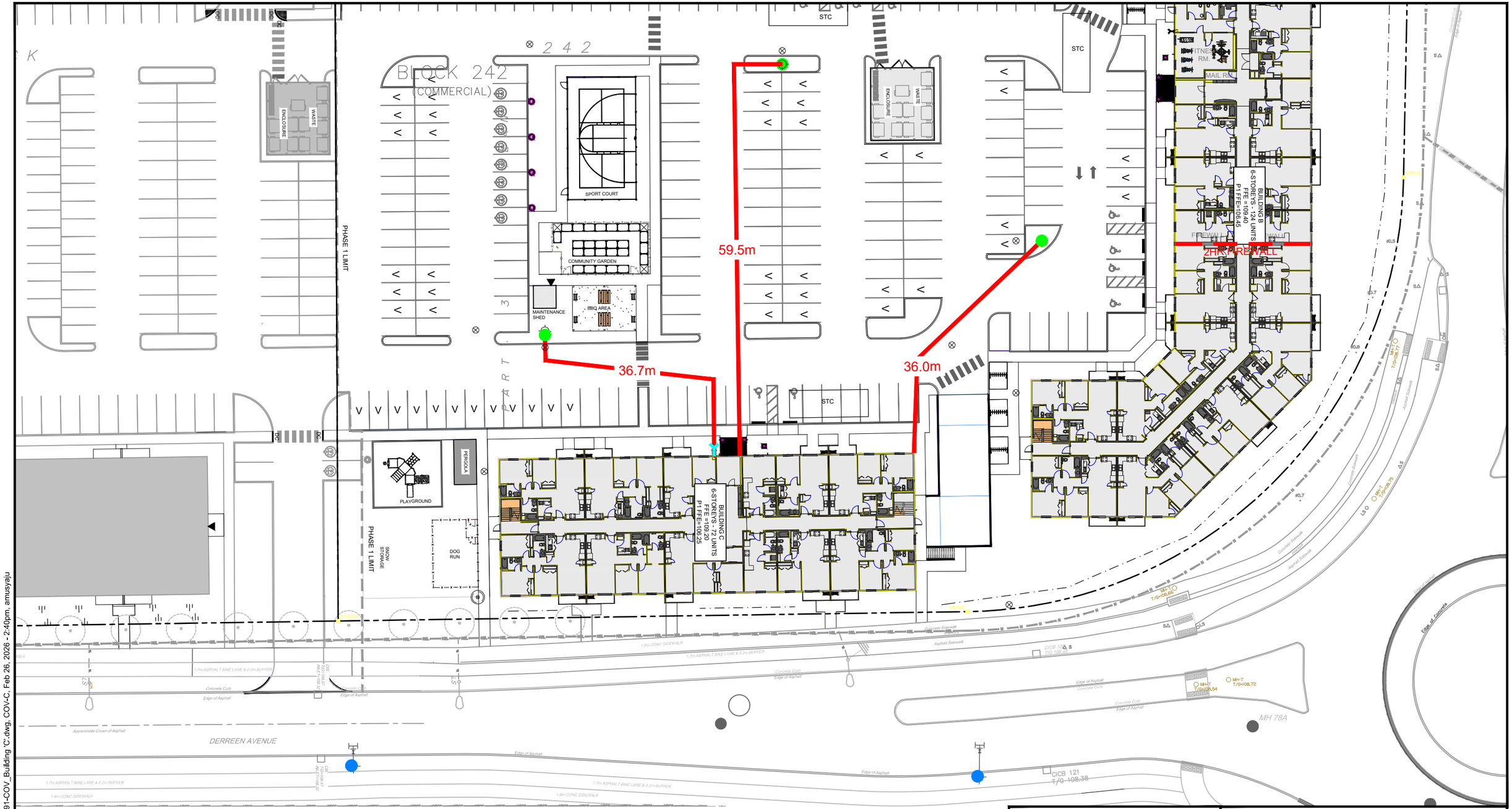
Engineers, Planners & Landscape Architects

**Novatech Project #:** 125091
**Project Name:** Palladium Terrace- Phase 2
**Date:** 3/5/2026
**Input By:** Anjush Musyaju, EIT
**Reviewed By:** Anthony Mestwarp, P.Eng
**Drawing Reference:** 125091-SEP-C

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

**Building Description:** Multifamily Residential Apartment (6 Storey) -C
**Type V - Wood frame**

| 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 | Yes | 1.5 | 1.5 | |
| | | Type IV - Mass Timber | | Varies | | |
| | | Type III - Ordinary construction | | 1 | | |
| | | Type II - Non-combustible construction | | 0.8 | | |
| | | Type I - Fire resistive construction (2 hrs) | | 0.6 | | |
| 2 | **Floor Area** | | | | | |
| | **A** | Building Footprint ($m^2$) | 1213.83 | | | |
| | | Number of Floors/Storeys | 6 | | | |
| | | Protected Openings (1 hr) if C<1.0 | No | | | |
| | | Area of structure considered ($m^2$) | | | 7,283 | |
| | **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% | -15% | **23,800** |
| | | Limited combustible | Yes | -15% | | |
| | | Combustible | | 0% | | |
| | | Free burning | | 15% | | |
| | | Rapid burning | | 25% | | |
| 4 | **Sprinkler Reduction** | | **FUS Table 4** | **Reduction** | | |
| | **(2)** | Adequately Designed System (NFPA 13) | Yes | -30% | -30% | **-11,900** |
| | | Standard Water Supply | Yes | -10% | -10% | |
| | | Fully Supervised System | Yes | -10% | -10% | |
| | | | | **Cumulative Sub-Total** | **-50%** | |
| | | **Area of Sprinklered Coverage ($m^2$)** | 7282.98 | 100% | | |
| | | | | **Cumulative Total** | **-50%** | |
| 5 | **Exposure Surcharge** | | **FUS Table 5** | | **Surcharge** | |
| | **(3)** | North Side | Sprinklered | | 0% | **0** |
| | | East Side | >30m | | 0% | |
| | | South Side | >30m | | 0% | |
| | | West Side | >30m | | 0% | |
| | | | | **Cumulative Total** | **0%** | |
| **Results** | | | | | | |
| 6 | **(1) + (2) + (3)** | **Total Required Fire Flow, rounded to nearest 1000L/min** | | | **L/min** | **12,000** |
| | | (2,000 L/min < Fire Flow < 45,000 L/min) | | or | L/s | **200** |
| | | | | or | USGPM | 3,170 |




## LEGEND

- PROPERTY LINE
- PROPOSED SIAMESE CONNECTION
- EXISTING CLASS AA HYDRANT
- PROPOSED HYDRANT
- DISTANCE FROM HYDRANT TO SIAMESE CONNECTION/ BUILDING ENTRANCE


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


# CITY OF OTTAWA
# 2765 PALLADIUM DRIVE

## COVERAGE PLAN (C)

SCALE: 1 : 500 (0, 5m, 10m, 20m)

| DATE | JOB | FIGURE |
|---|---|---|
| MAR 2026 | 125091 | COV-C |

SHT11X17.DWG - 279mmX432mm

M:\2025\125091\CAD\Civil\Figures\Servicing\125091-COV_Building 'C'.dwg, COV-C, Feb 26, 2026 - 2:40pm, amusyaju

**From:** Anthony Mestwarp <a.mestwarp@novatech-eng.com>
**Sent:** Thursday, March 5, 2026 3:42 PM
**To:** Candow, Julie <julie.candow@ottawa.ca>
**Cc:** Anjush Musyaju <a.musyaju@novatech-eng.com>; Polyak, Alex <alex.polyak@ottawa.ca>
**Subject:** 2765 Palladium drive - 125091

Hi Julie/ Alex,

I am working on the design of the 2765 Palladium Drive site. The proposed site is 1.59ha and is located at the intersection of Derreen Avenue and Palladium Drive.
The site is proposed to have three (3), 6-storey wood frame buildings complete with a central parking area. The site will contain 86-1-bed apartments, 164-2-bed apartments and 54 3-bed apartments for a total population of 632 persons.

**Site water Demands:**

Can you please provide water boundary conditions based on the following:

Average Day demand: **2.05l/s**
Maximum Day demand: **5.12 l/s**
Peak Hour Demand: **11.27 L/s**
Fireflows: **283.2L/s, 250L/s, 200 L/s**

It is proposed to service the site by connecting to the existing watermain within Derreen Avenue at two (2) locations. Figures and calculations are attached for your reference.

**Sanitary Allotment**

The pre consultation minutes for the site noted the following:

*Given that this parcel was anticipated for commercial use in the 195 Huntmar subdivision approval, it is anticipated that the sanitary capacity allocated to this parcel will be exceeded given that a residential use is proposed. The servicing report should identify the proposed sanitary demand and confirm if capacity is available in the downstream sanitary sewer system.*

The site was originally accounted for as commercial lands with an assumed flow of 28000L/ha/day, for a total assumed flow of **1.30l/s**.
The proposed residential development will have a design flow of **7.36l/s**, an increase of **6.06l/s.**

As such we have input the increased flow into a revised excel spread sheet for the surrounding subdivision which includes the sanitary system to the intersection of Robert Grant Avenue and Huntmar.
Reviewing the downstream system through the subdivision the existing worst-case capacity was **85.4%** utilization**;** this increases to **88.1%** in the ultimate condition. As such we do not anticipate conveyance issues in the downstream system.
Can you confirm if the above addresses any concerns that the City may have regarding the sanitary capacity. Calculations are attached for reference.

Please let me know if you have any questions or concerns.

Regards,

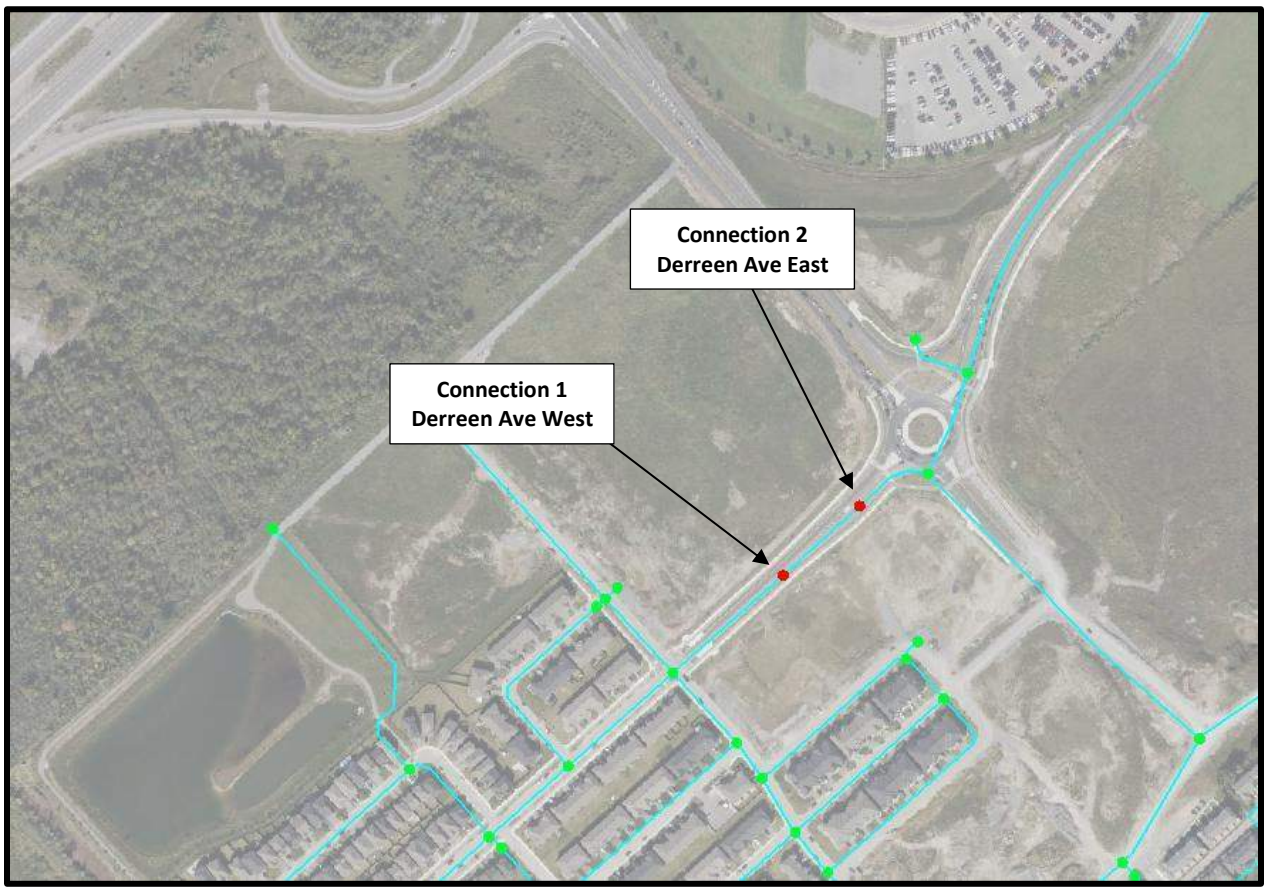
**Anthony Mestwarp**, P.Eng., Project Manager | Land Development Engineering
**NOVATECH**
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext. 216

# Boundary Conditions
# 2765 Palladium Drive – 2026

## Provided Information

| Scenario | Demand | |
|---|---|---|
| | L/min | L/s |
| Average Daily Demand | 123 | 2.05 |
| Maximum Daily Demand | 307 | 5.12 |
| Peak Hour | 676 | 11.27 |
| Fire Flow Demand #1 | 12,000 | 200.00 |
| Fire Flow Demand #2 | 15,000 | 250.00 |
| Fire Flow Demand #3 | 17,000 | 283.33 |

## Location



**Results**

**Connection 1 - Derreen Ave West**

| Demand Scenario | Head (m) | Pressure[1] (psi) |
|---|---|---|
| Maximum HGL | 160.6 | 78.0 |
| Peak Hour | 155.4 | 70.0 |
| Max Day plus Fire Flow #1 | 150.9 | 64.0 |
| Max Day plus Fire Flow #2 | 148.0 | 60.0 |
| Max Day plus Fire Flow #3 | 145.8 | 57.0 |

[1] Ground Elevation = 106.0 m

**Connection 2 - Derreen Ave East**

| Demand Scenario | Head (m) | Pressure[1] (psi) |
|---|---|---|
| Maximum HGL | 160.6 | 77.6 |
| Peak Hour | 155.4 | 70.2 |
| Max Day plus Fire Flow #1 | 151.5 | 64.6 |
| Max Day plus Fire Flow #2 | 148.8 | 60.9 |
| Max Day plus Fire Flow #3 | 146.9 | 58.1 |

[1] Ground Elevation = 106.0 m

**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.*

PROPOSED SWALE AND SUBDRAIN
REFER TO 125091-ND2 FOR DETAILS

2.75m HIGH NOISE BARRIER
ALCUF DP2 OR EQUIVALENT

AMENITY

SNOW STORAGE

COMMUNITY GARDEN

PERGOLA

DOG RUN

MAINTENANCE SHED

BENCHES

AMENITY AREA
624 m²

BUILDING A
6-STOREYS - 108 UNITS
FFE =109.40
P1 FFE=106.45

TRENCH DRAIN
TG=106.44
(FLOWS TO BE CONVEYED BY THE INTERNAL MECHANICAL SYSTEM TO STMMH 213)

BLDG A

4–BLDG A

4

5–4

5(HYD)

6–5

6(HYD)

7–6

7

8–7

8

BLDG B

3–4

3

3–10

10(HYD)

10–7

2–3

2

BLDG C

1–2

1

100–1

100

9–8

9

200–9

200

PALLADIUM TERRACE
PHASE 1

PHASE 1 LIMIT

PHASE 2 LIMIT

8-STOREYS - 177 UNITS
FFE =109.00
P1 FFE=105.60

MECHANICAL

ELECTRICAL

WASTE ENCLOSURE

SPORT COURT

PLAYGROUND

PERGOLA

SNOW STORAGE

DOG RUN

COMMUNITY RM.

FITNESS RM.

MAIL RM.

FIREWALL

BUILDING B
6-STOREYS - 124 UNITS
FFE =109.40
P1 FFE=106.45

BUILDING C
6-STOREYS - 72 UNITS
FFE =109.20
P1 FFE=106.25

TRENCH DRAIN
TG=106.24
(FLOWS TO BE CONVEYED BY THE INTERNAL MECHANICAL SYSTEM TO STMMH 203)

PROPOSED SWALE AND SUBDRAIN
REFER TO 125091-ND2 FOR DETAILS

CHLOE CRESCENT

CHLOE CRESCENT

CHLOE CRESCENT

# Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

**Novatech Project #:** 125091
**Project Name:** Palladium Terrace- Phase 2
**Date:** 6/8/2026
**Input By:** Anjush Musyaju, EIT
**Reviewed By:** Anthony Mestwarp, P.Eng
**Drawing Reference:** Site Plan

**Legend:** Input by User | No Input Required | Calculated Cells →

**Reference:** Ottawa Design Guidelines - Water Distribution (2010 and TBs)
MOE Design Guidelines for Drinking-Water Systems (2008)
Fire Underwriter's Survey Guideline (2020)
Ontario Building Code, Part 3 (2012)

**Small System =** NO

| Location | Total Water Demand | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Node | Residential Input & Average Demand | | | | | | | Maximum Day & Peak Hour Demand | | | | | | Design Fire Demand | | Basic Day Demand Daily Volume (m³) |
| | | | | | | | | Maximum Day Demand | | | Peak Hour Demand | | | Required Fire Flow (RFF) | | |
| | Singles | Semis / Towns | Apts (2-BR) | Apts (1-BR) | Apts (3-BR) | Pop. Equiv. | Res. Average Day Flow Demand (L/s) | Res. Peaking Factor | ICI Peaking Factor | Max Day Flow Demand (L/s) | Res. Peaking Factor | ICI Peaking Factor | Peak Hour Flow Demand (L/s) | FUS (L/min) | Max Day + RFF (L/s) | |
| 1 | | | | | | 0.00 | 0.00 | 2.50 | 1.50 | 0.00 | 5.50 | 2.70 | 0.00 | | 0.00 | 0.0 |
| 2 | | | 35 | 25 | 12 | 145.70 | 0.47 | 2.50 | 1.50 | 1.18 | 5.50 | 2.70 | 2.60 | | 1.18 | 40.8 |
| 3 | | | | | | 0.00 | 0.00 | 2.50 | 1.50 | 0.00 | 5.50 | 2.70 | 0.00 | | 0.00 | 0.0 |
| 4 | | | | | | 0.00 | 0.00 | 2.50 | 1.50 | 0.00 | 5.50 | 2.70 | 0.00 | | 0.00 | 0.0 |
| Building A | | | 71 | 25 | 12 | 221.30 | 0.72 | 2.50 | 1.50 | 1.79 | 5.50 | 2.70 | 3.94 | | 1.79 | 62.0 |
| 5(HYD) | | | | | | 0.00 | 0.00 | 2.50 | 1.50 | 0.00 | 5.50 | 2.70 | 0.00 | 17,000 | 283.33 | 0.0 |
| 6(HYD) | | | | | | 0.00 | 0.00 | 2.50 | 1.50 | 0.00 | 5.50 | 2.70 | 0.00 | 17,000 | 283.33 | 0.0 |
| 7 | | | | | | 0.00 | 0.00 | 2.50 | 1.50 | 0.00 | 5.50 | 2.70 | 0.00 | | 0.00 | 0.0 |
| 8 | | | 51 | 43 | 30 | 260.30 | 0.84 | 2.50 | 1.50 | 2.11 | 5.50 | 2.70 | 4.64 | | 2.11 | 72.9 |
| J9 | | | | | | 0.00 | 0.00 | 2.50 | 1.50 | 0.00 | 5.50 | 2.70 | 0.00 | | 0.00 | 0.0 |
| 10(HYD) | | | | | | 0.00 | 0.00 | 2.50 | 1.50 | 0.00 | 5.50 | 2.70 | 0.00 | 17,000 | 283.33 | 0.0 |
| **Totals** | **0** | **0** | **157** | **93** | **54** | **627.30** | **2.03** | **2.50** | **1.50** | **5.08** | **5.50** | **2.70** | **11.18** | | | **175.6** |

## Demand Parameters

| Residential | | | | | |
|---|---|---|---|---|---|
| **Unit Type** | **Singles** | **Semis/ Towns** | **Apts (2-BR)** | **Apts (1-BR)** | **Apts (3-BR)** |
| **Population Equiv.** | 3.4 | 2.7 | 2.1 | 1.4 | 3.1 |
| **Dailly Demand** | L/per person/day | | | | |
| **Average Demand** | 280 | | | | |
| **Basic Demand** | 280 | | | | |

| Residential Peaking Factors | | Max Day (x Avg Day) | Peak Hour (x Avg Day) |
|---|---|---|---|
| | **Pop.** | | |
| **Small System (If Applicable)** | 0 | 9.50 | 14.30 |
| | 30 | 9.50 | 14.30 |
| | 150 | 4.90 | 7.40 |
| *Modified* | 300 | 3.60 | *5.50* |
| | 450 | 3.00 | *5.50* |
| | 500 | 2.90 | *5.50* |
| **Large System (Default)** | > 500 | 2.50 | 5.50 |

| Quick Fire Flow Reference Guide | | | | Vulnerable Service Area (VSA) Review *** |
|---|---|---|---|---|
| **FUS (L/min)** | **Comments** | **OBC (L/min)** | **Comments** | |
| **> 2,000** | **Min FUS** | **< 9,000** | **Unsprinklered Non- Combustible** | **50** |
| | **Low Density** - Singles/Towns | | | **< 50 m³/day** |
| **10,000** | Complies w/ TB2014-01 Cap. (10m rear spacing, 6 units max, <600 m²) | | | **> 50 m³/day** |
| **13,000** | Non-complying w/TB2014-01. Calculate. | | | |
| **15,000** | **Medium Density** Back-to-back Towns. | | | |
| | **High Density** | | | |
| **20,000** | Wood Frame 4-Storey | | | |
| **5,000** | Fire-Resisitve Podium/Multi-Storey | | | |
| **30,000** | **High Contiguous / Hazard Areas** | | | |
| **< 45,000** | **Max FUS** | | | |

# Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

## Pipe Data Table

**Novatech Project #:** 125091 **Legend:** Input by User
**Project Name:** Palladium Terrace- Phase 2
**Date:** 6/8/2026
**Input By:** Anjush Musyaju, EIT
**Reviewed By:** Anthony Mestwarp, P.Eng
**Drawing Reference:** Site Plan **Note:** Hydraulic modelling completed using EPANET 2.2.

| Link ID | Length (m) | Diameter (mm) | C-Factor (m) |
|---|---|---|---|
| 100-1 | 19.91 | 204 | 110 |
| 1-2 | 17.02 | 204 | 110 |
| 2-3 | 16.17 | 204 | 110 |
| 3-4 | 41.70 | 204 | 110 |
| 5-4 | 41.83 | 204 | 110 |
| 6-5 | 53.86 | 204 | 110 |
| 7-6 | 14.00 | 204 | 110 |
| 8-7 | 6.60 | 204 | 110 |
| 9-8 | 28.68 | 204 | 100 |
| 200-9 | 18.97 | 204 | 110 |
| 3-10 | 9.40 | 204 | 110 |
| 10-7 | 62.89 | 204 | 110 |
| 4-BLDG'A' | 23.30 | 204 | 110 |

# Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

## Maximum Pressure During Average Day (AVDY) Conditions

**Novatech Project #:** 125091
**Project Name:** Palladium Terrace- Phase 2
**Date:** 6/8/2026
**Input By:** Anjush Musyaju, EIT
**Reviewed By:** Anthony Mestwarp
**Drawing Reference:** Site Plan

**Legend:** Input by User | No Input Required
Acceptable (40psi - 80psi)
Acceptable w/ PRV (81psi - 100psi)
Unacceptable (< 40psi or > 100psi)

**Note:** Hydraulic modelling completed using EPANET 2.0.

| Node | Elevation (m) | Demand (L/s) | Total Head (m) | Pressure (m) | Pressure (psi) | Age (hrs) |
|---|---|---|---|---|---|---|
| 1 | 108.91 | 0.00 | 160.60 | 51.69 | 74 | 0 |
| 2 | 109.05 | 0.47 | 160.60 | 51.55 | 73 | 0 |
| 3 | 108.48 | 0.00 | 160.60 | 52.12 | 74 | 1 |
| 4 | 108.71 | 0.00 | 160.60 | 51.89 | 74 | 3 |
| Building A | 109.30 | 0.72 | 160.60 | 51.30 | 73 | 4 |
| 5(HYD) | 108.90 | 0.00 | 160.60 | 51.70 | 74 | 6 |
| 6(HYD) | 108.68 | 0.00 | 160.60 | 51.92 | 74 | 4 |
| 7 | 109.09 | 0.00 | 160.60 | 51.51 | 73 | 3 |
| 8 | 109.20 | 0.84 | 160.60 | 51.40 | 73 | 0 |
| J9 | 108.57 | 0.00 | 160.60 | 52.03 | 74 | 0 |
| 10(HYD) | 108.57 | 0.00 | 160.60 | 52.03 | 74 | 1 |

# Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

## Minimum Pressure During Peak Hour (PKHR) Conditions

**Novatech Project #:** 125091
**Project Name:** Palladium Terrace- Phase 2
**Date:** 6/8/2026
**Input By:** Anjush Musyaju, E
**Reviewed By:** Anthony Mestwarp, P.Eng
**Drawing Reference:** Site Plan

**Legend:** Input by User | No Input Required
Acceptable (=> 40psi)
Unacceptable (< 40psi)

**Note:** Hydraulic modelling completed using EPANET 2.0.

| Node | Elevation (m) | Demand (L/s) | Total Head (m) | Pressure (m) | Pressure (psi) |
|---|---|---|---|---|---|
| 1 | 108.91 | 0.00 | 155.39 | 46.48 | 66 |
| 2 | 109.05 | 2.60 | 155.39 | 46.34 | 66 |
| 3 | 108.48 | 0.00 | 155.39 | 46.91 | 67 |
| 4 | 108.71 | 0.00 | 155.38 | 46.67 | 66 |
| Building A | 109.30 | 3.94 | 155.38 | 46.08 | 66 |
| 5(HYD) | 108.90 | 0.00 | 155.39 | 46.49 | 66 |
| 6(HYD) | 108.68 | 0.00 | 155.39 | 46.71 | 66 |
| 7 | 109.09 | 0.00 | 155.39 | 46.30 | 66 |
| 8 | 109.20 | 4.64 | 155.39 | 46.19 | 66 |
| J9 | 108.57 | 0.00 | 155.39 | 46.82 | 67 |
| 10(HYD) | 108.57 | 0.00 | 155.39 | 46.82 | 67 |

# Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

## Minimum Pressure During Max Day Plus Fire Flow (MXDY+FF) Condition - 5 (HYD)

**Novatech Project #:** 125091
**Project Name:** Palladium Terrace- Phase 2
**Date:** 6/8/2026
**Input By:** Anjush Musyaju, E
**Reviewed By:** Anthony Mestwarp, P.Eng
**Drawing Reference:** Site Plan

**Legend:** Input by User | No Input Required
Acceptable (=> 20psi)
Unacceptable (< 20psi)

**Note:** Hydraulic modelling completed using EPANET 2.0.

| Node | Elevation (m) | Demand (L/s) | Total Head (m) | Pressure (m) | Pressure (psi) |
|---|---|---|---|---|---|
| 1 | 108.91 | 0.00 | 143.73 | 34.82 | 50 |
| 2 | 109.05 | 1.18 | 141.96 | 32.91 | 47 |
| 3 | 108.48 | 0.00 | 140.30 | 31.82 | 45 |
| 4 | 108.71 | 0.00 | 136.13 | 27.42 | 39 |
| Building A | 109.30 | 1.79 | 136.13 | 26.83 | 38 |
| 5(HYD) | 108.90 | 283.33 | 132.05 | 23.15 | 33 |
| 6(HYD) | 108.68 | 0.00 | 138.60 | 29.92 | 43 |
| 7 | 109.09 | 0.00 | 140.30 | 31.21 | 44 |
| 8 | 109.20 | 2.11 | 141.08 | 31.88 | 45 |
| J9 | 108.57 | 0.00 | 144.58 | 36.01 | 51 |
| 10(HYD) | 108.57 | 0.00 | 140.30 | 31.73 | 45 |

# Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

## Minimum Pressure During Max Day Plus Fire Flow (MXDY+FF) Condition- 6(HYD)

**Novatech Project #:** 125091
**Project Name:** Palladium Terrace- Phase 2
**Date:** 6/8/2026
**Input By:** Anjush Musyaju, E
**Reviewed By:** Anthony Mestwarp, P.Eng
**Drawing Reference:** Site Plan

**Legend:** Input by User | No Input Required
Acceptable (=> 20psi)
Unacceptable (< 20psi)

**Note:** Hydraulic modelling completed using EPANET 2.0.

| Node | Elevation (m) | Demand (L/s) | Total Head (m) | Pressure (m) | Pressure (psi) |
|---|---|---|---|---|---|
| 1 | 108.91 | 0.00 | 143.95 | 35.04 | 50 |
| 2 | 109.05 | 1.18 | 142.38 | 33.33 | 47 |
| 3 | 108.48 | 0.00 | 140.90 | 32.42 | 46 |
| 4 | 108.71 | 0.00 | 139.50 | 30.79 | 44 |
| Building A | 109.30 | 1.79 | 139.50 | 30.20 | 43 |
| 5(HYD) | 108.90 | 0.00 | 138.16 | 29.26 | 42 |
| 6(HYD) | 108.68 | 283.33 | 136.43 | 27.75 | 39 |
| 7 | 109.09 | 0.00 | 139.60 | 30.51 | 43 |
| 8 | 109.20 | 2.11 | 140.47 | 31.27 | 44 |
| J9 | 108.57 | 0.00 | 144.34 | 35.77 | 51 |
| 10(HYD) | 108.57 | 0.00 | 140.73 | 32.16 | 46 |

# Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

## Minimum Pressure During Max Day Plus Fire Flow (MXDY+FF) Condition - 10(HYD)

**Novatech Project #:** 125091
**Project Name:** Palladium Terrace- Phase 2
**Date:** 6/8/2026
**Input By:** Anjush Musyaju, E
**Reviewed By:** Anthony Mestwarp, P.Eng
**Drawing Reference:** Site Plan

**Legend:** Input by User | No Input Required
Acceptable (=> 20psi)
Unacceptable (< 20psi)

**Note:** Hydraulic modelling completed using EPANET 2.0.

| Node | Elevation (m) | Demand (L/s) | Total Head (m) | Pressure (m) | Pressure (psi) |
|---|---|---|---|---|---|
| 1 | 108.91 | 0.00 | 143.42 | 34.51 | 49 |
| 2 | 109.05 | 1.18 | 141.39 | 32.34 | 46 |
| 3 | 108.48 | 0.00 | 139.49 | 31.01 | 44 |
| 4 | 108.71 | 0.00 | 139.92 | 31.21 | 44 |
| Building A | 109.30 | 1.79 | 139.92 | 30.62 | 44 |
| 5(HYD) | 108.90 | 0.00 | 140.38 | 31.48 | 45 |
| 6(HYD) | 108.68 | 0.00 | 140.98 | 32.30 | 46 |
| 7 | 109.09 | 0.00 | 141.14 | 32.05 | 46 |
| 8 | 109.20 | 2.11 | 141.82 | 32.62 | 46 |
| J9 | 108.57 | 0.00 | 144.88 | 36.31 | 52 |
| 10(HYD) | 108.57 | 283.33 | 137.77 | 29.20 | 42 |

# Appendix C
# Sanitary Servicing

PROPOSED SWALE AND SUBDRAIN
REFER TO 125091-ND2 FOR DETAILS

2.75m HIGH NOISE BARRIER
ALCUF DP2 OR EQUIVALENT

AMENITY

SNOW STORAGE

PERGOLA

MAINTENANCE SHED

PHASE 1 LIMIT

0.407
A-01
108 | 221

BUILDING A
6-STOREYS - 108 UNITS
FFE =109.40
P1 FFE=106.45

TRENCH DRAIN
T/G=106.44
(FLOWS TO BE CONVEYED BY THE INTERNAL MECHANICAL SYSTEM TO STMMH 213)

DOG RUN

BENCHES

AMENITY AREA
624 m²

TRENCH DRAIN
T/G=106.44
(FLOWS TO BE CONVEYED BY THE INTERNAL MECHANICAL SYSTEM TO STMMH 206)

2.0m-250mmØ SAN @ 2.00%

0.033
A-02
0 | 0

25.7m-250mmØ SAN @ 1.10%

WASTE ENCLOSURE

0.154
A-03
0 | 0

53.2m-250mmØ SAN @ 0.50%

10.4m-250mmØ SAN @ 2.00%

0.411
A-04
124 | 260

BUILDING B
6-STOREYS - 124 UNITS
FFE =109.40
P1 FFE=106.45

SPORT COURT

COMMUNITY GARDEN

0.183
A-05
0 | 0

29.7m-250mmØ SAN @ 1.50%

0.125
A-07
0 | 0

MAINTENANCE SHED

BBQ AREA

34.6m-250mmØ SAN @ 0.50%

10.7m-250mmØ SAN @ 2.00%

0.212
A-06
72 | 146

BUILDING C
6-STOREYS - 72 UNITS
FFE =109 20
P1 FFE=106.25

TRENCH DRAIN
T/G=106.24
(FLOWS TO BE CONVEYED BY THE INTERNAL MECHANICAL SYSTEM TO STMMH 203)

PROPOSED SWALE AND SUBDRAIN
REFER TO 125091-ND2 FOR DETAILS

0.068
A-08
0 | 0

PERGOLA

SNOW STORAGE

DOG RUN

30.8m-250mmØ SAN @ 0.65%

0.005
A-09
0 | 0

16.8m-250mmØ SAN @ 2.00%

1.7m ASPHALT BIKE LANE & 0.2m BUFFER

1.8m CONC SIDEWALK

111.9m-450mmØ SAN @ 0.25%

72.0m-450mmØ SAN @ 0.27%

DERREEN AVENUE

PALLADIUM DRIVE

MH 78A

OICB 121
T/G 108.38

SANMH 77A
T/G=108.63
INV.NE=101.32
INV.SW=101.34

MH-T
T/G=108.54

MH-T
T/G=108.72

MH-T
T/G=108.75

MH-T
T/G=108.60

NORTH

KEY PLAN
N.T.S.

Palladium

Palladium Dr.

Huntmar Dr.

SITE LOCATION

Hwy. 417

LEGEND

- PROPERTY LINE
- PROPOSED SANITARY SEWER AND MANHOLE
- SAN MH — EXISTING SANITARY MANHOLE & SEWER
- SANITARY SEWER DRAINAGE AREA BOUNDARY
- 0.47 / 20A-19A / 71 | 128 — DRAINAGE AREA (ha) / SAN SEWER PIPE RUN / NO. UNITS/POPULATION

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.

NOT FOR CONSTRUCTION

| No. | REVISION | DATE | BY |
|---|---|---|---|
| 1. | ISSUED FOR SITEPLAN APPLICATION | 06/08/26 | ARM |

SCALE
1:300

1:300
0 3 6 9 12

DESIGN ARM
CHECKED GJM
DRAWN AM
CHECKED ARM
APPROVED GJM

FOR REVIEW ONLY


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


LOCATION
CITY OF OTTAWA
PALLADIUM 2

DRAWING NAME
GRADING PLAN

PROJECT No. 125091
REV REV#1
DRAWING No. 125091-SAN

M:\2025\125091\CAD\Civil\125091-SAN.dwg, SAN, Jun 09, 2026 - 3:15pm, amattwarp

PLASMT.DWG - 84 mm x 594 mm

# SANITARY SEWER DESIGN SHEET

NOVATECH
Engineers, Planners & Landscape Architects

**Novatech Project #:** 125091
**Project Name:** Palladium 2
**Date:** 3/27/2026
**Revised:** 6/8/2026
**Input By:** Anjush Musyaju, EIT
**Reviewed By:** Anthony Mestwarp, P.Eng
**Drawing Reference:** 125091-SAN

**Legend:** Design Input by User
As-Built Input by User
Cumulative Cell
Calculated Design Cell Output

**Reference:** City of Ottawa - Sewer Design Guidelines (2012 and TBs)
MOE - Design Guidelines for Sewage Works (2008)

| Location | | | | Demand | | | | | | | | | | | | Design Capacity | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Residential Flow | | | | | | | | | | Extraneous Flow Area Method | | Total Design Flow | Proposed Sewer Pipe Sizing / Design | | | | | | | |
| Street | Area ID | From MH | To MH | Studio/ 1-BR Apt | 2-BR Apt | 3-BR Apt | Park Area | Population (in 1000's) | Cumulative Population (in 1000's) | Average Pop. Flow Q(q) (L/s) | Design Peaking Factor M | Peak Design Pop. Flow Q(p) (L/s) | Res. Drainage Area (ha.) | Cumulative Res. Drainage Area (ha.) | Cumulative Extraneous Drainage Area (ha.) | Design Extraneous Flow Q(e) (L/s) | Total Peak Design Flow Q(D) (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) | Q(D) / Qfull |
| | A-01 | Building A | 105 | 25 | 71 | 12 | | 0.221 | 0.221 | 0.72 | 3.51 | 2.51 | 0.407 | 0.407 | 0.407 | 0.13 | 2.65 | 2.0 | 250 PVC | 0.254 | 0.013 | 2.00 | 87.7 | 1.73 | 3.0% |
| | A-02 | 105 | 104 | | | | | 0.000 | 0.221 | 0.72 | 3.51 | 2.51 | 0.033 | 0.441 | 0.441 | 0.15 | 2.66 | 25.7 | 250 PVC | 0.254 | 0.013 | 1.10 | 65.1 | 1.28 | 4.1% |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | A-04 | Building B | 107 | 43 | 51 | 30 | | 0.260 | 0.260 | 0.84 | 3.48 | 2.94 | 0.411 | 0.411 | 0.411 | 0.14 | 3.07 | 10.4 | 250 PVC | 0.254 | 0.013 | 2.00 | 87.7 | 1.73 | 3.5% |
| | A-03 | 107 | 104 | | | | | 0.000 | 0.260 | 0.84 | 3.48 | 2.94 | 0.154 | 0.565 | 0.565 | 0.19 | 3.12 | 53.2 | 250 PVC | 0.254 | 0.013 | 0.50 | 43.9 | 0.87 | 7.1% |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | A-05 | 104 | 103 | | | | | 0.000 | 0.482 | 1.56 | 3.39 | 5.28 | 0.183 | 1.188 | 1.188 | 0.39 | 5.68 | 29.7 | 250 PVC | 0.254 | 0.013 | 0.50 | 43.9 | 0.87 | 12.9% |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | A-06 | Building C | 103 | 25 | 35 | 12 | | 0.146 | 0.146 | 0.47 | 3.56 | 1.68 | 0.212 | 0.212 | 0.212 | 0.07 | 1.75 | 10.7 | 250 PVC | 0.254 | 0.013 | 2.00 | 87.7 | 1.73 | 2.0% |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | A-07 | 103 | 102 | | | | | 0.000 | 0.627 | 2.03 | 3.34 | 6.78 | 0.125 | 1.525 | 1.525 | 0.50 | 7.29 | 34.6 | 250 PVC | 0.254 | 0.013 | 0.50 | 43.9 | 0.87 | 16.6% |
| | A-08 | 102 | 101 | | | | | 0.000 | 0.627 | 2.03 | 3.34 | 6.78 | 0.068 | 1.593 | 1.593 | 0.53 | 7.31 | 30.8 | 250 PVC | 0.254 | 0.013 | 0.65 | 50.0 | 0.99 | 14.6% |
| | A-09 | 101 | 100 | | | | | 0.000 | 0.627 | 2.03 | 3.34 | 6.78 | 0.005 | 1.598 | 1.598 | 0.53 | 7.31 | 16.8 | 250 PVC | 0.254 | 0.013 | 2.00 | 87.7 | 1.73 | 8.3% |
| **Totals** | | | | **93** | **157** | **54** | **0.000** | **0.627** | **0.627** | **2.03** | **3.34** | **6.78** | **1.598** | **1.598** | **1.598** | **0.53** | **7.31** | **213.9** | | | | | | | |

## Demand Equation / Parameters

1. **Q(D) =** Q(p) + Q(ici) + Q(e)
2. **Q(p) =** (P x q x M x K / 86,400)
3. **q =** 280 L/per person/day (design)
4. **M = Harmon Formula (maximum of 4.0)**
5. **K =** 0.8 (design)
6. **Park flow is considered equivalent to a single unit / ha**
   **Park Demand =** 4 single unit equivalent / park ha (~ 3,600 L/ha/day)
7. **Q(ici) =** ICI Area x ICI Flow x ICI Peak
8. **Q(e) =** 0.33 L/s/ha (design)

## Definitions

**Q(D) =** Peak Design Flow (L/s)
**Q(p) =** Peak Design Population Flow (L/s)
**Q(q) =** Average Population Flow (L/s)

| | Appartments Studio/ 1-BR | 2-BR | 3- BR |
|---|---|---|---|
| **P =** Residential Population = | 1.4 | 2.1 | 3.1 |

**q =** Average Capita Flow
**M =** Harmon Formula
**K =** Harmon Correction Factor
**Q(ici) =** Industrial / Commercial / Institutional Flow (L/s)
**Q(e) =** Extraneous Flow (L/s)

| Institutional / Commercial / Industrial | Industrial | Commercial / Institutional | |
|---|---|---|---|
| **Design =** | 35000 | 28000 | L/gross ha/day |
| **ICI Peak *** | | | |
| **Design =** | 1.0 | 1.5 | * ICI Peak = 1.0 Default, 1.5 if ICI in contributing area is >20% (design only) |

## 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

# SANITARY SEWER DESIGN SHEET

NOVATECH
Engineers, Planners & Landscape Architects

**ovatech Project #:** 123194
**Project Name:** Palladium 2
**Date:** 6/13/2024
**Revised:** 02/05/2025 (Anthony Mestwarp)
**Revised:** 08/13/2025 (Anthony Mestwarp)
**Input By:** Anjush Musyaju
**Reviewed By:** Anthony Mestwarp P.Eng.
**awing Reference:** 123194-SAN

**Legend:** Design Input by User
As-Built Input by User
Cumulative Cell
Calculated Design Cell Output
**Reference:** City of Ottawa - Sewer Design Guidelines (2012 a
MOE - Design Guidelines for Sewage Works (200

**Pre-Palladium 2**

| Location | | | | Demand | | | | | | | | | | | | | | | | | Design Capacity | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Residential Flow | | | | | | | | | | | | | | | Extraneous Flow Area Method | | Total Design Flow | Proposed Sewer Pipe Sizing / Design | | | | | | | |
| Street | Area ID | From MH | To MH | 1 bed | 2 bed | 3bed | Population (in 1000's) | Cumulative Population (in 1000's) | Average Pop. Flow Q(q) (L/s) | Design Peaking Factor M | Peak Design Pop. Flow Q(p) (L/s) | Res. Drainage Area (ha.) | Cumulative Res. Drainage Area (ha.) | Commercial / Institutional Area (ha.) | Cumulative Commercial / Institutional Area (ha.) | Park Area | Cumlativ Park area | Average Design Commercial / Institutional Flow (L/s) | Commercial / Institutional Peaking Factor | Cumulative ICI Area (ha.) | Peak Design ICI Flow Q (ici) (L/s) | Cumulative Extraneous Drainage Area (ha.) | Design Extraneous Flow Q(e) (L/s) | Total Peak Design Flow Q(D) (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) | Q(D) / Qfull |
| Culdaff rd | 425 Culdaff Road | BLDG | Ex. 71A | 48 | 93 | 36 | 0.374 | 0.374 | 1.21 | 3.43 | 4.16 | 0.973 | 0.973 | 0.000 | 0.000 | | | 0.00 | 1.00 | 0.000 | 0.00 | 0.973 | 0.32 | 4.48 | 3.0 | 200 PVC | 0.203 | 0.013 | 1.00 | 34.2 | 1.06 | 13.1% |
| Culdaff rd | 425 Culdaff Road | 71A | 72a | | | | 0.000 | 0.374 | 1.21 | 3.43 | 4.16 | 0.000 | 0.973 | 0.000 | 0.000 | | | 0.00 | 1.00 | 0.000 | 0.00 | 0.973 | 0.32 | 4.48 | 15.0 | 250 PVC | 0.254 | 0.013 | 0.65 | 50.0 | 0.99 | 9.0% |
| DownStream Analysis | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Culdaff rd | | 70A | 72A | | | | 0.000 | 0.000 | 0.00 | 3.80 | 0.00 | 0.190 | 0.630 | 27.300 | 27.300 | | | 8.85 | 1.50 | 27.300 | 13.27 | 27.930 | 9.22 | 22.49 | 76.0 | 250 PVC | 0.254 | 0.013 | 0.30 | 34.0 | 0.67 | 66.2% |
| Culdaff rd | | 72A | 73A | | | | 0.000 | 0.374 | 1.21 | 3.43 | 4.16 | 0.160 | 1.763 | 0.000 | 27.300 | | | 8.85 | 1.50 | 27.300 | 13.27 | 29.063 | 9.59 | 27.02 | 76.0 | 250 PVC | 0.254 | 0.013 | 0.30 | 34.0 | 0.67 | 79.5% |
| Derreen Ave | | 730A | 73A | | | | 0.000 | 5.586 | 18.10 | 2.76 | 49.96 | | 82.890 | 0.000 | 0.000 | | | 0.00 | 1.00 | 0.000 | 0.00 | 82.890 | 27.35 | 77.32 | 10.0 | 375 PVC | 0.381 | 0.013 | 0.30 | 100.2 | 0.88 | 77.2% |
| Culdaff Road | | 64A | 73A | | | | 0.000 | 1.447 | 4.69 | 3.15 | 14.78 | 0.110 | 12.630 | 0.000 | 1.670 | 0.530 | 0.530 | 0.60 | 1.00 | 2.200 | 0.60 | 14.830 | 4.89 | 20.28 | 10.0 | 375 PVC | 0.381 | 0.013 | 0.30 | 100.2 | 0.88 | 20.2% |
| Derreen Avenue | | 73A | 75A | | | | 0.000 | 7.407 | 24.00 | 2.67 | 64.00 | 0.090 | 97.373 | 0.000 | 28.970 | | 0.530 | 9.45 | 1.50 | 29.500 | 14.17 | 126.343 | 41.69 | 119.86 | 35.5 | 450 PVC | 0.457 | 0.013 | 0.25 | 148.7 | 0.91 | 80.6% |
| | Block 241 | 74A | 75A | | | | 0.000 | 0.000 | 0.00 | 3.80 | 0.00 | 0.000 | 0.000 | 1.060 | 1.060 | | 0.000 | 0.34 | 1.50 | 1.060 | 0.52 | 1.060 | 0.35 | 0.87 | 15.5 | 250 PVC | 0.254 | 0.013 | 0.65 | 50.0 | 0.99 | 1.7% |
| Derreen Avenue | | 75A | 77A | | | | 0.000 | 7.407 | 24.00 | 2.67 | 64.00 | 0.310 | 97.683 | 0.000 | 30.030 | | 0.530 | 9.79 | 1.50 | 30.560 | 14.68 | 127.713 | 42.15 | 120.83 | 112.0 | 450 PVC | 0.457 | 0.013 | 0.25 | 148.7 | 0.91 | 81.2% |
| | 2765 Palladium Road | | 77A | | | | 0.000 | 0.000 | 0.00 | 3.80 | 0.00 | | 0.000 | 1.594 | 1.594 | | 0.000 | 0.52 | 1.50 | 1.594 | 0.77 | 1.594 | 0.53 | 1.30 | 20.0 | 200 PVC | 0.203 | 0.013 | 1.00 | 34.2 | 1.06 | 3.8% |
| | Block 240 | | 77A | | | | 0.000 | 0.000 | 0.00 | 3.80 | 0.00 | | 0.000 | 0.640 | 0.640 | | 0.000 | 0.21 | 1.50 | 0.640 | 0.31 | 0.640 | 0.21 | 0.52 | 16.0 | 250 PVC | 0.254 | 0.013 | 0.65 | 50.0 | 0.99 | 1.0% |
| Derreen Avenue | | 77A | 78A | | | | 0.000 | 7.407 | 24.00 | 2.67 | 64.00 | 0.200 | 97.883 | 0.000 | 32.264 | | 0.530 | 10.51 | 1.50 | 32.794 | 15.77 | 130.147 | 42.95 | 122.72 | 72.0 | 450 PVC | 0.457 | 0.013 | 0.25 | 148.7 | 0.91 | 82.5% |
| Derreen Avenue | | 78A | 200A | | | | 0.000 | 7.407 | 24.00 | 2.67 | 64.00 | 0.140 | 98.023 | 0.000 | 32.264 | | 0.530 | 10.51 | 1.50 | 32.794 | 15.77 | 130.287 | 42.99 | 122.77 | 26.5 | 450 PVC | 0.457 | 0.013 | 0.25 | 148.7 | 0.91 | 82.6% |
| | Commercial | 251A | 200A | | | | 0.000 | 0.000 | 0.00 | 3.80 | 0.00 | | 0.000 | 1.350 | 1.350 | | 0.000 | 0.44 | 1.50 | 1.350 | 0.66 | 1.350 | 0.45 | 1.10 | 90.5 | 250 PVC | 0.254 | 0.013 | 0.65 | 50.0 | 0.99 | 2.2% |
| Robert Grant Ave | | 200A | 201A | | | | 0.000 | 7.407 | 24.00 | 2.67 | 64.00 | 2.190 | 100.213 | 0.000 | 33.614 | | 0.530 | 10.95 | 1.50 | 34.144 | 16.43 | 133.827 | 44.16 | 124.59 | 67.0 | 450 PVC | 0.457 | 0.013 | 0.25 | 148.7 | 0.91 | 83.8% |
| Robert Grant Ave | | 201A | 202A | | | | 0.000 | 7.407 | 24.00 | 2.67 | 64.00 | 0.260 | 100.473 | 0.000 | 34.964 | | 0.530 | 11.39 | 1.50 | 35.494 | 17.08 | 135.437 | 44.69 | 125.78 | 70.0 | 450 PVC | 0.457 | 0.013 | 0.25 | 148.7 | 0.91 | 84.6% |
| Robert Grant Ave | | 202A | 203A | | | | 0.000 | 7.407 | 24.00 | 2.67 | 64.00 | 0.230 | 100.703 | 0.000 | 34.964 | | 0.530 | 11.39 | 1.50 | 35.494 | 17.08 | 135.667 | 44.77 | 125.85 | 63.5 | 450 PVC | 0.457 | 0.013 | 0.25 | 148.7 | 0.91 | 84.6% |
| Robert Grant Ave | | 203A | 204A | | | | 0.000 | 7.407 | 24.00 | 2.67 | 64.00 | 0.430 | 101.133 | 0.000 | 34.964 | | 0.530 | 11.39 | 1.50 | 35.494 | 17.08 | 136.097 | 44.91 | 126.00 | 83.5 | 450 PVC | 0.457 | 0.013 | 0.25 | 148.7 | 0.91 | 84.7% |
| | Stittsville Main Street | 2000A | 204A | | | | 0.000 | 0.028 | 0.09 | 3.69 | 0.33 | 1.010 | 1.010 | | 0.000 | | 0.000 | 0.00 | 1.00 | 0.000 | 0.00 | 1.010 | 0.33 | 0.67 | 100.0 | 250 PVC | 0.254 | 0.013 | 0.65 | 50.0 | 0.99 | 1.3% |
| Robert Grant Ave | | 204A | 205A | | | | 0.000 | 7.435 | 24.10 | 2.66 | 64.21 | 0.690 | 102.833 | 0.000 | 34.964 | | 0.530 | 11.39 | 1.50 | 35.494 | 17.08 | 137.797 | 45.47 | 126.77 | 110.0 | 450 PVC | 0.457 | 0.013 | 0.25 | 148.7 | 0.91 | 85.2% |
| Robert Grant Ave | | 205A | 206A | | | | 0.000 | 7.435 | 24.10 | 2.66 | 64.21 | 0.590 | 103.423 | 0.000 | 34.964 | | 0.530 | 11.39 | 1.50 | 35.494 | 17.08 | 138.387 | 45.67 | 126.96 | 114.5 | 450 PVC | 0.457 | 0.013 | 0.25 | 148.7 | 0.91 | 85.4% |
| Robert Grant Ave | | 206A | 207A | | | | 0.000 | 7.435 | 24.10 | 2.66 | 64.21 | 0.160 | 103.583 | 7.460 | 42.424 | | 0.530 | 13.81 | 1.50 | 42.954 | 20.71 | 146.007 | 48.18 | 133.10 | 37.0 | 450 PVC | 0.457 | 0.013 | 0.30 | 162.9 | 0.99 | 81.7% |
| Robert Grant Ave | | 207A | 208A | | | | 0.000 | 7.435 | 24.10 | 2.66 | 64.21 | 0.860 | 104.443 | | 42.424 | | 0.530 | 13.81 | 1.50 | 42.954 | 20.71 | 146.867 | 48.47 | 133.39 | 43.5 | 450 PVC | 0.457 | 0.013 | 0.30 | 162.9 | 0.99 | 81.9% |
| Robert Grant Ave | | 208A | 209A | | | | 0.000 | 7.435 | 24.10 | 2.66 | 64.21 | 0.340 | 104.783 | | 42.424 | | 0.530 | 13.81 | 1.50 | 42.954 | 20.71 | 147.207 | 48.58 | 133.50 | 90.5 | 450 PVC | 0.457 | 0.013 | 0.30 | 162.9 | 0.99 | 81.9% |
| Robert Grant Ave | | 209A | 210A | | | | 0.000 | 7.435 | 24.10 | 2.66 | 64.21 | 0.380 | 105.163 | | 42.424 | | 0.530 | 13.81 | 1.50 | 42.954 | 20.71 | 147.587 | 48.70 | 133.63 | 101.5 | 450 PVC | 0.457 | 0.013 | 0.30 | 162.9 | 0.99 | 82.0% |
| Robert Grant Ave | | 210A | 211A | | | | 0.000 | 7.435 | 24.10 | 2.66 | 64.21 | 0.270 | 105.433 | | 42.424 | | 0.530 | 13.81 | 1.50 | 42.954 | 20.71 | 147.857 | 48.79 | 133.71 | 73.0 | 450 PVC | 0.457 | 0.013 | 0.30 | 162.9 | 0.99 | 82.1% |
| Robert Grant Ave | | 211A | 217A | | | | 0.000 | 7.435 | 24.10 | 2.66 | 64.21 | 0.380 | 105.813 | | 42.424 | | 0.530 | 13.81 | 1.50 | 42.954 | 20.71 | 148.237 | 48.92 | 133.84 | 110.0 | 450 PVC | 0.457 | 0.013 | 0.30 | 162.9 | 0.99 | 82.2% |
| Robert Grant Ave | | 217A | Huntmar | | | | 0.000 | 7.435 | 24.10 | 2.66 | 64.21 | 0.000 | 105.813 | 5.060 | 47.484 | | 0.530 | 15.45 | 1.50 | 48.014 | 23.17 | 153.297 | 50.59 | 137.97 | 110.0 | 450 PVC | 0.457 | 0.013 | 0.30 | 162.9 | 0.99 | 84.7% |
| **Totals** | | | | **48** | **93** | **36** | **0.374** | **0.374** | **1.21** | **3.43** | **4.16** | **0.973** | **0.973** | | **0.000** | **0.000** | | **0.00** | **1.00** | **0.000** | **0.00** | **0.973** | **0.32** | **4.48** | **3.0** | | | | | | | |

### Demand Equation / Parameters

1. **Q(D) =** Q(p) + Q(ici) + Q(e)
2. **Q(p) =** (P x q x M x K / 86,400)
3. **q =** 280 L/per person/day (design)
4. **M = Harmon Formula (maximum of 4.0)**
5. **K =** 0.8 (design)
6. **Park flow is considered equivalent to a single unit / ha**
   **Park Demand =** 9300 L/ha/day
7. **Q(ici) =** ICI Area x ICI Flow x ICI Peak
8. **Q(e) =** 0.33 L/s/ha (design)

### Definitions

**Q(D) =** Peak Design Flow (L/s)
**Q(p) =** Peak Design Population Flow (L/s)
**Q(q) =** Average Population Flow (L/s)

| | 1-Bed Apartmen | 2-Bed Apartmer | 3-Bed Apartmen | Single | Townhome |
|---|---|---|---|---|---|
| **P =** Residential Population = | 1.4 | 2.1 | 3.1 | **3.4** | **2.7** |

**q =** Average Capita Flow
**M =** Harmon Formula
**K =** Harmon Correction Factor
**Q(ici) =** Industrial / Commercial / Institutional Flow (L/s)
**Q(e) =** Extraneous Flow (L/s)

| Institutional / Commercial / Indus | Industrial | Commercial / Institutional | |
|---|---|---|---|
| **Design =** | 35000 | 28000 | L/gross ha/day |
| **ICI Peak *** | | | |
| **Design =** | 1.0 | 1.5 | * ICI Peak = 1.0 Default, 1.5 if ICI in contributing area is >20% (design only) |

### 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

# SANITARY SEWER DESIGN SHEET

NOVATECH
Engineers, Planners & Landscape Architects

**Novatech Project #:** 123194
**Project Name:** 425 Culdaff Road
**Date:** 6/13/2024
**Revised:** 02/05/2025 (Anthony Mestwarp)
**Revised:** 08/13/2025 (Anthony Mestwarp)
**Revised:** 03/05/2026 (Anthony Mestwarp)
**Revised:** 06/08/2026 (Anthony Mestwarp)
**Input By:** Anjush Musyaju
**Reviewed By:** Anthony Mestwarp P.Eng.
**Drawing Reference:** 123194-SAN

**Legend:**
- Design Input by User
- As-Built Input by User
- Cumulative Cell
- Calculated Design Cell Output

**Reference:** City of Ottawa - Sewer Design Guidelines (2012 an
MOE - Design Guidelines for Sewage Works (2008

**Post Palladium 2**

| Location | | | | Demand | | | | | | | | | | | | | | | | | Extraneous Flow Area Method | | Total Design Flow | Design Capacity | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Residential Flow | | | | | | | | | | | | | | | | | | | | Proposed Sewer Pipe Sizing / Design | | | | | | | |
| Street | Area ID | From MH | To MH | 1 bed | 2 bed | 3bed | Population (in 1000's) | Cumulative Population (in 1000's) | Average Pop. Flow Q(q) (L/s) | Design Peaking Factor M | Peak Design Pop. Flow Q(p) (L/s) | Res. Drainage Area (ha.) | Cumulative Res. Drainage Area (ha.) | Commercial / Institutional Area (ha.) | Cumulative Commercial / Institutional Area (ha.) | Park Area | Cumlativ Park area | Average Design Commercial / Institutional Flow (L/s) | Commercial / Institutional Peaking Factor | Cumulative ICI Area (ha.) | Peak Design ICI Flow Q (ici) (L/s) | Cumulative Extraneous Drainage Area (ha.) | Design Extraneous Flow Q(e) (L/s) | Total Peak Design Flow Q(D) (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) | Q(D) / Qfull |
| **Culdaff rd** | **425 Culdaff Road** | **BLDG** | **Ex. 71A** | **48** | **93** | **36** | **0.374** | **0.374** | **1.21** | **3.43** | **4.16** | **0.973** | **0.973** | **0.000** | **0.000** | | | **0.00** | **1.00** | **0.000** | **0.00** | **0.973** | **0.32** | **4.48** | **3.0** | **200 PVC** | **0.203** | **0.013** | **1.00** | **34.2** | **1.06** | **13.1%** |
| **Culdaff rd** | **425 Culdaff Road** | **71A** | **72a** | | | | **0.000** | **0.374** | **1.21** | **3.43** | **4.16** | **0.000** | **0.973** | **0.000** | **0.000** | | | **0.00** | **1.00** | **0.000** | **0.00** | **0.973** | **0.32** | **4.48** | **15.0** | **250 PVC** | **0.254** | **0.013** | **0.65** | **50.0** | **0.99** | **9.0%** |
| Culdaff rd | | 70A | 72A | | | | 0.000 | 0.000 | 0.00 | 3.80 | 0.00 | 0.190 | 0.630 | 27.300 | 27.300 | | | 8.85 | 1.50 | 27.300 | 13.27 | 27.930 | 9.22 | 22.49 | 76.0 | 250 PVC | 0.254 | 0.013 | 0.30 | 34.0 | 0.67 | 66.2% |
| Culdaff rd | | 72A | 73A | | | | 0.000 | 0.374 | 1.21 | 3.43 | 4.16 | 0.160 | 1.763 | 0.000 | 27.300 | | | 8.85 | 1.50 | 27.300 | 13.27 | 29.063 | 9.59 | 27.02 | 76.0 | 250 PVC | 0.254 | 0.013 | 0.30 | 34.0 | 0.67 | 79.5% |
| Derreen Ave | | 730A | 73A | | | | 0.000 | 5.586 | 18.10 | 2.76 | 49.96 | | 82.890 | 0.000 | 0.000 | | | 0.00 | 1.00 | 0.000 | 0.00 | 82.890 | 27.35 | 77.32 | 10.0 | 375 PVC | 0.381 | 0.013 | 0.30 | 100.2 | 0.88 | 77.2% |
| Culdaff Road | | 64A | 73A | | | | 0.000 | 1.447 | 4.69 | 3.15 | 14.78 | 0.110 | 12.630 | 0.000 | 1.670 | 0.530 | 0.530 | 0.60 | 1.00 | 2.200 | 0.60 | 14.830 | 4.89 | 20.28 | 10.0 | 375 PVC | 0.381 | 0.013 | 0.30 | 100.2 | 0.88 | 20.2% |
| Derreen Avenue | | 73A | 75A | | | | 0.000 | 7.407 | 24.00 | 2.67 | 64.00 | 0.090 | 97.373 | 0.000 | 28.970 | | 0.530 | 9.45 | 1.50 | 29.500 | 14.17 | 126.343 | 41.69 | 119.86 | 35.5 | 450 PVC | 0.457 | 0.013 | 0.25 | 148.7 | 0.91 | 80.6% |
| | Block 241 | 74A | 75A | | | | 0.000 | 0.000 | 0.00 | 3.80 | 0.00 | 0.000 | 0.000 | 1.060 | 1.060 | | 0.000 | 0.34 | 1.50 | 1.060 | 0.52 | 1.060 | 0.35 | 0.87 | 15.5 | 250 PVC | 0.254 | 0.013 | 0.65 | 50.0 | 0.99 | 1.7% |
| **Derreen Avenue** | | **75A** | **New Manhole** | | | | **0.000** | **7.407** | **24.00** | **2.67** | **64.00** | **0.310** | **97.683** | **0.000** | **30.030** | | **0.530** | **9.79** | **1.50** | **30.560** | **14.68** | **127.713** | **42.15** | **120.83** | **74.5** | **450 PVC** | **0.457** | **0.013** | **0.25** | **148.7** | **0.91** | **81.2%** |
| | **2765 Palladium Road** | | **New Manhole** | **93** | **157** | **54** | **0.627** | **0.627** | **2.03** | **3.34** | **6.78** | **1.594** | **1.594** | | **0.000** | | **0.000** | **0.00** | **1.00** | **0.000** | **0.00** | **1.594** | **0.53** | **7.31** | **20.0** | **200 PVC** | **0.203** | **0.013** | **1.00** | **34.2** | **1.06** | **21.4%** |
| **Derreen Avenue** | | **New Manhole** | **77A** | | | | **0.000** | **8.034** | **26.04** | **2.64** | **68.71** | **0.310** | **99.587** | **0.000** | **30.030** | | **0.530** | **9.79** | **1.50** | **30.560** | **14.68** | **129.617** | **42.77** | **126.16** | **37.4** | **450 PVC** | **0.457** | **0.013** | **0.25** | **148.7** | **0.91** | **84.8%** |
| | Block 240 | | 77A | | | | 0.000 | 0.000 | 0.00 | 3.80 | 0.00 | | 0.000 | 0.640 | 0.640 | | 0.000 | 0.21 | 1.50 | 0.640 | 0.31 | 0.640 | 0.21 | 0.52 | 16.0 | 250 PVC | 0.254 | 0.013 | 0.65 | 50.0 | 0.99 | 1.0% |
| Derreen Avenue | | 77A | 78A | | | | 0.000 | 8.034 | 26.04 | 2.64 | 68.71 | 0.200 | 99.787 | 0.000 | 30.670 | | 0.530 | 10.00 | 1.50 | 31.200 | 14.99 | 130.457 | 43.05 | 126.75 | 72.0 | 450 PVC | 0.457 | 0.013 | 0.25 | 148.7 | 0.91 | 85.2% |
| Derreen Avenue | | 78A | 200A | | | | 0.000 | 8.034 | 26.04 | 2.64 | 68.71 | 0.140 | 99.927 | 0.000 | 30.670 | | 0.530 | 10.00 | 1.50 | 31.200 | 14.99 | 130.597 | 43.10 | 126.80 | 26.5 | 450 PVC | 0.457 | 0.013 | 0.25 | 148.7 | 0.91 | 85.3% |
| | Commercial | 251A | 200A | | | | 0.000 | 0.000 | 0.00 | 3.80 | 0.00 | | 0.000 | 1.350 | 1.350 | | 0.000 | 0.44 | 1.50 | 1.350 | 0.66 | 1.350 | 0.45 | 1.10 | 90.5 | 250 PVC | 0.254 | 0.013 | 0.65 | 50.0 | 0.99 | 2.2% |
| Robert Grant Ave | | 200A | 201A | | | | 0.000 | 8.034 | 26.04 | 2.64 | 68.71 | 2.190 | 102.117 | 0.000 | 32.020 | | 0.530 | 10.43 | 1.50 | 32.550 | 15.65 | 134.137 | 44.27 | 128.62 | 67.0 | 450 PVC | 0.457 | 0.013 | 0.25 | 148.7 | 0.91 | 86.5% |
| Robert Grant Ave | | 201A | 202A | | | | 0.000 | 8.034 | 26.04 | 2.64 | 68.71 | 0.260 | 102.377 | 0.000 | 33.370 | | 0.530 | 10.87 | 1.50 | 33.900 | 16.31 | 135.747 | 44.80 | 129.81 | 70.0 | 450 PVC | 0.457 | 0.013 | 0.25 | 148.7 | 0.91 | 87.3% |
| Robert Grant Ave | | 202A | 203A | | | | 0.000 | 8.034 | 26.04 | 2.64 | 68.71 | 0.230 | 102.607 | 0.000 | 33.370 | | 0.530 | 10.87 | 1.50 | 33.900 | 16.31 | 135.977 | 44.87 | 129.89 | 63.5 | 450 PVC | 0.457 | 0.013 | 0.25 | 148.7 | 0.91 | 87.3% |
| Robert Grant Ave | | 203A | 204A | | | | 0.000 | 8.034 | 26.04 | 2.64 | 68.71 | 0.430 | 103.037 | 0.000 | 33.370 | | 0.530 | 10.87 | 1.50 | 33.900 | 16.31 | 136.407 | 45.01 | 130.03 | 83.5 | 450 PVC | 0.457 | 0.013 | 0.25 | 148.7 | 0.91 | 87.4% |
| | Stittsville Main Street | 2000A | 204A | | | | 0.000 | 0.028 | 0.09 | 3.69 | 0.33 | 1.010 | 1.010 | | 0.000 | | 0.000 | 0.00 | 1.00 | 0.000 | 0.00 | 1.010 | 0.33 | 0.67 | 100.0 | 250 PVC | 0.254 | 0.013 | 0.65 | 50.0 | 0.99 | 1.3% |
| Robert Grant Ave | | 204A | 205A | | | | 0.000 | 8.062 | 26.13 | 2.64 | 68.91 | 0.690 | 104.737 | 0.000 | 33.370 | | 0.530 | 10.87 | 1.50 | 33.900 | 16.31 | 138.107 | 45.58 | 130.80 | 110.0 | 450 PVC | 0.457 | 0.013 | 0.25 | 148.7 | 0.91 | 88.0% |
| Robert Grant Ave | | 205A | 206A | | | | 0.000 | 8.062 | 26.13 | 2.64 | 68.91 | 0.590 | 105.327 | 0.000 | 33.370 | | 0.530 | 10.87 | 1.50 | 33.900 | 16.31 | 138.697 | 45.77 | 130.99 | 114.5 | 450 PVC | 0.457 | 0.013 | 0.25 | 148.7 | 0.91 | 88.1% |
| Robert Grant Ave | | 206A | 207A | | | | 0.000 | 8.062 | 26.13 | 2.64 | 68.91 | 0.160 | 105.487 | 7.460 | 40.830 | | 0.530 | 13.29 | 1.50 | 41.360 | 19.93 | 146.317 | 48.28 | 137.13 | 37.0 | 450 PVC | 0.457 | 0.013 | 0.30 | 162.9 | 0.99 | 84.2% |
| Robert Grant Ave | | 207A | 208A | | | | 0.000 | 8.062 | 26.13 | 2.64 | 68.91 | 0.860 | 106.347 | | 40.830 | | 0.530 | 13.29 | 1.50 | 41.360 | 19.93 | 147.177 | 48.57 | 137.42 | 43.5 | 450 PVC | 0.457 | 0.013 | 0.30 | 162.9 | 0.99 | 84.4% |
| Robert Grant Ave | | 208A | 209A | | | | 0.000 | 8.062 | 26.13 | 2.64 | 68.91 | 0.340 | 106.687 | | 40.830 | | 0.530 | 13.29 | 1.50 | 41.360 | 19.93 | 147.517 | 48.68 | 137.53 | 90.5 | 450 PVC | 0.457 | 0.013 | 0.30 | 162.9 | 0.99 | 84.4% |
| Robert Grant Ave | | 209A | 210A | | | | 0.000 | 8.062 | 26.13 | 2.64 | 68.91 | 0.380 | 107.067 | | 40.830 | | 0.530 | 13.29 | 1.50 | 41.360 | 19.93 | 147.897 | 48.81 | 137.65 | 101.5 | 450 PVC | 0.457 | 0.013 | 0.30 | 162.9 | 0.99 | 84.5% |
| Robert Grant Ave | | 210A | 211A | | | | 0.000 | 8.062 | 26.13 | 2.64 | 68.91 | 0.270 | 107.337 | | 40.830 | | 0.530 | 13.29 | 1.50 | 41.360 | 19.93 | 148.167 | 48.89 | 137.74 | 73.0 | 450 PVC | 0.457 | 0.013 | 0.30 | 162.9 | 0.99 | 84.6% |
| Robert Grant Ave | | 211A | 217A | | | | 0.000 | 8.062 | 26.13 | 2.64 | 68.91 | 0.380 | 107.717 | | 40.830 | | 0.530 | 13.29 | 1.50 | 41.360 | 19.93 | 148.547 | 49.02 | 137.87 | 110.0 | 450 PVC | 0.457 | 0.013 | 0.30 | 162.9 | 0.99 | 84.6% |
| Robert Grant Ave | | 217A | Huntmar | | | | 0.000 | 8.062 | 26.13 | 2.64 | 68.91 | 0.000 | 107.717 | 5.060 | 45.890 | | 0.530 | 14.93 | 1.50 | 46.420 | 22.39 | 153.607 | 50.69 | 142.00 | 110.0 | 450 PVC | 0.457 | 0.013 | 0.30 | 162.9 | 0.99 | 87.2% |
| **Totals** | | | | **48** | **93** | **36** | **0.374** | **0.374** | **1.21** | **3.43** | **4.16** | **0.973** | **0.973** | | **0.000** | **0.000** | | **0.00** | **1.00** | **0.000** | **0.00** | **0.973** | **0.32** | **4.48** | **3.0** | | | | | | | |

