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## 2380 Tenth Line Road

## City of Ottawa

## Servicing and Stormwater Management Report

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**2380 Tenth Line Road**  
**City of Ottawa**  
**Servicing and Stormwater Management Report**

Prepared By:

**NOVATECH**  
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K2M 1P6

October 16, 2025  
Revised: April 17, 2026  
Revised: August 24, 2026

Novatech File: 125079  
Ref: R-2025-96

August 24, 2026

City of Ottawa  
Planning, Development and Building Services Department (PDBS)  
110 Laurier Avenue West, 4<sup>th</sup> Floor  
Ottawa ON, K1P 1J1

**Attention: John Sevigny C.E.T – A/Manager, Development Review East Branch**

**Reference: 2380 Tenth Line Road  
Servicing and Stormwater Management Report  
Our File No.: 125079**

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Please find enclosed the 'Servicing and Stormwater Management Report' for the above noted development located in the City of Ottawa. This report is submitted in support of the site plan application for the proposed development at 2380 Tenth Line Road.

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

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## 1.0 INTRODUCTION

Novatech has been retained to prepare a Servicing and Stormwater Management Report for the proposed retirement home on the property municipally known as 2380 Tenth Line Road in Ward 19 – Orleans South Navan. The following report outlines how the proposed development will be serviced with sanitary, storm and water infrastructure. **Figure 1** Key Plan shows the site location.

### 1.1 Existing Conditions

The subject site is approximately **0.624 hectares (ha.)** in size and is located on the north side of Promenade Decoeur Drive in the Orleans South-Navan Ward (Ward 19) in the City of Ottawa. The Subject Site is in an area bounded by Tenth Line Road to the east, the 2370 Tenth Line Condo development to the North, David Lewis Private to the west, and Promenade Decoeur Drive to the south.

A low-rise subdivision abuts the Subject Site to the north and west. Tenth Line Road, and low-rise dwellings featuring a mix of townhouses and single-family dwellings and open space are situated to the east and northeast of the site. Decoeur Drive, and low-rise dwellings with a mix of townhouses and single-family dwellings are situated to the south. The Notre-Place Catholic Elementary School is situated west of the site. **Figure 2** shows the existing site conditions.

The subject site is within the East Urban community and is subject to the design criteria within the following report:

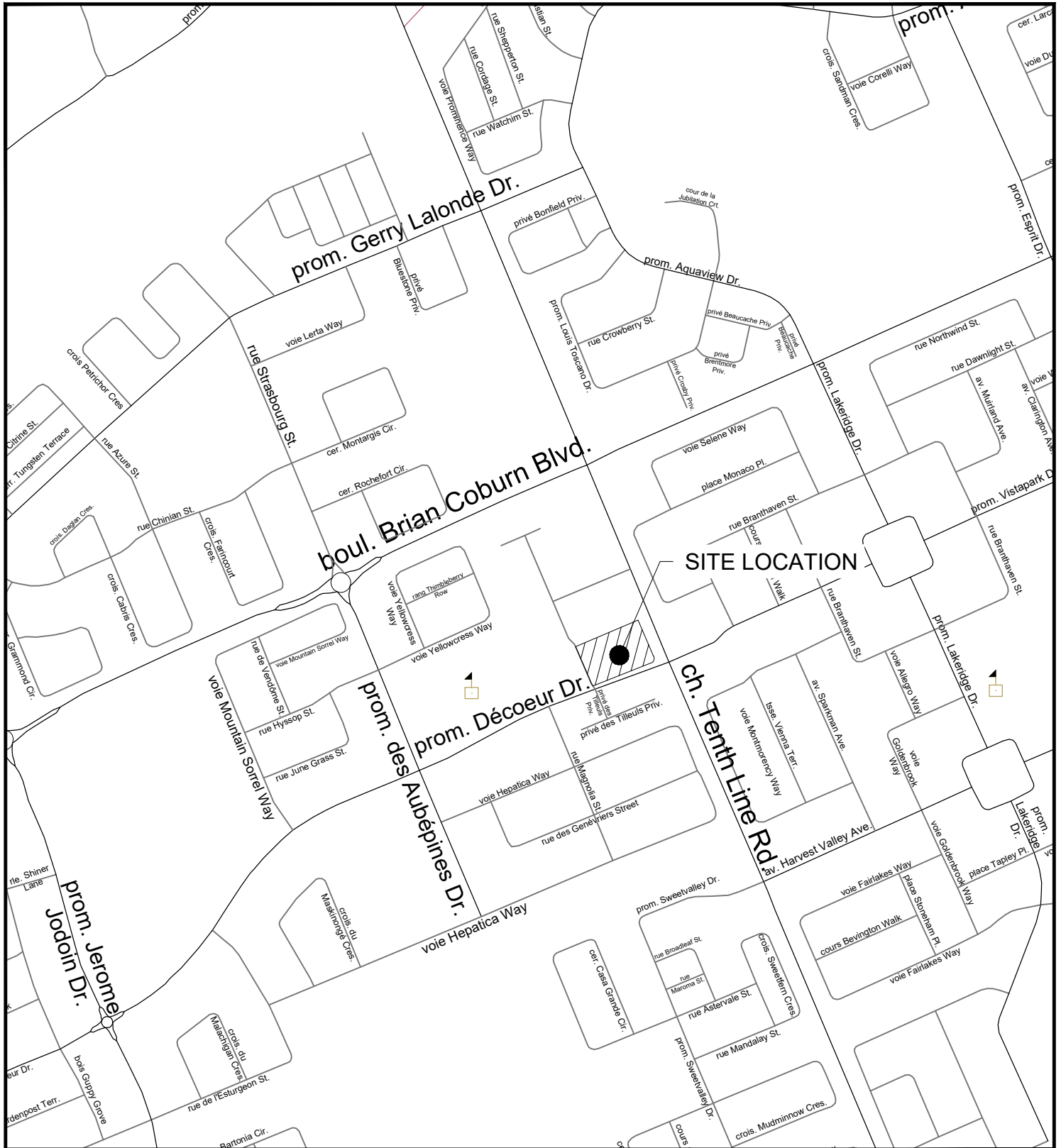
- 'East Urban Community (Neighborhood 5) Avalon West – Stage 3 Site Servicing and Stormwater Management Report', Atrel Engineering Ltd., November 2014 (Revision 7), (Referenced as **Atrel Report**).

Within the above report the subject site was a portion of Block 123. Block 123 has since been severed into multiple parcels including the neighboring 2370 Tenthline road development. Design information pertaining to the neighboring Tenth Line Road development is available within the following report:

- '2370 Tenth Line - Site Servicing and Stormwater Management Report', Stantec Consulting Ltd., December 2, 2022 (Revision 2), (Referenced as **2370 Report**).

### 1.2 Proposed Development

It is proposed to develop the site with a six (6) storey Retirement Home complete with above ground parking and an underground parking structure. The building will have a footprint of **2101.72 m<sup>2</sup>**, with a total of 141 dwelling units. Vehicular access to the site will be provided from Promenade Decoeur Drive while pedestrian access will be provided from both Promenade Decoeur Drive, and Tenth Line Rd. **Figure 3** shows the concept plan for the proposed development.



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CITY OF OTTAWA  
2380 TENTH LINE RD

KEY PLAN

SCALE

N.T.S

DATE

SEP 2025

JOB

125079

FIGURE

FIGURE 1

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**LEGEND**



SITE BOUNDARY



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CITY OF OTTAWA  
2380 TENTH LINE

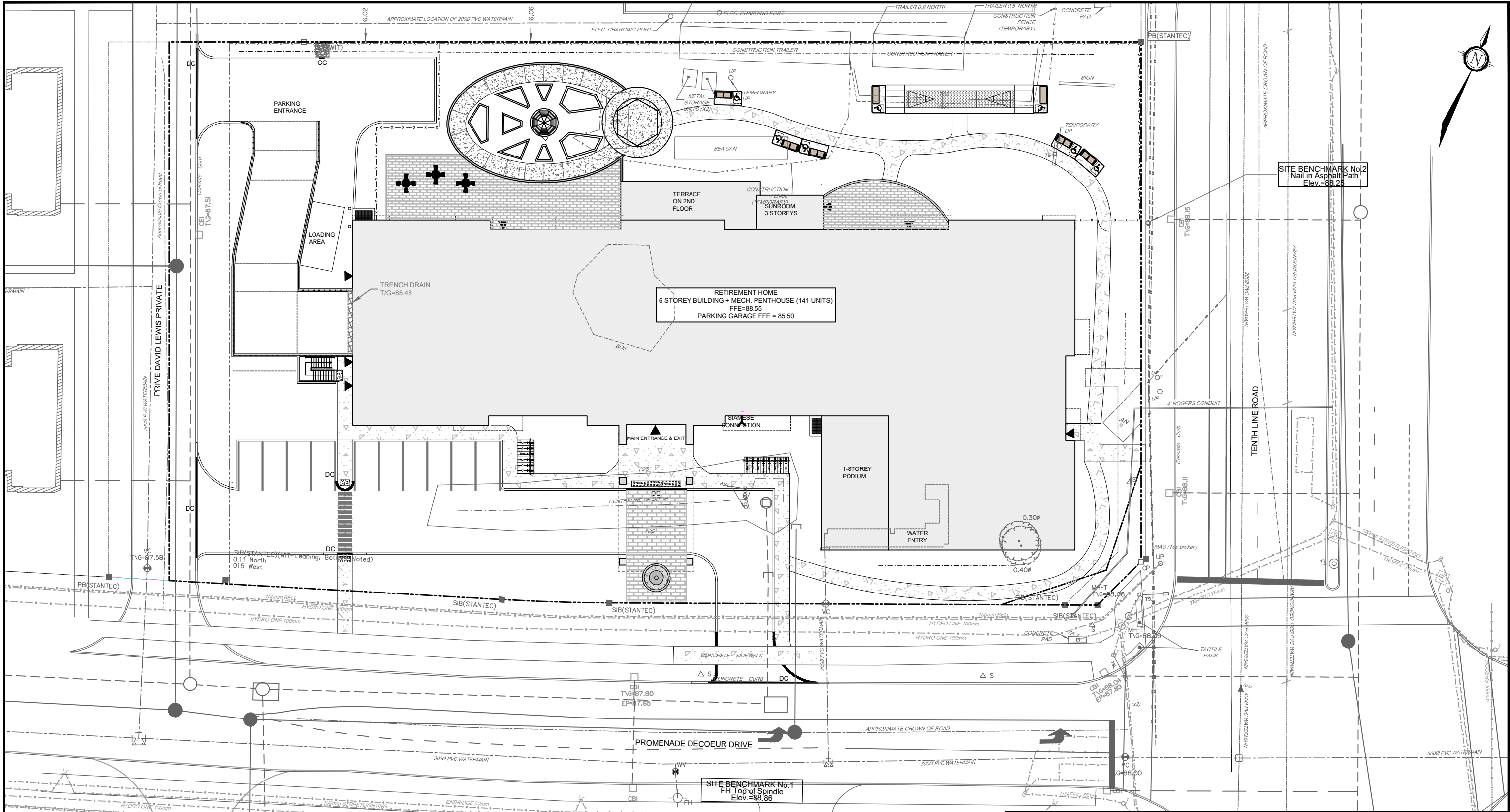
**EXISTING CONDITIONS**

SCALE 1 : 500 0 5m 10m 20m

DATE OCT 2025 JOB 125079 FIGURE FIG-3

CUT11V17 DWG 270mm X 122mm

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LEGEND

- SITE BOUNDARY
- BUILDING HATCH

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CITY OF OTTAWA  
2380 TENTH LINE RD

SITE PLAN

SCALE 1 : 400

DATE AUG 2026 JOB 125079 FIGURE FIGURE 3

## 2.0 GEOTECHNICAL INVESTIGATION

A geotechnical investigation was completed for the subject site, and a report prepared entitled 'Geotechnical Investigation', Proposed Multi-Storey Building, 2380 Tenth Line Road, Ottawa Ontario prepared by Paterson Group Inc. dated May 23, 2025 (PG7518-1). The following is a summary of the findings of the report:

- Based on these observations, the long-term groundwater table can be expected to be at a depth of approximately 2.5 to 3.5 m below the existing ground surface. It should be noted that groundwater levels are subject to seasonal fluctuations. Therefore, the groundwater levels could vary at the time of construction.
- Topsoil, building debris, and deleterious fill, such as those containing organic materials, should be stripped from under any buildings, paved areas, pipe bedding and other settlement sensitive structures.
- A permissible grade raise restriction of 0.8 m is recommended for the subject site. If greater permissible grade raises are required, preloading with or without a surcharge, lightweight fill, and/or other measures should be investigated to reduce the risks of unacceptable long-term post construction total and differential settlements.
- The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be cut back at 1H:1V or flatter. The flatter slope is required for excavation below groundwater level. Excavations below the groundwater level should be cut back at a maximum slope of 1.5H:1V. The subsoil at this site is considered to be mainly a Type 2 and 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects. Excavated soil should not be stockpiled directly at the top of excavations and heavy equipment should be kept away from the excavation sides. Slopes in excess of 3 m in height should be periodically inspected by the geotechnical consultant in order to detect if the slopes are exhibiting signs of distress.
- To reduce long-term lowering of the groundwater level at this site, clay seals should be provided in the service trenches. The seals should be at least 1.5 m long and should extend from trench wall to trench wall. Generally, the seals should extend from the frost line and fully penetrate the bedding, subbedding and cover material.
- 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 Person as stipulated under O.Reg. 63/16.

- The plasticity index of the silty clay deposit at the subject site does not exceed 40%. Therefore, the following tree planting setbacks are recommended for the silty clay deposit. Large trees (mature height over 14 m) can be planted within the silty clay areas provided a tree to foundation setback equal to the full mature height of the tree can be provided (e.g., in a park or other green space). Detailed tree planting recommendations in relation to the soil analysis are outlined within the Geotechnical report.

### 3.0 WATER SERVICING

The proposed development is located within the City of Ottawa's Zone 2E water distribution system. Existing City watermains are present within all municipal rights-of-way fronting the site. A 300 mm diameter PVC watermain is located within Promenade Decoeur Drive, while Tenth Line Road contains a 400 mm diameter PVC watermain that reduces to 200 mm in diameter. Additionally, a 200 mm diameter PVC watermain is situated within David Lewis Private adjacent to the site. A 300 mm diameter PVC service connection also extends from Promenade Decoeur Drive into the proposed development area.

#### 3.1 Watermain Design Parameters

Water demands have been calculated using criteria from Section 4 of the City of Ottawa Water Distribution Guidelines, ISTB-2021-03, and the Ontario Building Code as follows:

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

| Domestic Demand                  | Design Parameters                                                                                           |
|----------------------------------|-------------------------------------------------------------------------------------------------------------|
| Unit Population: Assisted Care   | 1.0 people/unit                                                                                             |
| Studio/1-Bed Apartments          | 1.4 people/unit                                                                                             |
| 2-bed Apartments                 | 2.1 people/unit                                                                                             |
| Residential Average Day Demand   | 280 L/c/d                                                                                                   |
| Assisted Care Average Day Demand | 450 L/c/d                                                                                                   |
| Maximum Day Demand (MXDY)        | Residential: 2.5 x Basic Day (> 500 Persons)<br>MOE Table 3-3 (<500 Persons)<br>Commercial: 1.5 x Basic Day |
| Peak Hour Demand (PKHR)          | Residential: 2.2 x Max Day (> 500 Persons)<br>MOE Table 3-3 (<500 Persons)<br>Commercial: 2.70 x Basic Day  |
| Commercial                       | Design Parameters                                                                                           |
| Beauty Salon                     | 650 L/station/day                                                                                           |
| Water Closet                     | 150L/fixture/day                                                                                            |
| Office                           | 75L/person/day                                                                                              |
| Dinning Area                     | 125 L/seat/day (1 seat/1.1m <sup>2</sup> )                                                                  |

| Fire Demand (FF) Design                    | Design Flows                       |
|--------------------------------------------|------------------------------------|
| Apartment Building                         | per FUS 2020                       |
| Hydrant spacing                            | 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 building is residential occupancy (Limited Combustible) and is composed of non-combustible 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. The building will have a footprint of **2101.72m<sup>2</sup>**. Correspondence with the Architect is included in **Appendix A** for reference.

### 3.3 Water Demand

The water demand calculations, fire flow calculations and correspondence are provided in **Appendix A** for reference. A summary of the water demand and fire flows are provided in **Table 3.2**.

**Table 3.2: Domestic Water Demand Summary**

| Population | Ave. Daily Demand (L/s) | Max. Daily Demand (L/s) | Peak Hour Demand (L/s) | Fire Flow (L/s) |
|------------|-------------------------|-------------------------|------------------------|-----------------|
| 177.60     | 1.41                    | 4.48                    | 7.08                   | 83              |

As per **ITSB 2021-03** the proposed development demand is above **50m<sup>3</sup>/day**, and contains more than 50 units, thus will need to be serviced with two (2) services separated by an isolation valve. Therefore, it is proposed to service by utilizing the existing 300mm diameter stub from Promenade Decoeur Drive, and a second new service will be installed adjacent the existing service complete with an isolation valve between the services. The existing 300mm service will be reduced to 200mm prior to entering the building.

Additionally, the required site fire flow will be provided by the existing City owned fire hydrants within the Promenade Decoeur Drive right-of-way. All existing hydrants within the vicinity of the development are blue top hydrants indicating a rating of Class AA. As per **ITSB 2018-02** 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<br>(m) | Contribution to Fire Flow |       |
|---------------|-----------------------------|---------------------------|-------|
|               |                             | (L/min)                   | (L/s) |
| AA            | ≤75                         | 5700                      | 95    |
|               | >75 and ≥150                | 3800                      | 63.33 |
| A             | ≤75                         | 3800                      | 63.33 |
|               | >75 and ≥150                | 2850                      | 47.50 |
| B             | ≤75                         | 1900                      | 31.67 |
|               | >75 and ≥150                | 1500                      | 25.00 |
| C             | ≤75                         | 800                       | 13.33 |
|               | >75 and ≥150                | 800                       | 13.33 |

With a calculated fire flow requirement of **83 L/s**, a single hydrant is sufficient to meet the required flow. There are currently two existing Class AA hydrants along Promenade Decoeur Drive: one located within **75 m** of the proposed building and another approximately **77.9 m** away, together capable of providing a combined flow of **158.33 L/s**, as outlined in **Table 3.2**. One of the hydrants, located on the opposite side of the road, is within **45 m** of the proposed Siamese connection. Refer to **Appendix A** for the Hydrant Coverage figure which depicts the existing hydrants and distances to the proposed building.

### 3.4 Water Analysis

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 and Hydraulic Analysis Summary**

| Criteria                                               | Head<br>(m) | Pressure <sup>1</sup><br>(psi) | Pressure<br>Requirements<br>(psi) |
|--------------------------------------------------------|-------------|--------------------------------|-----------------------------------|
| <b>Connection (300mm dia. Promenade Decoeur Drive)</b> |             |                                |                                   |
| Max HGL (Average Day)                                  | 130.2       | 59.2                           | < 80psi                           |
| Min HGL (Peak Hour)                                    | 126.9       | 54.5                           | > 40psi                           |
| Max Day + Fire Flow (1300L/min)                        | 126.9       | 54.5                           | > 20psi                           |

<sup>1</sup>Pressure based on a Finished Floor elevation of 88.55m

Based on the above system pressures the existing City infrastructure has capacity to service the proposed development. Booster pumps will be utilized by the internal mechanical system to ensure adequate pressures to the upper floors, as required. Refer to **Appendix A** for detailed water demand calculations and City of Ottawa boundary conditions.

#### 4.0 SANITARY SERVICING

Existing City sanitary sewers are located within all municipal rights-of-way fronting the site. A 250mm diameter sanitary main is located within Promenade Decoeur Drive, terminating at existing maintenance hole (MH) 3102, while Tenth Line Road contains a 600 mm diameter sanitary main. Additionally, a 250 mm diameter sanitary main is situated within David Lewis Private adjacent to the site. A 250 mm diameter service connection also extends from existing MH 3102 in Promenade Decoeur Drive into the proposed development area.

To provide sanitary servicing for the proposed development, a new 1,200 mm diameter maintenance hole will be installed at the property line connecting to the existing 250mm service stub. From this new maintenance hole, a 250 mm diameter PVC service connection will extend to the building to convey sanitary flows to the municipal system.

#### 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, ITSB-2018-01, and the Ontario Building Code as follows:

**Table 4.1: Sanitary Sewer Design Parameters**

| Design Component                 | Design Parameter                                                               |
|----------------------------------|--------------------------------------------------------------------------------|
| Unit Population: Assisted Care   | 1.0 person/unit                                                                |
| Studio/ 1-Bed Apartment          | 1.4 person/unit                                                                |
| 2-bed Apartment                  | 2.1 person/unit                                                                |
| Residential Flow Rate            | 280 L/cap/day                                                                  |
| Assisted Care Average Day Demand | 450 L/cap/day                                                                  |
| Residential Peaking Factor       | Harmon Equation (min=2.0, max=4.0)<br>Harmon Correction Factor = 0.8m (Design) |
| Commercial Flows: Beauty Salon   | 650 L/station/day                                                              |
| Water Closet                     | 150L/fixture/day                                                               |
| Office                           | 75L/person/day                                                                 |
| Dinning Area                     | 125 L/seat/day (1 seat/1.1m <sup>2</sup> )                                     |
| Extraneous Flow Rate             | Design = 0.33 L/s/ha                                                           |
| Minimum Pipe Size                | 200mm (Res)                                                                    |
| Minimum Velocity <sup>1</sup>    | 0.6 m/s                                                                        |
| Maximum Velocity                 | 3.0 m/s                                                                        |
| Minimum Pipe Cover               | 2.0 m (Unless frost protection provided)                                       |

<sup>1</sup>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 residential and assisted care units. The residential units will be composed of twenty-four (24) studio, fifty-one (51) one (1) bed, and six (6) two (2) bed apartments for a total of 81 units and a population of 118 persons. The assisted care units will be composed of fifty (50) studio, and ten (10) one (1) bed units for a total of 60 units and a population of 60 persons. The proposed residential flow for the site was determined to be **2.45L/s**. There will also be communal amenities on the ground floor including a dining area, salon, and an administrative office area. Additionally, there will be water closets for Guests and staff. The anticipated commercial flow from the development is **0.72L/s**. The extraneous flows for the **0.625ha** development was calculated to be **0.21L/s**. Thus, the peak sanitary flow including infiltration for the development is **3.38 L/s**. Detailed sanitary flow calculations are provided in **Appendix B** for reference.

## 4.3 Anticipated Site Flows

As noted previously, the detailed design of the East Urban Community was completed by Atrel with details provided within the **Atrel Report**. The East Community design assumed that 2370 Tenth Line and 2380 Tenth Line were one parcel **4.79 ha** in area with a commercial occupancy. The assumed flows were **50000L/day** with a peaking factor of **1.5**, and an extraneous flow of **0.28 L/s/ha**. The above resulted in a flow allotment of **5.50L/s** for the combined parcel. Therefore, the flow allotment for the proposed **0.624ha** development is **0.72L/s**.

## 4.4 Downstream Capacity

The Avalon West – Stage 3 sanitary collection system is directed to the Tenth Line Road Pumping Station at 2428 Tenth Line Road. As noted above, the proposed flows are higher than anticipated during the overall design. As such the capacity of the downstream system was reviewed to ensure that there is adequate capacity for the proposed development. The proposed development will result in an increase of **2.66L/s**.

It should also be noted that the neighboring 2370 Tenth Line also exceeded the allotment for the property. As noted in the **2370 Report**, 2370 Tenth Line had a property area of **3.19 ha**, and a design flow of **7.5L/s**. Based on the **Atrel Report** allotment values the site had an allotment of **3.66L/s**, for an exceedance of **3.84L/s**.

Thus, the total increase in flows to the downstream system from 2370 and 2380 Tenth Line is **6.5L/s**.

The flows from the site are conveyed through the system to the pumping station at 2428 Tenth Line Road. In the downstream system the pipe run from 3275-3276 in Hepacia Crescent had the least available capacity with a design flow of **100.31L/s**, and a capacity of **149.48 L/s**, for a utilization of **67.1%**. The increase in flow will result in a utilization of approximately **71%**.

It should be noted that the analysis in the **Atrel Report** was performed utilizing a sanitary flow of **350 L/cap/Day** which is significantly higher than the present **280l/cap/day** design flow, and thus the numbers above are conservative.

The slight increase in utilization will have a negligible impact on the downstream system. Based on the above analysis, the downstream system has capacity for the proposed development. Refer to **Appendix B** for report excerpts.

## 5.0 STORM SERVICING

Existing City storm sewers are located within all municipal rights-of-way fronting the proposed site. A 1,200 mm diameter storm sewer is situated within the Promenade Decoeur Drive right-of-way, terminating at existing maintenance hole (MH) 3574, while an 825 mm diameter storm sewer is located within the David Lewis Private right-of-way. The Tenth Line Road right-of-way also contains storm sewers ranging in diameter from 375 mm to 525 mm. Additionally, a 1,200 mm diameter service extends from existing MH 3574 in Promenade Decoeur Drive into the proposed development area.

The proposed development will be serviced using the existing 1,200 mm storm service. From this service, a private storm system will be constructed consisting of an independent controlled catch basin system along the northwestern and northeastern site boundary, a second independent controlled catch basin system complete with a 1,350 mm pipe and a 250 mm diameter building connection to convey roof drainage flows, and a 250 mm diameter building connection to convey uncontrolled foundation drainage and garage ramp flows. Refer to the General Plan of Services drawing **(125079-GP)** for detailed servicing information.

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 C** for detailed storm drainage area plans 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, and the **Atrel Report**.

