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260 MacLaren Street

Servicing and Stormwater Management Report

260 MacLaren Street
City of Ottawa
Servicing and Stormwater Management Report

Prepared By:

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Issued: September 17, 2010
Revised: July 06, 2011
Revised: September 02, 2026

Novatech File: 110166
Ref: R-2011-110

September 02, 2026

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

Attention: Jack Smith, Planner II, Development Review

**Reference: 260 MacLaren Street
Servicing and Stormwater Management Report
Our File No.: 110166**

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

Should you have any questions or require additional information, please contact the undersigned.

Yours truly,

NOVATECH



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

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1.0 INTRODUCTION

Novatech has been retained to prepare a Servicing and Stormwater Management Report for the proposed site plan located at 260 MacLaren Street within the City of Ottawa. The site is denoted as Lots 47 and 48 (South MacLaren Street Lots) on Registered Plan 15558, a copy of the Legal Plan is included in **Appendix A** for reference. **Figure 1** Key Plan shows the site location.

The development previously had Site Plan Approval based on a design completed in 2011. Since that time, the construction for the approved development did not take place and there are key changes to the building and site plan layout which require new design for the Civil components. This report will assess the Sanitary, Water, and Stormwater designs required to address the Site Plan changes.

1.1 Existing Conditions

The subject site is approximately 0.12 hectares (ha.), is generally flat, and is currently occupied by surface parking as shown in **Figure 2 - Existing Conditions**.

1.2 Proposed Development

It is proposed to develop the site with a six (6) storey apartment building with surface only parking (no underground parking). The building will have a ground floor footprint of 635m² and a total of 46 residential units. Vehicular and pedestrian access to the site will be provided from MacLaren Street. **Figure 3** shows the concept plan for the proposed development.

The site had an approved Site Plan Application based on the Servicing Design presented in the 260 MacLaren Street, Ottawa, Ontario Servicing Design Brief and Stormwater Management Reports prepared by Novatech and dated July 06, 2011. A pre-consultation meeting was held with the City of Ottawa in January 2026 to present the revised design concept and confirm the requirements to obtain an updated Site Plan Approval based on the new design. A copy of the approved Servicing Design Brief (2011) and SWM Report (2011) and the correspondence from the City pre-consultation meeting are included in **Appendix B**.

2.0 GEOTECHNICAL

A Geotechnical investigation was completed for the subject site and a report prepared entitled 'Geotechnical Investigation, Proposed Multi-Storey Building, 260 MacLaren Street, Ottawa, Ontario' prepared by Paterson Group Inc. dated November 24, 2010, (PG2232-1). The following summarizes the key Civil related findings of the report:

- 3 boreholes were completed onsite, and groundwater was only observed in one borehole (at a depth of 3.28m below the ground surface). It should also be noted that groundwater levels are subject to seasonal fluctuations. Therefore, the groundwater levels could vary at the time of construction.
- Based on the old building design (9 storey building with 3 levels of underground parking), a foundation drain system was recommended. Considering the new building design has no underground parking, it is recommended the Geotechnical consultant confirm if a foundation drain system is still required.
- A minimum of 150mm of OPSS Granular A should be used for sewer and water pipe bedding. The bedding should extend to the spring line of the pipe. Cover material, from the spring line to at least 300 mm above the obvert of the pipe should consist of OPSS Granular A or Granular B Type II with a maximum size of 25 mm. The bedding and cover materials should be placed in maximum 225 mm thick lifts compacted to 95% of the material's standard Proctor maximum dry density.
- Where hard surface areas are considered above the trench backfill, the trench backfill material within the frost zone (about 1.8 m below finished grade) and above the cover material should match the soils exposed at the trench walls to minimize differential frost heaving. The trench backfill should be placed in maximum 225 mm thick loose lifts and compacted to a minimum of 95% of the material standard Proctor maximum dry density.
- A temporary Permit to Take Water (PTTW) may be required based on the daily ground and/or surface water being pumped from the site during construction.

3.0 WATER SERVICING

There is an existing 305mm diameter (dia.) PVC watermain within MacLaren Street right-of-way fronting the site. The proposed development will be supplied with a 150mm diameter service which will connect to the existing 300mm diameter watermain; a shut off valve will be provided at the main and at the property line of the site as per the City of Ottawa Water Distribution Design Guidelines (May 13, 2026).

3.1 Watermain Design Parameters

Water Demands have been calculated using criteria for Section 4 of the City of Ottawa Water Distribution Guidelines (May 13, 2026).

Table 3.1: Watermain Design Parameters and Criteria

Domestic Demand Design Parameters	Design Parameters
Unit Population: 1-Bed Apartments	1.4 people/unit
2-bed Apartments	2.1 people/unit
3 Bed Apartments	3.1 people/unit
Basic Day Residential Demand (BSDY)	280 L/c/d
Maximum Day Demand (MXDY)	Residential: 2.5 x Basic Day (> 500 Persons) MOE Table 3-3 (<500 Persons)
Peak Hour Demand (PKHR)	Residential: 2.2 x Max Day (> 500 Persons) MOE Table 3-3 (<500 Persons)
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. Through correspondence with the Architect, it is understood that the proposed building is residential occupancy (Limited Combustible) and is composed of wood-frame construction and does not provide 1-hour protected openings. 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. Correspondence with the Architect is included in **Appendix C** for reference.