### Demand Equation / Parameters

1. **Q(D) =** Q(p) + Q(ici) + Q(e)
2. **Q(p) =** (P x q x M x K / 86,400)
3. **q =** 280 L/per person/day (design)
4. **M = Harmon Formula (maximum of 4.0)**
5. **K =** 0.8 (design)
6. **Park flow is considered equivalent to a single unit / ha**
   **Park Demand =** 9300 L/ha/day
7. **Q(ici) =** ICI Area x ICI Flow x ICI Peak
8. **Q(e) =** 0.33 L/s/ha (design)

### Definitions

**Q(D) =** Peak Design Flow (L/s)
**Q(p) =** Peak Design Population Flow (L/s)
**Q(q) =** Average Population Flow (L/s)

| | 1-Bed Apartment | 2-Bed Apartment | 3-Bed Apartment | Single | Townhome |
|---|---|---|---|---|---|
| **P =** Residential Population = | 1.4 | 2.1 | 3.1 | **3.4** | **2.7** |

**q =** Average Capita Flow
**M =** Harmon Formula
**K =** Harmon Correction Factor
**Q(ici) =** Industrial / Commercial / Institutional Flow (L/s)
**Q(e) =** Extraneous Flow (L/s)

| Institutional / Commercial / Indus | Industrial | Commercial / Institutional | |
|---|---|---|---|
| **Design =** | 35000 | 28000 | L/gross ha/day |
| **ICI Peak *** | | | |
| **Design =** | 1.0 | 1.5 | * ICI Peak = 1.0 Default, 1.5 if ICI in contributing area is >20% (design only) |

### 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

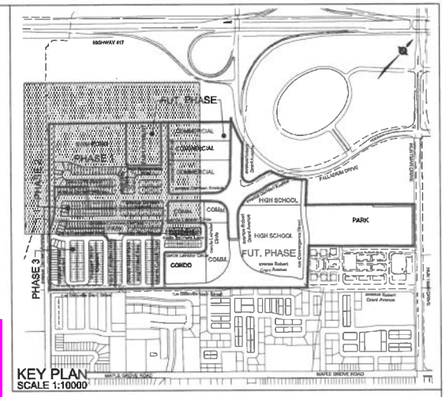
REVIEWED BY DEVELOPMENT REVIEW BRANCH

Signed

Date Sep 25 2020

Plan Number 18059

MARK-UPS BY NOVATECH
PREPARED BY ANTHONY
MESTWARP
DATE FEBRUARY 05, 2024




LEGEND

- SANITARY DRAINAGE BOUNDARY
- SANITARY SUB-DRAINAGE BOUNDARY
- SANITARY DRAINAGE BOUNDARY (OTHER PHASES)
- UPSTREAM MH TO DOWNSTREAM MH — 43A - 44A
- AREA IN HECTARES — 0.78
- POPULATION — 61
- UPSTREAM MH TO DOWNSTREAM MH — 43A - 44A
- AREA IN OTHER PHASES IN HECTARES — 0.78
- POPULATION — 61
- EXTERNAL AREA IN HECTARES — A=53.63
- EXTERNAL POPULATION — 107 P&P=6739
- DENSITY (PERSONS/HECTARE)
- EXTERNAL LAND USE — RESIDENTIAL
- MAINTENANCE HOLE — MH202A
- CAP

REFER TO DWG No. 90

block 256& 243
A=3.32ha

425 Culdaff Road
A=0.973ha
population = 374

2765 Palladium
A=1.594ha

A=21.99Ha
COMMERCIAL

A=73.25Ha
POP=4900
RESIDENTIAL

TOPOGRAPHIC INFORMATION
CITY OF OTTAWA 1K MAPPING, RECEIVED ON OCTOBER 4, 2016. FEEDMILL CREEK TOPOGRAPHIC SURVEY (JULY 25, 2019) AND PALLADIUM DRIVE TOPOGRAPHIC SURVEY (JUNE 23, 2020) PROVIDED BY STANTEC (PROJECT No. 161613545-111)

LEGAL INFORMATION
M-PLAN PROVIDED BY STANTEC GEOMATICS LTD., PROJECT No. 16-16-135-45 (195 HUNTMAR ROAD), RECEIVED ON MAY 21, 2020.
3rd SUBMISSION 20-07-09

ELEVATION NOTE
ELEVATIONS SHOWN HEREON ARE GEODETIC (COVID-1928:1978) AND ARE DERIVED FROM THE CAN-NET VRS NETWORK MONUMENT: OTTAWA
ELEVATION = 95.205m

| No. | BY | DATE | DESCRIPTION |
|---|---|---|---|
| 3 | W.L. | 20-07-09 | 3rd SUBMISSION |
| 2 | W.L. | 20-04-03 | 2nd SUBMISSION |
| 1 | W.L. | 19-12-23 | 1st SUBMISSION |

Ottawa CITY OF OTTAWA

PROJECT No. 12-624

LICENSED PROFESSIONAL ENGINEER W. LIU 100167632 20-07-04 PROVINCE OF ONTARIO

© DSEL

# SANITARY DRAINAGE PLAN

2325483 ONTARIO LTD.

195 HUNTMAR DRIVE


dsel david schaeffer engineering ltd
120 Iber Road, Unit 103
Stittsville, ON K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca


| | | |
|---|---|---|
| DRAWN BY: R.A./A.K. | CHECKED BY: W.L. | SHEET NO. |
| DESIGNED BY: W.L. | CHECKED BY: C.M. | 88 |
| SCALE: 1:1000 | DATE: DECEMBER 2019 | |

CITY PLAN No. 18059

CITY FILE No. D07-16-16-0011

MARK-UPS BY NOVATECH
PREPARED BY ANTHONY MESTWARP
DATE FEBRUARY 05, 2024

block 256& 243
A=3.32ha

425 Culdaff Road
A=0.973ha
population = 374

2765 Palladium
A=1.594ha

REFER TO DWG No. 88

REFER TO DWG No. 92

REFER TO DWG No. 91

A=21.99Ha
COMMERCIAL

A=0.66Ha
COMMERCIAL

A=0.69Ha
COMMERCIAL

chemin Culdaff Road

avenue Robert Grant Avenue

avenue Derreen Avenue

PALLADIUM DRIVE

PALLADIUM AUTO PARK

AUTOPARK

BLOCK 255
BLOCK 256
BLOCK 243
BLOCK 241
BLOCK 240
BLOCK 254
BLOCK 253
BLOCK 247

65A - 67A 0.07 0
66A - 67A 1.59
69A - 70A 1.60
67A - 70A 0.25 0
70A - 71A 0.19 0
71A 72A 2.70
72A - 73A 0.16 0
73A - 75A 0.09 0
75A - 77A 0.31 0
77A - 78A 0.20 0
78A - 200A 0.14
200A-201A 1.93 0
200A-201A 0.26 0
201A-202A 0.26 0
74A - 75A 1.06
76A - 77A 0.64
64A - 73A 0.11 0
63A - 64A 0.03 0
62A - 63A 0.01 0
61A - 62A 0.45 0
59A - 63A
206A-207A 1.55

cercle Leinster Circle

FUT. PHASE
PHASE 1

REVIEWED BY DEVELOPMENT REVIEW BRANCH
Signed
Date Sep 25 2020
Plan Number 18059

KEY PLAN
SCALE 1:10000

PHASE 1
PHASE 2
PHASE 3
FUT. PHASE
SWM POND
PARK
COMM
CONDO
HIGH SCHOOL

LEGEND

SANITARY DRAINAGE BOUNDARY
SANITARY SUB-DRAINAGE BOUNDARY
SANITARY DRAINAGE BOUNDARY (OTHER PHASES)
UPSTREAM MH TO DOWNSTREAM MH — 43A - 44A
AREA IN HECTARES — 0.78
POPULATION — 61
UPSTREAM MH TO DOWNSTREAM MH — 43A - 44A
AREA IN OTHER PHASES IN HECTARES — 0.78
POPULATION — 61
EXTERNAL AREA IN HECTARES — A=53.63
EXTERNAL POPULATION — 107 POP=5739
DENSITY (PERSONS/HECTARE)
EXTERNAL LAND USE — RESIDENTIAL
MAINTENANCE HOLE — 200MM SAN MH202A
CAP

TOPOGRAPHIC INFORMATION
CITY OF OTTAWA 1K MAPPING, RECEIVED ON OCTOBER 4, 2018. FEEDMILL CREEK TOPOGRAPHIC SURVEY (JULY 26, 2019) AND PALLADIUM DRIVE TOPOGRAPHIC SURVEY (JUNE 23, 2020) PROVIDED BY STANTEC (PROJECT No. 161613545-111)

LEGAL INFORMATION
M-PLAN PROVIDED BY STANTEC GEOMATICS LTD., PROJECT No. 16-16-135-45 (195 HUNTMAR ROAD), RECEIVED ON MAY 21, 2020.
3rd SUBMISSION 20-07-09

ELEVATION NOTE
ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928:1978) AND ARE DERIVED FROM THE CAN-NET VRS NETWORK MONUMENT: OTTAWA
ELEVATION = 95.205m

| No. | BY | DATE | DESCRIPTION |
|---|---|---|---|
| 3 | W.L. | 20-07-09 | 3rd SUBMISSION |
| 2 | W.L. | 20-04-01 | 2nd SUBMISSION |
| 1 | W.L. | 19-12-23 | 1st SUBMISSION |

Ottawa CITY OF OTTAWA

PROJECT No. 12-624

PROFESSIONAL ENGINEER W. LIU 100167932 PROVINCE OF ONTARIO

CITY PLAN No. 18059
CITY FILE No. D07-16-16-0011

© DSEL

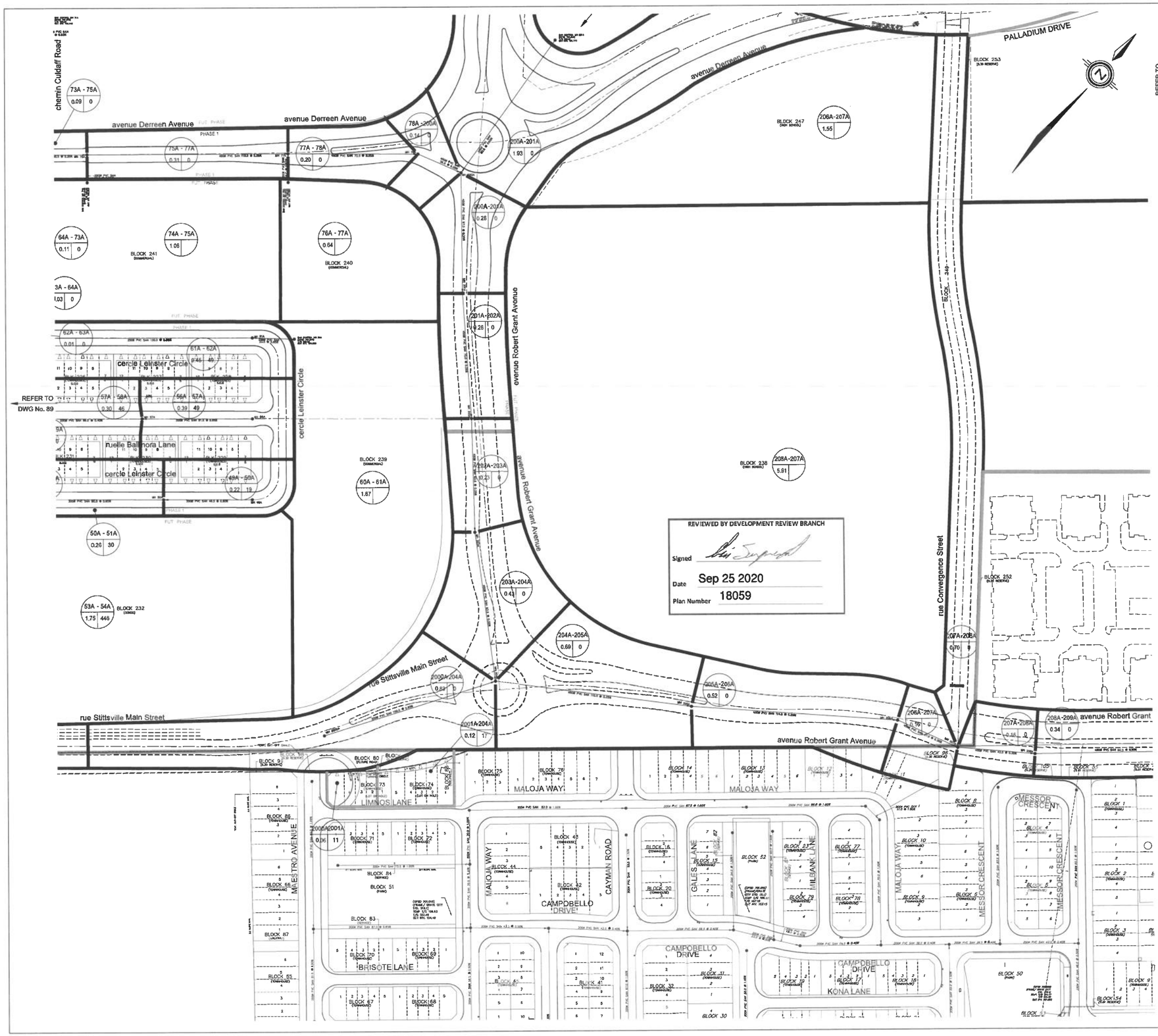
# SANITARY DRAINAGE PLAN

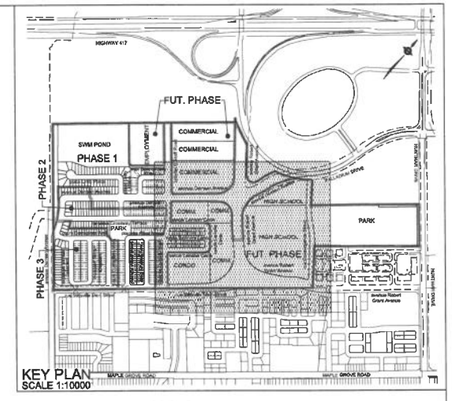
2325483 ONTARIO LTD.

195 HUNTMAR DRIVE

DSEL david schaeffer engineering ltd
120 Iber Road, Unit 103
Stittsville, ON K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

| | | |
|---|---|---|
| DRAWN BY: R.A./A.K. | CHECKED BY: W.L. | SHEET NO. |
| DESIGNED BY: W.L. | CHECKED BY: C.M. | 90 |
| SCALE: 1:1000 | DATE: DECEMBER 2019 | |




## LEGEND

- SANITARY DRAINAGE BOUNDARY
- SANITARY SUB-DRAINAGE BOUNDARY
- SANITARY DRAINAGE BOUNDARY (OTHER PHASES)
- UPSTREAM MH TO DOWNSTREAM MH — 43A - 44A
- AREA IN HECTARES — 0.78
- POPULATION — 61
- UPSTREAM MH TO DOWNSTREAM MH — 43A - 44A
- AREA IN OTHER PHASES IN HECTARES — 0.78
- POPULATION — 61
- EXTERNAL AREA IN HECTARES — A=53.63
- EXTERNAL POPULATION — 107
- DENSITY (PERSONS/HECTARE) — POP=5739
- EXTERNAL LAND USE — RESIDENTIAL
- MAINTENANCE HOLE — MH202A
- CAP

TOPOGRAPHIC INFORMATION
CITY OF OTTAWA 1K MAPPING, RECEIVED ON OCTOBER 4, 2016. FEEDMILL CREEK TOPOGRAPHIC SURVEY (JULY 25, 2019) AND PALLADIUM DRIVE TOPOGRAPHIC SURVEY (JUNE 23, 2020) PROVIDED BY STANTEC (PROJECT No. 161613545-111)

LEGAL INFORMATION
M-PLAN PROVIDED BY STANTEC GEOMATICS LTD., PROJECT No. 16-16-135-45 (195 HUNTMAR ROAD), RECEIVED ON MAY 21, 2020.
3rd SUBMISSION 20-07-09

ELEVATION NOTE
ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928:1978) AND ARE DERIVED FROM THE CAN-NET VRS NETWORK MONUMENT: OTTAWA

ELEVATION = 95.205m

| No. | BY | DATE | DESCRIPTION |
|---|---|---|---|
| 3 | W.L. | 20-07-09 | 3rd SUBMISSION |
| 2 | W.L. | 20-04-03 | 2nd SUBMISSION |
| 1 | W.L. | 19-12-23 | 1st SUBMISSION |

CITY OF OTTAWA

PROJECT No. 12-624

LICENSED PROFESSIONAL ENGINEER — W. LIU — 100167932 — 2020-07-09 — PROVINCE OF ONTARIO

© DSEL

# SANITARY DRAINAGE PLAN

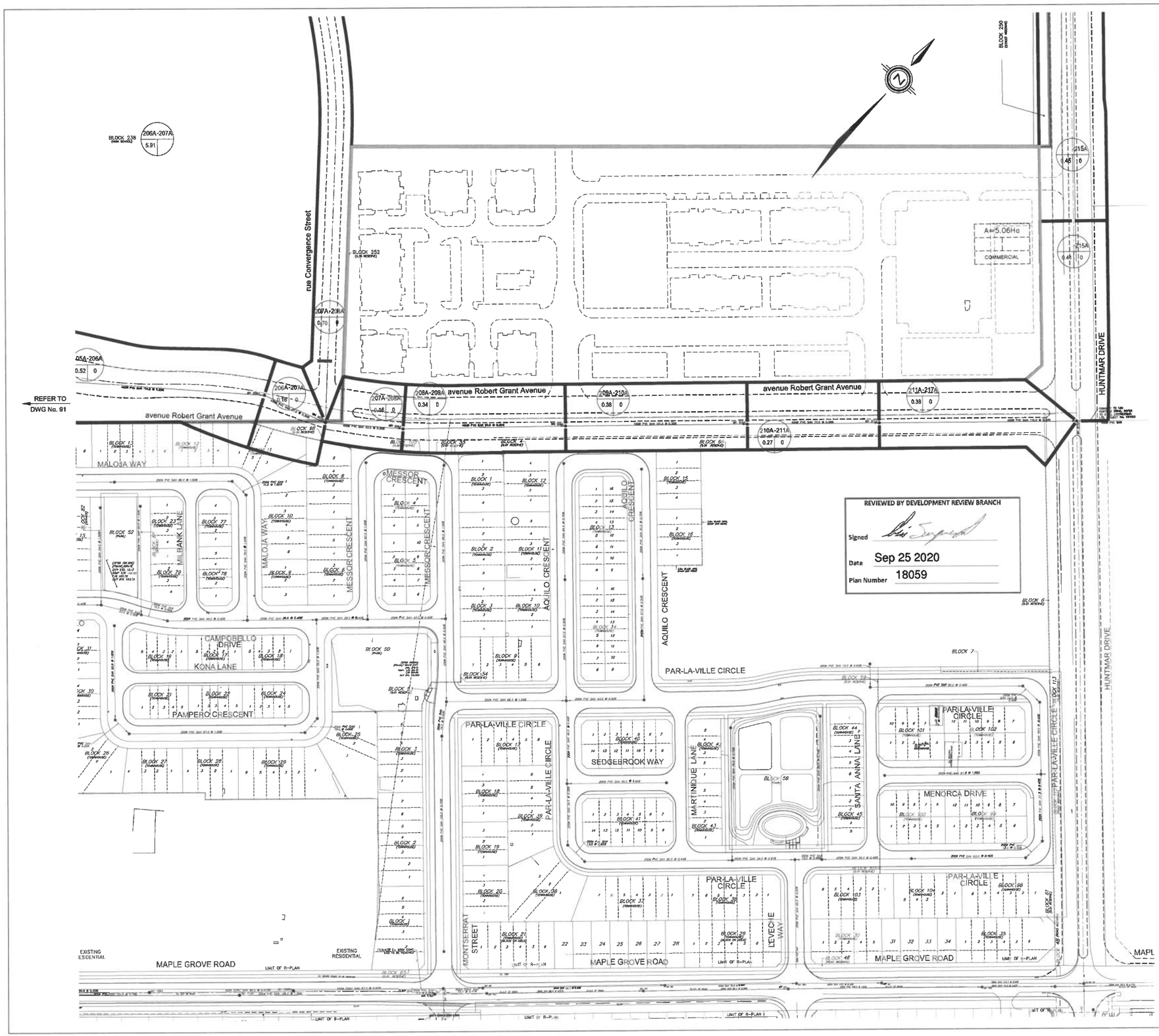
2325483 ONTARIO LTD.

195 HUNTMAR DRIVE

DSEL david schaeffer engineering ltd
120 Iber Road, Unit 103
Stittsville, ON K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

| | | |
|---|---|---|
| DRAWN BY: R.A./A.K. | CHECKED BY: W.L. | SHEET NO. 91 |
| DESIGNED BY: W.L. | CHECKED BY: C.M. | |
| SCALE: 1:1000 | DATE: DECEMBER 2019 | |

CITY FILE No. D07-16-16-0011 CITY PLAN No. 18059


BLOCK 238
206A-207A
5.91
rue Convergence Street
REFER TO DWG No. 91
REFER TO DWG No. 92
BLOCK 250
BLOCK 252
A=5.06Ha
COMMERCIAL
215A
0.46 0
215A
0.44 0
HUNTMAR DRIVE
207A-208A
0.70 0
205A-206A
0.52 0
206A-207A
0.16 0
207A-208A
0.46 0
208A-209A
0.34 0
209A-210A
0.38 0
211A-217
0.38 0
210A-211A
0.27 0
avenue Robert Grant Avenue
avenue Robert Grant Avenue
avenue Robert Grant Avenue
MALOJA WAY
MILBANK LANE
MESSOR CRESCENT
MESSOR CRESCENT
AQUILO CRESCENT
AQUILO CRESCENT
CAMPOBELLO DRIVE
KONA LANE
PAMPERO CRESCENT
PAR-LA-VILLE CIRCLE
PAR-LA-VILLE CIRCLE
PAR-LA-VILLE CIRCLE
PAR-LA-VILLE CIRCLE
PAR-LA-VILLE CIRCLE
SEDGEBROOK WAY
MARTINIQUE LANE
SANTA ANNA LANE
MENORCA DRIVE
MONTSERRAT STREET
LEVECHE WAY
MAPLE GROVE ROAD
MAPLE GROVE ROAD
MAPLE GROVE ROAD
EXISTING RESIDENTIAL
EXISTING RESIDENTIAL
LIMIT OF R-PLAN
LIMIT OF R-PLAN
LIMIT OF R-PLAN
LIMIT OF R-PLAN
LIMIT OF R-PLAN
REVIEWED BY DEVELOPMENT REVIEW BRANCH
Signed
Date Sep 25 2020
Plan Number 18059
FUT. PHASE
PHASE 1
PHASE 2
PHASE 3
SWM POND
EMPLOYMENT
COMMERCIAL
COMMERCIAL
COMMERCIAL
COMM.
COMM.
CONDO
COMM.
FUTURE PHASE
KEY PLAN
SCALE 1:10000
LEGEND
SANITARY DRAINAGE BOUNDARY
SANITARY SUB-ORAINAGE BOUNDARY
SANITARY ORAINAGE BOUNDARY (OTHER PHASES)
UPSTREAM MH TO DOWNSTREAM MH
AREA IN HECTARES
POPULATION
43A - 44A
0.78 61
UPSTREAM MH TO DOWNSTREAM MH
AREA IN OTHER PHASES IN HECTARES
POPULATION
43A-44A
0.78 61
EXTERNAL AREA IN HECTARES
EXTERNAL POPULATION
DENSITY (PERSONS/HECTARE)
EXTERNAL LAND USE
A=53.63
107 POP=5730
RESIDENTIAL
MAINTENANCE HOLE
MH202A
CAP
TOPOGRAPHIC INFORMATION
CITY OF OTTAWA 1K MAPPING, RECEIVED ON OCTOBER 4, 2016. FEEDMILL CREEK TOPOGRAPHIC SURVEY (JULY 26, 2019) AND PALLADIUM DRIVE TOPOGRAPHIC SURVEY (JUNE 23, 2020) PROVIDED BY STANTEC (PROJECT No. 161613545-111)
LEGAL INFORMATION
M-PLAN PROVIDED BY STANTEC GEOMATICS LTD., PROJECT No. 16-16-135-45
(195 HUNTMAR ROAD). RECEIVED ON MAY 21, 2020.
3rd SUBMISSION 20-07-09
ELEVATION NOTE
ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928:1978) AND ARE DERIVED FROM THE CAN-NET VRS NETWORK MONUMENT: OTTAWA
ELEVATION = 85.205m
3 W.L. 20-07-09 3rd SUBMISSION
2 W.L. 20-04-03 2nd SUBMISSION
1 W.L. 19-12-23 1st SUBMISSION
No. BY DATE DESCRIPTION
Ottawa CITY OF OTTAWA
PROJECT No. 12-624
LICENSED PROFESSIONAL ENGINEER W. LIU 100167932 PROVINCE OF ONTARIO
© DSEL
SANITARY DRAINAGE PLAN
2325483 ONTARIO LTD.
195 HUNTMAR DRIVE
DSEL david schaeffer engineering ltd
120 Iber Road, Unit 103 Stittsville, ON K2S 1E9 Tel. (613) 836-0856 Fax. (613) 836-7183 www.DSEL.ca
DRAWN BY: R.A./A.K.
CHECKED BY: W.L.
DESIGNED BY: W.L.
CHECKED BY: C.M.
SCALE: 1:1000
DATE: DECEMBER 2019
SHEET NO. 93
CITY PLAN No. 18059
CITY FILE No. D07-16-16-0011

# SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

| LOCATION | | | RESIDENTIAL AREA AND POPULATION | | | | | | | | COMM | | INSTIT | | PARK | | C+I+I | INFILTRATION | | | | PIPE | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STREET | FROM M.H. | TO M.H. | AREA (ha) | UNITS | UNITS Singles | UNITS Townhouse | POP. | CUMULATIVE AREA (ha) | CUMULATIVE POP. | PEAK FACT. | PEAK FLOW (l/s) | AREA (ha) | ACCU. AREA (ha) | AREA (ha) | ACCU. AREA (ha) | AREA (ha) | ACCU. AREA (ha) | PEAK FLOW (l/s) | TOTAL AREA (ha) | ACCU. AREA (ha) | INFILT. FLOW (l/s) | TOTAL FLOW (l/s) | DIST (m) | DIA (mm) | SLOPE (%) | CAP. (FULL) (l/s) | RATIO Q act/Q cap | VEL. (FULL) (m/s) | VEL. (ACT.) (m/s) |
| **Block 240 (Commercial)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 76A | 77A | | | | | | 0.00 | | | | 0.64 | 0.64 | | 0.00 | | 0.00 | 0.31 | 0.64 | 0.64 | 0.21 | 0.52 | 16.0 | 250 | 0.65 | 47.94 | 0.01 | 0.98 | 0.31 |
| To avenue Derreen Avenue, Pipe 77A - 78A | | | | | | | | 0.00 | 0 | | | | 0.64 | | 0.00 | | 0.00 | | | 0.64 | | | | | | | | | |
| **Block 241 (Commercial)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 74A | 75A | | | | | | 0.00 | | | | 1.06 | 1.06 | | 0.00 | | 0.00 | 0.52 | 1.06 | 1.06 | 0.35 | 0.87 | 15.5 | 250 | 0.65 | 47.94 | 0.02 | 0.98 | 0.37 |
| To avenue Derreen Avenue, Pipe 75A - 77A | | | | | | | | 0.00 | 0 | | | | 1.06 | | 0.00 | | 0.00 | | | 1.06 | | | | | | | | | |
| **Block 244 (Employment)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 68A | 70A | | | | | | 0.00 | | | | 1.99 | 1.99 | | 0.00 | | 0.00 | 0.97 | 1.99 | 1.99 | 0.66 | 1.62 | 15.0 | 250 | 0.65 | 47.94 | 0.03 | 0.98 | 0.45 |
| To chemin Culdaff Road, Pipe 70A - 72A | | | | | | | | 0.00 | 0 | | | | 1.99 | | 0.00 | | 0.00 | | | 1.99 | | | | | | | | | |
| **Block 243 (Commercial)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 69A | 70A | | | | | | 0.00 | | | | 1.60 | 1.60 | | 0.00 | | 0.00 | 0.78 | 1.60 | 1.60 | 0.53 | 1.31 | 15.0 | 250 | 0.65 | 47.94 | 0.03 | 0.98 | 0.42 |
| To chemin Culdaff Road, Pipe 70A - 72A | | | | | | | | 0.00 | 0 | | | | 1.60 | | 0.00 | | 0.00 | | | 1.60 | | | | | | | | | |
| **Block 256 (Commercial)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 66A | 67A | | | | | | 0.00 | | | | 1.59 | 1.59 | | 0.00 | | 0.00 | 0.77 | 1.59 | 1.59 | 0.52 | 1.30 | 15.0 | 250 | 0.65 | 47.94 | 0.03 | 0.98 | 0.42 |
| To chemin Culdaff Road, Pipe 67A - 70A | | | | | | | | 0.00 | 0 | | | | 1.59 | | 0.00 | | 0.00 | | | 1.59 | | | | | | | | | |
| **Block 233 (Servicing Block)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Contribution From cours Curraglass Walk, Pipe 30A - 33A | | | | | | | | 1.42 | 139 | | | | 0.00 | | 0.00 | | 0.00 | | 1.42 | 1.42 | | | | | | | | | |
| Contribution From cours Curraglass Walk, Pipe 32A - 33A | | | | | | | | 1.15 | 120 | | | | 0.00 | | 0.00 | | 0.00 | | 1.15 | 1.15 | | | | | | | | | |
| | 33A | 34A | 0.01 | | | | 0 | 2.58 | 259 | 3.48 | 2.92 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.01 | 2.58 | 0.85 | 3.78 | 12.0 | 200 | 0.40 | 20.74 | 0.18 | 0.66 | 0.50 |
| | 34A | 37A | 0.05 | | | | 0 | 2.63 | 259 | 3.48 | 2.92 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.05 | 2.63 | 0.87 | 3.79 | 60.5 | 200 | 0.45 | 22.00 | 0.17 | 0.70 | 0.52 |
| To terrasse Crossway Terrace, Pipe 37A - 39A | | | | | | | | 2.63 | 259 | | | | 0.00 | | 0.00 | | 0.00 | | | 2.63 | | | | | | | | | |
| **terrasse Crossway Terrace** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 35A | 36A | 0.49 | 12 | 12 | | 41 | 0.49 | 41 | 3.67 | 0.49 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.49 | 0.49 | 0.16 | 0.65 | 63.5 | 200 | 0.65 | 26.44 | 0.02 | 0.84 | 0.35 |
| | 36A | 37A | 0.53 | 15 | 15 | | 51 | 1.02 | 92 | 3.60 | 1.07 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.53 | 1.02 | 0.34 | 1.41 | 77.5 | 200 | 0.70 | 27.44 | 0.05 | 0.87 | 0.45 |
| Contribution From Block 223, Pipe 34A - 37A | | | | | | | | 2.63 | 259 | | | | 0.00 | | 0.00 | | 0.00 | | 2.63 | 2.63 | | | | | | | | | |
| | 37A | 39A | 0.19 | 4 | 4 | | 14 | 3.84 | 365 | 3.43 | 4.06 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.19 | 3.84 | 1.27 | 5.33 | 46.5 | 250 | 0.30 | 32.57 | 0.16 | 0.66 | 0.49 |
| Contribution From Block 236 (Park), Pipe 38A - 39A | | | | | | | | 0.00 | 0 | | | | 0.00 | | 0.00 | | 0.53 | | 0.53 | 0.53 | 0.17 | 0.17 | 11.0 | 200 | 0.65 | 26.44 | 0.01 | 0.84 | 0.23 |
| | 400A | 640A | 0.67 | 23 | | 23 | 63 | 0.67 | 63 | 3.63 | 0.74 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.67 | 0.67 | 0.22 | 0.96 | 94.5 | 200 | 0.65 | 26.44 | 0.04 | 0.84 | 0.40 |
| | 640A | 641A | | | | | | 0.67 | 63 | 3.63 | 0.74 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.67 | 0.22 | 0.96 | 2.5 | 200 | 1.00 | 32.80 | 0.03 | 1.04 | 0.46 |
| | 39A | 40A | 0.39 | 13 | | 13 | 35 | 4.23 | 400 | 3.42 | 4.43 | | 0.00 | | 0.00 | | 0.53 | 0.09 | 0.39 | 4.76 | 1.57 | 6.09 | 79.0 | 250 | 0.30 | 32.57 | 0.19 | 0.66 | 0.51 |
| | 40A | 641A | | | | | | 4.23 | 400 | 3.42 | 4.43 | | 0.00 | | 0.00 | | 0.53 | 0.00 | 0.00 | 4.76 | 1.57 | 6.00 | 89.5 | 250 | 0.30 | 32.57 | 0.18 | 0.66 | 0.51 |
| | 641A | 64A | | | | | | 4.90 | 463 | 3.39 | 5.09 | | 0.00 | | 0.00 | | 0.53 | 0.00 | 0.00 | 5.43 | 1.79 | 6.88 | 6.0 | 250 | 0.30 | 32.57 | 0.21 | 0.66 | 0.52 |
| To chemin Culdaff Road, Pipe 64A - 73A | | | | | | | | 4.90 | 463 | | | | 0.00 | | 0.00 | | 0.53 | | | 5.43 | | | | | | | | | |
| **rang Kindred Row** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 45A | 46A | 0.71 | 22 | | 22 | 60 | 0.71 | 60 | 3.64 | 0.71 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.71 | 0.71 | 0.23 | 0.94 | 78.5 | 200 | 0.65 | 26.44 | 0.04 | 0.84 | 0.39 |
| | 46A | 47A | 0.58 | 22 | | 22 | 60 | 1.29 | 120 | 3.58 | 1.39 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.58 | 1.29 | 0.43 | 1.82 | 90.5 | 200 | 0.65 | 26.44 | 0.07 | 0.84 | 0.48 |
| To placette Allied Mews, Pipe 47A - 48A | | | | | | | | 1.29 | 120 | | | | 0.00 | | 0.00 | | 0.00 | | | 1.29 | | | | | | | | | |
| **ruelle Ballinora Lane** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 56A | 57A | 0.39 | 18 | | 18 | 49 | 0.39 | 49 | 3.65 | 0.58 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.39 | 0.39 | 0.13 | 0.71 | 61.5 | 200 | 0.65 | 26.44 | 0.03 | 0.84 | 0.36 |
| | 57A | 58A | 0.30 | | | 17 | 46 | 0.69 | 95 | 3.60 | 1.11 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.30 | 0.69 | 0.23 | 1.34 | 66.0 | 200 | 0.40 | 20.74 | 0.06 | 0.66 | 0.37 |
| | 58A | 59A | 0.01 | | | | | 0.70 | 95 | 3.60 | 1.11 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.01 | 0.70 | 0.23 | 1.34 | 10.5 | 200 | 0.40 | 20.74 | 0.06 | 0.66 | 0.37 |
| To chemin Culdaff Road, Pipe 59A - 63A | | | | | | | | 0.70 | 95 | | | | 0.00 | | 0.00 | | 0.00 | | | 0.70 | | | | | | | | | |

DESIGN PARAMETERS

| | | | | |
|---|---|---|---|---|
| Park Flow = | 9300 | L/ha/da | 0.10764 | l/s/Ha |
| Average Daily Flow = | 280 | l/p/day | | |
| Comm/Inst Flow = | 28000 | L/ha/da | 0.3241 | l/s/Ha |
| Industrial Flow = | 35000 | L/ha/da | 0.40509 | l/s/Ha |
| Max Res. Peak Factor = | 4.00 | | | |
| Commercial/Inst./Park Peak Factor = | 1.50 | | | |
| Institutional = | 0.32 | l/s/Ha | | |

Industrial Peak Factor = as per MOE Graph

| | | | | |
|---|---|---|---|---|
| Extraneous Flow = | 0.330 | L/s/ha | | |
| Minimum Velocity = | 0.600 | m/s | | |
| Manning's n = | (Conc) | 0.013 | (Pvc) | 0.013 |
| Townhouse coeff= | 2.7 | | | |
| Single house coeff= | 3.4 | | | |

| | | | |
|---|---|---|---|
| Designed: R.A. | PROJECT: **195 Huntmar Drive** | | |
| Checked: W.L. | LOCATION: **City of Ottawa** | | |
| Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 87-93 | File Ref: 12-624 | Date: **July 2020** | Sheet No. 1 of 5 |

# SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

| LOCATION | | | RESIDENTIAL AREA AND POPULATION | | | | | | | | | COMM | | INSTIT | | PARK | | C+I+I | INFILTRATION | | | | PIPE | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STREET | FROM M.H. | TO M.H. | AREA (ha) | UNITS | UNITS Singles | UNITS Townhouse | POP. | CUMULATIVE AREA (ha) | CUMULATIVE POP. | PEAK FACT. | PEAK FLOW (l/s) | AREA (ha) | ACCU. AREA (ha) | AREA (ha) | ACCU. AREA (ha) | AREA (ha) | ACCU. AREA (ha) | PEAK FLOW (l/s) | TOTAL AREA (ha) | ACCU. AREA (ha) | INFILT. FLOW (l/s) | TOTAL FLOW (l/s) | DIST (m) | DIA (mm) | SLOPE (%) | CAP. (FULL) (l/s) | RATIO Q act/Q cap | VEL. (FULL) (m/s) | VEL. (ACT.) (m/s) |
| **placette Allied Mews** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 41A | 42A | 0.71 | 22 | | 22 | 60 | 0.71 | 60 | 3.64 | 0.71 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.71 | 0.71 | 0.23 | 0.94 | 79.0 | 200 | 0.80 | 29.34 | 0.03 | 0.93 | 0.42 |
| | 42A | 43A | 0.57 | 22 | | 22 | 60 | 1.28 | 120 | 3.58 | 1.39 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.57 | 1.28 | 0.42 | 1.81 | 83.0 | 200 | 0.40 | 20.74 | 0.09 | 0.66 | 0.40 |
| | 43A | 44A | 0.03 | | | | 0 | 1.31 | 120 | 3.58 | 1.39 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.03 | 1.31 | 0.43 | 1.82 | 11.0 | 200 | 0.40 | 20.74 | 0.09 | 0.66 | 0.41 |
| | 44A | 47A | 0.24 | 7 | | 7 | 19 | 1.55 | 139 | 3.56 | 1.60 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.24 | 1.55 | 0.51 | 2.12 | 61.0 | 200 | 0.40 | 20.74 | 0.10 | 0.66 | 0.42 |
| Contribution From rang Kindred Row, Pipe 46A - 47A | | | | | | | | 1.29 | 120 | | | | 0.00 | | 0.00 | | 0.00 | | 1.29 | 1.29 | | | | | | | | | |
| | 47A | 48A | 0.30 | 9 | | 9 | 25 | 3.14 | 284 | 3.47 | 3.19 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.30 | 3.14 | 1.04 | 4.23 | 62.0 | 200 | 0.40 | 20.74 | 0.20 | 0.66 | 0.52 |
| | 48A | 59A | | | | | | 3.14 | 284 | 3.47 | 3.19 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 3.14 | 1.04 | 4.23 | 10.0 | 200 | 0.40 | 20.74 | 0.20 | 0.66 | 0.52 |
| To chemin Culdaff Road, Pipe 59A - 63A | | | | | | | | 3.14 | 284 | | | | 0.00 | | 0.00 | | 0.00 | | | 3.14 | | | | | | | | | |
| **cercle Leinster Circle** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 49A | 50A | 0.22 | 7 | | 7 | 19 | 0.22 | 19 | 3.71 | 0.23 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.22 | 0.22 | 0.07 | 0.30 | 49.5 | 200 | 0.80 | 29.34 | 0.01 | 0.93 | 0.30 |
| | 50A | 51A | 0.26 | 11 | | 11 | 30 | 0.48 | 49 | 3.65 | 0.58 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.26 | 0.48 | 0.16 | 0.74 | 80.5 | 200 | 0.65 | 26.44 | 0.03 | 0.84 | 0.36 |
| | 51A | 55A | 0.01 | | | | | 0.49 | 49 | 3.65 | 0.58 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.01 | 0.49 | 0.16 | 0.74 | 10.5 | 200 | 0.40 | 20.74 | 0.04 | 0.66 | 0.30 |
| To chemin Culdaff Road, Pipe 55A - 59A | | | | | | | | 0.49 | 49 | | | | 0.00 | | 0.00 | | 0.00 | | | 0.49 | | | | | | | | | |
| | 60A | 61A | | | | | | 0.00 | | | | 1.67 | 1.67 | | 0.00 | | 0.00 | 0.81 | 1.67 | 1.67 | 0.55 | 1.36 | 23.5 | 250 | 0.65 | 47.94 | 0.03 | 0.98 | 0.43 |
| | 61A | 62A | 0.45 | 18 | | 18 | 49 | 0.45 | 49 | 3.65 | 0.58 | | 1.67 | | 0.00 | | 0.00 | 0.81 | 0.45 | 2.12 | 0.70 | 2.09 | 120.0 | 250 | 0.65 | 47.94 | 0.04 | 0.98 | 0.48 |
| | 62A | 63A | 0.01 | | | | 0 | 0.46 | 49 | 3.65 | 0.58 | | 1.67 | | 0.00 | | 0.00 | 0.81 | 0.01 | 2.13 | 0.70 | 2.09 | 9.5 | 250 | 0.65 | 47.94 | 0.04 | 0.98 | 0.48 |
| To chemin Culdaff Road, Pipe 63A - 64A | | | | | | | | 0.46 | 49 | | | | 1.67 | | 0.00 | | 0.00 | | | 2.13 | | | | | | | | | |
| **Block 232 (Condo)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 53A | 54A | 1.75 | | | | 446 | 1.75 | 446 | 3.40 | 4.91 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 1.75 | 1.75 | 0.58 | 5.49 | 11.0 | 250 | 0.65 | 47.94 | 0.11 | 0.98 | 0.64 |
| To chemin Culdaff Road, Pipe 54A - 55A | | | | | | | | 1.75 | 446 | | | | 0.00 | | 0.00 | | 0.00 | | | 1.75 | | | | | | | | | |
| **chemin Culdaff Road** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 65A | 67A | 0.07 | | | | 0 | 0.07 | 0 | | | 21.99 | 21.99 | | 0.00 | | 0.00 | 10.69 | 22.06 | 22.06 | 7.28 | 17.97 | 26.5 | 250 | 0.30 | 32.57 | 0.55 | 0.66 | 0.68 |
| Contribution From Block 256, Pipe 66A - 67A | | | | | | | | 0.00 | 0 | | | | 1.59 | | 0.00 | | 0.00 | | 1.59 | 1.59 | | | | | | | | | |
| | 67A | 70A | 0.25 | | | | 0 | 0.32 | 0 | | | | 23.58 | | 0.00 | | 0.00 | 11.46 | 0.25 | 23.90 | 7.89 | 19.35 | 97.0 | 250 | 0.30 | 32.57 | 0.59 | 0.66 | 0.69 |
| Contribution From Block 244, Pipe 68A - 70A | | | | | | | | 0.00 | 0 | | | | 1.99 | | 0.00 | | 0.00 | | 1.99 | 1.99 | | | | | | | | | |
| Contribution From Block 243, Pipe 69A - 70A | | | | | | | | 0.00 | 0 | | | | 1.60 | | 0.00 | | 0.00 | | 1.60 | 1.60 | | | | | | | | | |
| | | | 0.12 | | | | 0 | 0.44 | 0 | | | | 27.17 | | 0.00 | | 0.00 | | 0.12 | 27.61 | | | | | | | | | |
| | 70A | 72A | 0.19 | | | | 0 | 0.63 | 0 | | | | 27.17 | | 0.00 | | 0.00 | 13.21 | 0.19 | 27.80 | 9.17 | 22.38 | 76.0 | 250 | 0.30 | 32.57 | 0.69 | 0.66 | 0.71 |
| Contribution From Block 242, Pipe 71A - 72A | | | | | | | | 0.00 | 0 | | | | 2.70 | | 0.00 | | 0.00 | | 2.70 | 2.70 | | | | | | | | | |
| | 72A | 73A | 0.16 | | | | 0 | 0.79 | 0 | | | | 29.87 | | 0.00 | | 0.00 | 14.52 | 0.16 | 30.66 | 10.12 | 24.64 | 74.0 | 250 | 0.30 | 32.57 | 0.76 | 0.66 | 0.73 |
| To avenue Derreen Avenue, Pipe 73A - 75A | | | | | | | | 0.79 | 0 | | | | 29.87 | | 0.00 | | 0.00 | | | 30.66 | | | | | | | | | |
| **chemin Culdaff Road** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 52A | 54A | 0.74 | 15 | | 15 | 41 | 0.74 | 41 | 3.67 | 0.49 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.74 | 0.74 | 0.24 | 0.73 | 102.5 | 200 | 0.65 | 26.44 | 0.03 | 0.84 | 0.36 |
| Contribution From Block 232, Pipe 53A - 54A | | | | | | | | 1.75 | 446 | | | | 0.00 | | 0.00 | | 0.00 | | 1.75 | 1.75 | | | | | | | | | |
| | 54A | 55A | 0.09 | 3 | | 3 | 9 | 2.58 | 496 | 3.38 | 5.43 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.09 | 2.58 | 0.85 | 6.29 | 21.0 | 250 | 0.30 | 32.57 | 0.19 | 0.66 | 0.51 |
| Contribution From cercle Leinster Circle, Pipe 51A - 55A | | | | | | | | 0.49 | 49 | | | | 0.00 | | 0.00 | | 0.00 | | 0.49 | 0.49 | | | | | | | | | |
| | 55A | 59A | 0.15 | 4 | | 4 | 11 | 3.22 | 556 | 3.36 | 6.05 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.15 | 3.22 | 1.06 | 7.12 | 45.0 | 250 | 0.30 | 32.57 | 0.22 | 0.66 | 0.53 |
| Contribution From placette Allied Mews, Pipe 48A - 59A | | | | | | | | 3.14 | 284 | | | | 0.00 | | 0.00 | | 0.00 | | 3.14 | 3.14 | | | | | | | | | |
| Contribution From ruelle Ballinora Lane, Pipe 58A - 59A | | | | | | | | 0.70 | 95 | | | | 0.00 | | 0.00 | | 0.00 | | 0.70 | 0.70 | | | | | | | | | |
| | 59A | 63A | 0.07 | | | | 0 | 7.13 | 935 | 3.25 | 9.86 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.07 | 7.13 | 2.35 | 12.22 | 45.0 | 250 | 0.30 | 32.57 | 0.38 | 0.66 | 0.61 |
| Contribution From cercle Leinster Circle, Pipe 62A - 63A | | | | | | | | 0.46 | 49 | | | | 1.67 | | 0.00 | | 0.00 | | 2.13 | 9.26 | | | | | | | | | |
| | 63A | 64A | 0.03 | | | | 0 | 7.62 | 984 | 3.24 | 10.34 | | 1.67 | | 0.00 | | 0.00 | 0.81 | 0.03 | 9.29 | 3.07 | 14.22 | 27.5 | 250 | 0.30 | 32.57 | 0.44 | 0.66 | 0.64 |

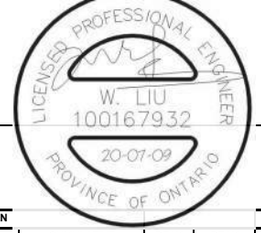
DESIGN PARAMETERS

| | | | | |
|---|---|---|---|---|
| Park Flow = | 9300 | L/ha/da | 0.10764 | l/s/Ha |
| Average Daily Flow = | 280 | l/p/day | | |
| Comm/Inst Flow = | 28000 | L/ha/da | 0.3241 | l/s/Ha |
| Industrial Flow = | 35000 | L/ha/da | 0.40509 | l/s/Ha |
| Max Res. Peak Factor = | 4.00 | | | |
| Commercial/Inst./Park Peak Factor = | 1.50 | | | |
| Institutional = | 0.32 | l/s/Ha | | |

Industrial Peak Factor = as per MOE Graph
Extraneous Flow = 0.330 L/s/ha
Minimum Velocity = 0.600 m/s
Manning's n = (Conc) 0.013 (Pvc) 0.013
Townhouse coeff= 2.7
Single house coeff= 3.4

Designed: R.A.
Checked: W.L.
Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 87-93

PROJECT: **195 Huntmar Drive**
LOCATION: **City of Ottawa**
File Ref: 12-624
Date: **July 2020**
Sheet No. 2 of 5




# SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

| LOCATION | | | RESIDENTIAL AREA AND POPULATION | | | | | | | | | COMM | | INSTIT | | PARK | | C+I+I | INFILTRATION | | | | PIPE | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STREET | FROM M.H. | TO M.H. | AREA (ha) | UNITS | UNITS Singles | UNITS Townhouse | POP. | CUMULATIVE AREA (ha) | CUMULATIVE POP. | PEAK FACT. | PEAK FLOW (l/s) | AREA (ha) | ACCU. AREA (ha) | AREA (ha) | ACCU. AREA (ha) | AREA (ha) | ACCU. AREA (ha) | PEAK FLOW (l/s) | TOTAL AREA (ha) | ACCU. AREA (ha) | INFILT. FLOW (l/s) | TOTAL FLOW (l/s) | DIST (m) | DIA (mm) | SLOPE (%) | CAP. (FULL) (l/s) | RATIO Q act/Q cap | VEL. (FULL) (m/s) | VEL. (ACT.) (m/s) |
| Contribution From terrasse Crossway Terrace, Pipe 641A - 64A | | | | | | | | 4.90 | 463 | | | | 0.00 | | 0.00 | | 0.53 | | 5.43 | 5.43 | | | | | | | | | |
| | 64A | 73A | 0.11 | | | | 0 | 12.63 | 1447 | 3.15 | 14.78 | | 1.67 | | 0.00 | | 0.53 | 0.90 | 0.11 | 14.83 | 4.89 | 20.58 | 73.5 | 250 | 0.85 | 54.83 | 0.38 | 1.12 | 1.03 |
| To avenue Derreen Avenue, Pipe 73A - 75A | | | | | | | | 12.63 | 1447 | | | | 1.67 | | 0.00 | | 0.53 | | | 14.83 | | | | | | | | | |
| **Block 242 (Commercial)** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 71A | 72A | | | | | | 0.00 | | | | 2.70 | 2.70 | | 0.00 | | 0.00 | 1.31 | 2.70 | 2.70 | 0.89 | 2.20 | 15.0 | 250 | 0.65 | 47.94 | 0.05 | 0.98 | 0.49 |
| To chemin Culdaff Road, Pipe 72A - 73A | | | | | | | | 0.00 | 0 | | | | 2.70 | | 0.00 | | 0.00 | | | 2.70 | | | | | | | | | |
| **voie Bermondsey Way** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 240A | 24A | 0.63 | 22 | | 22 | 60 | 0.63 | 60 | 3.64 | 0.71 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.63 | 0.63 | 0.21 | 0.92 | 78.0 | 200 | 0.65 | 26.44 | 0.03 | 0.84 | 0.39 |
| | 24A | 25A | 0.11 | 2 | | 2 | 6 | 0.74 | 66 | 3.63 | 0.78 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.11 | 0.74 | 0.24 | 1.02 | 11.0 | 200 | 0.40 | 20.74 | 0.05 | 0.66 | 0.34 |
| | 25A | 26A | 0.26 | 7 | | 7 | 19 | 1.00 | 85 | 3.61 | 0.99 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.26 | 1.00 | 0.33 | 1.32 | 67.0 | 200 | 0.55 | 24.32 | 0.05 | 0.77 | 0.41 |
| To avenue Derreen Avenue, Pipe 26A - 730A | | | | | | | | 1.00 | 85 | | | | 0.00 | | 0.00 | | 0.00 | | | 1.00 | | | | | | | | | |
| **Block 236** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 38A | 39A | | | | | | 0.00 | | | | | 0.00 | | 0.00 | 0.53 | 0.53 | 0.09 | 0.53 | 0.53 | 0.17 | 0.26 | 11.0 | 200 | 0.65 | 26.44 | 0.01 | 0.84 | 0.27 |
| To terrasse Crossway Terrace, Pipe 39A - 40A | | | | | | | | 0.00 | 0 | | | | 0.00 | | 0.00 | | 0.53 | | | 0.53 | | | | | | | | | |
| **place Unity Place** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 18A | 19A | 0.59 | 9 | 9 | | 31 | 0.59 | 31 | 3.68 | 0.37 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.59 | 0.59 | 0.19 | 0.56 | 29.5 | 200 | 2.20 | 48.65 | 0.01 | 1.55 | 0.52 |
| | 19A | 20A | 0.59 | 14 | 14 | | 48 | 1.18 | 79 | 3.62 | 0.93 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.59 | 1.18 | 0.39 | 1.32 | 79.0 | 200 | 0.65 | 26.44 | 0.05 | 0.84 | 0.43 |
| | 20A | 21A | 0.63 | 16 | 16 | | 55 | 1.81 | 134 | 3.57 | 1.55 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.63 | 1.81 | 0.60 | 2.15 | 80.5 | 200 | 0.70 | 27.44 | 0.08 | 0.87 | 0.51 |
| | 21A | 22A | 0.13 | 2 | 2 | | 7 | 1.94 | 141 | 3.56 | 1.63 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.13 | 1.94 | 0.64 | 2.27 | 13.5 | 200 | 0.35 | 19.40 | 0.12 | 0.62 | 0.41 |
| | 22A | 23A | 0.27 | 6 | 6 | | 21 | 2.21 | 162 | 3.54 | 1.86 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.27 | 2.21 | 0.73 | 2.59 | 66.0 | 200 | 0.35 | 19.40 | 0.13 | 0.62 | 0.43 |
| To avenue Derreen Avenue, Pipe 23A - 26A | | | | | | | | 2.21 | 162 | | | | 0.00 | | 0.00 | | 0.00 | | | 2.21 | | | | | | | | | |
| **croissant Billrian Crescent** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 0.09 | 1 | | 1 | 3 | 0.09 | 3 | | | | 0.00 | | 0.00 | | 0.00 | | 0.09 | 0.09 | | | | | | | | | |
| | 1A | 2A | 0.41 | | | | 0 | 0.50 | 3 | 3.76 | 0.04 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.41 | 0.50 | 0.17 | 0.20 | 11.0 | 200 | 1.20 | 35.93 | 0.01 | 1.14 | 0.29 |
| | 2A | 3A | 0.54 | 21 | | 21 | 57 | 1.04 | 60 | 3.64 | 0.71 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.54 | 1.04 | 0.34 | 1.05 | 75.0 | 200 | 0.65 | 26.44 | 0.04 | 0.84 | 0.41 |
| | 3A | 4A | 0.44 | 16 | | 16 | 44 | 1.48 | 104 | 3.59 | 1.21 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.44 | 1.48 | 0.49 | 1.70 | 82.0 | 200 | 0.40 | 20.74 | 0.08 | 0.66 | 0.39 |
| To cours Curraglass Walk, Pipe 4A - 5A | | | | | | | | 1.48 | 104 | | | | 0.00 | | 0.00 | | 0.00 | | | 1.48 | | | | | | | | | |
| | 27A | 28A | 0.09 | 1 | | 1 | 3 | 0.09 | 3 | 3.76 | 0.04 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.09 | 0.09 | 0.03 | 0.07 | 11.0 | 200 | 1.20 | 35.93 | 0.00 | 1.14 | 0.21 |
| | 28A | 29A | 0.57 | 23 | | 23 | 63 | 0.66 | 66 | 3.63 | 0.78 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.57 | 0.66 | 0.22 | 0.99 | 82.5 | 200 | 0.75 | 28.40 | 0.04 | 0.90 | 0.42 |
| | 29A | 30A | 0.47 | 18 | | 18 | 49 | 1.13 | 115 | 3.58 | 1.33 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.47 | 1.13 | 0.37 | 1.71 | 74.0 | 200 | 0.40 | 20.74 | 0.08 | 0.66 | 0.39 |
| To cours Curraglass Walk, Pipe 30A - 33A | | | | | | | | 1.13 | 115 | | | | 0.00 | | 0.00 | | 0.00 | | | 1.13 | | | | | | | | | |
| **Future Development** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 10A | 11A | 73.25 | | | | 4900 | 73.25 | 4900 | 2.80 | 44.50 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 73.25 | 73.25 | 24.17 | 68.68 | 16.0 | 375 | 0.25 | 87.67 | 0.78 | 0.79 | 0.88 |
| To avenue Derreen Avenue, Pipe 11A - 12A | | | | | | | | 73.25 | 4900 | | | | 0.00 | | 0.00 | | 0.00 | | | 73.25 | | | | | | | | | |
| **cours Curraglass Walk** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 31A | 32A | 0.77 | 22 | | 22 | 60 | 0.77 | 60 | 3.64 | 0.71 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.77 | 0.77 | 0.25 | 0.96 | 104.0 | 200 | 0.65 | 26.44 | 0.04 | 0.84 | 0.40 |
| | 32A | 33A | 0.38 | 22 | | 22 | 60 | 1.15 | 120 | 3.58 | 1.39 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.38 | 1.15 | 0.38 | 1.77 | 62.5 | 200 | 0.80 | 29.34 | 0.06 | 0.93 | 0.51 |
| To Block 233, Pipe 33A - 34A | | | | | | | | 1.15 | 120 | | | | 0.00 | | 0.00 | | 0.00 | | | 1.15 | | | | | | | | | |
| Contribution croissant Billrian Crescent, Pipe 29A - 30A | | | | | | | | 1.13 | 115 | | | | 0.00 | | 0.00 | | 0.00 | | 1.13 | 1.13 | | | | | | | | | |
| | 30A | 33A | 0.29 | 7 | 7 | | 24 | 1.42 | 139 | 3.56 | 1.60 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.29 | 1.42 | 0.47 | 2.07 | 68.5 | 200 | 0.40 | 20.74 | 0.10 | 0.66 | 0.42 |
| To Block 233, Pipe 33A - 34A | | | | | | | | 1.42 | 139 | | | | 0.00 | | 0.00 | | 0.00 | | | 1.42 | | | | | | | | | |

DESIGN PARAMETERS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Park Flow = | 9300 | L/ha/da | 0.10764 | l/s/Ha | Industrial Peak Factor = as per MOE Graph | | |
| Average Daily Flow = | 280 | l/p/day | | | Extraneous Flow = | 0.330 | L/s/ha |
| Comm/Inst Flow = | 28000 | L/ha/da | 0.3241 | l/s/Ha | Minimum Velocity = | 0.600 | m/s |
| Industrial Flow = | 35000 | L/ha/da | 0.40509 | l/s/Ha | Manning's n = (Conc) | 0.013 (Pvc) | 0.013 |
| Max Res. Peak Factor = | 4.00 | | | | Townhouse coeff= | 2.7 | |
| Commercial/Inst./Park Peak Factor = | 1.50 | | | | Single house coeff= | 3.4 | |
| Institutional = | 0.32 | l/s/Ha | | | | | |

Designed: R.A.

Checked: W.L.

Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 87-93

PROJECT: **195 Huntmar Drive**

LOCATION: **City of Ottawa**

File Ref: 12-624

Date: **July 2020**

Sheet No. 3 of 5

# SANITARY SEWER CALCULATION SHEET

Ottawa

Manning's n=0.013

| LOCATION | | | RESIDENTIAL AREA AND POPULATION | | | | | | | | | COMM | INSTIT | PARK | C+I+I | INFILTRATION | | | | PIPE | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STREET | FROM M.H. | TO M.H. | AREA (ha) | UNITS | UNITS Singles | UNITS Townhouse | POP. | CUMULATIVE AREA (ha) | CUMULATIVE POP. | PEAK FACT. | PEAK FLOW (l/s) | AREA (ha) | ACCU. AREA (ha) | AREA (ha) | ACCU. AREA (ha) | AREA (ha) | ACCU. AREA (ha) | PEAK FLOW (l/s) | TOTAL AREA (ha) | ACCU. AREA (ha) | INFILT. FLOW (l/s) | TOTAL FLOW (l/s) | DIST (m) | DIA (mm) | SLOPE (%) | CAP. (FULL) (l/s) | RATIO Q act/Q cap | VEL. (FULL) (m/s) | VEL. (ACT.) (m/s) |
| | 30A | 4A | 0.28 | 7 | 7 | | 24 | 0.28 | 24 | 3.70 | 0.29 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.28 | 0.28 | 0.09 | 0.38 | 67.5 | 200 | 1.20 | 35.93 | 0.01 | 1.14 | 0.37 |
| Contribution From croissant Billrian Crescent, Pipe 3A - 4A | | | | | | | | 1.48 | 104 | | | | 0.00 | | 0.00 | | 0.00 | | 1.48 | 1.48 | | | | | | | | | |
| | 4A | 5A | 0.11 | 2 | 2 | | 7 | 1.87 | 135 | 3.56 | 1.56 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.11 | 1.87 | 0.62 | 2.18 | 24.5 | 200 | 0.40 | 20.74 | 0.10 | 0.66 | 0.42 |
| | 5A | 6A | 0.17 | 3 | 3 | | 11 | 2.04 | 146 | 3.56 | 1.68 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.17 | 2.04 | 0.67 | 2.36 | 21.5 | 200 | 0.40 | 20.74 | 0.11 | 0.66 | 0.44 |
| | 6A | 11A | | | | | | 2.04 | 146 | 3.56 | 1.68 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 2.04 | 0.67 | 2.36 | 16.5 | 200 | 0.40 | 20.74 | 0.11 | 0.66 | 0.44 |
| To avenue Derreen Avenue, Pipe 11A - 12A | | | | | | | | 2.04 | 146 | | | | 0.00 | | 0.00 | | 0.00 | | | 2.04 | | | | | | | | | |
| **Future Development** | | | | | | | | | | | | 0.66 | | | | | | | 0.66 | 0.66 | | | | | | | | | |
| | 251A | 200A | | | | | | 0.00 | | | | 0.69 | 1.35 | | 0.00 | | 0.00 | 0.66 | 0.69 | 1.35 | 0.45 | 1.10 | 90.5 | 250 | 0.65 | 47.94 | 0.02 | 0.98 | 0.39 |
| To avenue Robert Grant Avenue, Pipe 200A - 201A | | | | | | | | 0.00 | 0 | | | | 1.35 | | 0.00 | | 0.00 | | | 1.35 | | | | | | | | | |
| **avenue Derreen Avenue** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 7A | 8A | 0.67 | 7 | 7 | | 24 | 0.67 | 24 | 3.70 | 0.29 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.67 | 0.67 | 0.22 | 0.51 | 90.0 | 200 | 0.65 | 26.44 | 0.02 | 0.84 | 0.33 |
| | 8A | 9A | 0.26 | 7 | 7 | | 24 | 0.93 | 48 | 3.65 | 0.57 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.26 | 0.93 | 0.31 | 0.88 | 63.0 | 200 | 0.40 | 20.74 | 0.04 | 0.66 | 0.33 |
| | 9A | 11A | 0.07 | | | | | 1.00 | 48 | 3.65 | 0.57 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.07 | 1.00 | 0.33 | 0.90 | 28.0 | 200 | 0.40 | 20.74 | 0.04 | 0.66 | 0.33 |
| Contribution From Future Development, Pipe 10A - 11A | | | | | | | | 73.25 | 4900 | | | | 0.00 | | 0.00 | | 0.00 | | 73.25 | 73.25 | | | | | | | | | |
| Contribution From cours Curraglass Walk, Pipe 6A - 11A | | | | | | | | 2.04 | 146 | | | | 0.00 | | 0.00 | | 0.00 | | 2.04 | 2.04 | | | | | | | | | |
| | 11A | 12A | 0.19 | 3 | 3 | | 11 | 76.48 | 5105 | 2.79 | 46.15 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.19 | 76.48 | 25.24 | 71.38 | 37.0 | 375 | 0.25 | 87.67 | 0.81 | 0.79 | 0.88 |
| | 12A | 13A | 0.11 | 1 | 1 | | 4 | 76.59 | 5109 | 2.79 | 46.18 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.11 | 76.59 | 25.27 | 71.45 | 25.0 | 375 | 0.25 | 87.67 | 0.82 | 0.79 | 0.88 |
| | 13A | 14A | 0.10 | 1 | 1 | | 4 | 76.69 | 5113 | 2.79 | 46.21 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.10 | 76.69 | 25.31 | 71.52 | 27.0 | 375 | 0.25 | 87.67 | 0.82 | 0.79 | 0.88 |
| | 14A | 15A | 0.21 | 3 | 3 | | 11 | 76.90 | 5124 | 2.79 | 46.30 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.21 | 76.90 | 25.38 | 71.67 | 37.5 | 375 | 0.25 | 87.67 | 0.82 | 0.79 | 0.88 |
| | 15A | 16A | 0.07 | 1 | 1 | | 4 | 76.97 | 5128 | 2.79 | 46.33 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.07 | 76.97 | 25.40 | 71.73 | 12.5 | 375 | 0.25 | 87.67 | 0.82 | 0.79 | 0.88 |
| | 16A | 17A | 0.72 | 17 | 17 | | 58 | 77.69 | 5186 | 2.78 | 46.79 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.72 | 77.69 | 25.64 | 72.43 | 98.0 | 375 | 0.25 | 87.67 | 0.83 | 0.79 | 0.89 |
| | 17A | 23A | 0.48 | 12 | 12 | | 41 | 78.17 | 5227 | 2.78 | 47.12 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.48 | 78.17 | 25.80 | 72.92 | 110.5 | 375 | 0.25 | 87.67 | 0.83 | 0.79 | 0.89 |
| Contribution From place Unity Place, Pipe 22A - 23A | | | | | | | | 2.21 | 162 | | | | 0.00 | | 0.00 | | 0.00 | | 2.21 | 2.21 | | | | | | | | | |
| | 232A | 231A | 0.36 | 8 | 8 | | 27 | 0.36 | 27 | 3.69 | 0.32 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.36 | 0.36 | 0.12 | 0.44 | 52.0 | 200 | 0.65 | 26.44 | 0.02 | 0.84 | 0.32 |
| | 231A | 23A | | | | | | 0.36 | 27 | 3.69 | 0.32 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 0.36 | 0.12 | 0.44 | 2.0 | 200 | 0.40 | 20.74 | 0.02 | 0.66 | 0.26 |
| To avenue Derreen Avenue, Pipe 23A - 26A | | | | | | | | 0.36 | 27 | | | | 0.00 | | 0.00 | | 0.00 | | | 0.36 | | | | | | | | | |
| | 230A | 260A | 0.26 | 6 | | 6 | 17 | 0.26 | 17 | 3.71 | 0.20 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.26 | 0.26 | 0.09 | 0.29 | 43.5 | 200 | 1.00 | 32.80 | 0.01 | 1.04 | 0.32 |
| | 260A | 261A | 0.78 | 25 | | 25 | 68 | 1.04 | 85 | 3.61 | 0.99 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.78 | 1.04 | 0.34 | 1.34 | 104.0 | 200 | 0.40 | 20.74 | 0.06 | 0.66 | 0.37 |
| | 261A | 730A | | | | | | 1.04 | 85 | 3.61 | 0.99 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 1.04 | 0.34 | 1.34 | 2.0 | 200 | 1.00 | 32.80 | 0.04 | 1.04 | 0.51 |
| To avenue Derreen Avenue, Pipe 730A - 73A | | | | | | | | 1.04 | 85 | | | | 0.00 | | 0.00 | | 0.00 | | | 1.04 | | | | | | | | | |
| | 23A | 26A | 0.11 | | | | 0 | 80.85 | 5416 | 2.77 | 48.62 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.11 | 80.85 | 26.68 | 75.30 | 70.5 | 375 | 0.30 | 96.03 | 0.78 | 0.87 | 0.96 |
| Contribution From voie Bermondsey Way, Pipe 25A - 26A | | | | | | | | 1.00 | 85 | | | | 0.00 | | 0.00 | | 0.00 | | 1.00 | 1.00 | | | | | | | | | |
| | 26A | 730A | | | | | | 81.85 | 5501 | 2.77 | 49.29 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 81.85 | 27.01 | 76.30 | 93.5 | 375 | 0.30 | 96.03 | 0.79 | 0.87 | 0.96 |
| | 730A | 73A | | | | | | 82.89 | 5586 | 2.76 | 49.96 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.00 | 82.89 | 27.35 | 77.32 | 10.0 | 375 | 0.30 | 96.03 | 0.81 | 0.87 | 0.97 |
| Contribution From chemin Culdaff Road, Pipe 64A - 73A | | | | | | | | 12.63 | 1447 | | | | 1.67 | | 0.00 | | 0.53 | | 14.83 | 14.83 | | | | | | | | | |
| Contribution From chemin Culdaff Road, Pipe 72A - 73A | | | | | | | | 0.79 | 0 | | | | 29.87 | | 0.00 | | 0.00 | | 30.66 | 30.66 | | | | | | | | | |
| | 73A | 75A | 0.09 | | | | 0 | 96.40 | 7033 | 2.68 | 61.17 | | 31.54 | | 0.00 | | 0.53 | 15.42 | 0.09 | 128.47 | 42.40 | 118.98 | 35.5 | 450 | 0.25 | 142.55 | 0.83 | 0.90 | 1.00 |
| Contribution From Block 241, Pipe 74A - 75A | | | | | | | | 0.00 | 0 | | | | 1.06 | | 0.00 | | 0.00 | | 1.06 | 129.53 | | | | | | | | | |
| | 75A | 77A | 0.31 | | | | 0 | 96.71 | 7033 | 2.68 | 61.17 | | 32.60 | | 0.00 | | 0.53 | 15.93 | 0.31 | 129.84 | 42.85 | 119.95 | 112.0 | 450 | 0.25 | 142.55 | 0.84 | 0.90 | 1.00 |
| Contribution From Block 240, Pipe 76A - 77A | | | | | | | | 0.00 | 0 | | | | 0.64 | | 0.00 | | 0.00 | | 0.64 | 130.48 | | | | | | | | | |
| | 77A | 78A | 0.20 | | | | 0 | 96.91 | 7033 | 2.68 | 61.17 | | 33.24 | | 0.00 | | 0.53 | 16.24 | 0.20 | 130.68 | 43.12 | 120.54 | 72.0 | 450 | 0.25 | 142.55 | 0.85 | 0.90 | 1.01 |
| | 78A | 200A | 0.14 | | | | 0 | 97.05 | 7033 | 2.68 | 61.17 | | 33.24 | | 0.00 | | 0.53 | 16.24 | 0.14 | 130.82 | 43.17 | 120.58 | 26.5 | 450 | 0.25 | 142.55 | 0.85 | 0.90 | 1.01 |
| To avenue Robert Grant Avenue, Pipe 200A - 201A | | | | | | | | 97.05 | 7033 | | | | 33.24 | | 0.00 | | 0.53 | | | 130.82 | | | | | | | | | |
| **avenue Robert Grant Avenue** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Contribution From Future Development, Pipe 251A - 200A | | | | | | | | 0.00 | 0 | | | | 1.35 | | 0.00 | | 0.00 | | 1.35 | 1.35 | | | | | | | | | |
| Contribution From avenue Derreen Avenue, Pipe 78A - 200A | | | | | | | | 97.05 | 7033 | | | | 33.24 | | 0.00 | | 0.53 | | 130.82 | 130.82 | | | | | | | | | |
| | | | 0.26 | | | | 0 | 97.31 | 7033 | | | | 34.59 | | 0.00 | | 0.53 | | 0.26 | 132.43 | | | | | | | | | |
| | 200A | 201A | 1.93 | | | | 0 | 99.24 | 7033 | 2.68 | 61.17 | | 34.59 | | 0.00 | | 0.53 | 16.90 | 1.93 | 134.36 | 44.34 | 122.41 | 67.0 | 450 | 0.25 | 142.55 | 0.86 | 0.90 | 1.01 |

DESIGN PARAMETERS

| | | | | |
|---|---|---|---|---|
| Park Flow = | 9300 | L/ha/da | 0.10764 | l/s/Ha |
| Average Daily Flow = | 280 | l/p/day | | |
| Comm/Inst Flow = | 28000 | L/ha/da | 0.3241 | l/s/Ha |
| Industrial Flow = | 35000 | L/ha/da | 0.40509 | l/s/Ha |
| Max Res. Peak Factor = | 4.00 | | | |
| Commercial/Inst./Park Peak Factor = | 1.50 | | | |
| Institutional = | 0.32 | l/s/Ha | | |

Industrial Peak Factor = as per MOE Graph
Extraneous Flow = 0.330 L/s/ha
Minimum Velocity = 0.600 m/s
Manning's n = (Conc) 0.013 (Pvc) 0.013
Townhouse coeff= 2.7
Single house coeff= 3.4

Designed: R.A.
Checked: W.L.
Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 87-93

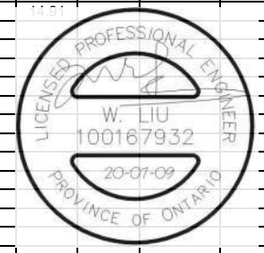
PROJECT: **195 Huntmar Drive**
LOCATION: **City of Ottawa**
File Ref: 12-624
Date: **July 2020**
Sheet No. 4 of 5

624_San3.xlsx

# SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

| LOCATION | | | RESIDENTIAL AREA AND POPULATION | | | | | | | | COMM | | INSTIT | | PARK | | C+I+I | INFILTRATION | | | | PIPE | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STREET | FROM M.H. | TO M.H. | AREA (ha) | UNITS | UNITS Singles | UNITS Townhouse | POP. | CUMULATIVE AREA (ha) | CUMULATIVE POP. | PEAK FACT. | PEAK FLOW (l/s) | AREA (ha) | ACCU. AREA (ha) | AREA (ha) | ACCU. AREA (ha) | AREA (ha) | ACCU. AREA (ha) | PEAK FLOW (l/s) | TOTAL AREA (ha) | ACCU. AREA (ha) | INFILT. FLOW (l/s) | TOTAL FLOW (l/s) | DIST (m) | DIA (mm) | SLOPE (%) | CAP. (FULL) (l/s) | RATIO Q act/Q cap | VEL. (FULL) (m/s) | VEL. (ACT.) (m/s) |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 201A | 202A | 0.26 | | | | 0 | 99.50 | 7033 | 2.68 | 61.17 | | 34.59 | | 0.00 | | 0.53 | 16.90 | 0.26 | 134.62 | 44.42 | 122.49 | 70.0 | 450 | 0.25 | 142.55 | 0.86 | 0.90 | 1.01 |
| | 202A | 203A | 0.23 | | | | 0 | 99.73 | 7033 | 2.68 | 61.17 | | 34.59 | | 0.00 | | 0.53 | 16.90 | 0.23 | 134.85 | 44.50 | 122.57 | 63.5 | 450 | 0.25 | 142.55 | 0.86 | 0.90 | 1.01 |
| | 203A | 204A | 0.43 | | | | 0 | 100.16 | 7033 | 2.68 | 61.17 | | 34.59 | | 0.00 | | 0.53 | 16.90 | 0.43 | 135.28 | 44.64 | 122.71 | 83.5 | 450 | 0.25 | 142.55 | 0.86 | 0.90 | 1.01 |
| To rue Stittsville Main Street, Pipe 204A - 205A | | | | | | | | 100.16 | 7033 | | | | 34.59 | | 0.00 | | 0.53 | | | 135.28 | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **rue Stittsville Main Street** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 0.06 | | | | 11 | | | | | | | | | | | | 0.06 | 0.06 | | | | | | | | | |
| | | | 0.12 | | | | 17 | | | | | | | | | | | | 0.12 | 0.18 | | | | | | | | | |
| | 2000A | 204A | 0.83 | | | | 0 | 1.01 | 28 | 3.69 | 0.33 | | 0.00 | | 0.00 | | 0.00 | 0.00 | 0.83 | 1.01 | 0.33 | 0.67 | 100.0 | 200 | 0.65 | 26.44 | 0.03 | 0.84 | 0.35 |
| Contribution From avenue Robert Grant Avenue, Pipe 203A - 204A | | | | | | | | 100.16 | 7033 | | | | 34.59 | | 0.00 | | 0.53 | | 135.28 | 136.29 | | | | | | | | | |
| | 204A | 205A | 0.69 | | | | 0 | 101.86 | 7061 | 2.68 | 61.38 | | 34.59 | | 0.00 | | 0.53 | 16.90 | 0.69 | 136.98 | 45.20 | 123.48 | 110.0 | 450 | 0.25 | 142.55 | 0.87 | 0.90 | 1.01 |
| | 205A | 206A | 0.52 | | | | 0 | 102.38 | 7061 | 2.68 | 61.38 | | 34.59 | | 0.00 | | 0.53 | 16.90 | 0.52 | 137.50 | 45.38 | 123.66 | 114.5 | 450 | 0.25 | 142.55 | 0.87 | 0.90 | 1.01 |
| | | | 0.16 | | | | 0 | 102.54 | 7061 | | | | 34.59 | 1.55 | 1.55 | | 0.53 | | 1.71 | 139.21 | | | | | | | | | |
| | 206A | 207A | | | | | | 102.54 | 7061 | 2.68 | 61.38 | | 34.59 | 5.91 | 7.46 | | 0.53 | 20.53 | 5.91 | 145.12 | 47.89 | 129.80 | 37.0 | 450 | 0.30 | 156.16 | 0.83 | 0.98 | 1.10 |
| | | | 0.16 | | | | 0 | 102.70 | 7061 | | | | 34.59 | | 7.46 | | 0.53 | | 0.16 | 145.28 | | | | | | | | | |
| | 207A | 208A | 0.70 | | | | 0 | 103.40 | 7061 | 2.68 | 61.38 | | 34.59 | | 7.46 | | 0.53 | 20.53 | 0.70 | 145.98 | 48.17 | 130.08 | 43.5 | 450 | 0.30 | 156.16 | 0.83 | 0.98 | 1.10 |
| | 208A | 209A | 0.34 | | | | 0 | 103.74 | 7061 | 2.68 | 61.38 | | 34.59 | | 7.46 | | 0.53 | 20.53 | 0.34 | 146.32 | 48.29 | 130.19 | 90.5 | 450 | 0.30 | 156.16 | 0.83 | 0.98 | 1.10 |
| | 209A | 210A | 0.38 | | | | 0 | 104.12 | 7061 | 2.68 | 61.38 | | 34.59 | | 7.46 | | 0.53 | 20.53 | 0.38 | 146.70 | 48.41 | 130.32 | 101.5 | 450 | 0.30 | 156.16 | 0.83 | 0.98 | 1.10 |
| | 210A | 211A | 0.27 | | | | 0 | 104.39 | 7061 | 2.68 | 61.38 | | 34.59 | | 7.46 | | 0.53 | 20.53 | 0.27 | 146.97 | 48.50 | 130.41 | 73.0 | 450 | 0.30 | 156.16 | 0.84 | 0.98 | 1.10 |
| | 211A | 217A | 0.38 | | | | 0 | 104.77 | 7061 | 2.68 | 61.38 | | 34.59 | | 7.46 | | 0.53 | 20.53 | 0.38 | 147.35 | 48.63 | 130.53 | 110.0 | 450 | 0.30 | 156.16 | 0.84 | 0.98 | 1.10 |
| | 217A | 130 Huntmar Drive | | | | | | 104.77 | 7061 | 2.68 | 61.38 | 5.06 | 39.65 | | 7.46 | | 0.53 | 22.99 | 5.06 | 152.41 | 50.30 | 134.66 | 110.0 | 450 | 0.30 | 156.16 | 0.86 | 0.98 | 1.10 |
| To 130 Huntmar Drive by Atrel Engineering Ltd. | | | | | | | | 104.77 | 7061 | | | | 39.65 | | 7.46 | | 0.53 | | | 152.41 | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Huntmar Drive** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 0.00 | | | | 0 | 0.00 | 0 | | | 6.95 | 6.95 | | 0.00 | 5.89 | 5.89 | | 12.84 | 12.84 | | | | | | | | | |
| | Fut. 214A | Fut. 215A | 0.95 | | | | 0 | 0.95 | 0 | | | | 6.95 | | 0.00 | | 5.89 | 4.33 | 0.95 | 13.79 | 4.55 | 8.88 | 70.0 | 250 | 0.30 | 32.57 | 0.27 | 0.66 | 0.56 |
| | | | 1.12 | | | | 0 | 2.07 | 0 | | | | 6.95 | | 0.00 | | 5.89 | 4.33 | 1.12 | 14.91 | | | | | | | | | |
| | Fut. 215A | 130 Huntmar Drive | | | | | 0 | 2.07 | 0 | | | 0.00 | 6.95 | | 0.00 | | 5.89 | 4.33 | 0.00 | 14.91 | 4.92 | 9.25 | | | | | | | |
| To 130 Huntmar Drive by Atrel Engineering Ltd. | | | | | | | | 2.07 | 0 | | | | 6.95 | | 0.00 | | 5.89 | | | | | | | | | | | | |

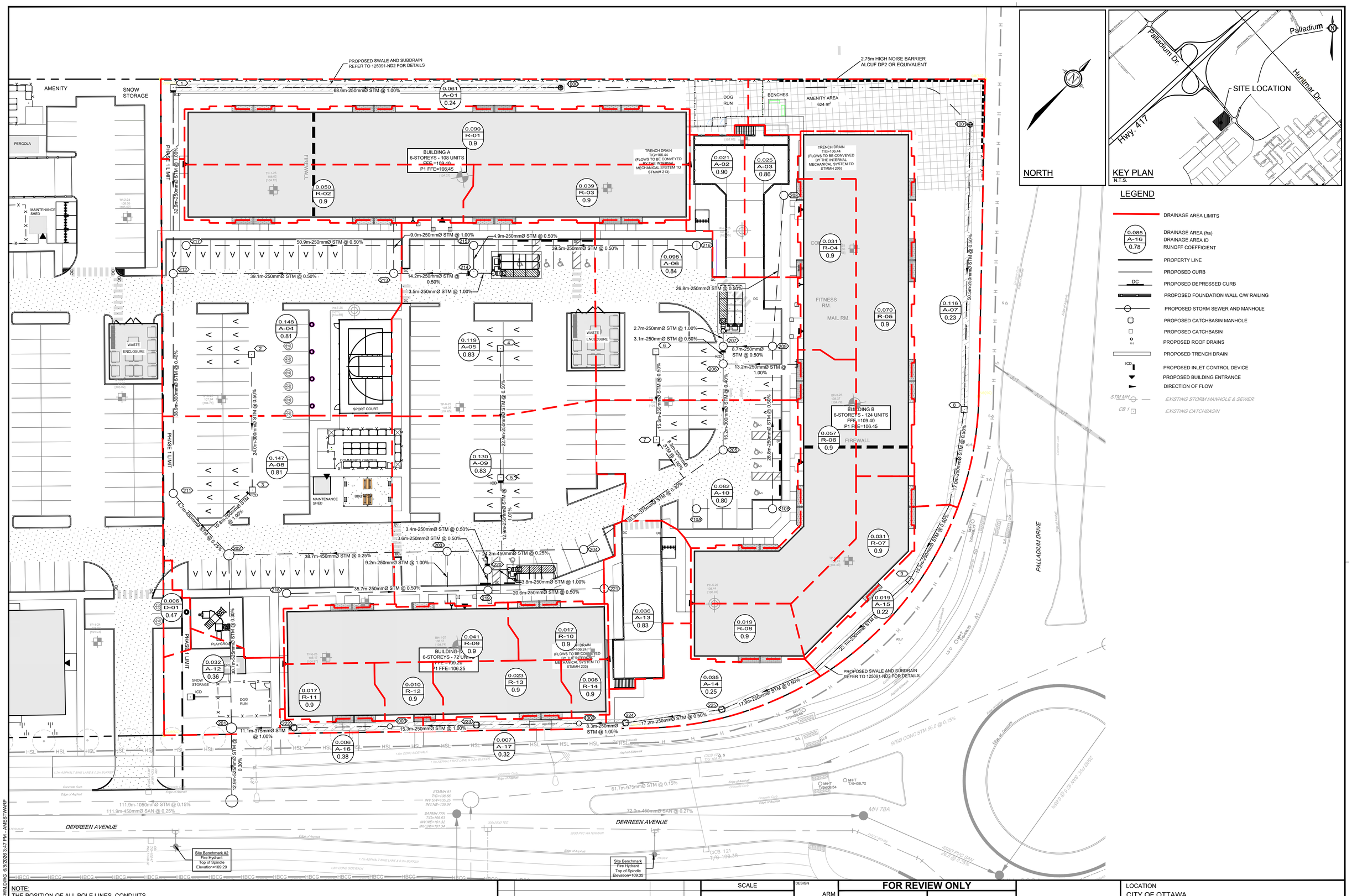



DESIGN PARAMETERS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Park Flow = | 9300 | L/ha/da | 0.10764 | l/s/Ha | | | |
| Average Daily Flow = | 280 | l/p/day | | | Industrial Peak Factor = as per MOE Graph | | |
| Comm/Inst Flow = | 28000 | L/ha/da | 0.3241 | l/s/Ha | Extraneous Flow = | 0.330 | L/s/ha |
| Industrial Flow = | 35000 | L/ha/da | 0.40509 | l/s/Ha | Minimum Velocity = | 0.600 | m/s |
| Max Res. Peak Factor = | 4.00 | | | | Manning's n = (Conc) | 0.013 (Pvc) | 0.013 |
| Commercial/Inst./Park Peak Factor = | 1.50 | | | | Townhouse coeff= | 2.7 | |
| Institutional = | 0.32 | l/s/Ha | | | Single house coeff= | 3.4 | |

| | | | |
|---|---|---|---|
| Designed: R.A. | PROJECT: **195 Huntmar Drive** | | |
| Checked: W.L. | LOCATION: **City of Ottawa** | | |
| Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 87-93 | File Ref: 12-624 | Date: **July 2020** | Sheet No. 5 of 5 |

# Appendix D
# Storm Servicing




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

| No. | REVISION | DATE | BY |
|---|---|---|---|
| 1. | ISSUED FOR SITEPLAN APPLICATION | 06/08/26 | ARM |

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

| | |
|---|---|
| DESIGN | ARM |
| CHECKED | GJM |
| DRAWN | AM |
| CHECKED | ARM |
| APPROVED | GJM |

**FOR REVIEW ONLY**

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

LOCATION
CITY OF OTTAWA
PALLADIUM 2

DRAWING NAME
STORM WATER MANAGEMENT PLAN

PROJECT No. 125091
REV REV#1
DRAWING No. 125091-STM

M:\2025\125091\CAD\CIVIL\125091-SWM.DWG 6/8/2026 3:47 PM - AMESTWARP

PLAN41.DWG - 841mmx594mm

# STORM SEWER DESIGN SHEET

NOVATECH
Engineers, Planners & Landscape Architects

**Novatech Project #:** 125091
**Project Name:** Palladium 2
**Date:** 3/27/2026
**Revised:** 6/8/2026
**Input By:** Anjush Musyaju, EIT
**Reviewed By:** Anthony Mestwarp, P.Eng
**Drawing Reference:** 125091-SWM

**Storm Design Event =** 2 Year

**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 | | | | | | | |
| Street | Area ID | From MH | To MH | Hardscape Area 0.9 | Pervious Area 0.2 | 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) | 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 |
| | R-02 | 217 | 215 | 0.050 | 0.000 | 0.050 | 0.90 | 0.13 | 0.13 | 10.00 | 76.81 | 9.7 | 50.9 | 250 PVC | 0.254 | 0.013 | 0.50 | 43.9 | 0.87 | 0.98 | 22.1% |
| | R-03 | 216 | 215 | 0.039 | 0.000 | 0.039 | 0.90 | 0.10 | 0.10 | 10.00 | 76.81 | 7.6 | 39.5 | 250 PVC | 0.254 | 0.013 | 0.50 | 43.9 | 0.87 | 0.76 | 17.2% |
| | | 215 | 214 | | | | | 0.00 | 0.22 | 10.98 | 73.24 | 16.5 | 4.9 | 250 PVC | 0.254 | 0.013 | 0.50 | 43.9 | 0.87 | 0.09 | 37.5% |
| | | 214 | 213 | | | | | 0.00 | 0.22 | 11.07 | 72.91 | 16.4 | 14.2 | 250 PVC | 0.254 | 0.013 | 0.50 | 43.9 | 0.87 | 0.27 | 37.3% |
| | A-02 | Building A | 213 | 0.021 | 0.000 | 0.021 | 0.90 | 0.05 | 0.05 | 10.00 | 76.81 | 4.1 | 9.0 | 250 PVC | 0.254 | 0.013 | 1.00 | 62.0 | 1.22 | 0.12 | 6.6% |
| | | 213 | 212 | | | | | 0.00 | 0.28 | 11.35 | 71.99 | 20.0 | 39.1 | 250 PVC | 0.254 | 0.013 | 0.50 | 43.9 | 0.87 | 0.75 | 45.6% |
| | A-01 | 212 | 211 | 0.004 | 0.058 | 0.061 | 0.24 | 0.04 | | | | | | | | | | | | | |
| | R-01 | | | 0.090 | 0.000 | 0.090 | 0.90 | 0.22 | 0.54 | 12.10 | 69.58 | 37.9 | 38.9 | 300 PVC | 0.3048 | 0.013 | 0.40 | 63.8 | 0.87 | 0.74 | 59.4% |
| | A-04 | 211 | 202 | 0.128 | 0.020 | 0.148 | 0.81 | 0.33 | | | | | | | | | | | | | |
| | A-08 | | | 0.128 | 0.019 | 0.147 | 0.81 | 0.33 | 1.21 | 12.84 | 67.38 | 81.3 | 14.7 | 450 CONC | 0.4572 | 0.013 | 0.25 | 148.7 | 0.91 | 0.27 | 54.7% |
| | R-04 | 208 | 209 | 0.031 | 0.000 | 0.031 | 0.90 | 0.08 | 0.08 | 10.00 | 76.81 | 6.0 | 26.8 | 250 PVC | 0.254 | 0.013 | 0.50 | 43.9 | 0.87 | 0.52 | 13.7% |
| | R-06 | 210B | 209 | 0.057 | 0.000 | 0.057 | 0.90 | 0.14 | 0.14 | 10.00 | 76.81 | 11.0 | 28.8 | 250 PVC | 0.254 | 0.013 | 0.50 | 43.9 | 0.87 | 0.55 | 25.2% |
| | | 209 | 207 | | | | | 0.00 | 0.22 | 10.55 | 74.74 | 16.6 | 8.7 | 250 PVC | 0.254 | 0.013 | 0.50 | 43.9 | 0.87 | 0.17 | 37.8% |
| | | 207 | 206 | | | | | 0.00 | 0.22 | 10.72 | 74.14 | 16.4 | 3.1 | 250 PVC | 0.254 | 0.013 | 0.50 | 43.9 | 0.87 | 0.06 | 37.5% |
| | A-03 | Building B | 206 | 0.023 | 0.002 | 0.025 | 0.86 | 0.06 | 0.06 | 10.00 | 76.81 | 4.5 | 13.2 | 250 PVC | 0.254 | 0.013 | 1.00 | 62.0 | 1.22 | 0.18 | 7.2% |
| | | 206 | 205 | | | | | 0.00 | 0.28 | 10.78 | 73.93 | 20.7 | 15.2 | 300 PVC | 0.3048 | 0.013 | 0.40 | 63.8 | 0.87 | 0.29 | 32.5% |
| | A-06 | 205 | 204 | 0.089 | 0.009 | 0.098 | 0.84 | 0.23 | | | | | | | | | | | | | |
| | A-10 | | | 0.071 | 0.011 | 0.082 | 0.80 | 0.18 | 0.69 | 11.07 | 72.92 | 50.5 | 30.3 | 375 PVC | 0.381 | 0.013 | 0.30 | 100.2 | 0.88 | 0.57 | 50.4% |
| | R-09 | 218 | 219 | 0.041 | 0.000 | 0.041 | 0.90 | 0.10 | 0.10 | 10.00 | 76.81 | 7.8 | 35.7 | 250 PVC | 0.254 | 0.013 | 0.50 | 43.9 | 0.87 | 0.69 | 17.9% |
| | R-10 | 221 | 219 | 0.017 | 0.000 | 0.017 | 0.90 | 0.04 | 0.04 | 10.00 | 76.81 | 3.2 | 20.6 | 250 PVC | 0.254 | 0.013 | 0.50 | 43.9 | 0.87 | 0.40 | 7.4% |
| | | 219 | 220 | | | | | 0.00 | 0.14 | 10.69 | 74.26 | 10.7 | 3.6 | 250 PVC | 0.254 | 0.013 | 0.50 | 43.9 | 0.87 | 0.07 | 24.4% |
| | | 220 | 204-203 | | | | | 0.00 | 0.14 | 10.76 | 74.02 | 10.7 | 3.4 | 250 PVC | 0.254 | 0.013 | 0.50 | 43.9 | 0.87 | 0.07 | 24.3% |
| | A-05 | 204 | 203 | 0.108 | 0.011 | 0.119 | 0.83 | 0.28 | | | | | | | | | | | | | |
| | A-09 | | | 0.116 | 0.014 | 0.130 | 0.83 | 0.30 | 1.41 | 11.65 | 71.01 | 100.3 | 24.2 | 450 CONC | 0.4572 | 0.013 | 0.25 | 148.7 | 0.91 | 0.45 | 67.4% |
| | A-13 | Building C | 203 | 0.032 | 0.004 | 0.036 | 0.83 | 0.08 | 0.08 | 10.00 | 76.81 | 6.3 | 9.2 | 250 PVC | 0.254 | 0.013 | 1.00 | 62.0 | 1.22 | 0.13 | 10.2% |
| | | 203 | 202 | | | | | 0.00 | 1.49 | 12.09 | 69.61 | 104.0 | 38.7 | 450 PVC | 0.4572 | 0.013 | 0.25 | 148.7 | 0.91 | 0.71 | 70.0% |
| | A-12 | 202 | 201 | 0.008 | 0.025 | 0.032 | 0.36 | 0.03 | 2.73 | 13.11 | 66.61 | 182.1 | 30.7 | 525 CONC | 0.5334 | 0.013 | 0.30 | 245.7 | 1.10 | 0.47 | 74.1% |

# STORM SEWER DESIGN SHEET

NOVATECH
Engineers, Planners & Landscape Architects

| Location | | | | Flow | | | | | | | | | Design Capacity | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | Proposed Sewer Pipe Sizing / Design | | | | | | | | |
| Street | Area ID | From MH | To MH | Hardscape Area 0.9 | Pervious Area 0.2 | 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) | 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 |
| | R-05 | 222 | 201 | 0.070 | 0.000 | 0.070 | 0.90 | 0.17 | | | | | | | | | | | | | |
| | A-07 | | | 0.004 | 0.112 | 0.116 | 0.23 | 0.07 | | | | | | | | | | | | | |
| | R-07 | | | 0.031 | 0.000 | 0.031 | 0.90 | 0.08 | | | | | | | | | | | | | |
| | A-15 | | | 0.000 | 0.019 | 0.019 | 0.22 | 0.01 | | | | | | | | | | | | | |
| | R-08 | | | 0.019 | 0.000 | 0.019 | 0.90 | 0.05 | | | | | | | | | | | | | |
| | A-14 | | | 0.002 | 0.032 | 0.035 | 0.25 | 0.02 | | | | | | | | | | | | | |
| | R-14 | | | 0.008 | 0.000 | 0.008 | 0.90 | 0.02 | | | | | | | | | | | | | |
| | R-13 | | | 0.023 | 0.000 | 0.023 | 0.90 | 0.06 | | | | | | | | | | | | | |
| | A-17 | | | 0.001 | 0.006 | 0.007 | 0.32 | 0.01 | | | | | | | | | | | | | |
| | R-12 | | | 0.010 | 0.000 | 0.010 | 0.90 | 0.03 | | | | | | | | | | | | | |
| | R-11 | | | 0.017 | 0.000 | 0.017 | 0.90 | 0.04 | | | | | | | | | | | | | |
| | A-16 | | | 0.001 | 0.004 | 0.006 | 0.38 | 0.01 | 0.57 | 10.00 | 76.81 | 43.4 | 11.1 | 375 CONC | 0.381 | 0.013 | 1.00 | 182.9 | 1.60 | 0.12 | 23.7% |
| | | | | | | | | | | | | | | | | | | | | | |
| | | 201 | Existing | | | | | 0.00 | 3.30 | 13.11 | 66.61 | 219.8 | 12.9 | 525 CONC | 0.5334 | 0.013 | 0.30 | 245.7 | 1.10 | 0.20 | 89.4% |
| **Totals** | | | | | | **1.59** | | **3.30** | | | | | | | | | | | | | |

## 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

# STORM SEWER DESIGN SHEET

NOVATECH
Engineers, Planners & Landscape Architects

**Novatech Project #:** 125091
**Project Name:** Palladium 2
**Date:** 6/26/2024
**Revised** 2/5/2025
**Revised** 6/8/2026
**Input By:** Anthony Mestwarp
**Reviewed By:** Greg Macdonald
**Drawing Reference:** 125091-SWM, 123194-SWM, drawings 95,96

**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 | | | | Demand | | | | | | | | | | Design Capacity | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Area | | Flow | | | | | | | | Proposed Sewer Pipe Sizing / Design | | | | | | | |
| | | From MH | To MH | Area | Weighted Runoff Coefficient C | Indivi. 2.78 AC | Accum. 2.78 AC | Time of Conc. Tc (min.) | Rain Intensity (mm/hr) I 2-yr | 5-yr | 10-yr | 100-yr | Peak Flow (L/s) | Total Uncontrolled Peak Flow Q (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 |
| | | 79 | 81 | | | 0.00 | 1.53 | 12.79 | 67.53 | | | | 103.32 | 473.1 | 61.5 | 975 CONC | 0.9906 | 0.013 | 0.15 | 905.5 | 1.17 | 0.87 | 52.2% |
| | | | | 0.38 | 0.70 | 0.74 | 0.74 | 12.79 | | 91.45 | | | 67.63 | | | | | | | | | | |
| | | | | | | 0.00 | 2.82 | 12.79 | | | 107.14 | | 302.13 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 12.79 | | | | | 0.00 | | | | | | | | | | |
| **2765 Palladium Road** | **Refer to Site Design Sheet for calculation Details** | | 81 | 1.59 | 0.75 | 3.30 | 3.30 | 13.11 | 66.63 | | | | 219.96 | 220.0 | 12.9 | 525 CONC | 0.5334 | 0.013 | 0.30 | 245.7 | 1.10 | 0.20 | 89.5% |
| | | | | | | 0.00 | 0.00 | 13.11 | | | | | 0.00 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 13.11 | | | | | 0.00 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 13.11 | | | | | 0.00 | | | | | | | | | | |
| Block 240 | | 80 | 81 | 0.64 | 0.80 | 1.42 | 1.42 | 10.00 | 76.81 | | | | 109.32 | 109.3 | 20.0 | 525 CONC | 0.5334 | 0.013 | 0.20 | 200.6 | 0.90 | 0.37 | 54.5% |
| | | | | | | 0.00 | 0.00 | 10.00 | | | | | 0.00 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 10.00 | | | | | 0.00 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 10.00 | | | | | 0.00 | | | | | | | | | | |
| **425 Culdaff** | **Refer to Novatech project 123194 STM design sheet for calculation details** | | 81-83 | 0.62 | 0.81 | 1.39 | 1.39 | 12.50 | 68.38 | | | | 95.15 | 95.2 | 10.0 | 450 PVC | 0.4572 | 0.013 | 1.00 | 297.4 | 1.81 | 0.09 | 32.0% |
| | | | | | | 0.00 | 0.00 | 12.50 | | | | | 0.00 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 12.50 | | | | | 0.00 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 12.50 | | | | | 0.00 | | | | | | | | | | |
| Derreen Avenue | | 81 | 83 | | | 0.00 | 7.65 | 13.66 | 65.12 | | | | 497.90 | 924.0 | 112.0 | 1050 CONC | 1.0668 | 0.013 | 0.15 | 1103.3 | 1.23 | 1.51 | 83.7% |
| | | | | 0.39 | 0.73 | 0.79 | 1.53 | 13.66 | | 88.14 | | | 134.94 | | | | | | | | | | |
| | | | | | | 0.00 | 2.82 | 13.66 | | | 103.25 | | 291.16 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 13.66 | | | | | 0.00 | | | | | | | | | | |
| Block 241 | | 82 | 83 | 1.06 | 0.80 | 2.36 | 2.36 | 10.00 | 76.81 | | | | 181.06 | 181.1 | 19.5 | 675 CONC | 0.6858 | 0.013 | 0.15 | 339.6 | 0.92 | 0.35 | 53.3% |
| | | | | | | 0.00 | 0.00 | 10.00 | | | | | 0.00 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 10.00 | | | | | 0.00 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 10.00 | | | | | 0.00 | | | | | | | | | | |
| Derreen Avenue | | 83 | 84 | | | 0.00 | 10.00 | 15.17 | 61.36 | | | | 613.81 | 1015.0 | 40.5 | 1050 CONC | 1.0668 | 0.013 | 0.20 | 1274.0 | 1.43 | 0.47 | 79.7% |
| | | | | | | 0.00 | 1.53 | 15.17 | | 83.00 | | | 127.06 | | | | | | | | | | |
| | | | | | | 0.00 | 2.82 | 15.17 | | | 97.19 | | 274.08 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 15.17 | | | | | 0.00 | | | | | | | | | | |
| Culdaff Road | | 73 | 84 | 0.19 | 0.74 | 0.39 | 18.14 | 16.58 | 58.27 | | | | 1057.08 | 1168.9 | 79.0 | 1350 CONC | 1.3716 | 0.013 | 0.11 | 1846.8 | 1.25 | 1.05 | 63.3% |
| | | | | | | 0.00 | 1.42 | 16.58 | | 78.78 | | | 111.86 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 16.58 | | | | | 0.00 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 16.58 | | | | | 0.00 | | | | | | | | | | |
| Culdaff Road | | 84 | 86 | | 0.00 | 0.00 | 28.14 | 17.63 | 56.18 | | | | 1581.07 | 2085.4 | 74.5 | 1650 CONC | 1.6764 | 0.013 | 0.11 | 3153.6 | 1.43 | 0.87 | 66.1% |
| | | | | 0.19 | 0.74 | 0.39 | 3.34 | 17.63 | | 75.91 | | | 253.69 | | | | | | | | | | |
| | | | | | | 0.00 | 2.82 | 17.63 | | | 88.86 | | 250.60 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 17.63 | | | | | 0.00 | | | | | | | | | | |
| **425 Culdaff** | **Refer to site design sheet for calculation details** | 85 | 86 | 0.35 | 0.61 | 0.59 | 0.59 | 10.24 | 75.90 | | | | 44.53 | 44.5 | 17.3 | 900 CONC | 0.9144 | 0.013 | 0.15 | 731.4 | 1.11 | 0.26 | 6.1% |
| | | | | | | 0.00 | 0.00 | 10.24 | | | | | 0.00 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 10.24 | | | | | 0.00 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 10.24 | | | | | 0.00 | | | | | | | | | | |
| Culdaff Road | | 86 | 87 | | 0.00 | 0.00 | 28.73 | 18.50 | 54.57 | | | | 1567.88 | 2057.6 | 26.0 | 1650 CONC | 1.6764 | 0.013 | 0.11 | 3153.6 | 1.43 | 0.30 | 65.2% |
| | | | | | | 0.00 | 3.34 | 18.50 | | 73.72 | | | 246.36 | | | | | | | | | | |
| | | | | | | 0.00 | 2.82 | 18.50 | | | 86.29 | | 243.33 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 18.50 | | | | | 0.00 | | | | | | | | | | |

# STORM SEWER DESIGN SHEET

NOVATECH
Engineers, Planners & Landscape Architects

| Location | | | | Demand | | | | | | | | | | Design Capacity | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Area | | Flow | | | | | | | | Proposed Sewer Pipe Sizing / Design | | | | | | | |
| | | From MH | To MH | Area | Weighted Runoff Coefficient C | Indivi. 2.78 AC | Accum. 2.78 AC | Time of Conc. Tc (min.) | Rain Intensity (mm/hr) I 2-yr | 5-yr | 10-yr | 100-yr | Peak Flow (L/s) | Total Uncontrolled Peak Flow Q (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 |
| Culdaff Road | | 87 | 94 | | 0.00 | 0.00 | 28.73 | 18.81 | 54.04 | | | | 1552.46 | 2064.3 | 16.5 | 1650 CONC | 1.6764 | 0.013 | 0.11 | 3153.6 | 1.43 | 0.19 | 65.5% |
| | | | | 0.18 | 0.74 | 0.37 | 3.71 | 18.81 | | 72.99 | | | 270.93 | | | | | | | | | | |
| | | | | | | 0.00 | 2.82 | 18.81 | | | 85.42 | | 240.90 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 18.81 | | | | | 0.00 | | | | | | | | | | |
| Culdaff Road | | 93 | 94 | | 0.00 | 0.00 | 7.38 | 12.30 | 68.97 | | | | 509.28 | 573.7 | 16.5 | 975 CONC | 0.9906 | 0.013 | 0.15 | 905.5 | 1.17 | 0.23 | 63.4% |
| | | | | | | 0.00 | 0.69 | 12.30 | | 93.43 | | | 64.47 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 12.30 | | | | | 0.00 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 12.30 | | | | | 0.00 | | | | | | | | | | |
| Block 235 | | 94 | 95 | 0.37 | 0.59 | 0.61 | 36.72 | 19.00 | 53.70 | | | | 1971.94 | 2530.6 | 109.0 | 1650 CONC | 1.6764 | 0.013 | 0.15 | 3682.6 | 1.67 | 1.09 | 68.7% |
| | | | | | | 0.00 | 4.40 | 19.00 | | 72.53 | | | 319.28 | | | | | | | | | | |
| | | | | | | 0.00 | 2.82 | 19.00 | | | 84.89 | | 239.38 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 19.00 | | | | | 0.00 | | | | | | | | | | |
| Block 244 | | 91 | 95 | 1.99 | 0.80 | 4.43 | 4.43 | 10.00 | 76.81 | | | | 339.92 | 339.9 | 6.5 | 825 CONC | 0.8382 | 0.013 | 0.15 | 580.0 | 1.05 | 0.10 | 58.6% |
| | | | | | | 0.00 | 0.00 | 10.00 | | | | | 0.00 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 10.00 | | | | | 0.00 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 10.00 | | | | | 0.00 | | | | | | | | | | |
| Block 235 | | 95 | 96 | | | 0.00 | 41.15 | 20.09 | 51.89 | | | | 2135.17 | 2674.8 | 57.0 | 1650 CONC | 1.6764 | 0.013 | 0.15 | 3682.6 | 1.67 | 0.57 | 72.6% |
| | | | | | | 0.00 | 4.40 | 20.09 | | 70.06 | | | 308.41 | | | | | | | | | | |
| | | | | | | 0.00 | 2.82 | 20.09 | | | 81.99 | | 231.20 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 20.09 | | | | | 0.00 | | | | | | | | | | |
| Block 235 | | 96 | HW | | | 0.00 | 41.15 | 20.66 | 51.00 | | | | 2098.43 | 2628.6 | 12.5 | 1650 CONC | 1.6764 | 0.013 | 0.15 | 3682.6 | 1.67 | 0.12 | 71.4% |
| | | | | | | 0.00 | 4.40 | 20.66 | | 68.84 | | | 303.05 | | | | | | | | | | |
| | | | | | | 0.00 | 2.82 | 20.66 | | | 80.56 | | 227.17 | | | | | | | | | | |
| | | | | | | 0.00 | 0.00 | 20.66 | | | | | 0.00 | | | | | | | | | | |
| **Totals** | | | | **15.90** | | | | | | | | | | **172.0** | | | | | | | | | |

### 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

# STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Manning 0.013 Arterial Roads Return Frequency = 10 years

| | LOCATION | | AREA (Ha) 2 YEAR | | | | AREA (Ha) 5 YEAR | | | | AREA (Ha) 10 YEAR | | | | AREA (Ha) 100 YEAR | | | | FLOW | | | | | | SEWER DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | AREA | R | Indiv. | Accum. | AREA | R | Indiv. | Accum. | AREA | R | Indiv. | Accum. | AREA | R | Indiv. | Accum. | Time of | Intensity | Intensity | Intensity | Intensity | Peak Flow | DIA. | DIA. | TYPE | SLOPE | LENGTH | INV | OBV | T/G | CAPACITY | VELOCITY | TIME OF | RATIO |
| | | | | | 2.78 AC | 2.78 AC | | | 2.78 AC | 2.78 AC | | | 2.78 AC | 2.78 AC | | | 2.78 AC | 2.78 AC | | 2 Year | 5 Year | 10 Year | 100 Year | | | | | | UPS | UPS | UPS | | | FLOW | |
| Location | From Node | To Node | (Ha) | | | | (Ha) | | | | (Ha) | | | | (Ha) | | | | Conc. | | | | | | (actual) | (nominal) | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | (min) | (mm/h) | (mm/h) | (mm/h) | (mm/h) | Q (l/s) | (mm) | (mm) | | (%) | (m) | | | | (l/s) | (m/s) | (min.) | Q/Q full |
| **croissant Billrian Crescent** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 0 | 300 | 300 | PVC | 0.35 | 11.0 | 106.154 | 106.454 | 108.992 | 57 | 0.81 | 0.23 | 0.00 |
| | | | 0.15 | 0.59 | 0.25 | 0.25 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | 2 | 3 | 0.45 | 0.74 | 0.93 | 1.17 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.23 | 75.95 | 103.01 | 120.75 | 176.51 | 89 | 375 | 375 | PVC | 0.50 | 82.5 | 106.040 | 106.415 | 108.924 | 124 | 1.12 | 1.22 | 0.72 |
| | 3 | 4 | 0.27 | 0.74 | 0.56 | 1.73 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 11.45 | 71.65 | 97.10 | 113.79 | 166.30 | 124 | 525 | 525 | CONC | 0.20 | 77.5 | 105.477 | 106.002 | 109.044 | 192 | 0.89 | 1.45 | 0.64 |
| To cours Curraglass Walk, Pipe 4 - 26 | | | | | | 1.73 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 12.91 | | | | | | | | | | | | | | | | |
| | 5 | 6 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 0 | 300 | 300 | PVC | 0.35 | 11.5 | 106.231 | 106.531 | 109.136 | 57 | 0.81 | 0.24 | 0.00 |
| | | | 0.15 | 0.59 | 0.25 | 0.25 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | 6 | 7 | 0.33 | 0.74 | 0.68 | 0.92 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.24 | 75.91 | 102.96 | 120.69 | 176.42 | 70 | 375 | 375 | PVC | 0.35 | 78.0 | 106.116 | 106.491 | 109.067 | 104 | 0.94 | 1.38 | 0.68 |
| | | | 0.06 | 0.59 | 0.10 | 1.02 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | 7 | 8 | 0.27 | 0.74 | 0.56 | 1.58 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 11.62 | 71.09 | 96.35 | 112.90 | 164.98 | 112 | 525 | 525 | CONC | 0.30 | 82.5 | 105.768 | 106.218 | 108.940 | 236 | 1.09 | 1.26 | 0.48 |
| To cours Curraglass Walk, Pipe 8 - 9 | | | | | | 1.58 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 12.88 | | | | | | | | | | | | | | | | |
| **cours Curraglass Walk** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 0.18 | 0.59 | 0.30 | 0.30 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | 23 | 24 | 0.36 | 0.74 | 0.74 | 1.04 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 80 | 450 | 450 | CONC | 0.20 | 97.5 | 105.981 | 106.431 | 109.055 | 128 | 0.80 | 2.03 | 0.62 |
| | | | 0.25 | 0.74 | 0.51 | 1.55 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | 24 | 25 | 0.28 | 0.59 | 0.46 | 2.01 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 12.03 | 69.81 | 94.58 | 110.82 | 161.93 | 140 | 450 | 450 | CONC | 0.70 | 60.5 | 105.766 | 106.216 | 108.952 | 239 | 1.50 | 0.67 | 0.59 |
| | 25 | 26 | 0.08 | 0.74 | 0.16 | 2.17 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 12.70 | 67.79 | 91.81 | 107.56 | 157.15 | 147 | 450 | 450 | CONC | 0.70 | 13.5 | 105.312 | 105.762 | 108.883 | 239 | 1.50 | 0.15 | 0.62 |
| To Block 233, Pipe 26 - 27 | | | | | | 2.17 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 12.85 | | | | | | | | | | | | | | | | |
| Contribution From croissant Billrian Crescent, Pipe 3 - 4 | | | | | | 1.73 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 12.91 | | | | | | | | | | | | | | | | |
| | 4 | 26 | 0.14 | 0.73 | 0.28 | 2.01 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 12.91 | 67.20 | 91.00 | 106.61 | 155.74 | 135 | 525 | 525 | CONC | 0.20 | 60.0 | 105.262 | 105.787 | 108.981 | 192 | 0.89 | 1.13 | 0.70 |
| To Block 233, Pipe 26 - 27 | | | | | | 2.01 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 14.03 | | | | | | | | | | | | | | | | |
| | | | 0.25 | 0.59 | 0.41 | 0.41 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | 4 | 8 | 0.27 | 0.73 | 0.55 | 0.96 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 74 | 375 | 375 | PVC | 0.65 | 73.0 | 106.070 | 106.445 | 108.976 | 141 | 1.28 | 0.95 | 0.52 |
| Contribution From croissant Billrian Crescent, Pipe 7 - 8 | | | | | | 1.58 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 12.88 | | | | | | | | | | | | | | | | |
| | 8 | 9 | | | 0.00 | 2.54 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 12.88 | 67.26 | 91.08 | 106.70 | 155.88 | 171 | 600 | 600 | CONC | 0.20 | 20.5 | 105.370 | 105.970 | 108.887 | 275 | 0.97 | 0.35 | 0.62 |
| | 9 | 10 | | | 0.00 | 2.54 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 13.24 | 66.27 | 89.72 | 105.11 | 153.54 | 168 | 600 | 600 | CONC | 0.20 | 23.5 | 105.299 | 105.899 | 108.731 | 275 | 0.97 | 0.40 | 0.61 |
| | 10 | 14 | 0.20 | 0.73 | 0.41 | 2.94 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 13.64 | 65.18 | 88.23 | 103.34 | 150.95 | 192 | 675 | 675 | CONC | 0.15 | 17.5 | 105.177 | 105.852 | 108.582 | 326 | 0.91 | 0.32 | 0.59 |
| To avenue Derreen Avenue, Pipe 14 - 15 | | | | | | 2.94 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 13.96 | | | | | | | | | | | | | | | | |
| **Block 233** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Contribution From cours Curraglass Walk, Pipe 25 - 26 | | | | | | 2.17 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 12.85 | | | | | | | | | | | | | | | | |
| Contribution From cours Curraglass Walk, Pipe 4 - 26 | | | | | | 2.01 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 14.03 | | | | | | | | | | | | | | | | |
| | 26 | 27 | | | 0.00 | 4.19 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 14.03 | 64.15 | 86.82 | 101.70 | 148.54 | 269 | 675 | 675 | CONC | 0.20 | 9.5 | 104.992 | 105.667 | 108.818 | 376 | 1.05 | 0.15 | 0.71 |
| | 27 | 30 | 0.05 | 0.59 | 0.08 | 4.27 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 14.18 | 63.77 | 86.30 | 101.08 | 147.63 | 272 | 750 | 750 | CONC | 0.11 | 60.0 | 104.898 | 105.648 | 108.775 | 369 | 0.84 | 1.20 | 0.74 |
| To terrasse Crossway Terrace, Pipe 30 - 34 | | | | | | 4.27 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 15.38 | | | | | | | | | | | | | | | | |
| **terrasse Crossway Terrace** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 31 | 32 | 0.15 | 0.74 | 0.31 | 0.31 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 24 | 300 | 300 | PVC | 0.35 | 74.0 | 105.649 | 105.949 | 108.404 | 57 | 0.81 | 1.52 | 0.41 |
| | | | 0.36 | 0.59 | 0.59 | 0.90 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | 32 | 34 | 0.40 | 0.74 | 0.82 | 1.72 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 11.52 | 71.41 | 96.78 | 113.41 | 165.73 | 123 | 525 | 525 | CONC | 0.20 | 82.0 | 105.165 | 105.690 | 108.342 | 192 | 0.89 | 1.54 | 0.64 |
| To place Unity Place, Pipe 34 - 40 | | | | | | 1.72 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 13.06 | | | | | | | | | | | | | | | | |
| | | | 0.18 | 0.59 | 0.30 | 0.30 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | 28 | 29 | 0.34 | 0.73 | 0.69 | 0.99 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 76 | 450 | 450 | CONC | 0.20 | 65.5 | 105.371 | 105.821 | 108.429 | 128 | 0.80 | 1.36 | 0.59 |
| | | | 0.29 | 0.59 | 0.48 | 1.46 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | 29 | 30 | 0.37 | 0.73 | 0.75 | 2.21 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 11.36 | 71.94 | 97.51 | 114.27 | 167.00 | 159 | 600 | 600 | CONC | 0.15 | 72.0 | 105.090 | 105.690 | 108.525 | 238 | 0.84 | 1.43 | 0.67 |
| Contribution From Block 233, Pipe 27 - 30 | | | | | | 4.27 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 15.38 | | | | | | | | | | | | | | | | |
| | 30 | 34 | 0.03 | 0.73 | 0.06 | 6.54 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 15.38 | 60.89 | 82.36 | 96.44 | 140.82 | 398 | 900 | 900 | CONC | 0.11 | 51.0 | 104.682 | 105.582 | 108.487 | 600 | 0.94 | 0.90 | 0.66 |
| To place Unity Place, Pipe 34 - 40 | | | | | | 6.54 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 16.28 | | | | | | | | | | | | | | | | |
| **place Unity Place** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 42 | 43 | 0.35 | 0.59 | 0.57 | 0.57 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 44 | 300 | 300 | PVC | 1.05 | 29.0 | 105.602 | 105.902 | 108.441 | 99 | 1.40 | 0.34 | 0.44 |

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/s

| | | | |
|---|---|---|---|
| Designed: W.L. | PROJECT: 195 Huntmar Drive | | |
| Checked: P.P. | LOCATION: City of Ottawa | | |
| Dwg. Reference: STM Drainage Plan, Dwgs 95 to 98 | File Ref: 12-624 | Date: July 2020 | Sheet No. SHEET 1 OF 5 |

# STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

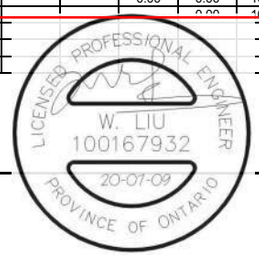
Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Arterial Roads Return Frequency = 10 years

Manning 0.013

| LOCATION | | | AREA (Ha) 2 YEAR | | | | 5 YEAR | | | | 10 YEAR | | | | 100 YEAR | | | | FLOW | | | | | | SEWER DATA | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | AREA | R | Indiv. | Accum. | AREA | R | Indiv. | Accum. | AREA | R | Indiv. | Accum. | AREA | R | Indiv. | Accum. | Time of | Intensity | Intensity | Intensity | Intensity | Peak Flow | DIA. | DIA. | TYPE | SLOPE | LENGTH | INV | OBV | T/G | CAPACITY | VELOCITY | TIME OF | RATIO |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | UPS | UPS | UPS | | | FLOW | |
| Location | From Node | To Node | (Ha) | | 2.78 AC | 2.78 AC | (Ha) | | 2.78 AC | 2.78 AC | (Ha) | | 2.78 AC | 2.78 AC | (Ha) | | 2.78 AC | 2.78 AC | Conc. (min) | 2 Year (mm/h) | 5 Year (mm/h) | 10 Year (mm/h) | 100 Year (mm/h) | Q (l/s) | (actual) | (nominal) | | (%) | (m) | | | | (l/s) | (m/s) | (min.) | Q/Q full |
| | | | 0.13 | 0.59 | 0.21 | 0.79 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | 43 | 44 | 0.59 | 0.73 | 1.20 | 1.98 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.34 | 75.51 | 102.41 | 120.04 | 175.47 | 150 | 600 | 600 | CONC | 0.15 | 75.0 | 104.997 | 105.597 | 108.131 | 238 | 0.84 | 1.49 | 0.63 |
| | 44 | 45 | | | 0.00 | 1.98 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 11.83 | 70.42 | 95.42 | 111.81 | 163.39 | 140 | 600 | 600 | CONC | 0.15 | 71.5 | 104.864 | 105.464 | 108.180 | 238 | 0.84 | 1.42 | 0.59 |
| | 45 | 46 | | | 0.00 | 1.98 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 13.25 | 66.24 | 89.68 | 105.06 | 153.47 | 131 | 600 | 600 | CONC | 0.15 | 11.0 | 104.697 | 105.297 | 107.849 | 238 | 0.84 | 0.22 | 0.55 |
| To Block 234, Pipe 46 - TEE47 | | | | | | 1.98 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 13.47 | | | | | | | | | | | | | | | | |
| Contribution From place Unity Place, Pipe 34 - 40 | | | | | | 10.25 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 17.55 | | | | | | | | | | | | | | | | |
| Contribution From avenue Derreen Avenue, Pipe 20 - 40 | | | | | | 4.16 | | | | 5.70 | | | | 0.00 | | | | 0.00 | 21.93 | | | | | | | | | | | | | | | | |
| Contribution From avenue Derreen Avenue, Pipe 39 - 40 | | | | | | 1.85 | | | | 1.38 | | | | 0.00 | | | | 0.00 | 14.16 | | | | | | | | | | | | | | | | |
| | | | 0.09 | 0.59 | 0.15 | 16.41 | | | 0.00 | 7.08 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | | | 0.10 | 0.59 | 0.16 | 16.57 | | | 0.00 | 7.08 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | | | 0.17 | 0.73 | 0.34 | 16.92 | | | 0.00 | 7.08 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | 40 | 41 | 0.29 | 0.59 | 0.48 | 17.39 | | | 0.00 | 7.08 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 21.93 | 49.13 | 66.29 | 77.56 | 113.13 | 1324 | 1350 | 1350 | CONC | 0.11 | 63.5 | 104.088 | 105.438 | 108.142 | 1770 | 1.24 | 0.86 | 0.75 |
| | 41 | 46 | 0.42 | 0.73 | 0.85 | 18.24 | | | 0.00 | 7.08 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 22.78 | 47.95 | 64.68 | 75.67 | 110.36 | 1333 | 1350 | 1350 | CONC | 0.11 | 25.5 | 103.988 | 105.338 | 107.944 | 1770 | 1.24 | 0.34 | 0.75 |
| To Block 234, Pipe 46 - TEE47 | | | | | | 18.24 | | | | 7.08 | | | | 0.00 | | | | 0.00 | 23.12 | | | | | | | | | | | | | | | | |
| **place Unity Place** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 33 | 34 | 0.53 | 0.40 | 0.59 | 0.59 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 45 | 375 | 375 | PVC | 0.30 | 10.5 | 105.183 | 105.558 | 108.299 | 96 | 0.87 | 0.20 | 0.47 |
| Contribution From terrasse Crossway Terrace, Pipe 30 - 34 | | | | | | 6.54 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 16.28 | | | | | | | | | | | | | | | | |
| Contribution From terrasse Crossway Terrace, Pipe 32 - 34 | | | | | | 1.72 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 13.06 | | | | | | | | | | | | | | | | |
| | | | 0.07 | 0.74 | 0.14 | 9.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | | | 0.19 | 0.59 | 0.31 | 9.31 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | | | 0.24 | 0.73 | 0.49 | 9.79 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | 34 | 40 | 0.28 | 0.59 | 0.46 | 10.25 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 16.28 | 58.91 | 79.64 | 93.25 | 136.14 | 604 | 1050 | 1050 | CONC | 0.11 | 80.0 | 104.476 | 105.526 | 108.299 | 906 | 1.05 | 1.27 | 0.67 |
| To place Unity Place, Pipe 40 - 41 | | | | | | 10.25 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 17.55 | | | | | | | | | | | | | | | | |
| **Block 234** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Contribution From place Unity Place, Pipe 41 - 46 | | | | | | 18.24 | | | | 7.08 | | | | 0.00 | | | | 0.00 | 23.12 | | | | | | | | | | | | | | | | |
| Contribution From place Unity Place, Pipe 45 - 46 | | | | | | 1.98 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 13.47 | | | | | | | | | | | | | | | | |
| | 46 | 47 | | | 0.00 | 20.23 | | | 0.00 | 7.08 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 23.12 | 47.49 | 64.06 | 74.94 | 109.30 | 1414 | 1350 | 1350 | CONC | 0.11 | 34.5 | 103.930 | 105.280 | 107.970 | 1770 | 1.24 | 0.46 | 0.80 |
| | 47 | HW | | | 0.00 | 20.23 | | | 0.00 | 7.08 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 23.59 | 46.89 | 63.24 | 73.98 | 107.89 | 1396 | 1350 | 1350 | CONC | 0.11 | 8.5 | 103.859 | 105.209 | 107.970 | 1770 | 1.24 | 0.11 | 0.79 |
| To POND 7 | | | | | | 20.23 | | | | 7.08 | | | | 0.00 | | | | 0.00 | 23.70 | | | | | | | | | | | | | | | | |
| **Block 244** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 91 | 95 | 1.99 | 0.80 | 4.43 | 4.43 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 340 | 825 | 825 | CONC | 0.15 | 6.5 | 104.776 | 105.601 | 107.450 | 556 | 1.04 | 0.10 | 0.61 |
| To Block 235, Pipe 95 - TEE96 | | | | | | 4.43 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 10.10 | | | | | | | | | | | | | | | | |
| **Block 243** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 90 | 92 | 1.60 | 0.80 | 3.56 | 3.56 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 273 | 750 | 750 | CONC | 0.15 | 19.0 | 105.205 | 105.955 | 108.580 | 431 | 0.98 | 0.32 | 0.63 |
| To chemin Culdaff Road, Pipe 92 - 93 | | | | | | 3.56 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 10.32 | | | | | | | | | | | | | | | | |
| **Block 256** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 88 | 89 | 1.59 | 0.80 | 3.54 | 3.54 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 272 | 750 | 750 | CONC | 0.15 | 19.0 | 105.358 | 106.108 | 108.640 | 431 | 0.98 | 0.32 | 0.63 |
| To chemin Culdaff Road, Pipe 89 - 92 | | | | | | 3.54 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 10.32 | | | | | | | | | | | | | | | | |
| **Block 242** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 85 | 86 | 2.70 | 0.80 | 6.00 | 6.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 461 | 900 | 900 | CONC | 0.15 | 19.0 | 105.071 | 105.971 | 108.395 | 701 | 1.10 | 0.29 | 0.66 |
| To chemin Culdaff Road, Pipe 86 - 87 | | | | | | 6.00 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 10.29 | | | | | | | | | | | | | | | | |
| **voie Bermondsey Way** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 35 | 36 | 0.17 | 0.74 | 0.35 | 0.35 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 27 | 300 | 300 | PVC | 0.35 | 76.5 | 105.705 | 106.005 | 108.204 | 57 | 0.81 | 1.58 | 0.47 |
| | 36 | 37 | | | 0.00 | 0.35 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 11.58 | 71.24 | 96.55 | 113.14 | 165.34 | 25 | 300 | 300 | PVC | 0.35 | 11.5 | 105.407 | 105.707 | 108.155 | 57 | 0.81 | 0.24 | 0.44 |
| | | | 0.21 | 0.59 | 0.34 | 0.69 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | 37 | 39 | 0.41 | 0.74 | 0.84 | 1.54 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 11.81 | 70.48 | 95.51 | 111.91 | 163.53 | 108 | 525 | 525 | CONC | 0.20 | 65.0 | 105.142 | 105.667 | 108.085 | 192 | 0.89 | 1.22 | 0.56 |
| To avenue Derreen Avenue, Pipe 39 - 40 | | | | | | 1.54 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 13.03 | | | | | | | | | | | | | | | | |
| **Block 241** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 82 | 83 | 1.06 | 0.80 | 2.36 | 2.36 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 181 | 675 | 675 | CONC | 0.15 | 19.5 | 105.489 | 106.164 | 108.350 | 326 | 0.91 | 0.36 | 0.56 |
| To avenue Derreen Avenue, Pipe 83 - 84 | | | | | | 2.36 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 10.36 | | | | | | | | | | | | | | | | |

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/s




| | |
|---|---|
| Designed: W.L. | PROJECT: 195 Huntmar Drive |
| Checked: P.P. | LOCATION: City of Ottawa |
| Dwg. Reference: STM Drainage Plan, Dwgs 95 to 98 | File Ref: 12-624 / Date: July 2020 / Sheet No. SHEET 2 OF 5 |

624_Stm3.xlsx

# STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

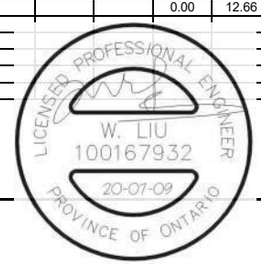
Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Arterial Roads Return Frequency = 10 years