### 6.1 Design Criteria

Through correspondence with the City of Ottawa, the **Atrel Report** and our knowledge of development requirements in the area, the following criteria have been adopted to control post-development stormwater discharge from the site:

- Control proposed development flows, up to and including the 100-year storm event, to an allowable release rate of **220L/s/ha**;
- Provide source controls which are in conformity with the City of Ottawa requirements, where possible;
- Limit ponding to 0.15 m for all rooftop storage areas and 0.35 m for all parking storage areas; and
- Provide guidelines to ensure that site preparation and construction is in accordance with the current Best Management Practices for Erosion and Sediment Control.

The approach to the stormwater management design is to determine the allowable release rate for the site, calculate the uncontrolled flow, and ensure that the remaining flow, in combination with the uncontrolled flow, does not exceed the allowable release rate. All proposed development runoff in excess of the allowable release rate, will be attenuated on-site prior to being released into the storm sewers Promenade Decoeur Drive.

### 6.2 Quantity Control

The proposed site is contained within the tributary area of the Avalon West (N5) SWM Facility. The flows from the site will be conveyed through the storm sewers of the rights-of-way, prior to discharging to the existing pond and ultimately the McKinnon Creek. The inflow rate into the minor system of the neighboring subdivisions was limited to **220 L/s/ha**, and a time of concentration of 10 minutes.

The proposed site has a total area of **0.624 ha**. The **0.037 ha** portion of the site within the right-of-way easement for David Lewis Private is captured within the neighboring 2370 storm system. As such allowable release rate for the remaining **0.587 ha** was calculated to be **129.1 L/s** based on the above criteria. It is proposed to control the post-development flows to the allowable release rate through the use of ICD's within proposed catch basin and maintenance hole structures as described in the following sections.

#### 6.2.1 Design Storms

The design storms are based on City of Ottawa IDF curve equations provided within the City of Ottawa sewer design Guidelines. Design storms were used for the 2, 5, 100, and 100+20%-year return periods (i.e. storm events) as listed below.

$$\begin{aligned} 100\text{-year} + 20\% \text{ Intensity} &= (1735.688 / (\text{Time in min} + 6.014)^{0.820}) * 1.20 \\ 100\text{-year Intensity} &= 1735.688 / (\text{Time in min} + 6.014)^{0.820} \\ 5\text{-year Intensity} &= 998.071 / (\text{Time in min} + 6.053)^{0.814} \\ 2\text{-year Intensity} &= 732.951 / (\text{Time in min} + 6.199)^{0.810} \end{aligned}$$

### 6.2.2 Catchment Areas

Post-development catchments were analyzed utilizing the rational method based on the proposed site plan and grading as shown on **Drawing 125079-SWM** within **Appendix C**.

The site has been divided into Seven (7) drainage areas for the post development condition. The drainage areas are as follows:

#### Area A-01:

- Stormwater from the proposed parking garage ramp will be collected by a proposed area drain and trench drain. The flows will be directed to the proposed free flowing building service at STMMH 101 by the internal mechanical system. The flows will remain uncontrolled and will drain by gravity to the existing sewer system within Promenade Decoeur Drive.

#### Area A-02:

- Stormwater from the proposed swale system located to the rear and along the east side of the building will be collected by landscape drains and catch basins. These flows will be controlled by a proposed inlet control device (ICD) within catchbasin manhole 102. The flows will then discharge by gravity to the existing sewer system within Promenade Decoeur Drive.

#### Area A-03 & A-04:

- Stormwater from the above ground parking area will be collected by proposed catchbasins, and conveyed to the 1350mm pipe between STMMH 106 and STMMH 105. The flows will be controlled by a proposed ICD within STMMH 105 and then drain by gravity to the existing sewer system within Promenade Decoeur Drive.

#### Area R-00:

- Stormwater from the building roof will be captured by roof drains and conveyed to the storm service connecting to STMMH 105 by the internal mechanical system. Flow attenuation will be provided by the proposed ICD within STMMH 105 with storage provided within the 1350mm pipe between STMMH 106 and STMMH 106.
- The roof will be provided complete with overflow scuppers provided for emergencies limiting potential ponding to 150mm above the roof insulation. Further details will be provided once a mechanical consultant is retained for the subject development.

#### Area D-01:

- The drainage along the west edge of the above ground parking area will flow uncontrolled to the David Lewis Private right-of-way, where it will be captured by the existing storm system.

#### Area D-02

- The drainage from the landscaped area and back of curb along the south property line will sheet flow uncontrolled to the Promenade Decoeur Drive right-of-way, where it will be captured by the existing storm system.

### 6.2.3 Rational Method Calculations

The stormwater flows for the subject site were calculated utilizing the rational method. The rational method utilizes the rainfall IFC curves and weighted runoff coefficients based on the proposed surface types. The minimum time of concentration to be utilized with the rational method is 10min as the results become erroneous at lower values. The equation is as follows:

$$Q = 2.78 \times C \times I \times A$$

Where:

C= The runoff coefficient

I is the rainfall intensity, City of Ottawa IDF

A is the catchment drainage area

The runoff coefficients for various surface types are as follows:

**Table 6.1: Runoff Coefficients**

| Surface Types   | Runoff Coefficient |
|-----------------|--------------------|
| Building Roof   | 0.90               |
| Asphalt Parking | 0.90               |
| Grass           | 0.20               |

Table **6.2 below** summarizes the flow, storage required, and storage provided for each of the site catchment areas.

Table 6.2: Stormwater Management Summary

| Area ID                      | Area (ha) | 1:5 Year Weighted Cw | 1:100 Year Weighted Cw | Control Device |     | Outlet Location         | 2 Year Storm Event |          |                  | 5 Year Storm Event |          |                  | 100 Year Storm Event |          |                  |                            |
|------------------------------|-----------|----------------------|------------------------|----------------|-----|-------------------------|--------------------|----------|------------------|--------------------|----------|------------------|----------------------|----------|------------------|----------------------------|
|                              |           |                      |                        |                |     |                         | Release (L/s)      | Head (m) | Req'd Vol (cu.m) | Release (L/s)      | Head (m) | Req'd Vol (cu.m) | Release (L/s)        | Head (m) | Req'd Vol (cu.m) | Max. Vol. Provided (cu.m.) |
| D-01                         | 0.004     | 0.40                 | 0.46                   | N/A            |     | David Lewis Private     | 0.40               | N/A      | N/A              | 0.50               | N/A      | N/A              | 1.00                 | N/A      | N/A              | N/A                        |
| D-02                         | 0.005     | 0.49                 | 0.56                   | N/A            |     | Promenade Decoeur Drive | 0.50               | N/A      | N/A              | 0.70               | N/A      | N/A              | 1.40                 | N/A      | N/A              | N/A                        |
| A-01                         | 0.025     | 0.90                 | 1.00                   | N/A            |     | Promenade Decoeur Drive | 4.70               | N/A      | N/A              | 6.40               | N/A      | N/A              | 12.20                | N/A      | N/A              | N/A                        |
| A-02                         | 0.222     | 0.50                 | 0.58                   | Plate Oriface  | 127 | Promenade Decoeur Drive | 23.90              | N/A      | N/A              | 32.42              | N/A      | N/A              | 49.50                | 1.994    | 23.43            | 28.96                      |
| R00, A-03, A-04              | 0.330     | 0.81                 | 0.91                   | Plate Oriface  | 152 | Promenade Decoeur Drive | 33.50              | 0.448    | 26.46            | 41.00              | 0.683    | 38.267           | 62.00                | 1.533    | 83.07            | 100.35                     |
| Post-Development Flow        |           |                      |                        |                |     |                         | 63.0               | -        |                  | 81.0               | -        |                  | 126.1                | -        |                  |                            |
| Total Allowable Release Rate |           |                      |                        |                |     |                         | 129.1              |          |                  | 129.1              |          |                  | 129.1                |          |                  |                            |

As summarized in the above table, the post-development flows will be controlled to **126.1 L/s**, approximately **3.0 L/s** lower than the pre-development condition of the site. The flows will be controlled by proposed ICDs within CBMH 102, and STMMH 105. All other flows from the site are proposed to be free flowing. All flows conveyed by others, or the internal mechanical system, shall adhere to the values in the above table.

Refer to **Appendix C** for Rational Method calculations and Drawing **125079-SWM**-Stormwater Management Plan.

### 6.3 Quality Control

As noted above the subject site is tributary to the Avalon West (N5) SWM Facility. The existing facility was designed to provide an Enhanced Level of Protection (80% total suspended solids removal) per MECP guidelines. As such no onsite quality control measures are required for the proposed site. Excerpts from the **Atrel Report** are included in **Appendix C** for reference.

### 6.4 Major Overland Flow Route

A major overland flow route will be provided for storms greater than the 100-year storm event. Stormwater will be directed to the surrounding rights-of-way, and the rear yard swale of the adjoining subdivision. The major overland system is shown on the Grading Plan (drawing 125079-GR).

## 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;
- Strawbale or rock check dams will be installed in swales and ditches;
- The contractor will be required to perform regular street sweeping and cleaning as required, to suppress dust and to provide safe and clean roadways adjacent to the construction site;

Erosion and sediment control measures should be inspected daily and after every rain event to determine maintenance, repair or replacement requirements. Sediments or granulars that enter site sewers shall be removed immediately by the contractor. These measures will be implemented prior to the commencement of construction and maintained in good order until vegetation has been established. Refer to the Erosion and Sediment Control Plan (drawing 125079-ESC) for additional information.

## 8.0 CONCLUSIONS AND RECOMMENDATIONS

### Watermain

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

- The existing 300 mm diameter service, together with the proposed 200 mm diameter water service connections to the existing 300 mm watermain within Promenade Decoeur Drive, will provide adequate servicing for the proposed development.
- There are adequate pressures in the existing watermain infrastructure to meet the required domestic demands for the development.
- There is adequate flow to service the proposed fire protections system.

### Sanitary Servicing

The analysis of the proposed sanitary system confirms the following:

- It is proposed to service the development with a new 250 mm sanitary service, connecting to the proposed manhole and discharging into the existing 250 mm sanitary service, which outlets to the municipal sewer network within the Promenade Decoeur Drive.
- 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 storm sewers within in the Promenade Decoeur Drive right-of-way.
- Stormwater control is to be provided by parking lot storage.
- Storm flows will be attenuated through the implementation of inlet control devices.
- As per existing conditions major overland flow routes have been provided to the surrounding rights-of-way.

### Erosion and Sediment control

- Erosion and sediment control measures (i.e. filter fabric, catch basin 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:**



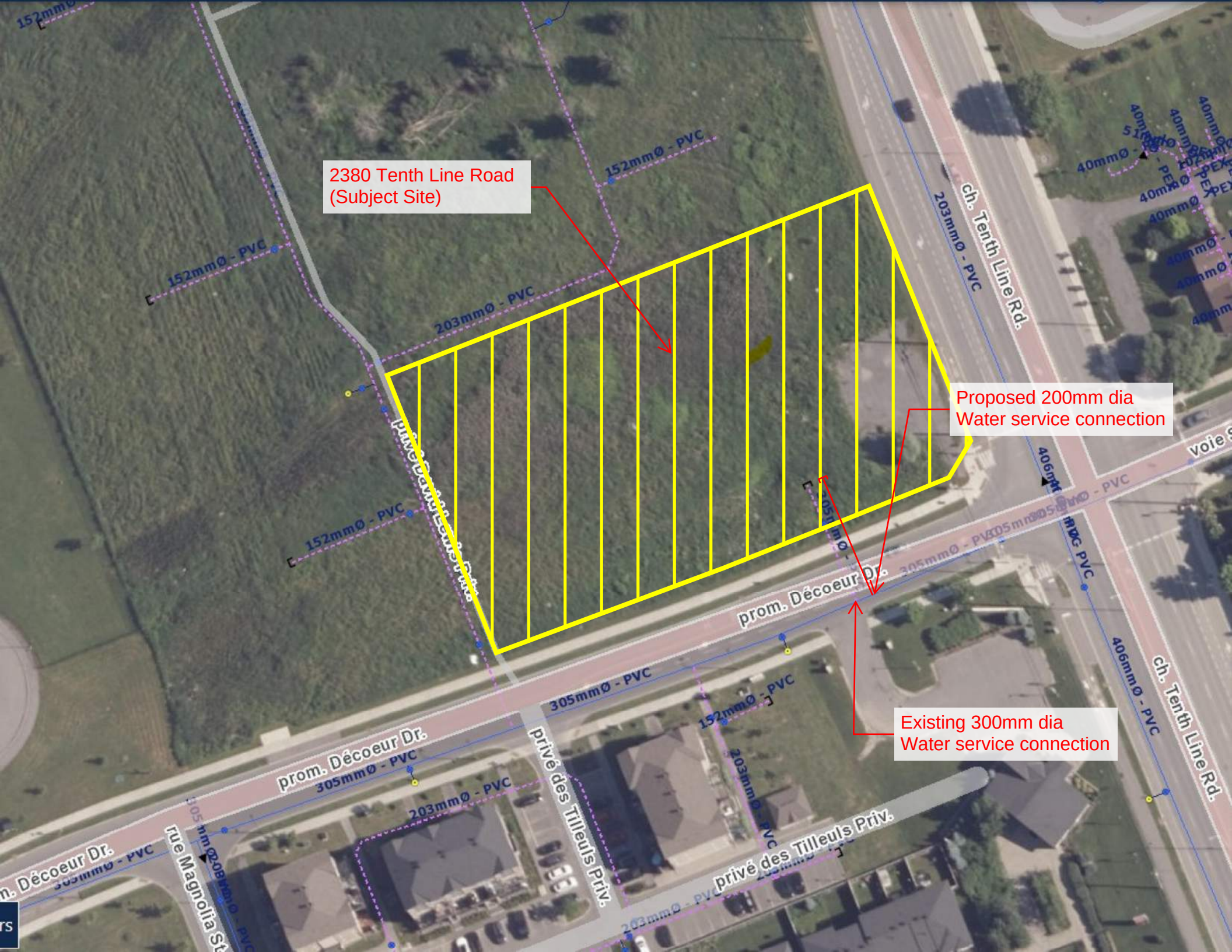
**Anthony Mestwarp, P.Eng  
Project Manager  
Land Development Engineering**

**Appendix A**  
**Water Servicing**

2380 Tenth Line Road  
(Subject Site)

Proposed 200mm dia  
Water service connection

Existing 300mm dia  
Water service connection



# Water Demand Design Sheet

## Boundary Condition Request

Novatech Project #: 125079  
Project Name: 2380 Tenth Line  
Date: 9/30/2025  
Input By: Anjush Musyaju, EIT  
Reviewed By: Anthony Mestwarp, P.Eng  
Drawing Reference: A100-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 = YES

|                                                            | # of Dwellings | # of fixtures/stations/offices | Area (m <sup>2</sup> ) | Pop. Equiv.   | Average Day Demand (L/s) | Maximum Day Demand (L/s) | Peak Hour Demand (L/s) |
|------------------------------------------------------------|----------------|--------------------------------|------------------------|---------------|--------------------------|--------------------------|------------------------|
| <b>Residential Input</b>                                   |                |                                |                        |               |                          |                          |                        |
| Apartments (2-BR)                                          | 6              |                                |                        | 12.60         | 0.04                     | 0.20                     | 0.30                   |
| Apartments (1-BR)                                          | 51             |                                |                        | 71.40         | 0.23                     | 1.13                     | 1.71                   |
| Apartments (Studio)                                        | 24             |                                |                        | 33.60         | 0.11                     | 0.53                     | 0.81                   |
| <b>Assisted care Input</b>                                 |                |                                |                        |               |                          |                          |                        |
| Apartments (1-BR)                                          | 11             |                                |                        | 11.00         | 0.06                     | 0.28                     | 0.42                   |
| Apartments (Studio)                                        | 49             |                                |                        | 49.00         | 0.26                     | 1.25                     | 1.89                   |
| <b>Industrial / Commercial / Institutional (ICI) Input</b> |                |                                |                        |               |                          |                          |                        |
| Beauty Salon                                               |                | 3.00                           |                        |               | 0.02                     | 0.03                     | 0.06                   |
| Water Closet                                               |                | 11.00                          |                        |               | 0.46                     | 0.69                     | 1.24                   |
| Office                                                     |                | 5.00                           |                        |               | 0.004                    | 0.01                     | 0.01                   |
| Dinning Area                                               |                |                                | 179.29                 | 162.99        | 0.24                     | 0.35                     | 0.64                   |
| Other Area                                                 |                |                                |                        |               | 0.00                     | 0.00                     | 0.00                   |
| <b>Totals</b>                                              | <b>141</b>     |                                | <b>179.29</b>          | <b>177.60</b> | <b>1.41</b>              | <b>4.48</b>              | <b>7.08</b>            |

\* It is assumed that the dinning area does not add to the building population and is mostly utilized by the tenants

## Summary

|                                                     |                                                                                                                                        |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| i. Type of Development and Units:                   | 6 Storey Retirement home building                                                                                                      |
| ii. Site Address:                                   | 2380 Tenth Line Road, Ottawa                                                                                                           |
| iii. Proposed Water Service Connection Location(s): | 200 mm service connection to tie into the existing 300 mm diameter watermain on Decoeur Drive, along with the existing 300 mm diameter |
| iv. Average Day Flow Demand:                        | 1.41 L/s                                                                                                                               |
| v. Peak Hour Flow Demand:                           | 7.08 L/s                                                                                                                               |
| vi. Maximum Day Flow Demand:                        | 4.48 L/s                                                                                                                               |
| vii. Required Fire Flow #1:                         | 5000 L/min                                                                                                                             |
| viii. Required Fire Flow #2:                        | L/min                                                                                                                                  |
| ix. Required Fire Flow #3:                          | L/min                                                                                                                                  |

# Water Demand Design Sheet

## Design Parameters

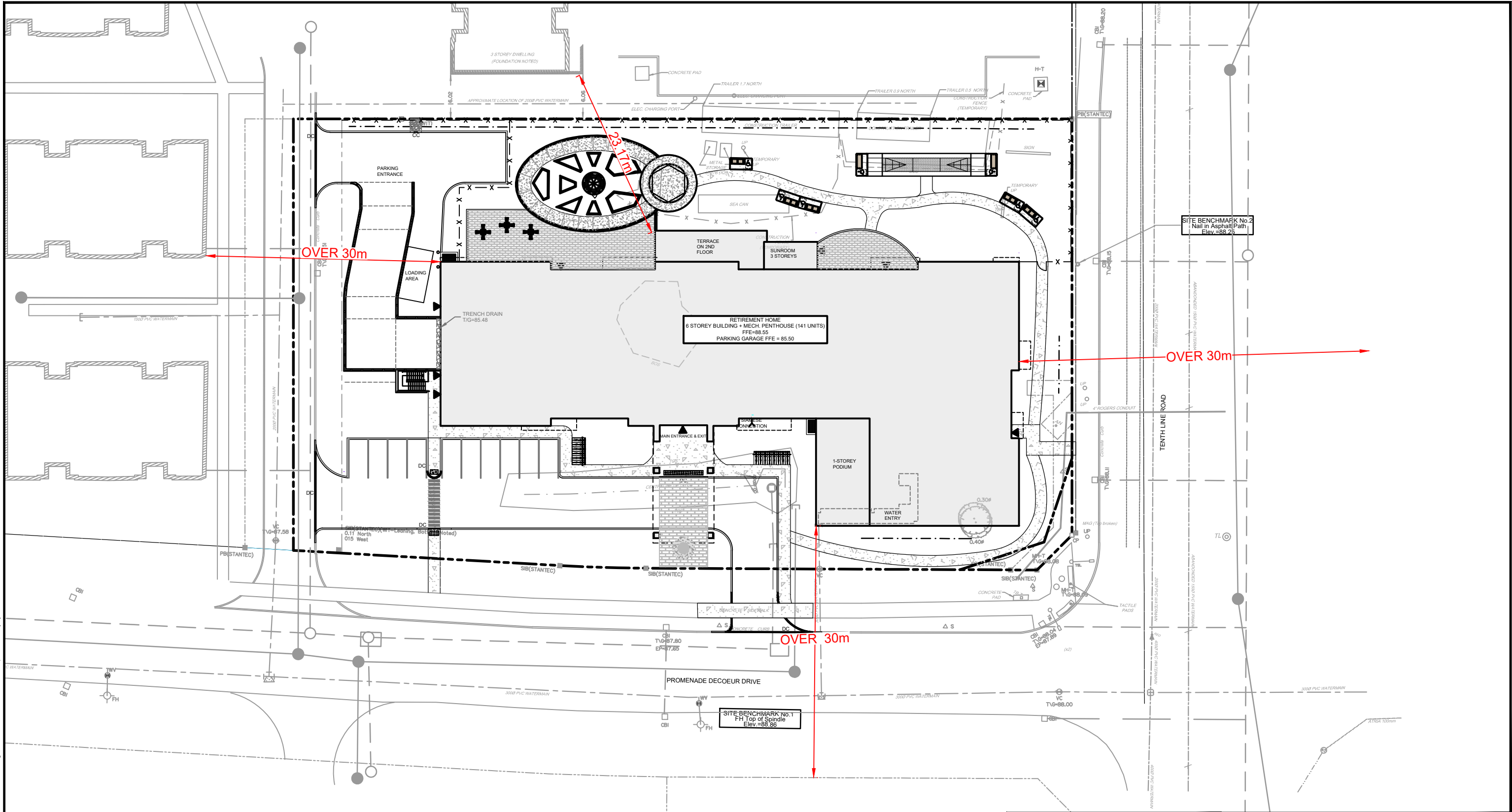
| Unit Type<br>Population Equiv. | Residential      |                |                  | Assisted         |                  | Dinning Area |
|--------------------------------|------------------|----------------|------------------|------------------|------------------|--------------|
|                                | Apts<br>(2-BR)   | Apts<br>(1-BR) | Apts<br>(Studio) | Apts<br>(1-BR)   | Apts<br>(Studio) |              |
|                                | 2.1              | 1.4            | 1.4              | 1                | 1                |              |
| Daily Demand                   | L/per person/day |                |                  | L/per person/day |                  |              |
| Average Demand                 | 280              |                |                  | 450              |                  |              |
| Basic Demand                   | 280              |                |                  | 450              |                  |              |

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

| Institutional / Commercial / Industrial |        |            |               |               |              |              |                           |
|-----------------------------------------|--------|------------|---------------|---------------|--------------|--------------|---------------------------|
| Industrial                              |        | Commercial | Institutional | Beauty Salon  | Water Closet | Office       | Dinning Area              |
| Light                                   | Heavy  |            |               |               |              |              | 1.1m <sup>2</sup> /person |
| L/gross ha/day                          |        |            |               | L/station/day | L/fixture/hr | L/person/day | L/seat/day                |
| 35,000                                  | 55,000 | 28,000     | 28,000        | 650           | 150          | 75           | 125                       |
| 10,000                                  | 17,000 | 17,000     | 17,000        |               |              |              |                           |

| ICI Peaking Factors | Max Day<br>(x Avg Day) | Peak Hour<br>(x Avg Day) |
|---------------------|------------------------|--------------------------|
|                     | 1.50                   | 2.70                     |

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## LEGEND

- PROPERTY LINE
- ← 19.28 → EXPOSURE DISTANCES



**NOVATECH**

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

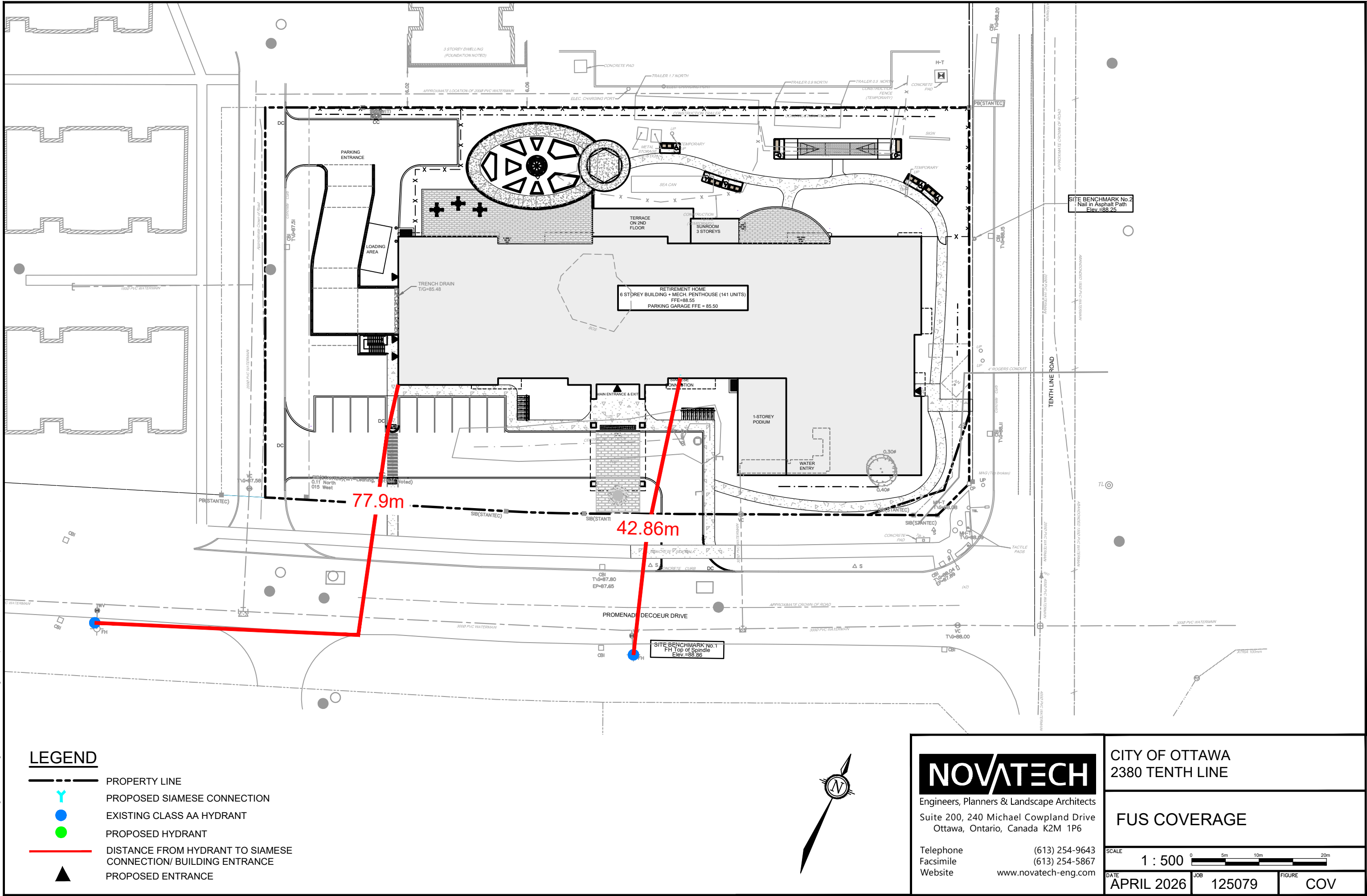
Telephone (613) 254-9643  
Facsimile (613) 254-5867  
Website [www.novatech-eng.com](http://www.novatech-eng.com)