Manning 0.013

| LOCATION | | | AREA (Ha) 2 YEAR | | | | AREA (Ha) 5 YEAR | | | | AREA (Ha) 10 YEAR | | | | AREA (Ha) 100 YEAR | | | | FLOW | | | | | | SEWER DATA | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | AREA | R | Indiv. | Accum. | AREA | R | Indiv. | Accum. | AREA | R | Indiv. | Accum. | AREA | R | Indiv. | Accum. | Time of | Intensity | Intensity | Intensity | Intensity | Peak Flow | DIA. | DIA. | TYPE | SLOPE | LENGTH | INV | OBV | T/G | CAPACITY | VELOCITY | TIME OF | RATIO |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Location | From Node | To Node | (Ha) | | 2.78 AC | 2.78 AC | (Ha) | | 2.78 AC | 2.78 AC | (Ha) | | 2.78 AC | 2.78 AC | (Ha) | | 2.78 AC | 2.78 AC | Conc. (min) | 2 Year (mm/h) | 5 Year (mm/h) | 10 Year (mm/h) | 100 Year (mm/h) | Q (l/s) | (mm) (actual) | (mm) (nominal) | | (%) | (m) | UPS | UPS | UPS | | | FLOW (min.) | Q/Q full |
| **Block 240** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 80 | 81 | 0.64 | 0.80 | 1.42 | 1.42 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 109 | 525 | 525 | CONC | 0.20 | 20.0 | 105.838 | 106.363 | 109.030 | 192 | 0.89 | 0.38 | 0.57 |
| To avenue Derreen Avenue, Pipe 81 - 83 | | | | | | 1.42 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 10.38 | | | | | | | | | | | | | | | | |
| **Future Development** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 750 | 75 | 0.69 | 0.80 | 1.53 | 1.53 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 118 | 525 | 525 | CONC | 0.20 | 23.5 | 106.123 | 106.648 | 108.800 | 192 | 0.89 | 0.44 | 0.61 |
| To avenue Robert Grant Avenue, Pipe 75 - 78 | | | | | | 1.53 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 10.44 | | | | | | | | | | | | | | | | |
| **avenue Derreen Avenue** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | 0.00 | 0.00 | 0.09 | 0.74 | 0.19 | 0.19 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | | | 0.19 | 0.59 | 0.31 | 0.31 | | | 0.00 | 0.19 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | 38 | 39 | | | 0.00 | 0.31 | 0.34 | 0.74 | 0.70 | 0.88 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 116 | 450 | 450 | CONC | 0.30 | 89.0 | 105.354 | 105.804 | 108.403 | 156 | 0.98 | 1.51 | 0.74 |
| Contribution From voie Bermondsey Way, Pipe 37 - 39 | | | | | | 1.54 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 13.03 | | | | | | | | | | | | | | | | |
| | 39 | 40 | | | 0.00 | 1.85 | 0.24 | 0.74 | 0.49 | 1.38 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 13.03 | 66.84 | 90.51 | 106.03 | 154.90 | 248 | 750 | 750 | CONC | 0.15 | 66.0 | 104.787 | 105.537 | 108.224 | 431 | 0.98 | 1.13 | 0.58 |
| To place Unity Place, Pipe 40 - 41 | | | | | | 1.85 | | | | 1.38 | | | | 0.00 | | | | 0.00 | 14.16 | | | | | | | | | | | | | | | | |
| | 76 | 78 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 0.51 | 0.70 | 0.99 | 0.99 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 121 | 450 | 450 | CONC | 0.55 | 94.0 | 106.240 | 106.615 | 108.731 | 211 | 1.33 | 1.18 | 0.57 |
| Contribution From avenue Robert Grant Avenue, Pipe 75 - 78 | | | | | | 1.53 | | | | 0.00 | | | | 1.83 | | | | 0.00 | 11.99 | | | | | | | | | | | | | | | | |
| | 78 | 79 | | | 0.00 | 1.53 | | | 0.00 | 0.00 | | | 0.00 | 2.82 | | | 0.00 | 0.00 | 11.99 | 69.93 | 94.75 | 111.02 | 162.23 | 421 | 975 | 975 | CONC | 0.15 | 56.0 | 105.558 | 106.533 | 108.717 | 868 | 1.16 | 0.80 | 0.48 |
| | 79 | 81 | | | 0.00 | 1.53 | 0.38 | 0.70 | 0.74 | 0.74 | | | 0.00 | 2.82 | | | 0.00 | 0.00 | 12.79 | 67.53 | 91.45 | 107.14 | 156.53 | 474 | 975 | 975 | CONC | 0.15 | 61.5 | 105.440 | 106.415 | 108.566 | 868 | 1.16 | 0.88 | 0.55 |
| Contribution From Block 240, Pipe 80 - 81 | | | | | | 1.42 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 10.38 | | | | | | | | | | | | | | | | |
| | 81 | 83 | | | 0.00 | 2.96 | 0.39 | 0.73 | 0.79 | 1.53 | | | 0.00 | 2.82 | | | 0.00 | 0.00 | 13.67 | 65.09 | 88.11 | 103.21 | 150.75 | 619 | 1050 | 1050 | CONC | 0.15 | 112.0 | 105.273 | 106.323 | 108.651 | 1058 | 1.22 | 1.53 | 0.58 |
| Contribution From Block 241, Pipe 82 - 83 | | | | | | 2.36 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 10.36 | | | | | | | | | | | | | | | | |
| | 83 | 84 | | | 0.00 | 5.32 | | | 0.00 | 1.53 | | | 0.00 | 2.82 | | | 0.00 | 0.00 | 15.20 | 61.30 | 82.92 | 97.10 | 141.79 | 727 | 1050 | 1050 | CONC | 0.20 | 40.5 | 105.085 | 106.135 | 108.293 | 1221 | 1.41 | 0.48 | 0.60 |
| To chemin Culdaff Road, Pipe 84 - 86 | | | | | | 5.32 | | | | 1.53 | | | | 2.82 | | | | 0.00 | 15.68 | | | | | | | | | | | | | | | | |
| Contribution From rue Stittsville Main Street, Pipe 21 - 11 | | | | | | 0.00 | | | | 1.28 | | | | 0.00 | | | | 0.00 | 12.38 | | | | | | | | | | | | | | | | |
| | | | 0.12 | 0.59 | 0.20 | 0.20 | | | 0.00 | 1.28 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | | | 0.12 | 0.59 | 0.20 | 0.39 | | | 0.00 | 1.28 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | 11 | 12 | | | 0.00 | 0.39 | 0.31 | 0.73 | 0.63 | 1.90 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 12.38 | 68.75 | 93.12 | 109.10 | 159.41 | 204 | 675 | 675 | CONC | 0.15 | 118.0 | 105.647 | 106.322 | 109.053 | 326 | 0.91 | 2.16 | 0.63 |
| | | | 0.06 | 0.59 | 0.10 | 0.49 | | | 0.00 | 1.90 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | | | 0.10 | 0.59 | 0.16 | 0.66 | | | 0.00 | 1.90 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | 12 | 13 | | | 0.00 | 0.66 | 0.40 | 0.73 | 0.81 | 2.72 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 14.54 | 62.88 | 85.08 | 99.65 | 145.53 | 272 | 750 | 750 | CONC | 0.15 | 63.0 | 105.395 | 106.145 | 108.793 | 431 | 0.98 | 1.08 | 0.63 |
| | 13 | 14 | | | 0.00 | 0.66 | | | 0.00 | 2.72 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 15.61 | 60.36 | 81.63 | 95.58 | 139.56 | 261 | 750 | 750 | CONC | 0.15 | 30.0 | 105.270 | 106.020 | 108.676 | 431 | 0.98 | 0.51 | 0.61 |
| Contribution From cours Curraglass Walk, Pipe 10 - 14 | | | | | | 2.94 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 13.96 | | | | | | | | | | | | | | | | |
| | 14 | 15 | | | 0.00 | 3.60 | 0.20 | 0.73 | 0.41 | 3.12 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 16.13 | 59.23 | 80.09 | 93.77 | 136.91 | 463 | 975 | 975 | CONC | 0.11 | 33.0 | 105.000 | 105.975 | 108.738 | 743 | 1.00 | 0.55 | 0.62 |
| | 15 | 16 | | | 0.00 | 3.60 | | | 0.00 | 3.12 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 16.68 | 58.07 | 78.50 | 91.91 | 134.17 | 454 | 975 | 975 | CONC | 0.11 | 28.0 | 104.934 | 105.909 | 108.573 | 743 | 1.00 | 0.47 | 0.61 |
| | 16 | 17 | | | 0.00 | 3.60 | | | 0.00 | 3.12 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 17.15 | 57.12 | 77.21 | 90.39 | 131.94 | 447 | 975 | 975 | CONC | 0.11 | 27.0 | 104.873 | 105.848 | 108.724 | 743 | 1.00 | 0.45 | 0.60 |
| | 17 | 18 | | | 0.00 | 3.60 | 0.32 | 0.73 | 0.65 | 3.77 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 17.60 | 56.24 | 76.00 | 88.97 | 129.86 | 489 | 975 | 975 | CONC | 0.11 | 37.0 | 104.813 | 105.788 | 108.575 | 743 | 1.00 | 0.62 | 0.66 |
| | 18 | 19 | | | 0.00 | 3.60 | | | 0.00 | 3.77 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 18.22 | 55.09 | 74.42 | 87.11 | 127.14 | 479 | 975 | 975 | CONC | 0.11 | 14.0 | 104.742 | 105.717 | 108.446 | 743 | 1.00 | 0.23 | 0.64 |
| | 19 | 20 | | | 0.00 | 3.60 | 0.23 | 0.73 | 0.47 | 4.24 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 18.45 | 54.66 | 73.84 | 86.43 | 126.14 | 510 | 975 | 975 | CONC | 0.11 | 97.5 | 104.697 | 105.672 | 108.532 | 743 | 1.00 | 1.63 | 0.69 |
| | | | | | 0.00 | 3.60 | 0.16 | 0.73 | 0.32 | 4.56 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | | | 0.34 | 0.59 | 0.56 | 4.16 | | | 0.00 | 4.56 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | 20 | 40 | | | 0.00 | 4.16 | 0.56 | 0.73 | 1.14 | 5.70 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 20.08 | 51.89 | 70.07 | 81.99 | 119.63 | 615 | 1050 | 1050 | CONC | 0.11 | 115.5 | 104.515 | 105.565 | 108.172 | 906 | 1.05 | 1.84 | 0.68 |
| To place Unity Place, Pipe 40 - 41 | | | | | | 4.16 | | | | 5.70 | | | | 0.00 | | | | 0.00 | 21.93 | | | | | | | | | | | | | | | | |
| **rang Kindred Row** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 54 | 55 | 0.13 | 0.74 | 0.27 | 0.27 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 21 | 375 | 375 | PVC | 0.30 | 79.0 | 106.061 | 106.436 | 108.888 | 96 | 0.87 | 1.51 | 0.21 |
| | | | 0.28 | 0.59 | 0.46 | 0.73 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | | | 0.16 | 0.74 | 0.33 | 1.06 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | 55 | 56 | 0.39 | 0.74 | 0.80 | 1.86 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 11.51 | 71.44 | 96.82 | 113.46 | 165.81 | 133 | 525 | 525 | CONC | 0.20 | 94.0 | 105.674 | 106.199 | 108.775 | 192 | 0.89 | 1.76 | 0.69 |
| To placette Allied Mews, Pipe 56 - 57 | | | | | | 1.86 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 13.28 | | | | | | | | | | | | | | | | |
| **ruelle Ballinora Lane** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 65 | 66 | 0.52 | 0.76 | 1.10 | 1.10 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 84 | 375 | 375 | PVC | 0.45 | 79.0 | 106.296 | 106.671 | 108.937 | 118 | 1.06 | 1.24 | 0.72 |
| | 66 | 67 | 0.17 | 0.76 | 0.36 | 1.46 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 11.24 | 72.36 | 98.09 | 114.95 | 167.99 | 105 | 450 | 450 | CONC | 0.25 | 68.5 | 105.865 | 106.315 | 108.711 | 143 | 0.90 | 1.27 | 0.74 |
| | 67 | 68 | | | 0.00 | 1.46 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 12.51 | 68.35 | 92.57 | 108.46 | 158.46 | 100 | 450 | 450 | CONC | 0.25 | 8.0 | 105.664 | 106.114 | 108.635 | 143 | 0.90 | 0.15 | 0.70 |
| To chemin Culdaff Road, Pipe 68 - 72 | | | | | | 1.46 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 12.66 | | | | | | | | | | | | | | | | |

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/s




| | | |
|---|---|---|
| Designed: W.L. | PROJECT: 195 Huntmar Drive | |
| Checked: P.P. | LOCATION: City of Ottawa | |
| Dwg. Reference: STM Drainage Plan, Dwgs 95 to 98 | File Ref: 12-624 | Date: July 2020 |
| | | Sheet No. SHEET 3 OF 5 |

624_Stm3.xlsx

# STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

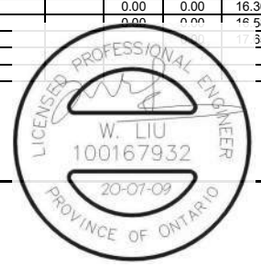
Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Manning 0.013 Arterial Roads Return Frequency = 10 years

Ottawa

| | LOCATION | | AREA (Ha) | | | | | | | | | | | | | | FLOW | | | | | | SEWER DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2 YEAR | | | | 5 YEAR | | | | 10 YEAR | | | | 100 YEAR | | | | Time of | Intensity | Intensity | Intensity | Intensity | Peak Flow | DIA. | DIA. | TYPE | SLOPE | LENGTH | INV | OBV | T/G | CAPACITY | VELOCITY | TIME OF | RATIO |
| | | | AREA | R | Indiv. | Accum. | AREA | R | Indiv. | Accum. | AREA | R | Indiv. | Accum. | AREA | R | Indiv. | Accum. | Conc. | 2 Year | 5 Year | 10 Year | 100 Year | | (mm) | (mm) | | | | UPS | UPS | UPS | | | FLOW | |
| Location | From Node | To Node | (Ha) | | 2.78 AC | 2.78 AC | (Ha) | | 2.78 AC | 2.78 AC | (Ha) | | 2.78 AC | 2.78 AC | (Ha) | | 2.78 AC | 2.78 AC | (min) | (mm/h) | (mm/h) | (mm/h) | (mm/h) | Q (l/s) | (actual) | (nominal) | | (%) | (m) | | | | (l/s) | (m/s) | (min.) | Q/Q full |
| **placette Allied Mews** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 50 | 51 | 0.28 | 0.74 | 0.58 | 0.58 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 44 | 375 | 375 | PVC | 0.40 | 76.0 | 106.150 | 106.525 | 108.975 | 111 | 1.00 | 1.26 | 0.40 |
| | | | 0.27 | 0.59 | 0.44 | 1.02 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | | |
| | 51 | 52 | 0.39 | 0.74 | 0.80 | 1.82 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 11.26 | 72.28 | 97.97 | 114.81 | 167.79 | 132 | 525 | 525 | CONC | 0.20 | 86.0 | 105.696 | 106.221 | 108.985 | 192 | 0.89 | 1.61 | 0.68 |
| | 52 | 53 | | | 0.00 | 1.82 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 12.87 | 67.29 | 91.12 | 106.75 | 155.95 | 123 | 525 | 525 | CONC | 0.20 | 11.5 | 105.494 | 106.019 | 108.913 | 192 | 0.89 | 0.22 | 0.64 |
| | | | 0.16 | 0.59 | 0.26 | 2.08 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | | |
| | 53 | 56 | 0.21 | 0.74 | 0.43 | 2.52 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 13.09 | 66.67 | 90.28 | 105.76 | 154.50 | 168 | 600 | 600 | CONC | 0.15 | 64.5 | 105.396 | 105.996 | 108.843 | 238 | 0.84 | 1.28 | 0.71 |
| Contribution From rang Kindred Row, Pipe 55 - 56 | | | | | | 1.86 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 13.28 | | | | | | | | | | | | | | | | | |
| | | | 0.14 | 0.59 | 0.23 | 4.60 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | | |
| | 56 | 57 | 0.20 | 0.74 | 0.41 | 5.01 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 14.37 | 63.30 | 85.65 | 100.32 | 146.51 | 317 | 825 | 825 | CONC | 0.11 | 58.5 | 105.186 | 106.011 | 108.845 | 476 | 0.89 | 1.09 | 0.67 |
| | 57 | 68 | | | 0.00 | 5.01 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 15.46 | 60.69 | 82.09 | 96.13 | 140.36 | 304 | 825 | 825 | CONC | 0.11 | 9.5 | 105.092 | 105.917 | 108.612 | 476 | 0.89 | 0.18 | 0.64 |
| To chemin Culdaff Road, Pipe 68 - 72 | | | | | | 5.01 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 15.64 | | | | | | | | | | | | | | | | | |
| **cercle Leinster Circle** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 59 | 60 | 0.41 | 0.76 | 0.87 | 0.87 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 67 | 375 | 375 | PVC | 0.50 | 81.0 | 106.193 | 106.568 | 108.724 | 124 | 1.12 | 1.20 | 0.54 |
| | 60 | 64 | | | 0.00 | 0.87 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 11.20 | 72.48 | 98.24 | 115.13 | 168.26 | 63 | 375 | 375 | PVC | 0.85 | 13.5 | 105.758 | 106.133 | 108.633 | 162 | 1.46 | 0.15 | 0.39 |
| To chemin Culdaff Road, Pipe 64 - 68 | | | | | | 0.87 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 11.36 | | | | | | | | | | | | | | | | | |
| | 69 | 70 | 1.67 | 0.80 | 3.71 | 3.71 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 285 | 750 | 750 | CONC | 0.15 | 22.5 | 105.558 | 106.308 | 108.724 | 431 | 0.98 | 0.38 | 0.66 |
| | 70 | 71 | 0.50 | 0.76 | 1.06 | 4.77 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.38 | 75.36 | 102.21 | 119.80 | 175.12 | 360 | 825 | 825 | CONC | 0.15 | 116.5 | 105.449 | 106.274 | 108.628 | 556 | 1.04 | 1.87 | 0.65 |
| | 71 | 72 | | | 0.00 | 4.77 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 12.25 | 69.12 | 93.64 | 109.71 | 160.30 | 330 | 825 | 825 | CONC | 0.15 | 16.5 | 105.244 | 106.069 | 108.541 | 556 | 1.04 | 0.26 | 0.59 |
| To chemin Culdaff Road, Pipe 72 - 73 | | | | | | 4.77 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 12.52 | | | | | | | | | | | | | | | | | |
| **Block 232** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 62 | 63 | 1.75 | 0.80 | 3.89 | 3.89 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 299 | 750 | 750 | CONC | 0.15 | 14.5 | 105.324 | 106.074 | 108.980 | 431 | 0.98 | 0.25 | 0.69 |
| To chemin Culdaff Road, Pipe 63 - 64 | | | | | | 3.89 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 10.25 | | | | | | | | | | | | | | | | | |
| **chemin Culdaff Road** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Contribution From Block 256, Pipe 88 - 89 | | | | | | 3.54 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 10.32 | | | | | | | | | | | | | | | | | |
| | | | | | 0.00 | 3.54 | 0.11 | 0.73 | 0.22 | 0.22 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | | |
| | 89 | 92 | | | 0.00 | 3.54 | 0.23 | 0.73 | 0.47 | 0.69 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.32 | 75.58 | 102.51 | 120.16 | 175.65 | 338 | 825 | 825 | CONC | 0.15 | 102.0 | 105.254 | 106.079 | 108.378 | 556 | 1.04 | 1.63 | 0.61 |
| Contribution From Block 243, Pipe 90 - 92 | | | | | | 3.56 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 10.32 | | | | | | | | | | | | | | | | | |
| | 92 | 93 | | | 0.00 | 7.09 | | | 0.00 | 0.69 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 11.96 | 70.02 | 94.87 | 111.16 | 162.44 | 562 | 975 | 975 | CONC | 0.15 | 24.0 | 104.951 | 105.926 | 108.317 | 868 | 1.16 | 0.34 | 0.65 |
| | 93 | 94 | | | 0.00 | 7.09 | | | 0.00 | 0.69 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 12.30 | 68.96 | 93.42 | 109.46 | 159.93 | 554 | 975 | 975 | CONC | 0.15 | 16.5 | 104.855 | 105.830 | 108.252 | 868 | 1.16 | 0.24 | 0.64 |
| To Block 235, Pipe 94 - 95 | | | | | | 7.09 | | | | 0.69 | | | | 0.00 | | | | 0.00 | 12.54 | | | | | | | | | | | | | | | | | |
| Contribution From chemin Culdaff Road, Pipe 73 - 84 | | | | | | 18.14 | | | | 1.42 | | | | 0.00 | | | | 0.00 | 17.65 | | | | | | | | | | | | | | | | | |
| Contribution From avenue Derreen Avenue, Pipe 83 - 84 | | | | | | 5.32 | | | | 1.53 | | | | 2.82 | | | | 0.00 | 15.68 | | | | | | | | | | | | | | | | | |
| | 84 | 86 | | | 0.00 | 23.45 | 0.19 | 0.74 | 0.39 | 3.34 | | | 0.00 | 2.82 | | | 0.00 | 0.00 | 17.65 | 56.16 | 75.88 | 88.83 | 129.65 | 1821 | 1650 | 1650 | CONC | 0.11 | 74.5 | 104.404 | 106.054 | 108.428 | 3023 | 1.41 | 0.88 | 0.60 |
| Contribution From Block 242, Pipe 85 - 86 | | | | | | 6.00 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 10.29 | | | | | | | | | | | | | | | | | |
| | 86 | 87 | | | 0.00 | 29.46 | | | 0.00 | 3.34 | | | 0.00 | 2.82 | | | 0.00 | 0.00 | 18.52 | 54.53 | 73.67 | 86.22 | 125.84 | 2096 | 1650 | 1650 | CONC | 0.11 | 26.0 | 104.292 | 105.942 | 108.384 | 3023 | 1.41 | 0.31 | 0.69 |
| | 87 | 94 | | | 0.00 | 29.46 | 0.18 | 0.74 | 0.37 | 3.71 | | | 0.00 | 2.82 | | | 0.00 | 0.00 | 18.83 | 53.99 | 72.93 | 85.36 | 124.56 | 2102 | 1650 | 1650 | CONC | 0.11 | 16.5 | 104.203 | 105.853 | 108.253 | 3023 | 1.41 | 0.19 | 0.70 |
| To Block 235, Pipe 94 - 95 | | | | | | 29.46 | | | | 3.71 | | | | 2.82 | | | | 0.00 | 19.02 | | | | | | | | | | | | | | | | | |
| **chemin Culdaff Road** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Contribution From rue Stittsville Main Street, Pipe 600 - 61 | | | | | | 0.00 | | | | 1.15 | | | | 0.00 | | | | 0.00 | 12.41 | | | | | | | | | | | | | | | | | |
| | | | 0.11 | 0.74 | 0.23 | 0.23 | | | 0.00 | 1.15 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | | |
| | | | | | 0.00 | 0.23 | 0.13 | 0.73 | 0.26 | 1.42 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | | |
| | | | 0.26 | 0.74 | 0.53 | 0.76 | | | 0.00 | 1.42 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | | |
| | 61 | 63 | 0.30 | 0.59 | 0.49 | 1.25 | | | 0.00 | 1.42 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 12.41 | 68.64 | 92.97 | 108.93 | 159.16 | 218 | 675 | 675 | CONC | 0.15 | 123.0 | 105.562 | 106.237 | 108.994 | 326 | 0.91 | 2.25 | 0.67 |
| Contribution From Block 232, Pipe 62 - 63 | | | | | | 3.89 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 10.25 | | | | | | | | | | | | | | | | | |
| | 63 | 64 | | | 0.00 | 5.15 | | | 0.00 | 1.42 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 14.66 | 62.57 | 84.66 | 99.14 | 144.79 | 442 | 825 | 825 | CONC | 0.20 | 17.0 | 105.227 | 106.052 | 108.776 | 642 | 1.20 | 0.24 | 0.69 |
| Contribution From cercle Leinster Circle, Pipe 60 - 64 | | | | | | 0.87 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 11.36 | | | | | | | | | | | | | | | | | |
| | 64 | 68 | 0.14 | 0.74 | 0.29 | 6.30 | | | 0.00 | 1.42 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 14.90 | 62.00 | 83.88 | 98.23 | 143.45 | 509 | 900 | 900 | CONC | 0.15 | 49.0 | 105.118 | 106.018 | 108.792 | 701 | 1.10 | 0.74 | 0.73 |
| Contribution From placette Allied Mews, Pipe 57 - 68 | | | | | | 5.01 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 15.64 | | | | | | | | | | | | | | | | | |
| Contribution From ruelle Ballinora Lane, Pipe 67 - 68 | | | | | | 1.46 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 12.66 | | | | | | | | | | | | | | | | | |
| | 68 | 72 | 0.10 | 0.74 | 0.21 | 12.98 | | | 0.00 | 1.42 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 15.64 | 60.29 | 81.54 | 95.48 | 139.41 | 898 | 1200 | 1200 | CONC | 0.11 | 45.0 | 104.894 | 106.094 | 108.746 | 1293 | 1.14 | 0.66 | 0.69 |
| Contribution From cercle Leinster Circle, Pipe 71 - 72 | | | | | | 4.77 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 12.52 | | | | | | | | | | | | | | | | | |
| | 72 | 73 | | | 0.00 | 17.75 | | | 0.00 | 1.42 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 16.30 | 58.87 | 79.59 | 93.18 | 136.04 | 1157 | 1350 | 1350 | CONC | 0.11 | 21.0 | 104.694 | 106.044 | 108.703 | 1770 | 1.24 | 0.28 | 0.65 |
| | 73 | 84 | 0.19 | 0.74 | 0.39 | 18.14 | | | 0.00 | 1.42 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 16.58 | 58.27 | 78.78 | 92.23 | 134.64 | 1169 | 1350 | 1350 | CONC | 0.11 | 79.0 | 104.641 | 105.991 | 108.586 | 1770 | 1.24 | 1.06 | 0.66 |
| To chemin Culdaff Road, Pipe 84 - 86 | | | | | | 18.14 | | | | 1.42 | | | | 0.00 | | | | 0.00 | 17.35 | | | | | | | | | | | | | | | | | |

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/s




| | | | |
|---|---|---|---|
| Designed: W.L. | PROJECT: 195 Huntmar Drive | | |
| Checked: P.P. | LOCATION: City of Ottawa | | |
| Dwg. Reference: STM Drainage Plan, Dwgs 95 to 98 | File Ref: 12-624 | Date: July 2020 | Sheet No. SHEET 4 OF 5 |

624_Stm3.xlsx

# STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Arterial Roads Return Frequency = 10 years

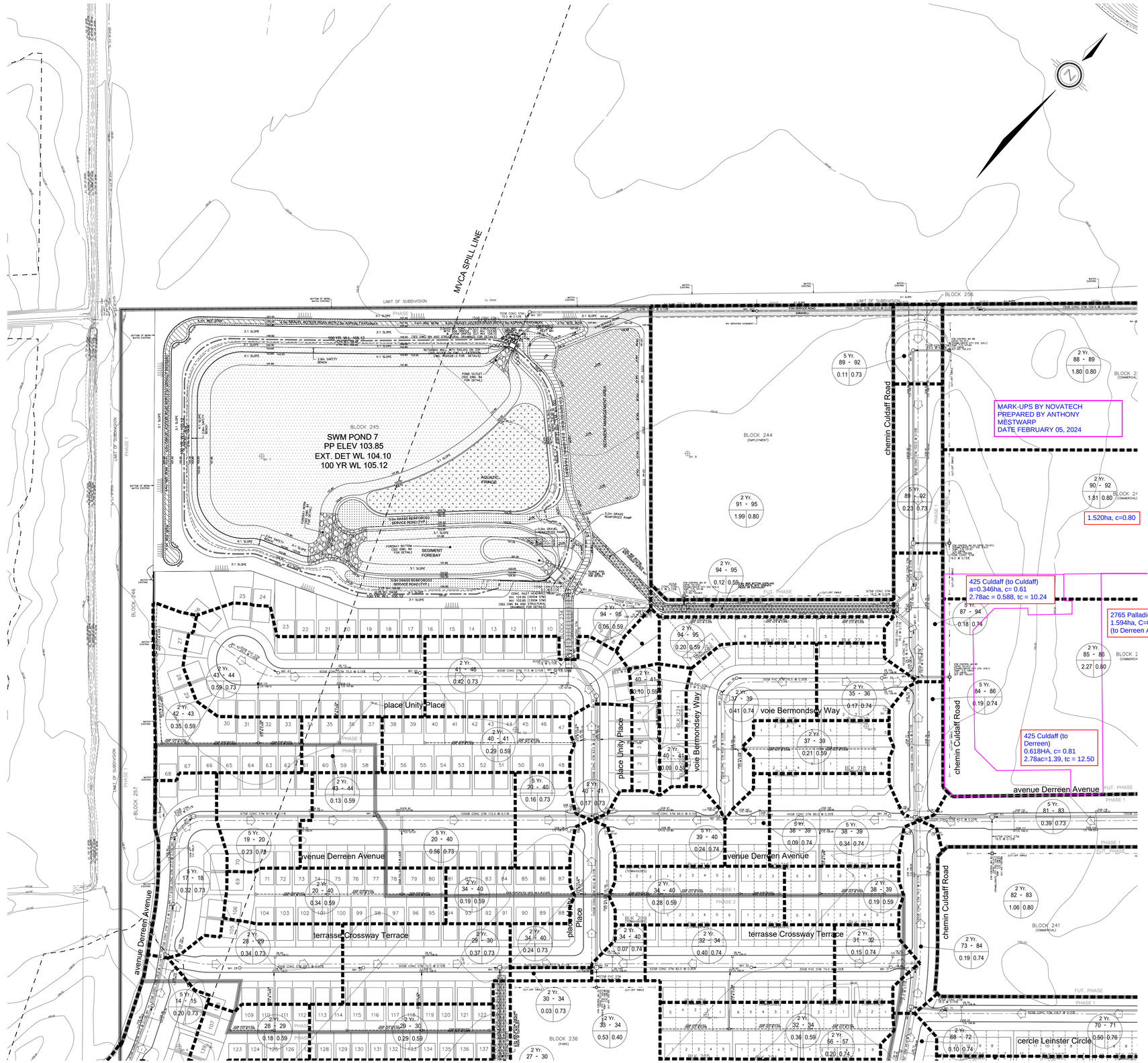
Manning 0.013

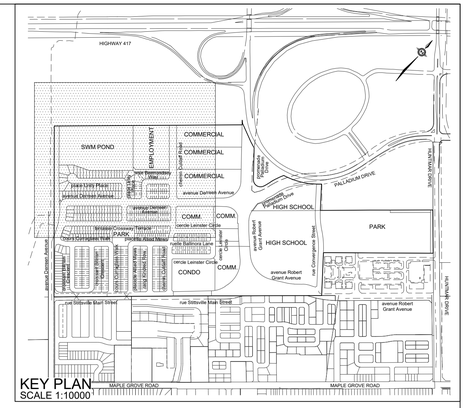
| | LOCATION | | AREA (Ha) | | | | | | | | | | | | | | | | FLOW | | | | | | SEWER DATA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2 YEAR | | | | 5 YEAR | | | | 10 YEAR | | | | 100 YEAR | | | | Time of | Intensity | Intensity | Intensity | Intensity | Peak Flow | DIA. | DIA. | TYPE | SLOPE | LENGTH | INV | OBV | T/G | CAPACITY | VELOCITY | TIME OF | RATIO |
| | | | AREA | R | Indiv. | Accum. | AREA | R | Indiv. | Accum. | AREA | R | Indiv. | Accum. | AREA | R | Indiv. | Accum. | Conc. | 2 Year | 5 Year | 10 Year | 100 Year | | (mm) | (mm) | | | | UPS | UPS | UPS | | | FLOW | |
| Location | From Node | To Node | (Ha) | | 2.78 AC | 2.78 AC | (Ha) | | 2.78 AC | 2.78 AC | (Ha) | | 2.78 AC | 2.78 AC | (Ha) | | 2.78 AC | 2.78 AC | (min) | (mm/h) | (mm/h) | (mm/h) | (mm/h) | Q (l/s) | (actual) | (nominal) | | (%) | (m) | | | | (l/s) | (m/s) | (min.) | Q/Q full |
| **Block 235** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Contribution From chemin Culdaff Road, Pipe 87 - 94 | | | | | | 29.46 | | | | 3.71 | | | | 2.82 | | | | 0.00 | 19.02 | | | | | | | | | | | | | | | | |
| Contribution From chemin Culdaff Road, Pipe 93 - 94 | | | | | | 7.09 | | | | 0.69 | | | | 0.00 | | | | 0.00 | 12.54 | | | | | | | | | | | | | | | | |
| | | | 0.05 | 0.59 | 0.08 | 36.64 | | | 0.00 | 4.40 | | | 0.00 | 2.82 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | | | 0.12 | 0.59 | 0.20 | 36.83 | | | 0.00 | 4.40 | | | 0.00 | 2.82 | | | 0.00 | 0.00 | | | | | | | | | | | | | | | | | |
| | 94 | 95 | 0.20 | 0.59 | 0.33 | 37.16 | | | 0.00 | 4.40 | | | 0.00 | 2.82 | | | 0.00 | 0.00 | 19.02 | 53.65 | 72.47 | 84.81 | 123.77 | 2552 | 1650 | 1650 | CONC | 0.15 | 109.0 | 104.155 | 105.805 | 108.157 | 3530 | 1.65 | 1.10 | 0.72 |
| Contribution From Block 244, Pipe 91 - 95 | | | | | | 4.43 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 10.10 | | | | | | | | | | | | | | | | |
| | 95 | 96 | | | 0.00 | 41.59 | | | 0.00 | 4.40 | | | 0.00 | 2.82 | | | 0.00 | 0.00 | 20.13 | 51.83 | 69.98 | 81.89 | 119.48 | 2694 | 1650 | 1650 | CONC | 0.15 | 57.0 | 103.975 | 105.625 | 108.200 | 3530 | 1.65 | 0.58 | 0.76 |
| | 96 | HW | | | 0.00 | 41.59 | | | 0.00 | 4.40 | | | 0.00 | 2.82 | | | 0.00 | 0.00 | 20.70 | 50.93 | 68.75 | 80.45 | 117.36 | 2647 | 1650 | 1650 | CONC | 0.15 | 12.5 | 103.869 | 105.519 | 108.200 | 3530 | 1.65 | 0.13 | 0.75 |
| To POND | | | | | | 41.59 | | | | 4.40 | | | | 2.82 | | | | 0.00 | 20.83 | | | | | | | | | | | | | | | | |
| **rue Convergence Street** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Fut. 208 | Fut. 209 | | | 0.00 | 0.00 | 0.51 | 0.70 | 0.99 | 0.99 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 103 | 450 | 450 | CONC | 0.25 | 75.5 | 101.982 | 102.432 | 104.432 | 143 | 0.90 | 1.40 | 0.73 |
| To rue Stittsville Main Street, Fut. Pipe 209 - 210 | | | | | | 0.00 | | | | 0.99 | | | | 0.00 | | | | 0.00 | 11.40 | | | | | | | | | | | | | | | | |
| **avenue Robert Grant Avenue** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 74 | 75 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 0.44 | 0.70 | 0.86 | 0.86 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 105 | 450 | 450 | CONC | 0.45 | 91.0 | 106.660 | 107.110 | 109.141 | 191 | 1.20 | 1.26 | 0.55 |
| Contribution From Future Development, Pipe 750 - 75 | | | | | | 1.53 | | | | 0.00 | | | | 0.00 | | | | 0.00 | 10.44 | | | | | | | | | | | | | | | | |
| | 75 | 78 | | | 0.00 | 1.53 | | | 0.00 | 0.00 | 0.50 | 0.70 | 0.97 | 1.83 | | | 0.00 | 0.00 | 11.26 | 72.28 | 97.97 | 114.81 | 167.80 | 321 | 750 | 750 | CONC | 0.15 | 42.5 | 105.851 | 106.601 | 108.921 | 431 | 0.98 | 0.73 | 0.74 |
| To avenue Derreen Avenue, Pipe 78 - 79 | | | | | | 1.53 | | | | 0.00 | | | | 1.83 | | | | 0.00 | 11.99 | | | | | | | | | | | | | | | | |
| **rue Stittsville Main Street** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Fut. 22 | Fut. 21 | | | 0.00 | 0.00 | 0.31 | 0.74 | 0.64 | 0.64 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 66 | 375 | 375 | PVC | 0.30 | 72.0 | 106.358 | 106.733 | 109.002 | 96 | 0.87 | 1.38 | 0.69 |
| | Fut. 21 | 11 | | | 0.00 | 0.00 | 0.31 | 0.74 | 0.64 | 1.28 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 11.38 | 71.88 | 97.43 | 114.17 | 166.86 | 124 | 525 | 525 | CONC | 0.30 | 65.0 | 105.992 | 106.517 | 108.986 | 236 | 1.09 | 1.00 | 0.53 |
| To avenue Derreen Avenue, Pipe 11 - 12 | | | | | | 0.00 | | | | 1.28 | | | | 0.00 | | | | 0.00 | 12.38 | | | | | | | | | | | | | | | | |
| | Fut. 590 | Fut. 600 | | | 0.00 | 0.00 | 0.38 | 0.74 | 0.78 | 0.78 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 10.00 | 76.81 | 104.19 | 122.14 | 178.56 | 81 | 375 | 375 | PVC | 0.40 | 91.0 | 106.519 | 106.894 | 109.064 | 111 | 1.00 | 1.51 | 0.73 |
| | Fut. 600 | 61 | | | 0.00 | 0.00 | 0.18 | 0.74 | 0.37 | 1.15 | | | 0.00 | 0.00 | | | 0.00 | 0.00 | 11.51 | 71.45 | 96.84 | 113.48 | 165.84 | 112 | 450 | 450 | CONC | 0.45 | 65.0 | 106.080 | 106.530 | 109.069 | 191 | 1.20 | 0.90 | 0.58 |
| To chemin Culdaff Road, Pipe 61 - 63 | | | | | | 0.00 | | | | 1.15 | | | | 0.00 | | | | 0.00 | 12.41 | | | | | | | | | | | | | | | | |
| **POND 7 OUTLET** | | | | | | | | | | | | | | | | | | | | | | | Pond 100 year outflow 116 l/s per PDB Prepared by JFSA | | | | | | | | | | | | |
| | 300 | 3000 | | | | | | | | | | | | | | | | | | | | | 116 | 750 | 750 | CONC | 0.10 | 4.5 | 103.746 | 104.496 | 106.570 | 352.0491 | 0.7969 | 0.0941 | 0.329 |
| | 3000 | 301 | | | | | | | | | | | | | | | | | | | | | 116 | 750 | 750 | CONC | 0.10 | 15.0 | 103.721 | 104.471 | 106.570 | 352.0491 | 0.7969 | 0.3137 | 0.329 |
| | 301 | 302 | | | | | | | | | | | | | | | | | | | | | 116 | 750 | 750 | CONC | 0.10 | 120.0 | 103.646 | 104.396 | 106.570 | 352.0491 | 0.7969 | 2.5098 | 0.329 |
| | 302 | 303 | | | | | | | | | | | | | | | | | | | | | 116 | 750 | 750 | CONC | 0.10 | 120.0 | 103.506 | 104.256 | 106.770 | 352.0491 | 0.7969 | 2.5098 | 0.329 |
| | 303 | 304 | | | | | | | | | | | | | | | | | | | | | 116 | 750 | 750 | CONC | 0.10 | 109.5 | 103.366 | 104.116 | 106.554 | 352.0491 | 0.7969 | 2.2902 | 0.329 |
| | 304 | 305 | | | | | | | | | | | | | | | | | | | | | 116 | 750 | 750 | CONC | 0.10 | 98.0 | 103.236 | 103.986 | 105.724 | 352.0491 | 0.7969 | 2.0497 | 0.329 |
| | 305 | 306 | | | | | | | | | | | | | | | | | | | | | 116 | 750 | 750 | CONC | 0.10 | 20.0 | 103.108 | 103.858 | 107.716 | 352.0491 | 0.7969 | 0.4183 | 0.329 |
| | 306 | 307 | | | | | | | | | | | | | | | | | | | | | 116 | 750 | 750 | CONC | 0.10 | 106.5 | 103.028 | 103.778 | 107.870 | 352.0491 | 0.7969 | 2.2274 | 0.329 |
| | Contribution From existing culvert- 2-year flow | | | | | | | | | | | | | | | | | | | | | | 206 | | | | | | | | | | | | |
| | 307 | 308 | | | | | | | | | | | | | | | | | | | | | 322 | 750 | 750 | CONC | 0.10 | 35.0 | 102.891 | 103.641 | 107.870 | 352.0491 | 0.7969 | 0.7320 | 0.915 |
| | 308 | 309 | | | | | | | | | | | | | | | | | | | | | 322 | 750 | 750 | CONC | 0.10 | 85.5 | 102.826 | 103.576 | 107.870 | 352.0491 | 0.7969 | 1.7882 | 0.915 |

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/s

| | | | |
|---|---|---|---|
| Designed: W.L. | PROJECT: 195 Huntmar Drive | | |
| Checked: P.P. | LOCATION: City of Ottawa | | |
| Dwg. Reference: STM Drainage Plan, Dwgs 95 to 98 | File Ref: 12-624 | Date: July 2020 | Sheet No. SHEET 5 OF 5 |




REFER TO
DWG No. 96

## LEGEND

- STORM DRAINAGE BOUNDARY
- SUB-DRAINAGE BOUNDARY
- STORM DRAINAGE BOUNDARY (OTHER PHASES)
- STORM FREQUENCY / UPSTREAM MH TO DOWNSTREAM MH — 2Yr. / 43 - 44
- AREA IN HECTARES — 0.37 / 0.51
- RUNOFF COEFFICIENT
- EXTERNAL 2.78AC = — 2.78AC=14.40
- EXTERNAL TIME OF CONCENTRATION — TC=14.5 MIN
- EXTERNAL BLENDED RUNOFF COEFFICIENT — C= 0.70 / 2YR
- EXTERNAL STORM FREQUENCY
- UPSTREAM MH TO DOWNSTREAM MH — 21-23
- AREA IN OTHER PHASES IN HECTARES — 0.28 / 0.78
- RUNOFF COEFFICIENT
- STREET CATCHBASIN & LEAD
- STREET CATCHBASIN WITH CLOSED LID & LEAD MAINTENANCE HOLE — MH202
- CURB INLET CATCHBASIN & LEAD CATCHBASIN/ MAINTENANCE HOLE — CBMH201
- INTERCONNECTED CATCH BASIN & LEADS
- CAP
- OVERLAND FLOW DIRECTION
- EXTERNAL OVERLAND FLOW DIRECTION
- EMERGENCY OVERLAND FLOW DIRECTION — E

## TOPOGRAPHIC INFORMATION

CITY OF OTTAWA 1K MAPPING, RECEIVED ON OCTOBER 4, 2016. FEEDMILL CREEK TOPOGRAPHIC SURVEY (JULY 26, 2019) AND PALLADIUM DRIVE TOPOGRAPHIC SURVEY (JUNE 23, 2020) PROVIDED BY STANTEC (PROJECT No. 161613545-111)

## LEGAL INFORMATION

M-PLAN PROVIDED BY STANTEC GEOMATICS LTD., PROJECT No. 16-16-135-45 (195 HUNTMAR ROAD), RECEIVED ON MAY 17, 2021.

## ELEVATION NOTE

ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928:1978) AND ARE DERIVED FROM THE CAN-NET VRS NETWORK MONUMENT: OTTAWA

**ELEVATION = 95.205m**

| No. | BY | DATE | DESCRIPTION |
|---|---|---|---|
| 9 | W.L. | 21-05-20 | REVISED AS PER MPLAN CHANGE |
| 8 | W.L. | 21-04-20 | REVISED AS PER MPLAN CHANGE |
| 7 | W.L. | 21-04-08 | REVISED AS PER NEW N/S ARTERIAL ROAD DESIGN |
| 6 | W.L. | 21-03-18 | REVISED AS PER CITY COMMENTS |
| 5 | W.L. | 21-03-05 | REVISED AS PER CITY COMMENTS |
| 4 | W.L. | 20-11-09 | 4th SUBMISSION |
| 3 | W.L. | 20-07-09 | 3rd SUBMISSION |
| 2 | W.L. | 20-04-03 | 2nd SUBMISSION |
| 1 | W.L. | 19-12-23 | 1st SUBMISSION |

Ottawa CITY OF OTTAWA

PROJECT No. 12-624

LICENSED PROFESSIONAL ENGINEERS — W. LIU — 100167932 — 21-05-20 — PROVINCE OF ONTARIO

© DSEL

# STORM DRAINAGE PLAN

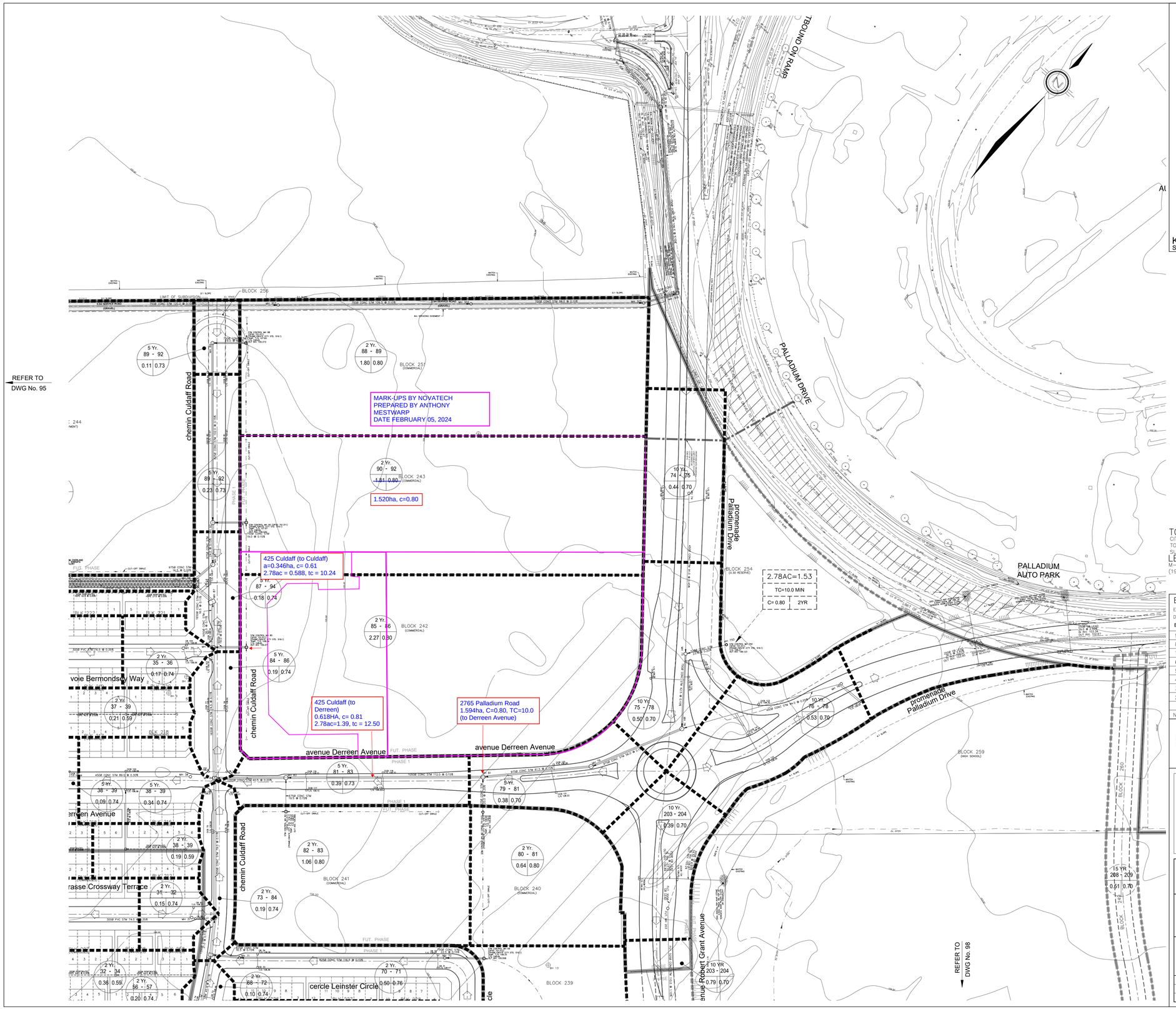
2325483 ONTARIO LTD.

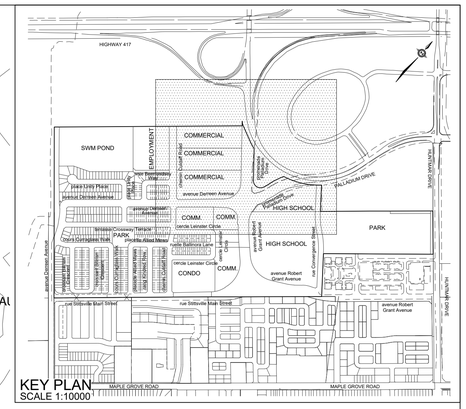
195 HUNTMAR DRIVE

DSEL david schaeffer engineering ltd
120 Iber Road, Unit 103
Stittsville, ON K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

| | | | |
|---|---|---|---|
| DRAWN BY: R.A./A.K. | CHECKED BY: W.L. | SHEET NO. | |
| DESIGNED BY: W.L. | CHECKED BY: C.M. | 95 | |
| SCALE: 1:1000 | DATE: DECEMBER 2019 | | |

CITY FILE No. D07-16-16-0011 CITY PLAN No. 18059




## LEGEND

STORM DRAINAGE BOUNDARY
SUB-DRAINAGE BOUNDARY
STORM DRAINAGE BOUNDARY (OTHER PHASES)
STORM FREQUENCY — 2Yr
UPSTREAM MH TO DOWNSTREAM MH — 43 - 44
AREA IN HECTARES — 0.37 | 0.51
RUNOFF COEFFICIENT
EXTERNAL 2.78AC = — 2.78AC=14.40
EXTERNAL TIME OF CONCENTRATION — TC=14.5 MIN
EXTERNAL BLENDED RUNOFF COEFFICIENT — C= 0.70 | 2YR
EXTERNAL STORM FREQUENCY
UPSTREAM MH TO DOWNSTREAM MH — 21-23
AREA IN OTHER PHASES IN HECTARES — 0.28 | 0.78
RUNOFF COEFFICIENT
STREET CATCHBASIN & LEAD
STREET CATCHBASIN WITH CLOSED LID & LEAD MAINTENANCE HOLE — MH202
CURB INLET CATCHBASIN & LEAD CATCHBASIN/ MAINTENANCE HOLE — CBMH201
INTERCONNECTED CATCH BASIN & LEADS
CAP
OVERLAND FLOW DIRECTION
EXTERNAL OVERLAND FLOW DIRECTION
EMERGENCY OVERLAND FLOW DIRECTION

## TOPOGRAPHIC INFORMATION

CITY OF OTTAWA 1K MAPPING, RECEIVED ON OCTOBER 4, 2016. FEEDMILL CREEK TOPOGRAPHIC SURVEY (JULY 26, 2019) AND PALLADIUM DRIVE TOPOGRAPHIC SURVEY (JUNE 23, 2020) PROVIDED BY STANTEC (PROJECT No. 161613545-111)

## LEGAL INFORMATION

M-PLAN PROVIDED BY STANTEC GEOMATICS LTD., PROJECT No. 16-16-135-45 (195 HUNTMAR ROAD), RECEIVED ON MAY 17, 2021.

## ELEVATION NOTE

ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928:1978) AND ARE DERIVED FROM THE CAN-NET VRS NETWORK MONUMENT: OTTAWA

**ELEVATION = 95.205m**

| No. | BY | DATE | DESCRIPTION |
|---|---|---|---|
| 9 | W.L. | 21-05-20 | REVISED AS PER MPLAN CHANGE |
| 8 | W.L. | 21-04-20 | REVISED AS PER MPLAN CHANGE |
| 7 | W.L. | 21-04-08 | REVISED AS PER NEW N/S ARTERIAL ROAD DESIGN |
| 6 | W.L. | 21-03-18 | REVISED AS PER CITY COMMENTS |
| 5 | W.L. | 21-03-05 | REVISED AS PER CITY COMMENTS |
| 4 | W.L. | 20-11-09 | 4th SUBMISSION |
| 3 | W.L. | 20-07-09 | 3rd SUBMISSION |
| 2 | W.L. | 20-04-03 | 2nd SUBMISSION |
| 1 | W.L. | 19-12-23 | 1st SUBMISSION |

Ottawa CITY OF OTTAWA

PROJECT No. 12-624

LICENCE PROFESSIONAL ENGINEER W. LIU 100167932 12-09-2019 PROVINCE OF ONTARIO

© DSEL

# STORM DRAINAGE PLAN

2325483 ONTARIO LTD.

195 HUNTMAR DRIVE


david schaeffer engineering ltd
120 Iber Road, Unit 103
Stittsville, ON K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca


| | | | |
|---|---|---|---|
| DRAWN BY: R.A./A.K. | CHECKED BY: W.L. | SHEET NO. | |
| DESIGNED BY: W.L. | CHECKED BY: C.M. | 96 | |
| SCALE: 1:1000 | DATE: DECEMBER 2019 | | |

CITY PLAN No. 18059

CITY FILE No. D07-16-16-0011

This document is presented in the language it was provided.
Ce document est présenté dans la langue dans laquelle il a été fourni.

Committee of Adjustment
Received | Reçu le

2023-06-05

City of Ottawa | Ville d'Ottawa
Comité de dérogation

**Consent**
**COMMENTS TO THE COMMITTEE OF ADJUSTMENT**
**Panel 3**

---

Site Address: 2765 Palladium Drive
Legal Description: Block 242, Plan 4M-1687

No.: D08-01-23/B-00118 & D08-01-23/B-00119
Date: June 1, 2023 Hearing Date: June 6, 2023
Planner: Luke Teeft

Official Plan Designation: Mixed Industrial, Minor Corridor
Zoning: GM[2654] – General Mixed Use, Exception 2654

---

## DEPARTMENT COMMENTS

The Planning, Real Estate, and Economic Development Department has **No Concerns** with the application as submitted subject to the following requested conditions.

## DISCUSSION AND RATIONALE

The subject property is designated as Mixed Industrial and Minor Corridor in Schedule B5 of the Official Plan. Mixed Industrial areas are clusters of economic activity that are less impactful and provide a broader range of non-residential uses than Industrial areas. Minor Corridors are intended to provide a mix of residential and non-residential uses that are compatible with a dense mixed-use urban environment.

The subject site is zoned GM[2654] – General Mixed Use, Exception 2654. The purpose of the General Mixed-Use Zone is to permit a range of residential and non-residential uses in the General Urban Area and other specific areas identified in the Official Plan (By-law 2013-58).

The applicant proposes to sever the property at 2765 Palladium Drive into two separate parcels. The severed parcel identified as Part 1 and 2 in the attached 4M plan will have 119.53 metres of frontage on Culdaff Road, a depth of 78.5 metres and an area of 9730.18 square metres. This parcel will be known municipally as 425 Culdaff Road. The retained parcel identified as Part 3 in the attached 4M plan will

have 148.33 metres of frontage on Palladium Drive, a depth of 85.23 metres and an area of 15,940.04 square metres. This parcel will continue to be known municipally as 2765 Palladium Road.

Staff have determined that lot creation at this location poses no risk to nearby properties or complications for the future use of the lands. The severance provides an opportunity for increased density and diversity of uses on the subject property. Staff have no concerns with the proposal subject to the following conditions.

**ADDITIONAL COMMENTS:**

**Building Code Services:**

No comments.

**Civil Engineering:**

- Staff have reviewed the Grading and Servicing design submitted as part of the Subdivision application including the subject land. The existing plans show drainage from Part 3 (2765 Palladium Drive) towards Parts 1 and 2 (425 Culdaff Road). At the time of Site Plan and/or Building Permit, the applicant will be required to regrade Part 3 (2765 Palladium Drive) or provide adequate on-site storm structures to contain drainage within 2765 Palladium Drive and discharge overland flow towards the City's right-of-way. Separate water and sewer connections to the municipal services along Derreen Avenue will also be required.

- The only engineering condition imposed is the Noise study. As the vacant land will be about 155 metres from an arterial road (Palladium Drive), this condition is included in anticipation of residential development that would go directly to building permit instead of a site plan.

**CONDITIONS:**

If approved, the Planning, Real Estate and Economic Development Department requests that the Committee of Adjustment impose the following condition(s) on the application(s):

1. That the Owner(s) provide plans, drawings or reports as may be required to demonstrate, to the satisfaction of the **Manager, Right-of-Way, Heritage, and Urban Design Department or his/her designate** that a private approach that conforms with the Private Approach By-law (2003-447) can

reasonably be established on both the retained and severed parcels, to be confirmed in writing from the Department to the Committee.

2. That the Owner(s) provide evidence (payment receipt) to the Committee that payment has been made to the City of Ottawa of cash-in-lieu of the conveyance of land for park or other public recreational purposes, plus applicable appraisal costs. The value of the land otherwise required to be conveyed shall be determined by the City of Ottawa in accordance with the provisions of By-Law No. 2009-95, as amended. Information regarding the appraisal process can be obtained by contacting the Planner.

3. That the Owner(s) prepare a noise attenuation study in compliance with the City of Ottawa Environmental Noise Control Guidelines to the satisfaction of the **General Manager, Planning, Infrastructure and Economic Development Department**, **or his/her designate**. The Owner(s) shall also enter into an agreement with the City that requires the Owner to implement any noise control attenuation measures recommended in the approved study. The Agreement will also deal with any covenants/notices recommended in the approved study, that shall be registered on the land title and bind future owners on subsequent transfers, warning purchasers and/or tenants of expected noise levels due to the existing source of environmental noise. The Agreement shall be to the satisfaction of the **General Manager, Planning, Infrastructure and Economic Development Department, or his/her designate**. The Committee requires a copy of the Agreement and written confirmation from **City Legal Services** that it has been registered on title.;

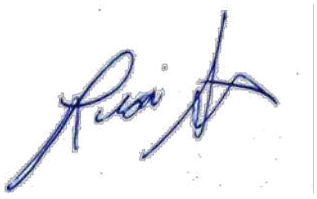
   **or**

   Design the dwelling units with the provision for adding central air conditioning at the occupant's discretion and enter into an Agreement with the City, at the expense of the Owner, which is to be registered on title to deal with the covenants/ notices that shall run with the land and bind future owners on subsequent transfers, warning purchasers and/or tenants of expected noise levels due to the existing source of environmental noise. The following two conditions will be included in the above-noted Agreement:

   i) "The Purchaser/Lessee for himself, his heirs, executors, administrators, successors and assigns, acknowledges being advised that this dwelling unit has been fitted with a forced air heating system and the ducting, etc. was sized to accommodate central air conditioning. Installation of central air conditioning by the Purchaser/Lessee will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within

the City of Ottawa's and the Ministry of the Environment and Climate Change's noise criteria;" and

ii) "The Purchaser/Lessee for himself, his heirs, executors, administrators, successors and assigns acknowledges being advised that noise levels due to increasing roadway traffic may be of concern, occasionally interfering with some activities of the dwelling occupants as the outdoor sound level exceeds the City of Ottawa's and the Ministry of the Environment and Climate Change's noise criteria.



Luke Teeft
Planner I, Development Review, PRED Dept.

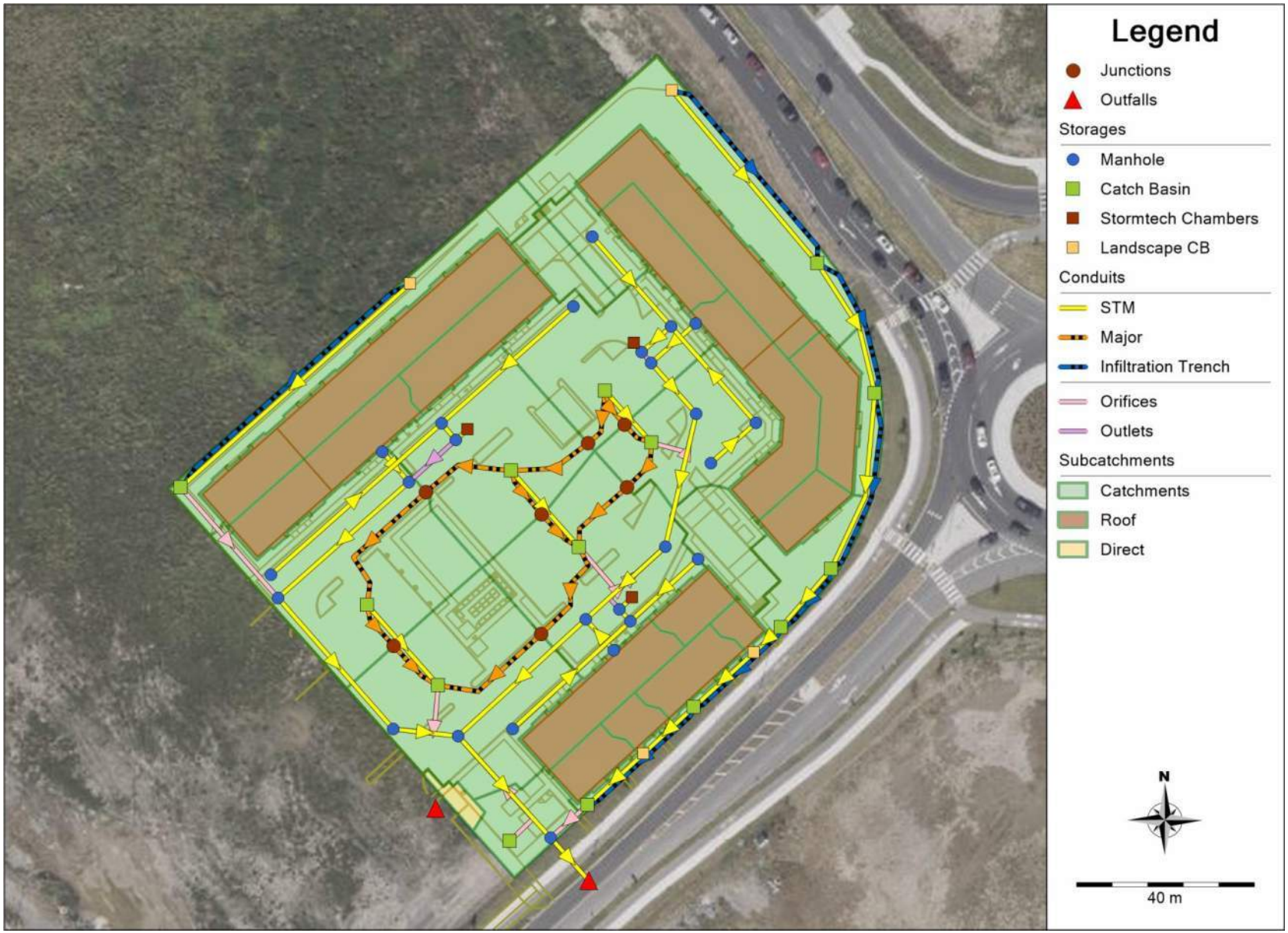
Lisa Stern, MCIP, RPP
Planner III, Development Review, PRED Dept.

# Appendix E
# PCSWMM Modeling

**Palladium II (125091)**
**PCSWMM Model Schematic (Post-Development)**

NOVATECH
Engineers, Planners & Landscape Architects

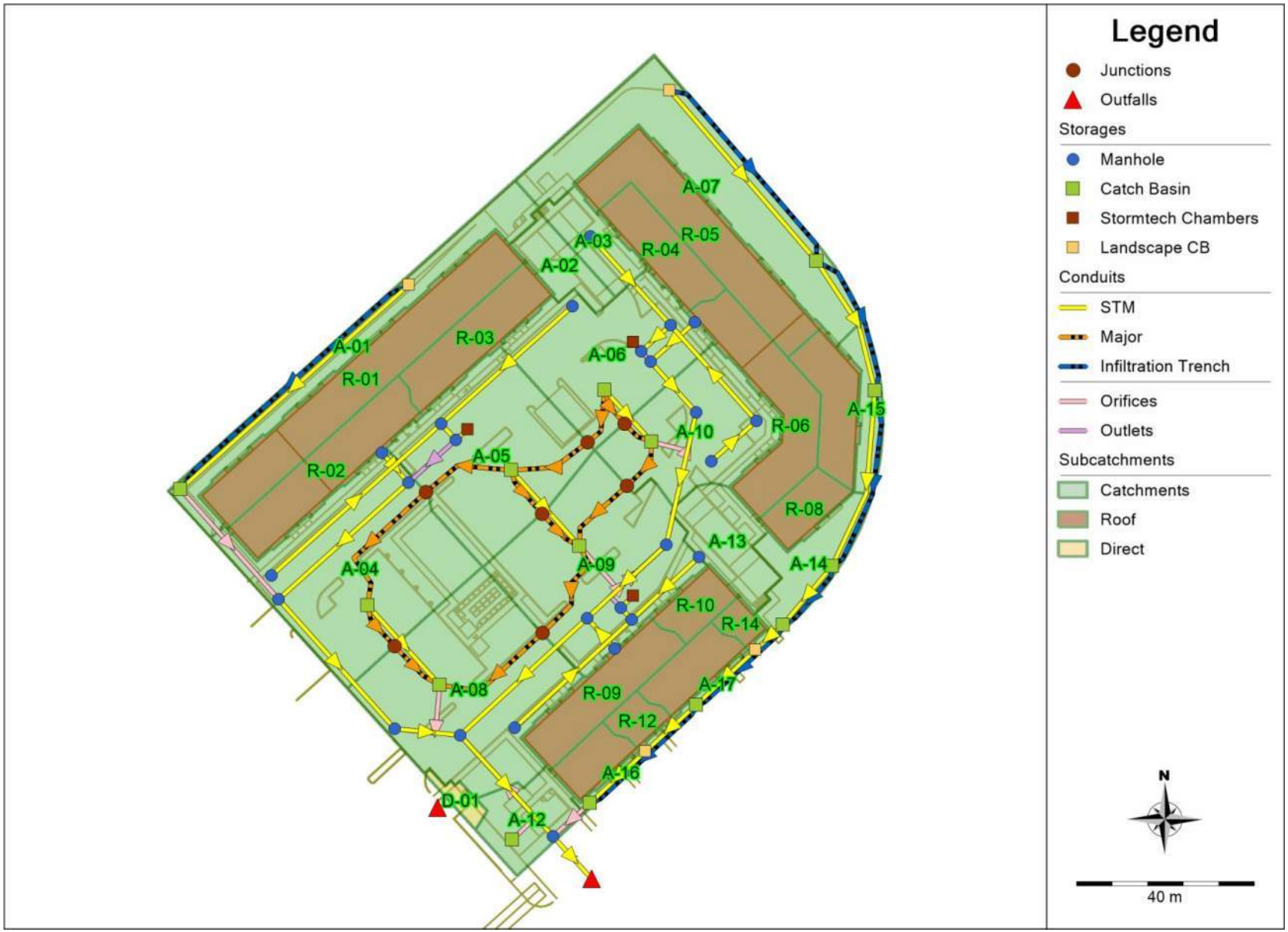
## Overall Model Schematic



**Palladium II (125091)**
**PCSWMM Model Schematic (Post-Development)**

NOVATECH
Engineers, Planners & Landscape Architects

## Subcatchment IDs



**Palladium II (125091)**
**PCSWMM Model Schematic (Post-Development)**

NOVATECH
Engineers, Planners & Landscape Architects

## Catchbasins and Stormtech Chambers

**Palladium II (125091)**
**PCSWMM Model Schematic (Post-Development)**

NOVATECH
Engineers, Planners & Landscape Architects

## Manholes and Outfalls

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

  WARNING 03: negative offset ignored for Link C21
  WARNING 03: negative offset ignored for Link C21

  *************
  Element Count
  *************
  Number of rain gages ...... 1
  Number of subcatchments ... 31
  Number of nodes ........... 55
  Number of links ........... 67
  Number of pollutants ...... 0
  Number of land uses ....... 0


  ****************
  Raingage Summary
  ****************
                                                    Data       Recording
  Name                 Data Source                  Type       Interval
  ------------------------------------------------------------------------
  Raingage             01-C6hr-2yr                  INTENSITY   10 min.


  ********************
  Subcatchment Summary
  ********************
  Name                        Area     Width   %Imperv    %Slope Rain Gage
Outlet
  ------------------------------------------------------------------------------
--------------------------
  A-01                        0.06    152.50      6.00    2.5000 Raingage
LD1000
  A-02                        0.02     26.25    100.00    2.0000 Raingage
98
  A-03                        0.03     27.78     94.00    2.0000 Raingage
97
  A-04                        0.15     82.22     87.00    2.5000 Raingage
CB2
  A-05                        0.12     70.00     90.00    2.5000 Raingage
CB4
  A-06                        0.10     61.88     91.00    2.5000 Raingage
CB6
  A-07                        0.12    128.89      4.00    6.0000 Raingage
LD1001
  A-08                        0.15     70.00     89.00    2.0000 Raingage
CB3
  A-09                        0.13     76.47     90.00    2.0000 Raingage
CB5
  A-10                        0.08     58.57     86.00    2.5000 Raingage
CB7
  A-12                        0.03     35.56     23.00    2.5000 Raingage
CB10
  A-13                        0.04     27.69     90.00    2.0000 Raingage
96
```

| | | | | | |
|---|---|---|---|---|---|
| A-14 | 0.04 | 29.17 | 7.00 | 11.0000 | Raingage |
| CBMH225 | | | | | |
| A-15 | 0.02 | 63.33 | 3.00 | 20.0000 | Raingage |
| CB9 | | | | | |
| A-16 | 0.01 | 60.00 | 26.00 | 9.0000 | Raingage |
| LD1003 | | | | | |
| A-17 | 0.01 | 70.00 | 17.00 | 3.5000 | Raingage |
| LD1002 | | | | | |
| D-01 | 0.01 | 15.00 | 39.00 | 3.5000 | Raingage |
| OF1 | | | | | |
| R-01 | 0.09 | 90.00 | 100.00 | 3.0000 | Raingage |
| LD1000 | | | | | |
| R-02 | 0.05 | 55.56 | 100.00 | 3.0000 | Raingage |
| MH217 | | | | | |
| R-03 | 0.04 | 39.00 | 100.00 | 3.0000 | Raingage |
| MH216 | | | | | |
| R-04 | 0.03 | 31.00 | 100.00 | 3.0000 | Raingage |
| MH208 | | | | | |
| R-05 | 0.07 | 70.00 | 100.00 | 3.0000 | Raingage |
| LD1001 | | | | | |
| R-06 | 0.06 | 57.00 | 100.00 | 3.0000 | Raingage |
| MH210A | | | | | |
| R-07 | 0.03 | 34.44 | 100.00 | 3.0000 | Raingage |
| CB9 | | | | | |
| R-08 | 0.02 | 21.11 | 100.00 | 3.0000 | Raingage |
| CBMH225 | | | | | |
| R-09 | 0.04 | 45.56 | 100.00 | 3.0000 | Raingage |
| MH218 | | | | | |
| R-10 | 0.02 | 17.00 | 100.00 | 3.0000 | Raingage |
| MH221 | | | | | |
| R-11 | 0.02 | 18.89 | 100.00 | 3.0000 | Raingage |
| LD1003 | | | | | |
| R-12 | 0.01 | 11.11 | 100.00 | 3.0000 | Raingage |
| LD1003 | | | | | |
| R-13 | 0.02 | 25.56 | 100.00 | 3.0000 | Raingage |
| LD1002 | | | | | |
| R-14 | 0.01 | 8.89 | 100.00 | 3.0000 | Raingage |
| LD1002 | | | | | |

**********
Node Summary
**********

| Name | Type | Invert Elev. | Max. Depth | Ponded Area | External Inflow |
|---|---|---|---|---|---|
| HP-A-04 | JUNCTION | 108.70 | 1.00 | 0.0 | |
| HP-A-05 | JUNCTION | 108.75 | 1.00 | 0.0 | |
| HP-A-05-2 | JUNCTION | 109.02 | 1.00 | 0.0 | |
| HP-A-06 | JUNCTION | 108.78 | 1.00 | 0.0 | |
| HP-A-06-2 | JUNCTION | 108.80 | 1.00 | 0.0 | |
| HP-A-07 | JUNCTION | 108.75 | 1.00 | 0.0 | |
| HP-A-09 | JUNCTION | 108.73 | 1.00 | 0.0 | |
| MH200 | OUTFALL | 105.72 | 0.53 | 0.0 | |
| OF1 | OUTFALL | 0.00 | 0.00 | 0.0 | |
| 96 | STORAGE | 106.32 | 2.70 | 0.0 | |
| 97 | STORAGE | 106.59 | 2.51 | 0.0 | |
| 98 | STORAGE | 106.67 | 2.39 | 0.0 | |
| CB1 | STORAGE | 106.66 | 3.04 | 0.0 | |

| | | | | |
|---|---|---|---|---|
| CB10 | STORAGE | 107.40 | 2.20 | 0.0 |
| CB2 | STORAGE | 107.15 | 2.20 | 0.0 |
| CB3 | STORAGE | 107.00 | 2.35 | 0.0 |
| CB4 | STORAGE | 107.25 | 2.20 | 0.0 |
| CB5 | STORAGE | 107.13 | 2.32 | 0.0 |
| CB6 | STORAGE | 107.30 | 2.20 | 0.0 |
| CB7 | STORAGE | 107.19 | 2.41 | 0.0 |
| CB8 | STORAGE | 107.41 | 2.01 | 0.0 |
| CB9 | STORAGE | 107.20 | 2.37 | 0.0 |
| CBMH222 | STORAGE | 106.01 | 2.56 | 0.0 |
| CBMH223 | STORAGE | 106.55 | 2.04 | 0.0 |
| CBMH224 | STORAGE | 106.83 | 2.66 | 0.0 |
| CBMH225 | STORAGE | 106.95 | 2.45 | 0.0 |
| LD1000 | STORAGE | 107.41 | 2.42 | 0.0 |
| LD1001 | STORAGE | 107.67 | 2.04 | 0.0 |
| LD1002 | STORAGE | 106.74 | 2.86 | 0.0 |
| LD1003 | STORAGE | 106.39 | 3.26 | 0.0 |
| MH201 | STORAGE | 105.75 | 2.99 | 0.0 |
| MH202 | STORAGE | 105.85 | 2.70 | 0.0 |
| MH203 | STORAGE | 106.03 | 2.74 | 0.0 |
| MH204 | STORAGE | 106.10 | 2.72 | 0.0 |
| MH205 | STORAGE | 106.27 | 2.63 | 0.0 |
| MH206 | STORAGE | 106.41 | 2.41 | 0.0 |
| MH207 | STORAGE | 106.48 | 2.36 | 0.0 |
| MH208 | STORAGE | 106.78 | 2.45 | 0.0 |
| MH209 | STORAGE | 106.59 | 2.51 | 0.0 |
| MH210A | STORAGE | 107.30 | 1.70 | 0.0 |
| MH210B | STORAGE | 107.17 | 2.08 | 0.0 |
| MH211 | STORAGE | 105.97 | 2.65 | 0.0 |
| MH212 | STORAGE | 106.28 | 2.44 | 0.0 |
| MH213 | STORAGE | 106.54 | 2.52 | 0.0 |
| MH214 | STORAGE | 106.62 | 2.35 | 0.0 |
| MH215 | STORAGE | 106.69 | 2.40 | 0.0 |
| MH216 | STORAGE | 106.95 | 2.12 | 0.0 |
| MH217 | STORAGE | 107.35 | 1.50 | 0.0 |
| MH218 | STORAGE | 107.00 | 1.93 | 0.0 |
| MH219 | STORAGE | 106.21 | 2.81 | 0.0 |
| MH220 | STORAGE | 106.18 | 2.72 | 0.0 |
| MH221 | STORAGE | 106.37 | 2.72 | 0.0 |
| ST1 | STORAGE | 106.67 | 0.99 | 0.0 |
| ST2 | STORAGE | 106.52 | 0.99 | 0.0 |
| ST3 | STORAGE | 106.28 | 0.99 | 0.0 |

**********
Link Summary
**********

| Name | From Node | To Node | Type | Length | % Slope | Roughness |
|---|---|---|---|---|---|---|
| C1 | CB4 | HP-A-05 | CONDUIT | 2.0 | - 15.1717 | 0.0130 |
| C10 | HP-A-04 | CB3 | CONDUIT | 2.0 | 17.7743 | 0.0130 |
| C11 | CB4 | HP-A-05-2 | CONDUIT | 2.0 | - 29.7331 | 0.0130 |

| | | | | | |
|---|---|---|---|---|---|
| C12 | HP-A-05-2 | CB2 | CONDUIT | 2.0 | |
| 35.5544 | 0.0130 | | | | |
| C13 | CB6 | HP-A-06-2 | CONDUIT | 2.0 | - |
| 15.1717 | 0.0130 | | | | |
| C14 | HP-A-06-2 | CB4 | CONDUIT | 2.0 | |
| 17.7743 | 0.0130 | | | | |
| C15 | LD1001 | CB8 | CONDUIT | 50.5 | |
| 0.5154 | 0.0350 | | | | |
| C16 | CB8 | CB9 | CONDUIT | 32.2 | |
| 0.6522 | 0.0350 | | | | |
| C17 | CB9 | CBMH225 | CONDUIT | 41.0 | |
| 0.6095 | 0.0350 | | | | |
| C18 | CBMH225 | CBMH224 | CONDUIT | 17.2 | |
| 0.6977 | 0.0350 | | | | |
| C19 | CBMH224 | CBMH223 | CONDUIT | 26.4 | |
| 1.0591 | 0.0350 | | | | |
| C2 | HP-A-05 | CB5 | CONDUIT | 2.0 | |
| 15.1717 | 0.0130 | | | | |
| C20 | CBMH223 | CBMH222 | CONDUIT | 32.3 | |
| 1.6721 | 0.0350 | | | | |
| C21 | LD1000 | CB1 | CONDUIT | 68.6 | |
| 1.0932 | 0.0350 | | | | |
| C3 | CB6 | HP-A-06 | CONDUIT | 2.0 | - |
| 14.1393 | 0.0130 | | | | |
| C4 | HP-A-06 | CB7 | CONDUIT | 2.0 | |
| 9.0367 | 0.0130 | | | | |
| C5 | CB7 | HP-A-07 | CONDUIT | 2.0 | - |
| 7.5212 | 0.0130 | | | | |
| C6 | HP-A-07 | CB5 | CONDUIT | 2.0 | |
| 15.1717 | 0.0130 | | | | |
| C7 | CB5 | HP-A-09 | CONDUIT | 2.0 | - |
| 14.1393 | 0.0130 | | | | |
| C8 | HP-A-09 | CB3 | CONDUIT | 2.0 | |
| 19.3525 | 0.0130 | | | | |
| C9 | CB2 | HP-A-04 | CONDUIT | 2.0 | - |
| 17.7743 | 0.0130 | | | | |
| STM-25 | MH212 | MH211 | CONDUIT | 39.7 | |
| 0.4026 | 0.0130 | | | | |
| STM-26 | MH211 | MH202 | CONDUIT | 14.7 | |
| 0.2725 | 0.0130 | | | | |
| STM-27 | MH202 | MH201 | CONDUIT | 30.7 | |
| 0.2932 | 0.0130 | | | | |
| STM-28 | MH201 | MH200 | CONDUIT | 12.9 | |
| 0.2322 | 0.0130 | | | | |
| STM-29 | CB2 | CB3 | CONDUIT | 24.0 | |
| 0.5000 | 0.0130 | | | | |
| STM-31 | CB4 | CB5 | CONDUIT | 22.9 | |
| 0.4810 | 0.0130 | | | | |
| STM-33 | CB6 | CB7 | CONDUIT | 15.6 | |
| 0.5128 | 0.0130 | | | | |
| STM-35 | MH206 | MH205 | CONDUIT | 15.2 | |
| 0.3934 | 0.0130 | | | | |
| STM-36 | MH205 | MH204 | CONDUIT | 30.3 | |
| 0.2966 | 0.0130 | | | | |
| STM-37 | MH204 | MH203 | CONDUIT | 24.2 | |
| 0.2480 | 0.0130 | | | | |
| STM-37_(1) | MH203 | MH202 | CONDUIT | 38.6 | |
| 0.2587 | 0.0130 | | | | |
| STM-39 | MH213 | MH212 | CONDUIT | 39.1 | |
| 0.5120 | 0.0130 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| STM-40 | | 98 | MH213 | CONDUIT | 8.9 |
| 0.8939 | 0.0130 | | | | |
| STM-41 | | 97 | MH206 | CONDUIT | 13.2 |
| 0.9827 | 0.0130 | | | | |
| STM-42 | | 96 | MH203 | CONDUIT | 9.2 |
| 0.9772 | 0.0130 | | | | |
| STM-44 | | MH218 | MH219 | CONDUIT | 35.7 |
| 0.5048 | 0.0130 | | | | |
| STM-45 | | MH221 | MH219 | CONDUIT | 20.6 |
| 0.4857 | 0.0130 | | | | |
| STM-46 | | MH219 | MH220 | CONDUIT | 3.6 |
| 0.5525 | 0.0130 | | | | |
| STM-48 | | MH217 | MH215 | CONDUIT | 50.9 |
| 0.4908 | 0.0130 | | | | |
| STM-49 | | MH215 | MH214 | CONDUIT | 4.9 |
| 0.4082 | 0.0130 | | | | |
| STM-50 | | MH216 | MH215 | CONDUIT | 39.5 |
| 0.5070 | 0.0130 | | | | |
| STM-53 | | ST3 | MH220 | CONDUIT | 3.8 |
| 1.0417 | 0.0130 | | | | |
| STM-54 | | ST1 | MH214 | CONDUIT | 3.5 |
| 1.1429 | 0.0130 | | | | |
| STM-55 | | MH208 | MH209 | CONDUIT | 26.7 |
| 0.4864 | 0.0130 | | | | |
| STM-56 | | MH210B | MH209 | CONDUIT | 28.8 |
| 0.4865 | 0.0130 | | | | |
| STM-57 | | MH209 | MH207 | CONDUIT | 8.7 |
| 0.4577 | 0.0130 | | | | |
| STM-60 | | ST2 | MH207 | CONDUIT | 2.7 |
| 1.1112 | 0.0130 | | | | |
| STM-70 | | LD1000 | CB1 | CONDUIT | 68.6 |
| 1.0057 | 0.0130 | | | | |
| STM-71 | | LD1001 | CB8 | CONDUIT | 50.5 |
| 0.4955 | 0.0130 | | | | |
| STM-72 | | CB8 | CB9 | CONDUIT | 32.2 |
| 0.5590 | 0.0130 | | | | |
| STM-74 | | CB9 | CBMH225 | CONDUIT | 41.0 |
| 0.5363 | 0.0130 | | | | |
| STM-77 | | CBMH224 | LD1002 | CONDUIT | 8.3 |
| 0.9674 | 0.0130 | | | | |
| STM-77_(1) | | LD1002 | CBMH223 | CONDUIT | 18.2 |
| 0.9907 | 0.0130 | | | | |
| STM-78 | | CBMH223 | LD1003 | CONDUIT | 15.3 |
| 0.9792 | 0.0130 | | | | |
| STM-78_(1) | | LD1003 | CBMH222 | CONDUIT | 17.0 |
| 1.0012 | 0.0130 | | | | |
| STM-79 | | CBMH225 | CBMH224 | CONDUIT | 17.2 |
| 0.5233 | 0.0130 | | | | |
| STM-83 | | MH210A | MH210B | CONDUIT | 13.5 |
| 0.5185 | 0.0130 | | | | |
| O-CB1 | | CB1 | MH212 | ORIFICE | |
| O-CB10 | | CB10 | MH202 | ORIFICE | |
| O-CB3 | | CB3 | MH211 | ORIFICE | |
| O-Cb5 | | CB5 | MH204 | ORIFICE | |
| O-CB7 | | CB7 | MH205 | ORIFICE | |
| O-CBMH222 | | CBMH222 | MH201 | ORIFICE | |
| O-MH206 | | MH207 | MH206 | OUTLET | |
| O-MH214 | | MH214 | MH213 | OUTLET | |
| O-MH220 | | MH220 | MH204 | OUTLET | |

**********
Cross Section Summary
**********

| Conduit | Shape | Full Depth | Full Area | Hyd. Rad. | Max. Width | No. of Barrels | Full Flow |
|---|---|---|---|---|---|---|---|
| C1 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 63947.17 |
| C10 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 69215.12 |
| C11 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 89521.02 |
| C12 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 97892.98 |
| C13 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 63947.17 |
| C14 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 69215.12 |
| C15 | RECT_CLOSED | 0.55 | 0.19 | 0.11 | 0.35 | 1 | 88.97 |
| C16 | RECT_CLOSED | 0.55 | 0.19 | 0.11 | 0.35 | 1 | 100.08 |
| C17 | RECT_CLOSED | 0.55 | 0.19 | 0.11 | 0.35 | 1 | 96.75 |
| C18 | RECT_CLOSED | 0.55 | 0.19 | 0.11 | 0.35 | 1 | 103.51 |
| C19 | RECT_CLOSED | 0.55 | 0.19 | 0.11 | 0.35 | 1 | 127.53 |
| C2 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 63947.17 |
| C20 | RECT_CLOSED | 0.55 | 0.19 | 0.11 | 0.35 | 1 | 160.25 |
| C21 | RECT_CLOSED | 0.55 | 0.19 | 0.11 | 0.35 | 1 | 129.57 |
| C3 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 61733.10 |
| C4 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 49352.50 |
| C5 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 45024.40 |
| C6 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 63947.17 |
| C7 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 61733.10 |
| C8 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 72222.70 |
| C9 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 69215.12 |
| STM-25 | CIRCULAR | 0.30 | 0.07 | 0.07 | 0.30 | 1 | 61.36 |
| STM-26 | CIRCULAR | 0.45 | 0.16 | 0.11 | 0.45 | 1 | 148.83 |
| STM-27 | CIRCULAR | 0.53 | 0.22 | 0.13 | 0.53 | 1 | 232.87 |
| STM-28 | CIRCULAR | 0.53 | 0.22 | 0.13 | 0.53 | 1 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| STM-29 | CIRCULAR | 0.30 | 0.07 | 0.07 | 0.30 | 1 |
| 68.38 | | | | | | |
| STM-31 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 41.25 | | | | | | |
| STM-33 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 42.59 | | | | | | |
| STM-35 | CIRCULAR | 0.30 | 0.07 | 0.07 | 0.30 | 1 |
| 60.66 | | | | | | |
| STM-36 | CIRCULAR | 0.38 | 0.11 | 0.09 | 0.38 | 1 |
| 95.50 | | | | | | |
| STM-37 | CIRCULAR | 0.45 | 0.16 | 0.11 | 0.45 | 1 |
| 142.00 | | | | | | |
| STM-37_(1) | CIRCULAR | 0.45 | 0.16 | 0.11 | 0.45 | 1 |
| 145.03 | | | | | | |
| STM-39 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 42.56 | | | | | | |
| STM-40 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 56.23 | | | | | | |
| STM-41 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 58.95 | | | | | | |
| STM-42 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 58.79 | | | | | | |
| STM-44 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 42.25 | | | | | | |
| STM-45 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 41.45 | | | | | | |
| STM-46 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 44.20 | | | | | | |
| STM-48 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 41.66 | | | | | | |
| STM-49 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 37.99 | | | | | | |
| STM-50 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 42.34 | | | | | | |
| STM-53 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 60.70 | | | | | | |
| STM-54 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 63.58 | | | | | | |
| STM-55 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 41.47 | | | | | | |
| STM-56 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 41.48 | | | | | | |
| STM-57 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 40.23 | | | | | | |
| STM-60 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 62.69 | | | | | | |
| STM-70 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 59.64 | | | | | | |
| STM-71 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 41.86 | | | | | | |
| STM-72 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 44.46 | | | | | | |
| STM-74 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 43.55 | | | | | | |
| STM-77 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 58.49 | | | | | | |
| STM-77_(1) | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 59.19 | | | | | | |
| STM-78 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 58.85 | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| STM-78_(1) | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 59.51 | | | | | | |
| STM-79 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 43.02 | | | | | | |
| STM-83 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 42.82 | | | | | | |

**********
Analysis Options
**********
Flow Units ..... LPS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... YES
  Water Quality ..... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date ..... 04/17/2026 00:00:00
Ending Date ..... 04/19/2026 00:00:00
Antecedent Dry Days ..... 0.0
Report Time Step ..... 00:01:00
Wet Time Step ..... 00:01:00
Dry Time Step ..... 00:01:00
Routing Time Step ..... 1.00 sec
Variable Time Step ..... YES
Maximum Trials ..... 8
Number of Threads ..... 16
Head Tolerance ..... 0.001500 m

| ********** | Volume | Depth |
|---|---|---|
| Runoff Quantity Continuity | hectare-m | mm |
| ********** | --------- | ------- |
| Total Precipitation ..... | 0.059 | 36.858 |
| Evaporation Loss ..... | 0.000 | 0.000 |
| Infiltration Loss ..... | 0.012 | 7.824 |
| Surface Runoff ..... | 0.045 | 28.335 |
| Final Storage ..... | 0.001 | 0.735 |
| Continuity Error (%) ..... | -0.095 | |

| ********** | Volume | Volume |
|---|---|---|
| Flow Routing Continuity | hectare-m | 10^6 ltr |
| ********** | --------- | --------- |
| Dry Weather Inflow ..... | 0.000 | 0.000 |
| Wet Weather Inflow ..... | 0.045 | 0.451 |
| Groundwater Inflow ..... | 0.000 | 0.000 |
| RDII Inflow ..... | 0.000 | 0.000 |
| External Inflow ..... | 0.000 | 0.000 |
| External Outflow ..... | 0.045 | 0.451 |
| Flooding Loss ..... | 0.000 | 0.000 |

```
  Evaporation Loss .........          0.000          0.000
  Exfiltration Loss ........          0.000          0.000
  Initial Stored Volume ....          0.000          0.000
  Final Stored Volume ......          0.000          0.000
  Continuity Error (%) .....         -0.049


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


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


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


  ************************
  Routing Time Step Summary
  ************************
  Minimum Time Step           :     0.50 sec
  Average Time Step           :     1.00 sec
  Maximum Time Step           :     1.00 sec
  % of Time in Steady State   :     0.00
  Average Iterations per Step :     2.00
  % of Steps Not Converging   :     0.00
  Time Step Frequencies       :
      1.000 -  0.871 sec      :    99.66 %
      0.871 -  0.758 sec      :     0.13 %
      0.758 -  0.660 sec      :     0.08 %
      0.660 -  0.574 sec      :     0.05 %
      0.574 -  0.500 sec      :     0.08 %


  ***************************
  Subcatchment Runoff Summary
  ***************************

  ------------------------------------------------------------------------------------
-----------------------------------------
                            Total      Total      Total      Total     Imperv
Perv      Total       Total     Peak  Runoff
                         Precip      Runon       Evap      Infil     Runoff
Runoff     Runoff      Runoff   Runoff   Coeff
  Subcatchment                mm         mm         mm         mm         mm
mm         mm    10^6 ltr      LPS
  ------------------------------------------------------------------------------------
-----------------------------------------
  A-01                      36.86       0.00       0.00      34.04       2.12
0.62       2.74        0.00     2.31   0.074
```

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A-02 | | | 36.86 | 0.00 | 0.00 | 0.00 | 35.33 |
| 0.00 | 35.33 | 0.01 | 4.48 | 0.959 | | | |
| A-03 | | | 36.86 | 0.00 | 0.00 | 2.15 | 33.21 |
| 0.06 | 33.28 | 0.01 | 5.15 | 0.903 | | | |
| A-04 | | | 36.86 | 0.00 | 0.00 | 4.69 | 30.73 |
| 0.10 | 30.83 | 0.05 | 28.23 | 0.837 | | | |
| A-05 | | | 36.86 | 0.00 | 0.00 | 3.60 | 31.79 |
| 0.09 | 31.88 | 0.04 | 23.44 | 0.865 | | | |
| A-06 | | | 36.86 | 0.00 | 0.00 | 3.24 | 32.15 |
| 0.08 | 32.23 | 0.03 | 19.72 | 0.874 | | | |
| A-07 | | | 36.86 | 0.00 | 0.00 | 34.87 | 1.41 |
| 0.52 | 1.93 | 0.00 | 3.08 | 0.052 | | | |
| A-08 | | | 36.86 | 0.00 | 0.00 | 3.97 | 31.44 |
| 0.08 | 31.52 | 0.05 | 28.50 | 0.855 | | | |
| A-09 | | | 36.86 | 0.00 | 0.00 | 3.60 | 31.79 |
| 0.08 | 31.87 | 0.04 | 25.56 | 0.865 | | | |
| A-10 | | | 36.86 | 0.00 | 0.00 | 5.05 | 30.38 |
| 0.12 | 30.50 | 0.03 | 15.56 | 0.827 | | | |
| A-12 | | | 36.86 | 0.00 | 0.00 | 28.02 | 8.12 |
| 0.37 | 8.49 | 0.00 | 1.95 | 0.230 | | | |
| A-13 | | | 36.86 | 0.00 | 0.00 | 3.60 | 31.79 |
| 0.09 | 31.88 | 0.01 | 7.11 | 0.865 | | | |
| A-14 | | | 36.86 | 0.00 | 0.00 | 33.77 | 2.47 |
| 0.52 | 2.99 | 0.00 | 1.16 | 0.081 | | | |
| A-15 | | | 36.86 | 0.00 | 0.00 | 34.85 | 1.06 |
| 0.94 | 2.00 | 0.00 | 1.40 | 0.054 | | | |
| A-16 | | | 36.86 | 0.00 | 0.00 | 26.46 | 9.21 |
| 0.87 | 10.08 | 0.00 | 0.80 | 0.273 | | | |
| A-17 | | | 36.86 | 0.00 | 0.00 | 29.77 | 6.01 |
| 0.87 | 6.88 | 0.00 | 0.74 | 0.187 | | | |
| D-01 | | | 36.86 | 0.00 | 0.00 | 22.00 | 13.77 |
| 0.50 | 14.27 | 0.00 | 0.66 | 0.387 | | | |
| R-01 | | | 36.86 | 0.00 | 0.00 | 0.00 | 36.90 |
| 0.00 | 36.90 | 0.03 | 19.20 | 1.001 | | | |
| R-02 | | | 36.86 | 0.00 | 0.00 | 0.00 | 36.90 |
| 0.00 | 36.90 | 0.02 | 10.67 | 1.001 | | | |
| R-03 | | | 36.86 | 0.00 | 0.00 | 0.00 | 36.90 |
| 0.00 | 36.90 | 0.01 | 8.32 | 1.001 | | | |
| R-04 | | | 36.86 | 0.00 | 0.00 | 0.00 | 36.90 |
| 0.00 | 36.90 | 0.01 | 6.61 | 1.001 | | | |
| R-05 | | | 36.86 | 0.00 | 0.00 | 0.00 | 36.90 |
| 0.00 | 36.90 | 0.03 | 14.94 | 1.001 | | | |
| R-06 | | | 36.86 | 0.00 | 0.00 | 0.00 | 36.90 |
| 0.00 | 36.90 | 0.02 | 12.16 | 1.001 | | | |
| R-07 | | | 36.86 | 0.00 | 0.00 | 0.00 | 36.90 |
| 0.00 | 36.90 | 0.01 | 6.61 | 1.001 | | | |
| R-08 | | | 36.86 | 0.00 | 0.00 | 0.00 | 36.90 |
| 0.00 | 36.90 | 0.01 | 4.05 | 1.001 | | | |
| R-09 | | | 36.86 | 0.00 | 0.00 | 0.00 | 36.90 |
| 0.00 | 36.90 | 0.02 | 8.75 | 1.001 | | | |
| R-10 | | | 36.86 | 0.00 | 0.00 | 0.00 | 36.90 |
| 0.00 | 36.90 | 0.01 | 3.63 | 1.001 | | | |
| R-11 | | | 36.86 | 0.00 | 0.00 | 0.00 | 36.90 |
| 0.00 | 36.90 | 0.01 | 3.63 | 1.001 | | | |
| R-12 | | | 36.86 | 0.00 | 0.00 | 0.00 | 36.90 |
| 0.00 | 36.90 | 0.00 | 2.13 | 1.001 | | | |
| R-13 | | | 36.86 | 0.00 | 0.00 | 0.00 | 36.90 |
| 0.00 | 36.90 | 0.01 | 4.91 | 1.001 | | | |
| R-14 | | | 36.86 | 0.00 | 0.00 | 0.00 | 36.90 |
| 0.00 | 36.90 | 0.00 | 1.71 | 1.001 | | | |

**********
Node Depth Summary
**********

| Node | Type | Average Depth Meters | Maximum Depth Meters | Maximum HGL Meters | Time of Max Occurrence days hr:min | Reported Max Depth Meters |
|---|---|---|---|---|---|---|
| HP-A-04 | JUNCTION | 0.00 | 0.00 | 108.70 | 0 00:00 | 0.00 |
| HP-A-05 | JUNCTION | 0.00 | 0.00 | 108.75 | 0 00:00 | 0.00 |
| HP-A-05-2 | JUNCTION | 0.00 | 0.00 | 109.02 | 0 00:00 | 0.00 |
| HP-A-06 | JUNCTION | 0.00 | 0.00 | 108.78 | 0 00:00 | 0.00 |
| HP-A-06-2 | JUNCTION | 0.00 | 0.00 | 108.80 | 0 00:00 | 0.00 |
| HP-A-07 | JUNCTION | 0.00 | 0.00 | 108.75 | 0 00:00 | 0.00 |
| HP-A-09 | JUNCTION | 0.00 | 0.00 | 108.73 | 0 00:00 | 0.00 |
| MH200 | OUTFALL | 0.01 | 0.40 | 106.12 | 0 02:11 | 0.40 |
| OF1 | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| 96 | STORAGE | 0.00 | 0.06 | 106.38 | 0 02:10 | 0.06 |
| 97 | STORAGE | 0.00 | 0.05 | 106.64 | 0 02:10 | 0.05 |
| 98 | STORAGE | 0.00 | 0.05 | 106.72 | 0 02:10 | 0.05 |
| CB1 | STORAGE | 0.01 | 0.49 | 107.15 | 0 02:12 | 0.49 |
| CB10 | STORAGE | 0.00 | 0.06 | 107.46 | 0 02:10 | 0.06 |
| CB2 | STORAGE | 0.01 | 1.19 | 108.34 | 0 02:10 | 1.19 |
| CB3 | STORAGE | 0.01 | 1.32 | 108.32 | 0 02:10 | 1.32 |
| CB4 | STORAGE | 0.01 | 0.94 | 108.19 | 0 02:10 | 0.94 |
| CB5 | STORAGE | 0.01 | 1.03 | 108.16 | 0 02:10 | 1.03 |
| CB6 | STORAGE | 0.01 | 0.97 | 108.27 | 0 02:10 | 0.97 |
| CB7 | STORAGE | 0.01 | 1.07 | 108.26 | 0 02:10 | 1.06 |
| CB8 | STORAGE | 0.00 | 0.07 | 107.48 | 0 02:10 | 0.07 |
| CB9 | STORAGE | 0.00 | 0.09 | 107.29 | 0 02:10 | 0.09 |
| CBMH222 | STORAGE | 0.01 | 0.91 | 106.92 | 0 02:13 | 0.91 |
| CBMH223 | STORAGE | 0.00 | 0.37 | 106.92 | 0 02:14 | 0.37 |
| CBMH224 | STORAGE | 0.00 | 0.09 | 106.92 | 0 02:13 | 0.09 |
| CBMH225 | STORAGE | 0.00 | 0.10 | 107.05 | 0 02:10 | 0.10 |
| LD1000 | STORAGE | 0.00 | 0.07 | 107.48 | 0 02:10 | 0.07 |
| LD1001 | STORAGE | 0.00 | 0.08 | 107.75 | 0 02:10 | 0.08 |
| LD1002 | STORAGE | 0.00 | 0.19 | 106.93 | 0 02:14 | 0.19 |
| LD1003 | STORAGE | 0.01 | 0.53 | 106.92 | 0 02:13 | 0.53 |
| MH201 | STORAGE | 0.01 | 0.48 | 106.23 | 0 02:11 | 0.48 |
| MH202 | STORAGE | 0.01 | 0.42 | 106.27 | 0 02:10 | 0.42 |
| MH203 | STORAGE | 0.01 | 0.34 | 106.37 | 0 02:10 | 0.34 |
| MH204 | STORAGE | 0.01 | 0.30 | 106.40 | 0 02:10 | 0.30 |
| MH205 | STORAGE | 0.01 | 0.19 | 106.46 | 0 02:10 | 0.19 |
| MH206 | STORAGE | 0.00 | 0.08 | 106.49 | 0 02:10 | 0.08 |
| MH207 | STORAGE | 0.01 | 0.37 | 106.85 | 0 02:20 | 0.37 |
| MH208 | STORAGE | 0.00 | 0.07 | 106.85 | 0 02:19 | 0.07 |
| MH209 | STORAGE | 0.01 | 0.26 | 106.85 | 0 02:20 | 0.26 |
| MH210A | STORAGE | 0.00 | 0.11 | 107.41 | 0 02:10 | 0.11 |
| MH210B | STORAGE | 0.00 | 0.10 | 107.27 | 0 02:10 | 0.10 |
| MH211 | STORAGE | 0.01 | 0.32 | 106.29 | 0 02:10 | 0.32 |
| MH212 | STORAGE | 0.01 | 0.11 | 106.39 | 0 02:10 | 0.11 |
| MH213 | STORAGE | 0.00 | 0.08 | 106.62 | 0 02:10 | 0.08 |
| MH214 | STORAGE | 0.01 | 0.37 | 106.99 | 0 02:20 | 0.37 |
| MH215 | STORAGE | 0.01 | 0.30 | 106.99 | 0 02:20 | 0.30 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| MH216 | STORAGE | 0.00 | 0.08 | 107.03 | 0 | 02:03 | 0.08 |
| MH217 | STORAGE | 0.00 | 0.09 | 107.44 | 0 | 02:10 | 0.09 |
| MH218 | STORAGE | 0.00 | 0.08 | 107.08 | 0 | 02:10 | 0.08 |
| MH219 | STORAGE | 0.01 | 0.28 | 106.49 | 0 | 02:13 | 0.28 |
| MH220 | STORAGE | 0.01 | 0.31 | 106.49 | 0 | 02:13 | 0.31 |
| MH221 | STORAGE | 0.00 | 0.12 | 106.49 | 0 | 02:13 | 0.12 |
| ST1 | STORAGE | 0.01 | 0.32 | 106.99 | 0 | 02:20 | 0.32 |
| ST2 | STORAGE | 0.01 | 0.33 | 106.85 | 0 | 02:20 | 0.33 |
| ST3 | STORAGE | 0.00 | 0.21 | 106.49 | 0 | 02:12 | 0.21 |

**********
Node Inflow Summary
**********

| Node | Type | Maximum Lateral Inflow LPS | Maximum Total Inflow LPS | Time of Max Occurrence days hr:min | | Lateral Inflow Volume 10^6 ltr | Total Inflow Volume 10^6 ltr | Flow Balance Error Percent |
|---|---|---|---|---|---|---|---|---|
| HP-A-04 | JUNCTION | 0.00 | 0.00 | 0 | 00:00 | 0 | 0 | 0.000 ltr |
| HP-A-05 | JUNCTION | 0.00 | 0.00 | 0 | 00:00 | 0 | 0 | 0.000 ltr |
| HP-A-05-2 | JUNCTION | 0.00 | 0.00 | 0 | 00:00 | 0 | 0 | 0.000 ltr |
| HP-A-06 | JUNCTION | 0.00 | 0.00 | 0 | 00:00 | 0 | 0 | 0.000 ltr |
| HP-A-06-2 | JUNCTION | 0.00 | 0.00 | 0 | 00:00 | 0 | 0 | 0.000 ltr |
| HP-A-07 | JUNCTION | 0.00 | 0.00 | 0 | 00:00 | 0 | 0 | 0.000 ltr |
| HP-A-09 | JUNCTION | 0.00 | 0.00 | 0 | 00:00 | 0 | 0 | 0.000 ltr |
| MH200 | OUTFALL | 0.00 | 192.33 | 0 | 02:11 | 0 | 0.45 | 0.000 |
| OF1 | OUTFALL | 0.66 | 0.66 | 0 | 02:10 | 0.000856 | 0.000856 | 0.000 |
| 96 | STORAGE | 7.11 | 7.11 | 0 | 02:10 | 0.0115 | 0.0115 | 0.132 |
| 97 | STORAGE | 5.15 | 5.15 | 0 | 02:10 | 0.00832 | 0.00832 | 0.004 |
| 98 | STORAGE | 4.48 | 4.48 | 0 | 02:10 | 0.00742 | 0.00742 | 0.006 |
| CB1 | STORAGE | 0.00 | 20.95 | 0 | 02:10 | 0 | 0.0349 | -0.162 |
| CB10 | STORAGE | 1.95 | 1.95 | 0 | 02:10 | 0.00272 | 0.00272 | 0.001 |
| CB2 | STORAGE | 28.23 | 28.23 | 0 | 02:10 | 0.0456 | 0.0456 | -0.011 |
| CB3 | STORAGE | 28.50 | 55.67 | 0 | 02:10 | 0.0463 | 0.092 | -0.000 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| CB4 | | STORAGE | 23.44 | 23.44 | 0 | 02:10 | 0.0379 |
| 0.0379 | -0.008 | | | | | | |
| CB5 | | STORAGE | 25.56 | 48.44 | 0 | 02:10 | 0.0414 |
| 0.0794 | -0.003 | | | | | | |
| CB6 | | STORAGE | 19.72 | 19.72 | 0 | 02:10 | 0.0319 |
| 0.0319 | -0.002 | | | | | | |
| CB7 | | STORAGE | 15.56 | 34.76 | 0 | 02:10 | 0.025 |
| 0.0569 | 0.003 | | | | | | |
| CB8 | | STORAGE | 0.00 | 17.03 | 0 | 02:10 | 0 |
| 0.0281 | -0.001 | | | | | | |
| CB9 | | STORAGE | 8.01 | 24.32 | 0 | 02:10 | 0.0118 |
| 0.0399 | -0.003 | | | | | | |
| CBMH222 | | STORAGE | 0.00 | 32.36 | 0 | 02:06 | 0 |
| 0.0704 | -0.114 | | | | | | |
| CBMH223 | | STORAGE | 0.00 | 35.10 | 0 | 02:10 | 0 |
| 0.0598 | -0.215 | | | | | | |
| CBMH224 | | STORAGE | 0.00 | 28.28 | 0 | 02:10 | 0 |
| 0.048 | -0.026 | | | | | | |
| CBMH225 | | STORAGE | 5.22 | 28.69 | 0 | 02:10 | 0.00806 |
| 0.048 | -0.002 | | | | | | |
| LD1000 | | STORAGE | 21.51 | 21.51 | 0 | 02:10 | 0.0349 |
| 0.0349 | 0.073 | | | | | | |
| LD1001 | | STORAGE | 18.02 | 18.02 | 0 | 02:10 | 0.0281 |
| 0.0281 | -0.010 | | | | | | |
| LD1002 | | STORAGE | 7.36 | 21.90 | 0 | 02:10 | 0.0119 |
| 0.0332 | 0.355 | | | | | | |
| LD1003 | | STORAGE | 6.56 | 20.43 | 0 | 02:06 | 0.0106 |
| 0.0297 | 0.175 | | | | | | |
| MH201 | | STORAGE | 0.00 | 192.62 | 0 | 02:10 | 0 |
| 0.45 | 0.007 | | | | | | |
| MH202 | | STORAGE | 0.00 | 174.69 | 0 | 02:10 | 0 |
| 0.379 | -0.141 | | | | | | |
| MH203 | | STORAGE | 0.00 | 102.34 | 0 | 02:10 | 0 |
| 0.21 | 0.089 | | | | | | |
| MH204 | | STORAGE | 0.00 | 96.44 | 0 | 02:10 | 0 |
| 0.198 | 0.024 | | | | | | |
| MH205 | | STORAGE | 0.00 | 44.50 | 0 | 02:10 | 0 |
| 0.0976 | 0.022 | | | | | | |
| MH206 | | STORAGE | 0.00 | 10.30 | 0 | 02:10 | 0 |
| 0.0407 | 0.005 | | | | | | |
| MH207 | | STORAGE | 0.00 | 18.58 | 0 | 02:05 | 0 |
| 0.0408 | -0.203 | | | | | | |
| MH208 | | STORAGE | 6.61 | 6.61 | 0 | 02:10 | 0.0114 |
| 0.0114 | 0.835 | | | | | | |
| MH209 | | STORAGE | 0.00 | 18.78 | 0 | 02:10 | 0 |
| 0.0324 | 0.088 | | | | | | |
| MH210A | | STORAGE | 12.16 | 12.16 | 0 | 02:10 | 0.021 |
| 0.021 | -0.004 | | | | | | |
| MH210B | | STORAGE | 0.00 | 12.16 | 0 | 02:10 | 0 |
| 0.021 | -0.004 | | | | | | |
| MH211 | | STORAGE | 0.00 | 73.16 | 0 | 02:10 | 0 |
| 0.167 | 0.065 | | | | | | |
| MH212 | | STORAGE | 0.00 | 18.95 | 0 | 02:10 | 0 |
| 0.0751 | -0.073 | | | | | | |
| MH213 | | STORAGE | 0.00 | 9.62 | 0 | 02:10 | 0 |
| 0.0402 | 0.000 | | | | | | |
| MH214 | | STORAGE | 0.00 | 18.09 | 0 | 02:04 | 0 |
| 0.0409 | -0.119 | | | | | | |
| MH215 | | STORAGE | 0.00 | 18.99 | 0 | 02:10 | 0 |
| 0.0327 | -0.247 | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| MH216 | STORAGE | 8.32 | 8.32 | 0 | 02:10 | 0.0144 | 0.0144 |
| 1.018 | | | | | | | |
| MH217 | STORAGE | 10.67 | 10.67 | 0 | 02:10 | 0.0185 | 0.0185 |
| -0.011 | | | | | | | |
| MH218 | STORAGE | 8.75 | 8.75 | 0 | 02:10 | 0.0151 | 0.0151 |
| -0.010 | | | | | | | |
| MH219 | STORAGE | 0.00 | 12.37 | 0 | 02:07 | 0 | 0.0214 |
| -0.124 | | | | | | | |
| MH220 | STORAGE | 0.00 | 11.86 | 0 | 02:04 | 0 | 0.025 |
| -0.010 | | | | | | | |
| MH221 | STORAGE | 3.63 | 3.63 | 0 | 02:10 | 0.00627 | 0.00627 |
| 0.411 | | | | | | | |
| ST1 | STORAGE | 0.00 | 13.55 | 0 | 02:04 | 0 | 0.00812 |
| 0.083 | | | | | | | |
| ST2 | STORAGE | 0.00 | 14.12 | 0 | 02:04 | 0 | 0.00849 |
| 0.031 | | | | | | | |
| ST3 | STORAGE | 0.00 | 7.84 | 0 | 02:04 | 0 | 0.00358 |
| 0.110 | | | | | | | |

**********
Node Surcharge Summary
**********

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

| Node | Type | Hours Surcharged | Max. Height Above Crown Meters | Min. Depth Below Rim Meters |
|---|---|---|---|---|
| ST1 | STORAGE | 0.47 | 0.071 | 0.669 |
| ST2 | STORAGE | 0.51 | 0.078 | 0.662 |

**********
Node Flooding Summary
**********

No nodes were flooded.

**********
Storage Volume Summary
**********

| Storage Unit | Average Volume 1000 m³ | Avg Pcnt Full | Evap Pcnt Loss | Exfil Pcnt Loss | Maximum Volume 1000 m³ | Max Pcnt Full | Time of Max Occurrence days hr:min | Maximum Outflow LPS |
|---|---|---|---|---|---|---|---|---|
| 96 | 0.000 | 0.0 | 0.0 | 0.0 | 0.000 | 0.0 | 0 00:00 | 7.10 |
| 97 | 0.000 | 0.0 | 0.0 | 0.0 | 0.000 | 0.0 | 0 00:00 | 5.13 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 98 | | 0.000 | 0.0 | 0.0 | 0.0 | 0.000 | 0.0 | 0 |
| 00:00 | 4.48 | | | | | | | |
| CB1 | | 0.000 | 0.3 | 0.0 | 0.0 | 0.000 | 16.2 | 0 |
| 02:12 | 9.81 | | | | | | | |
| CB10 | | 0.000 | 0.0 | 0.0 | 0.0 | 0.000 | 0.0 | 0 |
| 02:10 | 1.86 | | | | | | | |
| CB2 | | 0.000 | 0.0 | 0.0 | 0.0 | 0.000 | 0.0 | 0 |
| 02:10 | 27.21 | | | | | | | |
| CB3 | | 0.000 | 0.0 | 0.0 | 0.0 | 0.000 | 0.0 | 0 |
| 02:10 | 54.68 | | | | | | | |
| CB4 | | 0.000 | 0.0 | 0.0 | 0.0 | 0.000 | 0.0 | 0 |
| 02:10 | 22.94 | | | | | | | |
| CB5 | | 0.000 | 0.0 | 0.0 | 0.0 | 0.000 | 0.0 | 0 |
| 02:10 | 47.92 | | | | | | | |
| CB6 | | 0.000 | 0.0 | 0.0 | 0.0 | 0.000 | 0.1 | 0 |
| 02:10 | 19.21 | | | | | | | |
| CB7 | | 0.000 | 0.0 | 0.0 | 0.0 | 0.000 | 0.1 | 0 |
| 02:10 | 34.27 | | | | | | | |
| CB8 | | 0.000 | 0.1 | 0.0 | 0.0 | 0.000 | 3.7 | 0 |
| 02:10 | 16.60 | | | | | | | |
| CB9 | | 0.000 | 0.1 | 0.0 | 0.0 | 0.000 | 3.9 | 0 |
| 02:10 | 23.62 | | | | | | | |
| CBMH222 | | 0.000 | 0.5 | 0.0 | 0.0 | 0.001 | 35.4 | 0 |
| 02:13 | 22.21 | | | | | | | |
| CBMH223 | | 0.000 | 0.2 | 0.0 | 0.0 | 0.000 | 18.1 | 0 |
| 02:14 | 30.09 | | | | | | | |
| CBMH224 | | 0.000 | 0.1 | 0.0 | 0.0 | 0.000 | 3.4 | 0 |
| 02:13 | 28.35 | | | | | | | |
| CBMH225 | | 0.000 | 0.1 | 0.0 | 0.0 | 0.000 | 4.2 | 0 |
| 02:10 | 28.28 | | | | | | | |
| LD1000 | | 0.000 | 0.1 | 0.0 | 0.0 | 0.000 | 3.0 | 0 |
| 02:10 | 20.95 | | | | | | | |
| LD1001 | | 0.000 | 0.1 | 0.0 | 0.0 | 0.000 | 3.9 | 0 |
| 02:10 | 17.03 | | | | | | | |
| LD1002 | | 0.000 | 0.1 | 0.0 | 0.0 | 0.000 | 6.6 | 0 |
| 02:14 | 21.84 | | | | | | | |
| LD1003 | | 0.000 | 0.2 | 0.0 | 0.0 | 0.000 | 16.2 | 0 |
| 02:13 | 17.12 | | | | | | | |
| MH201 | | 0.000 | 0.5 | 0.0 | 0.0 | 0.001 | 16.2 | 0 |
| 02:11 | 192.33 | | | | | | | |
| MH202 | | 0.000 | 0.4 | 0.0 | 0.0 | 0.001 | 15.6 | 0 |
| 02:10 | 172.91 | | | | | | | |
| MH203 | | 0.000 | 0.4 | 0.0 | 0.0 | 0.001 | 12.3 | 0 |
| 02:10 | 101.08 | | | | | | | |
| MH204 | | 0.000 | 0.3 | 0.0 | 0.0 | 0.001 | 11.1 | 0 |
| 02:10 | 95.61 | | | | | | | |
| MH205 | | 0.000 | 0.3 | 0.0 | 0.0 | 0.000 | 7.2 | 0 |
| 02:10 | 44.24 | | | | | | | |
| MH206 | | 0.000 | 0.2 | 0.0 | 0.0 | 0.000 | 3.5 | 0 |
| 02:10 | 10.26 | | | | | | | |
| MH207 | | 0.000 | 0.4 | 0.0 | 0.0 | 0.000 | 15.6 | 0 |
| 02:20 | 17.94 | | | | | | | |
| MH208 | | 0.000 | 0.1 | 0.0 | 0.0 | 0.000 | 2.9 | 0 |
| 02:19 | 6.83 | | | | | | | |
| MH209 | | 0.000 | 0.3 | 0.0 | 0.0 | 0.000 | 10.3 | 0 |
| 02:20 | 18.58 | | | | | | | |
| MH210A | | 0.000 | 0.2 | 0.0 | 0.0 | 0.000 | 6.2 | 0 |
| 02:10 | 12.16 | | | | | | | |
| MH210B | | 0.000 | 0.2 | 0.0 | 0.0 | 0.000 | 4.9 | 0 |
| 02:10 | 12.16 | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| MH211 | 0.000 | 0.3 | 0.0 | 0.0 | 0.001 | 11.9 | 0 |
| 02:10 | 71.86 | | | | | | |
| MH212 | 0.000 | 0.3 | 0.0 | 0.0 | 0.000 | 4.7 | 0 |
| 02:10 | 18.84 | | | | | | |
| MH213 | 0.000 | 0.2 | 0.0 | 0.0 | 0.000 | 3.4 | 0 |
| 02:10 | 9.44 | | | | | | |
| MH214 | 0.000 | 0.4 | 0.0 | 0.0 | 0.000 | 15.8 | 0 |
| 02:20 | 17.32 | | | | | | |
| MH215 | 0.000 | 0.3 | 0.0 | 0.0 | 0.000 | 12.6 | 0 |
| 02:20 | 18.09 | | | | | | |
| MH216 | 0.000 | 0.1 | 0.0 | 0.0 | 0.000 | 3.6 | 0 |
| 02:03 | 8.56 | | | | | | |
| MH217 | 0.000 | 0.2 | 0.0 | 0.0 | 0.000 | 6.1 | 0 |
| 02:10 | 10.67 | | | | | | |
| MH218 | 0.000 | 0.2 | 0.0 | 0.0 | 0.000 | 4.0 | 0 |
| 02:10 | 8.75 | | | | | | |
| MH219 | 0.000 | 0.2 | 0.0 | 0.0 | 0.000 | 9.8 | 0 |
| 02:13 | 11.86 | | | | | | |
| MH220 | 0.000 | 0.2 | 0.0 | 0.0 | 0.000 | 11.3 | 0 |
| 02:13 | 11.48 | | | | | | |
| MH221 | 0.000 | 0.1 | 0.0 | 0.0 | 0.000 | 4.3 | 0 |
| 02:13 | 3.63 | | | | | | |
| ST1 | 0.000 | 0.7 | 0.0 | 0.0 | 0.008 | 32.5 | 0 |
| 02:20 | 2.61 | | | | | | |
| ST2 | 0.000 | 0.7 | 0.0 | 0.0 | 0.008 | 33.3 | 0 |
| 02:20 | 6.41 | | | | | | |
| ST3 | 0.000 | 0.3 | 0.0 | 0.0 | 0.003 | 20.9 | 0 |
| 02:12 | 1.75 | | | | | | |

**********
Outfall Loading Summary
**********

| Outfall Node | Flow Freq Pcnt | Avg Flow LPS | Max Flow LPS | Total Volume 10^6 ltr |
|---|---|---|---|---|
| MH200 | 17.64 | 15.36 | 192.33 | 0.450 |
| OF1 | 3.27 | 0.13 | 0.66 | 0.001 |
| System | 10.45 | 15.49 | 192.58 | 0.451 |

**********
Link Flow Summary
**********

| Link | Type | Maximum \|Flow\| LPS | Time of Max Occurrence days hr:min | Maximum \|Veloc\| m/sec | Max/ Full Flow | Max/ Full Depth |
|---|---|---|---|---|---|---|
| C1 | CONDUIT | 0.00 | 0 00:00 | 0.00 | 0.00 | 0.00 |
| C10 | CONDUIT | 0.00 | 0 00:00 | 0.00 | 0.00 | 0.00 |
| C11 | CONDUIT | 0.00 | 0 00:00 | 0.00 | 0.00 | 0.00 |
| C12 | CONDUIT | 0.00 | 0 00:00 | 0.00 | 0.00 | 0.00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| C13 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.00 |
| C14 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.00 |
| C15 | CONDUIT | 7.92 | 0 | 02:10 | 0.29 | 0.09 | 0.14 |
| C16 | CONDUIT | 8.31 | 0 | 02:10 | 0.29 | 0.08 | 0.15 |
| C17 | CONDUIT | 11.17 | 0 | 02:10 | 0.33 | 0.12 | 0.18 |
| C18 | CONDUIT | 12.98 | 0 | 02:10 | 0.39 | 0.13 | 0.17 |
| C19 | CONDUIT | 13.44 | 0 | 02:10 | 0.42 | 0.11 | 0.42 |
| C2 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.00 |
| C20 | CONDUIT | 16.12 | 0 | 02:10 | 0.16 | 0.10 | 0.84 |
| C21 | CONDUIT | 10.27 | 0 | 02:10 | 0.23 | 0.08 | 0.49 |
| C3 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.00 |
| C4 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.00 |
| C5 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.00 |
| C6 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.00 |
| C7 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.00 |
| C8 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.00 |
| C9 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.00 |
| STM-25 | CONDUIT | 18.84 | 0 | 02:10 | 0.77 | 0.31 | 0.47 |
| STM-26 | CONDUIT | 71.86 | 0 | 02:10 | 0.83 | 0.48 | 0.73 |
| STM-27 | CONDUIT | 172.91 | 0 | 02:10 | 0.88 | 0.74 | 0.85 |
| STM-28 | CONDUIT | 192.33 | 0 | 02:11 | 0.99 | 0.93 | 0.84 |
| STM-29 | CONDUIT | 27.21 | 0 | 02:10 | 0.43 | 0.40 | 1.00 |
| STM-31 | CONDUIT | 22.94 | 0 | 02:10 | 0.47 | 0.56 | 1.00 |
| STM-33 | CONDUIT | 19.21 | 0 | 02:10 | 0.43 | 0.45 | 1.00 |
| STM-35 | CONDUIT | 10.26 | 0 | 02:10 | 0.61 | 0.17 | 0.32 |
| STM-36 | CONDUIT | 44.24 | 0 | 02:10 | 0.79 | 0.46 | 0.55 |
| STM-37 | CONDUIT | 95.61 | 0 | 02:10 | 0.85 | 0.67 | 0.70 |
| STM-37_(1) | CONDUIT | 101.08 | 0 | 02:10 | 0.88 | 0.70 | 0.75 |
| STM-39 | CONDUIT | 9.44 | 0 | 02:10 | 0.69 | 0.22 | 0.32 |
| STM-40 | CONDUIT | 4.48 | 0 | 02:10 | 0.64 | 0.08 | 0.20 |
| STM-41 | CONDUIT | 5.13 | 0 | 02:10 | 0.70 | 0.09 | 0.21 |
| STM-42 | CONDUIT | 7.10 | 0 | 02:10 | 0.80 | 0.12 | 0.39 |
| STM-44 | CONDUIT | 8.75 | 0 | 02:10 | 0.70 | 0.21 | 0.30 |
| STM-45 | CONDUIT | 3.63 | 0 | 02:07 | 0.45 | 0.09 | 0.67 |
| STM-46 | CONDUIT | 11.86 | 0 | 02:04 | 0.39 | 0.27 | 1.00 |
| STM-48 | CONDUIT | 10.67 | 0 | 02:10 | 0.71 | 0.26 | 0.35 |
| STM-49 | CONDUIT | 18.09 | 0 | 02:04 | 0.67 | 0.48 | 1.00 |
| STM-50 | CONDUIT | 8.56 | 0 | 02:03 | 0.62 | 0.20 | 0.57 |
| STM-53 | CONDUIT | 7.84 | 0 | 02:04 | 0.73 | 0.13 | 0.91 |
| STM-54 | CONDUIT | 13.55 | 0 | 02:04 | 0.59 | 0.21 | 1.00 |
| STM-55 | CONDUIT | 6.83 | 0 | 02:03 | 0.57 | 0.16 | 0.54 |
| STM-56 | CONDUIT | 12.16 | 0 | 02:10 | 0.72 | 0.29 | 0.38 |
| STM-57 | CONDUIT | 18.58 | 0 | 02:05 | 0.73 | 0.46 | 1.00 |
| STM-60 | CONDUIT | 14.12 | 0 | 02:04 | 0.65 | 0.23 | 1.00 |
| STM-70 | CONDUIT | 10.68 | 0 | 02:10 | 0.69 | 0.18 | 0.64 |
| STM-71 | CONDUIT | 9.11 | 0 | 02:10 | 0.70 | 0.22 | 0.31 |
| STM-72 | CONDUIT | 8.29 | 0 | 02:10 | 0.70 | 0.19 | 0.29 |
| STM-74 | CONDUIT | 12.45 | 0 | 02:10 | 0.78 | 0.29 | 0.36 |
| STM-77 | CONDUIT | 15.03 | 0 | 02:10 | 0.92 | 0.26 | 0.54 |
| STM-77_(1) | CONDUIT | 21.84 | 0 | 02:10 | 1.08 | 0.37 | 0.88 |
| STM-78 | CONDUIT | 14.34 | 0 | 02:06 | 0.86 | 0.24 | 1.00 |
| STM-78_(1) | CONDUIT | 17.12 | 0 | 02:04 | 0.95 | 0.29 | 1.00 |
| STM-79 | CONDUIT | 15.29 | 0 | 02:10 | 0.83 | 0.36 | 0.40 |
| STM-83 | CONDUIT | 12.16 | 0 | 02:10 | 0.70 | 0.28 | 0.39 |
| O-CB1 | ORIFICE | 9.81 | 0 | 02:12 | | | 1.00 |
| O-CB10 | ORIFICE | 1.86 | 0 | 02:10 | | | 0.73 |
| O-CB3 | ORIFICE | 54.68 | 0 | 02:10 | | | 1.00 |

| | | | | | |
|---|---|---|---|---|---|
| O-Cb5 | ORIFICE | 47.92 | 0 | 02:10 | 1.00 |
| O-CB7 | ORIFICE | 34.27 | 0 | 02:10 | 1.00 |
| O-CBMH222 | ORIFICE | 22.21 | 0 | 02:17 | 1.00 |
| O-MH206 | DUMMY | 5.61 | 0 | 02:20 | |
| O-MH214 | DUMMY | 5.64 | 0 | 02:20 | |
| O-MH220 | DUMMY | 4.55 | 0 | 02:13 | |

**********
Flow Classification Summary
**********

| Inlet Conduit | Adjusted /Actual Length | Fraction of Time in Flow Class: Dry | Up Dry | Down Dry | Sub Crit | Sup Crit | Up Crit | Down Crit | Norm Ltd | Ctrl |
|---|---|---|---|---|---|---|---|---|---|---|
| C1 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C10 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C11 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C12 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C13 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C14 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C15 | 1.00 | 0.57 | 0.10 | 0.00 | 0.33 | 0.00 | 0.00 | 0.00 | 0.24 | 0.00 |
| C16 | 1.00 | 0.53 | 0.05 | 0.00 | 0.42 | 0.00 | 0.00 | 0.00 | 0.55 | 0.00 |
| C17 | 1.00 | 0.50 | 0.05 | 0.00 | 0.45 | 0.00 | 0.00 | 0.00 | 0.45 | 0.00 |
| C18 | 1.00 | 0.47 | 0.04 | 0.00 | 0.49 | 0.00 | 0.00 | 0.00 | 0.31 | 0.00 |
| C19 | 1.00 | 0.44 | 0.04 | 0.00 | 0.52 | 0.00 | 0.00 | 0.00 | 0.72 | 0.00 |
| C2 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C20 | 1.00 | 0.34 | 0.12 | 0.00 | 0.54 | 0.00 | 0.00 | 0.00 | 0.90 | 0.00 |
| C21 | 1.00 | 0.47 | 0.20 | 0.00 | 0.33 | 0.00 | 0.00 | 0.00 | 0.38 | 0.00 |
| C3 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C4 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C5 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C6 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C7 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C8 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | | | | | | | | | |
| C9 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-25 | 1.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-26 | 1.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.98 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-27 | 1.00 | 0.01 | 0.00 | 0.00 | 0.14 | 0.00 | 0.00 | 0.85 | 0.10 |
| 0.00 | | | | | | | | | |
| STM-28 | 1.00 | 0.01 | 0.00 | 0.00 | 0.99 | 0.00 | 0.00 | 0.00 | 0.84 |
| 0.00 | | | | | | | | | |
| STM-29 | 1.00 | 0.02 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.95 | 0.02 |
| 0.00 | | | | | | | | | |
| STM-31 | 1.00 | 0.02 | 0.00 | 0.00 | 0.09 | 0.00 | 0.00 | 0.89 | 0.06 |
| 0.00 | | | | | | | | | |
| STM-33 | 1.00 | 0.02 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.96 | 0.01 |
| 0.00 | | | | | | | | | |
| STM-35 | 1.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-36 | 1.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-37 | 1.00 | 0.01 | 0.00 | 0.00 | 0.12 | 0.00 | 0.00 | 0.88 | 0.02 |
| 0.00 | | | | | | | | | |
| STM-37_(1) | 1.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.99 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-39 | 1.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-40 | 1.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.98 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-41 | 1.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.98 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-42 | 1.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.97 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-44 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-45 | 1.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.98 | 0.01 |
| 0.00 | | | | | | | | | |
| STM-46 | 1.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.97 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-48 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-49 | 1.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.97 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-50 | 1.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.97 | 0.02 |
| 0.00 | | | | | | | | | |
| STM-53 | 1.00 | 0.04 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.94 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-54 | 1.00 | 0.01 | 0.03 | 0.00 | 0.09 | 0.00 | 0.00 | 0.87 | 0.05 |
| 0.00 | | | | | | | | | |
| STM-55 | 1.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.98 | 0.01 |
| 0.00 | | | | | | | | | |
| STM-56 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-57 | 1.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.97 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-60 | 1.00 | 0.01 | 0.03 | 0.00 | 0.09 | 0.00 | 0.00 | 0.87 | 0.05 |
| 0.00 | | | | | | | | | |
| STM-70 | 1.00 | 0.67 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.31 | 0.02 |
| 0.00 | | | | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| STM-71 | 1.00 | 0.67 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-72 | 1.00 | 0.58 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.42 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-74 | 1.00 | 0.55 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.45 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-77 | 1.00 | 0.48 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.51 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-77_(1) | 1.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.99 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-78 | 1.00 | 0.46 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.53 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-78_(1) | 1.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.98 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-79 | 1.00 | 0.51 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.49 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-83 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 0.00 | | | | | | | | | |

**********
Conduit Surcharge Summary
**********

| Conduit | Hours Full: Both Ends | Hours Full: Upstream | Hours Full: Dnstream | Hours Above Full Normal Flow | Hours Capacity Limited |
|---|---|---|---|---|---|
| C20 | 0.01 | 0.01 | 0.42 | 0.01 | 0.01 |
| STM-29 | 0.19 | 0.19 | 0.22 | 0.01 | 0.01 |
| STM-31 | 0.19 | 0.19 | 0.22 | 0.01 | 0.01 |
| STM-33 | 0.19 | 0.19 | 0.21 | 0.01 | 0.01 |
| STM-46 | 0.25 | 0.25 | 0.33 | 0.01 | 0.01 |
| STM-49 | 0.40 | 0.40 | 0.47 | 0.01 | 0.01 |
| STM-54 | 0.47 | 0.47 | 0.63 | 0.01 | 0.01 |
| STM-57 | 0.20 | 0.20 | 0.40 | 0.01 | 0.01 |
| STM-60 | 0.51 | 0.51 | 0.62 | 0.01 | 0.01 |
| STM-70 | 0.01 | 0.01 | 0.37 | 0.01 | 0.01 |
| STM-77_(1) | 0.01 | 0.01 | 0.21 | 0.01 | 0.01 |
| STM-78 | 0.22 | 0.22 | 0.36 | 0.01 | 0.01 |
| STM-78_(1) | 0.37 | 0.37 | 0.46 | 0.01 | 0.01 |

Analysis begun on: Fri May 15 11:16:31 2026
Analysis ended on: Fri May 15 11:16:37 2026
Total elapsed time: 00:00:06

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

  WARNING 03: negative offset ignored for Link C21
  WARNING 03: negative offset ignored for Link C21

  *************
  Element Count
  *************
  Number of rain gages ...... 1
  Number of subcatchments ... 31
  Number of nodes ........... 55
  Number of links ........... 67
  Number of pollutants ...... 0
  Number of land uses ....... 0


  ****************
  Raingage Summary
  ****************
                                                    Data       Recording
  Name                 Data Source                  Type       Interval
  ------------------------------------------------------------------------
  Raingage             02-C6hr-5yr                  INTENSITY   10 min.


  ********************
  Subcatchment Summary
  ********************
  Name                        Area     Width   %Imperv    %Slope Rain Gage
Outlet
  ----------------------------------------------------------------------------------
--------------------------
  A-01                        0.06    152.50      6.00    2.5000 Raingage
LD1000
  A-02                        0.02     26.25    100.00    2.0000 Raingage
98
  A-03                        0.03     27.78     94.00    2.0000 Raingage
97
  A-04                        0.15     82.22     87.00    2.5000 Raingage
CB2
  A-05                        0.12     70.00     90.00    2.5000 Raingage
CB4
  A-06                        0.10     61.88     91.00    2.5000 Raingage
CB6
  A-07                        0.12    128.89      4.00    6.0000 Raingage
LD1001
  A-08                        0.15     70.00     89.00    2.0000 Raingage
CB3
  A-09                        0.13     76.47     90.00    2.0000 Raingage
CB5
  A-10                        0.08     58.57     86.00    2.5000 Raingage
CB7
  A-12                        0.03     35.56     23.00    2.5000 Raingage
CB10
  A-13                        0.04     27.69     90.00    2.0000 Raingage
96
```

| | | | | | |
|---|---|---|---|---|---|
| A-14 | 0.04 | 29.17 | 7.00 | 11.0000 | Raingage |
| CBMH225 | | | | | |
| A-15 | 0.02 | 63.33 | 3.00 | 20.0000 | Raingage |
| CB9 | | | | | |
| A-16 | 0.01 | 60.00 | 26.00 | 9.0000 | Raingage |
| LD1003 | | | | | |
| A-17 | 0.01 | 70.00 | 17.00 | 3.5000 | Raingage |
| LD1002 | | | | | |
| D-01 | 0.01 | 15.00 | 39.00 | 3.5000 | Raingage |
| OF1 | | | | | |
| R-01 | 0.09 | 90.00 | 100.00 | 3.0000 | Raingage |
| LD1000 | | | | | |
| R-02 | 0.05 | 55.56 | 100.00 | 3.0000 | Raingage |
| MH217 | | | | | |
| R-03 | 0.04 | 39.00 | 100.00 | 3.0000 | Raingage |
| MH216 | | | | | |
| R-04 | 0.03 | 31.00 | 100.00 | 3.0000 | Raingage |
| MH208 | | | | | |
| R-05 | 0.07 | 70.00 | 100.00 | 3.0000 | Raingage |
| LD1001 | | | | | |
| R-06 | 0.06 | 57.00 | 100.00 | 3.0000 | Raingage |
| MH210A | | | | | |
| R-07 | 0.03 | 34.44 | 100.00 | 3.0000 | Raingage |
| CB9 | | | | | |
| R-08 | 0.02 | 21.11 | 100.00 | 3.0000 | Raingage |
| CBMH225 | | | | | |
| R-09 | 0.04 | 45.56 | 100.00 | 3.0000 | Raingage |
| MH218 | | | | | |
| R-10 | 0.02 | 17.00 | 100.00 | 3.0000 | Raingage |
| MH221 | | | | | |
| R-11 | 0.02 | 18.89 | 100.00 | 3.0000 | Raingage |
| LD1003 | | | | | |
| R-12 | 0.01 | 11.11 | 100.00 | 3.0000 | Raingage |
| LD1003 | | | | | |
| R-13 | 0.02 | 25.56 | 100.00 | 3.0000 | Raingage |
| LD1002 | | | | | |
| R-14 | 0.01 | 8.89 | 100.00 | 3.0000 | Raingage |
| LD1002 | | | | | |

**********
Node Summary
**********

| Name | Type | Invert Elev. | Max. Depth | Ponded Area | External Inflow |
|---|---|---|---|---|---|
| HP-A-04 | JUNCTION | 108.70 | 1.00 | 0.0 | |
| HP-A-05 | JUNCTION | 108.75 | 1.00 | 0.0 | |
| HP-A-05-2 | JUNCTION | 109.02 | 1.00 | 0.0 | |
| HP-A-06 | JUNCTION | 108.78 | 1.00 | 0.0 | |
| HP-A-06-2 | JUNCTION | 108.80 | 1.00 | 0.0 | |
| HP-A-07 | JUNCTION | 108.75 | 1.00 | 0.0 | |
| HP-A-09 | JUNCTION | 108.73 | 1.00 | 0.0 | |
| MH200 | OUTFALL | 105.72 | 0.53 | 0.0 | |
| OF1 | OUTFALL | 0.00 | 0.00 | 0.0 | |
| 96 | STORAGE | 106.32 | 2.70 | 0.0 | |
| 97 | STORAGE | 106.59 | 2.51 | 0.0 | |
| 98 | STORAGE | 106.67 | 2.39 | 0.0 | |
| CB1 | STORAGE | 106.66 | 3.04 | 0.0 | |

| | | | | |
|---|---|---|---|---|
| CB10 | STORAGE | 107.40 | 2.20 | 0.0 |
| CB2 | STORAGE | 107.15 | 2.20 | 0.0 |
| CB3 | STORAGE | 107.00 | 2.35 | 0.0 |
| CB4 | STORAGE | 107.25 | 2.20 | 0.0 |
| CB5 | STORAGE | 107.13 | 2.32 | 0.0 |
| CB6 | STORAGE | 107.30 | 2.20 | 0.0 |
| CB7 | STORAGE | 107.19 | 2.41 | 0.0 |
| CB8 | STORAGE | 107.41 | 2.01 | 0.0 |
| CB9 | STORAGE | 107.20 | 2.37 | 0.0 |
| CBMH222 | STORAGE | 106.01 | 2.56 | 0.0 |
| CBMH223 | STORAGE | 106.55 | 2.04 | 0.0 |
| CBMH224 | STORAGE | 106.83 | 2.66 | 0.0 |
| CBMH225 | STORAGE | 106.95 | 2.45 | 0.0 |
| LD1000 | STORAGE | 107.41 | 2.42 | 0.0 |
| LD1001 | STORAGE | 107.67 | 2.04 | 0.0 |
| LD1002 | STORAGE | 106.74 | 2.86 | 0.0 |
| LD1003 | STORAGE | 106.39 | 3.26 | 0.0 |
| MH201 | STORAGE | 105.75 | 2.99 | 0.0 |
| MH202 | STORAGE | 105.85 | 2.70 | 0.0 |
| MH203 | STORAGE | 106.03 | 2.74 | 0.0 |
| MH204 | STORAGE | 106.10 | 2.72 | 0.0 |
| MH205 | STORAGE | 106.27 | 2.63 | 0.0 |
| MH206 | STORAGE | 106.41 | 2.41 | 0.0 |
| MH207 | STORAGE | 106.48 | 2.36 | 0.0 |
| MH208 | STORAGE | 106.78 | 2.45 | 0.0 |
| MH209 | STORAGE | 106.59 | 2.51 | 0.0 |
| MH210A | STORAGE | 107.30 | 1.70 | 0.0 |
| MH210B | STORAGE | 107.17 | 2.08 | 0.0 |
| MH211 | STORAGE | 105.97 | 2.65 | 0.0 |
| MH212 | STORAGE | 106.28 | 2.44 | 0.0 |
| MH213 | STORAGE | 106.54 | 2.52 | 0.0 |
| MH214 | STORAGE | 106.62 | 2.35 | 0.0 |
| MH215 | STORAGE | 106.69 | 2.40 | 0.0 |
| MH216 | STORAGE | 106.95 | 2.12 | 0.0 |
| MH217 | STORAGE | 107.35 | 1.50 | 0.0 |
| MH218 | STORAGE | 107.00 | 1.93 | 0.0 |
| MH219 | STORAGE | 106.21 | 2.81 | 0.0 |
| MH220 | STORAGE | 106.18 | 2.72 | 0.0 |
| MH221 | STORAGE | 106.37 | 2.72 | 0.0 |
| ST1 | STORAGE | 106.67 | 0.99 | 0.0 |
| ST2 | STORAGE | 106.52 | 0.99 | 0.0 |
| ST3 | STORAGE | 106.28 | 0.99 | 0.0 |