CITY OF OTTAWA  
2380 TENTH LINE

## FUS SEPARATION

|        |            |              |
|--------|------------|--------------|
| SCALE  | 1 : 500    | 0 5m 10m 20m |
| DATE   | APRIL 2026 | JOB 125079   |
| FIGURE | SEP        |              |

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# FUS - Fire Flow Calculations

Novatech Project #: 125079  
Project Name: 2380 Tenth Line Road  
Date: 8/22/2025  
Input By: Anjush Musyaju, EIT  
Reviewed By: Anthony Mestwarp, P.Eng  
Drawing Reference: 125079-COV

Legend: Input by User

No Input Required

Reference: Fire Underwriter's Survey Guideline (2020)  
Formula Method

Building Description: Multi-Storey Tower  
Type II - Non-combustible construction

| Step                            |                                                                | Choose                                                                         |                    | Value Used                 | Total Fire Flow (L/min) |
|---------------------------------|----------------------------------------------------------------|--------------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|
| <b>Base Fire Flow</b>           |                                                                |                                                                                |                    |                            |                         |
| 1                               | <b>Construction Material</b>                                   |                                                                                | <b>Multiplier</b>  |                            | 0.8                     |
|                                 | <b>Coefficient related to type of construction</b><br><b>C</b> | Type V - Wood frame                                                            |                    | 1.5                        |                         |
|                                 |                                                                | Type IV - Mass Timber                                                          |                    | Varies                     |                         |
|                                 |                                                                | Type III - Ordinary construction                                               |                    | 1                          |                         |
|                                 |                                                                | Type II - Non-combustible construction                                         | Yes                | 0.8                        |                         |
|                                 |                                                                | Type I - Fire resistive construction (2 hrs)                                   |                    | 0.6                        |                         |
| 2                               | <b>Floor Area</b>                                              |                                                                                |                    |                            |                         |
|                                 | <b>A</b>                                                       | Building Footprint (m <sup>2</sup> )                                           | 2102               |                            |                         |
|                                 |                                                                | Number of Floors/Storeys                                                       | 6                  |                            |                         |
|                                 |                                                                | Protected Openings (1 hr) if C<1.0                                             | Yes                |                            |                         |
|                                 |                                                                | Area of structure considered (m <sup>2</sup> )                                 |                    | 3,153                      |                         |
|                                 | <b>F</b>                                                       | <b>Base fire flow without reductions</b><br><b>F = 220 C (A)<sup>0.5</sup></b> |                    |                            | 10,000                  |
| <b>Reductions or Surcharges</b> |                                                                |                                                                                |                    |                            |                         |
| 3                               | <b>Occupancy hazard reduction or surcharge</b>                 |                                                                                | <b>FUS Table 3</b> | <b>Reduction/Surcharge</b> | 8,500                   |
|                                 | (1)                                                            | Non-combustible                                                                |                    | -25%                       |                         |
|                                 |                                                                | Limited combustible                                                            | Yes                | -15%                       |                         |
|                                 |                                                                | Combustible                                                                    |                    | 0%                         |                         |
|                                 |                                                                | Free burning                                                                   |                    | 15%                        |                         |
|                                 |                                                                | Rapid burning                                                                  |                    | 25%                        |                         |
| 4                               | <b>Sprinkler Reduction</b>                                     |                                                                                | <b>FUS Table 4</b> | <b>Reduction</b>           | -4,250                  |
|                                 | (2)                                                            | Adequately Designed System (NFPA 13)                                           | Yes                | -30%                       |                         |
|                                 |                                                                | Standard Water Supply                                                          | Yes                | -10%                       |                         |
|                                 |                                                                | Fully Supervised System                                                        | Yes                | -10%                       |                         |
|                                 |                                                                | <b>Cumulative Sub-Total</b>                                                    |                    | -50%                       |                         |
| 5                               | <b>Exposure Surcharge</b>                                      |                                                                                | <b>FUS Table 5</b> | <b>Surcharge</b>           | 850                     |
|                                 | (3)                                                            | North Side                                                                     | 20.1 - 30 m        | 10%                        |                         |
|                                 |                                                                | East Side                                                                      | >30m               | 0%                         |                         |
|                                 |                                                                | South Side                                                                     | >30m               | 0%                         |                         |
|                                 |                                                                | West Side                                                                      | >30m               | 0%                         |                         |
|                                 |                                                                | <b>Cumulative Total</b>                                                        |                    | 10%                        |                         |
| <b>Results</b>                  |                                                                |                                                                                |                    |                            |                         |
| 6                               | (1) + (2) + (3)                                                | <b>Total Required Fire Flow, rounded to nearest 1000L/min</b>                  |                    | <b>L/min</b>               | <b>5,000</b>            |
|                                 |                                                                | (2,000 L/min < Fire Flow < 45,000 L/min)                                       |                    | or L/s                     | 83                      |
|                                 |                                                                |                                                                                |                    | or USGPM                   | 1,321                   |

**From:** Carly Rouault <crouault@neuf.ca>

**Sent:** Thursday, August 21, 2025 5:56 PM

**To:** Anthony Mestwarp <a.mestwarp@novatech-eng.com>

**Cc:** Pascal Vendette <pascal@neuf.ca>; Amina Aliyu <aaliyu@neuf.ca>; Owen MacLeod <omacleod@neuf.ca>

**Subject:** RE: 2380 Tenth Line - 125079

Hi Anthony,

I think this should answer all your questions. See highlighted items below.

Thanks,

**CARLY ROUAULT**, OAQ

Architecte. Architect

T 514 847 1117 #333 F 514 847 2287

630, boul. René-Lévesque O. 32<sup>e</sup> étage, Montréal (QC)

H3B 1S6

**NEUF ARCHITECTES INC.** [Confidentialité +  
Transmission](#)

Montréal. Ottawa. Toronto

**De :** Anthony Mestwarp

**Envoyé :** 21 août 2025 14:47

**À :** Carly Rouault

**Cc :** Pascal Vendette ; Amina Aliyu ; Owen MacLeod

**Objet :** RE: 2380 Tenth Line - 125079

Hi Carly,

Can you confirm the following for the fire demand calculations for the proposed building at 2380 Tenth line:

1. Building construction

|                                              |
|----------------------------------------------|
| Type V - Wood frame                          |
| Type IV - Mass Timber                        |
| Type III - Ordinary construction             |
| Type II - Non-combustible construction       |
| Type I - Fire resistive construction (2 hrs) |

2. If there are 1hr protected openings between floors

FRR ratings and construction type to follow requirements of 3.2.2.55A

**3.2.2.55A. Group C, Retirement Home, Any Height, Any Area, Sprinklered**

- (1) Except as permitted by Articles 3.2.2.55B. to 3.2.2.55E., a retirement home shall conform to Sentence (2).
- (2) Except as permitted by Article 3.2.2.16., the building referred to in Sentence (1) shall be of noncombustible construction, and
- (a) except as permitted by Sentences 3.2.2.7.(1) and 3.2.2.18.(2), the building shall be sprinklered throughout,
- (b) floor assemblies shall be fire separations with a fire-resistance rating not less than 2 h,
- (c) mezzanines shall have a fire-resistance rating not less than 1 h, and
- (d) loadbearing walls, columns and arches shall have a fire-resistance rating not less than that required for the supported assembly.

3. Details on the proposed sprinkler system

|                                      |
|--------------------------------------|
| Adequately Designed System (NFPA 13) |
| Standard Water Supply                |
| Fully Supervised System              |

Mechanical to confirm – should be a standard system.

4. If any areas of the proposed building will be without sprinkler protection.

None

5. The proposed building floor area per floor if the floor area varies.

Building area (OBC) is : 2099m<sup>2</sup>

Gross floor area by floor is per the screen shot below. Note that the gross construction area is a bit larger than the OBC gross area as it includes the thickness of the exterior walls.

| GROSS CONSTRUCTION AREA |                        |                         |
|-------------------------|------------------------|-------------------------|
| LEVEL                   | AREA (m <sup>2</sup> ) | AREA (ft <sup>2</sup> ) |
| 00-BASEMENT             | 2100 m <sup>2</sup>    | 22607 ft <sup>2</sup>   |
| 01-GROUND FLOOR         | 2102 m <sup>2</sup>    | 22623 ft <sup>2</sup>   |
| 02-2nd FLOOR            | 1947 m <sup>2</sup>    | 20955 ft <sup>2</sup>   |
| 03-3rd FLOOR            | 1947 m <sup>2</sup>    | 20956 ft <sup>2</sup>   |
| 04-4th FLOOR            | 1872 m <sup>2</sup>    | 20151 ft <sup>2</sup>   |
| 05-5th FLOOR            | 1872 m <sup>2</sup>    | 20151 ft <sup>2</sup>   |
| 06-6th FLOOR            | 1872 m <sup>2</sup>    | 20149 ft <sup>2</sup>   |
|                         | 13712 m <sup>2</sup>   | 147590 ft <sup>2</sup>  |

**NOTES:**

**GROSS CONSTRUCTION AREA INCLUDES ALL AREA INSIDE THE OUTSIDE FACE OF EXTERIOR WALLS WITH NO DEDUCTIONS.**

**UNIT AREAS** INCLUDE ALL AREA FROM THE OUTSIDE FACE OF EXTERIOR WALLS TO THE MIDPOINT OF DEMISING WALLS.

AREAS ARE SUBJECT TO CHANGE THROUGH THE DESIGN PROCESS.

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

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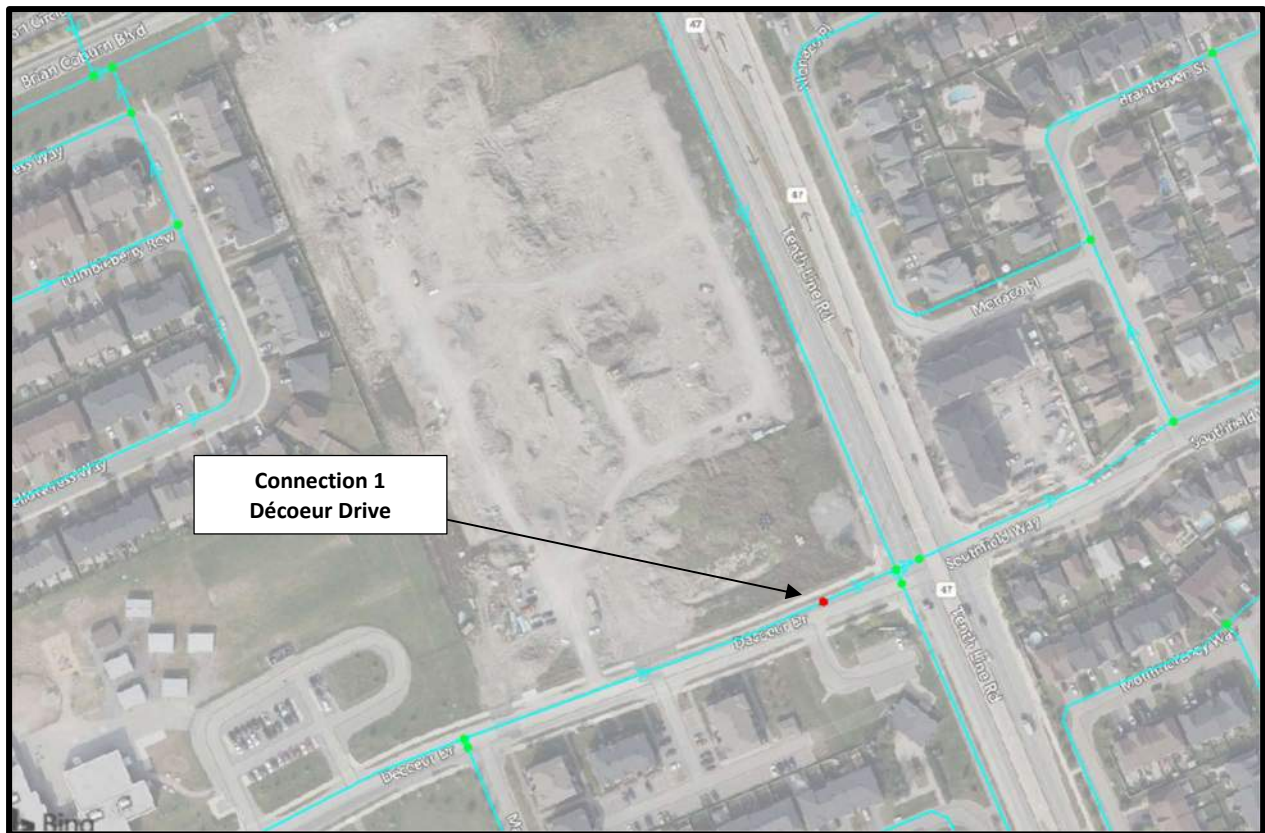
\*\*Electronic documents, when supplied, are supplemental. The print (or pdf) versions of the documents govern. Requested electronic documents remain the property of Novatech (on behalf of the Owner) and shall only be used for the purpose for which they were originally intended

## Boundary Conditions 2380 Tenth Line Road

### Provided Information

| Scenario             | Demand |       |
|----------------------|--------|-------|
|                      | L/min  | L/s   |
| Average Daily Demand | 85     | 1.41  |
| Maximum Daily Demand | 269    | 4.48  |
| Peak Hour            | 425    | 7.08  |
| Fire Flow Demand #1  | 5,000  | 83.33 |

### Location



## **Results**

### **Connection 1 – Décoeur Drive**

| <b>Demand Scenario</b>    | <b>Head (m)</b> | <b>Pressure<sup>1</sup> (psi)</b> |
|---------------------------|-----------------|-----------------------------------|
| Maximum HGL               | 130.2           | 60.0                              |
| Peak Hour                 | 126.9           | 55.3                              |
| Max Day plus Fire Flow #1 | 126.9           | 55.3                              |

<sup>1</sup> Ground Elevation = 88.0 m

## **Notes**

1. The IWSD has recently updated their water modelling software. Any significant difference between previously received BC results and newly received BC results could be attributed to this update.
2. According to the OWDG Tech Bulletin ISTB-2021-03 Section 4.3.1.:
  - Industrial, commercial, institutional service areas with a basic day demand greater than 50 m<sup>3</sup>/day (0.58 L/s) and 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. Individual residential facilities with a basic day demand greater than 50 m<sup>3</sup>/day shall be connected with a minimum of two water services, separated by an isolation valve, to avoid the creation of a vulnerable service area.

## **Disclaimer**

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

**CALCULATED WATER DEMANDS:**

**Water Demands**

Average Day (Maximum HGL)= 1.41 L/s  
 Maximum Day = 4.48 L/s  
 Peak Hour (Minimum HGL) = 7.08 L/s  
 Fire Flow (FUS) = 83.33 L/s

**City of Ottawa Boundary Conditions:**

Average Day (Maximum HGL)= 130.2 m  
 Peak Hour (Minimum HGL) = 126.9 m  
 Max Day + Fire = 126.9 m

**Watermain Analysis**

Finished Floor Elevation = 88.55 m

High Pressure Test = Max. HGL - Finished Floor Elevation x 1.42197 PSI/m < 80 PSI

**High Pressure = 59.2 PSI**

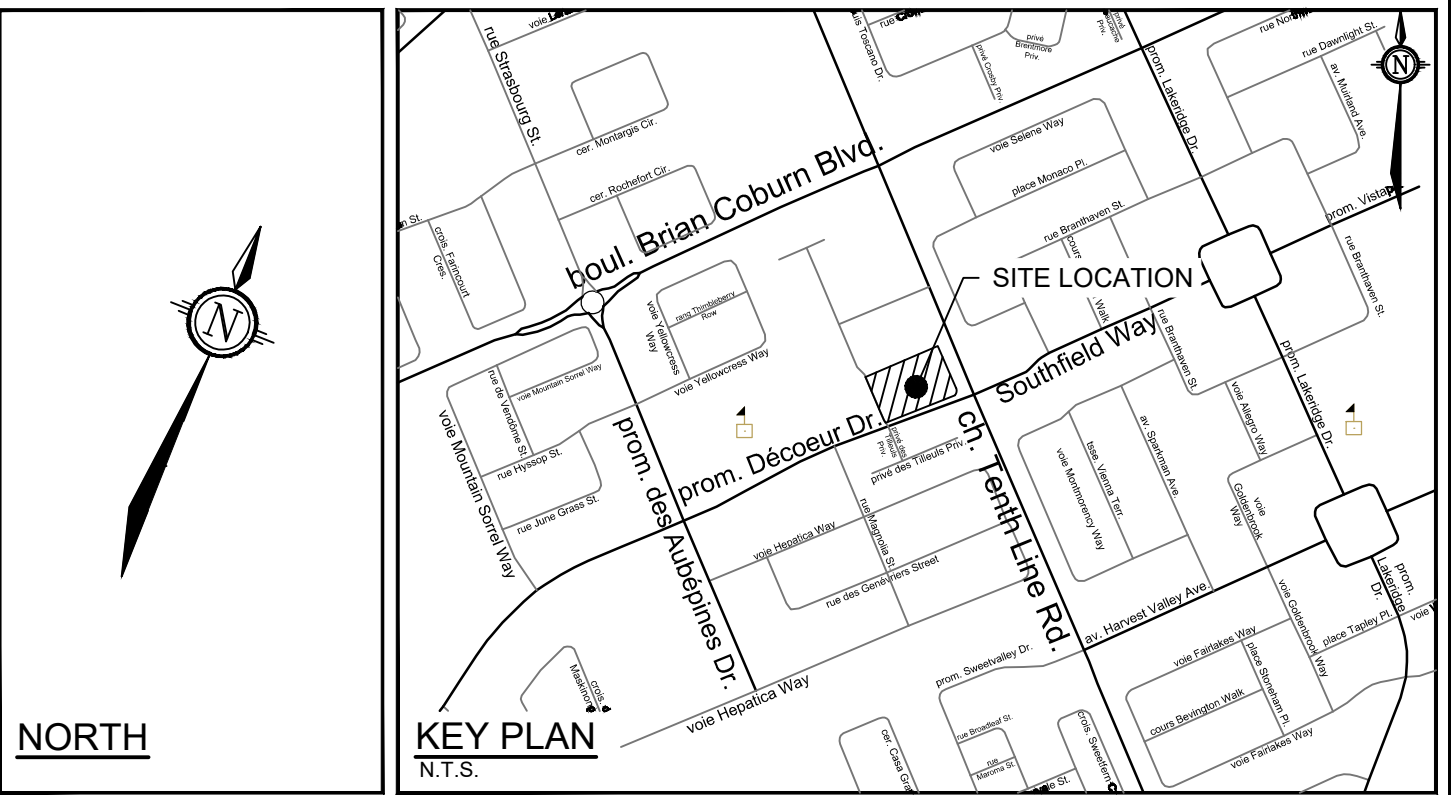
Low Pressure Test = Min. HGL - Finished Floor Elevation x 1.42197 PSI/m > 40 PSI

**Low Pressure = 54.5 PSI**

Max Day + Fire Test = Max Day + Fire Flow - Finished Floor Elevation x 1.42197 PSI/m > 20 PSI

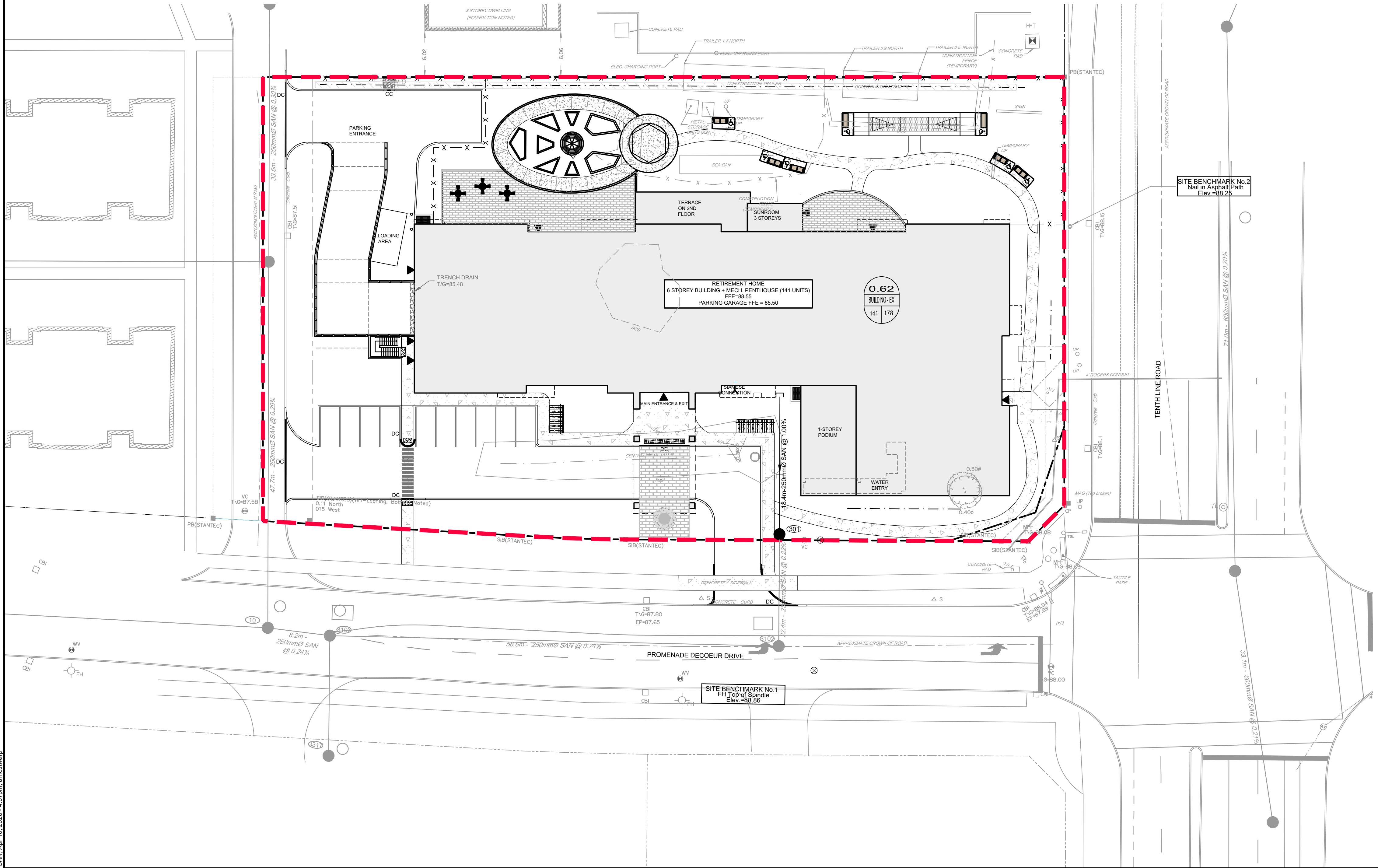
**Max Day + Fire (Connection #1) = 54.5 PSI**

**Appendix B**  
**Sanitary Servicing**



LEGEND

- SITE PROPERTY LINE
- MISC LEGAL LINE (EASEMENT, PROPERTY LINES) REFER TO LEGAL PLAN FOR DETAILS
- PROPOSED TACTILE WALKING SURFACE INDICATOR (TWSI)
- PROPOSED CURB
- PROPOSED DEPRESSED CURB
- SWALE c/w SUBDRAIN AND DIRECTION OF FLOW
- FIRE DEPARTMENT SIAMESE CONNECTION
- PROPOSED BUILDING ENTRANCE
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED CATCHBASIN
- PROPOSED AREA DRAIN
- PROPOSED LANDSCAPE DRAIN (ELBOW/TEE)
- PROPOSED BIKE RACKS
- PROPOSED CROSSWALK PAINTING
- PROPOSED LINE PAINTING
- PROPOSED SANITARY MANHOLE
- PROPOSED SANITARY SEWER AND FLOW DIRECTION
- SANITARY DRAINAGE AREA BOUNDARY
- AREA IN HECTARES
- MANHOLE TO MANHOLE
- POPULATION EQUIVALENT
- EXISTING VALVE & VALVE BOX
- EXISTING VALVE & LEAD
- EXISTING STORM MANHOLE
- EXISTING CATCHBASIN
- EXISTING DITCH CENTERLINE
- EXISTING SANITARY MANHOLE & SEWER



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  |
|-----|-----------------------------------------|---------------|-----|
| 2.  | REVISED PER CITY SUPPORTABILITY COMMENT | APRIL 17/2026 | ARM |
| 1.  | ISSUED FOR SPA                          | OCT 16/2025   | ARM |