**********
Link Summary
**********

| Name | From Node | To Node | Type | Length | % Slope | Roughness |
|---|---|---|---|---|---|---|
| C1 | CB4 | HP-A-05 | CONDUIT | 2.0 | - 15.1717 | 0.0130 |
| C10 | HP-A-04 | CB3 | CONDUIT | 2.0 | 17.7743 | 0.0130 |
| C11 | CB4 | HP-A-05-2 | CONDUIT | 2.0 | - 29.7331 | 0.0130 |

| | | | | | |
|---|---|---|---|---|---|
| C12 | HP-A-05-2 | CB2 | CONDUIT | 2.0 | |
| 35.5544 | 0.0130 | | | | |
| C13 | CB6 | HP-A-06-2 | CONDUIT | 2.0 | - |
| 15.1717 | 0.0130 | | | | |
| C14 | HP-A-06-2 | CB4 | CONDUIT | 2.0 | |
| 17.7743 | 0.0130 | | | | |
| C15 | LD1001 | CB8 | CONDUIT | 50.5 | |
| 0.5154 | 0.0350 | | | | |
| C16 | CB8 | CB9 | CONDUIT | 32.2 | |
| 0.6522 | 0.0350 | | | | |
| C17 | CB9 | CBMH225 | CONDUIT | 41.0 | |
| 0.6095 | 0.0350 | | | | |
| C18 | CBMH225 | CBMH224 | CONDUIT | 17.2 | |
| 0.6977 | 0.0350 | | | | |
| C19 | CBMH224 | CBMH223 | CONDUIT | 26.4 | |
| 1.0591 | 0.0350 | | | | |
| C2 | HP-A-05 | CB5 | CONDUIT | 2.0 | |
| 15.1717 | 0.0130 | | | | |
| C20 | CBMH223 | CBMH222 | CONDUIT | 32.3 | |
| 1.6721 | 0.0350 | | | | |
| C21 | LD1000 | CB1 | CONDUIT | 68.6 | |
| 1.0932 | 0.0350 | | | | |
| C3 | CB6 | HP-A-06 | CONDUIT | 2.0 | - |
| 14.1393 | 0.0130 | | | | |
| C4 | HP-A-06 | CB7 | CONDUIT | 2.0 | |
| 9.0367 | 0.0130 | | | | |
| C5 | CB7 | HP-A-07 | CONDUIT | 2.0 | - |
| 7.5212 | 0.0130 | | | | |
| C6 | HP-A-07 | CB5 | CONDUIT | 2.0 | |
| 15.1717 | 0.0130 | | | | |
| C7 | CB5 | HP-A-09 | CONDUIT | 2.0 | - |
| 14.1393 | 0.0130 | | | | |
| C8 | HP-A-09 | CB3 | CONDUIT | 2.0 | |
| 19.3525 | 0.0130 | | | | |
| C9 | CB2 | HP-A-04 | CONDUIT | 2.0 | - |
| 17.7743 | 0.0130 | | | | |
| STM-25 | MH212 | MH211 | CONDUIT | 39.7 | |
| 0.4026 | 0.0130 | | | | |
| STM-26 | MH211 | MH202 | CONDUIT | 14.7 | |
| 0.2725 | 0.0130 | | | | |
| STM-27 | MH202 | MH201 | CONDUIT | 30.7 | |
| 0.2932 | 0.0130 | | | | |
| STM-28 | MH201 | MH200 | CONDUIT | 12.9 | |
| 0.2322 | 0.0130 | | | | |
| STM-29 | CB2 | CB3 | CONDUIT | 24.0 | |
| 0.5000 | 0.0130 | | | | |
| STM-31 | CB4 | CB5 | CONDUIT | 22.9 | |
| 0.4810 | 0.0130 | | | | |
| STM-33 | CB6 | CB7 | CONDUIT | 15.6 | |
| 0.5128 | 0.0130 | | | | |
| STM-35 | MH206 | MH205 | CONDUIT | 15.2 | |
| 0.3934 | 0.0130 | | | | |
| STM-36 | MH205 | MH204 | CONDUIT | 30.3 | |
| 0.2966 | 0.0130 | | | | |
| STM-37 | MH204 | MH203 | CONDUIT | 24.2 | |
| 0.2480 | 0.0130 | | | | |
| STM-37_(1) | MH203 | MH202 | CONDUIT | 38.6 | |
| 0.2587 | 0.0130 | | | | |
| STM-39 | MH213 | MH212 | CONDUIT | 39.1 | |
| 0.5120 | 0.0130 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| STM-40 | | 98 | MH213 | CONDUIT | 8.9 |
| 0.8939 | 0.0130 | | | | |
| STM-41 | | 97 | MH206 | CONDUIT | 13.2 |
| 0.9827 | 0.0130 | | | | |
| STM-42 | | 96 | MH203 | CONDUIT | 9.2 |
| 0.9772 | 0.0130 | | | | |
| STM-44 | | MH218 | MH219 | CONDUIT | 35.7 |
| 0.5048 | 0.0130 | | | | |
| STM-45 | | MH221 | MH219 | CONDUIT | 20.6 |
| 0.4857 | 0.0130 | | | | |
| STM-46 | | MH219 | MH220 | CONDUIT | 3.6 |
| 0.5525 | 0.0130 | | | | |
| STM-48 | | MH217 | MH215 | CONDUIT | 50.9 |
| 0.4908 | 0.0130 | | | | |
| STM-49 | | MH215 | MH214 | CONDUIT | 4.9 |
| 0.4082 | 0.0130 | | | | |
| STM-50 | | MH216 | MH215 | CONDUIT | 39.5 |
| 0.5070 | 0.0130 | | | | |
| STM-53 | | ST3 | MH220 | CONDUIT | 3.8 |
| 1.0417 | 0.0130 | | | | |
| STM-54 | | ST1 | MH214 | CONDUIT | 3.5 |
| 1.1429 | 0.0130 | | | | |
| STM-55 | | MH208 | MH209 | CONDUIT | 26.7 |
| 0.4864 | 0.0130 | | | | |
| STM-56 | | MH210B | MH209 | CONDUIT | 28.8 |
| 0.4865 | 0.0130 | | | | |
| STM-57 | | MH209 | MH207 | CONDUIT | 8.7 |
| 0.4577 | 0.0130 | | | | |
| STM-60 | | ST2 | MH207 | CONDUIT | 2.7 |
| 1.1112 | 0.0130 | | | | |
| STM-70 | | LD1000 | CB1 | CONDUIT | 68.6 |
| 1.0057 | 0.0130 | | | | |
| STM-71 | | LD1001 | CB8 | CONDUIT | 50.5 |
| 0.4955 | 0.0130 | | | | |
| STM-72 | | CB8 | CB9 | CONDUIT | 32.2 |
| 0.5590 | 0.0130 | | | | |
| STM-74 | | CB9 | CBMH225 | CONDUIT | 41.0 |
| 0.5363 | 0.0130 | | | | |
| STM-77 | | CBMH224 | LD1002 | CONDUIT | 8.3 |
| 0.9674 | 0.0130 | | | | |
| STM-77_(1) | | LD1002 | CBMH223 | CONDUIT | 18.2 |
| 0.9907 | 0.0130 | | | | |
| STM-78 | | CBMH223 | LD1003 | CONDUIT | 15.3 |
| 0.9792 | 0.0130 | | | | |
| STM-78_(1) | | LD1003 | CBMH222 | CONDUIT | 17.0 |
| 1.0012 | 0.0130 | | | | |
| STM-79 | | CBMH225 | CBMH224 | CONDUIT | 17.2 |
| 0.5233 | 0.0130 | | | | |
| STM-83 | | MH210A | MH210B | CONDUIT | 13.5 |
| 0.5185 | 0.0130 | | | | |
| O-CB1 | | CB1 | MH212 | ORIFICE | |
| O-CB10 | | CB10 | MH202 | ORIFICE | |
| O-CB3 | | CB3 | MH211 | ORIFICE | |
| O-Cb5 | | CB5 | MH204 | ORIFICE | |
| O-CB7 | | CB7 | MH205 | ORIFICE | |
| O-CBMH222 | | CBMH222 | MH201 | ORIFICE | |
| O-MH206 | | MH207 | MH206 | OUTLET | |
| O-MH214 | | MH214 | MH213 | OUTLET | |
| O-MH220 | | MH220 | MH204 | OUTLET | |

**********
Cross Section Summary
**********

| Conduit | Shape | Full Depth | Full Area | Hyd. Rad. | Max. Width | No. of Barrels | Full Flow |
|---|---|---|---|---|---|---|---|
| C1 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 63947.17 |
| C10 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 69215.12 |
| C11 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 89521.02 |
| C12 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 97892.98 |
| C13 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 63947.17 |
| C14 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 69215.12 |
| C15 | RECT_CLOSED | 0.55 | 0.19 | 0.11 | 0.35 | 1 | 88.97 |
| C16 | RECT_CLOSED | 0.55 | 0.19 | 0.11 | 0.35 | 1 | 100.08 |
| C17 | RECT_CLOSED | 0.55 | 0.19 | 0.11 | 0.35 | 1 | 96.75 |
| C18 | RECT_CLOSED | 0.55 | 0.19 | 0.11 | 0.35 | 1 | 103.51 |
| C19 | RECT_CLOSED | 0.55 | 0.19 | 0.11 | 0.35 | 1 | 127.53 |
| C2 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 63947.17 |
| C20 | RECT_CLOSED | 0.55 | 0.19 | 0.11 | 0.35 | 1 | 160.25 |
| C21 | RECT_CLOSED | 0.55 | 0.19 | 0.11 | 0.35 | 1 | 129.57 |
| C3 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 61733.10 |
| C4 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 49352.50 |
| C5 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 45024.40 |
| C6 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 63947.17 |
| C7 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 61733.10 |
| C8 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 72222.70 |
| C9 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 69215.12 |
| STM-25 | CIRCULAR | 0.30 | 0.07 | 0.07 | 0.30 | 1 | 61.36 |
| STM-26 | CIRCULAR | 0.45 | 0.16 | 0.11 | 0.45 | 1 | 148.83 |
| STM-27 | CIRCULAR | 0.53 | 0.22 | 0.13 | 0.53 | 1 | 232.87 |
| STM-28 | CIRCULAR | 0.53 | 0.22 | 0.13 | 0.53 | 1 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| STM-29 | CIRCULAR | 0.30 | 0.07 | 0.07 | 0.30 | 1 |
| 68.38 | | | | | | |
| STM-31 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 41.25 | | | | | | |
| STM-33 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 42.59 | | | | | | |
| STM-35 | CIRCULAR | 0.30 | 0.07 | 0.07 | 0.30 | 1 |
| 60.66 | | | | | | |
| STM-36 | CIRCULAR | 0.38 | 0.11 | 0.09 | 0.38 | 1 |
| 95.50 | | | | | | |
| STM-37 | CIRCULAR | 0.45 | 0.16 | 0.11 | 0.45 | 1 |
| 142.00 | | | | | | |
| STM-37_(1) | CIRCULAR | 0.45 | 0.16 | 0.11 | 0.45 | 1 |
| 145.03 | | | | | | |
| STM-39 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 42.56 | | | | | | |
| STM-40 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 56.23 | | | | | | |
| STM-41 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 58.95 | | | | | | |
| STM-42 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 58.79 | | | | | | |
| STM-44 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 42.25 | | | | | | |
| STM-45 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 41.45 | | | | | | |
| STM-46 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 44.20 | | | | | | |
| STM-48 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 41.66 | | | | | | |
| STM-49 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 37.99 | | | | | | |
| STM-50 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 42.34 | | | | | | |
| STM-53 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 60.70 | | | | | | |
| STM-54 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 63.58 | | | | | | |
| STM-55 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 41.47 | | | | | | |
| STM-56 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 41.48 | | | | | | |
| STM-57 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 40.23 | | | | | | |
| STM-60 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 62.69 | | | | | | |
| STM-70 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 59.64 | | | | | | |
| STM-71 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 41.86 | | | | | | |
| STM-72 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 44.46 | | | | | | |
| STM-74 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 43.55 | | | | | | |
| STM-77 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 58.49 | | | | | | |
| STM-77_(1) | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 59.19 | | | | | | |
| STM-78 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 58.85 | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| STM-78_(1) | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 59.51 | | | | | | |
| STM-79 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 43.02 | | | | | | |
| STM-83 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 42.82 | | | | | | |

**********
Analysis Options
**********
Flow Units ..... LPS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... YES
  Water Quality ..... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date ..... 04/17/2026 00:00:00
Ending Date ..... 04/19/2026 00:00:00
Antecedent Dry Days ..... 0.0
Report Time Step ..... 00:01:00
Wet Time Step ..... 00:01:00
Dry Time Step ..... 00:01:00
Routing Time Step ..... 1.00 sec
Variable Time Step ..... YES
Maximum Trials ..... 8
Number of Threads ..... 16
Head Tolerance ..... 0.001500 m

| ********** | Volume | Depth |
|---|---|---|
| Runoff Quantity Continuity | hectare-m | mm |
| ********** | --------- | ------- |
| Total Precipitation ..... | 0.078 | 49.037 |
| Evaporation Loss ..... | 0.000 | 0.000 |
| Infiltration Loss ..... | 0.014 | 8.989 |
| Surface Runoff ..... | 0.063 | 39.370 |
| Final Storage ..... | 0.001 | 0.735 |
| Continuity Error (%) ..... | -0.115 | |

| ********** | Volume | Volume |
|---|---|---|
| Flow Routing Continuity | hectare-m | 10^6 ltr |
| ********** | --------- | --------- |
| Dry Weather Inflow ..... | 0.000 | 0.000 |
| Wet Weather Inflow ..... | 0.063 | 0.627 |
| Groundwater Inflow ..... | 0.000 | 0.000 |
| RDII Inflow ..... | 0.000 | 0.000 |
| External Inflow ..... | 0.000 | 0.000 |
| External Outflow ..... | 0.063 | 0.627 |
| Flooding Loss ..... | 0.000 | 0.000 |

```
  Evaporation Loss .........          0.000          0.000
  Exfiltration Loss ........          0.000          0.000
  Initial Stored Volume ....          0.000          0.000
  Final Stored Volume ......          0.000          0.000
  Continuity Error (%) .....         -0.051


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


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


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


  ************************
  Routing Time Step Summary
  ************************
  Minimum Time Step           :     0.50 sec
  Average Time Step           :     1.00 sec
  Maximum Time Step           :     1.00 sec
  % of Time in Steady State   :     0.00
  Average Iterations per Step :     2.00
  % of Steps Not Converging   :     0.00
  Time Step Frequencies       :
      1.000 -  0.871 sec      :    99.68 %
      0.871 -  0.758 sec      :     0.13 %
      0.758 -  0.660 sec      :     0.07 %
      0.660 -  0.574 sec      :     0.05 %
      0.574 -  0.500 sec      :     0.08 %


  ***************************
  Subcatchment Runoff Summary
  ***************************

  ------------------------------------------------------------------------------------
-----------------------------------------
                            Total      Total      Total      Total     Imperv
Perv      Total       Total     Peak  Runoff
                         Precip      Runon       Evap      Infil     Runoff
Runoff     Runoff      Runoff   Runoff   Coeff
  Subcatchment                mm         mm         mm         mm         mm
mm         mm    10^6 ltr      LPS
  ------------------------------------------------------------------------------------
-----------------------------------------
  A-01                      49.04       0.00       0.00      39.08       2.85
7.06       9.91        0.01    10.69   0.202
```

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A-02 | | | 49.04 | 0.00 | 0.00 | 0.00 | 47.53 |
| 0.00 | 47.53 | 0.01 | 6.08 | 0.969 | | | |
| A-03 | | | 49.04 | 0.00 | 0.00 | 2.46 | 44.68 |
| 0.49 | 45.16 | 0.01 | 7.11 | 0.921 | | | |
| A-04 | | | 49.04 | 0.00 | 0.00 | 5.38 | 41.34 |
| 1.00 | 42.35 | 0.06 | 40.91 | 0.864 | | | |
| A-05 | | | 49.04 | 0.00 | 0.00 | 4.13 | 42.77 |
| 0.78 | 43.55 | 0.05 | 33.36 | 0.888 | | | |
| A-06 | | | 49.04 | 0.00 | 0.00 | 3.71 | 43.25 |
| 0.71 | 43.95 | 0.04 | 27.87 | 0.896 | | | |
| A-07 | | | 49.04 | 0.00 | 0.00 | 40.14 | 1.90 |
| 6.97 | 8.87 | 0.01 | 17.35 | 0.181 | | | |
| A-08 | | | 49.04 | 0.00 | 0.00 | 4.55 | 42.29 |
| 0.85 | 43.13 | 0.06 | 40.87 | 0.880 | | | |
| A-09 | | | 49.04 | 0.00 | 0.00 | 4.13 | 42.77 |
| 0.78 | 43.55 | 0.06 | 36.41 | 0.888 | | | |
| A-10 | | | 49.04 | 0.00 | 0.00 | 5.78 | 40.87 |
| 1.09 | 41.96 | 0.03 | 22.65 | 0.856 | | | |
| A-12 | | | 49.04 | 0.00 | 0.00 | 32.32 | 10.93 |
| 5.46 | 16.38 | 0.01 | 5.31 | 0.334 | | | |
| A-13 | | | 49.04 | 0.00 | 0.00 | 4.12 | 42.77 |
| 0.79 | 43.56 | 0.02 | 10.10 | 0.888 | | | |
| A-14 | | | 49.04 | 0.00 | 0.00 | 38.86 | 3.32 |
| 6.78 | 10.10 | 0.00 | 5.49 | 0.206 | | | |
| A-15 | | | 49.04 | 0.00 | 0.00 | 39.93 | 1.43 |
| 7.73 | 9.16 | 0.00 | 3.96 | 0.187 | | | |
| A-16 | | | 49.04 | 0.00 | 0.00 | 30.35 | 12.37 |
| 6.07 | 18.44 | 0.00 | 1.38 | 0.376 | | | |
| A-17 | | | 49.04 | 0.00 | 0.00 | 34.11 | 8.08 |
| 6.69 | 14.78 | 0.00 | 1.55 | 0.301 | | | |
| D-01 | | | 49.04 | 0.00 | 0.00 | 25.21 | 18.52 |
| 4.74 | 23.26 | 0.00 | 1.39 | 0.474 | | | |
| R-01 | | | 49.04 | 0.00 | 0.00 | 0.00 | 49.10 |
| 0.00 | 49.10 | 0.04 | 26.05 | 1.001 | | | |
| R-02 | | | 49.04 | 0.00 | 0.00 | 0.00 | 49.10 |
| 0.00 | 49.10 | 0.02 | 14.47 | 1.001 | | | |
| R-03 | | | 49.04 | 0.00 | 0.00 | 0.00 | 49.10 |
| 0.00 | 49.10 | 0.02 | 11.29 | 1.001 | | | |
| R-04 | | | 49.04 | 0.00 | 0.00 | 0.00 | 49.10 |
| 0.00 | 49.10 | 0.02 | 8.97 | 1.001 | | | |
| R-05 | | | 49.04 | 0.00 | 0.00 | 0.00 | 49.10 |
| 0.00 | 49.10 | 0.03 | 20.26 | 1.001 | | | |
| R-06 | | | 49.04 | 0.00 | 0.00 | 0.00 | 49.10 |
| 0.00 | 49.10 | 0.03 | 16.50 | 1.001 | | | |
| R-07 | | | 49.04 | 0.00 | 0.00 | 0.00 | 49.10 |
| 0.00 | 49.10 | 0.02 | 8.97 | 1.001 | | | |
| R-08 | | | 49.04 | 0.00 | 0.00 | 0.00 | 49.10 |
| 0.00 | 49.10 | 0.01 | 5.50 | 1.001 | | | |
| R-09 | | | 49.04 | 0.00 | 0.00 | 0.00 | 49.10 |
| 0.00 | 49.10 | 0.02 | 11.87 | 1.001 | | | |
| R-10 | | | 49.04 | 0.00 | 0.00 | 0.00 | 49.10 |
| 0.00 | 49.10 | 0.01 | 4.92 | 1.001 | | | |
| R-11 | | | 49.04 | 0.00 | 0.00 | 0.00 | 49.10 |
| 0.00 | 49.10 | 0.01 | 4.92 | 1.001 | | | |
| R-12 | | | 49.04 | 0.00 | 0.00 | 0.00 | 49.10 |
| 0.00 | 49.10 | 0.00 | 2.89 | 1.001 | | | |
| R-13 | | | 49.04 | 0.00 | 0.00 | 0.00 | 49.10 |
| 0.00 | 49.10 | 0.01 | 6.66 | 1.001 | | | |
| R-14 | | | 49.04 | 0.00 | 0.00 | 0.00 | 49.10 |
| 0.00 | 49.10 | 0.00 | 2.32 | 1.001 | | | |

**********
Node Depth Summary
**********

| Node | Type | Average Depth Meters | Maximum Depth Meters | Maximum HGL Meters | Time of Max Occurrence days hr:min | Reported Max Depth Meters |
|---|---|---|---|---|---|---|
| HP-A-04 | JUNCTION | 0.00 | 0.00 | 108.70 | 0 00:00 | 0.00 |
| HP-A-05 | JUNCTION | 0.00 | 0.00 | 108.75 | 0 00:00 | 0.00 |
| HP-A-05-2 | JUNCTION | 0.00 | 0.00 | 109.02 | 0 00:00 | 0.00 |
| HP-A-06 | JUNCTION | 0.00 | 0.00 | 108.78 | 0 00:00 | 0.00 |
| HP-A-06-2 | JUNCTION | 0.00 | 0.00 | 108.80 | 0 00:00 | 0.00 |
| HP-A-07 | JUNCTION | 0.00 | 0.00 | 108.75 | 0 00:00 | 0.00 |
| HP-A-09 | JUNCTION | 0.00 | 0.00 | 108.73 | 0 00:00 | 0.00 |
| MH200 | OUTFALL | 0.02 | 0.53 | 106.25 | 0 02:07 | 0.52 |
| OF1 | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| 96 | STORAGE | 0.00 | 0.18 | 106.50 | 0 02:12 | 0.18 |
| 97 | STORAGE | 0.00 | 0.06 | 106.65 | 0 02:09 | 0.06 |
| 98 | STORAGE | 0.00 | 0.06 | 106.73 | 0 02:10 | 0.06 |
| CB1 | STORAGE | 0.01 | 0.82 | 107.48 | 0 02:12 | 0.82 |
| CB10 | STORAGE | 0.00 | 0.15 | 107.55 | 0 02:10 | 0.15 |
| CB2 | STORAGE | 0.01 | 1.32 | 108.47 | 0 02:10 | 1.32 |
| CB3 | STORAGE | 0.01 | 1.44 | 108.44 | 0 02:10 | 1.44 |
| CB4 | STORAGE | 0.01 | 1.30 | 108.55 | 0 02:10 | 1.29 |
| CB5 | STORAGE | 0.01 | 1.38 | 108.51 | 0 02:10 | 1.37 |
| CB6 | STORAGE | 0.01 | 1.31 | 108.61 | 0 02:10 | 1.31 |
| CB7 | STORAGE | 0.01 | 1.40 | 108.59 | 0 02:10 | 1.40 |
| CB8 | STORAGE | 0.00 | 0.12 | 107.53 | 0 02:10 | 0.11 |
| CB9 | STORAGE | 0.00 | 0.14 | 107.34 | 0 02:10 | 0.14 |
| CBMH222 | STORAGE | 0.02 | 1.25 | 107.26 | 0 02:17 | 1.25 |
| CBMH223 | STORAGE | 0.01 | 0.71 | 107.26 | 0 02:18 | 0.71 |
| CBMH224 | STORAGE | 0.01 | 0.43 | 107.26 | 0 02:18 | 0.43 |
| CBMH225 | STORAGE | 0.00 | 0.32 | 107.27 | 0 02:18 | 0.32 |
| LD1000 | STORAGE | 0.00 | 0.10 | 107.51 | 0 02:10 | 0.10 |
| LD1001 | STORAGE | 0.00 | 0.13 | 107.80 | 0 02:10 | 0.13 |
| LD1002 | STORAGE | 0.01 | 0.52 | 107.26 | 0 02:18 | 0.52 |
| LD1003 | STORAGE | 0.01 | 0.87 | 107.26 | 0 02:17 | 0.87 |
| MH201 | STORAGE | 0.02 | 0.60 | 106.35 | 0 02:10 | 0.60 |
| MH202 | STORAGE | 0.01 | 0.56 | 106.41 | 0 02:12 | 0.56 |
| MH203 | STORAGE | 0.01 | 0.47 | 106.50 | 0 02:12 | 0.47 |
| MH204 | STORAGE | 0.01 | 0.43 | 106.53 | 0 02:12 | 0.43 |
| MH205 | STORAGE | 0.01 | 0.28 | 106.55 | 0 02:12 | 0.28 |
| MH206 | STORAGE | 0.01 | 0.14 | 106.55 | 0 02:13 | 0.14 |
| MH207 | STORAGE | 0.01 | 0.51 | 106.99 | 0 02:20 | 0.51 |
| MH208 | STORAGE | 0.00 | 0.21 | 106.99 | 0 02:20 | 0.21 |
| MH209 | STORAGE | 0.01 | 0.40 | 106.99 | 0 02:20 | 0.40 |
| MH210A | STORAGE | 0.00 | 0.13 | 107.43 | 0 02:10 | 0.13 |
| MH210B | STORAGE | 0.00 | 0.12 | 107.29 | 0 02:10 | 0.12 |
| MH211 | STORAGE | 0.01 | 0.45 | 106.42 | 0 02:12 | 0.45 |
| MH212 | STORAGE | 0.01 | 0.16 | 106.44 | 0 02:11 | 0.16 |
| MH213 | STORAGE | 0.01 | 0.10 | 106.64 | 0 02:10 | 0.10 |
| MH214 | STORAGE | 0.01 | 0.50 | 107.12 | 0 02:20 | 0.50 |
| MH215 | STORAGE | 0.01 | 0.44 | 107.13 | 0 02:20 | 0.43 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| MH216 | STORAGE | 0.00 | 0.18 | 107.13 | 0 | 02:20 | 0.18 |
| MH217 | STORAGE | 0.00 | 0.11 | 107.46 | 0 | 02:10 | 0.11 |
| MH218 | STORAGE | 0.00 | 0.09 | 107.09 | 0 | 02:10 | 0.09 |
| MH219 | STORAGE | 0.01 | 0.39 | 106.60 | 0 | 02:13 | 0.39 |
| MH220 | STORAGE | 0.01 | 0.42 | 106.60 | 0 | 02:13 | 0.42 |
| MH221 | STORAGE | 0.00 | 0.23 | 106.60 | 0 | 02:13 | 0.23 |
| ST1 | STORAGE | 0.01 | 0.45 | 107.12 | 0 | 02:20 | 0.45 |
| ST2 | STORAGE | 0.01 | 0.47 | 106.99 | 0 | 02:20 | 0.47 |
| ST3 | STORAGE | 0.01 | 0.32 | 106.60 | 0 | 02:13 | 0.32 |

**********
Node Inflow Summary
**********

| Node | Type | Maximum Lateral Inflow LPS | Maximum Total Inflow LPS | Time of Max Occurrence days hr:min | | Lateral Inflow Volume 10^6 ltr | Total Inflow Volume 10^6 ltr | Flow Balance Error Percent |
|---|---|---|---|---|---|---|---|---|
| HP-A-04 | JUNCTION | 0.00 | 0.00 | 0 | 00:00 | 0 | 0 | 0.000 ltr |
| HP-A-05 | JUNCTION | 0.00 | 0.00 | 0 | 00:00 | 0 | 0 | 0.000 ltr |
| HP-A-05-2 | JUNCTION | 0.00 | 0.00 | 0 | 00:00 | 0 | 0 | 0.000 ltr |
| HP-A-06 | JUNCTION | 0.00 | 0.00 | 0 | 00:00 | 0 | 0 | 0.000 ltr |
| HP-A-06-2 | JUNCTION | 0.00 | 0.00 | 0 | 00:00 | 0 | 0 | 0.000 ltr |
| HP-A-07 | JUNCTION | 0.00 | 0.00 | 0 | 00:00 | 0 | 0 | 0.000 ltr |
| HP-A-09 | JUNCTION | 0.00 | 0.00 | 0 | 00:00 | 0 | 0 | 0.000 ltr |
| MH200 | OUTFALL | 0.00 | 217.01 | 0 | 02:13 | 0 | 0.626 | 0.000 |
| OF1 | OUTFALL | 1.39 | 1.39 | 0 | 02:10 | 0.0014 | 0.0014 | 0.000 |
| 96 | STORAGE | 10.10 | 10.10 | 0 | 02:10 | 0.0157 | 0.0157 | 0.128 |
| 97 | STORAGE | 7.11 | 7.11 | 0 | 02:10 | 0.0113 | 0.0113 | 0.439 |
| 98 | STORAGE | 6.08 | 6.08 | 0 | 02:10 | 0.00998 | 0.00998 | 0.073 |
| CB1 | STORAGE | 0.00 | 36.04 | 0 | 02:10 | 0 | 0.0502 | -0.380 |
| CB10 | STORAGE | 5.31 | 5.31 | 0 | 02:10 | 0.00524 | 0.00524 | 0.001 |
| CB2 | STORAGE | 40.91 | 40.91 | 0 | 02:10 | 0.0627 | 0.0627 | 0.021 |
| CB3 | STORAGE | 40.87 | 68.84 | 0 | 02:10 | 0.0634 | 0.126 | -0.004 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| CB4 | STORAGE | 33.36 | 33.36 | 0 | 02:10 | 0.0518 | |
| 0.0518 | 0.008 | | | | | | |
| CB5 | STORAGE | 36.41 | 60.93 | 0 | 02:10 | 0.0566 | |
| 0.108 | 0.003 | | | | | | |
| CB6 | STORAGE | 27.87 | 27.87 | 0 | 02:10 | 0.0435 | |
| 0.0435 | 0.016 | | | | | | |
| CB7 | STORAGE | 22.65 | 42.00 | 0 | 02:03 | 0.0344 | |
| 0.0779 | 0.000 | | | | | | |
| CB8 | STORAGE | 0.00 | 35.81 | 0 | 02:10 | 0 | |
| 0.0445 | -0.342 | | | | | | |
| CB9 | STORAGE | 12.93 | 45.84 | 0 | 02:10 | 0.017 | |
| 0.0616 | 0.741 | | | | | | |
| CBMH222 | STORAGE | 0.00 | 38.02 | 0 | 02:04 | 0 | |
| 0.105 | -0.091 | | | | | | |
| CBMH223 | STORAGE | 0.00 | 48.11 | 0 | 02:06 | 0 | |
| 0.0905 | -0.199 | | | | | | |
| CBMH224 | STORAGE | 0.00 | 47.17 | 0 | 02:08 | 0 | |
| 0.0742 | -0.268 | | | | | | |
| CBMH225 | STORAGE | 10.99 | 54.82 | 0 | 02:10 | 0.0129 | |
| 0.074 | -0.327 | | | | | | |
| LD1000 | STORAGE | 36.73 | 36.73 | 0 | 02:10 | 0.0502 | |
| 0.0502 | 0.097 | | | | | | |
| LD1001 | STORAGE | 37.61 | 37.61 | 0 | 02:10 | 0.0447 | |
| 0.0447 | 0.421 | | | | | | |
| LD1002 | STORAGE | 10.52 | 33.23 | 0 | 02:07 | 0.0163 | |
| 0.042 | 0.380 | | | | | | |
| LD1003 | STORAGE | 9.19 | 24.82 | 0 | 02:04 | 0.0144 | |
| 0.0417 | 0.171 | | | | | | |
| MH201 | STORAGE | 0.00 | 217.02 | 0 | 02:12 | 0 | |
| 0.626 | 0.016 | | | | | | |
| MH202 | STORAGE | 0.00 | 195.59 | 0 | 02:09 | 0 | |
| 0.52 | -0.130 | | | | | | |
| MH203 | STORAGE | 0.00 | 118.69 | 0 | 02:08 | 0 | |
| 0.285 | 0.105 | | | | | | |
| MH204 | STORAGE | 0.00 | 111.51 | 0 | 02:08 | 0 | |
| 0.269 | 0.023 | | | | | | |
| MH205 | STORAGE | 0.00 | 52.25 | 0 | 02:09 | 0 | |
| 0.132 | -0.008 | | | | | | |
| MH206 | STORAGE | 0.00 | 13.44 | 0 | 02:10 | 0 | |
| 0.0544 | -0.091 | | | | | | |
| MH207 | STORAGE | 0.00 | 24.64 | 0 | 02:04 | 0 | |
| 0.055 | -0.195 | | | | | | |
| MH208 | STORAGE | 8.97 | 8.97 | 0 | 02:10 | 0.0152 | |
| 0.0152 | 0.752 | | | | | | |
| MH209 | STORAGE | 0.00 | 25.47 | 0 | 02:07 | 0 | |
| 0.0431 | 0.095 | | | | | | |
| MH210A | STORAGE | 16.50 | 16.50 | 0 | 02:10 | 0.028 | |
| 0.028 | -0.004 | | | | | | |
| MH210B | STORAGE | 0.00 | 16.50 | 0 | 02:10 | 0 | |
| 0.028 | -0.005 | | | | | | |
| MH211 | STORAGE | 0.00 | 80.54 | 0 | 02:09 | 0 | |
| 0.23 | 0.049 | | | | | | |
| MH212 | STORAGE | 0.00 | 24.54 | 0 | 02:10 | 0 | |
| 0.104 | -0.192 | | | | | | |
| MH213 | STORAGE | 0.00 | 12.38 | 0 | 02:10 | 0 | |
| 0.0537 | 0.127 | | | | | | |
| MH214 | STORAGE | 0.00 | 23.68 | 0 | 02:04 | 0 | |
| 0.0551 | -0.075 | | | | | | |
| MH215 | STORAGE | 0.00 | 25.75 | 0 | 02:08 | 0 | |
| 0.0435 | -0.305 | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| MH216 | STORAGE | 11.29 | 11.29 | 0 | 02:10 | 0.0191 | 0.0191 |
| 0.819 | | | | | | | |
| MH217 | STORAGE | 14.47 | 14.47 | 0 | 02:10 | 0.0246 | 0.0246 |
| -0.011 | | | | | | | |
| MH218 | STORAGE | 11.87 | 11.87 | 0 | 02:10 | 0.0201 | 0.0201 |
| -0.010 | | | | | | | |
| MH219 | STORAGE | 0.00 | 16.77 | 0 | 02:04 | 0 | 0.0285 |
| -0.024 | | | | | | | |
| MH220 | STORAGE | 0.00 | 15.66 | 0 | 02:03 | 0 | 0.034 |
| -0.009 | | | | | | | |
| MH221 | STORAGE | 4.92 | 4.92 | 0 | 02:10 | 0.00835 | 0.00835 |
| 0.075 | | | | | | | |
| ST1 | STORAGE | 0.00 | 18.32 | 0 | 02:03 | 0 | 0.0115 |
| 0.060 | | | | | | | |
| ST2 | STORAGE | 0.00 | 19.43 | 0 | 02:03 | 0 | 0.0119 |
| 0.028 | | | | | | | |
| ST3 | STORAGE | 0.00 | 11.31 | 0 | 02:03 | 0 | 0.00551 |
| 0.082 | | | | | | | |

**********
Node Surcharge Summary
**********

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

| Node | Type | Hours Surcharged | Max. Height Above Crown Meters | Min. Depth Below Rim Meters |
|---|---|---|---|---|
| ST1 | STORAGE | 0.88 | 0.203 | 0.537 |
| ST2 | STORAGE | 0.90 | 0.216 | 0.524 |

**********
Node Flooding Summary
**********

No nodes were flooded.

**********
Storage Volume Summary
**********

| Storage Unit | Average Volume 1000 m³ | Avg Pcnt Full | Evap Pcnt Loss | Exfil Pcnt Loss | Maximum Volume 1000 m³ | Max Pcnt Full | Time of Max Occurrence days hr:min | Maximum Outflow LPS |
|---|---|---|---|---|---|---|---|---|
| 96 | 0.000 | 0.0 | 0.0 | 0.0 | 0.000 | 0.0 | 0 00:00 | 9.97 |
| 97 | 0.000 | 0.0 | 0.0 | 0.0 | 0.000 | 0.0 | 0 00:00 | 7.15 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 98 | | 0.000 | 0.0 | 0.0 | 0.0 | 0.000 | 0.0 | 0 |
| 00:00 | 6.08 | | | | | | | |
| CB1 | | 0.000 | 0.5 | 0.0 | 0.0 | 0.000 | 26.9 | 0 |
| 02:12 | 12.89 | | | | | | | |
| CB10 | | 0.000 | 0.0 | 0.0 | 0.0 | 0.000 | 0.0 | 0 |
| 02:10 | 4.89 | | | | | | | |
| CB2 | | 0.000 | 0.0 | 0.0 | 0.0 | 0.005 | 0.5 | 0 |
| 02:10 | 41.99 | | | | | | | |
| CB3 | | 0.000 | 0.0 | 0.0 | 0.0 | 0.004 | 0.2 | 0 |
| 02:10 | 57.33 | | | | | | | |
| CB4 | | 0.000 | 0.0 | 0.0 | 0.0 | 0.003 | 0.3 | 0 |
| 02:10 | 41.72 | | | | | | | |
| CB5 | | 0.000 | 0.0 | 0.0 | 0.0 | 0.001 | 0.1 | 0 |
| 02:10 | 55.91 | | | | | | | |
| CB6 | | 0.000 | 0.0 | 0.0 | 0.0 | 0.003 | 0.6 | 0 |
| 02:10 | 30.43 | | | | | | | |
| CB7 | | 0.000 | 0.0 | 0.0 | 0.0 | 0.001 | 0.1 | 0 |
| 02:10 | 39.64 | | | | | | | |
| CB8 | | 0.000 | 0.1 | 0.0 | 0.0 | 0.000 | 5.7 | 0 |
| 02:10 | 34.48 | | | | | | | |
| CB9 | | 0.000 | 0.1 | 0.0 | 0.0 | 0.000 | 5.8 | 0 |
| 02:10 | 44.79 | | | | | | | |
| CBMH222 | | 0.000 | 0.9 | 0.0 | 0.0 | 0.001 | 48.6 | 0 |
| 02:17 | 26.26 | | | | | | | |
| CBMH223 | | 0.000 | 0.5 | 0.0 | 0.0 | 0.001 | 34.8 | 0 |
| 02:18 | 33.84 | | | | | | | |
| CBMH224 | | 0.000 | 0.2 | 0.0 | 0.0 | 0.000 | 16.3 | 0 |
| 02:18 | 41.67 | | | | | | | |
| CBMH225 | | 0.000 | 0.2 | 0.0 | 0.0 | 0.000 | 12.9 | 0 |
| 02:18 | 47.17 | | | | | | | |
| LD1000 | | 0.000 | 0.1 | 0.0 | 0.0 | 0.000 | 4.1 | 0 |
| 02:10 | 36.04 | | | | | | | |
| LD1001 | | 0.000 | 0.1 | 0.0 | 0.0 | 0.000 | 6.2 | 0 |
| 02:10 | 35.81 | | | | | | | |
| LD1002 | | 0.000 | 0.3 | 0.0 | 0.0 | 0.000 | 18.3 | 0 |
| 02:18 | 30.43 | | | | | | | |
| LD1003 | | 0.000 | 0.4 | 0.0 | 0.0 | 0.000 | 26.7 | 0 |
| 02:17 | 20.52 | | | | | | | |
| MH201 | | 0.000 | 0.6 | 0.0 | 0.0 | 0.001 | 20.2 | 0 |
| 02:10 | 217.01 | | | | | | | |
| MH202 | | 0.000 | 0.5 | 0.0 | 0.0 | 0.001 | 20.7 | 0 |
| 02:12 | 193.98 | | | | | | | |
| MH203 | | 0.000 | 0.4 | 0.0 | 0.0 | 0.001 | 17.2 | 0 |
| 02:12 | 115.89 | | | | | | | |
| MH204 | | 0.000 | 0.4 | 0.0 | 0.0 | 0.001 | 15.8 | 0 |
| 02:12 | 109.00 | | | | | | | |
| MH205 | | 0.000 | 0.3 | 0.0 | 0.0 | 0.000 | 10.7 | 0 |
| 02:12 | 51.00 | | | | | | | |
| MH206 | | 0.000 | 0.2 | 0.0 | 0.0 | 0.000 | 6.0 | 0 |
| 02:13 | 12.77 | | | | | | | |
| MH207 | | 0.000 | 0.6 | 0.0 | 0.0 | 0.001 | 21.4 | 0 |
| 02:20 | 23.51 | | | | | | | |
| MH208 | | 0.000 | 0.2 | 0.0 | 0.0 | 0.000 | 8.5 | 0 |
| 02:20 | 9.31 | | | | | | | |
| MH209 | | 0.000 | 0.4 | 0.0 | 0.0 | 0.000 | 15.9 | 0 |
| 02:20 | 24.64 | | | | | | | |
| MH210A | | 0.000 | 0.2 | 0.0 | 0.0 | 0.000 | 7.5 | 0 |
| 02:10 | 16.50 | | | | | | | |
| MH210B | | 0.000 | 0.2 | 0.0 | 0.0 | 0.000 | 5.9 | 0 |
| 02:10 | 16.50 | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| MH211 | | 0.000 | 0.4 | 0.0 | 0.0 | 0.001 | 17.1 | 0 |
| 02:12 | 86.48 | | | | | | | |
| MH212 | | 0.000 | 0.3 | 0.0 | 0.0 | 0.000 | 6.7 | 0 |
| 02:11 | 25.05 | | | | | | | |
| MH213 | | 0.000 | 0.2 | 0.0 | 0.0 | 0.000 | 3.9 | 0 |
| 02:10 | 12.16 | | | | | | | |
| MH214 | | 0.000 | 0.6 | 0.0 | 0.0 | 0.001 | 21.4 | 0 |
| 02:20 | 22.51 | | | | | | | |
| MH215 | | 0.000 | 0.5 | 0.0 | 0.0 | 0.000 | 18.1 | 0 |
| 02:20 | 23.68 | | | | | | | |
| MH216 | | 0.000 | 0.2 | 0.0 | 0.0 | 0.000 | 8.3 | 0 |
| 02:20 | 11.47 | | | | | | | |
| MH217 | | 0.000 | 0.3 | 0.0 | 0.0 | 0.000 | 7.2 | 0 |
| 02:10 | 14.47 | | | | | | | |
| MH218 | | 0.000 | 0.2 | 0.0 | 0.0 | 0.000 | 4.7 | 0 |
| 02:10 | 11.87 | | | | | | | |
| MH219 | | 0.000 | 0.3 | 0.0 | 0.0 | 0.000 | 13.9 | 0 |
| 02:13 | 15.66 | | | | | | | |
| MH220 | | 0.000 | 0.3 | 0.0 | 0.0 | 0.000 | 15.4 | 0 |
| 02:13 | 15.15 | | | | | | | |
| MH221 | | 0.000 | 0.2 | 0.0 | 0.0 | 0.000 | 8.5 | 0 |
| 02:13 | 4.92 | | | | | | | |
| ST1 | | 0.000 | 1.1 | 0.0 | 0.0 | 0.011 | 46.0 | 0 |
| 02:20 | 2.71 | | | | | | | |
| ST2 | | 0.000 | 1.1 | 0.0 | 0.0 | 0.012 | 47.3 | 0 |
| 02:20 | 6.00 | | | | | | | |
| ST3 | | 0.000 | 0.5 | 0.0 | 0.0 | 0.005 | 32.4 | 0 |
| 02:13 | 2.02 | | | | | | | |

**********
Outfall Loading Summary
**********

| Outfall Node | Flow Freq Pcnt | Avg Flow LPS | Max Flow LPS | Total Volume 10^6 ltr |
|---|---|---|---|---|
| MH200 | 17.76 | 20.93 | 217.01 | 0.626 |
| OF1 | 4.29 | 0.17 | 1.39 | 0.001 |
| System | 11.03 | 21.10 | 217.42 | 0.627 |

**********
Link Flow Summary
**********

| Link | Type | Maximum \|Flow\| LPS | Time of Max Occurrence days hr:min | Maximum \|Veloc\| m/sec | Max/ Full Flow | Max/ Full Depth |
|---|---|---|---|---|---|---|
| C1 | CONDUIT | 0.00 | 0 00:00 | 0.00 | 0.00 | 0.05 |
| C10 | CONDUIT | 0.00 | 0 00:00 | 0.00 | 0.00 | 0.05 |
| C11 | CONDUIT | 0.00 | 0 00:00 | 0.00 | 0.00 | 0.05 |
| C12 | CONDUIT | 0.00 | 0 00:00 | 0.00 | 0.00 | 0.06 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| C13 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.06 |
| C14 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.05 |
| C15 | CONDUIT | 15.11 | 0 | 02:10 | 0.36 | 0.17 | 0.22 |
| C16 | CONDUIT | 15.73 | 0 | 02:10 | 0.36 | 0.16 | 0.23 |
| C17 | CONDUIT | 19.37 | 0 | 02:10 | 0.37 | 0.20 | 0.36 |
| C18 | CONDUIT | 21.13 | 0 | 02:08 | 0.44 | 0.20 | 0.68 |
| C19 | CONDUIT | 24.01 | 0 | 02:09 | 0.43 | 0.19 | 0.89 |
| C2 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.03 |
| C20 | CONDUIT | 20.40 | 0 | 02:09 | 0.16 | 0.13 | 1.00 |
| C21 | CONDUIT | 16.38 | 0 | 02:10 | 0.24 | 0.13 | 0.59 |
| C3 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.06 |
| C4 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.00 |
| C5 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.00 |
| C6 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.03 |
| C7 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.03 |
| C8 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.05 |
| C9 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.06 |
| STM-25 | CONDUIT | 25.05 | 0 | 02:17 | 0.82 | 0.41 | 0.77 |
| STM-26 | CONDUIT | 86.48 | 0 | 02:16 | 0.86 | 0.58 | 1.00 |
| STM-27 | CONDUIT | 193.98 | 0 | 02:12 | 0.91 | 0.83 | 1.00 |
| STM-28 | CONDUIT | 217.01 | 0 | 02:13 | 1.03 | 1.05 | 1.00 |
| STM-29 | CONDUIT | 41.99 | 0 | 02:16 | 0.59 | 0.61 | 1.00 |
| STM-31 | CONDUIT | 41.72 | 0 | 02:13 | 0.85 | 1.01 | 1.00 |
| STM-33 | CONDUIT | 30.43 | 0 | 02:12 | 0.62 | 0.71 | 1.00 |
| STM-35 | CONDUIT | 12.77 | 0 | 02:08 | 0.64 | 0.21 | 0.58 |
| STM-36 | CONDUIT | 51.00 | 0 | 02:08 | 0.79 | 0.53 | 0.84 |
| STM-37 | CONDUIT | 109.00 | 0 | 02:08 | 0.88 | 0.77 | 0.98 |
| STM-37_(1) | CONDUIT | 115.89 | 0 | 02:07 | 0.89 | 0.80 | 1.00 |
| STM-39 | CONDUIT | 12.16 | 0 | 02:10 | 0.74 | 0.29 | 0.38 |
| STM-40 | CONDUIT | 6.08 | 0 | 02:10 | 0.69 | 0.11 | 0.24 |
| STM-41 | CONDUIT | 7.15 | 0 | 02:10 | 0.76 | 0.12 | 0.26 |
| STM-42 | CONDUIT | 9.97 | 0 | 02:09 | 0.86 | 0.17 | 0.86 |
| STM-44 | CONDUIT | 11.87 | 0 | 02:10 | 0.76 | 0.28 | 0.35 |
| STM-45 | CONDUIT | 4.92 | 0 | 02:04 | 0.47 | 0.12 | 0.96 |
| STM-46 | CONDUIT | 15.66 | 0 | 02:03 | 0.39 | 0.35 | 1.00 |
| STM-48 | CONDUIT | 14.47 | 0 | 02:10 | 0.77 | 0.35 | 0.41 |
| STM-49 | CONDUIT | 23.68 | 0 | 02:04 | 0.67 | 0.62 | 1.00 |
| STM-50 | CONDUIT | 11.47 | 0 | 02:02 | 0.65 | 0.27 | 0.85 |
| STM-53 | CONDUIT | 11.31 | 0 | 02:03 | 0.59 | 0.19 | 1.00 |
| STM-54 | CONDUIT | 18.32 | 0 | 02:03 | 0.57 | 0.29 | 1.00 |
| STM-55 | CONDUIT | 9.31 | 0 | 02:02 | 0.60 | 0.22 | 0.92 |
| STM-56 | CONDUIT | 16.50 | 0 | 02:10 | 0.77 | 0.40 | 0.45 |
| STM-57 | CONDUIT | 24.64 | 0 | 02:04 | 0.78 | 0.61 | 1.00 |
| STM-60 | CONDUIT | 19.43 | 0 | 02:03 | 0.59 | 0.31 | 1.00 |
| STM-70 | CONDUIT | 19.66 | 0 | 02:10 | 0.63 | 0.33 | 0.70 |
| STM-71 | CONDUIT | 20.70 | 0 | 02:10 | 0.89 | 0.49 | 0.48 |
| STM-72 | CONDUIT | 18.76 | 0 | 02:10 | 0.88 | 0.42 | 0.45 |
| STM-74 | CONDUIT | 25.42 | 0 | 02:10 | 0.91 | 0.58 | 0.72 |
| STM-77 | CONDUIT | 22.81 | 0 | 02:07 | 0.97 | 0.39 | 1.00 |
| STM-77_(1) | CONDUIT | 30.43 | 0 | 02:06 | 1.14 | 0.51 | 1.00 |
| STM-78 | CONDUIT | 16.36 | 0 | 02:04 | 0.85 | 0.28 | 1.00 |
| STM-78_(1) | CONDUIT | 20.52 | 0 | 02:04 | 0.95 | 0.34 | 1.00 |
| STM-79 | CONDUIT | 27.58 | 0 | 02:09 | 0.95 | 0.64 | 1.00 |
| STM-83 | CONDUIT | 16.50 | 0 | 02:10 | 0.75 | 0.39 | 0.46 |
| O-CB1 | ORIFICE | 12.89 | 0 | 02:12 | | | 1.00 |
| O-CB10 | ORIFICE | 4.89 | 0 | 02:10 | | | 1.00 |
| O-CB3 | ORIFICE | 57.33 | 0 | 02:10 | | | 1.00 |

| | | | | | |
|---|---|---|---|---|---|
| O-Cb5 | ORIFICE | 55.91 | 0 | 02:10 | 1.00 |
| O-CB7 | ORIFICE | 39.64 | 0 | 02:10 | 1.00 |
| O-CBMH222 | ORIFICE | 26.26 | 0 | 02:25 | 1.00 |
| O-MH206 | DUMMY | 6.93 | 0 | 02:20 | |
| O-MH214 | DUMMY | 6.92 | 0 | 02:20 | |
| O-MH220 | DUMMY | 5.51 | 0 | 02:13 | |

**********
Flow Classification Summary
**********

| Inlet Conduit | Adjusted /Actual Length | Fraction of Time in Flow Class: Dry | Up Dry | Down Dry | Sub Crit | Sup Crit | Up Crit | Down Crit | Norm Ltd | Inlet Ctrl |
|---|---|---|---|---|---|---|---|---|---|---|
| C1 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C10 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C11 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C12 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C13 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C14 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C15 | 1.00 | 0.57 | 0.10 | 0.00 | 0.33 | 0.00 | 0.00 | 0.00 | 0.24 | 0.00 |
| C16 | 1.00 | 0.53 | 0.05 | 0.00 | 0.42 | 0.00 | 0.00 | 0.00 | 0.55 | 0.00 |
| C17 | 1.00 | 0.50 | 0.05 | 0.00 | 0.45 | 0.00 | 0.00 | 0.00 | 0.45 | 0.00 |
| C18 | 1.00 | 0.47 | 0.04 | 0.00 | 0.49 | 0.00 | 0.00 | 0.00 | 0.31 | 0.00 |
| C19 | 1.00 | 0.44 | 0.04 | 0.00 | 0.52 | 0.00 | 0.00 | 0.00 | 0.72 | 0.00 |
| C2 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C20 | 1.00 | 0.34 | 0.12 | 0.00 | 0.54 | 0.00 | 0.00 | 0.00 | 0.88 | 0.00 |
| C21 | 1.00 | 0.47 | 0.20 | 0.00 | 0.33 | 0.00 | 0.00 | 0.00 | 0.38 | 0.00 |
| C3 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C4 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C5 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C6 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C7 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C8 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | | | | | | | | | |
| C9 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-25 | 1.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.99 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-26 | 1.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.98 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-27 | 1.00 | 0.01 | 0.00 | 0.00 | 0.14 | 0.00 | 0.00 | 0.85 | 0.10 |
| 0.00 | | | | | | | | | |
| STM-28 | 1.00 | 0.01 | 0.00 | 0.00 | 0.99 | 0.00 | 0.00 | 0.00 | 0.84 |
| 0.00 | | | | | | | | | |
| STM-29 | 1.00 | 0.02 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.94 | 0.03 |
| 0.00 | | | | | | | | | |
| STM-31 | 1.00 | 0.02 | 0.00 | 0.00 | 0.11 | 0.00 | 0.00 | 0.87 | 0.08 |
| 0.00 | | | | | | | | | |
| STM-33 | 1.00 | 0.02 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.95 | 0.02 |
| 0.00 | | | | | | | | | |
| STM-35 | 1.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.99 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-36 | 1.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.99 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-37 | 1.00 | 0.01 | 0.00 | 0.00 | 0.12 | 0.00 | 0.00 | 0.87 | 0.02 |
| 0.00 | | | | | | | | | |
| STM-37_(1) | 1.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.98 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-39 | 1.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.99 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-40 | 1.00 | 0.02 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.97 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-41 | 1.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.97 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-42 | 1.00 | 0.02 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.97 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-44 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-45 | 1.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.97 | 0.01 |
| 0.00 | | | | | | | | | |
| STM-46 | 1.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.96 | 0.01 |
| 0.00 | | | | | | | | | |
| STM-48 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-49 | 1.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.96 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-50 | 1.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.97 | 0.02 |
| 0.00 | | | | | | | | | |
| STM-53 | 1.00 | 0.04 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.93 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-54 | 1.00 | 0.01 | 0.03 | 0.00 | 0.10 | 0.00 | 0.00 | 0.87 | 0.05 |
| 0.00 | | | | | | | | | |
| STM-55 | 1.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.97 | 0.01 |
| 0.00 | | | | | | | | | |
| STM-56 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-57 | 1.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.96 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-60 | 1.00 | 0.01 | 0.02 | 0.00 | 0.10 | 0.00 | 0.00 | 0.87 | 0.05 |
| 0.00 | | | | | | | | | |
| STM-70 | 1.00 | 0.67 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.31 | 0.02 |
| 0.00 | | | | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| STM-71 | 1.00 | 0.67 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-72 | 1.00 | 0.58 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.42 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-74 | 1.00 | 0.55 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.44 | 0.01 |
| 0.00 | | | | | | | | | |
| STM-77 | 1.00 | 0.48 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.50 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-77_(1) | 1.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.98 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-78 | 1.00 | 0.46 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.52 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-78_(1) | 1.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.98 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-79 | 1.00 | 0.51 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.48 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-83 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| 0.00 | | | | | | | | | |

**********
Conduit Surcharge Summary
**********

| Conduit | Hours Full: Both Ends | Hours Full: Upstream | Hours Full: Dnstream | Hours Above Full Normal Flow | Hours Capacity Limited |
|---|---|---|---|---|---|
| C19 | 0.01 | 0.01 | 0.35 | 0.01 | 0.01 |
| C20 | 0.35 | 0.35 | 0.76 | 0.01 | 0.01 |
| C21 | 0.01 | 0.01 | 0.41 | 0.01 | 0.01 |
| STM-25 | 0.01 | 0.01 | 0.06 | 0.01 | 0.01 |
| STM-26 | 0.06 | 0.06 | 0.11 | 0.01 | 0.01 |
| STM-27 | 0.11 | 0.11 | 0.16 | 0.01 | 0.01 |
| STM-28 | 0.11 | 0.17 | 0.11 | 0.11 | 0.11 |
| STM-29 | 0.31 | 0.31 | 0.34 | 0.01 | 0.01 |
| STM-31 | 0.26 | 0.26 | 0.32 | 0.01 | 0.01 |
| STM-33 | 0.27 | 0.27 | 0.30 | 0.01 | 0.01 |
| STM-37 | 0.01 | 0.01 | 0.06 | 0.01 | 0.01 |
| STM-37_(1) | 0.07 | 0.07 | 0.11 | 0.01 | 0.01 |
| STM-42 | 0.01 | 0.01 | 0.07 | 0.01 | 0.01 |
| STM-45 | 0.01 | 0.01 | 0.41 | 0.01 | 0.01 |
| STM-46 | 0.60 | 0.60 | 0.66 | 0.01 | 0.01 |
| STM-49 | 0.83 | 0.83 | 0.88 | 0.01 | 0.04 |
| STM-50 | 0.01 | 0.01 | 0.64 | 0.01 | 0.01 |
| STM-53 | 0.38 | 0.38 | 0.50 | 0.01 | 0.01 |
| STM-54 | 0.88 | 0.88 | 1.01 | 0.01 | 0.01 |
| STM-55 | 0.01 | 0.01 | 0.50 | 0.01 | 0.01 |
| STM-57 | 0.69 | 0.69 | 0.81 | 0.01 | 0.01 |
| STM-60 | 0.90 | 0.90 | 1.00 | 0.01 | 0.01 |
| STM-70 | 0.01 | 0.01 | 0.67 | 0.01 | 0.01 |
| STM-74 | 0.01 | 0.01 | 0.18 | 0.01 | 0.01 |
| STM-77 | 0.38 | 0.38 | 0.47 | 0.01 | 0.01 |
| STM-77_(1) | 0.48 | 0.48 | 0.61 | 0.01 | 0.01 |
| STM-78 | 0.61 | 0.61 | 0.71 | 0.01 | 0.01 |
| STM-78_(1) | 0.72 | 0.72 | 0.80 | 0.01 | 0.01 |
| STM-79 | 0.23 | 0.23 | 0.35 | 0.01 | 0.01 |

```
Analysis begun on:  Fri May 15 10:05:05 2026
Analysis ended on:  Fri May 15 10:05:15 2026
Total elapsed time: 00:00:10
```

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

  WARNING 03: negative offset ignored for Link C21
  WARNING 03: negative offset ignored for Link C21

  *************
  Element Count
  *************
  Number of rain gages ...... 1
  Number of subcatchments ... 31
  Number of nodes ........... 55
  Number of links ........... 67
  Number of pollutants ...... 0
  Number of land uses ....... 0


  ****************
  Raingage Summary
  ****************
                                                    Data       Recording
  Name                 Data Source                  Type       Interval
  ------------------------------------------------------------------------
  Raingage             03-C6hr-100yr                INTENSITY   10 min.


  ********************
  Subcatchment Summary
  ********************
  Name                        Area     Width   %Imperv    %Slope Rain Gage
Outlet
  ------------------------------------------------------------------------------
--------------------------
  A-01                        0.06    152.50      6.00    2.5000 Raingage
LD1000
  A-02                        0.02     26.25    100.00    2.0000 Raingage
98
  A-03                        0.03     27.78     94.00    2.0000 Raingage
97
  A-04                        0.15     82.22     87.00    2.5000 Raingage
CB2
  A-05                        0.12     70.00     90.00    2.5000 Raingage
CB4
  A-06                        0.10     61.88     91.00    2.5000 Raingage
CB6
  A-07                        0.12    128.89      4.00    6.0000 Raingage
LD1001
  A-08                        0.15     70.00     89.00    2.0000 Raingage
CB3
  A-09                        0.13     76.47     90.00    2.0000 Raingage
CB5
  A-10                        0.08     58.57     86.00    2.5000 Raingage
CB7
  A-12                        0.03     35.56     23.00    2.5000 Raingage
CB10
  A-13                        0.04     27.69     90.00    2.0000 Raingage
96
```

| | | | | | | |
|---|---|---|---|---|---|---|
| A-14 | 0.04 | 29.17 | 7.00 | 11.0000 | Raingage | CBMH225 |
| A-15 | 0.02 | 63.33 | 3.00 | 20.0000 | Raingage | CB9 |
| A-16 | 0.01 | 60.00 | 26.00 | 9.0000 | Raingage | LD1003 |
| A-17 | 0.01 | 70.00 | 17.00 | 3.5000 | Raingage | LD1002 |
| D-01 | 0.01 | 15.00 | 39.00 | 3.5000 | Raingage | OF1 |
| R-01 | 0.09 | 90.00 | 100.00 | 3.0000 | Raingage | LD1000 |
| R-02 | 0.05 | 55.56 | 100.00 | 3.0000 | Raingage | MH217 |
| R-03 | 0.04 | 39.00 | 100.00 | 3.0000 | Raingage | MH216 |
| R-04 | 0.03 | 31.00 | 100.00 | 3.0000 | Raingage | MH208 |
| R-05 | 0.07 | 70.00 | 100.00 | 3.0000 | Raingage | LD1001 |
| R-06 | 0.06 | 57.00 | 100.00 | 3.0000 | Raingage | MH210A |
| R-07 | 0.03 | 34.44 | 100.00 | 3.0000 | Raingage | CB9 |
| R-08 | 0.02 | 21.11 | 100.00 | 3.0000 | Raingage | CBMH225 |
| R-09 | 0.04 | 45.56 | 100.00 | 3.0000 | Raingage | MH218 |
| R-10 | 0.02 | 17.00 | 100.00 | 3.0000 | Raingage | MH221 |
| R-11 | 0.02 | 18.89 | 100.00 | 3.0000 | Raingage | LD1003 |
| R-12 | 0.01 | 11.11 | 100.00 | 3.0000 | Raingage | LD1003 |
| R-13 | 0.02 | 25.56 | 100.00 | 3.0000 | Raingage | LD1002 |
| R-14 | 0.01 | 8.89 | 100.00 | 3.0000 | Raingage | LD1002 |

**********
Node Summary
**********

| Name | Type | Invert Elev. | Max. Depth | Ponded Area | External Inflow |
|---|---|---|---|---|---|
| HP-A-04 | JUNCTION | 108.70 | 1.00 | 0.0 | |
| HP-A-05 | JUNCTION | 108.75 | 1.00 | 0.0 | |
| HP-A-05-2 | JUNCTION | 109.02 | 1.00 | 0.0 | |
| HP-A-06 | JUNCTION | 108.78 | 1.00 | 0.0 | |
| HP-A-06-2 | JUNCTION | 108.80 | 1.00 | 0.0 | |
| HP-A-07 | JUNCTION | 108.75 | 1.00 | 0.0 | |
| HP-A-09 | JUNCTION | 108.73 | 1.00 | 0.0 | |
| MH200 | OUTFALL | 105.72 | 0.53 | 0.0 | |
| OF1 | OUTFALL | 0.00 | 0.00 | 0.0 | |
| 96 | STORAGE | 106.32 | 2.70 | 0.0 | |
| 97 | STORAGE | 106.59 | 2.51 | 0.0 | |
| 98 | STORAGE | 106.67 | 2.39 | 0.0 | |
| CB1 | STORAGE | 106.66 | 3.04 | 0.0 | |

| | | | | |
|---|---|---|---|---|
| CB10 | STORAGE | 107.40 | 2.20 | 0.0 |
| CB2 | STORAGE | 107.15 | 2.20 | 0.0 |
| CB3 | STORAGE | 107.00 | 2.35 | 0.0 |
| CB4 | STORAGE | 107.25 | 2.20 | 0.0 |
| CB5 | STORAGE | 107.13 | 2.32 | 0.0 |
| CB6 | STORAGE | 107.30 | 2.20 | 0.0 |
| CB7 | STORAGE | 107.19 | 2.41 | 0.0 |
| CB8 | STORAGE | 107.41 | 2.01 | 0.0 |
| CB9 | STORAGE | 107.20 | 2.37 | 0.0 |
| CBMH222 | STORAGE | 106.01 | 2.56 | 0.0 |
| CBMH223 | STORAGE | 106.55 | 2.04 | 0.0 |
| CBMH224 | STORAGE | 106.83 | 2.66 | 0.0 |
| CBMH225 | STORAGE | 106.95 | 2.45 | 0.0 |
| LD1000 | STORAGE | 107.41 | 2.42 | 0.0 |
| LD1001 | STORAGE | 107.67 | 2.04 | 0.0 |
| LD1002 | STORAGE | 106.74 | 2.86 | 0.0 |
| LD1003 | STORAGE | 106.39 | 3.26 | 0.0 |
| MH201 | STORAGE | 105.75 | 2.99 | 0.0 |
| MH202 | STORAGE | 105.85 | 2.70 | 0.0 |
| MH203 | STORAGE | 106.03 | 2.74 | 0.0 |
| MH204 | STORAGE | 106.10 | 2.72 | 0.0 |
| MH205 | STORAGE | 106.27 | 2.63 | 0.0 |
| MH206 | STORAGE | 106.41 | 2.41 | 0.0 |
| MH207 | STORAGE | 106.48 | 2.36 | 0.0 |
| MH208 | STORAGE | 106.78 | 2.45 | 0.0 |
| MH209 | STORAGE | 106.59 | 2.51 | 0.0 |
| MH210A | STORAGE | 107.30 | 1.70 | 0.0 |
| MH210B | STORAGE | 107.17 | 2.08 | 0.0 |
| MH211 | STORAGE | 105.97 | 2.65 | 0.0 |
| MH212 | STORAGE | 106.28 | 2.44 | 0.0 |
| MH213 | STORAGE | 106.54 | 2.52 | 0.0 |
| MH214 | STORAGE | 106.62 | 2.35 | 0.0 |
| MH215 | STORAGE | 106.69 | 2.40 | 0.0 |
| MH216 | STORAGE | 106.95 | 2.12 | 0.0 |
| MH217 | STORAGE | 107.35 | 1.50 | 0.0 |
| MH218 | STORAGE | 107.00 | 1.93 | 0.0 |
| MH219 | STORAGE | 106.21 | 2.81 | 0.0 |
| MH220 | STORAGE | 106.18 | 2.72 | 0.0 |
| MH221 | STORAGE | 106.37 | 2.72 | 0.0 |
| ST1 | STORAGE | 106.67 | 0.99 | 0.0 |
| ST2 | STORAGE | 106.52 | 0.99 | 0.0 |
| ST3 | STORAGE | 106.28 | 0.99 | 0.0 |

**********
Link Summary
**********

| Name | From Node | To Node | Type | Length | % Slope | Roughness |
|---|---|---|---|---|---|---|
| C1 | CB4 | HP-A-05 | CONDUIT | 2.0 | - 15.1717 | 0.0130 |
| C10 | HP-A-04 | CB3 | CONDUIT | 2.0 | 17.7743 | 0.0130 |
| C11 | CB4 | HP-A-05-2 | CONDUIT | 2.0 | - 29.7331 | 0.0130 |

| | | | | | |
|---|---|---|---|---|---|
| C12 | HP-A-05-2 | CB2 | CONDUIT | 2.0 | |
| 35.5544 | 0.0130 | | | | |
| C13 | CB6 | HP-A-06-2 | CONDUIT | 2.0 | - |
| 15.1717 | 0.0130 | | | | |
| C14 | HP-A-06-2 | CB4 | CONDUIT | 2.0 | |
| 17.7743 | 0.0130 | | | | |
| C15 | LD1001 | CB8 | CONDUIT | 50.5 | |
| 0.5154 | 0.0350 | | | | |
| C16 | CB8 | CB9 | CONDUIT | 32.2 | |
| 0.6522 | 0.0350 | | | | |
| C17 | CB9 | CBMH225 | CONDUIT | 41.0 | |
| 0.6095 | 0.0350 | | | | |
| C18 | CBMH225 | CBMH224 | CONDUIT | 17.2 | |
| 0.6977 | 0.0350 | | | | |
| C19 | CBMH224 | CBMH223 | CONDUIT | 26.4 | |
| 1.0591 | 0.0350 | | | | |
| C2 | HP-A-05 | CB5 | CONDUIT | 2.0 | |
| 15.1717 | 0.0130 | | | | |
| C20 | CBMH223 | CBMH222 | CONDUIT | 32.3 | |
| 1.6721 | 0.0350 | | | | |
| C21 | LD1000 | CB1 | CONDUIT | 68.6 | |
| 1.0932 | 0.0350 | | | | |
| C3 | CB6 | HP-A-06 | CONDUIT | 2.0 | - |
| 14.1393 | 0.0130 | | | | |
| C4 | HP-A-06 | CB7 | CONDUIT | 2.0 | |
| 9.0367 | 0.0130 | | | | |
| C5 | CB7 | HP-A-07 | CONDUIT | 2.0 | - |
| 7.5212 | 0.0130 | | | | |
| C6 | HP-A-07 | CB5 | CONDUIT | 2.0 | |
| 15.1717 | 0.0130 | | | | |
| C7 | CB5 | HP-A-09 | CONDUIT | 2.0 | - |
| 14.1393 | 0.0130 | | | | |
| C8 | HP-A-09 | CB3 | CONDUIT | 2.0 | |
| 19.3525 | 0.0130 | | | | |
| C9 | CB2 | HP-A-04 | CONDUIT | 2.0 | - |
| 17.7743 | 0.0130 | | | | |
| STM-25 | MH212 | MH211 | CONDUIT | 39.7 | |
| 0.4026 | 0.0130 | | | | |
| STM-26 | MH211 | MH202 | CONDUIT | 14.7 | |
| 0.2725 | 0.0130 | | | | |
| STM-27 | MH202 | MH201 | CONDUIT | 30.7 | |
| 0.2932 | 0.0130 | | | | |
| STM-28 | MH201 | MH200 | CONDUIT | 12.9 | |
| 0.2322 | 0.0130 | | | | |
| STM-29 | CB2 | CB3 | CONDUIT | 24.0 | |
| 0.5000 | 0.0130 | | | | |
| STM-31 | CB4 | CB5 | CONDUIT | 22.9 | |
| 0.4810 | 0.0130 | | | | |
| STM-33 | CB6 | CB7 | CONDUIT | 15.6 | |
| 0.5128 | 0.0130 | | | | |
| STM-35 | MH206 | MH205 | CONDUIT | 15.2 | |
| 0.3934 | 0.0130 | | | | |
| STM-36 | MH205 | MH204 | CONDUIT | 30.3 | |
| 0.2966 | 0.0130 | | | | |
| STM-37 | MH204 | MH203 | CONDUIT | 24.2 | |
| 0.2480 | 0.0130 | | | | |
| STM-37_(1) | MH203 | MH202 | CONDUIT | 38.6 | |
| 0.2587 | 0.0130 | | | | |
| STM-39 | MH213 | MH212 | CONDUIT | 39.1 | |
| 0.5120 | 0.0130 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| STM-40 | | 98 | MH213 | CONDUIT | 8.9 |
| 0.8939 | 0.0130 | | | | |
| STM-41 | | 97 | MH206 | CONDUIT | 13.2 |
| 0.9827 | 0.0130 | | | | |
| STM-42 | | 96 | MH203 | CONDUIT | 9.2 |
| 0.9772 | 0.0130 | | | | |
| STM-44 | | MH218 | MH219 | CONDUIT | 35.7 |
| 0.5048 | 0.0130 | | | | |
| STM-45 | | MH221 | MH219 | CONDUIT | 20.6 |
| 0.4857 | 0.0130 | | | | |
| STM-46 | | MH219 | MH220 | CONDUIT | 3.6 |
| 0.5525 | 0.0130 | | | | |
| STM-48 | | MH217 | MH215 | CONDUIT | 50.9 |
| 0.4908 | 0.0130 | | | | |
| STM-49 | | MH215 | MH214 | CONDUIT | 4.9 |
| 0.4082 | 0.0130 | | | | |
| STM-50 | | MH216 | MH215 | CONDUIT | 39.5 |
| 0.5070 | 0.0130 | | | | |
| STM-53 | | ST3 | MH220 | CONDUIT | 3.8 |
| 1.0417 | 0.0130 | | | | |
| STM-54 | | ST1 | MH214 | CONDUIT | 3.5 |
| 1.1429 | 0.0130 | | | | |
| STM-55 | | MH208 | MH209 | CONDUIT | 26.7 |
| 0.4864 | 0.0130 | | | | |
| STM-56 | | MH210B | MH209 | CONDUIT | 28.8 |
| 0.4865 | 0.0130 | | | | |
| STM-57 | | MH209 | MH207 | CONDUIT | 8.7 |
| 0.4577 | 0.0130 | | | | |
| STM-60 | | ST2 | MH207 | CONDUIT | 2.7 |
| 1.1112 | 0.0130 | | | | |
| STM-70 | | LD1000 | CB1 | CONDUIT | 68.6 |
| 1.0057 | 0.0130 | | | | |
| STM-71 | | LD1001 | CB8 | CONDUIT | 50.5 |
| 0.4955 | 0.0130 | | | | |
| STM-72 | | CB8 | CB9 | CONDUIT | 32.2 |
| 0.5590 | 0.0130 | | | | |
| STM-74 | | CB9 | CBMH225 | CONDUIT | 41.0 |
| 0.5363 | 0.0130 | | | | |
| STM-77 | | CBMH224 | LD1002 | CONDUIT | 8.3 |
| 0.9674 | 0.0130 | | | | |
| STM-77_(1) | | LD1002 | CBMH223 | CONDUIT | 18.2 |
| 0.9907 | 0.0130 | | | | |
| STM-78 | | CBMH223 | LD1003 | CONDUIT | 15.3 |
| 0.9792 | 0.0130 | | | | |
| STM-78_(1) | | LD1003 | CBMH222 | CONDUIT | 17.0 |
| 1.0012 | 0.0130 | | | | |
| STM-79 | | CBMH225 | CBMH224 | CONDUIT | 17.2 |
| 0.5233 | 0.0130 | | | | |
| STM-83 | | MH210A | MH210B | CONDUIT | 13.5 |
| 0.5185 | 0.0130 | | | | |
| O-CB1 | | CB1 | MH212 | ORIFICE | |
| O-CB10 | | CB10 | MH202 | ORIFICE | |
| O-CB3 | | CB3 | MH211 | ORIFICE | |
| O-Cb5 | | CB5 | MH204 | ORIFICE | |
| O-CB7 | | CB7 | MH205 | ORIFICE | |
| O-CBMH222 | | CBMH222 | MH201 | ORIFICE | |
| O-MH206 | | MH207 | MH206 | OUTLET | |
| O-MH214 | | MH214 | MH213 | OUTLET | |
| O-MH220 | | MH220 | MH204 | OUTLET | |

**********
Cross Section Summary
**********

| Conduit | Shape | Full Depth | Full Area | Hyd. Rad. | Max. Width | No. of Barrels | Full Flow |
|---|---|---|---|---|---|---|---|
| C1 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 63947.17 |
| C10 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 69215.12 |
| C11 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 89521.02 |
| C12 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 97892.98 |
| C13 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 63947.17 |
| C14 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 69215.12 |
| C15 | RECT_CLOSED | 0.55 | 0.19 | 0.11 | 0.35 | 1 | 88.97 |
| C16 | RECT_CLOSED | 0.55 | 0.19 | 0.11 | 0.35 | 1 | 100.08 |
| C17 | RECT_CLOSED | 0.55 | 0.19 | 0.11 | 0.35 | 1 | 96.75 |
| C18 | RECT_CLOSED | 0.55 | 0.19 | 0.11 | 0.35 | 1 | 103.51 |
| C19 | RECT_CLOSED | 0.55 | 0.19 | 0.11 | 0.35 | 1 | 127.53 |
| C2 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 63947.17 |
| C20 | RECT_CLOSED | 0.55 | 0.19 | 0.11 | 0.35 | 1 | 160.25 |
| C21 | RECT_CLOSED | 0.55 | 0.19 | 0.11 | 0.35 | 1 | 129.57 |
| C3 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 61733.10 |
| C4 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 49352.50 |
| C5 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 45024.40 |
| C6 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 63947.17 |
| C7 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 61733.10 |
| C8 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 72222.70 |
| C9 | RECT_OPEN | 1.00 | 3.00 | 0.60 | 3.00 | 1 | 69215.12 |
| STM-25 | CIRCULAR | 0.30 | 0.07 | 0.07 | 0.30 | 1 | 61.36 |
| STM-26 | CIRCULAR | 0.45 | 0.16 | 0.11 | 0.45 | 1 | 148.83 |
| STM-27 | CIRCULAR | 0.53 | 0.22 | 0.13 | 0.53 | 1 | 232.87 |
| STM-28 | CIRCULAR | 0.53 | 0.22 | 0.13 | 0.53 | 1 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| STM-29 | CIRCULAR | 0.30 | 0.07 | 0.07 | 0.30 | 1 |
| 68.38 | | | | | | |
| STM-31 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 41.25 | | | | | | |
| STM-33 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 42.59 | | | | | | |
| STM-35 | CIRCULAR | 0.30 | 0.07 | 0.07 | 0.30 | 1 |
| 60.66 | | | | | | |
| STM-36 | CIRCULAR | 0.38 | 0.11 | 0.09 | 0.38 | 1 |
| 95.50 | | | | | | |
| STM-37 | CIRCULAR | 0.45 | 0.16 | 0.11 | 0.45 | 1 |
| 142.00 | | | | | | |
| STM-37_(1) | CIRCULAR | 0.45 | 0.16 | 0.11 | 0.45 | 1 |
| 145.03 | | | | | | |
| STM-39 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 42.56 | | | | | | |
| STM-40 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 56.23 | | | | | | |
| STM-41 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 58.95 | | | | | | |
| STM-42 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 58.79 | | | | | | |
| STM-44 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 42.25 | | | | | | |
| STM-45 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 41.45 | | | | | | |
| STM-46 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 44.20 | | | | | | |
| STM-48 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 41.66 | | | | | | |
| STM-49 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 37.99 | | | | | | |
| STM-50 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 42.34 | | | | | | |
| STM-53 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 60.70 | | | | | | |
| STM-54 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 63.58 | | | | | | |
| STM-55 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 41.47 | | | | | | |
| STM-56 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 41.48 | | | | | | |
| STM-57 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 40.23 | | | | | | |
| STM-60 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 62.69 | | | | | | |
| STM-70 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 59.64 | | | | | | |
| STM-71 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 41.86 | | | | | | |
| STM-72 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 44.46 | | | | | | |
| STM-74 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 43.55 | | | | | | |
| STM-77 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 58.49 | | | | | | |
| STM-77_(1) | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 59.19 | | | | | | |
| STM-78 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 58.85 | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| STM-78_(1) | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 59.51 | | | | | | |
| STM-79 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 43.02 | | | | | | |
| STM-83 | CIRCULAR | 0.25 | 0.05 | 0.06 | 0.25 | 1 |
| 42.82 | | | | | | |

**********
Analysis Options
**********
Flow Units ..... LPS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... YES
  Water Quality ..... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date ..... 04/17/2026 00:00:00
Ending Date ..... 04/19/2026 00:00:00
Antecedent Dry Days ..... 0.0
Report Time Step ..... 00:01:00
Wet Time Step ..... 00:01:00
Dry Time Step ..... 00:01:00
Routing Time Step ..... 1.00 sec
Variable Time Step ..... YES
Maximum Trials ..... 8
Number of Threads ..... 16
Head Tolerance ..... 0.001500 m

| ********** | Volume | Depth |
|---|---|---|
| Runoff Quantity Continuity | hectare-m | mm |
| ********** | --------- | ------- |
| Initial LID Storage ..... | 0.001 | 0.735 |
| Total Precipitation ..... | 0.131 | 82.323 |
| Evaporation Loss ..... | 0.000 | 0.000 |
| Infiltration Loss ..... | 0.018 | 11.247 |
| Surface Runoff ..... | 0.113 | 71.192 |
| Final Storage ..... | 0.001 | 0.735 |
| Continuity Error (%) ..... | -0.139 | |

| ********** | Volume | Volume |
|---|---|---|
| Flow Routing Continuity | hectare-m | 10^6 ltr |
| ********** | --------- | --------- |
| Dry Weather Inflow ..... | 0.000 | 0.000 |
| Wet Weather Inflow ..... | 0.113 | 1.133 |
| Groundwater Inflow ..... | 0.000 | 0.000 |
| RDII Inflow ..... | 0.000 | 0.000 |
| External Inflow ..... | 0.000 | 0.001 |
| External Outflow ..... | 0.114 | 1.136 |

```
  Flooding Loss ............          0.000         0.000
  Evaporation Loss .........          0.000         0.000
  Exfiltration Loss ........          0.000         0.000
  Initial Stored Volume ....          0.001         0.006
  Final Stored Volume ......          0.001         0.006
  Continuity Error (%) .....         -0.126

  *************************
  Highest Continuity Errors
  *************************
  Node MH215 (-1.04%)
  Node CB8 (-1.03%)

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

  ********************************
  Highest Flow Instability Indexes
  ********************************
  Link O-CBMH222 (40)

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

  ************************
  Routing Time Step Summary
  ************************
  Minimum Time Step           :     0.50 sec
  Average Time Step           :     1.00 sec
  Maximum Time Step           :     1.00 sec
  % of Time in Steady State   :     0.00
  Average Iterations per Step :     2.00
  % of Steps Not Converging   :     0.00
  Time Step Frequencies       :
      1.000 -  0.871 sec      :    99.74 %
      0.871 -  0.758 sec      :     0.09 %
      0.758 -  0.660 sec      :     0.05 %
      0.660 -  0.574 sec      :     0.05 %
      0.574 -  0.500 sec      :     0.08 %