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

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

| FOR REVIEW ONLY |
|-----------------|
|                 |
|                 |

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Website www.novatech-eng.com

|                                               |                           |
|-----------------------------------------------|---------------------------|
| LOCATION<br>CITY OF OTTAWA<br>2380 TENTH LINE | PROJECT No.<br>125079     |
| DRAWING NAME<br>SANITARY PLAN                 | REV<br>REV#2              |
|                                               | DRAWING No.<br>125079-SAN |

SANITARY SEWER DESIGN SHEET



ratech Project #: 125079  
Project Name: 2380 Tenth Line  
Date: 8/11/2025  
Revised 3/11/2026  
Input By: Anjush Musyaju, EIT  
Reviewed By: Anthony Mestwarp, P.Eng  
wing Reference: 125079-SAN

Legend: Design Input by User  
As-Built Input by User  
Cumulative Cell  
Calculated Design Cell Output  
Reference: City of Ottawa - Sewer Design Guidelines (  
MOE - Design Guidelines for Sewage Work

| Location   |         |          |          | Demand           |       |       |             |                       |                   |               |       |             |                       |                   |                         |                       |                    |                                                    |                        |                        |                 |                  |                               |                            |                           |                 |       |                   | Design Capacity                     |         |         |       |       |        |             |       |      |
|------------|---------|----------|----------|------------------|-------|-------|-------------|-----------------------|-------------------|---------------|-------|-------------|-----------------------|-------------------|-------------------------|-----------------------|--------------------|----------------------------------------------------|------------------------|------------------------|-----------------|------------------|-------------------------------|----------------------------|---------------------------|-----------------|-------|-------------------|-------------------------------------|---------|---------|-------|-------|--------|-------------|-------|------|
| Street     | Area ID | From MH  | To MH    | Design Flow Flow |       |       |             |                       |                   |               |       |             |                       |                   |                         |                       |                    | Industrial / Commercial / Institutional (ICI) Flow |                        |                        |                 |                  |                               |                            |                           | Extraneous Flow |       | Total Design Flow | Proposed Sewer Pipe Sizing / Design |         |         |       |       |        |             |       |      |
|            |         |          |          | Residential      |       |       |             |                       |                   | Assisted Care |       |             |                       |                   | Total Flows             |                       |                    |                                                    |                        |                        |                 |                  |                               |                            |                           |                 |       |                   |                                     |         |         |       |       |        |             |       |      |
|            |         |          |          | Studio           | 1-Bed | 2-Bed | Population  | Cumulative Population | Average Pop. Flow | Studio        | 1-Bed | Population  | Cumulative Population | Average Pop. Flow | Design Peaking Factor M | Peak Design Pop. Flow | Res. Drainage Area | Cumulative Res. Drainage Area                      | Beauty salon (station) | Water Closet (Fixture) | Office (person) | Dining Area (m²) | Average Commercial Flow (L/s) | Cumulative Commercial Flow | Commercial Peaking Factor |                 |       |                   |                                     |         |         |       |       |        |             |       |      |
|            |         |          |          |                  |       |       | (in 1000's) | (in 1000's)           | Q(q) (L/s)        |               |       | (in 1000's) | (in 1000's)           | Q(q) (L/s)        |                         | Q(p) (L/s)            | (ha.)              | (ha.)                                              |                        |                        |                 |                  |                               | L/s                        |                           |                 | (ha.) | Q(e) (L/s)        | Q(D) (L/s)                          | (m)     |         | (m)   | n     | So (%) | Qfull (L/s) | (m/s) |      |
| Street One | A1      | Building | 301      | 24               | 51    | 6     | 0.118       | 0.118                 | 0.38              | 49            | 11    | 0.060       | 0.060                 | 0.31              | 3.53                    | 2.45                  | 0.625              | 0.625                                              | 3.00                   | 11.00                  | 5.00            | 179.20           | 0.72                          | 0.72                       | 1.00                      | 0.72            | 0.625 | 0.21              | 3.38                                | 18.4    | 250 PVC | 0.254 | 0.013 | 1.00   | 62.0        | 1.22  | 5.4% |
| Street One |         | 301      | Existing |                  |       |       | 0.000       | 0.118                 | 0.38              |               |       | 0.000       | 0.060                 | 0.31              | 3.53                    | 2.45                  | 0.000              | 0.625                                              | 0.000                  | 0.000                  | 0.000           | 0.00             | 0.72                          | 1.000                      | 0.72                      | 0.625           | 0.21  | 3.38              | 14.6                                | 250 PVC | 0.254   | 0.013 | 0.22  | 29.1   | 0.57        | 11.6% |      |
| Totals     |         |          |          | 24               | 51    | 6     | 0.118       | 0.118                 | 0.38              | 49            | 11    | 0.060       | 0.060                 | 0.31              | 3.53                    | 2.45                  | 0.625              | 0.625                                              |                        |                        |                 |                  |                               |                            | 0.721                     | 0.625           | 0.21  | 3.38              | 33.0                                |         |         |       |       |        |             |       |      |

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 (Residential design)  
450 L/per person/day (Assisted Care 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)  
  
P = Residential Population =  
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

Design =

ICI Peak \*

Design =

Residential

| Studio | 1-Bed | 2-Bed |
|--------|-------|-------|
| 1.4    | 1.4   | 2.1   |

Assisted care

| Studio | 1-Bed |
|--------|-------|
| 1      | 1     |

Commercial

|              |                               |
|--------------|-------------------------------|
| Beauty salon | 650 L/Station/day             |
| Water Closet | 150 L/Fixture/hr              |
| Office       | 75 L/person/day               |
| Dining Area  | 125 L/seat/day (1.1person/m²) |

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<sub>p</sub>\*R<sup>2/3</sup>\*So<sup>0.5</sup>

Definitions

Q full = Capacity (L/s)  
n = Manning coefficient of roughness (0.013)  
A<sub>p</sub> = Pipe flow area (m²)  
R = Hydraulic Radius of wetted area (dia./4 for full pipes)  
So = Pipe slope/gradient

Atrel Report Excerpts

**SANITARY SEWER COMPUTATION FORM**

DATE: **November, 2014**  
DESIGNED BY: AGS  
CHECKED BY: JMD

PROJECT: Neighbourhood 5 - Avalon West - STAGE 3  
CLIENT: Minto Communities Inc.  
PROJECT #: 131004  
BY: ATREL ENGINEERING LTD

q= 350 l/cap.day  
i= 0.28 l/ha.s  
PVC/CONC N= 0.013  
OTHER N= 0.024

**Table 21**  
Townhouse= 2.7 person/unit  
Back to Back= 2.1 person/unit  
Single Dwellings= 3.4 person/unit

| STREET NAMES        | LOCATION  |      |           |       | RESIDENTIAL |      |                       |                  | FLOW Q(p) (L/S) | COMMERCIAL, INSTITUTIONAL |      |                       |                  | PEAK DES. Q(d) (L/S) | TYPE PIPE | DIA. (NOM) (mm) | (ACT) (MM) | SEWER DATA      |           |            |          | CAP. (L/S) | Remaining Capacity (%) | VEL. (M/S) | UpStream |          | DwnStream |       |       |
|---------------------|-----------|------|-----------|-------|-------------|------|-----------------------|------------------|-----------------|---------------------------|------|-----------------------|------------------|----------------------|-----------|-----------------|------------|-----------------|-----------|------------|----------|------------|------------------------|------------|----------|----------|-----------|-------|-------|
|                     | FROM (Up) |      | TO (Down) |       | AREA (ha.)  | POP. | CUMULATIVE AREA (ha.) | PEAKING FACTOR M |                 | AREA (ha.)                | POP. | CUMULATIVE AREA (ha.) | PEAKING FACTOR M |                      |           |                 |            | FLOW Q(p) (L/S) | SLOPE (%) | LENGTH (M) | Obv. (M) |            |                        |            | Inv. (M) | Obv. (M) | Inv. (M)  |       |       |
| Commercial          | MH        | 100  | MH        | 3102  |             |      |                       |                  |                 |                           | 4.79 | 685                   | 4.79             | 685                  | 1.50      | 4.16            | 5.50       | PVC             | 250       | 251.5      | 0.24     | 22.5       | 29.59                  | 81%        | 0.60     | 82.89    | 82.64     | 82.84 | 82.59 |
| Site Plan No.1      | MH        | 3101 | MH        | 3102  | 0.18        | 17.0 | 0.18                  | 17               | 4.00            | 0.28                      |      |                       |                  |                      |           |                 | 0.33       | PVC             | 200       | 201.2      | 2.00     | 45.0       | 47.11                  | 99%        | 1.48     | 84.19    | 83.99     | 83.29 | 83.09 |
| Décoeur Drive       | MH        | 3102 | MH        | 3103  | 0.26        |      | 0.44                  | 17               | 4.00            | 0.28                      |      |                       | 4.79             | 685                  | 1.50      | 4.16            | 5.90       | PVC             | 250       | 251.5      | 0.24     | 57.0       | 29.59                  | 80%        | 0.60     | 82.78    | 82.53     | 82.64 | 82.39 |
| Décoeur Drive       | MH        | 3103 | MH        | 3104  | 0.23        |      | 0.67                  | 17               | 4.00            | 0.28                      |      |                       | 4.79             | 685                  | 1.50      | 4.16            | 5.97       | PVC             | 250       | 251.5      | 0.24     | 85.0       | 29.59                  | 80%        | 0.60     | 82.64    | 82.39     | 82.44 | 82.19 |
| School              | MH        | 101  | MH        | 3104  |             |      |                       |                  |                 |                           | 2.44 | 350                   | 2.44             | 350                  | 1.50      | 2.13            | 2.81       | PVC             | 250       | 251.5      | 0.24     | 23.5       | 29.59                  | 91%        | 0.60     | 82.73    | 82.48     | 82.67 | 82.42 |
| Magnolia Street     | MH        | 3104 | MH        | 3107  | 0.08        |      | 0.75                  | 17               | 4.00            | 0.28                      |      |                       | 7.23             | 1035                 | 1.50      | 6.29            | 8.80       | PVC             | 250       | 251.5      | 0.24     | 50.5       | 29.59                  | 70%        | 0.60     | 82.38    | 82.13     | 82.26 | 82.01 |
| Site Plan No.1      | MH        | 3105 | MH        | 3106  | 0.26        | 26.0 | 0.26                  | 26.0             | 4.00            | 0.42                      |      |                       |                  |                      |           |                 | 0.49       | PVC             | 200       | 201.17     | 0.90     | 59.0       | 31.60                  | 98%        | 0.99     | 85.19    | 84.99     | 84.66 | 84.46 |
| Site Plan No.1      | MH        | 3106 | MH        | 3107  | 0.29        | 30.0 | 0.55                  | 56.0             | 4.00            | 0.91                      |      |                       |                  |                      |           |                 | 1.06       | PVC             | 200       | 201.17     | 2.00     | 70.0       | 47.11                  | 98%        | 1.48     | 84.06    | 83.86     | 82.66 | 82.46 |
| Magnolia Street     | MH        | 3107 | MH        | 3115  | 0.08        |      | 1.38                  | 73.0             | 4.00            | 1.18                      |      |                       | 7.23             | 1035                 | 1.50      | 6.29            | 9.88       | PVC             | 300       | 299.21     | 0.19     | 48.5       | 41.86                  | 76%        | 0.60     | 82.16    | 81.86     | 82.07 | 81.77 |
| Hepatica Crescent   | MH        | 3110 | MH        | 3112  | 0.28        | 11.0 | 0.28                  | 11.0             | 4.00            | 0.18                      |      |                       |                  |                      |           |                 | 0.26       | PVC             | 200       | 201.17     | 1.60     | 31.5       | 42.14                  | 99%        | 1.33     | 85.11    | 84.91     | 84.61 | 84.41 |
| Park                | MH        | 3111 | MH        | 3112  | 1.19        |      | 1.19                  |                  |                 |                           |      |                       |                  |                      |           |                 | 0.33       | PVC             | 200       | 201.17     | 0.32     | 14.0       | 18.93                  | 98%        | 0.60     | 84.12    | 83.92     | 84.07 | 83.87 |
| Hepatica Crescent   | MH        | 3112 | MH        | 3115  | 0.32        | 14.0 | 1.79                  | 25.0             | 4.00            | 0.41                      |      |                       |                  |                      |           |                 | 0.91       | PVC             | 200       | 201.17     | 2.00     | 97.0       | 47.11                  | 98%        | 1.48     | 84.01    | 83.81     | 82.07 | 81.87 |
| Hepatica Crescent   | MH        | 3113 | MH        | 3114  | 0.54        | 50.0 | 0.54                  | 50.0             | 4.00            | 0.81                      |      |                       |                  |                      |           |                 | 0.96       | PVC             | 200       | 201.17     | 0.65     | 80.0       | 26.86                  | 96%        | 0.84     | 85.25    | 85.05     | 84.73 | 84.53 |
| Hepatica Crescent   | MH        | 3114 | MH        | 3115  | 0.52        | 47.0 | 1.06                  | 97.0             | 4.00            | 1.57                      |      |                       |                  |                      |           |                 | 1.87       | PVC             | 200       | 201.17     | 1.80     | 86.5       | 44.69                  | 96%        | 1.41     | 84.13    | 83.93     | 82.57 | 82.37 |
| Magnolia Street     | MH        | 3115 | MH        | 3124  | 0.49        | 34.0 | 4.72                  | 229.0            | 4.00            | 3.71                      |      |                       | 7.23             | 1035                 | 1.50      | 6.29            | 13.35      | PVC             | 300       | 299.21     | 0.19     | 79.0       | 41.86                  | 68%        | 0.60     | 82.07    | 81.77     | 81.92 | 81.62 |
| Genévriers Street   | MH        | 3116 | MH        | 3117  | 0.33        | 21.0 | 0.33                  | 21.0             | 4.00            | 0.34                      |      |                       |                  |                      |           |                 | 0.43       | PVC             | 200       | 201.17     | 0.65     | 59.0       | 26.86                  | 98%        | 0.84     | 84.90    | 84.70     | 84.52 | 84.32 |
| Genévriers Street   | MH        | 3117 | MH        | 3118  | 0.18        | 51.0 | 0.51                  | 72.0             | 4.00            | 1.17                      |      |                       |                  |                      |           |                 | 1.31       | PVC             | 200       | 201.17     | 0.65     | 12.0       | 26.86                  | 95%        | 0.84     | 84.49    | 84.29     | 84.41 | 84.21 |
| Genévriers Street   | MH        | 3118 | MH        | 3119  | 0.65        | 58.0 | 1.16                  | 130.0            | 4.00            | 2.11                      |      |                       |                  |                      |           |                 | 2.43       | PVC             | 200       | 201.17     | 1.50     | 77.5       | 40.80                  | 94%        | 1.28     | 84.38    | 84.18     | 83.22 | 83.02 |
| Genévriers Street   | MH        | 3119 | MH        | 3124  | 0.15        | 7.0  | 1.31                  | 137.0            | 4.00            | 2.22                      |      |                       |                  |                      |           |                 | 2.59       | PVC             | 200       | 201.17     | 1.50     | 52.5       | 40.80                  | 94%        | 1.28     | 82.62    | 82.42     | 81.83 | 81.63 |
| Hepatica Crescent   | MH        | 3113 | MH        | 3120  | 0.05        | 3.0  | 0.05                  | 3.0              | 4.00            | 0.05                      |      |                       |                  |                      |           |                 | 0.06       | PVC             | 200       | 201.17     | 0.65     | 10.0       | 26.86                  | 100%       | 0.84     | 85.23    | 85.03     | 85.16 | 84.96 |
| Hepatica Crescent   | MH        | 3120 | MH        | 3122  | 0.28        | 17.0 | 0.33                  | 20.0             | 4.00            | 0.32                      |      |                       |                  |                      |           |                 | 0.42       | PVC             | 200       | 201.17     | 2.10     | 71.5       | 48.27                  | 99%        | 1.52     | 85.13    | 84.93     | 83.63 | 83.43 |
| Hepatica Crescent   | MH        | 3121 | MH        | 3122  | 0.27        | 21.0 | 0.27                  | 21.0             | 4.00            | 0.34                      |      |                       |                  |                      |           |                 | 0.42       | PVC             | 200       | 201.17     | 0.88     | 69.0       | 31.25                  | 99%        | 0.98     | 84.78    | 84.58     | 84.17 | 83.97 |
| Genévriers Street   | MH        | 3122 | MH        | 3123  | 0.40        | 28.0 | 1.00                  | 69.0             | 4.00            | 1.12                      |      |                       |                  |                      |           |                 | 1.40       | PVC             | 200       | 201.17     | 0.75     | 86.5       | 28.85                  | 95%        | 0.91     | 83.57    | 83.37     | 82.92 | 82.72 |
| Genévriers Street   | MH        | 3123 | MH        | 3124  | 0.48        | 34.0 | 1.48                  | 103.0            | 4.00            | 1.67                      |      |                       |                  |                      |           |                 | 2.08       | PVC             | 200       | 201.17     | 0.75     | 88.5       | 28.85                  | 93%        | 0.91     | 82.71    | 82.51     | 82.05 | 81.85 |
| Magnolia Street     | MH        | 3124 | MH        | 3273  | 0.49        | 41.0 | 8.00                  | 510.0            | 3.97            | 8.20                      |      |                       | 7.23             | 1035                 | 1.50      | 6.29            | 18.75      | PVC             | 300       | 299.21     | 0.19     | 79.0       | 41.86                  | 55%        | 0.60     | 81.55    | 81.25     | 81.40 | 81.10 |
| Site Plan No.2      | MH        | 3129 | MH        | 3130  | 0.79        | 84.0 | 0.79                  | 84.0             | 4.00            | 1.36                      |      |                       |                  |                      |           |                 | 1.58       | PVC             | 200       | 201.17     | 0.32     | 91.5       | 18.93                  | 92%        | 0.60     | 84.32    | 84.12     | 84.02 | 83.82 |
| Site Plan No.2      | MH        | 3130 | MH        | 3131  |             |      | 0.79                  | 84.0             | 4.00            | 1.36                      |      |                       |                  |                      |           |                 | 1.58       | PVC             | 200       | 201.17     | 0.32     | 120.0      | 18.93                  | 92%        | 0.60     | 84.02    | 83.82     | 83.63 | 83.43 |
| Des Aubépines Drive | MH        | 3131 | MH        | 3140  | 0.22        |      | 1.01                  | 84.0             | 4.00            | 1.36                      |      |                       |                  |                      |           |                 | 1.64       | PVC             | 250       | 251.46     | 0.24     | 51.0       | 29.59                  | 94%        | 0.60     | 83.62    | 83.37     | 83.50 | 83.25 |
| Commercial          | MH        | 106  | MH        | 3133  |             |      |                       |                  |                 |                           |      |                       |                  |                      |           |                 |            | PVC             | 250       | 251.5      | 0.24     | 9.0        | 29.59                  | 100%       | 0.60     | 84.15    | 83.90     | 84.13 | 83.88 |
| Street No.12        | MH        | 3132 | MH        | 3133  | 0.08        |      | 0.08                  |                  |                 |                           |      |                       |                  |                      |           |                 | 0.02       | PVC             | 200       | 201.17     | 0.65     | 41.5       | 26.86                  | 100%       | 0.84     | 84.41    | 84.21     | 84.14 | 83.94 |
| Street No.8         | MH        | 3133 | MH        | 3134  | 0.48        | 57.0 | 0.56                  | 57.0             | 4.00            | 0.92                      |      |                       |                  |                      |           |                 | 1.08       | PVC             | 250       | 251.46     | 0.24     | 85.5       | 29.59                  | 96%        | 0.60     | 84.13    | 83.88     | 83.92 | 83.67 |
| Street No.8         | MH        | 3134 | MH        | 3139A | 0.51        | 63.0 | 1.07                  | 120.0            | 4.00            | 1.94                      |      |                       |                  |                      |           |                 | 2.24       | PVC             | 250       | 251.46     | 0.24     | 83.5       | 29.59                  | 92%        | 0.60     | 83.92    | 83.67     | 83.72 | 83.47 |



**SANITARY SEWER COMPUTATION FORM**

DATE: **November, 2014**  
 DESIGNED BY: AGS  
 CHECKED BY: JMD

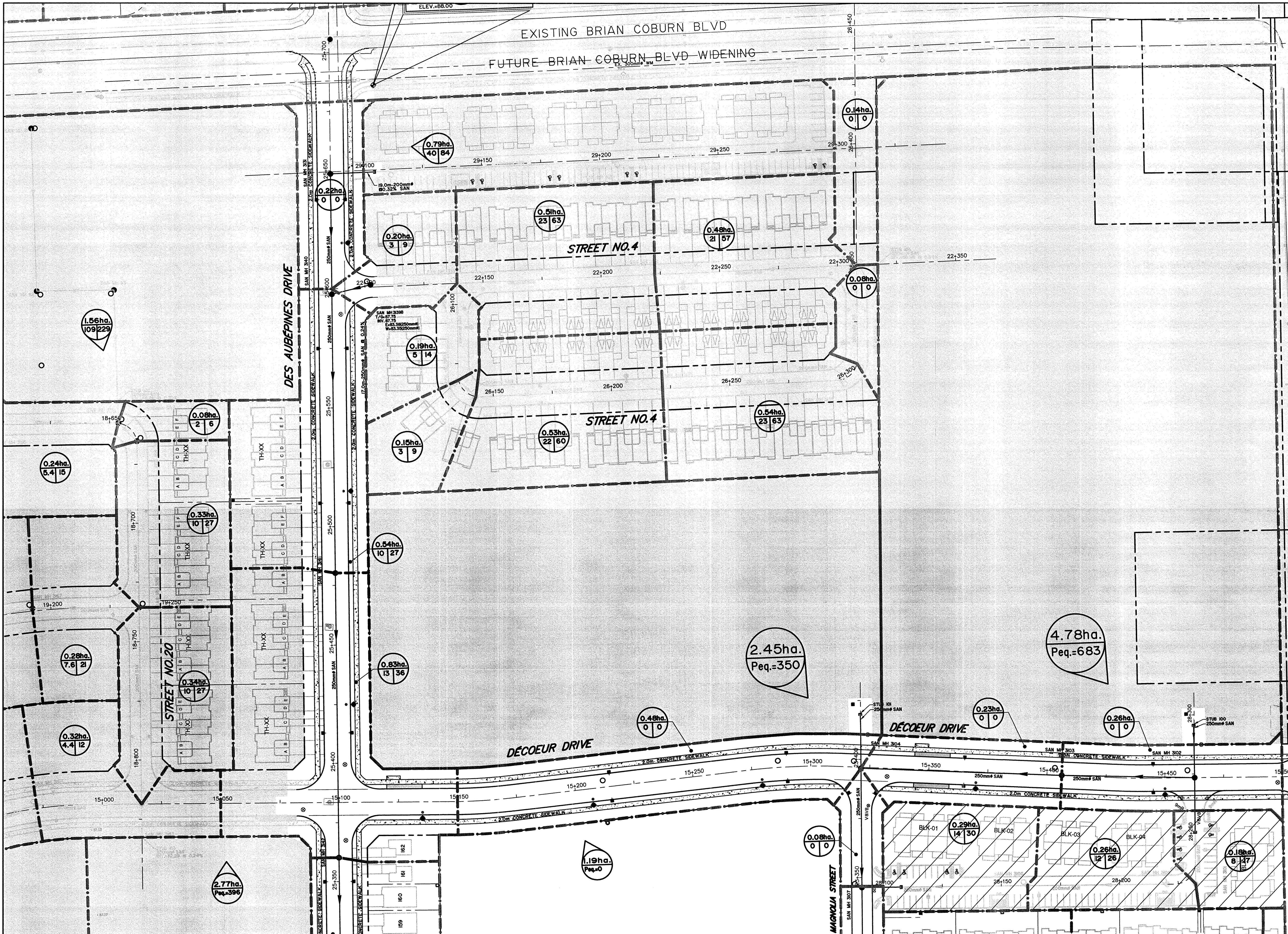
PROJECT: Neighbourhood 5 - Avalon West - STAGE 3  
 CLIENT: Minto Communities Inc.  
 PROJECT #: 131004  
 BY: ATREL ENGINEERING LTD

q= 350 l/cap.day  
 i= 0.28 l/ha.s  
 PVC/CONC N= 0.013  
 OTHER N= 0.024

**Table 21**  
 Townhouse= 2.7 person/unit  
 Back to Back= 2.1 person/unit  
 Single Dwellings= 3.4 person/unit

| STREET NAMES                     | LOCATION  |       |           |       | RESIDENTIAL           |        |                       |        | COMMERCIAL, INSTITUTIONAL |                 |                       |        | PEAK DES. Q(d) (L/S) | SEWER DATA            |      |                  |                 |           |                 |            |           |            |            | UpStream               |            | DwnStream |          |          |
|----------------------------------|-----------|-------|-----------|-------|-----------------------|--------|-----------------------|--------|---------------------------|-----------------|-----------------------|--------|----------------------|-----------------------|------|------------------|-----------------|-----------|-----------------|------------|-----------|------------|------------|------------------------|------------|-----------|----------|----------|
|                                  | FROM (Up) |       | TO (Down) |       | INDIVIDUAL AREA (ha.) | POP.   | CUMULATIVE AREA (ha.) | POP.   | PEAKING FACTOR M          | FLOW Q(p) (L/S) | INDIVIDUAL AREA (ha.) | POP.   |                      | CUMULATIVE AREA (ha.) | POP. | PEAKING FACTOR M | FLOW Q(p) (L/S) | TYPE PIPE | DIA. (NOM) (mm) | (ACT) (MM) | SLOPE (%) | LENGTH (M) | CAP. (L/S) | Remaining Capacity (%) | VEL. (M/S) | Obv. (M)  | Inv. (M) | Obv. (M) |
| Street No.12                     | MH        | 3132  | MH        | 3135  |                       |        |                       |        |                           |                 |                       |        |                      |                       |      |                  | PVC             | 200       | 201.17          | 0.65       | 9.5       | 26.86      | 100%       | 0.84                   | 84.55      | 84.35     | 84.49    | 84.29    |
| Street No.12                     | MH        | 3135  | MH        | 3136  | 0.54                  | 63.0   | 0.54                  | 63.0   | 4.00                      | 1.02            |                       |        |                      |                       |      |                  | 1.17 PVC        | 200       | 201.17          | 0.32       | 76.0      | 18.93      | 94%        | 0.60                   | 84.46      | 84.26     | 84.21    | 84.01    |
| Street No.12                     | MH        | 3136  | MH        | 3137  | 0.53                  | 60.0   | 1.07                  | 123.0  | 4.00                      | 1.99            |                       |        |                      |                       |      |                  | 2.29 PVC        | 200       | 201.17          | 0.32       | 79.0      | 18.93      | 88%        | 0.60                   | 84.21      | 84.01     | 83.95    | 83.75    |
| Street No.12                     | MH        | 3137  | MH        | 3138  | 0.15                  | 9.0    | 1.22                  | 132.0  | 4.00                      | 2.14            |                       |        |                      |                       |      |                  | 2.48 PVC        | 200       | 201.17          | 0.32       | 10.5      | 18.93      | 87%        | 0.60                   | 83.92      | 83.72     | 83.89    | 83.69    |
| Street No.12                     | MH        | 3138  | MH        | 3139A | 0.19                  | 14.0   | 1.41                  | 146.0  | 4.00                      | 2.37            |                       |        |                      |                       |      |                  | 2.76 PVC        | 200       | 201.17          | 0.32       | 41.0      | 18.93      | 85%        | 0.60                   | 83.86      | 83.66     | 83.73    | 83.53    |
| Street No.8                      | MH        | 3139A | MH        | 3139B | 0.20                  | 9.0    | 2.68                  | 275    | 4.00                      | 4.46            |                       |        |                      |                       |      |                  | 5.21 PVC        | 250       | 251.5           | 0.24       | 36.5      | 29.59      | 82%        | 0.60                   | 83.72      | 83.47     | 83.63    | 83.38    |
| Street No.8                      | MH        | 3139B | MH        | 3140  |                       |        | 2.68                  | 275    | 4.00                      | 4.46            |                       |        |                      |                       |      |                  | 5.21 PVC        | 250       | 251.5           | 0.24       | 17.0      | 29.59      | 82%        | 0.60                   | 83.60      | 83.35     | 83.56    | 83.31    |
| Des Aubépines Drive              | MH        | 3140  | MH        | 3141  | 0.54                  | 27.0   | 4.23                  | 386.0  | 4.00                      | 6.25            |                       |        |                      |                       |      |                  | 7.44 PVC        | 250       | 251.46          | 0.24       | 117.5     | 29.59      | 75%        | 0.60                   | 83.50      | 83.25     | 83.22    | 82.97    |
| Des Aubépines Drive              | MH        | 3141  | MH        | 3142  | 0.83                  | 36.0   | 5.06                  | 422.0  | 4.00                      | 6.84            |                       |        |                      |                       |      |                  | 8.25 PVC        | 250       | 251.46          | 0.24       | 120.0     | 29.59      | 72%        | 0.60                   | 83.22      | 82.97     | 82.93    | 82.68    |
| Des Aubépines Drive              | MH        | 3142  | MH        | 3143  | 0.54                  | 28.0   | 5.60                  | 450.0  | 4.00                      | 7.29            |                       |        |                      |                       |      |                  | 8.85 PVC        | 250       | 251.46          | 0.24       | 101.0     | 29.59      | 70%        | 0.60                   | 82.93      | 82.68     | 82.69    | 82.44    |
| Des Aubépines Drive              | MH        | 3143  | MH        | 3271  | 0.86                  | 55.0   | 6.46                  | 505.0  | 3.97                      | 8.13            |                       |        |                      |                       |      |                  | 9.93 PVC        | 250       | 251.46          | 0.24       | 119.5     | 29.59      | 66%        | 0.60                   | 82.69      | 82.44     | 82.40    | 82.15    |
| Street No.11                     | MH        | 3270  | MH        | 3271  | 45.26                 | 3308.0 | 45.26                 | 3308.0 | 3.41                      | 45.64           | 12.78                 | 1828.0 | 12.78                | 1828                  | 1.50 | 11.11            | 73.00 CONC      | 450       | 457.20          | 0.11       | 120.0     | 98.65      | 26%        | 0.60                   | 81.81      | 81.36     | 81.68    | 81.23    |
| Hepatica Crescent                | MH        | 3271  | MH        | 3272  | 0.69                  | 45.0   | 52.41                 | 3858.0 | 3.35                      | 52.31           |                       |        | 12.78                | 1828                  | 1.50 | 11.11            | 81.67 CONC      | 525       | 533.40          | 0.11       | 99.5      | 148.80     | 45%        | 0.67                   | 81.53      | 81.00     | 81.42    | 80.89    |
| Hepatica Crescent                | MH        | 3272  | MH        | 3273  | 0.83                  | 58.0   | 53.24                 | 3916.0 | 3.34                      | 53.01           |                       |        | 12.78                | 1828                  | 1.50 | 11.11            | 82.60 CONC      | 525       | 533.40          | 0.11       | 120.0     | 149.48     | 45%        | 0.67                   | 81.42      | 80.89     | 81.29    | 80.76    |
| Hepatica Crescent                | MH        | 3273  | MH        | 3274  | 0.49                  | 31.0   | 61.73                 | 4457.0 | 3.29                      | 59.42           |                       |        | 20.01                | 2863                  | 1.50 | 17.40            | 99.70 CONC      | 525       | 533.40          | 0.11       | 79.0      | 149.48     | 33%        | 0.67                   | 81.29      | 80.76     | 81.20    | 80.67    |
| Hepatica Crescent                | MH        | 3274  | MH        | 3275  | 0.60                  | 38.0   | 62.33                 | 4495.0 | 3.29                      | 59.86           |                       |        | 20.01                | 2863                  | 1.50 | 17.40            | 100.31 CONC     | 525       | 533.40          | 0.11       | 89.0      | 149.48     | 33%        | 0.67                   | 81.20      | 80.67     | 81.10    | 80.57    |
| Hepatica Crescent                | MH        | 3275  | MH        | 3276  |                       |        | 62.33                 | 4495.0 | 3.29                      | 59.86           |                       |        | 20.01                | 2863                  | 1.50 | 17.40            | 100.31 CONC     | 525       | 533.40          | 0.11       | 8.5       | 149.48     | 33%        | 0.67                   | 81.10      | 80.57     | 81.09    | 80.56    |
| Hepatica Crescent                | MH        | 3276  | MH        | 15166 |                       |        | 62.33                 | 4495.0 | 3.29                      | 59.86           |                       |        | 20.01                | 2863                  | 1.50 | 17.40            | 100.31 CONC     | 675       | 685.80          | 0.12       | 34.5      | 303.78     | 67%        | 0.82                   | 81.09      | 80.41     | 81.05    | 80.37    |
|                                  |           |       |           |       |                       |        |                       |        |                           |                 |                       |        |                      |                       |      |                  |                 |           |                 |            |           |            |            |                        |            |           |          |          |
| Proposed Stage 3 Sanitary Sewers |           |       |           |       |                       |        |                       |        |                           |                 |                       |        |                      |                       |      |                  |                 |           |                 |            |           |            |            |                        |            |           |          |          |
| Future Stages Sanitary Sewers    |           |       |           |       |                       |        |                       |        |                           |                 |                       |        |                      |                       |      |                  |                 |           |                 |            |           |            |            |                        |            |           |          |          |





**LEGEND**

- 0.63ha  
10 40  
SANITARY DRAINAGE SUB AREA  
POPULATION EQUIVALENT  
NUMBER OF UNITS IN SUB AREA
- DRAINAGE AREA BOUNDARY
- PROPOSED SANITARY SEWER
- EXISTING SANITARY SEWER
- OUTSIDE PROPOSED DEVELOPMENT
- /// SITE PLAN APPROVAL

REVIEWED BY DEVELOPMENT REVIEW BRANCH  
Signed Will Curry  
Date Nov 24 2014  
Plan Number 16796

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                | APPLIES WHEN DRAWING MODIFIED | DATE       | BY  |
|-----|-------------------------|-------------------------------|------------|-----|
| 1   | AS PER CITY COMMENTS    |                               | JULY 25/14 | JMD |
| 2   | AS PER CITY COMMENTS    |                               | AUG 12/14  | JMD |
| 3   | AS PER CITY COMMENTS    |                               | SEPT 10/14 | JMD |
| 4   | ISSUED FOR TENDER       |                               | SEPT 12/14 | JMD |
| 5   | ISSUED FOR CONSTRUCTION |                               | SEPT 16/14 | JMD |
| 6   | ISSUED FOR CONSTRUCTION |                               | OCT 9/14   | JMD |
| 7   | AS PER CITY COMMENTS    |                               | OCT 31/14  | JMD |
| 8   | AS PER CITY COMMENTS    |                               | NOV 6/14   | JMD |
| 9   | AS PER CITY COMMENTS    |                               | NOV 18/14  | JMD |
| 10  | AS PER CITY COMMENTS    |                               | NOV 20/14  | JMD |

SCALE

8m 0 1:750 24m

DESIGN AGS

CHECKED JMD

DRAWN PNC

CHECKED AGS

APPROVED JMD

LICENCED PROFESSIONAL ENGINEER  
A.G.Y. SAUVE  
100142393  
PROVINCE OF ONTARIO

LICENCED PROFESSIONAL ENGINEER  
J.M. DECOEUR  
100127204  
PROVINCE OF ONTARIO

**ATREL Engineering Ltd.**  
Engineers - Ingénieurs  
380 LAURIER ST. ROCKLAND, ONTARIO K4K 1G2  
TEL.: (613) 446-7423 FAX: (613) 446-7425

CITY OF OTTAWA  
EAST URBAN COMMUNITY  
AVALON WEST STAGE 3

MINTO COMMUNITIES INC.

CLIENT No. 148  
PROJECT No. 131004  
DATE NOVEMBER 2013  
DRAWING No. 131004-SAN2

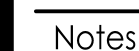
PLAN  
SANITARY DRAINAGE AREA PLAN

2370 Report Excerpts



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Legend



**APPROVED**  
By Geraldine Wildman at 6:13 pm, Jul 24, 2023

|          |    |       |         |
|----------|----|-------|---------|
| Revision | By | Appd. | YY.MM.D |
|----------|----|-------|---------|

|             | SWR | CHRG | DEPT | PERMID |
|-------------|-----|------|------|--------|
| Permit-Seal |     |      |      |        |

Permit-Seal

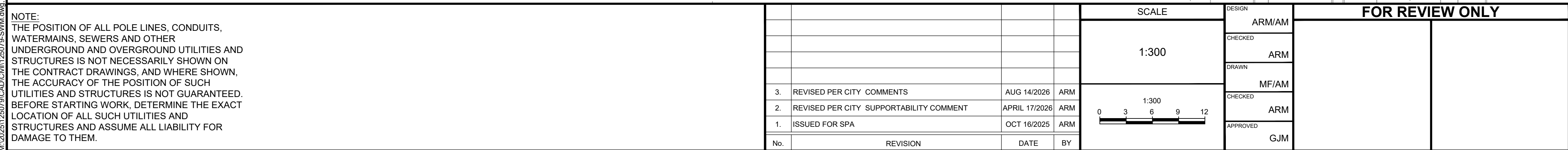
|                          |                |            |
|--------------------------|----------------|------------|
| Project No.<br>160401710 | Scale<br>1:500 | 0 5 15 25m |
| Drawing No.              | Sheet          | Revision   |

5  
N No. 1866

| <div></div> | SUBDIVISION:                                                          |            | <div>SANITARY SEWER<br/>DESIGN SHEET<br/>(City of Ottawa)</div> |                          |               |                  |      |                            |      |               |                       |              | DESIGN PARAMETERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                       |              |                       |              |                       |                       |                       |                       |                          |               |               |             |          |       |              |                         |                            |                         |        |      |  |  |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|------------|-----------------------------------------------------------------|--------------------------|---------------|------------------|------|----------------------------|------|---------------|-----------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------------|--------------|-----------------------|--------------|-----------------------|-----------------------|-----------------------|-----------------------|--------------------------|---------------|---------------|-------------|----------|-------|--------------|-------------------------|----------------------------|-------------------------|--------|------|--|--|
|                                                                                              | ORLEANS DECOEUR<br>RESIDENTIAL DEVELOPMENT                            |            |                                                                 |                          |               |                  |      |                            |      |               |                       |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |              |                       |              |                       |              |                       |                       |                       |                       |                          |               |               |             |          |       |              |                         |                            |                         |        |      |  |  |
|                                                                                              | DATE: 2022-09-23<br>REVISION: 2<br>DESIGNED BY: MJS<br>CHECKED BY: MW |            |                                                                 |                          |               |                  |      |                            |      |               |                       |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |              |                       |              |                       |              |                       |                       |                       |                       |                          |               |               |             |          |       |              |                         |                            |                         |        |      |  |  |
|                                                                                              |                                                                       |            | FILE NUMBER:                                                    |                          | 160401710     |                  |      |                            |      |               |                       |              | MAX PEAK FACTOR (RES.)= 4.0<br>MIN PEAK FACTOR (RES.)= 2.0<br>PEAKING FACTOR (INDUSTRIAL): 2.4<br>PEAKING FACTOR (ICI >20%): 1.5<br>PERSONS / 1 BED+DEN & 2 BED 2.1<br>PERSONS / TOWNHOME 2.7<br>PERSONS / 2 BED+DEN 3.1<br>AVG. DAILY FLOW / PERSON 280 l/p/day<br>COMMERCIAL 28,000 l/ha/day<br>INDUSTRIAL (HEAVY) 55,000 l/ha/day<br>INDUSTRIAL (LIGHT) 35,000 l/ha/day<br>INSTITUTIONAL 28,000 l/ha/day<br>INFILTRATION 0.33 l/s/ha<br>MINIMUM VELOCITY 0.60 m/s<br>MAXIMUM VELOCITY 3.00 m/s<br>MANNINGS n 0.013<br>BEDDING CLASS B<br>MINIMUM COVER 2.50 m<br>HARMON CORRECTION FACTOR 0.8 |              |                       |              |                       |              |                       |                       |                       |                       |                          |               |               |             |          |       |              |                         |                            |                         |        |      |  |  |
| LOCATION                                                                                     |                                                                       |            | RESIDENTIAL AREA AND POPULATION                                 |                          |               |                  |      |                            |      |               |                       |              | COMMERCIAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              | INDUSTRIAL (L)        |              | INDUSTRIAL (H)        |              | INSTITUTIONAL         |                       | GREEN / UNUSED        |                       | C+H                      | INFILTRATION  |               |             | TOTAL    | PIPE  |              |                         |                            |                         |        |      |  |  |
| AREA ID<br>NUMBER                                                                            | FROM<br>M.H.                                                          | TO<br>M.H. | AREA<br>(ha)                                                    | 1 BED+DEN<br>& 2 BED APT | UNITS<br>TOWN | 2 BED+DEN<br>APT | POP. | CUMULATIVE<br>AREA<br>(ha) | POP. | PEAK<br>FACT. | PEAK<br>FLOW<br>(l/s) | AREA<br>(ha) | ACCU.<br>AREA<br>(ha)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | AREA<br>(ha) | ACCU.<br>AREA<br>(ha) | AREA<br>(ha) | ACCU.<br>AREA<br>(ha) | AREA<br>(ha) | ACCU.<br>AREA<br>(ha) | PEAK<br>FLOW<br>(l/s) | TOTAL<br>AREA<br>(ha) | ACCU.<br>AREA<br>(ha) | INFILT.<br>FLOW<br>(l/s) | FLOW<br>(l/s) | LENGTH<br>(m) | DIA<br>(mm) | MATERIAL | CLASS | SLOPE<br>(%) | CAP.<br>(FULL)<br>(l/s) | CAP. V<br>PEAK FLOW<br>(%) | VEL.<br>(FULL)<br>(m/s) |        |      |  |  |
| R120A                                                                                        | 120                                                                   | 12         | 0.10                                                            | 24                       | 0             | 4                | 63   | 0.10                       | 63   | 3.63          | 0.7                   | 0.09         | 0.09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00                  | 0.0                   | 0.19                  | 0.19                     | 0.1           | 0.8           | 10.9        | 150      | PVC   | DR 28        | 1.00                    | 15.3                       | 5.53%                   | 0.86   |      |  |  |
| G12A                                                                                         | 12                                                                    | 10         | 0.00                                                            | 0                        | 0             | 0                | 0    | 0.10                       | 63   | 3.63          | 0.7                   | 0.00         | 0.09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.36                  | 0.36                  | 0.0                   | 0.36                     | 0.56          | 0.2           | 1.0         | 35.1     | 250   | PVC          | SDR 35                  | 0.30                       | 33.2                    | 2.87%  | 0.67 |  |  |
| R11A                                                                                         | 11                                                                    | 10         | 0.17                                                            | 0                        | 24            | 0                | 65   | 0.17                       | 65   | 3.63          | 0.8                   | 0.00         | 0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00                  | 0.0                   | 0.17                  | 0.17                     | 0.1           | 0.8           | 37.3        | 200      | PVC   | SDR 35       | 1.00                    | 33.4                       | 2.45%                   | 1.05   |      |  |  |
| G10A                                                                                         | 10                                                                    | 8          | 0.00                                                            | 0                        | 0             | 0                | 0    | 0.28                       | 128  | 3.57          | 1.5                   | 0.00         | 0.09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.31                  | 0.67                  | 0.0                   | 0.31                     | 1.03          | 0.3           | 1.8         | 59.5     | 250   | PVC          | SDR 35                  | 0.30                       | 33.2                    | 5.56%  | 0.67 |  |  |
| R9A                                                                                          | 9                                                                     | 8          | 0.19                                                            | 0                        | 24            | 0                | 65   | 0.19                       | 65   | 3.63          | 0.8                   | 0.00         | 0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00                  | 0.0                   | 0.19                  | 0.19                     | 0.1           | 0.8           | 37.4        | 200      | PVC   | SDR 35       | 1.00                    | 33.4                       | 2.47%                   | 1.05   |      |  |  |
|                                                                                              | 8                                                                     | 7          | 0.00                                                            | 0                        | 0             | 0                | 0    | 0.47                       | 192  | 3.52          | 2.2                   | 0.00         | 0.09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.67                  | 0.0                   | 0.00                  | 1.23                     | 0.4           | 2.6           | 14.5        | 250      | PVC   | SDR 35       | 0.30                    | 33.2                       | 7.92%                   | 0.67   |      |  |  |
| R15A                                                                                         | 15                                                                    | 13         | 0.46                                                            | 0                        | 24            | 0                | 65   | 0.46                       | 65   | 3.63          | 0.8                   | 0.00         | 0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00                  | 0.0                   | 0.46                  | 0.46                     | 0.2           | 0.9           | 69.6        | 200      | PVC   | SDR 35       | 0.50                    | 23.6                       | 3.87%                   | 0.74   |      |  |  |
| R14A                                                                                         | 14                                                                    | 13         | 0.46                                                            | 0                        | 24            | 0                | 65   | 0.46                       | 65   | 3.63          | 0.8                   | 0.00         | 0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00                  | 0.0                   | 0.46                  | 0.46                     | 0.2           | 0.9           | 70.7        | 200      | PVC   | SDR 35       | 0.50                    | 23.6                       | 3.87%                   | 0.74   |      |  |  |
| R161A                                                                                        | 161                                                                   | 16         | 0.10                                                            | 24                       | 0             | 4                | 63   | 0.10                       | 63   | 3.63          | 0.7                   | 0.09         | 0.09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00                  | 0.0                   | 0.19                  | 0.19                     | 0.1           | 0.8           | 8.9         | 150      | PVC   | DR 28        | 1.00                    | 15.3                       | 5.54%                   | 0.86   |      |  |  |
| R160A                                                                                        | 160                                                                   | 16         | 0.10                                                            | 24                       | 0             | 4                | 63   | 0.10                       | 63   | 3.63          | 0.7                   | 0.09         | 0.09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00                  | 0.0                   | 0.19                  | 0.19                     | 0.1           | 0.8           | 7.6         | 150      | PVC   | DR 28        | 1.00                    | 15.3                       | 5.53%                   | 0.86   |      |  |  |
| G16A                                                                                         | 16                                                                    | 13         | 0.00                                                            | 0                        | 0             | 0                | 0    | 0.21                       | 126  | 3.57          | 1.5                   | 0.00         | 0.18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.04                  | 0.04                  | 0.1                   | 0.04                     | 0.43          | 0.1           | 1.7         | 32.2     | 250   | PVC          | SDR 35                  | 0.30                       | 33.2                    | 5.07%  | 0.67 |  |  |
|                                                                                              | 13                                                                    | 7          | 0.00                                                            | 0                        | 0             | 0                | 0    | 1.13                       | 255  | 3.49          | 2.9                   | 0.00         | 0.18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.04                  | 0.1                   | 0.00                  | 1.36                     | 0.4           | 3.4           | 55.6        | 250      | PVC   | SDR 35       | 0.30                    | 33.4                       | 10.16%                  | 0.67   |      |  |  |
| G7A                                                                                          | 7                                                                     | 5          | 0.00                                                            | 0                        | 0             | 0                | 0    | 1.60                       | 448  | 3.40          | 4.9                   | 0.00         | 0.27                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.51                  | 1.22                  | 0.1                   | 0.51                     | 3.09          | 1.0           | 6.0         | 45.0     | 250   | PVC          | SDR 35                  | 0.30                       | 33.2                    | 18.18% | 0.67 |  |  |
| R6A                                                                                          | 6                                                                     | 5          | 0.20                                                            | 0                        | 24            | 0                | 65   | 0.20                       | 65   | 3.63          | 0.8                   | 0.00         | 0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00                  | 0.0                   | 0.20                  | 0.20                     | 0.1           | 0.8           | 37.4        | 200      | PVC   | SDR 35       | 1.00                    | 33.4                       | 2.47%                   | 1.05   |      |  |  |
|                                                                                              | 5                                                                     | 4          | 0.00                                                            | 0                        | 0             | 0                | 0    | 1.79                       | 512  | 3.37          | 5.6                   | 0.00         | 0.27                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00         | 0.00                  | 1.22                  | 0.1                   | 0.00                  | 3.29                     | 1.1           | 6.8           | 26.4        | 250      | PVC   | SDR 35       | 0.30                    | 33.2                       | 20.41%                  | 0.67   |      |  |  |
|                                                                                              | 4                                                                     | 2          | 0.00                                                            | 0                        | 0             | 0                | 0    | 1.79                       | 512  | 3.37          | 5.6                   | 0.00         | 0.27                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00         | 0.00                  | 1.22                  | 0.1                   | 0.00                  | 3.29                     | 1.1           | 6.8           | 33.6        | 250      | PVC   | SDR 35       | 0.30                    | 33.2                       | 20.41%                  | 0.67   |      |  |  |
| R3A                                                                                          | 3                                                                     | 2          | 0.19                                                            | 0                        | 24            | 0                | 65   | 0.19                       | 65   | 3.63          | 0.8                   | 0.00         | 0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00                  | 0.0                   | 0.19                  | 0.19                     | 0.1           | 0.8           | 37.3        | 200      | PVC   | SDR 35       | 1.00                    | 33.4                       | 2.47%                   | 1.05   |      |  |  |
|                                                                                              | 2                                                                     | 1          | 0.00                                                            | 0                        | 0             | 0                | 0    | 1.99                       | 577  | 3.35          | 6.3                   | 0.00         | 0.27                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.00         | 0.00                  | 0.00         | 0.00                  | 0.00         | 0.00                  | 1.22                  | 0.1                   | 0.00                  | 3.48                     | 1.1           | 7.5           | 48.2        | 250      | PVC   | SDR 35       | 0.30                    | 33.2                       | 22.63%                  | 0.67   |      |  |  |
|                                                                                              |                                                                       |            |                                                                 |                          |               |                  |      |                            |      |               |                       |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |              |                       |              |                       |              |                       |                       |                       |                       |                          |               |               |             |          | 250   |              |                         |                            |                         |        |      |  |  |

## **Appendix C**

### **Storm Servicing**

[illegible]

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PLANA1.DWG - 841mmx594mm

**Novatech Project #:** 125079  
**Project Name:** 2380 Tenth Line  
**Date:** 8/17/2026  
**Input By:** Anjush Musyaju, EIT  
**Reviewed By:** Anthony Mestwarp. P.Eng  
**Drawing Reference:** 125079-SWM

**Storm Tributary Area Coefficients**

| Area ID | Area (ha)    | Imperivous<br>Area (ha) | Proposed<br>Pervious<br>Area<br>(ha) | Coefficient |
|---------|--------------|-------------------------|--------------------------------------|-------------|
|         |              | 0.9                     | 0.2                                  |             |
| D-01    | 0.004        | 0.001                   | 0.003                                | 0.40        |
| D-02    | 0.005        | 0.002                   | 0.003                                | 0.49        |
| A-01    | 0.025        | 0.025                   | 0.000                                | 0.90        |
| A-02    | 0.222        | 0.096                   | 0.126                                | 0.50        |
| A-03    | 0.082        | 0.053                   | 0.029                                | 0.65        |
| A-04    | 0.028        | 0.015                   | 0.012                                | 0.58        |
| R-00    | 0.221        | 0.221                   | 0.000                                | 0.90        |
|         | <b>0.587</b> | <b>1.313</b>            | <b>0.173</b>                         | <b>2.07</b> |

STORM SEWER DESIGN SHEET



Novatech Project #: 125079  
Project Name: 2380 Tenth Line  
Date: 9/4/2025  
Revised: 4/9/2026  
Revised: 8/17/2026  
Input By: Anjush Musyaju, EIT  
Reviewed By: Anthony Mestwarp. P.Eng  
Drawing Reference: 125079-SWM