  ***************************
  Subcatchment Runoff Summary
  ***************************

  ---------------------------------------------------------------------------------
-----------------------------------------
                            Total      Total      Total      Total     Imperv
Perv      Total       Total      Peak  Runoff
```

| Subcatchment | Precip mm | Runon mm | Evap mm | Infil mm | Runoff mm | Runoff mm | Runoff 10^6 ltr | Runoff LPS | Runoff Coeff |
|---|---|---|---|---|---|---|---|---|---|
| A-01 | 82.32 | 0.00 | 0.00 | 48.90 | 4.94 | 28.60 | 33.54 | 0.02 | 26.51 | 0.407 |
| A-02 | 82.32 | 0.00 | 0.00 | 0.00 | 82.44 | 0.00 | 82.44 | 0.02 | 10.42 | 1.001 |
| A-03 | 82.32 | 0.00 | 0.00 | 3.10 | 77.49 | 1.86 | 79.35 | 0.02 | 12.31 | 0.964 |
| A-04 | 82.32 | 0.00 | 0.00 | 6.75 | 71.71 | 3.98 | 75.69 | 0.11 | 72.26 | 0.919 |
| A-05 | 82.32 | 0.00 | 0.00 | 5.18 | 74.19 | 3.07 | 77.26 | 0.09 | 58.32 | 0.938 |
| A-06 | 82.32 | 0.00 | 0.00 | 4.66 | 75.01 | 2.77 | 77.78 | 0.08 | 48.58 | 0.945 |
| A-07 | 82.32 | 0.00 | 0.00 | 50.10 | 3.29 | 29.02 | 32.32 | 0.04 | 48.92 | 0.393 |
| A-08 | 82.32 | 0.00 | 0.00 | 5.71 | 73.35 | 3.36 | 76.72 | 0.11 | 71.93 | 0.932 |
| A-09 | 82.32 | 0.00 | 0.00 | 5.18 | 74.18 | 3.07 | 77.25 | 0.10 | 63.71 | 0.938 |
| A-10 | 82.32 | 0.00 | 0.00 | 7.26 | 70.89 | 4.29 | 75.19 | 0.06 | 39.99 | 0.913 |
| A-12 | 82.32 | 0.00 | 0.00 | 40.28 | 18.95 | 23.18 | 42.12 | 0.01 | 13.68 | 0.512 |
| A-13 | 82.32 | 0.00 | 0.00 | 5.18 | 74.19 | 3.07 | 77.26 | 0.03 | 17.65 | 0.939 |
| A-14 | 82.32 | 0.00 | 0.00 | 48.51 | 5.77 | 28.14 | 33.91 | 0.01 | 14.91 | 0.412 |
| A-15 | 82.32 | 0.00 | 0.00 | 50.21 | 2.47 | 29.91 | 32.39 | 0.01 | 8.35 | 0.393 |
| A-16 | 82.32 | 0.00 | 0.00 | 38.25 | 21.43 | 23.04 | 44.47 | 0.00 | 2.72 | 0.540 |
| A-17 | 82.32 | 0.00 | 0.00 | 42.93 | 14.00 | 25.68 | 39.69 | 0.00 | 3.13 | 0.482 |
| D-01 | 82.32 | 0.00 | 0.00 | 31.64 | 32.12 | 18.69 | 50.81 | 0.00 | 2.76 | 0.617 |
| R-01 | 82.32 | 0.00 | 0.00 | 0.00 | 82.44 | 0.00 | 82.44 | 0.07 | 44.64 | 1.001 |
| R-02 | 82.32 | 0.00 | 0.00 | 0.00 | 82.44 | 0.00 | 82.44 | 0.04 | 24.80 | 1.001 |
| R-03 | 82.32 | 0.00 | 0.00 | 0.00 | 82.44 | 0.00 | 82.44 | 0.03 | 19.34 | 1.001 |
| R-04 | 82.32 | 0.00 | 0.00 | 0.00 | 82.44 | 0.00 | 82.44 | 0.03 | 15.38 | 1.001 |
| R-05 | 82.32 | 0.00 | 0.00 | 0.00 | 82.44 | 0.00 | 82.44 | 0.06 | 34.72 | 1.001 |
| R-06 | 82.32 | 0.00 | 0.00 | 0.00 | 82.44 | 0.00 | 82.44 | 0.05 | 28.27 | 1.001 |
| R-07 | 82.32 | 0.00 | 0.00 | 0.00 | 82.44 | 0.00 | 82.44 | 0.03 | 15.38 | 1.001 |
| R-08 | 82.32 | 0.00 | 0.00 | 0.00 | 82.44 | 0.00 | 82.44 | 0.02 | 9.42 | 1.001 |
| R-09 | 82.32 | 0.00 | 0.00 | 0.00 | 82.44 | 0.00 | 82.44 | 0.03 | 20.34 | 1.001 |
| R-10 | 82.32 | 0.00 | 0.00 | 0.00 | 82.44 | 0.00 | 82.44 | 0.01 | 8.43 | 1.001 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| R-11 | | 82.32 | 0.00 | 0.00 | 0.00 | 82.44 | |
| 0.00 | 82.44 | 0.01 | 8.43 | 1.001 | | | |
| R-12 | | 82.32 | 0.00 | 0.00 | 0.00 | 82.44 | |
| 0.00 | 82.44 | 0.01 | 4.96 | 1.001 | | | |
| R-13 | | 82.32 | 0.00 | 0.00 | 0.00 | 82.44 | |
| 0.00 | 82.44 | 0.02 | 11.41 | 1.001 | | | |
| R-14 | | 82.32 | 0.00 | 0.00 | 0.00 | 82.44 | |
| 0.00 | 82.44 | 0.01 | 3.97 | 1.001 | | | |

**********
Node Depth Summary
**********

| Node | Type | Average Depth Meters | Maximum Depth Meters | Maximum HGL Meters | Time of Max Occurrence days hr:min | Reported Max Depth Meters |
|---|---|---|---|---|---|---|
| HP-A-04 | JUNCTION | 0.00 | 0.00 | 108.70 | 0 00:00 | 0.00 |
| HP-A-05 | JUNCTION | 0.00 | 0.00 | 108.75 | 0 00:00 | 0.00 |
| HP-A-05-2 | JUNCTION | 0.00 | 0.00 | 109.02 | 0 00:00 | 0.00 |
| HP-A-06 | JUNCTION | 0.00 | 0.00 | 108.78 | 0 00:00 | 0.00 |
| HP-A-06-2 | JUNCTION | 0.00 | 0.00 | 108.80 | 0 00:00 | 0.00 |
| HP-A-07 | JUNCTION | 0.00 | 0.00 | 108.75 | 0 00:00 | 0.00 |
| HP-A-09 | JUNCTION | 0.00 | 0.00 | 108.73 | 0 00:00 | 0.00 |
| MH200 | OUTFALL | 0.31 | 0.35 | 106.07 | 0 02:11 | 0.35 |
| OF1 | OUTFALL | 0.00 | 0.00 | 0.00 | 0 00:00 | 0.00 |
| 96 | STORAGE | 0.00 | 0.25 | 106.57 | 0 02:10 | 0.24 |
| 97 | STORAGE | 0.00 | 0.09 | 106.68 | 0 02:05 | 0.09 |
| 98 | STORAGE | 0.00 | 0.08 | 106.75 | 0 02:07 | 0.08 |
| CB1 | STORAGE | 0.03 | 1.50 | 108.16 | 0 02:20 | 1.50 |
| CB10 | STORAGE | 0.00 | 0.77 | 108.17 | 0 02:10 | 0.76 |
| CB2 | STORAGE | 0.02 | 1.42 | 108.57 | 0 02:11 | 1.42 |
| CB3 | STORAGE | 0.03 | 1.54 | 108.54 | 0 02:11 | 1.54 |
| CB4 | STORAGE | 0.02 | 1.40 | 108.65 | 0 02:11 | 1.40 |
| CB5 | STORAGE | 0.02 | 1.49 | 108.62 | 0 02:10 | 1.49 |
| CB6 | STORAGE | 0.02 | 1.43 | 108.73 | 0 02:11 | 1.43 |
| CB7 | STORAGE | 0.02 | 1.53 | 108.72 | 0 02:10 | 1.53 |
| CB8 | STORAGE | 0.01 | 0.55 | 107.96 | 0 02:20 | 0.55 |
| CB9 | STORAGE | 0.01 | 0.76 | 107.96 | 0 02:21 | 0.76 |
| CBMH222 | STORAGE | 0.08 | 1.93 | 107.94 | 0 02:21 | 1.93 |
| CBMH223 | STORAGE | 0.03 | 1.40 | 107.95 | 0 02:21 | 1.40 |
| CBMH224 | STORAGE | 0.02 | 1.12 | 107.95 | 0 02:21 | 1.12 |
| CBMH225 | STORAGE | 0.02 | 1.01 | 107.96 | 0 02:21 | 1.00 |
| LD1000 | STORAGE | 0.01 | 0.76 | 108.17 | 0 02:20 | 0.76 |
| LD1001 | STORAGE | 0.01 | 0.30 | 107.97 | 0 02:20 | 0.30 |
| LD1002 | STORAGE | 0.03 | 1.21 | 107.95 | 0 02:21 | 1.21 |
| LD1003 | STORAGE | 0.04 | 1.55 | 107.94 | 0 02:21 | 1.55 |
| MH201 | STORAGE | 0.29 | 0.58 | 106.33 | 0 02:11 | 0.58 |
| MH202 | STORAGE | 0.19 | 0.57 | 106.42 | 0 02:10 | 0.57 |
| MH203 | STORAGE | 0.02 | 0.53 | 106.56 | 0 02:10 | 0.53 |
| MH204 | STORAGE | 0.02 | 0.51 | 106.61 | 0 02:10 | 0.51 |
| MH205 | STORAGE | 0.01 | 0.38 | 106.65 | 0 02:10 | 0.38 |
| MH206 | STORAGE | 0.01 | 0.24 | 106.65 | 0 02:10 | 0.24 |
| MH207 | STORAGE | 0.03 | 0.91 | 107.39 | 0 02:21 | 0.91 |
| MH208 | STORAGE | 0.01 | 0.61 | 107.39 | 0 02:20 | 0.61 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| MH209 | STORAGE | 0.02 | 0.80 | 107.39 | 0 | 02:20 | 0.80 |
| MH210A | STORAGE | 0.01 | 0.18 | 107.48 | 0 | 02:09 | 0.18 |
| MH210B | STORAGE | 0.01 | 0.23 | 107.40 | 0 | 02:20 | 0.23 |
| MH211 | STORAGE | 0.07 | 0.48 | 106.45 | 0 | 02:11 | 0.48 |
| MH212 | STORAGE | 0.01 | 0.21 | 106.49 | 0 | 02:10 | 0.21 |
| MH213 | STORAGE | 0.01 | 0.12 | 106.66 | 0 | 02:08 | 0.12 |
| MH214 | STORAGE | 0.03 | 0.88 | 107.50 | 0 | 02:21 | 0.88 |
| MH215 | STORAGE | 0.03 | 0.81 | 107.50 | 0 | 02:20 | 0.81 |
| MH216 | STORAGE | 0.01 | 0.55 | 107.50 | 0 | 02:20 | 0.55 |
| MH217 | STORAGE | 0.01 | 0.16 | 107.51 | 0 | 02:20 | 0.16 |
| MH218 | STORAGE | 0.00 | 0.12 | 107.12 | 0 | 02:10 | 0.12 |
| MH219 | STORAGE | 0.02 | 0.74 | 106.95 | 0 | 02:20 | 0.74 |
| MH220 | STORAGE | 0.02 | 0.77 | 106.95 | 0 | 02:20 | 0.77 |
| MH221 | STORAGE | 0.01 | 0.58 | 106.95 | 0 | 02:20 | 0.58 |
| ST1 | STORAGE | 0.02 | 0.83 | 107.50 | 0 | 02:21 | 0.83 |
| ST2 | STORAGE | 0.03 | 0.87 | 107.39 | 0 | 02:21 | 0.87 |
| ST3 | STORAGE | 0.01 | 0.67 | 106.95 | 0 | 02:20 | 0.67 |

**********
Node Inflow Summary
**********

| Node | Type | Maximum Lateral Inflow LPS | Maximum Total Inflow LPS | Time of Max Occurrence days hr:min | | Lateral Inflow Volume 10^6 ltr | Total Inflow Volume 10^6 ltr | Flow Balance Error Percent |
|---|---|---|---|---|---|---|---|---|
| HP-A-04 | JUNCTION | 0.00 | 0.00 | 0 | 00:00 | 0 | 0 | 0.000 ltr |
| HP-A-05 | JUNCTION | 0.00 | 0.00 | 0 | 00:00 | 0 | 0 | 0.000 ltr |
| HP-A-05-2 | JUNCTION | 0.00 | 0.00 | 0 | 00:00 | 0 | 0 | 0.000 ltr |
| HP-A-06 | JUNCTION | 0.00 | 0.00 | 0 | 00:00 | 0 | 0 | 0.000 ltr |
| HP-A-06-2 | JUNCTION | 0.00 | 0.00 | 0 | 00:00 | 0 | 0 | 0.000 ltr |
| HP-A-07 | JUNCTION | 0.00 | 0.00 | 0 | 00:00 | 0 | 0 | 0.000 ltr |
| HP-A-09 | JUNCTION | 0.00 | 0.00 | 0 | 00:00 | 0 | 0 | 0.000 ltr |
| MH200 | OUTFALL | 0.00 | 270.18 | 0 | 02:11 | 0 | 1.13 | 0.000 |
| OF1 | OUTFALL | 2.76 | 2.76 | 0 | 02:10 | 0.00305 | 0.00305 | 0.000 |
| 96 | STORAGE | 17.65 | 17.65 | 0 | 02:10 | 0.0278 | 0.0278 | 0.138 |
| 97 | STORAGE | 12.31 | 12.31 | 0 | 02:10 | 0.0198 | 0.0198 | 0.419 |
| 98 | STORAGE | 10.42 | 10.42 | 0 | 02:10 | 0.0173 | 0.0173 | 0.198 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| CB1 | STORAGE | 0.00 | 57.11 | 0 | 02:04 | 0 | 0.0946 |
| -0.458 | | | | | | | |
| CB10 | STORAGE | 13.68 | 13.68 | 0 | 02:10 | 0.0135 | 0.0135 |
| 0.000 | | | | | | | |
| CB2 | STORAGE | 72.26 | 72.26 | 0 | 02:10 | 0.112 | 0.112 |
| 0.043 | | | | | | | |
| CB3 | STORAGE | 71.93 | 103.36 | 0 | 02:10 | 0.113 | 0.225 |
| 0.015 | | | | | | | |
| CB4 | STORAGE | 58.32 | 58.32 | 0 | 02:10 | 0.0919 | 0.0919 |
| 0.001 | | | | | | | |
| CB5 | STORAGE | 63.71 | 87.56 | 0 | 02:10 | 0.1 | 0.192 |
| 0.008 | | | | | | | |
| CB6 | STORAGE | 48.58 | 48.58 | 0 | 02:10 | 0.077 | 0.077 |
| 0.000 | | | | | | | |
| CB7 | STORAGE | 39.99 | 56.17 | 0 | 02:10 | 0.0617 | 0.139 |
| -0.004 | | | | | | | |
| CB8 | STORAGE | 0.00 | 80.36 | 0 | 02:08 | 0 | 0.0942 |
| -1.024 | | | | | | | |
| CB9 | STORAGE | 23.73 | 93.30 | 0 | 02:07 | 0.0317 | 0.127 |
| 0.170 | | | | | | | |
| CBMH222 | STORAGE | 0.00 | 42.64 | 0 | 02:06 | 0 | 0.209 |
| -0.025 | | | | | | | |
| CBMH223 | STORAGE | 0.00 | 64.27 | 0 | 02:03 | 0 | 0.183 |
| -0.126 | | | | | | | |
| CBMH224 | STORAGE | 0.00 | 71.93 | 0 | 02:04 | 0 | 0.155 |
| -0.193 | | | | | | | |
| CBMH225 | STORAGE | 24.33 | 96.77 | 0 | 02:05 | 0.0275 | 0.154 |
| -0.332 | | | | | | | |
| LD1000 | STORAGE | 71.15 | 71.15 | 0 | 02:10 | 0.0947 | 0.0947 |
| 0.016 | | | | | | | |
| LD1001 | STORAGE | 83.64 | 83.64 | 0 | 02:10 | 0.0952 | 0.0952 |
| 1.102 | | | | | | | |
| LD1002 | STORAGE | 18.51 | 47.97 | 0 | 02:03 | 0.0283 | 0.0743 |
| 0.250 | | | | | | | |
| LD1003 | STORAGE | 16.11 | 29.03 | 0 | 02:01 | 0.0249 | 0.0785 |
| 0.023 | | | | | | | |
| MH201 | STORAGE | 0.00 | 270.22 | 0 | 02:11 | 0 | 1.14 |
| -0.002 | | | | | | | |
| MH202 | STORAGE | 0.00 | 241.18 | 0 | 02:10 | 0 | 0.925 |
| -0.058 | | | | | | | |
| MH203 | STORAGE | 0.00 | 139.66 | 0 | 02:10 | 0 | 0.499 |
| 0.002 | | | | | | | |
| MH204 | STORAGE | 0.00 | 124.99 | 0 | 02:10 | 0 | 0.471 |
| -0.000 | | | | | | | |
| MH205 | STORAGE | 0.00 | 60.45 | 0 | 02:10 | 0 | 0.231 |
| 0.014 | | | | | | | |
| MH206 | STORAGE | 0.00 | 20.82 | 0 | 02:10 | 0 | 0.0922 |
| -0.114 | | | | | | | |
| MH207 | STORAGE | 0.00 | 37.67 | 0 | 02:07 | 0 | 0.0944 |
| -0.056 | | | | | | | |
| MH208 | STORAGE | 15.38 | 15.38 | 0 | 02:10 | 0.0256 | 0.0256 |
| 0.351 | | | | | | | |
| MH209 | STORAGE | 0.00 | 42.16 | 0 | 02:08 | 0 | 0.0719 |
| -0.612 | | | | | | | |
| MH210A | STORAGE | 28.27 | 28.27 | 0 | 02:10 | 0.047 | 0.047 |
| 0.474 | | | | | | | |
| MH210B | STORAGE | 0.00 | 28.41 | 0 | 02:10 | 0 | 0.0468 |
| 0.687 | | | | | | | |
| MH211 | STORAGE | 0.00 | 92.95 | 0 | 02:11 | 0 | 0.411 |
| 0.040 | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| MH212 | STORAGE | 0.00 | 36.12 | 0 | 02:10 | 0 | 0.186 | -0.185 |
| MH213 | STORAGE | 0.00 | 18.82 | 0 | 02:10 | 0 | 0.0906 | 0.150 |
| MH214 | STORAGE | 0.00 | 37.15 | 0 | 02:03 | 0 | 0.0942 | -0.032 |
| MH215 | STORAGE | 0.00 | 43.37 | 0 | 02:07 | 0 | 0.0726 | -1.027 |
| MH216 | STORAGE | 19.34 | 19.34 | 0 | 02:10 | 0.0322 | 0.0322 | 0.322 |
| MH217 | STORAGE | 24.80 | 24.80 | 0 | 02:10 | 0.0412 | 0.0412 | 1.750 |
| MH218 | STORAGE | 20.34 | 20.34 | 0 | 02:10 | 0.0338 | 0.0338 | 0.693 |
| MH219 | STORAGE | 0.00 | 26.78 | 0 | 02:10 | 0 | 0.0476 | -0.537 |
| MH220 | STORAGE | 0.00 | 24.63 | 0 | 02:10 | 0 | 0.0594 | -0.003 |
| MH221 | STORAGE | 8.43 | 8.43 | 0 | 02:10 | 0.014 | 0.014 | 0.106 |
| ST1 | STORAGE | 0.00 | 29.86 | 0 | 02:03 | 0 | 0.0209 | 0.022 |
| ST2 | STORAGE | 0.00 | 29.83 | 0 | 02:02 | 0 | 0.0221 | 0.002 |
| ST3 | STORAGE | 0.00 | 18.39 | 0 | 02:02 | 0 | 0.0115 | 0.033 |

**********
Node Surcharge Summary
**********

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

| Node | Type | Hours Surcharged | Max. Height Above Crown Meters | Min. Depth Below Rim Meters |
|---|---|---|---|---|
| ST1 | STORAGE | 1.74 | 0.580 | 0.160 |
| ST2 | STORAGE | 1.73 | 0.617 | 0.123 |

**********
Node Flooding Summary
**********

No nodes were flooded.

**********
Storage Volume Summary
**********

| | Average Volume | Avg Pcnt | Evap Pcnt | Exfil Pcnt | Maximum Volume | Max Pcnt | Time of Max Occurrence | Maximum Outflow |
|---|---|---|---|---|---|---|---|---|

| Storage Unit | 1000 m³ | Full | Loss | Loss | 1000 m³ | Full | days |
|---|---|---|---|---|---|---|---|
| hr:min LPS | | | | | | | |
| 96 | 0.000 | 0.0 | 0.0 | 0.0 | 0.000 | 0.0 | 0 |
| 00:00 17.31 | | | | | | | |
| 97 | 0.000 | 0.0 | 0.0 | 0.0 | 0.000 | 0.0 | 0 |
| 00:00 12.65 | | | | | | | |
| 98 | 0.000 | 0.0 | 0.0 | 0.0 | 0.000 | 0.0 | 0 |
| 00:00 10.42 | | | | | | | |
| CB1 | 0.000 | 1.1 | 0.0 | 0.0 | 0.001 | 49.5 | 0 |
| 02:20 17.68 | | | | | | | |
| CB10 | 0.000 | 0.0 | 0.0 | 0.0 | 0.000 | 0.0 | 0 |
| 02:10 12.46 | | | | | | | |
| CB2 | 0.000 | 0.0 | 0.0 | 0.0 | 0.021 | 2.2 | 0 |
| 02:11 46.80 | | | | | | | |
| CB3 | 0.000 | 0.0 | 0.0 | 0.0 | 0.021 | 1.4 | 0 |
| 02:11 59.32 | | | | | | | |
| CB4 | 0.000 | 0.0 | 0.0 | 0.0 | 0.017 | 1.9 | 0 |
| 02:11 44.70 | | | | | | | |
| CB5 | 0.000 | 0.0 | 0.0 | 0.0 | 0.013 | 0.9 | 0 |
| 02:10 58.23 | | | | | | | |
| CB6 | 0.000 | 0.0 | 0.0 | 0.0 | 0.018 | 3.2 | 0 |
| 02:11 34.18 | | | | | | | |
| CB7 | 0.000 | 0.0 | 0.0 | 0.0 | 0.005 | 0.8 | 0 |
| 02:10 41.40 | | | | | | | |
| CB8 | 0.000 | 0.5 | 0.0 | 0.0 | 0.000 | 27.6 | 0 |
| 02:20 69.67 | | | | | | | |
| CB9 | 0.000 | 0.6 | 0.0 | 0.0 | 0.000 | 32.1 | 0 |
| 02:21 76.15 | | | | | | | |
| CBMH222 | 0.000 | 2.9 | 0.0 | 0.0 | 0.002 | 75.3 | 0 |
| 02:21 31.98 | | | | | | | |
| CBMH223 | 0.000 | 1.6 | 0.0 | 0.0 | 0.002 | 68.4 | 0 |
| 02:21 32.10 | | | | | | | |
| CBMH224 | 0.000 | 0.9 | 0.0 | 0.0 | 0.001 | 42.2 | 0 |
| 02:21 54.92 | | | | | | | |
| CBMH225 | 0.000 | 0.9 | 0.0 | 0.0 | 0.001 | 41.0 | 0 |
| 02:21 71.93 | | | | | | | |
| LD1000 | 0.000 | 0.5 | 0.0 | 0.0 | 0.000 | 31.4 | 0 |
| 02:20 57.11 | | | | | | | |
| LD1001 | 0.000 | 0.3 | 0.0 | 0.0 | 0.000 | 14.6 | 0 |
| 02:20 80.36 | | | | | | | |
| LD1002 | 0.000 | 1.0 | 0.0 | 0.0 | 0.000 | 42.3 | 0 |
| 02:21 40.31 | | | | | | | |
| LD1003 | 0.000 | 1.2 | 0.0 | 0.0 | 0.000 | 47.6 | 0 |
| 02:21 22.51 | | | | | | | |
| MH201 | 0.000 | 9.6 | 0.0 | 0.0 | 0.001 | 19.3 | 0 |
| 02:11 270.18 | | | | | | | |
| MH202 | 0.000 | 6.9 | 0.0 | 0.0 | 0.001 | 21.3 | 0 |
| 02:10 240.62 | | | | | | | |
| MH203 | 0.000 | 0.6 | 0.0 | 0.0 | 0.001 | 19.4 | 0 |
| 02:10 137.90 | | | | | | | |
| MH204 | 0.000 | 0.6 | 0.0 | 0.0 | 0.001 | 18.7 | 0 |
| 02:10 125.88 | | | | | | | |
| MH205 | 0.000 | 0.4 | 0.0 | 0.0 | 0.000 | 14.4 | 0 |
| 02:10 59.32 | | | | | | | |
| MH206 | 0.000 | 0.3 | 0.0 | 0.0 | 0.000 | 10.1 | 0 |
| 02:10 19.08 | | | | | | | |
| MH207 | 0.000 | 1.2 | 0.0 | 0.0 | 0.001 | 38.4 | 0 |
| 02:21 35.78 | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| MH208 | | 0.000 | 0.6 | 0.0 | 0.0 | 0.001 | 25.0 | 0 |
| 02:20 | 15.58 | | | | | | | |
| MH209 | | 0.000 | 1.0 | 0.0 | 0.0 | 0.001 | 31.9 | 0 |
| 02:20 | 37.67 | | | | | | | |
| MH210A | | 0.000 | 0.3 | 0.0 | 0.0 | 0.000 | 10.8 | 0 |
| 02:09 | 28.41 | | | | | | | |
| MH210B | | 0.000 | 0.3 | 0.0 | 0.0 | 0.000 | 10.9 | 0 |
| 02:20 | 29.05 | | | | | | | |
| MH211 | | 0.000 | 2.6 | 0.0 | 0.0 | 0.001 | 18.0 | 0 |
| 02:11 | 93.61 | | | | | | | |
| MH212 | | 0.000 | 0.4 | 0.0 | 0.0 | 0.000 | 8.6 | 0 |
| 02:10 | 33.65 | | | | | | | |
| MH213 | | 0.000 | 0.3 | 0.0 | 0.0 | 0.000 | 4.9 | 0 |
| 02:08 | 19.37 | | | | | | | |
| MH214 | | 0.000 | 1.2 | 0.0 | 0.0 | 0.001 | 37.4 | 0 |
| 02:21 | 35.39 | | | | | | | |
| MH215 | | 0.000 | 1.1 | 0.0 | 0.0 | 0.001 | 33.9 | 0 |
| 02:20 | 37.15 | | | | | | | |
| MH216 | | 0.000 | 0.7 | 0.0 | 0.0 | 0.001 | 26.2 | 0 |
| 02:20 | 19.26 | | | | | | | |
| MH217 | | 0.000 | 0.4 | 0.0 | 0.0 | 0.000 | 10.5 | 0 |
| 02:20 | 26.71 | | | | | | | |
| MH218 | | 0.000 | 0.2 | 0.0 | 0.0 | 0.000 | 6.4 | 0 |
| 02:10 | 20.34 | | | | | | | |
| MH219 | | 0.000 | 0.7 | 0.0 | 0.0 | 0.001 | 26.4 | 0 |
| 02:20 | 24.63 | | | | | | | |
| MH220 | | 0.000 | 0.7 | 0.0 | 0.0 | 0.001 | 28.4 | 0 |
| 02:20 | 23.25 | | | | | | | |
| MH221 | | 0.000 | 0.4 | 0.0 | 0.0 | 0.001 | 21.4 | 0 |
| 02:20 | 8.01 | | | | | | | |
| ST1 | | 0.001 | 2.5 | 0.0 | 0.0 | 0.021 | 84.1 | 0 |
| 02:21 | 3.60 | | | | | | | |
| ST2 | | 0.001 | 2.6 | 0.0 | 0.0 | 0.022 | 87.9 | 0 |
| 02:21 | 6.05 | | | | | | | |
| ST3 | | 0.000 | 1.4 | 0.0 | 0.0 | 0.011 | 68.2 | 0 |
| 02:20 | 3.29 | | | | | | | |

**********
Outfall Loading Summary
**********

| Outfall Node | Flow Freq Pcnt | Avg Flow LPS | Max Flow LPS | Total Volume 10^6 ltr |
|---|---|---|---|---|
| MH200 | 39.37 | 16.87 | 270.18 | 1.134 |
| OF1 | 7.34 | 0.23 | 2.76 | 0.003 |
| System | 23.36 | 17.10 | 271.40 | 1.138 |

**********
Link Flow Summary
**********

| | Maximum | Time of Max | Maximum | Max/ | Max/ |
|---|---|---|---|---|---|

| Link | Type | \|Flow\| LPS | Occurrence days | Occurrence hr:min | \|Veloc\| m/sec | Full Flow | Full Depth |
|---|---|---|---|---|---|---|---|
| C1 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.10 |
| C10 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.09 |
| C11 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.10 |
| C12 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.11 |
| C13 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.12 |
| C14 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.10 |
| C15 | CONDUIT | 42.74 | 0 | 02:10 | 0.45 | 0.48 | 0.77 |
| C16 | CONDUIT | 33.75 | 0 | 02:09 | 0.40 | 0.34 | 1.00 |
| C17 | CONDUIT | 42.19 | 0 | 02:07 | 0.43 | 0.44 | 1.00 |
| C18 | CONDUIT | 43.15 | 0 | 02:06 | 0.50 | 0.42 | 1.00 |
| C19 | CONDUIT | 39.35 | 0 | 02:06 | 0.39 | 0.31 | 1.00 |
| C2 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.08 |
| C20 | CONDUIT | 26.77 | 0 | 02:05 | 0.16 | 0.17 | 1.00 |
| C21 | CONDUIT | 31.46 | 0 | 02:09 | 0.25 | 0.24 | 1.00 |
| C3 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.12 |
| C4 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.06 |
| C5 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.06 |
| C6 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.08 |
| C7 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.08 |
| C8 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.09 |
| C9 | CONDUIT | 0.00 | 0 | 00:00 | 0.00 | 0.00 | 0.11 |
| STM-25 | CONDUIT | 33.65 | 0 | 02:11 | 0.87 | 0.55 | 0.85 |
| STM-26 | CONDUIT | 93.61 | 0 | 02:11 | 0.82 | 0.63 | 1.00 |
| STM-27 | CONDUIT | 240.62 | 0 | 02:11 | 1.11 | 1.03 | 1.00 |
| STM-28 | CONDUIT | 270.18 | 0 | 02:11 | 1.40 | 1.30 | 0.84 |
| STM-29 | CONDUIT | 46.80 | 0 | 02:36 | 0.66 | 0.68 | 1.00 |
| STM-31 | CONDUIT | 44.70 | 0 | 02:29 | 0.91 | 1.08 | 1.00 |
| STM-33 | CONDUIT | 34.18 | 0 | 02:27 | 0.70 | 0.80 | 1.00 |
| STM-35 | CONDUIT | 19.08 | 0 | 02:10 | 0.67 | 0.31 | 0.90 |
| STM-36 | CONDUIT | 59.32 | 0 | 02:10 | 0.81 | 0.62 | 1.00 |
| STM-37 | CONDUIT | 125.88 | 0 | 02:11 | 0.89 | 0.89 | 1.00 |
| STM-37_(1) | CONDUIT | 137.90 | 0 | 02:10 | 0.91 | 0.95 | 1.00 |
| STM-39 | CONDUIT | 19.37 | 0 | 02:10 | 0.81 | 0.46 | 0.53 |
| STM-40 | CONDUIT | 10.42 | 0 | 02:08 | 0.79 | 0.19 | 0.32 |
| STM-41 | CONDUIT | 12.65 | 0 | 02:07 | 0.87 | 0.21 | 0.53 |
| STM-42 | CONDUIT | 17.31 | 0 | 02:09 | 0.98 | 0.29 | 0.99 |
| STM-44 | CONDUIT | 20.34 | 0 | 02:10 | 0.89 | 0.48 | 0.47 |
| STM-45 | CONDUIT | 8.01 | 0 | 02:02 | 0.42 | 0.19 | 1.00 |
| STM-46 | CONDUIT | 24.63 | 0 | 02:10 | 0.50 | 0.56 | 1.00 |
| STM-48 | CONDUIT | 26.71 | 0 | 02:07 | 0.87 | 0.64 | 0.82 |
| STM-49 | CONDUIT | 37.15 | 0 | 02:03 | 0.76 | 0.98 | 1.00 |
| STM-50 | CONDUIT | 19.26 | 0 | 02:03 | 0.68 | 0.45 | 1.00 |
| STM-53 | CONDUIT | 18.39 | 0 | 02:02 | 0.51 | 0.30 | 1.00 |
| STM-54 | CONDUIT | 29.86 | 0 | 02:03 | 0.61 | 0.47 | 1.00 |
| STM-55 | CONDUIT | 15.58 | 0 | 02:01 | 0.66 | 0.38 | 1.00 |
| STM-56 | CONDUIT | 29.05 | 0 | 02:08 | 0.88 | 0.70 | 0.95 |
| STM-57 | CONDUIT | 37.67 | 0 | 02:07 | 0.77 | 0.94 | 1.00 |
| STM-60 | CONDUIT | 29.83 | 0 | 02:02 | 0.61 | 0.48 | 1.00 |
| STM-70 | CONDUIT | 32.41 | 0 | 02:04 | 0.81 | 0.54 | 1.00 |
| STM-71 | CONDUIT | 45.31 | 0 | 02:08 | 1.04 | 1.08 | 1.00 |
| STM-72 | CONDUIT | 39.65 | 0 | 02:07 | 0.95 | 0.89 | 1.00 |
| STM-74 | CONDUIT | 43.19 | 0 | 02:05 | 1.00 | 0.99 | 1.00 |
| STM-77 | CONDUIT | 29.65 | 0 | 02:03 | 0.93 | 0.51 | 1.00 |
| STM-77_(1) | CONDUIT | 40.31 | 0 | 02:03 | 1.19 | 0.68 | 1.00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STM-78 | CONDUIT | 14.80 | 0 | 02:01 | 0.81 | 0.25 | 1.00 |
| STM-78_(1) | CONDUIT | 22.51 | 0 | 02:01 | 0.85 | 0.38 | 1.00 |
| STM-79 | CONDUIT | 40.77 | 0 | 02:04 | 1.07 | 0.95 | 1.00 |
| STM-83 | CONDUIT | 28.41 | 0 | 02:10 | 0.85 | 0.66 | 0.66 |
| O-CB1 | ORIFICE | 17.68 | 0 | 02:20 | | | 1.00 |
| O-CB10 | ORIFICE | 12.46 | 0 | 02:10 | | | 1.00 |
| O-CB3 | ORIFICE | 59.32 | 0 | 02:12 | | | 1.00 |
| O-Cb5 | ORIFICE | 58.23 | 0 | 02:10 | | | 1.00 |
| O-CB7 | ORIFICE | 41.40 | 0 | 02:10 | | | 1.00 |
| O-CBMH222 | ORIFICE | 31.98 | 0 | 02:39 | | | 1.00 |
| O-MH206 | DUMMY | 9.26 | 0 | 02:21 | | | |
| O-MH214 | DUMMY | 9.10 | 0 | 02:21 | | | |
| O-MH220 | DUMMY | 7.67 | 0 | 02:20 | | | |

**********
Flow Classification Summary
**********

| | Adjusted | ---------- Fraction of Time in Flow Class ------- | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | /Actual | | Up | Down | Sub | Sup | Up | Down | Norm Inlet |
| Conduit | Length | Dry | Dry | Dry | Crit | Crit | Crit | Crit | Ltd Ctrl |
| C1 | 1.00 | 0.99 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 0.00 |
| C10 | 1.00 | 0.99 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 0.00 |
| C11 | 1.00 | 0.99 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 0.00 |
| C12 | 1.00 | 0.99 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 0.00 |
| C13 | 1.00 | 0.99 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 0.00 |
| C14 | 1.00 | 0.99 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 0.00 |
| C15 | 1.00 | 0.57 | 0.10 | 0.00 | 0.33 | 0.00 | 0.00 | 0.00 | 0.24 0.00 |
| C16 | 1.00 | 0.53 | 0.05 | 0.00 | 0.42 | 0.00 | 0.00 | 0.00 | 0.56 0.00 |
| C17 | 1.00 | 0.49 | 0.06 | 0.00 | 0.45 | 0.00 | 0.00 | 0.00 | 0.44 0.00 |
| C18 | 1.00 | 0.46 | 0.05 | 0.00 | 0.49 | 0.00 | 0.00 | 0.00 | 0.33 0.00 |
| C19 | 1.00 | 0.42 | 0.05 | 0.00 | 0.53 | 0.00 | 0.00 | 0.00 | 0.86 0.00 |
| C2 | 1.00 | 0.99 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 0.00 |
| C20 | 1.00 | 0.00 | 0.43 | 0.00 | 0.57 | 0.00 | 0.00 | 0.00 | 0.96 0.00 |
| C21 | 1.00 | 0.47 | 0.20 | 0.00 | 0.33 | 0.00 | 0.00 | 0.00 | 0.36 0.00 |
| C3 | 1.00 | 0.99 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 0.00 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C4 | 1.00 | 0.99 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | | | | | | | | | |
| C5 | 1.00 | 0.99 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | | | | | | | | | |
| C6 | 1.00 | 0.99 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | | | | | | | | | |
| C7 | 1.00 | 0.99 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | | | | | | | | | |
| C8 | 1.00 | 0.99 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | | | | | | | | | |
| C9 | 1.00 | 0.99 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-25 | 1.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.99 | 0.01 |
| 0.00 | | | | | | | | | |
| STM-26 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-27 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-28 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-29 | 1.00 | 0.00 | 0.00 | 0.00 | 0.07 | 0.00 | 0.00 | 0.93 | 0.04 |
| 0.00 | | | | | | | | | |
| STM-31 | 1.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.00 | 0.00 | 0.88 | 0.11 |
| 0.00 | | | | | | | | | |
| STM-33 | 1.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 0.95 | 0.03 |
| 0.00 | | | | | | | | | |
| STM-35 | 1.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.99 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-36 | 1.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.99 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-37 | 1.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.00 | 0.00 | 0.88 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-37_(1) | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.16 |
| 0.00 | | | | | | | | | |
| STM-39 | 1.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.99 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-40 | 1.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.97 | 0.03 |
| 0.00 | | | | | | | | | |
| STM-41 | 1.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.97 | 0.03 |
| 0.00 | | | | | | | | | |
| STM-42 | 1.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.99 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-44 | 1.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.99 | 0.01 |
| 0.00 | | | | | | | | | |
| STM-45 | 1.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.96 | 0.01 |
| 0.00 | | | | | | | | | |
| STM-46 | 1.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.00 | 0.00 | 0.94 | 0.01 |
| 0.00 | | | | | | | | | |
| STM-48 | 1.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.97 | 0.01 |
| 0.00 | | | | | | | | | |
| STM-49 | 1.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.00 | 0.00 | 0.94 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-50 | 1.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 0.95 | 0.01 |
| 0.00 | | | | | | | | | |
| STM-53 | 1.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.96 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-54 | 1.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.00 | 0.00 | 0.88 | 0.06 |
| 0.00 | | | | | | | | | |
| STM-55 | 1.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.96 | 0.01 |
| 0.00 | | | | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| STM-56 | 1.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.98 | 0.01 |
| 0.00 | | | | | | | | | |
| STM-57 | 1.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 0.95 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-60 | 1.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.00 | 0.00 | 0.88 | 0.05 |
| 0.00 | | | | | | | | | |
| STM-70 | 1.00 | 0.67 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.29 | 0.02 |
| 0.00 | | | | | | | | | |
| STM-71 | 1.00 | 0.67 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.31 | 0.01 |
| 0.00 | | | | | | | | | |
| STM-72 | 1.00 | 0.58 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.40 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-74 | 1.00 | 0.55 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.42 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-77 | 1.00 | 0.47 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.49 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-77_(1) | 1.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.97 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-78 | 1.00 | 0.43 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.53 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-78_(1) | 1.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.96 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-79 | 1.00 | 0.51 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.46 | 0.00 |
| 0.00 | | | | | | | | | |
| STM-83 | 1.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.99 | 0.00 |
| 0.00 | | | | | | | | | |

**********
Conduit Surcharge Summary
**********

| Conduit | Hours Full: Both Ends | Hours Full: Upstream | Hours Full: Dnstream | Hours Above Full Normal Flow | Hours Capacity Limited |
|---|---|---|---|---|---|
| C15 | 0.01 | 0.01 | 0.04 | 0.01 | 0.01 |
| C16 | 0.04 | 0.04 | 0.57 | 0.01 | 0.01 |
| C17 | 0.57 | 0.57 | 0.87 | 0.01 | 0.01 |
| C18 | 0.87 | 0.87 | 1.00 | 0.01 | 0.01 |
| C19 | 1.00 | 1.00 | 1.24 | 0.01 | 0.01 |
| C20 | 1.24 | 1.24 | 1.58 | 0.01 | 0.01 |
| C21 | 0.42 | 0.42 | 1.11 | 0.01 | 0.01 |
| STM-25 | 0.01 | 0.01 | 0.09 | 0.01 | 0.01 |
| STM-26 | 0.09 | 0.09 | 0.18 | 0.01 | 0.01 |
| STM-27 | 0.24 | 0.24 | 0.33 | 0.07 | 0.07 |
| STM-28 | 0.01 | 0.41 | 0.01 | 0.51 | 0.01 |
| STM-29 | 0.64 | 0.64 | 0.75 | 0.01 | 0.01 |
| STM-31 | 0.54 | 0.54 | 0.66 | 0.02 | 0.02 |
| STM-33 | 0.55 | 0.55 | 0.66 | 0.01 | 0.01 |
| STM-36 | 0.01 | 0.01 | 0.13 | 0.01 | 0.01 |
| STM-37 | 0.14 | 0.14 | 0.23 | 0.01 | 0.01 |
| STM-37_(1) | 0.18 | 0.26 | 0.18 | 0.01 | 0.18 |
| STM-42 | 0.01 | 0.01 | 0.26 | 0.01 | 0.01 |
| STM-45 | 0.85 | 0.85 | 1.07 | 0.01 | 0.01 |
| STM-46 | 1.22 | 1.22 | 1.28 | 0.01 | 0.01 |
| STM-48 | 0.01 | 0.01 | 0.69 | 0.01 | 0.01 |

| | | | | | |
|---|---|---|---|---|---|
| STM-49 | 1.69 | 1.70 | 1.74 | 0.01 | 0.14 |
| STM-50 | 1.05 | 1.05 | 1.54 | 0.01 | 0.01 |
| STM-53 | 1.04 | 1.04 | 1.14 | 0.01 | 0.01 |
| STM-54 | 1.74 | 1.74 | 1.86 | 0.01 | 0.01 |
| STM-55 | 1.11 | 1.11 | 1.39 | 0.01 | 0.01 |
| STM-56 | 0.01 | 0.01 | 0.55 | 0.01 | 0.01 |
| STM-57 | 1.54 | 1.55 | 1.65 | 0.01 | 0.13 |
| STM-60 | 1.73 | 1.73 | 1.82 | 0.01 | 0.01 |
| STM-70 | 0.71 | 0.71 | 1.32 | 0.01 | 0.01 |
| STM-71 | 0.26 | 0.26 | 0.69 | 0.04 | 0.01 |
| STM-72 | 0.70 | 0.70 | 0.91 | 0.01 | 0.01 |
| STM-74 | 0.94 | 0.94 | 1.15 | 0.01 | 0.01 |
| STM-77 | 1.26 | 1.26 | 1.33 | 0.01 | 0.01 |
| STM-77_(1) | 1.34 | 1.34 | 1.45 | 0.01 | 0.01 |
| STM-78 | 1.45 | 1.45 | 1.54 | 0.01 | 0.01 |
| STM-78_(1) | 1.54 | 1.54 | 1.64 | 0.01 | 0.01 |
| STM-79 | 1.17 | 1.17 | 1.24 | 0.01 | 0.01 |

Analysis begun on:  Tue May 12 14:31:49 2026
Analysis ended on:  Tue May 12 14:31:56 2026
Total elapsed time: 00:00:07

**Palladium II - 125091**
**5mm Retention Calculations**

| **Site Infiltration Requirement** | | |
|---|---|---|
| Total Site Area | 1.594 | ha |
| Retention Requirement | 5 | mm |
| **Total Retention Volume Required** | **79.7** | **$m^3$** |

**Depression Storage**

*Depression storage on paved and landscaped areas as per City guidelines.*
*Assume no depression storage on pitched roof or entrance ramp to parking*

| **Land Use** | | | **Paved** | **Landscaped** |
|---|---|---|---|---|
| Area (ha) | | | 0.520 | 0.350 |
| Depression Storage (mm) | | | 1.57 | 4.67 |
| Depression Storage Vol ($m^3$) | | | 8.2 | 16.3 |
| **Total Depression Storage Vol ($m^3$)** | | | **24.5** | |

**Infiltration Storage**

*Storage in clearstone layer below Stormtech chambers and infiltration trenches.*

| **Storage Location** | **R-02 & R-03 Chambers** | **R-04 & R-06 Chambers** | **R-09 & R-10 Chambers** | **Trenches** |
|---|---|---|---|---|
| Length (m) | 8.85 | 8.85 | 8.85 | 263.18 |
| Width (m) | 4.65 | 4.65 | 3.28 | 1.25 |
| Depth (m) | 0.6 | 0.6 | 0.6 | 0.3 |
| Porosity | 0.4 | 0.4 | 0.4 | 0.3 |
| Infiltration Rate (mm/hr) | 15 | 15 | 15 | 15 |
| Drawdown Time (hrs) | 40 | 40 | 40 | 20 |
| Volume ($m^3$) | 9.9 | 9.9 | 7.0 | 29.6 |
| **Total Infiltration Vol ($m^3$)** | **56.3** | | | |

| **Total Retention Volume ($m^3$)** Depression + Infiltration Storage | **80.8** |
|---|---|

| CB 2 | | |
|---|---|---|
| **Elevation** | **Area** | **Volume** |
| 108.35 | 0.37 | 0.000 |
| 108.40 | 22.794 | 0.579 |
| 108.45 | 70.827 | 2.920 |
| 108.50 | 135.195 | 8.070 |
| 108.55 | 216.128 | 16.853 |
| 108.60 | 316.549 | 30.170 |
| 108.65 | 437.985 | 49.034 |

| CB 3 | | |
|---|---|---|
| **Elevation** | **Area** | **Volume** |
| 108.35 | 0.37 | 0.000 |
| 108.40 | 28.026 | 0.710 |
| 108.45 | 93.301 | 3.743 |
| 108.50 | 193.651 | 10.917 |
| 108.55 | 332.821 | 24.079 |
| 108.60 | 514.875 | 45.271 |
| 108.65 | 697.248 | 75.574 |

| CB 4 | | |
|---|---|---|
| **Elevation** | **Area** | **Volume** |
| 108.45 | 0.37 | 0.000 |
| 108.50 | 19.66 | 0.501 |
| 108.55 | 61.8 | 2.537 |
| 108.60 | 127.556 | 7.271 |
| 108.65 | 217.49 | 15.897 |
| 108.70 | 319.37 | 29.319 |
| 108.75 | 434.261 | 48.160 |

| CB 5 | | |
|---|---|---|
| **Elevation** | **Area** | **Volume** |
| 108.45 | 0.37 | 0.000 |
| 108.50 | 25.885 | 0.656 |
| 108.55 | 85.521 | 3.442 |
| 108.60 | 170.957 | 9.853 |
| 108.65 | 288.631 | 21.343 |
| 108.70 | 444.05 | 39.660 |
| 108.73 | 561.671 | 54.746 |

| CB 6 | | |
|---|---|---|
| **Elevation** | **Area** | **Volume** |
| 108.50 | 0.37 | 0.000 |
| 108.55 | 17.754 | 0.453 |
| 108.60 | 52.52 | 2.210 |
| 108.65 | 99.822 | 6.019 |
| 108.70 | 154.732 | 12.382 |
| 108.75 | 218.381 | 21.710 |
| 108.78 | 260.135 | 28.888 |

| CB 7 | | |
|---|---|---|
| **Elevation** | **Area** | **Volume** |
| 108.60 | 0.37 | 0.000 |
| 108.65 | 24.518 | 0.622 |
| 108.70 | 74.644 | 3.101 |
| 108.75 | 144.764 | 8.586 |

| CB 10 | | |
|---|---|---|
| **Elevation** | **Area** | **Volume** |
| 108.60 | 0.37 | 0.000 |
| 108.65 | 23.038 | 0.585 |
| 108.70 | 72.137 | 2.965 |
| 108.71 | 85.829 | 3.754 |

# Palladium II - 125091

**ROW Ponding Depths**

| Structure | T/G | Max. Static Ponding (Spill Depth) | | 2-yr Event (6hr) | | | | 5-yr Event (6hr) | | | | 100-yr Event (6hr) | | | | 100-yr Event (+20%) (6hr) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (m) | Elev. (m) | Depth (m) | Elev. (m) | Depth (m) | Cascading Flow? | Cascade Depth (m) | Elev. (m) | Depth (m) | Cascading Flow? | Cascade Depth (m) | Elev. (m) | Depth (m) | Cascading Flow? | Cascade Depth (m) | Elev. (m) | Depth (m) | Cascading Flow? | Cascade Depth (m) |
| CB1 | 108.70 | 109.00 | 0.30 | 107.14 | 0.00 | N | 0.00 | 107.47 | 0.00 | N | 0.00 | 108.16 | 0.00 | N | 0.00 | 108.55 | 0.00 | N | 0.00 |
| CB10 | 108.60 | 108.75 | 0.15 | 107.46 | 0.00 | N | 0.00 | 107.56 | 0.00 | N | 0.00 | 108.17 | 0.00 | N | 0.00 | 108.60 | 0.00 | N | 0.00 |
| CB2 | 108.35 | 108.70 | 0.35 | 108.34 | 0.00 | N | 0.00 | 108.47 | 0.12 | N | 0.00 | 108.57 | 0.22 | N | 0.00 | 108.60 | 0.25 | N | 0.00 |
| CB3 | 108.35 | 108.65 | 0.30 | 108.32 | 0.00 | N | 0.00 | 108.44 | 0.09 | N | 0.00 | 108.54 | 0.19 | N | 0.00 | 108.57 | 0.22 | N | 0.00 |
| CB4 | 108.45 | 108.75 | 0.30 | 108.20 | 0.00 | N | 0.00 | 108.55 | 0.10 | N | 0.00 | 108.65 | 0.20 | N | 0.00 | 108.68 | 0.23 | N | 0.00 |
| CB5 | 108.45 | 108.73 | 0.28 | 108.16 | 0.00 | N | 0.00 | 108.51 | 0.06 | N | 0.00 | 108.62 | 0.17 | N | 0.00 | 108.65 | 0.20 | N | 0.00 |
| CB6 | 108.50 | 108.78 | 0.28 | 108.28 | 0.00 | N | 0.00 | 108.61 | 0.11 | N | 0.00 | 108.73 | 0.23 | N | 0.00 | 108.76 | 0.26 | N | 0.00 |
| CB7 | 108.60 | 108.75 | 0.15 | 108.26 | 0.00 | N | 0.00 | 108.59 | 0.00 | N | 0.00 | 108.72 | 0.12 | N | 0.00 | 108.75 | 0.15 | N | 0.00 |
| CB8 | 108.42 | 108.61 | 0.19 | 107.48 | 0.00 | N | 0.00 | 107.53 | 0.00 | N | 0.00 | 107.96 | 0.00 | N | 0.00 | 108.30 | 0.00 | N | 0.00 |
| CB9 | 108.57 | 108.96 | 0.39 | 107.29 | 0.00 | N | 0.00 | 107.34 | 0.00 | N | 0.00 | 107.96 | 0.00 | N | 0.00 | 108.29 | 0.00 | N | 0.00 |
| CBMH222 | 108.57 | 108.90 | 0.33 | 106.92 | 0.00 | N | 0.00 | 107.26 | 0.00 | N | 0.00 | 107.94 | 0.00 | N | 0.00 | 108.27 | 0.00 | N | 0.00 |
| CBMH223 | 108.59 | 108.68 | 0.09 | 106.92 | 0.00 | N | 0.00 | 107.26 | 0.00 | N | 0.00 | 107.95 | 0.00 | N | 0.00 | 108.28 | 0.00 | N | 0.00 |
| CBMH224 | 108.49 | 108.62 | 0.13 | 106.92 | 0.00 | N | 0.00 | 107.27 | 0.00 | N | 0.00 | 107.95 | 0.00 | N | 0.00 | 108.28 | 0.00 | N | 0.00 |
| CBMH225 | 108.40 | 108.62 | 0.22 | 107.05 | 0.00 | N | 0.00 | 107.27 | 0.00 | N | 0.00 | 107.96 | 0.00 | N | 0.00 | 108.29 | 0.00 | N | 0.00 |
| LD1000 | 108.83 | 0.00 | 0.00 | 107.47 | 0.00 | N | 0.00 | 107.50 | 0.00 | N | 0.00 | 108.17 | 0.00 | N | 0.00 | 108.56 | 0.00 | N | 0.00 |
| LD1001 | 108.71 | 0.00 | 0.00 | 107.75 | 0.00 | N | 0.00 | 107.80 | 0.00 | N | 0.00 | 107.97 | 0.00 | N | 0.00 | 108.30 | 0.00 | N | 0.00 |
| LD1002 | 108.60 | 108.69 | 0.09 | 106.93 | 0.00 | N | 0.00 | 107.27 | 0.00 | N | 0.00 | 107.95 | 0.00 | N | 0.00 | 108.28 | 0.00 | N | 0.00 |
| LD1003 | 108.65 | 109.00 | 0.35 | 106.92 | 0.00 | N | 0.00 | 107.26 | 0.00 | N | 0.00 | 107.94 | 0.00 | N | 0.00 | 108.27 | 0.00 | N | 0.00 |

# Appendix F
# Drawings

## GENERAL NOTES:

1. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
2. DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING.
3. OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
4. BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR $5,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.
5. 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 DIMENSIONS AND INVERTS MUST BE VERIFIED PRIOR TO CONSTRUCTION. IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
8. THE SITE BENCHMARK BENCHMARK IS THE TOP OF HYDRANT SPINDEL (ELEV = 109.29). LOCATED ON DERREEN AVENUE ACROSS THE ROAD FROM THE PROJECTION OF THE SOUTH PROPERTYLINE. BENCHMARK #2 IS THE TOP OF HYDRANT SPINDEL (ELEV = 109.35), LOCATED ON DERREEN AVENUE ACCROSS THE ROAD FROM THE PROJECTION OF THE SOUTH PROPERTYLINE. ELEVATIONS SHOWN ARE GEODETIC AND ARE REFERRED TO THE CGVD-1928:1978 (MONUMENT No. 19770882). REFER TO THE FARLEY, SMITH & DENIS SURVEYING LTD. 2025 TOPOGRAPHIC SKETCH OF # PART OF BLOCK 242, REGISTERED PLAN 4M-1687, CITY OF OTTAWA.
9. REFER TO GEOTECHNICAL REPORT (No. PG7573-1, DATED JUNE 30, 2025), PREPARED BY PATERSON GROUP FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS, AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
10. REFER TO ARCHITECT'S AND LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILDING AND HARDSURFACE AREAS AND DIMENSIONS.
11. REFER TO SERVICING AND STORMWATER MANAGEMENT REPORT PREPARED BY NOVATECH ENGINEERING CONSULTANTS LTD, (DATED JUNE 10, 2026).
12. SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).
13. PROVIDE LINE/PARKING PAINTING.
14. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GENERAL PLAN OF SERVICES INDICATING ALL SERVICING AS-BUILT INFORMATION SHOWN ON THIS PLAN. AS-BUILT INFORMATION MUST INCLUDE: PIPE MATERIAL, SIZES, LENGTHS, SLOPES, INVERT AND T/G ELEVATIONS, STRUCTURE LOCATIONS, VALVE AND HYDRANT LOCATIONS, T/WM ELEVATIONS AND ANY ALIGNMENT CHANGES, ETC.
15. CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT FOR CONSTRUCTION PURPOSES.

## SEWER NOTES:

1. SPECIFICATIONS:

| ITEM | SPEC. No. | REFERENCE |
|---|---|---|
| CATCHBASIN (600x600mm) | 705.010 | OPSD |
| STORM / SANITARY MANHOLE (1200Ø) | 701.010 | OPSD |
| STORM / SANITARY MANHOLE (1500Ø) | 701.011 | OPSD |
| STORM / SANITARY MANHOLE (1800Ø) | 701.012 | OPSD |
| CB, FRAME & COVER | 400.020 | OPSD |
| WATERTIGHT FRAME & COVER | 401.030 | OPSD |
| STORM / SANITARY MH FRAME | S25 | CITY OF OTTAWA |
| SANITARY COVER | S24 | CITY OF OTTAWA |
| STORM COVER (CLOSED) | S24.1 | CITY OF OTTAWA |
| STORM COVER (OPEN) | S28.1 | CITY OF OTTAWA |
| SEWER TRENCH | S6 & S7 | CITY OF OTTAWA |
| LANDSCAPE CATCHNASINS | S30 & S31 | CITY OF OTTAWA |
| LANDSCAPE PERFORATED PIPE | S29 | CITY OF OTTAWA |
| SANITARY SEWER | PVC DR 35 | |
| CATCHBASIN LEAD | PVC DR 35 | |
| STORM SEWER(<450mmØ) | PVC DR 35 | |
| STORM SEWER (>450mmØ) | CONC CLASS 65D (UNLESS OTHERWISE NOTED) | |

INSULATE ALL PIPES (SAN/STM) THAT HAVE LESS THAN 2.0m COVER WITH 50mmX1200mm HI-40 INSULATION. PROVIDE 150mm CLEARANCE BETWEEN PIPE AND INSULATION (REFER TO DETAIL).

2. SERVICES ARE TO BE CONSTRUCTED TO 1.0m FROM FACE OF BUILDING AT A MINIMUM SLOPE OF 1.0% (2.0% IS PREFERRED).
3. SEWER SERVICE CONNECTIONS PER CITY OF OTTAWA DETAILS S11 AND S11.1.
4. DUE TO THE PRESENCE OF FILL MATERIAL ACROSS THE SUBJECT SITE, IT IS RECOMMENDED THAT THE FILL MATERIAL BE SUB-EXCAVATED A MINIMUM OF 300 MM BELOW PROPOSED SEWER OR WATER PIPES AND PROOF-ROLLED USING SUITABLY SIZED COMPACTION EQUIPMENT. THE BEDDING LAYER SHOULD THEN BE PLACED AND SHOULD CONSIST OF OPSS GRANULAR A WITH A MINIMUM THICKNESS OF 300 MM. IF THE BEDDING IS PLACED ON BEDROCK, THE THICKNESS OF THE BEDDING SHOULD BE A MINIMUM OF 300 MM FOR SEWER OR WATER PIPES.THE BEDDING MATERIAL SHOULD EXTEND TO THE SPRING LINE OF THE PIPE.
5. COVER MATERIAL, FROM THE SPRING LINE TO A MINIMUM OF 300 MM ABOVE THE OBVERT OF THE PIPE SHOULD CONSIST OF OPSS GRANULAR A CRUSHED STONE. THE BEDDING AND COVER MATERIALS SHOULD BE PLACED IN MAXIMUM 225 MM THICK LIFTS AND COMPACTED TO 99% OF THE SPMDD.
6. WHERE HARD SURFACE AREAS ARE CONSIDERED ABOVE THE TRENCH BACKFILL, THE TRENCH BACKFILL MATERIAL WITHIN THE FROST ZONE (ABOUT 1.8 M BELOW FINISHED GRADE) SHOULD MATCH THE SOILS EXPOSED AT THE TRENCH WALLS TO REDUCE THE POTENTIAL DIFFERENTIAL FROST HEAVING. THE TRENCH BACKFILL SHOULD BE PLACED IN MAXIMUM 300 MM THICK LOOSE LIFTS AND COMPACTED TO A MINIMUM OF 95% OF THE SPMDD.
7. FLEXIBLE CONNECTIONS ARE REQUIRED FOR CONNECTING PIPES TO MANHOLES (FOR EXAMPLE KOR-N-SEAL, PSX: POSITIVE SEAL AND DURASEAL). THE CONCRETE CRADLE FOR THE PIPE CAN BE ELIMINATED.
8. THE OWNER SHALL REQUIRE THAT THE SITE SERVICING CONTRACTOR PERFORM FIELD TESTS FOR QUALITY CONTROL OF ALL SANITARY SEWERS. LEAKAGE TESTING SHALL BE COMPLETED IN ACCORDANCE WITH OPSS 410.07.16, 410.07.16.04 AND 407.07.24. DYE TESTING IS TO BE COMPLETED ON ALL SANITARY SERVICES TO CONFIRM PROPER CONNECTION TO THE SANITARY SEWER MAIN. THE FIELD TESTS SHALL BE PERFORMED IN THE PRESENCE OF A CERTIFIED PROFESSIONAL ENGINEER WHO SHALL SUBMIT A CERTIFIED COPY OF THE TEST RESULTS.
9. STORM MANHOLES AND CBMHS ARE TO HAVE 300mm SUMPS UNLESS OTHERWISE INDICATED.
10. 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.
11. ALL CATCHBASINS AND CATCHBASIN MANHOLES TO BE PROVIDED WITH MINIMUM 3 METER LONG PERFORATED SUBDRAINS EXTENDING IN TWO DIRECTIONS AT THE SUBGRADE LEVEL. SUBDRAIN IS TO BE PROVIDED AT THE TRANSITIONS BETWEEN DIFFERENT PAVEMENT COMPOSITIONS. THE SUBGRADE SURFACE SHOULD BE SHAPED TO PROMOTE WATER FLOW TO THE DRAINAGE LINES.

## WATERMAIN NOTES:

1. SPECIFICATIONS:

| ITEM | SPEC. No. | REFERENCE |
|---|---|---|
| WATERMAIN TRENCHING | W17 | CITY OF OTTAWA |
| THERMAL INSULATION IN SHALLOW TRENCHES | W22 | CITY OF OTTAWA |
| THERMAL INSULATION AT OPEN STRUCTURES | W23 | CITY OF OTTAWA |
| WATERMAIN CROSSING BELOW SEWER/ABOVE SEWER | W25 / W25.2 | CITY OF OTTAWA |
| VALVE AND VALVE BOX | W24 | CITY OF OTTAWA |
| DISTRICT METERING AREA CHAMBER | W3 | CITY OF OTTAWA |
| FIRE HYDRANT | W19 | CITY OF OTTAWA |
| WATERMAIN | PVC DR 18 | |

2. SUPPLY AND CONSTRUCT ALL WATERMAINS AND APPURTENANCES IN ACCORDANCE WITH THE CITY OF OTTAWA STANDARDS AND SPECIFICATIONS. EXCAVATION, INSTALLATION, BACKFILL AND RESTORATION OF ALL WATERMAINS BY THE CONTRACTOR. CONNECTIONS AND SHUT-OFFS AT THE MAIN AND CHLORINATION OF THE WATER SYSTEM SHALL BE PERFORMED BY CITY OFFICIALS.
3. WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE UNLESS OTHERWISE INDICATED. ANY WATERMAIN WITH LESS THAN 2.4m COVER TO BE INSULATED PER THE SHOWN DETAIL.
4. PROVIDE A MINIMUM VERTICAL CLEARANCE OF 0.50m ABOVE AND BELOW BETWEEN OUTSIDE OF PIPES AT ALL CROSSINGS PER CITY OF OTTAWA STANDARDS W25/W25.2
5. WATER SERVICE IS TO BE CONSTRUCTED TO WITHIN 1.0m OF FOUNDATION WALL AND CAPPED, UNLESS OTHERWISE INDICATED.
6. CATHODIC PROTECTION REQUIRED FOR ALL IRON FITTINGS CITY OF OTTAWA STANDARD DETAILS W-39, 40, 41, 42, 43 AND 44.
7. PROVIDE THERMAL INSULATION FOR WATERMAIN AT OPEN STRUCTURES PER CITY OF OTTAWA STANDARD DETAIL W-23.
8. IF WATERMAIN MUST BE DEFLECTED TO MEET ALIGNMENT, ENSURE THAT THE AMOUNT OF DEFLECTION USED IS LESS THAN HALF THAT RECOMMENDED BY THE MANUFACTURER.

## GRADING NOTES:

1. TOPSOIL AND FILL, SUCH AS THOSE CONTAINING SIGNIFICANT AMOUNTS OF ORGANIC OR DELETERIOUS MATERIALS, SHOULD BE STRIPPED FROM UNDER ANY BUILDINGS, PAVED AREAS, PIPE BEDDING AND OTHER SETTLEMENT SENSITIVE STRUCTURES. AS DIRECTED BY THE SITE ENGINEER OR GEOTECHNICAL ENGINEER.
2. SITE-EXCAVATED SOIL CAN BE PLACED AS GENERAL LANDSCAPING FILL WHERE SETTLEMENT IS A MINOR CONCERN OF THE GROUND SURFACE. THESE MATERIALS SHOULD BE SPREAD IN THIN LIFTS AND AT LEAST COMPACTED BY THE TRACKS OF THE SPREADING EQUIPMENT TO MINIMIZE VOIDS. IF THESE MATERIALS ARE TO BE PLACED TO INCREASE THE SUBGRADE LEVEL FOR AREAS TO BE PAVED, THE FILL SHOULD BE COMPACTED IN MAXIMUM 300 mm THICK LIFTS AND TO A MINIMUM DENSITY OF 95% OF THE RESPECTIVE SPMDD.
3. CONSIDERATION MAY BE GIVEN FOR LEAVING IN-SITU FILL IN PLACE AT THE SUBGRADE LEVEL OF PAVED AREAS PROVIDED IT IS REVIEWED IN THE FIELD AT THE TIME OF CONSTRUCTION BY PATERSON PERSONNEL AND SUBSEQUENTLY PROOF-ROLLER BY A SUITABLY-SIZED SHEEPSFOOT ROLLER. PROOF-ROLLING SHOULD BE COMPLETED UNDER DRY AND ABOVE-FREEZING CONDITIONS AND UNDER THE SUPERVISION OF PATERSON PERSONNEL.
4. IF SOFT SPOTS DEVELOP IN THE SUBGRADE DURING COMPACTION OR DUE TO CONSTRUCTION TRAFFIC, THE AFFECTED AREAS SHOULD BE EXCAVATED AND REPLACED WITH OPSS GRANULAR B TYPE II MATERIAL. AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.
5. FILL USED FOR GRADING BENEATH THE BASE AND SUBBASE LAYERS OF PAVED AREAS SHOULD CONSIST, UNLESS OTHERWISE SPECIFIED, OF CLEAN IMPORTED GRANULAR FILL, SUCH AS OPSS GRANULAR A, GRANULAR B TYPE II OR SELECT SUBGRADE MATERIAL. THIS MATERIAL SHOULD BE TESTED AND APPROVED PRIOR TO DELIVERY TO THE SITE. THE FILL SHOULD BE PLACED IN LIFTS NO GREATER THAN 300 mm THICK AND COMPACTED USING SUITABLE COMPACTION EQUIPMENT FOR THE LIFT THICKNESS. FILL PLACED BENEATH THE PAVED AREAS SHOULD BE COMPACTED TO AT LEAST 95% OF ITS SPMDD.
6. THE PAVEMENT GRANULAR BASE AND SUBBASE SHOULD BE PLACED IN MAXIMUM 300 MM THICK LIFTS AND COMPACTED TO A MINIMUM OF 100% OF THE SPMDD WITH SUITABLE VIBRATORY EQUIPMENT.
7. MINIMUM OF 2% GRADE FOR ALL GRASS AREAS UNLESS OTHERWISE NOTED.
8. MAXIMUM TERRACING GRADE TO BE 3:1 UNLESS OTHERWISE NOTED.
9. ALL GRADES BY CURBS ARE EDGE OF PAVEMENT GRADES UNLESS OTHERWISE INDICATED.
10. ALL CURBS SHALL BE BARRIER CURB (150mm) UNLESS OTHERWISE NOTED.
11. BACKFILL MATERIAL BELOW SIDEWALK AND WALKWAY SUBGRADE AREAS OR OTHER SETTLEMENT SENSITIVE STRUCTURES WHICH ARE NOT ADJACENT TO THE BUILDINGS SHOULD CONSIST OF FREE-DRAINING,NON-FROST SUSCEPTIBLE MATERIAL. THIS MATERIAL SHOULD BE PLACED IN MAXIMUM 300 MM THICK LOOSE LIFTS AND COMPACTED TO AT LEAST 98% OF ITS SPMDD UNDER DRY AND ABOVE FREEZING CONDITIONS.
12. REFER TO LANDSCAPE PLAN FOR PLANTING AND OTHER LANDSCAPE FEATURE DETAILS.
13. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GRADING PLAN INDICATING AS-BUILT ELEVATIONS OF ALL DESIGN GRADES SHOWN ON THIS PLAN.

## PAVEMENT STRUCTURE:

CAR ONLY PARKING AREAS
- 50mm HL3 OR SUPERPAVE 12.5
- 150mm OPSS GRAN "A" CRUSHED STONE
- 300mm OPSS GRAN "B" TYPE II

(SUBGRADE - EITHER FILL, IN SITU SOIL OR OPSS GRANULAR B TYPE I OR II MATERIAL PLACED OVER IN SITU SOIL.)

LOCAL RESIDENTIAL ROADWAYS, ACCESS LANES AND HEAVY-TRUCK PARKING AREAS
- 40mm HL3 OR SUPERPAVE 12.5
- 50mm HL8 OR SUPERPAVE 19.0
- 150mm OPSS GRAN "A" CRUSHED STONE
- 400mm OPSS GRAN "B" TYPE II

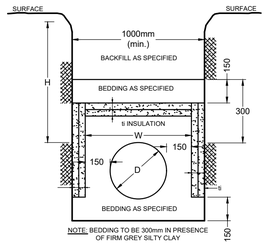
(SUBGRADE - EITHER FILL, IN SITU SOIL OR OPSS GRANULAR B TYPE I OR II MATERIAL PLACED OVER IN SITU SOIL.)

## SEWER & WATERMAIN INSULATION NOTES:

1. INSULATE ALL SEWER PIPES THAT HAVE LESS THAN 2.0m COVER AND ALL WATERMAIN WITH LESS THAN 2.4m OF COVER WITH EXPANDED POLYSTYRENE INSULATION AS PER OPSD 1109.030.
2. THE THICKNESS OF INSULATION SHALL BE THE EQUIVALENT OF 25mm FOR EVERY 300mm REDUCTION IN THE REQUIRED DEPTH OF COVER WITH 50mm MINIMUM (SEE TABLE)

| COVER SEWER / WATER (mm) | INSULATION THICKNESS (mm) |
|---|---|
| 2000-1700 / 2400-2100 | 50 |
| 1700-1400 / 2100-1800 | 75 |
| 1400-1100 / 1800-1500 | 100 |

T = THICKNESS OF INSULATION (mm)
W = WIDTH OF INSULATION (mm)
W = D + 300 (1000 min.)
D = O.D OF PIPE (mm)




**INSULATION DETAIL FOR SHALLOW SEWERS & WATERMAIN**
N.T.S

### PIPE CROSSING TABLE

| CROSSING | LOWER PIPE | HIGHER PIPE | CLEARANCE |
|---|---|---|---|
| (1) | 250mmØ SAN OBV = 104.70 | 1050mmØ STM INV = 105.06* | ±0.36m |
| (2) | 450mmØ SAN OBV = 101.96 | 200mmØ WM INV = 104.68 | ±2.72m |
| (3) | 200mmØ WM OBV = 104.57 | 1050mmØ STM INV = 105.07* | ±0.50m |
| (4) | 250mmØ SAN OBV = 104.96 | 375mmØ STM INV = 105.92 | ±0.96m |
| (5) | 200mmØ WM OBV = 105.47 | 375mmØ STM INV = 105.97 | ±0.50m |
| (6) | 250mmØ SAN OBV = 105.31 | 450mmØ STM INV = 105.85* | ±0.54m |
| (7) | 450mmØ STM OBV = 106.49* | 200mmØ WM INV = 106.99 | ±0.50m |
| (8) | 250mmØ SAN OBV = 105.40 | 200mmØ WM INV = 106.89 | ±1.49m |
| (9) | 250mmØ SAN OBV = 105.78 | 200mmØ STM INV = 106.86 | ±1.08m |
| (10) | 250mmØ STM OBV = 106.55 | 250mmØ STM INV = 106.86 | ±0.31m |
| (11) | 250mmØ SAN OBV = 105.64 | 450mmØ STM INV = 105.94* | ±0.30m |
| (12) | 250mmØ SAN OBV = 105.62 | 200mmØ WM INV = 106.07 | ±0.45m |
| (13) | 200mmØ WM OBV = 105.70 | 375mmØ STM INV = 106.20 | ±0.50m |
| (14) | 200mmØ WM OBV = 105.74 | 375mmØ STM INV = 106.24 | ±0.50m |
| (15) | 200mmØ WM OBV = 106.17 | 250mmØ STM INV = 107.13 | ±0.96m |
| (16) | 250mmØ SAN OBV = 105.77 | 250mmØ STM INV = 107.20 | ±1.44m |
| (17) | 250mmØ SAN OBV = 105.63 | 250mmØ STM INV = 107.28 | ±1.65m |
| (18) | 250mmØ SAN OBV = 106.03 | 200mmØ WM INV = 106.53 | ±0.50m |
| (19) | 250mmØ SAN OBV = 106.08 | 300mmØ STM INV = 106.40 | ±0.33m |
| (20) | 250mmØ SAN OBV = 106.71 | 250mmØ STM INV = 107.03 | ±0.32m |
| (21) | 250mmØ STM OBV = 106.80 | 250mmØ STM INV = 107.05 | ±0.25m |
| (22) | 200mmØ WM OBV = 105.86 | 250mmØ STM INV = 106.36 | ±0.50m |
| (23) | 200mmØ WM OBV = 106.52 | 250mmØ STM INV = 107.34 | ±0.82m |
| (24) | 250mmØ SAN OBV = 106.22 | 200mmØ WM INV = 106.72 | ±0.50m |
| (25) | 250mmØ SAN OBV = 106.26 | 250mmØ STM INV = 106.57 | ±0.31m |
| (26) | 250mmØ STM OBV = 106.89 | 250mmØ STM INV = 107.17 | ±0.28m |
| (27) | 250mmØ SAN OBV = 106.32 | 250mmØ STM INV = 107.16 | ±0.84m |
| (28) | 450mmØ SAN OBV = 101.75* | 200mmØ WM INV = 105.65 | ±3.90m |
| (29) | 200mmØ WM OBV = 104.77 | 975mmØ STM INV = 105.27* | ±0.50m |
| (30) | 200mmØ WM OBV = 106.05 | 250mmØ STM INV = 106.90 | ±0.85m |

### PROPOSED 200mmØ WATER SERVICE (0+000.0)

| STATION | SURFACE ELEVATION | T/WM ELEVATION | COMMENTS |
|---|---|---|---|
| 0+000.00 | 108.47 | 106.02 | CONNECTION TO EXISTING 300mmØ WATERMAIN |
| 0+002.66 | 108.51 | 104.88 | CROSS ABOVE 450mmØ SAN (±2.72m CLEARANCE) |
| 0+005.10 | 108.53 | 104.57 | CROSS BELOW 1050mmØ STM AS PER CITY OF OTTAWA STANDARD W25 (±0.50m CLEARANCE) |
| 0+018.01 | 108.85 | 105.47 | CROSS BELOW 375mmØ STM AS PER CITY OF OTTAWA STANDARD W25 (±0.50m CLEARANCE) |
| 0+019.91 | 108.91 | 105.47 | DMA PER CITY OF OTTAWA DETAIL W3 |
| 0+036.92 | 108.96 | 106.56 | 200mmX200mm TEE |
| 0+048.79 | 108.53 | 107.19 | CROSS ABOVE 450mmØ STM AS PER CITY OF OTTAWA STANDARD W25.2(±0.50m CLEARANCE) |
| 0+050.29 | 108.51 | 107.09 | CROSS ABOVE 250mmØ SAN (±1.49m CLEARANCE) |
| 0+053.09 | 108.48 | 106.08 | 200mmX200mm TEE |
| 0+056.10 | 108.43 | 106.03 | PROPOSED VALVE AND VALVE BOX |
| 0+094.78 | 108.71 | 106.31 | 200mmX200mm TEE |

### PROPOSED 200mmØ WATER SERVICE (1+000.0)

| STATION | SURFACE ELEVATION | T/WM ELEVATION | COMMENTS |
|---|---|---|---|
| 1+000.0 | 108.40 | 105.91 | CONNECTION TO EXISTING 300mmØ WATERMAIN |
| 1+002.65 | 108.43 | 105.85 | CROSS ABOVE 450mmØ SAN (±3.90m CLEARANCE) |
| 1+008.93 | 108.44 | 104.77 | CROSS BELOW 975mmØ STM AS PER CITY OF OTTAWA STANDARD W25 (±0.50m CLEARANCE) |
| 1+018.97 | 108.57 | 105.87 | PROPOSED VALVE AND VALVE BOX |
| 1+020.22 | 108.45 | 106.05 | CROSS BELOW 250 mmØ STM (±0.85m CLEARANCE) |
| 1+047.65 | 109.20 | 106.80 | 200mmX200mm TEE |
| 1+054.24 | 109.09 | 106.69 | 200mmX200mm TEE |
| 1+061.51 | 108.84 | 105.74 | CROSS BELOW 375mmØ STM AS PER CITY OF OTTAWA STANDARD W25 (±0.50m CLEARANCE) |
| 1+063.93 | 108.79 | 106.17 | CROSS BELOW 250mmØ CB LEAD(±0.96m CLEARANCE) |
| 1+069.23 | 108.70 | 106.30 | 200mmX150mm TEE (HYD) |
| 1+080.50 | 108.67 | 106.73 | CROSS ABOVE 250mmØ SAN AS PER CITY OF OTTAWA STANDARD W25.2(±0.50m CLEARANCE) |
| 1+088.85 | 108.65 | 106.25 | 45° BEND |
| 1+097.34 | 108.80 | 106.40 | 45° BEND |
| 1+122.12 | 108.90 | 106.50 | 200mmX150mm TEE (HYD) |
| 1+136.95 | 108.90 | 106.92 | CROSS ABOVE 250mmØ SAN AS PER CITY OF OTTAWA STANDARD W25.2(±0.50m CLEARANCE) |
| 1+156.32 | 108.74 | 106.34 | PROPOSED VALVE AND VALVE BOX |
| 1+163.93 | 108.71 | 106.31 | 200mmX200mm TEE |
| 1+173.71 | 108.65 | 106.25 | 45° BEND |
| 1+176.55 | 108.70 | 106.30 | 45° BEND |
| 1+178.24 | 108.77 | 105.86 | CROSS BELOW 250mmØ STM AS PER CITY OF OTTAWA STANDARD W25 (±0.50m CLEARANCE) |
| 1+183.25 | 108.91 | 106.51 | CROSS BELOW 250mmØ STM(±0.82m CLEARANCE) |
| 1+185.07 | 109.08 | 106.68 | PROPOSED VALVE AND VALVE BOX |
| 1+187.21 | 109.30 | 106.90 | CAP SERVICE 1.0m FROM THE FOUNDATION WALL |

### PROPOSED 200mmØ WATER SERVICE (2+000.0)

| STATION | SURFACE ELEVATION | T/WM ELEVATION | COMMENTS |
|---|---|---|---|
| 2+000.0 | 108.48 | 106.08 | 200mmX200mm TEE |
| 2+009.40 | 108.57 | 106.17 | 200mmX150mm TEE (HYD) |
| 2+029.96 | 108.67 | 106.27 | CROSS ABOVE 250mmØ SAN (±0.45m CLEARANCE) |
| 2+041.15 | 108.75 | 106.35 | CROSS BELOW 250mmØ CB LEAD (±0.69m CLEARANCE) |
| 2+061.84 | 109.07 | 105.70 | CROSS BELOW 375mmØ STM AS PER CITY OF OTTAWA STANDARD W25 (±0.50m CLEARANCE) |
| 2+059.2 | 108.95 | 106.55 | PROPOSED VALVE AND VALVE BOX |
| 2+072.28 | 109.09 | 106.69 | 200mmX200mm TEE |

* CONTRACTOR TO CONFIRM THE ELEVATION OF THE EXISTING WATER STUB/MAIN AND NOTIFY THE ENGINEER IF DIFFERENT

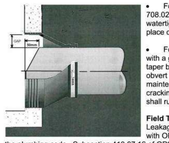
### ICD SIZING AND FLOWS

| STRUCTURE | ORIFICE ICD SIZE | ICD INVERT (m) | T/G (m) | 100-yr HGL (m) | 100-yr HEAD (m) | 100-yr RELEASE RATE (L/s) |
|---|---|---|---|---|---|---|
| CB 1 | 83mm PLATE | 106.66 | 108.70 | 108.15 | 1.46 | 17.7 |
| CB 3 | 152mm PLATE | 107.00 | 108.35 | 108.63 | 1.55 | 59.3 |
| CB 5 | 152mm PLATE | 107.13 | 108.45 | 108.62 | 1.41 | 58.2 |
| CB 7 | 127mm PLATE | 107.19 | 108.60 | 108.72 | 1.47 | 41.4 |
| CB 10 | 83mm PLATE | 107.40 | 108.60 | 108.17 | 0.73 | 12.5 |
| MH 207 | 105mm PLATE | 106.48 | 108.84 | 107.39 | 0.86 | 9.3 |
| MH 214 | 105mm PLATE | 106.62 | 108.95 | 107.50 | 0.83 | 9.1 |
| MH 220 | 100mm PLATE | 106.18 | 108.90 | 106.95 | 0.72 | 7.7 |
| CBMH 222 | 108mm PLATE | 106.01 | 108.57 | 107.94 | 1.88 | 32.0 |

| SANITARY MANHOLES THAT REQUIRE WATER TIGHT LIDS (PER OPSD 401.030) |
|---|
| MANHOLE ID |
| 102 |
| 104 |

| STORM MANHOLES THAT REQUIRE WATER TIGHT LIDS (PER OPSD 401.030) |
|---|
| MANHOLE ID |
| 202 |

**Pipe Connections to Structures**
For concrete pipe connections to structures OPSD 708.020 applies. Use of Kor-N-Seal and equivalent type products limited to 825mm ID and less.



- For PVC pipe connections to structures OPSD 708.020 applies with the condition that flexible watertight connectors shall be approved cast-in-place or boot gaskets listed in MW-22.15.
- For Kor-N-Seal and equivalent type products with a gap between the pipe and the cored hole, taper back the top half of the PVC pipe until the obvert is 50mm behind the inside wall of the maintenance hole to prevent rubbing and eventual cracking of the obvert by cleaning hoses. Hoses shall rub on the concrete edge not the obvert.

**Field Testing**
Leakage testing shall be completed in accordance with OPSS.MUNI 410.07.16 and in accordance with the plumbing code. Subsection 410.07.16 of OPSS.MUNI 410 is amended by the following:

**PIPE CONNECTIONS TO STRUCTURES (EXCERPTED FROM OTTAWA F-4100)**

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.

NOT FOR CONSTRUCTION

| No. | REVISION | DATE | BY |
|---|---|---|---|
| 1. | ISSUED FOR SITEPLAN APPLICATION | JUNE 10/26 | ARM |

SCALE: AS SHOWN

DESIGN: ARM
CHECKED: GJM
DRAWN: AM
CHECKED: ARM
APPROVED: GJM

**FOR REVIEW ONLY**


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


LOCATION
CITY OF OTTAWA
PALLADIUM 2

DRAWING NAME
NOTES AND DETAILS PLAN

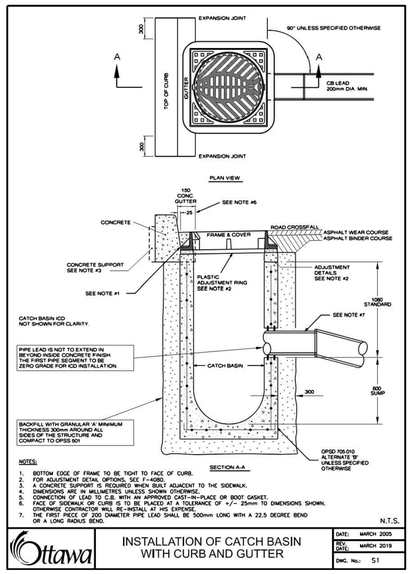
PROJECT No. 125091
REV REV#1
DRAWING No. 125079-ND1

CITY PLAN No. XXXXX

M:\2025\125091\CAD\Civil\125091-ND.dwg, ND1, Jun 09, 2026 - 7:48pm, amestwarp

CITY FILE No.Dxx-xx-XX-XXXX

PLAN1.DWG - 841mmx594mm

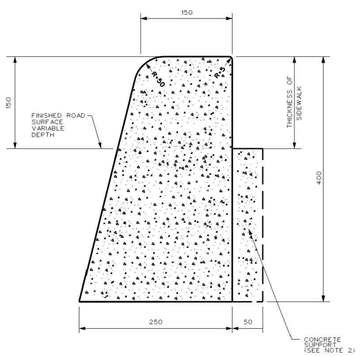



NOTES:

1. BOTTOM EDGE OF FRAME TO BE TIGHT TO FACE OF CURB.
2. FOR ADJUSTMENT DETAIL OPTIONS, SEE F-4080.
3. A CONCRETE SUPPORT IS REQUIRED WHEN BUILT ADJACENT TO THE SIDEWALK.
4. DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
5. FRAME AND COVER TO BE SECURED WITH NON-SLIP PLACE OR BOOT GASKET.
6. FACE OF SIDEWALK OR CURB IS TO BE PLACED AT A TOLERANCE OF +/- 25mm TO DIMENSIONS SHOWN, OTHERWISE CONTRACTOR WILL RE-INSTALL AT HIS EXPENSE.
7. THE FIRST PIECE OF 200 DIAMETER PIPE LEAD SHALL BE 500mm LONG WITH A 22.5 DEGREE BEND OR A LONG RADIUS BEND.

N.T.S.

| | | | |
|---|---|---|---|
| Ottawa | INSTALLATION OF CATCH BASIN WITH CURB AND GUTTER | DATE: MARCH 2005<br>REV. DATE: MARCH 2019<br>DWG. No.: S1 | |



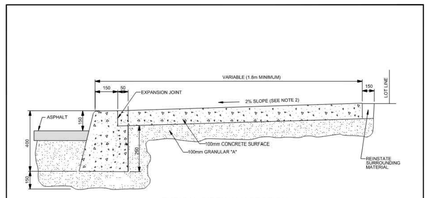

## CONCRETE BARRIER CURB

NOTES:

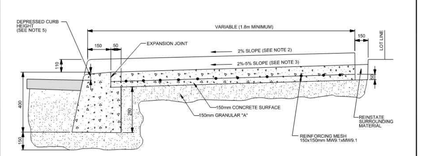
1. THE FULL CURB DEPTH SHALL BE CARRIED THROUGH THE DEPRESSED ACCESS CROSSING.
2. A CONCRETE SUPPORT IS REQUIRED WHEN BUILT ADJACENT TO THE SIDEWALK.
3. IF AN EXTRUSION CURBING MACHINE IS USED, THE EXPANSION BITUMINOUS MATERIAL AND THE ⌀15 DOWELS ARE TO BE PLACED AT THE END OF THE EXTRUSION
4. EXPANSION AND CONTRACTION JOINTS AS PER SC5
5. DEPRESSED CURB HEIGHT - FOR PEDESTRIAN CURB RAMPS 0 TO 6 mm AND FOR PRIVATE ENTRANCES 0 TO 13mm

(DIMENSIONS mm)
NTS

| | | | |
|---|---|---|---|
| Ottawa | CONCRETE BARRIER CURB FOR GRANULAR BASE PAVEMENT (MODIFIED OPSD 600.110) | DATE: JAN 2003<br>REV. DATE: JANUARY 2026<br>DWG. No.: SC1.1 | |



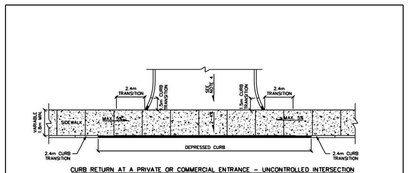

TYPICAL SIDEWALK SECTION



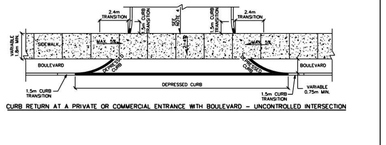

NOTES:

1. ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED
2. THE MAXIMUM SLOPE IS NOT TO EXCEED 2%
3. FOR CURB RAMPS, SLOPE OF 2% TO 5%, MAXIMUM 8%
4. EXPANSION AND DUMMY JOINTS AS PER SC5
5. DEPRESSED CURB HEIGHT - FOR PEDESTRIAN CURB RAMPS 0 TO 6 mm AND FOR PRIVATE ENTRANCES 0 TO 13mm

| | | | |
|---|---|---|---|
| Ottawa | TITLE: CONCRETE BARRIER CURB WITH SIDEWALK | DATE: JAN 2003<br>REV: JULY 2025<br>DWG No: SC1.4 | |




CURB RETURN AT A PRIVATE OR COMMERCIAL ENTRANCE - UNCONTROLLED INTERSECTION



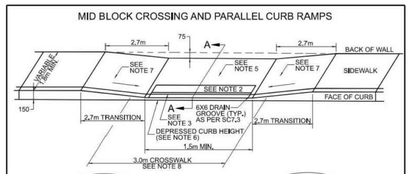

CURB RETURN AT A PRIVATE OR COMMERCIAL ENTRANCE WITH BOULEVARD - UNCONTROLLED INTERSECTION

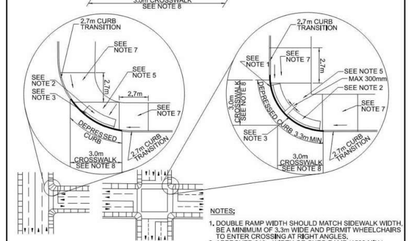
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
2. CURB DETAILS SEE SC1.1, SC1.2 AND SC1.3.
3. SIDEWALK DETAILS SEE SC2 AND SC3.
4. MAXIMUM SLOPE VARIES, SEE PRIVATE APPROACH BYLAW.
5. UNCONTROLLED INTERSECTION MEANS AN ENTRANCE NOT LOCATED AT A TRAFFIC SIGNAL OR ALL-WAY STOP CONTROL.

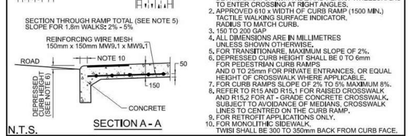
| | | | |
|---|---|---|---|
| Ottawa | CURB RETURN ENTRANCES - UNCONTROLLED INTERSECTIONS | DATE: MARCH 2007<br>REV. DATE: MARCH 2021<br>DWG. No.: SC7.1 | |

## MID BLOCK CROSSING AND PARALLEL CURB RAMPS




SECTION THROUGH RAMP TOTAL (SEE NOTE 5) SLOPE FOR 1.8m WALKS 2% - 5%



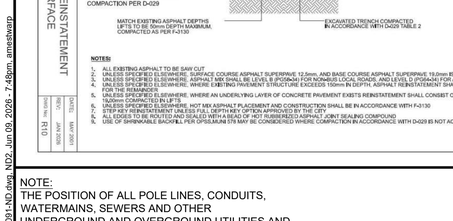

SECTION A - A

N.T.S.

NOTES:

1. DOUBLE RAMP WIDTH SHOULD MATCH SIDEWALK WIDTH. BE A MINIMUM OF 3.3m WIDE AND PERMIT WHEELCHAIRS TO ENTER CROSSING AT RIGHT ANGLES.
2. APPROVED 610 x WIDTH OF CURB RAMP (1500 MIN.) TACTILE WALKING SURFACE INDICATOR. RADIUS TO MATCH CURB.
3. 150 TO 200 GAP
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
5. FOR TRANSITIONAL MAXIMUM SLOPE OF 2%.
6. DEPRESSED CURB HEIGHT SHALL BE 0 TO 6mm FOR PEDESTRIAN CURB RAMPS FOR PRIVATE ENTRANCES, OR EQUAL HEIGHT OF CROSSWALK WHERE APPLICABLE.
7. FOR CURB RAMPS SLOPE OF 2% TO 5%, MAXIMUM 8%.
8. REFER TO RA-PS-13 FOR PAINTED PAVEMENT CROSSWALK AND R-15.2 FOR AT - GRADE CONCRETE CROSSWALK, SUBJECT TO AVOIDANCE OF MEDIANS, CROSSWALK LINES TO CENTRED ON THE CURB RAMP.
9. FOR RETROFIT APPLICATIONS ONLY.
10. FOR MONOLITHIC SIDEWALK, TWISI SHALL BE 300 TO 350mm BACK FROM CURB FACE.

| | | | |
|---|---|---|---|
| Ottawa | PEDESTRIAN CURB RAMP WITHOUT BOULEVARD | DATE: MAY 2001<br>REV. DATE: MARCH 2022<br>DWG. No: SC6 | |




CONNECTION WITHOUT VERTICAL RISER

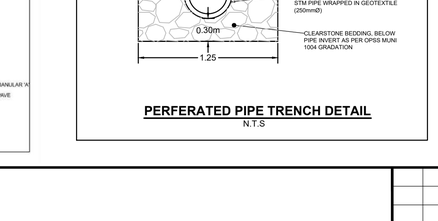



VERTICAL RISER

NOTES:

1. DIAMETER OF SERVICE CONNECTIONS SHALL BE NO GREATER THAN 50% OF THE DIAMETER OF THE RIGID SEWER MAIN. DIAMETER, THE CONNECTION SHALL BE AT THE SAME ELEVATION OR GREATER THAN THE ELEVATION OF THE SPRINGLINE OF THE SEWER MAIN.
2. SANITARY SERVICES TO BE 125mm AND STORM SERVICES TO BE 160mm FOR NEW RESIDENCES UNLESS SPECIFIED OTHERWISE.SERVICE PIPE AND RADIUS BENDS TO BE APPROVED CSA B182.2, SDR28 PRODUCTS UNLESS SPECIFIED OTHERWISE
3. APPROVED CONTROLLED SETTLEMENT JOINTS OPTIONAL FOR SERVICE CONNECTIONS TO MAIN SEWERS UP TO 5m DEEP. WHERE APPROVED, CONNECTIONS TO SEWERS OVER 5m DEEP REQUIRE APPROVED CONTROLLED SETTLEMENT JOINTS
4. VERTICAL RISER SHALL BE SAME AS SERVICE PIPE UNLESS OTHERWISE SPECIFIED
5. CAP AT THE PROPERTY LINE SHALL BE ADEQUATELY BRACED TO WITHSTAND TESTING PRESSURE
6. FOR NEW CONSTRUCTION, INSERTS MUST BE INSTALLED ON THE MAIN PIPE BEFORE THAT PIPE IS LAID. FOR SERVICES/BRANCHES 375mm DIA. OR LESS, APPROVED "CORED TEES" MAY BE USED
7. ALL CONNECTIONS TO BE MADE WITH APPROVED CONNECTIONS
8. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN
9. RADIUS BENDS GREATER THAN 22.5° ARE NOT ALLOWED

| | | | |
|---|---|---|---|
| Ottawa | TITLE: SEWER SERVICE CONNECTIONS FOR RIGID MAIN SEWER PIPE (MODIFIED OPSD-1006.010) | DATE: MAR 2006<br>REV: MAR 2024<br>DWG No: S11 | |







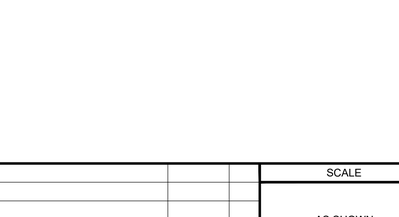
SECTION A - A

NOTES:

FOR WATERMAIN 100mm (NOMINAL) TO 400mm (NOMINAL)

1. BARREL TO INVERT SEPARATION (D) SHALL BE 500mm MINIMUM
2. THRUST BLOCKS FOR MAINS LARGER THAN 400mm (NOMINAL) SHALL BE PER SPECIAL DESIGN
3. FOR 300mm (NOMINAL) AND 400mm (NOMINAL) MAINS, BENDS SHALL BE MAX. 22° 30'.
4. CONCRETE FOR THRUST BLOCKS SHALL BE 20 MPa
5. REFER TO W20J,K FOR RESTRAINED LENGTH REQUIREMENTS
6. REFER TO W25.3 AND W25.4 FOR THRUST BLOCK REQUIREMENTS
7. ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED
8. DESIGNED TO MEET THE INTENT OF THE MOE WATERMAIN DESIGN CRITERIA JUNE 2012
9. CATHODIC PROTECTION MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH W36, W40, AND W42
10. TRACER WIRE REQUIRED FOR PVC, PEX AND HDPE WATERMAIN PIPE ONLY AS PER W36

| | | | |
|---|---|---|---|
| Ottawa | TITLE: WATERMAIN CROSSING BELOW SEWER | DATE: MAY 2001<br>REV: JAN 2026<br>DWG No: W25 | |



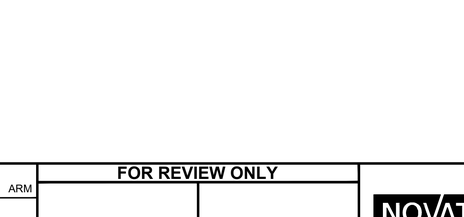

SECTION A - A

NOTES:

FOR WATERMAIN 100mm (NOMINAL) TO 400mm (NOMINAL)

1. BARREL TO INVERT SEPARATION (D) SHALL BE 500mm MINIMUM
2. THRUST BLOCKS FOR MAINS LARGER THAN 400mm (NOMINAL) SHALL BE PER SPECIAL DESIGN.
3. FOR 300mm (NOMINAL) AND 400mm (NOMINAL) MAINS, BENDS SHALL BE MAX. 22° 30'.
4. CONCRETE FOR THRUST BLOCKS SHALL BE 20 MPa.
5. REFER TO W20J,K FOR RESTRAINED LENGTH REQUIREMENTS.
6. REFER TO W25.3 AND W25.4 FOR THRUST BLOCK REQUIREMENTS.
7. ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.
8. DESIGNED TO MEET THE INTENT OF THE MOE WATERMAIN DESIGN CRITERIA JUNE 2012.
9. CATHODIC PROTECTION MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH W36, W40, AND W42.
10. TRACER WIRE REQUIRED FOR PVC, PEX AND HDPE WATERMAIN PIPE ONLY AS PER W36.

| | | | |
|---|---|---|---|
| Ottawa | WATERMAIN CROSSING OVER SEWER | DATE: MAY 2001<br>REV. DATE: JANUARY 2026<br>DWG. No.: W25.2 | |





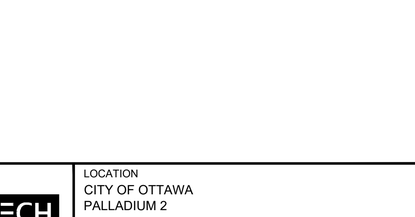


SECTION A - A

NOTES:

1. CLEARANCE AROUND PIPE AT CHAMBER WALL TO BE 50mm MINIMUM
2. VALVE CHAMBERS IN LIEU OF BOXES ON WATERMAINS SMALLER THAN 300mm ONLY TO BE USED, IF APPROVED BY THE CONTRACT ADMINISTRATOR
3. REFER TO MH-15-15 FOR APPROVED MANUFACTURERS
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED
5. CATHODIC PROTECTION MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH W39, W40 AND W42
6. TRACER WIRE REQUIRED FOR PVC, PEX AND HDPE WATERMAIN PIPE ONLY AS PER W36. TRACER WIRE TO BE CONNECTED TO VALVE BOLT AS PER W55 AND SECURED TO TOP OF CHAMBER

| | | | |
|---|---|---|---|
| Ottawa | TITLE: DISTRICT METERING AREA CHAMBER | DATE: MAY 2001<br>REV: JAN 2026<br>DWG No: W3 | |




| PIPE DIAMETER (INSIDE) | |
|---|---|
| SEWER | 'I' |
| 250mm | 375mm |
| 300mm | 450mm |
| 375mm | 525mm |
| 450mm | 600mm |
| 525mm | 750mm |
| 600mm | 750mm |

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.
2. FOR DITCHED PIPE APPLICATIONS, TOP OF CB SHALL BE MIN. 5cm ABOVE BOTTOM OF THE DITCH/SWALE AND BE LOCATED MIN. 2m FROM EDGE OF PAVEMENT.
3. WHEN NON PERFORATED PIPE IS USED, MATCH THE "I" (VERTICAL OPENING DIAMETER) TO THE PIPE DIAMETER AND CONNECT WITH MANUFACTURER RECOMMENDED COUPLERS.
4. SEE MH-21-15 FOR ALTERNATE APPROVED FITTING MANUFACTURERS.

| | | | |
|---|---|---|---|
| Ottawa | CATCH BASIN - ELBOW FOR REAR YARD, DITCHED PIPE AND LANDSCAPING APPLICATIONS | DATE: MARCH 2007<br>REV. DATE: MARCH 2019<br>DWG. No.: S31 | |




NOTES:

1. ALL EXISTING ASPHALT TO BE SAW CUT
2. UNLESS SPECIFIED ELSEWHERE, SURFACE COURSE ASPHALT SUPERPAVE 12.5mm, AND BASE COURSE ASPHALT SUPERPAVE 19.0mm IS TO BE USED.
3. UNLESS SPECIFIED ELSEWHERE, ASPHALT MIX SHALL BE LEVEL B (PG58-34) FOR NON-BUS LOCAL ROADS, AND LEVEL D (PG64-34) FOR ALL OTHER ROADS
4. UNLESS SPECIFIED ELSEWHERE, WHERE EXISTING PAVEMENT STRUCTURE EXCEEDS 150mm IN DEPTH, ASPHALT REINSTATEMENT SHALL BE 150mm AND GRANULAR 'A' FOR THE REMAINDER.
5. UNLESS SPECIFIED ELSEWHERE, WHERE AN UNDERLYING LAYER OF CONCRETE PAVEMENT EXISTS REINSTATEMENT SHALL CONSIST OF 150mm OF SUPERPAVE 19.0mm COMPACTED IN LIFTS.
6. UNLESS SPECIFIED ELSEWHERE, HOT MIX ASPHALT PLACEMENT AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH F-4130
7. STEP KEY TO BE USED WHERE TRENCH WIDTH EXCEEDS 1.5m AT THE SURFACE
8. ALL EDGES TO BE ROUTED AND SEALED WITH A BEAD OF HOT RUBBERIZED ASPHALT JOINT SEALING COMPOUND
9. USE OF SHRINKABLE BACKFILL PER OPSS.MUNI 578 MAY BE CONSIDERED WHERE COMPACTION IN ACCORDANCE WITH D-029 IS NOT ACHIEVABLE

| | | | |
|---|---|---|---|
| Ottawa | TITLE: STANDARD TRENCH REINSTATEMENT IN PAVED SURFACE | DATE: MAR 2005<br>REVISED: JAN 2026<br>DWG No.: R10 | |




**PERFORATED PIPE TRENCH DETAIL**
N.T.S

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.

NOT FOR CONSTRUCTION

| No. | REVISION | DATE | BY |
|---|---|---|---|
| 1. | ISSUED FOR SITEPLAN APPLICATION | JUNE 10/26 | ARM |

SCALE: AS SHOWN

DESIGN: ARM
CHECKED: GJM
DRAWN: AM
CHECKED: ARM
APPROVED: GJM

**FOR REVIEW ONLY**


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


LOCATION
CITY OF OTTAWA
PALLADIUM 2

DRAWING NAME
NOTES AND DETAILS PLAN

PROJECT No. 125091
REV REV#1
DRAWING No. 125079-ND2

CITY PLAN No. XXXXX

M:\2025\125091\CAD\Civil\125091-ND.dwg, ND2, Jun 09, 2026 - 7:48pm, amestwarp

CITY FILE No.Dxx-xx-XX-XXXX

PROPOSED SWALE AND SUBDRAIN
REFER TO 125091-ND2 FOR DETAILS

SILT FENCE
AS PER OPSD 219.110(TYP)

2.75m HIGH NOISE BARRIER
ALCUF DP2 OR EQUIVALENT

SNOW STORAGE

CB 1

LD 1000

PHASE 1 LIMIT

BUILDING A
6-STOREYS - 108 UNITS
FFE =109.40
P1 FFE=106.45

TRENCH DRAIN
T/G=106.44
(FLOWS TO BE CONVEYED BY THE INTERNAL MECHANICAL SYSTEM TO STMMH 213)

LD 1001

TRENCH DRAIN
T/G=106.44
(FLOWS TO BE CONVEYED BY THE INTERNAL MECHANICAL SYSTEM TO STMMH 206)

STMMH 208

STMMH 217

STMMH 215

STMMH 216

STMMH 212

STMMH 213

STMMH 214

WASTE ENCLOSURE

CB 2

CB 4

WASTE ENCLOSURE

CB 6

STMMH 207

STMMH 209

STMMH 206

SPORT COURT

COMMUNITY GARDEN

CB 7

CB 8

BUILDING B
6-STOREYS - 124 UNITS
FFE =109.40
P1 FFE=106.45

STMMH 205

CB 5

CB 3

STMMH 211

MAINTENANCE SHED

BBQ AREA

STMMH 210A

STMMH 210B

STMMH 202

STMMH 203

STMMH 204

STMMH 220

STMMH 219

STMMH 218

STMMH 221

CB 9

PLAYGROUND

PERGOLA

SNOW STORAGE

CB 10

DOG RUN

BUILDING C
6-STOREYS - 72 UNITS
FFE =109.20
P1 FFE=106.25

TRENCH DRAIN
T/G=106.24
(FLOWS TO BE CONVEYED BY THE INTERNAL MECHANICAL SYSTEM TO STMMH 203)

PROPOSED SWALE AND SUBDRAIN
REFER TO 125091-ND2 FOR DETAILS

STMMH 201

CBMH 222

LD 1003

CBMH 223

LD 1002

CBMH 224

CBMH 225

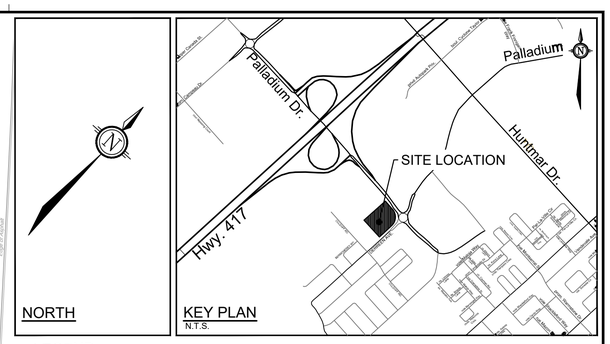
SILT FENCE
AS PER OPSD 219.110(TYP)

PALLADIUM DRIVE

DERREEN AVENUE

Site Benchmark #2
Fire Hydrant
Top of Spindle
Elevation=109.29

Site Benchmark
Fire Hydrant
Top of Spindle




KEY PLAN
N.T.S.

## LEGEND

- PROPERTY LINE
- PHASE 1 LIMIT
- PROPOSED CURB
- PROPOSED DEPRESSED CURB (DC)
- PROPOSED FOUNDATION WALL C/W RAILING
- PROPOSED TACTILE WALKING SURFACE INDICATOR (TWSI)
- PROPOSED STORM SEWER AND MANHOLE
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED CATCHBASIN
- PROPOSED LANDSCAPE DRAIN
- PROPOSED TRENCH DRAIN
- PROPOSED INLET CONTROL DEVICE (ICD)
- PROPOSED BUILDING ENTRANCE
- SWALE
- PROPOSED FIREWALL
- PROPOSED BIKE RACKS
- PROPOSED ROOF LIMITS
- PROPOSED FILTER BAGS AT CATCHBASINS, CATCHBASIN MANHOLES AND TRENCHDRAINS
- PROPOSED MUD MAT (M M)
- LIGHT DUTY SILT FENCE (OPSD 219.110)
- EXISTING STORM MANHOLE (STM MH)
- EXISTING CATCHBASIN (CB 1)

## EROSION AND SEDIMENT CONTROL NOTES:

THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.

1) THE OWNER AGREES TO PREPARE AND IMPLEMENT AN EROSION AND SEDIMENT CONTROL PLAN TO THE SATISFACTION OF THE CITY OF OTTAWA, 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 IN ACCORDANCE WITH THE CURRENT BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL SUCH AS BUT NOT LIMITED TO INSTALLING FILTER CLOTHS ACROSS MANHOLE/CATCHBASIN LIDS TO PREVENT SEDIMENTS FROM ENTERING STRUCTURES AND INSTALL AND MAINTAIN A LIGHT DUTY SILT FENCE BARRIER AS REQUIRED.

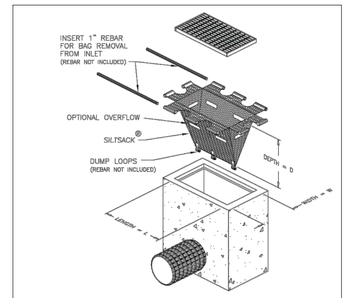
2) THE CONTRACTOR SHALL PLACE FILTER BAGS UNDER THE CATCHBASIN AND MANHOLE GRATES FOR THE DURATION OF CONSTRUCTION AND WILL REMAIN IN PLACE DURING ALL PHASES OF CONSTRUCTION.

3) SILT FENCING FOR ENTIRE PERIMETER OF SITE, SHALL BE UTILIZED TO CONTROL EROSION FROM THE SITE DURING CONSTRUCTION.

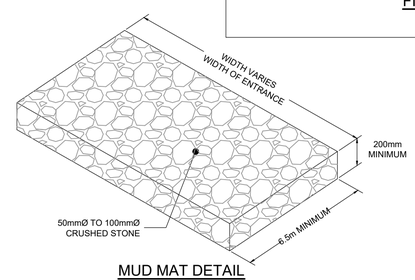
4) THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.

5) PROVIDE MUD MATS AT ALL CONSTRUCTION ACCESS POINTS TO MINIMIZE SEDIMENT TRANSPORT OFFSITE.

6) EROSION AND SEDIMENT CONTROL MEASURES MAY BE MODIFIED IN THE FIELD AT THE DISCRETION OF THE CITY OF OTTAWA SITE INSPECTOR OR CONSERVATION AUTHORITY.




FILTER BAG DETAL
NOT TO SCALE




MUD MAT DETAIL
NOT TO SCALE

REFER TO 125091-ND FOR ADDITIONAL NOTES & DETAILS

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.

NOT FOR CONSTRUCTION

| No. | REVISION | DATE | BY |
|---|---|---|---|
| 1. | ISSUED FOR SITEPLAN APPLICATION | JUNE 10/26 | ARM |

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

DESIGN ARM
CHECKED GJM
DRAWN AM
CHECKED ARM
APPROVED GJM

FOR REVIEW ONLY


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

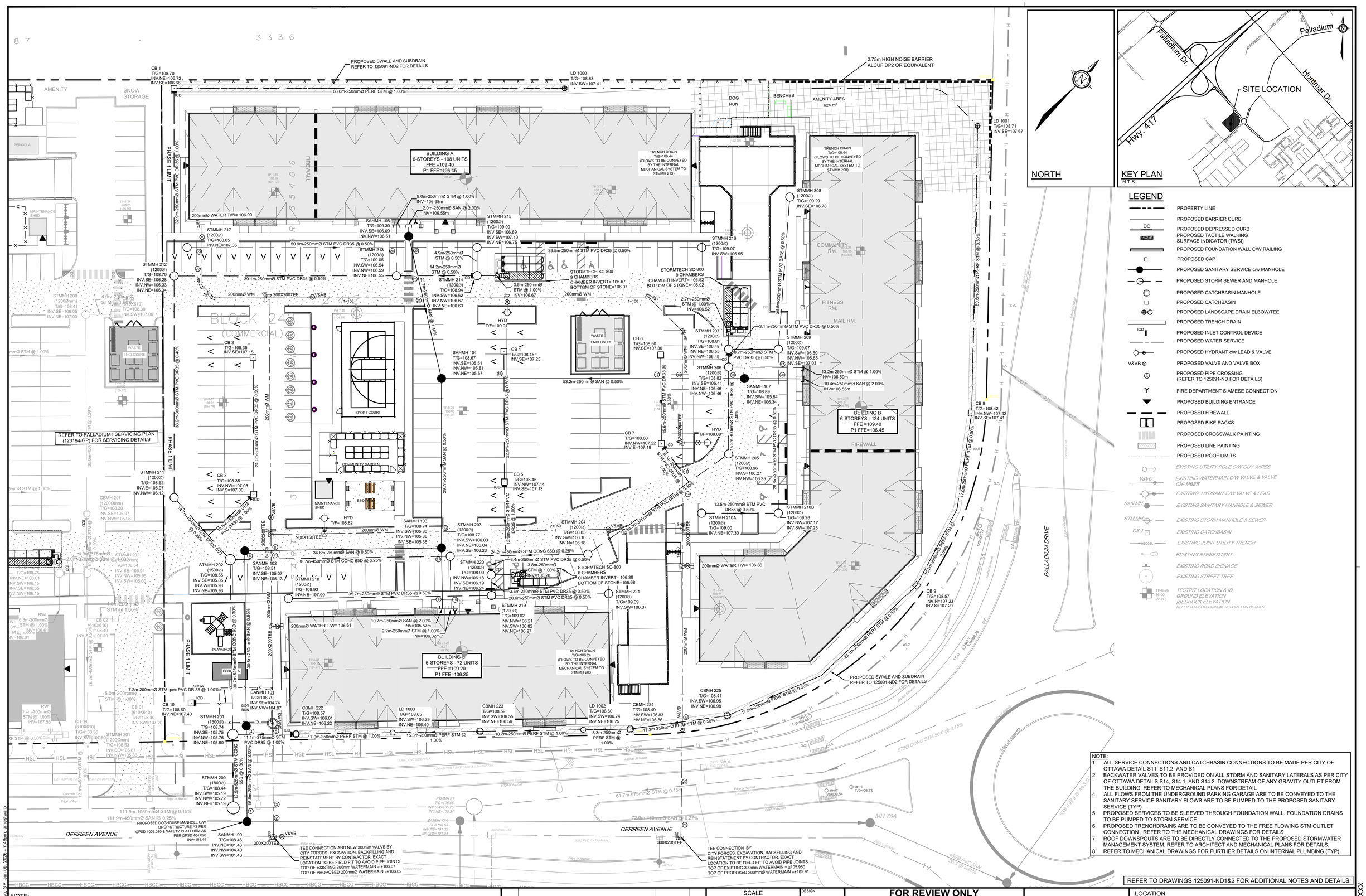

LOCATION
CITY OF OTTAWA
PALLADIUM 2

DRAWING NAME
EROSION AND SEDIMENT CONTROL PLAN

PROJECT No. 125091
REV REV#1
DRAWING No. 125091-ESC

CITY FILE No.Dxx-xx-XX-XXXX
CITY PLAN No. XXXXX

M:\2025\125091\CAD\Civil\125091-ESC.dwg, ESC, Jun 09, 2026 - 7:48pm, amestvsarp




## LEGEND

- PROPERTY LINE
- PROPOSED BARRIER CURB
- PROPOSED DEPRESSED CURB
- PROPOSED TACTILE WALKING SURFACE INDICATOR (TWSI)
- PROPOSED FOUNDATION WALL C/W RAILING
- PROPOSED CAP
- PROPOSED SANITARY SERVICE c/w MANHOLE
- PROPOSED STORM SEWER AND MANHOLE
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED CATCHBASIN
- PROPOSED LANDSCAPE DRAIN ELBOW/TEE
- PROPOSED TRENCH DRAIN
- PROPOSED INLET CONTROL DEVICE
- PROPOSED WATER SERVICE
- PROPOSED HYDRANT c/w LEAD & VALVE
- PROPOSED VALVE AND VALVE BOX
- PROPOSED PIPE CROSSING (REFER TO 125091-ND FOR DETAILS)
- FIRE DEPARTMENT SIAMESE CONNECTION
- PROPOSED BUILDING ENTRANCE
- PROPOSED FIREWALL
- PROPOSED BIKE RACKS
- PROPOSED CROSSWALK PAINTING
- PROPOSED LINE PAINTING
- PROPOSED ROOF LIMITS
- *EXISTING UTILITY POLE C/W GUY WIRES*
- *EXISTING WATERMAIN C/W VALVE & VALVE CHAMBER*
- *EXISTING HYDRANT C/W VALVE & LEAD*
- *EXISTING SANITARY MANHOLE & SEWER*
- *EXISTING STORM MANHOLE & SEWER*
- *EXISTING CATCHBASIN*
- *EXISTING JOINT UTILITY TRENCH*
- *EXISTING STREETLIGHT*
- *EXISTING ROAD SIGNAGE*
- *EXISTING STREET TREE*
- TESTPIT LOCATION & ID
  GROUND ELEVATION
  (BEDROCK ELEVATION)
  REFER TO GEOTECHNICAL REPORT FOR DETAILS

NOTE:
1. ALL SERVICE CONNECTIONS AND CATCHBASIN CONNECTIONS TO BE MADE PER CITY OF OTTAWA DETAIL S11, S11.2, AND S1
2. BACKWATER VALVES TO BE PROVIDED ON ALL STORM AND SANITARY LATERALS AS PER CITY OF OTTAWA DETAILS S14, S14.1, AND S14.2. DOWNSTREAM OF ANY GRAVITY OUTLET FROM THE BUILDING. REFER TO MECHANICAL PLANS FOR DETAIL
4. ALL FLOWS FROM THE UNDERGROUND PARKING GARAGE ARE TO BE CONVEYED TO THE SANITARY SERVICE.SANITARY FLOWS ARE TO BE PUMPED TO THE PROPOSED SANITARY SERVICE (TYP)
5. PROPOSED SERVICES TO BE SLEEVED THROUGH FOUNDATION WALL. FOUNDATION DRAINS TO BE PUMPED TO STORM SERVICE.
6. PROPOSED TRENCHDRAINS ARE TO BE CONVEYED TO THE FREE FLOWING STM OUTLET CONNECTION , REFER TO THE MECHANICAL DRAWINGS FOR DETAILS
7. ROOF DOWNSPOUTS ARE TO BE DIRECTLY CONNECTED TO THE PROPOSED STORMWATER MANAGEMENT SYSTEM. REFER TO ARCHITECT AND MECHANICAL PLANS FOR DETAILS.
8. REFER TO MECHANICAL DRAWINGS FOR FURTHER DETAILS ON INTERNAL PLUMBING (TYP).

REFER TO DRAWINGS 125091-ND1&2 FOR ADDITIONAL NOTES AND DETAILS

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.

NOT FOR CONSTRUCTION

| No. | REVISION | DATE | BY |
|---|---|---|---|
| 1. | ISSUED FOR SITEPLAN APPLICATION | JUNE 10/26 | ARM |

SCALE 1:300

1:300
0 3 6 9 12

| | |
|---|---|
| DESIGN | ARM |
| CHECKED | GJM |
| DRAWN | AM |
| CHECKED | ARM |
| APPROVED | GJM |

**FOR REVIEW ONLY**


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

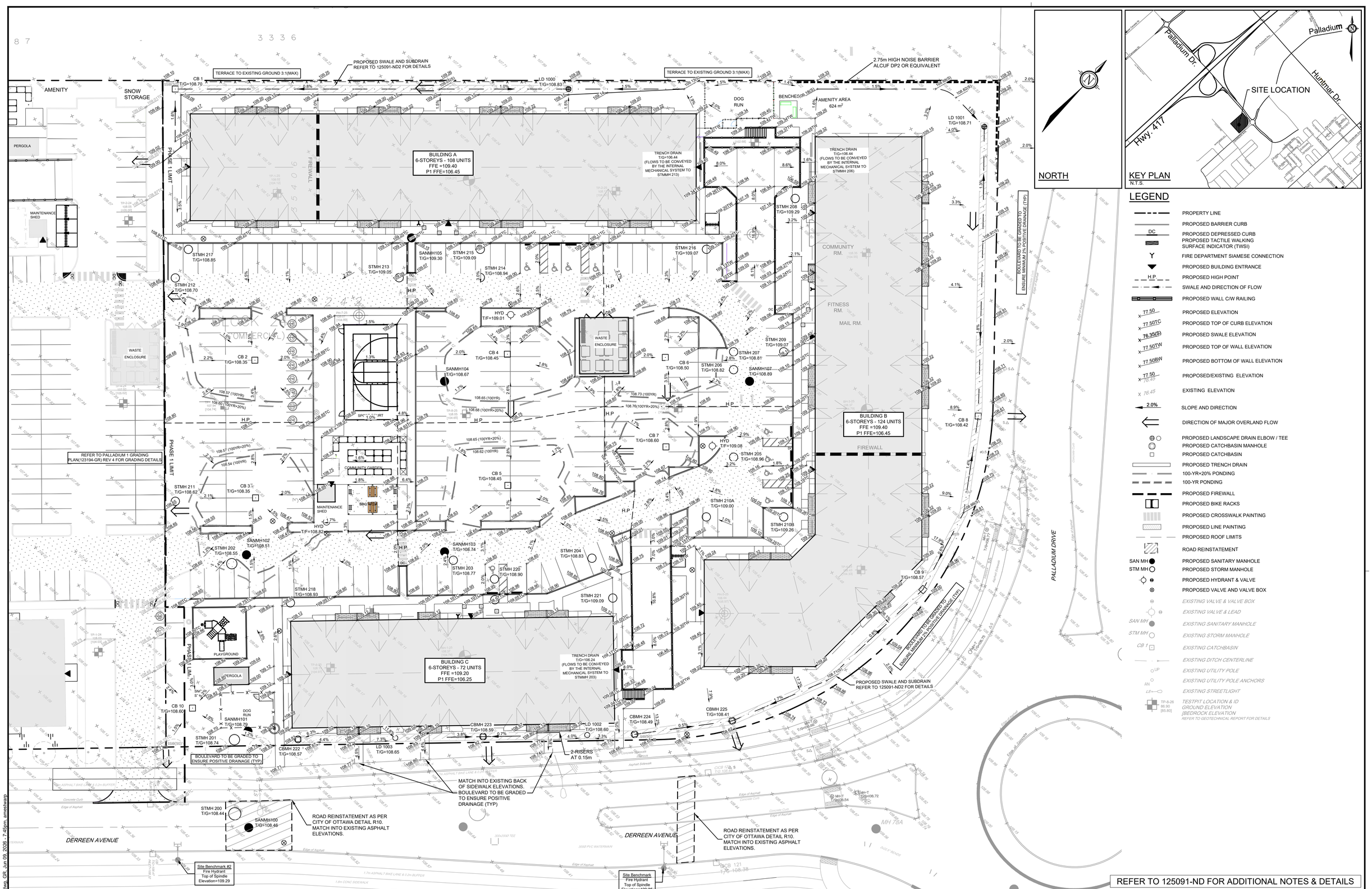

LOCATION
CITY OF OTTAWA
PALLADIUM 2

DRAWING NAME
GENERAL PLAN OF SERVICES

PROJECT No. 125091
REV REV#1
DRAWING No. 125091-GP

CITY FILE No.Dxx-xx-XX-XXXX
CITY PLAN No. XXXXX

M:\2025\125091\CAD\Civil\125091-GP.dwg, GP_Jun 09, 2026 - 7:46pm, amestwarp
PLAN1:200 - 24"x36"(ARCH D)




REFER TO 125091-ND FOR ADDITIONAL NOTES & DETAILS

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.

NOT FOR CONSTRUCTION

| No. | REVISION | DATE | BY |
|---|---|---|---|
| 1. | ISSUED FOR SITEPLAN APPLICATION | JUNE 10/26 | ARM |

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

| | |
|---|---|
| DESIGN | ARM |
| CHECKED | GJM |
| DRAWN | AM |
| CHECKED | ARM |
| APPROVED | GJM |

FOR REVIEW ONLY


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


LOCATION
CITY OF OTTAWA
PALLADIUM 2

DRAWING NAME
GRADING PLAN

| | |
|---|---|
| PROJECT No. | 125091 |
| REV | REV#1 |
| DRAWING No. | 125091-GR |

CITY PLAN No. XXXXX

M:\2025\125091\CAD\Civil\125091-GR_Layout.dwg, GR_Jun 09, 2026 - 7:45pm, amestwarp

CITY FILE No.Dxx-xx-XX-XXXX