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)

Storm Design Event = 2 Year

| Location   |                  |          |          | Flow           |               |                    |                         |                    |                   |                               |                                |                                            | Design Capacity                     |                             |                       |                |                           |                            |                             |                        |           |
|------------|------------------|----------|----------|----------------|---------------|--------------------|-------------------------|--------------------|-------------------|-------------------------------|--------------------------------|--------------------------------------------|-------------------------------------|-----------------------------|-----------------------|----------------|---------------------------|----------------------------|-----------------------------|------------------------|-----------|
|            |                  |          |          |                |               |                    |                         |                    |                   |                               |                                |                                            | Proposed Sewer Pipe Sizing / Design |                             |                       |                |                           |                            |                             |                        |           |
| Street     | Area ID          | From MH  | To MH    | Hardscape Area | Pervious Area | Area<br>A<br>(ha.) | Runoff Coefficient<br>C | Indivi.<br>2.78 AC | Accum.<br>2.78 AC | Time of Conc.<br>Tc<br>(min.) | Rain Intensity<br>I<br>(mm/hr) | Total Uncontrolled Peak Flow<br>Q<br>(L/s) | Pipe Length<br>(m)                  | Pipe Size (mm) and Material | Pipe ID Actual<br>(m) | Roughness<br>n | Design Grade<br>So<br>(%) | Capacity<br>Qfull<br>(L/s) | Full Flow Velocity<br>(m/s) | Time of Flow<br>(min.) | Q / Qfull |
| Street One | A-01             | Building | 101      | 0.02           | 0             | 0.02               | 0.90                    | 0.06               | 0.06              | 10.00                         | 76.81                          | 4.7                                        | 10.2                                | 250 PVC                     | 0.254                 | 0.013          | 2.00                      | 87.7                       | 1.73                        | 0.10                   | 5.4%      |
|            |                  |          |          |                |               |                    |                         |                    |                   |                               |                                |                                            |                                     |                             |                       |                |                           |                            |                             |                        |           |
| Street One | A-03, A-04, R-00 | 105      | 101      | 0.29           | 0.04          | 0.33               | 0.81                    | 0.75               | 0.75              | 10.00                         | 76.81                          | 57.3                                       | 5.1                                 | 250 PVC                     | 0.254                 | 0.013          | 1.00                      | 62.0                       | 1.22                        | 0.07                   | 92.4%     |
|            |                  |          |          |                |               |                    |                         |                    |                   |                               |                                |                                            |                                     |                             |                       |                |                           |                            |                             |                        |           |
| Street One | A-02             | 102      | 101-EX   | 0.10           | 0.13          | 0.22               | 0.50                    | 0.31               | 0.31              | 10.00                         | 76.81                          | 23.9                                       | 26.6                                | 250 PVC                     | 0.254                 | 0.013          | 0.50                      | 43.9                       | 0.87                        | 0.51                   | 54.5%     |
|            |                  |          |          |                |               |                    |                         |                    |                   |                               |                                |                                            |                                     |                             |                       |                |                           |                            |                             |                        |           |
| Street One |                  | 101      | EXISTING |                |               |                    |                         | 0.00               | 1.12              | 10.51                         | 74.89                          | 83.8                                       | 19.8                                | 1200 CONC                   | 1.2192                | 0.013          | 0.21                      | 1863.9                     | 1.60                        | 0.21                   | 4.5%      |
| Totals     |                  |          |          |                |               | 0.58               |                         | 1.12               |                   |                               |                                |                                            | 61.7                                |                             |                       |                |                           |                            |                             |                        |           |

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<sub>p</sub>\*R<sup>2/3</sup>\*So<sup>0.5</sup>

Definitions

Q full = Capacity (L/s)  
n = Manning coefficient of roughness (0.013)  
A<sub>p</sub> = Pipe flow area (m<sup>2</sup>)  
R = Hydraulic Radius of wetted area (dia./4 for full pipes)  
So = Pipe slope/gradient

TABLE 1A: Existing Conditions

| Drainage Area | Area (HA) | "C"  |
|---------------|-----------|------|
| Block 1       | 0.59      | 0.20 |
| Total         | 0.59      | 0.20 |

|                  |     |        |
|------------------|-----|--------|
| Site Constraints | 220 | L/s/ha |
|------------------|-----|--------|

\* Stormwater Management Report for Cassette Subdivision', 2275 Mer-Bleue Road, City of Ottawa, May 2022, Updated July 2022, JFSA  
Ref. No.: 231-22, Prepared by JFSA

TABLE 1B: Allowable Flows

| Outlet Options          | Area (ha) | Q <sub>ALLOW</sub> (L/s) |
|-------------------------|-----------|--------------------------|
| Promenade Decoeur Drive | 0.587     | 129.1                    |

**TABLE 2A: Post-Development Runoff Coefficient "C" - D-01**

| Area  | Surface | Ha    | "C"  | C <sub>avg</sub> | *C <sub>100</sub> |
|-------|---------|-------|------|------------------|-------------------|
| Total | Hard    | 0.001 | 0.90 | 0.40             | 0.46              |
| 0.004 | Soft    | 0.003 | 0.20 |                  |                   |

Runoff Coefficient Equation

$$C = (A_{\text{hard}} \times 0.9 + A_{\text{soft}} \times 0.2) / A_{\text{Tot}}$$

\* Runoff Coefficient increases by 25% up to a maximum value of 1.00 for the 100-Year event

**TABLE 2B: Post-Development D-01 Flows**

| Outlet Options      | Area (ha) | C <sub>avg</sub> | Tc (min) | Q <sub>2 Year</sub> (L/s) | Q <sub>5 Year</sub> (L/s) | Q <sub>100 Year</sub> (L/s) |
|---------------------|-----------|------------------|----------|---------------------------|---------------------------|-----------------------------|
| David Lewis Private | 0.004     | 0.40             | 10       | <b>0.4</b>                | <b>0.5</b>                | <b>1.0</b>                  |

Time of Concentration Tc= 10 min  
 Intensity (2 Year Event) I<sub>2</sub>= 76.81 mm/hr  
 Intensity (5 Year Event) I<sub>5</sub>= 104.19 mm/hr  
 Intensity (100 Year Event) I<sub>100</sub>= 178.56 mm/hr

Equations:  
 Flow Equation  
 $Q = 2.78 \times C \times I \times A$

Where:  
 C is the runoff coefficient  
 I is the rainfall intensity, City of Ottawa IDF  
 A is the total drainage area

100 year Intensity =  $1735.688 / (\text{Time in min} + 6.014)^{0.820}$   
 5 year Intensity =  $998.071 / (\text{Time in min} + 6.053)^{0.814}$   
 2 year Intensity =  $732.951 / (\text{Time in min} + 6.199)^{0.810}$

**TABLE 3A: Post-Development Runoff Coefficient "C" - D-02**

| Area  | Surface | Ha    | "C"  | C <sub>avg</sub> | *C <sub>100</sub> |
|-------|---------|-------|------|------------------|-------------------|
| Total | Hard    | 0.002 | 0.90 | 0.44             | 0.51              |
| 0.006 | Soft    | 0.004 | 0.20 |                  |                   |

Runoff Coefficient Equation

$$C = (A_{\text{hard}} \times 0.9 + A_{\text{soft}} \times 0.2) / A_{\text{Tot}}$$

\* Runoff Coefficient increases by 25% up to a maximum value of 1.00 for the 100-Year event

**TABLE 3B: Post-Development D-02 Flows**

| Outlet Options          | Area (ha) | C <sub>avg</sub> | Tc (min) | Q <sub>2 Year</sub> (L/s) | Q <sub>5 Year</sub> (L/s) | Q <sub>100 Year</sub> (L/s) |
|-------------------------|-----------|------------------|----------|---------------------------|---------------------------|-----------------------------|
| Promenade Decoeur Drive | 0.006     | 0.44             | 10       | <b>0.6</b>                | <b>0.7</b>                | <b>1.5</b>                  |

Time of Concentration Tc= 10 min  
 Intensity (2 Year Event) I<sub>2</sub>= 76.81 mm/hr  
 Intensity (5 Year Event) I<sub>5</sub>= 104.19 mm/hr  
 Intensity (100 Year Event) I<sub>100</sub>= 178.56 mm/hr

Equations:  
 Flow Equation  
 $Q = 2.78 \times C \times I \times A$

Where:  
 C is the runoff coefficient  
 I is the rainfall intensity, City of Ottawa IDF  
 A is the total drainage area

100 year Intensity =  $1735.688 / (\text{Time in min} + 6.014)^{0.820}$   
 5 year Intensity =  $998.071 / (\text{Time in min} + 6.053)^{0.814}$   
 2 year Intensity =  $732.951 / (\text{Time in min} + 6.199)^{0.810}$

**TABLE 4A: Post-Development Runoff Coefficient "C" - A-01**

| Area  | Surface | Ha    | "C"  | C <sub>avg</sub> | *C <sub>100</sub> | Runoff Coefficient Equation                                              |
|-------|---------|-------|------|------------------|-------------------|--------------------------------------------------------------------------|
| Total | Hard    | 0.025 | 0.90 | 0.90             | 1.00              | C = (A <sub>hard</sub> x 0.9 + A <sub>soft</sub> x 0.2)/A <sub>Tot</sub> |
| 0.025 | Soft    | 0.000 | 0.20 |                  |                   | * Runoff Coefficient increases by                                        |

**TABLE 4B: Post-Development A-01 Flows**

| Outlet Options          | Area (ha) | C <sub>avg</sub> | Tc (min) | Q <sub>2 Year</sub> (L/s) | Q <sub>5 Year</sub> (L/s) | Q <sub>100 Year</sub> (L/s) |
|-------------------------|-----------|------------------|----------|---------------------------|---------------------------|-----------------------------|
| Promenade Decoeur Drive | 0.025     | 0.90             | 10       | 4.7                       | 6.4                       | 12.2                        |

Time of Concentration Tc= 10 min  
 Intensity (2 Year Event) I<sub>2</sub>= 76.81 mm/hr  
 Intensity (5 Year Event) I<sub>5</sub>= 104.19 mm/hr  
 Intensity (100 Year Event) I<sub>100</sub>= 178.56 mm/hr

Equations:  
 Flow Equation  
 $Q = 2.78 \times C \times I \times A$

Where:  
 C is the runoff coefficient  
 I is the rainfall intensity, City of Ottawa IDF  
 A is the total drainage area

100 year Intensity =  $1735.688 / (\text{Time in min} + 6.014)^{0.820}$   
 5 year Intensity =  $998.071 / (\text{Time in min} + 6.053)^{0.814}$   
 2 year Intensity =  $732.951 / (\text{Time in min} + 6.199)^{0.810}$

**TABLE 5A: Post-Development Runoff Coefficient "C" - A-02**

| Area  | Surface | Ha    | 5 Year Event |                  | 100 Year Event |                   |
|-------|---------|-------|--------------|------------------|----------------|-------------------|
|       |         |       | "C"          | C <sub>avg</sub> | "C" + 25%      | *C <sub>avg</sub> |
| Total | Hard    | 0.096 | 0.90         | 0.50             | 1.00           | 0.58              |
| 0.222 | Roof    | 0.000 | 0.90         |                  | 1.00           |                   |
|       | Soft    | 0.126 | 0.20         |                  | 0.25           |                   |

**TABLE 5B: 2 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-02**

0.222 =Area (ha)

0.50 = C

| Return Period | Time (min) | Intensity (mm/hr) | Flow Q (L/s) | Allowable Runoff (L/s)* | Net Flow to be Stored (L/s) | Storage Req'd (m <sup>3</sup> ) |
|---------------|------------|-------------------|--------------|-------------------------|-----------------------------|---------------------------------|
| 2 YEAR        | 0          | 167.22            | 52.03        | 16.2                    | 35.88                       | 0.00                            |
|               | 5          | 103.57            | 32.23        | 16.2                    | 16.08                       | 4.82                            |
|               | <b>10</b>  | <b>76.81</b>      | <b>23.90</b> | <b>16.2</b>             | <b>7.75</b>                 | <b>4.65</b>                     |
|               | 15         | 61.77             | 19.22        | 16.2                    | 3.07                        | 2.76                            |
|               | 20         | 52.03             | 16.19        | 16.2                    | 0.04                        | 0.05                            |

**TABLE 5C: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-02**

0.222 =Area (ha)

0.50 = C

| Return Period | Time (min) | Intensity (mm/hr) | Flow Q (L/s) | Allowable Runoff (L/s)* | Net Flow to be Stored (L/s) | Storage Req'd (m <sup>3</sup> ) |
|---------------|------------|-------------------|--------------|-------------------------|-----------------------------|---------------------------------|
| 5 YEAR        | 0          | 230.48            | 71.71        | 18.800                  | 52.91                       | 0.00                            |
|               | 5          | 141.18            | 43.93        | 18.800                  | 25.13                       | 7.54                            |
|               | <b>10</b>  | <b>104.19</b>     | <b>32.42</b> | <b>18.800</b>           | <b>13.62</b>                | <b>8.17</b>                     |
|               | 15         | 83.56             | 26.00        | 18.800                  | 7.20                        | 6.48                            |
|               | 20         | 70.25             | 21.86        | 18.800                  | 3.06                        | 3.67                            |

**TABLE 5D: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-02**

0.222 =Area (ha)

0.58 = C

| Return Period | Time (min) | Intensity (mm/hr) | Flow Q (L/s) | Allowable Runoff (L/s)* | Net Flow to be Stored (L/s) | Storage Req'd (m <sup>3</sup> ) |
|---------------|------------|-------------------|--------------|-------------------------|-----------------------------|---------------------------------|
| 100 YEAR      | 5          | 242.70            | 86.26        | 24.75                   | 61.51                       | 18.45                           |
|               | 10         | 178.56            | 63.46        | 24.75                   | 38.71                       | 23.23                           |
|               | <b>15</b>  | <b>142.89</b>     | <b>50.79</b> | <b>24.75</b>            | <b>26.04</b>                | <b>23.43</b>                    |
|               | 20         | 119.95            | 42.63        | 24.75                   | 17.88                       | 21.46                           |
|               | 25         | 103.85            | 36.91        | 24.75                   | 12.16                       | 18.24                           |

**TABLE 5E: 100 YEAR + 20% EVENT QUANTITY STORAGE REQUIREMENT - A-02**

0.222 =Area (ha)

0.58 = C

| Return Period | Time (min) | Intensity (mm/hr) | Flow Q (L/s) | Allowable Runoff (L/s)* | Net Flow to be Stored (L/s) | Storage Req'd (m <sup>3</sup> ) |
|---------------|------------|-------------------|--------------|-------------------------|-----------------------------|---------------------------------|
| 100 YEAR + 20 | 5          | 291.24            | 103.51       | 29.3                    | 74.26                       | 22.28                           |
|               | 10         | 214.27            | 76.15        | 29.3                    | 46.90                       | 28.14                           |
|               | <b>15</b>  | <b>171.47</b>     | <b>60.94</b> | <b>29.3</b>             | <b>31.69</b>                | <b>28.52</b>                    |
|               | 20         | 143.94            | 51.16        | 29.3                    | 21.91                       | 26.29                           |
|               | 25         | 124.62            | 44.29        | 29.3                    | 15.04                       | 22.56                           |

Equations:

Flow Equation

$$Q = 2.78 \times C \times I \times A$$

Where:

C is the runoff coefficient

I is the rainfall intensity, City of Ottawa IDF

A is the total drainage area

\* Allowable run-off is 50% of the actual flow to calculate the required volume as per city of Ottawa Guidelines for underground storage

Runoff Coefficient Equation

$$C_s = (A_{\text{hard}} \times 0.9 + A_{\text{soft}} \times 0.2) / A_{\text{Tot}}$$

$$C_{100} = (A_{\text{hard}} \times 1.0 + A_{\text{soft}} \times 0.25) / A_{\text{Tot}}$$

TABLE 6F: Catchbasin - A-03, A-04, R-00

| Structures | Size Dia.(mm) | Area (m <sup>2</sup> ) | T/G   | Inv OUT |
|------------|---------------|------------------------|-------|---------|
| STMMH106   | 2400          | 4.52                   | 87.82 | 85.22   |
| STMMH105   | 2400          | 4.52                   | 88.17 | 85.16   |
| CB3        | 610X610       | 0.37                   | 87.95 | 86.45   |
| CB4        | 610X610       | 0.37                   | 87.77 | 86.27   |
| CB5        | 610X610       | 0.37                   | 87.75 | 86.25   |
| CB6        | 610X610       | 0.37                   | 87.98 | 86.48   |

TABLE 6G: Pipe - A-03, A-04, R-00

| Structures      | Dia.(mm) | Area (m <sup>2</sup> ) | Upstream inv | Down stream invert | Length* (m) | Volume |
|-----------------|----------|------------------------|--------------|--------------------|-------------|--------|
| CBMH106-CBMH105 | 1372     | 1.48                   | 85.22        | 85.17              | 46.90       | 69.34  |
| CB3-LEAD        | 250      | 0.05                   | 86.45        | 85.94              | 11.20       | 0.55   |
| CB4-LEAD        | 200      | 0.03                   | 86.27        | 86.21              | 2.80        | 0.09   |
| CB5-LEAD        | 200      | 0.03                   | 86.25        | 86.19              | 2.80        | 0.09   |
| CB6-STMMH105    | 200      | 0.03                   | 86.60        | 86.57              | 5.00        | 0.16   |

\* Length is edge of structure to edge of structure

TABLE 6H: Storage Provided - A-03, A-04, R-00

| Area A-05: Above Ground Ponding |                       |                             |                       |                             |                                  |
|---------------------------------|-----------------------|-----------------------------|-----------------------|-----------------------------|----------------------------------|
| Elevation (m)                   | CB4 Ponding Depth (m) | CB4 Area* (m <sup>2</sup> ) | CB5 Ponding Depth (m) | CB5 Area* (m <sup>2</sup> ) | Storage Volume (m <sup>3</sup> ) |
| 87.75                           | 0.000                 | 0.000                       | 0.000                 | 0.360                       | 0.00                             |
| 87.77                           | 0.000                 | 0.360                       | 0.020                 | 2.878                       | 0.03                             |
| 87.8                            | 0.030                 | 5.883                       | 0.050                 | 8.862                       | 0.30                             |
| 87.82                           | 0.050                 | 11.836                      | 0.070                 | 14.623                      | 0.71                             |
| 87.85                           | 0.080                 | 24.448                      | 0.100                 | 27.189                      | 1.89                             |
| 87.88                           | 0.110                 | 42.243                      | 0.130                 | 40.188                      | 3.90                             |

TABLE 6I: Storage Provided - A-03, A-04, R-00

| Storage Table |                  |                                   |                                   |                              |                              |                              |                              |                               |                                       |                                  |                                |
|---------------|------------------|-----------------------------------|-----------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|-------------------------------|---------------------------------------|----------------------------------|--------------------------------|
| Elevation (m) | System Depth (m) | STMMH106 Volume (m <sup>3</sup> ) | STMMH105 Volume (m <sup>3</sup> ) | CB3 Volume (m <sup>3</sup> ) | CB4 Volume (m <sup>3</sup> ) | CB5 Volume (m <sup>3</sup> ) | CB6 Volume (m <sup>3</sup> ) | Pipe Volume (m <sup>3</sup> ) | Underground Volume (m <sup>3</sup> )* | Ponding Volume (m <sup>3</sup> ) | Total Volume (m <sup>3</sup> ) |
| 85.160        | 0.00             | 0.00                              | 0.00                              | 0.00                         | -                            | -                            | -                            | 0.00                          | 0.00                                  | 0.00                             | 0.00                           |
| 86.700        | 1.54             | 0.00                              | 6.97                              | 0.09                         | 0.16                         | 0.17                         | 0.08                         | 70.22                         | 77.69                                 | 0.00                             | 77.69                          |
| 86.800        | 1.64             | 7.15                              | 7.42                              | 0.13                         | 0.20                         | 0.20                         | 0.12                         | -                             | 85.44                                 | 0.00                             | 85.44                          |
| 86.950        | 1.79             | 7.83                              | 8.10                              | 0.19                         | 0.25                         | 0.26                         | 0.17                         | -                             | 87.02                                 | 0.00                             | 87.02                          |
| 87.100        | 1.94             | 8.50                              | 8.78                              | 0.24                         | 0.31                         | 0.32                         | 0.23                         | -                             | 88.60                                 | 0.00                             | 88.60                          |
| 87.250        | 2.09             | 9.18                              | 9.45                              | 0.30                         | 0.36                         | 0.37                         | 0.29                         | -                             | 90.18                                 | 0.00                             | 90.18                          |
| 87.400        | 2.24             | 9.86                              | 10.13                             | 0.35                         | 0.42                         | 0.43                         | 0.34                         | -                             | 91.76                                 | 0.00                             | 91.76                          |
| 87.550        | 2.39             | 10.54                             | 10.81                             | 0.41                         | 0.48                         | 0.48                         | 0.40                         | -                             | 93.34                                 | 0.00                             | 93.34                          |
| 87.700        | 2.54             | 11.22                             | 11.49                             | 0.47                         | 0.53                         | 0.54                         | 0.45                         | -                             | 94.92                                 | 0.00                             | 94.92                          |
| 87.750        | 2.59             | 11.45                             | 11.72                             | 0.48                         | 0.55                         | 0.56                         | 0.47                         | -                             | 95.45                                 | 0.00                             | 95.45                          |
| 87.770        | 2.61             | 11.54                             | 11.81                             | 0.49                         | 0.56                         | -                            | 0.48                         | -                             | 95.65                                 | 0.03                             | 95.68                          |
| 87.800        | 2.64             | 11.67                             | 11.94                             | 0.50                         | -                            | -                            | 0.49                         | -                             | 95.94                                 | 0.30                             | 96.25                          |
| 87.820        | 2.66             | 11.76                             | 12.03                             | 0.51                         | -                            | -                            | 0.50                         | -                             | 96.14                                 | 0.71                             | 96.85                          |
| 87.850        | 2.69             | -                                 | 12.17                             | 0.52                         | -                            | -                            | 0.51                         | -                             | 96.30                                 | 1.89                             | 98.18                          |
| 87.880        | 2.72             | -                                 | 12.30                             | 0.53                         | -                            | -                            | 0.52                         | -                             | 96.46                                 | 3.90                             | 100.35                         |

TABLE 6J: Orifice Sizing information - A-03, A-04, R-00

| Control Device<br>Plate Orifice 152 |            |          |          | Orifice Control Sizing |                          |                        |                      |
|-------------------------------------|------------|----------|----------|------------------------|--------------------------|------------------------|----------------------|
| Design Event                        | Flow (L/S) | Head (m) | Elev (m) | Outlet dia. (mm)       | Volume (m <sup>3</sup> ) | Area (m <sup>2</sup> ) | Equivalent Dia. (mm) |
| 1:2 Year                            | 33.50      | 0.45     | 85.68    | 250                    | 26.46                    | 0.0182                 | 152.0                |
| 1:5 Year                            | 41.00      | 0.68     | 85.92    | 250.00                 | 38.27                    | 0.0181                 | 152.0                |
| 1:100 Year                          | 62.00      | 1.53     | 86.77    | 250.00                 | 83.07                    | 0.0182                 | 152.0                |
| 1:100 + 20 Year                     | 79.20      | 2.56     | 87.79    | 250.00                 | 96.15                    | 0.0180                 | 152.0                |

The design Head is calculated based on the centre of the orifice at the bottom of the pipe

$$Q = 0.62 \times A \times (2gh)^{0.5}$$

Q is the release rate in m<sup>3</sup>/s

A is the orifice area in m<sup>2</sup>

g is the acceleration due to gravity, 9.81 m/s<sup>2</sup>

h is the head of water above the orifice centre in m

d is the diameter of the orifice in m

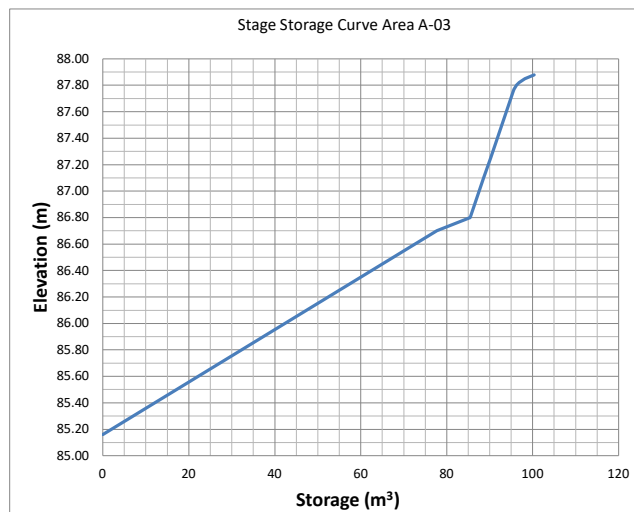


**TABLE 6A: Post-Development Runoff Coefficient "C" - A-03, A-04, R-00**

| Area  | Surface | Ha    | 5 Year Event |                  | 100 Year Event |                   |
|-------|---------|-------|--------------|------------------|----------------|-------------------|
|       |         |       | "C"          | C <sub>avg</sub> | "C" + 25%      | *C <sub>avg</sub> |
| Total | Hard    | 0.068 | 0.90         | 0.81             | 1.00           | 0.91              |
| 0.330 | Roof    | 0.221 | 0.90         |                  | 1.00           |                   |
|       | Soft    | 0.041 | 0.20         |                  | 0.25           |                   |

**TABLE 6B: 2 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-03, A-04, R-00**

0.330 =Area (ha)

0.81 = C

| Return Period | Time (min) | Intensity (mm/hr) | Flow Q (L/s) | Allowable Runoff (L/s)* | Net Flow to be Stored (L/s) | Storage Req'd (m <sup>3</sup> ) |
|---------------|------------|-------------------|--------------|-------------------------|-----------------------------|---------------------------------|
| 2 YEAR        | 10         | 76.81             | 57.28        | 16.75                   | 40.53                       | 24.32                           |
|               | 15         | 61.77             | 46.06        | 16.75                   | 29.31                       | 26.38                           |
|               | <b>20</b>  | <b>52.03</b>      | <b>38.80</b> | <b>16.75</b>            | <b>22.05</b>                | <b>26.46</b>                    |
|               | 25         | 45.17             | 33.68        | 16.75                   | 16.93                       | 25.40                           |
|               | 30         | 40.04             | 29.86        | 16.75                   | 13.11                       | 23.60                           |

**TABLE 6C: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-03, A-04, R-00**

0.330 =Area (ha)

0.81 = C

| Return Period | Time (min) | Intensity (mm/hr) | Flow Q (L/s) | Allowable Runoff (L/s)* | Net Flow to be Stored (L/s) | Storage Req'd (m <sup>3</sup> ) |
|---------------|------------|-------------------|--------------|-------------------------|-----------------------------|---------------------------------|
| 5 YEAR        | 10         | 104.19            | 77.70        | 20.50                   | 57.20                       | 34.32                           |
|               | 15         | 83.56             | 62.31        | 20.50                   | 41.81                       | 37.63                           |
|               | <b>20</b>  | <b>70.25</b>      | <b>52.39</b> | <b>20.50</b>            | <b>31.89</b>                | <b>38.27</b>                    |
|               | 25         | 60.90             | 45.41        | 20.50                   | 24.91                       | 37.37                           |
|               | 30         | 53.93             | 40.22        | 20.50                   | 19.72                       | 35.49                           |

**TABLE 6D: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-03, A-04, R-00**

0.330 =Area (ha)

0.91 = C

| Return Period | Time (min) | Intensity (mm/hr) | Flow Q (L/s) | Allowable Runoff (L/s)* | Net Flow to be Stored (L/s) | Storage Req'd (m <sup>3</sup> ) |
|---------------|------------|-------------------|--------------|-------------------------|-----------------------------|---------------------------------|
| 100 YEAR      | 15         | 142.89            | 118.86       | 31.00                   | 87.86                       | 79.07                           |
|               | 20         | 119.95            | 99.77        | 31.00                   | 68.77                       | 82.53                           |
|               | <b>25</b>  | <b>103.85</b>     | <b>86.38</b> | <b>31.00</b>            | <b>55.38</b>                | <b>83.07</b>                    |
|               | 30         | 91.87             | 76.41        | 31.00                   | 45.41                       | 81.75                           |
|               | 35         | 82.58             | 68.69        | 31.00                   | 37.69                       | 79.14                           |

**TABLE 6E: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-03, A-04, R-00**

0.330 =Area (ha)

0.91 = C

| Return Period | Time (min) | Intensity (mm/hr) | Flow Q (L/s)  | Allowable Runoff (L/s)* | Net Flow to be Stored (L/s) | Storage Req'd (m <sup>3</sup> ) |
|---------------|------------|-------------------|---------------|-------------------------|-----------------------------|---------------------------------|
| 100 YEAR + 20 | 10         | 214.27            | 178.23        | 39.6                    | 138.63                      | 83.18                           |
|               | 15         | 171.47            | 142.63        | 39.6                    | 103.03                      | 92.72                           |
|               | <b>20</b>  | <b>143.94</b>     | <b>119.73</b> | <b>39.6</b>             | <b>80.13</b>                | <b>96.15</b>                    |
|               | 25         | 124.62            | 103.65        | 39.6                    | 64.05                       | 96.08                           |
|               | 30         | 110.24            | 91.70         | 39.6                    | 52.10                       | 93.77                           |

Equations:

Flow Equation

$$Q = 2.78 \times C \times I \times A$$

Where:

C is the runoff coefficient

I is the rainfall intensity, City of Ottawa IDF

A is the total drainage area

\* Allowable run-off is 50% of the actual flow to calculate the required volume as per city of Ottawa Guidelines for underground storage

Runoff Coefficient Equation

$$C_s = (A_{\text{hard}} \times 0.9 + A_{\text{soft}} \times 0.2) / A_{\text{Tot}}$$

$$C_{100} = (A_{\text{hard}} \times 1.0 + A_{\text{soft}} \times 0.25) / A_{\text{Tot}}$$

TABLE 6F: Catchbasin - A-03, A-04, R-00

| Structures | Size Dia.(mm) | Area (m <sup>2</sup> ) | T/G   | Inv OUT |
|------------|---------------|------------------------|-------|---------|
| STMMH106   | 2400          | 4.52                   | 87.82 | 85.22   |
| STMMH105   | 2400          | 4.52                   | 88.17 | 85.16   |
| CB3        | 610X610       | 0.37                   | 87.95 | 86.45   |
| CB4        | 610X610       | 0.37                   | 87.77 | 86.27   |
| CB5        | 610X610       | 0.37                   | 87.75 | 86.25   |
| CB6        | 610X610       | 0.37                   | 87.98 | 86.48   |

TABLE 6G: Pipe - A-03, A-04, R-00

| Structures      | Dia.(mm) | Area (m <sup>2</sup> ) | Upstream inv | Down stream invert | Length* (m) | Volume |
|-----------------|----------|------------------------|--------------|--------------------|-------------|--------|
| CBMH106-CBMH105 | 1372     | 1.48                   | 85.22        | 85.17              | 46.90       | 69.34  |
| CB3-LEAD        | 250      | 0.05                   | 86.45        | 85.94              | 11.20       | 0.55   |
| CB4-LEAD        | 200      | 0.03                   | 86.27        | 86.21              | 2.80        | 0.09   |
| CB5-LEAD        | 200      | 0.03                   | 86.25        | 86.19              | 2.80        | 0.09   |
| CB6-STMMH105    | 200      | 0.03                   | 86.60        | 86.57              | 5.00        | 0.16   |

\* Length is edge of structure to edge of structure

TABLE 6H: Storage Provided - A-03, A-04, R-00

| Area A-05: Above Ground Ponding |                       |                             |                       |                             |                                  |
|---------------------------------|-----------------------|-----------------------------|-----------------------|-----------------------------|----------------------------------|
| Elevation (m)                   | CB4 Ponding Depth (m) | CB4 Area* (m <sup>2</sup> ) | CB5 Ponding Depth (m) | CB5 Area* (m <sup>2</sup> ) | Storage Volume (m <sup>3</sup> ) |
| 87.75                           | 0.000                 | 0.000                       | 0.000                 | 0.360                       | 0.00                             |
| 87.77                           | 0.000                 | 0.360                       | 0.020                 | 2.878                       | 0.03                             |
| 87.8                            | 0.030                 | 5.883                       | 0.050                 | 8.862                       | 0.30                             |
| 87.82                           | 0.050                 | 11.836                      | 0.070                 | 14.623                      | 0.71                             |
| 87.85                           | 0.080                 | 24.448                      | 0.100                 | 27.189                      | 1.89                             |
| 87.88                           | 0.110                 | 42.243                      | 0.130                 | 40.188                      | 3.90                             |

TABLE 6I: Storage Provided - A-03, A-04, R-00

| Storage Table |                  |                                   |                                   |                              |                              |                              |                              |                               |                                       |                                  |                                |
|---------------|------------------|-----------------------------------|-----------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|-------------------------------|---------------------------------------|----------------------------------|--------------------------------|
| Elevation (m) | System Depth (m) | STMMH106 Volume (m <sup>3</sup> ) | STMMH105 Volume (m <sup>3</sup> ) | CB3 Volume (m <sup>3</sup> ) | CB4 Volume (m <sup>3</sup> ) | CB5 Volume (m <sup>3</sup> ) | CB6 Volume (m <sup>3</sup> ) | Pipe Volume (m <sup>3</sup> ) | Underground Volume (m <sup>3</sup> )* | Ponding Volume (m <sup>3</sup> ) | Total Volume (m <sup>3</sup> ) |
| 85.160        | 0.00             | 0.00                              | 0.00                              | 0.00                         | -                            | -                            | -                            | 0.00                          | 0.00                                  | 0.00                             | 0.00                           |
| 86.700        | 1.54             | 0.00                              | 6.97                              | 0.09                         | 0.16                         | 0.17                         | 0.08                         | 70.22                         | 77.69                                 | 0.00                             | 77.69                          |
| 86.800        | 1.64             | 7.15                              | 7.42                              | 0.13                         | 0.20                         | 0.20                         | 0.12                         | -                             | 85.44                                 | 0.00                             | 85.44                          |
| 86.950        | 1.79             | 7.83                              | 8.10                              | 0.19                         | 0.25                         | 0.26                         | 0.17                         | -                             | 87.02                                 | 0.00                             | 87.02                          |
| 87.100        | 1.94             | 8.50                              | 8.78                              | 0.24                         | 0.31                         | 0.32                         | 0.23                         | -                             | 88.60                                 | 0.00                             | 88.60                          |
| 87.250        | 2.09             | 9.18                              | 9.45                              | 0.30                         | 0.36                         | 0.37                         | 0.29                         | -                             | 90.18                                 | 0.00                             | 90.18                          |
| 87.400        | 2.24             | 9.86                              | 10.13                             | 0.35                         | 0.42                         | 0.43                         | 0.34                         | -                             | 91.76                                 | 0.00                             | 91.76                          |
| 87.550        | 2.39             | 10.54                             | 10.81                             | 0.41                         | 0.48                         | 0.48                         | 0.40                         | -                             | 93.34                                 | 0.00                             | 93.34                          |
| 87.700        | 2.54             | 11.22                             | 11.49                             | 0.47                         | 0.53                         | 0.54                         | 0.45                         | -                             | 94.92                                 | 0.00                             | 94.92                          |
| 87.750        | 2.59             | 11.45                             | 11.72                             | 0.48                         | 0.55                         | 0.56                         | 0.47                         | -                             | 95.45                                 | 0.00                             | 95.45                          |
| 87.770        | 2.61             | 11.54                             | 11.81                             | 0.49                         | 0.56                         | -                            | 0.48                         | -                             | 95.65                                 | 0.03                             | 95.68                          |
| 87.800        | 2.64             | 11.67                             | 11.94                             | 0.50                         | -                            | -                            | 0.49                         | -                             | 95.94                                 | 0.30                             | 96.25                          |
| 87.820        | 2.66             | 11.76                             | 12.03                             | 0.51                         | -                            | -                            | 0.50                         | -                             | 96.14                                 | 0.71                             | 96.85                          |
| 87.850        | 2.69             | -                                 | 12.17                             | 0.52                         | -                            | -                            | 0.51                         | -                             | 96.30                                 | 1.89                             | 98.18                          |
| 87.880        | 2.72             | -                                 | 12.30                             | 0.53                         | -                            | -                            | 0.52                         | -                             | 96.46                                 | 3.90                             | 100.35                         |

TABLE 6J: Orifice Sizing information - A-03, A-04, R-00

| Control Device  |            |          |          |                  |                          |                        |                      |
|-----------------|------------|----------|----------|------------------|--------------------------|------------------------|----------------------|
| Plate Orifice   |            |          |          | 152              |                          |                        |                      |
| Design Event    | Flow (L/S) | Head (m) | Elev (m) | Outlet dia. (mm) | Volume (m <sup>3</sup> ) | Area (m <sup>2</sup> ) | Equivalent Dia. (mm) |
| 1:2 Year        | 33.50      | 0.45     | 85.68    | 250              | 26.46                    | 0.0182                 | 152.0                |
| 1:5 Year        | 41.00      | 0.68     | 85.92    | 250.00           | 38.27                    | 0.0181                 | 152.0                |
| 1:100 Year      | 62.00      | 1.53     | 86.77    | 250.00           | 83.07                    | 0.0182                 | 152.0                |
| 1:100 + 20 Year | 79.20      | 2.56     | 87.79    | 250.00           | 96.15                    | 0.0180                 | 152.0                |

Orifice Control Sizing

$$Q = 0.62 \times A \times (2gh)^{0.5}$$

Q is the release rate in m<sup>3</sup>/s

A is the orifice area in m<sup>2</sup>

g is the acceleration due to gravity, 9.81 m/s<sup>2</sup>

h is the head of water above the orifice centre in m

d is the diameter of the orifice in m

The design Head is calculated based on the centre of the orifice at the bottom of the pipe

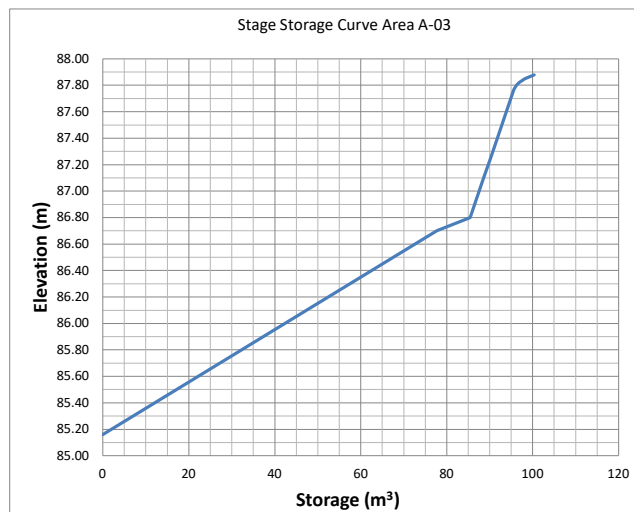


Table 9: Post-Development Stormwater Management Summary

| Area ID                      | Area (ha) | 1:5 Year Weighted Cw | 1:100 Year Weighted Cw | Control Device | Outlet Location             | 2 Year Storm Event |          |                  | 5 Year Storm Event |          |                  | 100 Year Storm Event |          |                  |                             |
|------------------------------|-----------|----------------------|------------------------|----------------|-----------------------------|--------------------|----------|------------------|--------------------|----------|------------------|----------------------|----------|------------------|-----------------------------|
|                              |           |                      |                        |                |                             | Release (L/s)      | Head (m) | Req'd Vol (cu.m) | Release (L/s)      | Head (m) | Req'd Vol (cu.m) | Release (L/s)        | Head (m) | Req'd Vol (cu.m) | Max. Vol. Provide d (cu.m.) |
| D-01                         | 0.004     | 0.40                 | 0.46                   | N/A            | David Lewis Private         | 0.40               | N/A      | N/A              | 0.50               | N/A      | N/A              | 1.00                 | N/A      | N/A              | N/A                         |
| D-02                         | 0.006     | 0.44                 | 0.51                   | N/A            | Promenade Decoeur Drive     | 0.60               | N/A      | N/A              | 0.70               | N/A      | N/A              | 1.50                 | N/A      | N/A              | N/A                         |
| A-01                         | 0.025     | 0.90                 | 1.00                   | N/A            | Promenade Decoeur Drive     | 4.70               | N/A      | N/A              | 6.40               | N/A      | N/A              | 12.20                | N/A      | N/A              | N/A                         |
| A-02                         | 0.222     | 0.50                 | 0.58                   | Plate Oriface  | 127 Promenade Decoeur Drive | 23.90              | N/A      | N/A              | 32.42              | N/A      | N/A              | 49.50                | 1.994    | 23.43            | 28.96                       |
| R00, A-03, A-04              | 0.330     | 0.81                 | 0.91                   | Plate Oriface  | 152 Promenade Decoeur Drive | 33.50              | 0.448    | 26.46            | 41.00              | 0.683    | 38.267           | 62.00                | 1.533    | 83.07            | 100.35                      |
| Post-Development Flow        |           |                      |                        |                |                             | 63.1               | -        |                  | 81.0               | -        |                  | 126.2                | -        |                  |                             |
| Total Allowable Release Rate |           |                      |                        |                |                             | 129.1              |          |                  | 129.1              |          |                  | 129.1                |          |                  |                             |

## Atrel Report Excerpts

- ii) The storm sewer on Des Aubépines Drive (referred as the Eastern Trunk as per IBI Group Report) is already constructed and is designed to carry the flow from this proposed development. The trunk information was extracted from IBI's As-Built Drawings of Neighbourhood 5, Phase 1, dated December 17<sup>th</sup>, 2009.
- iii) There is an existing 28.0m – 675mmø sanitary concrete stub west of existing San MH 15166 located on Tenth Line Rd near the pumping station.
- iv) It is proposed to connect directly on these services as they have been designed accordingly. The watermain, storm and sanitary sewer design of Avalon West Stage 3 were done in conjunction with IBI's reports titled "Mer Bleue Community Design Plan Infrastructure Servicing Study report dated April 2006" and "Avalon West (Neighbourhood 5), Stormwater Management Facility Design, Revision 5" dated October 2013.

## 1.4 Storm Sewer

The "Mer Bleue Community Design Plan Infrastructure Servicing Study" and "Avalon West (Neighbourhood 5), Stormwater Management Facility Design Report" prepared by IBI Group recommends that the storm water of Avalon West Stage 3 be conveyed to the future Storm Water Management (SWM) Basin located south of Neighbourhood 5. The Avalon West Stage 3 development falls within the Eastern Trunk watershed, which conveys its runoff to a SWM pond. This SWM facility (designed by others) will control both the quantity and quality of the storm water from Avalon West Stage 3. The attenuated flow will then discharge via a storm sewer, which will outlet into the McKinnon Creek located south of the proposed pond. According to IBI Group's memo "Update to Avalon West Stormwater Management Facility Design Report: Proposed Mattamy Bisson Lands" dated November 3, 2014 the pond level for the 100yr will be 84.65 m once the Mattamy Bisson lands are developed.

### 1.4.1 Design Constraints

The main storm drainage design constraints can be summarized as follows:

#### a) Minor System

- 1) Storm sewer will be designed using the Rational formula for the 5 year storm using an inlet time of 10 minutes for roads.
- 2) All residential inlets will be equipped with flow restrictors. The term "inlet" means "a single catch basin" or "a group of interconnected catchbasins" connected by a single lead into the minor system. The inflow rate into the minor system shall be 220 L/s/ha, as per IBI's report.
- 3) Catch basin densities and capacities for commercial development should be assessed on a site specific basis to limit the inflow into the minor system to a maximum of 220 L/s/ha, as per IBI's report.
- 4) Green space areas shall be restricted to 220L/s/ha, as per IBI's report.
- 5) The arterial roads area shall be restricted to a 1:10 year storm and a 10 minute inlet time which represents 238 l/s/ha according to IBI's report.

- 6) The hydraulic grade line shall be computed and the maximum permitted hydraulic grade line elevation is to be 0.30m below the underside of footing.
- 7) Dynamic modelling shall be provided for all submerged outlets.

b) Major System

- 1) Grading design is to be based on split lot drainage.
- 2) The commercial developments and green space shall be designed to provide an on-site storage to retain the 100 year storm event.
- 3) On site detention storage of 124 m<sup>3</sup>/ha for Townhouses, 108 m<sup>3</sup>/ha for single family units and 168 m<sup>3</sup>/ha for stacked homes may be provided in the following areas:
  - i) Road low points (Sawtooth design)
  - ii) Parking Areas on private sites

c) Street and Rear Yard Emergency Overflow

- 1) On street routing to emergency storage area must be provided and illustrated on the grade control plan. This routing must incorporate a maximum 0.30m flow depth on street under either static or dynamic conditions. An overall positive slope of 0.10% will be required across consecutive high points for routing purposes.
- 2) A maximum ponding depth of 0.30m will be allowed in the rear yards.
- 3) A ponding area plan that includes an identification number, the area, the depth, the volume and an elevation will be required.

d) Water Quality

An Enhanced Level of Protection (80 % removal of Total Suspended Solids) will be achieved in the ultimate stormwater management wet pond, as per IBI's reports. The Best Management Practices should also be implemented within the subdivision design and during construction.

e) Geotechnical Constraints

The geotechnical investigation conducted for Neighbourhood 5 – Avalon West indicates that the low lying lands are prone to an excessive soil consolidation, and can only be developed with grade raise restriction or by using non-standard techniques, such as structural slabs.





| STORM SEWER COMPUTATION FORM        |           |           |      |      |                                  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                 |               |               |                  |                        | Neighbourhood 5 - Avalon West - STAGE 3                                    |                               |                |                           |      |                 |       |           |            |            | STORM FREQUENCY : 5 YEAR                                                          |            |                    |          |          |          |          |                  |                 |                | Table 1           |                   |          |  |                 |                   |              |          |  |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| DESIGNED BY: AGS<br>CHECKED BY: JMD |           |           |      |      |                                  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                 |               |               |                  |                        | Minto Communities Inc.<br>131004<br>ATREL ENGINEERING LTD<br>November 2014 |                               |                |                           |      |                 |       |           |            |            | RATIONAL METHOD Q= 2.78 AIR<br>PVC/CONC N= 0.013<br>CSP N= 0.024<br>CORR N= 0.021 |            |                    |          |          |          |          |                  |                 |                |                   |                   |          |  |                 |                   |              |          |  |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| STREET NAMES                        | LOCATION  |           |      |      | AREA (ha.)<br>RUNOFF COEFFICIENT |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | RATIONAL METHOD |               | 5 YEAR        |                  |                        |                                                                            | Commercial & green space area |                | ACTUAL<br>PIPE FLOW (L/S) | PIPE |                 |       |           | SEWER DATA |            |                                                                                   |            |                    |          |          |          | UpStream |                  | Forced drop (M) | Inv to Inv (M) | DwStream          |                   | UpStream |  | Down MH Hgl (M) | SURG AT UP MH (M) | USF ELEV (M) | UpStream |  | Comment |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                                     | FROM (Up) | TO (Down) | 0.20 | 0.27 | 0.29                             | 0.30 | 0.36 | 0.39 | 0.45 | 0.48 | 0.50 | 0.55 | 0.60 | 0.62 | 0.65 | 0.70 | 0.75 | 0.80 | 0.85 | 0.70 | 0.70 | 0.76            | INDIV. 2.78AR | ACCUM. 2.78AR | TIME CONC. (MIN) | RAINF. INTENS. (MM/HR) | FLOW (L/S)                                                                 | Restr Flow (L/S)              | Cum Flow (L/S) |                           | TYPE | DIA. (NOM) (mm) | (ACT) | SLOPE (%) | LENGTH (M) | CAP. (L/S) | Remaining Capacity (%)                                                            | VEL. (M/S) | TIME OF FLOW (MIN) | Obv. (M) | Inv. (M) | Obv. (M) | Inv. (M) | Hgl at UP-MH (M) |                 |                | Hgl Out UP-MH (M) | HGL FREEBOARD (M) |          |  |                 |                   |              |          |  |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Chinian Street                      | MH        | 635       | MH   | 216  |                                  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |                 |               |               |                  |                        |                                                                            |                               |                |                           |      |                 |       |           |            |            |                                                                                   |            |                    |          |          |          |          |                  |                 |                |                   |                   |          |  |                 |                   |              |          |  |         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

DESIGNED BY: AGS  
CHECKED BY: JMD

**Neighbourhood 5 - Avalon West - STAGE 3**  
Minto Communities Inc.  
131004  
ATREL ENGINEERING LTD  
November 2014

STORM FREQUENCY : 5 YEAR  
RATIONAL METHOD Q= 2.78 AIR  
PVC/CONC N= 0.013  
CSP N= 0.024  
CORR N= 0.021

Table 1

| STREET NAMES        | LOCATION  |           |                    |          | AREA (ha.) |      |      |      |      |      |      |      |      |      |      |      |      |      |               |               |                  |                        |            |                  | RATIONAL METHOD |      | 5 YEAR          |        | Commercial & green space area |            | ACTUAL PIPE FLOW (L/S) | PIPE       |                        |            |                    | SEWER DATA |          |          |          |                  |                   | UpStream     |               | Forced drop (M) | Inv to Inv (M) | DwStream |       | UpStream |       | Down MH Hgl (M) | SURG AT UP MH (M) | UpStream |      |     |     |  |  |
|---------------------|-----------|-----------|--------------------|----------|------------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------|---------------|------------------|------------------------|------------|------------------|-----------------|------|-----------------|--------|-------------------------------|------------|------------------------|------------|------------------------|------------|--------------------|------------|----------|----------|----------|------------------|-------------------|--------------|---------------|-----------------|----------------|----------|-------|----------|-------|-----------------|-------------------|----------|------|-----|-----|--|--|
|                     | FROM (Up) | TO (Down) | RUNOFF COEFFICIENT |          |            |      |      |      |      |      |      |      |      |      |      |      |      |      | INDIV. 2.78AR | ACCUM. 2.78AR | TIME CONC. (MIN) | RAINF. INTENS. (MM/Hr) | FLOW (L/S) | Restr Flow (L/S) | Cum Flow (L/S)  | TYPE | DIA. (NOM) (mm) | (ACT)  | SLOPE (%)                     | LENGTH (M) |                        | CAP. (L/S) | Remaining Capacity (%) | VEL. (M/S) | TIME OF FLOW (MIN) | Obv. (M)   | Inv. (M) | Obv. (M) | Inv. (M) | Hgl at UP-MH (M) | Hgl Out UP-MH (M) | USF ELEV (M) | FREEBOARD (M) |                 |                | Comment  |       |          |       |                 |                   |          |      |     |     |  |  |
|                     |           |           | 0.20               | 0.27     | 0.29       | 0.30 | 0.36 | 0.39 | 0.45 | 0.48 | 0.50 | 0.55 | 0.60 | 0.62 | 0.65 | 0.70 | 0.75 | 0.80 |               |               |                  |                        |            |                  |                 |      |                 |        |                               |            |                        |            |                        |            |                    |            |          |          |          |                  |                   |              |               | 0.85            | 0.70           |          | 0.70  | 0.76     |       |                 |                   |          |      |     |     |  |  |
| Maenolia Street     | MH        | 3585      | MH                 | 3594     |            |      |      |      |      |      |      |      |      | 0.14 |      |      |      | 0.37 |               |               |                  |                        |            |                  |                 | 0.93 | 22.95           | 18.50  | 73.73                         | 1692.38    |                        | 1692.38    | CONC                   | 1650       | 1676.4             | 0.10       | 79.0     | 3006.86  | 44%      | 1.36             | 0.97              | 85.00        | 83.35         |                 | no             | 84.92    | 83.27 | 85.00    | 85.00 | 84.92           |                   | 85.63    | 0.63 |     | OK  |  |  |
| Génévriers Street   | MH        | 3586      | MH                 | 3587     |            |      |      |      |      |      |      |      |      | 0.42 |      |      |      | 0.22 |               |               |                  |                        |            |                  |                 | 1.07 | 1.07            | 10.00  | 104.19                        | 111.51     |                        | 111.51     | CONC                   | 525        | 533.4              | 0.18       | 59.0     | 179.46   | 38%      | 0.80             | 1.22              | 85.20        | 84.68         |                 | no             | 85.11    | 84.59 | 85.20    | 85.20 | 85.11           |                   | 85.60    | 0.40 |     | OK  |  |  |
| Génévriers Street   | MH        | 3587      | MH                 | 3588     |            |      |      |      |      |      |      |      |      |      |      |      |      |      | 0.22          |               |                  |                        |            |                  |                 | 1.07 | 1.07            | 11.22  | 98.14                         | 105.04     |                        | 105.04     | CONC                   | 525        | 533.4              | 0.18       | 11.5     | 179.46   | 41%      | 0.80             | 1.24              | 85.08        | 84.56         |                 | no             | 85.06    | 84.54 | 85.08    | 85.08 | 85.06           |                   | 85.79    | 0.71 |     | OK  |  |  |
| Génévriers Street   | MH        | 3588      | MH                 | 3589     |            |      |      |      |      |      |      |      |      |      |      |      |      |      | 0.40          |               |                  |                        |            |                  |                 | 0.78 | 1.85            | 11.46  | 97.05                         | 105.42     |                        | 105.42     | CONC                   | 675        | 685.8              | 0.11       | 77.5     | 294.79   | 39%      | 0.80             | 1.62              | 85.06        | 84.39         |                 | no             | 84.97    | 84.30 | 85.06    | 85.06 | 84.97           |                   | 85.59    | 0.53 |     | OK  |  |  |
| Génévriers Street   | MH        | 3589      | MH                 | 3594     |            |      |      |      |      |      |      |      |      |      |      |      |      |      |               |               |                  |                        |            |                  |                 | 0.78 | 1.85            | 13.08  | 90.32                         | 166.97     |                        | 166.97     | CONC                   | 750        | 762.0              | 0.11       | 48.0     | 390.41   | 57%      | 0.86             | 0.93              | 84.97        | 84.22         |                 | no             | 84.92    | 84.17 | 84.97    | 84.97 | 84.92           |                   | 85.71    | 0.74 |     | OK  |  |  |
| Hepatica Crescent   | MH        | 3583      | MH                 | 3590     |            |      |      |      |      |      |      |      |      |      |      |      |      |      |               |               |                  |                        |            |                  |                 | 0.08 | 299.2           | 104.19 | 104.19                        |            |                        |            | PVC                    | 300        | 299.2              | 0.34       | 10.5     | 55.99    | 100%     | 0.80             | 0.22              | 85.52        | 85.22         |                 | no             | 85.48    | 85.18 | 85.52    | 85.52 | 85.48           |                   | 86.08    | 0.56 |     | OK  |  |  |
| Hepatica Crescent   | MH        | 3590      | MH                 | 3592     |            |      |      |      |      |      |      |      |      |      |      |      |      | 0.04 |               |               |                  |                        |            |                  |                 | 0.08 | 0.08            | 10.22  | 103.05                        | 8.02       |                        | 8.02       | PVC                    | 300        | 299.2              | 0.34       | 71.5     | 55.99    | 86%      | 0.80             | 1.50              | 85.45        | 85.15         |                 | no             | 85.21    | 84.91 | 85.45    | 85.45 | 85.22           |                   | 85.96    | 0.51 |     | OK  |  |  |
| Hepatica Crescent   | MH        | 3591      | MH                 | 3592     |            |      |      |      |      |      |      |      |      |      |      |      |      | 0.18 |               |               |                  |                        |            |                  |                 | 0.35 | 0.35            | 10.00  | 104.19                        | 36.50      |                        | 36.50      | PVC                    | 375        | 366.4              | 0.26       | 69.0     | 84.05    | 57%      | 0.80             | 1.44              | 85.39        | 85.02         |                 | no             | 85.21    | 84.84 | 85.39    | 85.39 | 85.22           |                   | 85.86    | 0.47 |     | OK  |  |  |
| Génévriers Street   | MH        | 3592      | MH                 | 3593     |            |      |      |      |      |      |      |      |      | 0.29 |      |      |      | 0.40 |               |               |                  |                        |            |                  |                 | 1.22 | 1.65            | 11.72  | 95.92                         | 158.26     |                        | 158.26     | CONC                   | 675        | 685.8              | 0.26       | 69.0     | 294.79   | 46%      | 0.80             | 1.88              | 85.21        | 84.54         |                 | no             | 85.11    | 84.44 | 85.29    | 85.21 | 85.11           |                   | 85.84    | 0.63 |     | OK  |  |  |
| Génévriers Street   | MH        | 3593      | MH                 | 3594     |            |      |      |      |      |      |      |      |      | 0.12 |      |      |      | 0.24 |               |               |                  |                        |            |                  |                 | 0.65 | 2.30            | 13.60  | 88.39                         | 203.34     |                        | 203.34     | CONC                   | 750        | 762.0              | 0.10       | 90.0     | 367.27   | 45%      | 0.81             | 1.86              | 85.11        | 84.36         | 0.10            | no             | 85.02    | 84.27 | 85.11    | 85.11 | 85.02           |                   | 85.75    | 0.64 |     | OK  |  |  |
| Magnolia Street     | MH        | 3594      | MH                 | 3597     |            |      |      |      |      |      |      |      |      | 0.16 |      |      |      | 0.28 |               |               |                  |                        |            |                  |                 | 0.79 | 27.89           | 19.46  | 71.45                         | 1992.91    |                        | 1992.91    | CONC                   | 1800       | 1828.8             | 0.10       | 84.0     | 3792.13  | 47%      | 1.44             | 0.97              | 84.92        | 83.12         |                 | no             | 84.84    | 83.04 | 84.92    | 84.92 | 84.84           |                   | 85.64    | 0.72 |     | OK  |  |  |
| Hepatica Crescent   | MH        | 3595      | MH                 | 3596     |            |      |      |      |      |      |      |      |      | 0.37 |      |      |      | 0.31 |               |               |                  |                        |            |                  |                 | 1.17 | 1.17            | 10.00  | 104.19                        | 121.80     |                        | 121.80     | CONC                   | 525        | 533.4              | 0.16       | 71.0     | 179.46   | 32%      | 0.80             | 1.47              | 85.14        | 84.62         |                 | no             | 85.03    | 84.51 | 85.14    | 85.14 | 85.03           |                   | 85.59    | 0.45 |     | OK  |  |  |
| Hepatica Crescent   | MH        | 3596      | MH                 | 3597     |            |      |      |      |      |      |      |      |      | 0.29 |      |      |      | 0.23 |               |               |                  |                        |            |                  |                 | 0.89 | 2.06            | 11.47  | 97.01                         | 199.84     |                        | 199.84     | CONC                   | 675        | 685.8              | 0.12       | 80.5     | 303.78   | 34%      | 0.82             | 1.63              | 85.03        | 84.36         | 0.15            | no             | 84.93    | 84.26 | 85.03    | 85.03 | 84.93           |                   | 85.54    | 0.51 |     | OK  |  |  |
| Hepatica Crescent   | MH        | 3597      | MH                 | 3598     |            |      |      |      |      |      |      |      |      | 0.73 |      |      |      | 0.56 |               |               |                  |                        |            |                  |                 | 2.21 | 32.16           | 20.43  | 69.31                         | 2228.89    |                        | 2228.89    | CONC                   | 1800       | 1828.8             | 0.13       | 118.0    | 4323.69  | 48%      | 1.65             | 1.19              | 84.78        | 82.98         |                 | no             | 84.63    | 82.83 | 84.82    | 84.78 | 84.72           |                   | 85.35    | 0.57 |     | OK  |  |  |
| Hepatica Crescent   | MH        | 3598      | MH                 | 53646    |            |      |      |      |      |      |      |      |      | 0.48 |      |      |      | 0.32 |               |               |                  |                        |            |                  |                 | 1.36 | 33.51           | 21.63  | 66.87                         | 2241.15    |                        | 2241.15    | CONC                   | 1800       | 1828.8             | 0.13       | 101.5    | 4323.69  | 48%      | 1.65             | 1.03              | 84.63        | 82.83         |                 | no             | 84.50    | 82.70 | 84.72    | 84.72 | 84.68           | 0.09              | 85.20    | 0.48 |     | OK  |  |  |
| Des Aubépines Drive | MH        | 53646     | MH                 | HEADWALL |            |      |      |      |      |      |      |      |      |      |      |      |      |      |               |               |                  |                        |            |                  |                 |      | 138.58          | 31.10  | 52.63                         | 7293.72    |                        | 2755.89    | 10049.61               | CONC       | 2700               | 2743.2     | 0.10     | 38.5     | 11180.46 | 10%              | 1.89              | 0.34         | 84.50         | 81.80           |                | no       | 84.46 | 81.76    | 84.68 | 84.68           | 84.65             | 0.18     | n/a  | n/a | n/a |  |  |

Existing Storm Sewers  
Existing Eastern Trunk  
Stage 2 Storm Sewers  
Proposed Stage 3 Storm Sewers  
Future Stages Storm Sewers





## Table 2

PVC/CONC N= 0.013  
CSP N= 0.024  
CORR N= 0.021

2322, 2370 Tenth Line  
Road, 885 Decoeur  
Drive





2370 Report Excerpts

| ICD TABLE    |                |                 |              |                |                |                  |
|--------------|----------------|-----------------|--------------|----------------|----------------|------------------|
| CATCHMAIN ID | TRIBUTARY AREA | ICD TYPE        | SYR HEAD (m) | 100YR HEAD (m) | SYR FLOW (L/s) | 100YR FLOW (L/s) |
| C8 [10A]     | 1101A          | 178mm HF ORFICE | 1.23         | 1.68           | 49.79          | 81.43            |
| C8 [10A]     | 1103A          | 178mm HF ORFICE | 1.53         | 1.68           | 77.99          | 81.72            |
| C8 [10A]     | 1104A          | 178mm HF ORFICE | 1.53         | 1.68           | 77.99          | 81.72            |
| C8 [10A]     | 1108A          | 178mm HF ORFICE | 1.53         | 1.68           | 77.99          | 81.72            |
| C8 [10A]     | 1105A          | 152mm HF ORFICE | 0.28         | 1.53           | 24.52          | 56.87            |
| C8 [10A]     | 1106A          | 127mm HF ORFICE | 1.33         | 1.63           | 39.70          | 40.68            |
| C8 [10A]     | 1108A          | 178mm HF ORFICE | 1.53         | 1.68           | 77.99          | 81.72            |
| C8 [10A]     | 1109A          | 178mm HF ORFICE | 1.53         | 1.68           | 77.99          | 81.72            |



Notes

Permit-Seal

ORLEANS DECOEUR RESIDENTIAL DEVELOPMENT  
2370 TENTH LINE ROAD  
OTTAWA, ON, CANADA

Title  
STORM DRAINAGE AREA PLAN

|                          |                |            |
|--------------------------|----------------|------------|
| Project No.<br>160401710 | Scale<br>1:500 | 0 5 15 25m |
| Drawing No.              | Sheet          | Revision   |

SD-1 6 of 7 5  
PLAN No. 1866

|                                                                                 |               |            |                                                 |                          |                           |                            |                        |                                                                                          |                      |                       |                        |                           |                            |                           |                            |                            |                             |                             |                              |                         |                                |                                |                                 |                                  |                               |                                         |                                        |               |                                  |                        |                      |                      |                      |              |                                     |                  |                        |                          |
|---------------------------------------------------------------------------------|---------------|------------|-------------------------------------------------|--------------------------|---------------------------|----------------------------|------------------------|------------------------------------------------------------------------------------------|----------------------|-----------------------|------------------------|---------------------------|----------------------------|---------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|------------------------------|-------------------------|--------------------------------|--------------------------------|---------------------------------|----------------------------------|-------------------------------|-----------------------------------------|----------------------------------------|---------------|----------------------------------|------------------------|----------------------|----------------------|----------------------|--------------|-------------------------------------|------------------|------------------------|--------------------------|
|  | DECOEUR       |            | STORM SEWER<br>DESIGN SHEET<br>(City of Ottawa) |                          |                           |                            |                        | DESIGN PARAMETERS<br>I = a / (t+b) <sup>2</sup> (As per City of Ottawa Guidelines, 2012) |                      |                       |                        |                           |                            |                           |                            |                            |                             |                             |                              |                         |                                |                                |                                 |                                  |                               |                                         |                                        |               |                                  |                        |                      |                      |                      |              |                                     |                  |                        |                          |
|                                                                                 | DATE:         | 2022-11-22 |                                                 |                          |                           |                            |                        |                                                                                          |                      |                       |                        |                           |                            |                           |                            |                            |                             |                             |                              |                         |                                |                                |                                 |                                  |                               |                                         |                                        |               |                                  |                        |                      |                      |                      |              |                                     |                  |                        |                          |
|                                                                                 | REVISION:     | 2          |                                                 |                          |                           |                            |                        |                                                                                          |                      |                       |                        |                           |                            |                           |                            |                            |                             |                             |                              |                         |                                |                                |                                 |                                  |                               |                                         |                                        |               |                                  |                        |                      |                      |                      |              |                                     |                  |                        |                          |
|                                                                                 | DESIGNED BY:  | MJS        |                                                 |                          |                           |                            |                        |                                                                                          |                      |                       |                        |                           |                            |                           |                            |                            |                             |                             |                              |                         |                                |                                |                                 |                                  |                               |                                         |                                        |               |                                  |                        |                      |                      |                      |              |                                     |                  |                        |                          |
| CHECKED BY:                                                                     | DT            |            |                                                 | FILE NUMBER: 160401710   |                           |                            |                        |                                                                                          | a = 732.951          |                       |                        |                           | b = 6.199                  |                           |                            |                            | c = 0.810                   |                             |                              |                         | MANNING'S n = 0.013            |                                |                                 |                                  | BEDDING CLASS = B             |                                         |                                        |               | MINIMUM COVER: 2.00 m            |                        |                      |                      | TIME OF ENTRY 10 min |              |                                     |                  |                        |                          |
| LOCATION                                                                        |               |            | DRAINAGE AREA                                   |                          |                           |                            |                        |                                                                                          |                      |                       |                        |                           |                            |                           |                            |                            |                             |                             |                              |                         | PIPE SELECTION                 |                                |                                 |                                  |                               |                                         |                                        |               |                                  |                        |                      |                      |                      |              |                                     |                  |                        |                          |
| AREA ID<br>NUMBER                                                               | FROM<br>M.H.  | TO<br>M.H. | AREA<br>(2-YEAR)<br>(ha)                        | AREA<br>(5-YEAR)<br>(ha) | AREA<br>(10-YEAR)<br>(ha) | AREA<br>(100-YEAR)<br>(ha) | AREA<br>(ROOF)<br>(ha) | C<br>(2-YEAR)<br>(-)                                                                     | C<br>(5-YEAR)<br>(-) | C<br>(10-YEAR)<br>(-) | C<br>(100-YEAR)<br>(-) | A x C<br>(2-YEAR)<br>(ha) | ACCUM<br>AxC (2YR)<br>(ha) | A x C<br>(5-YEAR)<br>(ha) | ACCUM<br>AxC (5YR)<br>(ha) | A x C<br>(10-YEAR)<br>(ha) | ACCUM<br>AxC (10YR)<br>(ha) | A x C<br>(100-YEAR)<br>(ha) | ACCUM<br>AxC (100YR)<br>(ha) | T of C<br>(min)         | I <sub>2</sub> -YEAR<br>(mm/h) | I <sub>5</sub> -YEAR<br>(mm/h) | I <sub>10</sub> -YEAR<br>(mm/h) | I <sub>100</sub> -YEAR<br>(mm/h) | Q <sub>CONTROL</sub><br>(L/s) | ACCUM.<br>Q <sub>CONTROL</sub><br>(L/s) | Q <sub>ACT</sub><br>(CIA/360)<br>(L/s) | LENGTH<br>(m) | PIPE WIDTH<br>OR DIAMETE<br>(mm) | PIPE<br>HEIGHT<br>(mm) | PIPE<br>SHAPE<br>(-) | MATERIAL<br>(-)      | CLASS<br>(-)         | SLOPE<br>(%) | Q <sub>cap</sub><br>(FULL)<br>(L/s) | % FULL<br>(-)    | VEL<br>(FULL)<br>(m/s) | TIME OF<br>FLOW<br>(min) |
| R104A                                                                           | BLDG C        | 104        | 0.00                                            | 0.00                     | 0.00                      | 0.00                       | 0.10                   | 0.00                                                                                     | 0.00                 | 0.00                  | 0.00                   | 0.000                     | 0.000                      | 0.000                     | 0.000                      | 0.000                      | 0.000                       | 0.000                       | 0.000                        | 10.00<br>10.19          | 76.81                          | 104.19                         | 122.14                          | 178.56                           | 12.3                          | 12.3                                    | 12.3                                   | 9.4           | 200                              | 200                    | CIRCULAR             | PVC                  | -                    | 1.00         | 33.3                                | 36.87%           | 1.05                   | 0.19                     |
| L105A                                                                           | 105A-1        | 104        | 0.12                                            | 0.00                     | 0.00                      | 0.00                       | 0.00                   | 0.69                                                                                     | 0.00                 | 0.00                  | 0.00                   | 0.083                     | 0.083                      | 0.000                     | 0.000                      | 0.000                      | 0.000                       | 0.000                       | 0.000                        | 10.00<br>10.50          | 76.81                          | 104.19                         | 122.14                          | 178.56                           | 0.0                           | 0.0                                     | 17.8                                   | 27.2          | 200                              | 200                    | CIRCULAR             | PVC                  | -                    | 1.00         | 33.3                                | 53.35%           | 1.05                   | 0.50                     |
| L104A, L104B                                                                    | 104           | 103        | 0.76                                            | 0.00                     | 0.00                      | 0.00                       | 0.00                   | 0.79                                                                                     | 0.00                 | 0.00                  | 0.00                   | 0.603                     | 0.686                      | 0.000                     | 0.000                      | 0.000                      | 0.000                       | 0.000                       | 0.000                        | 10.50<br>12.08          | 74.95                          | 101.64                         | 119.14                          | 174.14                           | 0.0                           | 12.3                                    | 155.1                                  | 108.6         | 450                              | 450                    | CIRCULAR             | CONCRETE             | -                    | 0.40         | 188.1                               | 82.45%           | 1.15                   | 1.59                     |
| L109A                                                                           | 109A-1<br>109 | 109<br>106 | 0.00<br>0.38                                    | 0.00<br>0.00             | 0.00<br>0.00              | 0.00<br>0.00               | 0.00<br>0.00           | 0.00<br>0.81                                                                             | 0.00<br>0.00         | 0.00<br>0.00          | 0.00<br>0.00           | 0.000<br>0.306            | 0.000<br>0.306             | 0.000<br>0.000            | 0.000<br>0.000             | 0.000<br>0.000             | 0.000<br>0.000              | 0.000<br>0.000              | 0.000<br>0.000               | 10.00<br>10.59          | 76.81<br>76.81                 | 104.19<br>104.19               | 122.14<br>122.14                | 178.56<br>178.56                 | 0.0<br>0.0                    | 0.0<br>0.0                              | 0.0<br>65.2                            | 10.5<br>40.7  | 200<br>300                       | 200<br>300             | CIRCULAR<br>CIRCULAR | PVC<br>PVC           | -<br>-               | 1.00<br>0.75 | 33.3<br>83.3                        | 0.00%<br>78.30%  | 1.05<br>1.18           | 0.00<br>0.59             |
| L108A                                                                           | 108A-1<br>108 | 108<br>106 | 0.00<br>0.36                                    | 0.00<br>0.00             | 0.00<br>0.00              | 0.00<br>0.00               | 0.00<br>0.00           | 0.00<br>0.85                                                                             | 0.00<br>0.00         | 0.00<br>0.00          | 0.00<br>0.00           | 0.000<br>0.302            | 0.000<br>0.302             | 0.000<br>0.000            | 0.000<br>0.000             | 0.000<br>0.000             | 0.000<br>0.000              | 0.000<br>0.000              | 0.000<br>0.000               | 10.00<br>10.67          | 76.81<br>76.81                 | 104.19<br>104.19               | 122.14<br>122.14                | 178.56<br>178.56                 | 0.0<br>0.0                    | 0.0<br>0.0                              | 0.0<br>64.4                            | 10.4<br>46.1  | 200<br>300                       | 200<br>300             | CIRCULAR<br>CIRCULAR | PVC<br>PVC           | -<br>-               | 1.00<br>0.75 | 33.3<br>83.3                        | 0.00%<br>77.33%  | 1.05<br>1.18           | 0.00<br>0.67             |
|                                                                                 | BLDG A        | 107        | 0.00                                            | 0.00                     | 0.00                      | 0.00                       | 0.00                   | 0.00                                                                                     | 0.00                 | 0.00                  | 0.00                   | 0.000                     | 0.000                      | 0.000                     | 0.000                      | 0.000                      | 0.000                       | 0.000                       | 0.000                        | 10.00<br>10.19          | 76.81                          | 104.19                         | 122.14                          | 178.56                           | 12.3                          | 12.3                                    | 12.3                                   | 9.0           | 200                              | 200                    | CIRCULAR             | PVC                  | -                    | 1.00         | 33.3                                | 36.87%           | 1.05                   | 0.19                     |
|                                                                                 | BLDG B        | 107        | 0.00                                            | 0.00                     | 0.00                      | 0.00                       | 0.00                   | 0.00                                                                                     | 0.00                 | 0.00                  | 0.00                   | 0.000                     | 0.000                      | 0.000                     | 0.000                      | 0.000                      | 0.000                       | 0.000                       | 0.000                        | 10.00<br>10.15          | 76.81                          | 104.19                         | 122.14                          | 178.56                           | 12.3                          | 12.3                                    | 12.3                                   | 7.4           | 200                              | 200                    | CIRCULAR             | PVC                  | -                    | 1.00         | 33.3                                | 36.87%           | 1.05                   | 0.15                     |
| R107B, R107A                                                                    | 107           | 106        | 0.00                                            | 0.00                     | 0.00                      | 0.00                       | 0.21                   | 0.00                                                                                     | 0.00                 | 0.00                  | 0.00                   | 0.000                     | 0.000                      | 0.000                     | 0.000                      | 0.000                      | 0.000                       | 0.000                       | 0.000                        | 10.19<br>10.97          | 76.10                          | 103.23                         | 121.00                          | 176.88                           | 0.0                           | 24.6                                    | 24.6                                   | 35.2          | 300                              | 300                    | CIRCULAR             | PVC                  | -                    | 0.50         | 68.0                                | 36.12%           | 0.97                   | 0.78                     |
| L106A                                                                           | 106           | 103        | 0.20                                            | 0.00                     | 0.00                      | 0.00                       | 0.00                   | 0.81                                                                                     | 0.00                 | 0.00                  | 0.00                   | 0.166                     | 0.773                      | 0.000                     | 0.000                      | 0.000                      | 0.000                       | 0.000                       | 0.000                        | 10.97<br>12.03          | 73.28                          | 99.35                          | 116.44                          | 170.18                           | 0.0                           | 24.6                                    | 181.9                                  | 52.1          | 600                              | 600                    | CIRCULAR             | CONCRETE             | -                    | 0.15         | 248.1                               | 73.33%           | 0.85                   | 1.06                     |
| L103A                                                                           | 103           | 102        | 0.43                                            | 0.00                     | 0.00                      | 0.00                       | 0.00                   | 0.71                                                                                     | 0.00                 | 0.00                  | 0.00                   | 0.306                     | 1.765                      | 0.000                     | 0.000                      | 0.000                      | 0.000                       | 0.000                       | 0.000                        | 12.08                   | 69.64                          | 94.34                          | 110.54                          | 161.52                           | 0.0                           | 36.8                                    | 378.3                                  | 48.5          | 750                              | 750                    | CIRCULAR             | CONCRETE             | -                    | 0.15         | 449.8                               | 84.11%           | 0.99                   | 0.82                     |
| L101A                                                                           | 102<br>101    | 101<br>100 | 0.00<br>0.35                                    | 0.00<br>0.00             | 0.00<br>0.00              | 0.00<br>0.00               | 0.00<br>0.00           | 0.00<br>0.68                                                                             | 0.00<br>0.00         | 0.00<br>0.00          | 0.00<br>0.00           | 0.000<br>0.241            | 1.765<br>2.006             | 0.000<br>0.000            | 0.000<br>0.000             | 0.000<br>0.000             | 0.000<br>0.000              | 0.000<br>0.000              | 0.000<br>0.000               | 12.90<br>13.28<br>14.64 | 67.21<br>66.16                 | 91.01<br>89.57                 | 106.62<br>104.93                | 155.77<br>153.28                 | 0.0<br>0.0                    | 36.8<br>36.8                            | 366.4<br>405.5                         | 22.0<br>81.4  | 750<br>825                       | 750<br>825             | CIRCULAR<br>CIRCULAR | CONCRETE<br>CONCRETE | -<br>-               | 0.15<br>0.15 | 449.8<br>580.0                      | 81.46%<br>69.92% | 0.99<br>1.05           | 0.37<br>1.36             |