3.3 Water Demand

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

Table 3.2: Domestic Water Demand Summary

Population	Commercial Area (m ²)	Ave. Daily Demand (L/s)	Max. Daily Demand (L/s)	Peak Hour Demand (L/s)	Fire Flow (L/s)
78	0.00	0.25	2.39	3.60	150

As per the City of Ottawa Water Distribution Guidelines, the proposed development services less than 50 dwellings, and thus can be serviced with a single water main feed. Therefore, it is proposed to service the proposed development with a single 150mm diameter water service connected to the existing 305mm PVC watermain within the MacLaren Street right-of-way.

Additionally, the required site fire flow will be provided by the existing City owned fire hydrants within the MacLaren Street right-of-way. All existing hydrants within the vicinity of the development are blue top hydrants indicating a rating of Class AA. As per the City's Design Guidelines, the fire flow allowance from the existing hydrants was assumed to be as outlined in **Table 3.3**.

Table 3.3: Maximum Flow to be considered from a given hydrant.

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

As the required fire demand is **150L/s** the site fire flows can be provided by two Class AA hydrants. There are two existing AA hydrants located within 75m of the proposed development that can be utilized for the fire flow. The first is located at the south-west corner of the MacLaren Street and Metcalfe St. intersection; the second is situated in front of 268 MacLaren Street. Additionally, the noted hydrant in front of 268 MacLaren Street, is located within **45m** of the proposed Siamese connection. Refer to **Appendix C** for the Hydrant Coverage figure which depicts the existing hydrants and distances to the proposed building.

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

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

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

Table 3.4: Water Boundary Conditions

Criteria	Demand (L/s)	Head (m)
Connection – MacLaren Street		
Max HGL (Average Day)	0.25	107.5
Min HGL (Peak Hour)	3.60	114.8
Max Day + Fire Flow	150	107.8

The above boundary conditions were used for analyzing the performance of the proposed and existing watermain systems. **Table 3.5** summarizes the results of the analysis.

Table 3.5: Water Boundary Conditions and Hydraulic Analysis Summary

Criteria	Head (m)	Pressure ¹ (psi)	Pressure Requirements (psi)
Connection – MacLaren Street			
Max HGL (Average Day)	114.8	61.0	<80psi
Min HGL (Peak Hour)	107.5	50.6	>40psi
Max Day + Fire Flow	107.8	51.0	>20psi

¹Pressure based on an elevation of 71.92m

The hydraulic analysis indicates the system can provide adequate pressure and flow to meet the domestic and fire flow requirements. Refer to **Appendix C** for the water demand calculations and Water Boundary correspondence.

4.0 SANITARY SERVICING

There is an existing 375mm diameter concrete 100D combined sewer built in the year 1997 running along the frontage of the site within the MacLaren Street right-of-way. There are no other sewers within the vicinity that would facilitate a connection. As such it is proposed to service the development with a 200mm sanitary connection to the existing combined sewer.

Sanitary flows for the proposed development were calculated using criteria from Section 4 of the City of Ottawa Sewer Design Guidelines (2026) and the Ontario Building Code as shown in **Table 4.1**.

Table 4.1: Sanitary Sewer Design Parameters

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

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

The peak sanitary flow including infiltration for the development was calculated to be **0.95 L/s**.

The development previously had Site Plan Approval based on the 260 MacLaren Street Servicing Design Brief (dated July 6, 2011). The peak sanitary Flow in the approved Design Brief is 3.52L/s, which is substantially higher than the new peak sanitary flow. Detailed sanitary flow calculations are provided in **Appendix D** for reference.

5.0 STORM SERVICING

There is an existing 375mm diameter concrete 100D combined sewer running along the frontage of the site within the MacLaren Street right-of-way. There are no other sewers within the vicinity that would facilitate a connection. As such it is proposed to service the development with a 200mm storm connection to the existing combined sewer.

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
Combined Sewer Area	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 E** 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.

6.1 Design Criteria

Through correspondence with the City of Ottawa, 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 a 2-year pre-development level. The pre-development run-off coefficient shall be as per existing but no more than 0.4. The time of concentration shall be calculated but shall not be less than 10.0min.
- Provide source controls which are in conformity with the City of Ottawa requirements, where possible.
- Foundation drainage is to be independently connected to sewer main unless being pumped with appropriate back up power, sufficient sized pump and back flow prevention.
- Limit ponding to 0.15 m for all rooftop storage areas and 0.30 m for all parking storage areas;
- Ensure no surface ponding during the 2-year Storm event; 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 combined sewer within MacLaren Street.

6.2 Quantity Control

The predevelopment site coefficient was determined to be **0.90**, as the site is primarily covered with paved surface parking. The existing time of concentration was calculated to be under 10min. Per city criteria, a maximum coefficient of 0.4 and a time of concentration of 10.0min was utilized to determine the allowable release rate for the site.

Utilizing the above, the allowable release rate for the **0.12 ha** site was calculated to be **10.20 L/s**. This will be achieved with onsite underground storm sewers including a 825mm dia. superpipe, which collects drainage from the site including the roof. The superpipe will outlet to the existing combined sewer in MacLaren Street and the flow will be controlled with an ICD in the downstream side of the manhole connected to the superpipe.

The ICD utilized to control the flow will be a 90mm dia. Tempest LMF in the downstream side in the storm manhole at the site outlet. Refer to **Appendix E** for the stormwater calculations and the Tempest ICD brochure.

6.3 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 MacLaren Street right-of-way. The major overland system is shown on the Grading Plan (drawing 110166-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 123062-ESC) for additional information.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Watermain

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

- The proposed 150mm dia. watermain service which connects to the existing 305mm watermain within MacLaren Street can service 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 existing and proposed sanitary system confirms the following:

- It is proposed to service the development with a proposed 200mm Sanitary service which will connect to the existing combined sewers within the MacLaren Street right-of-way.
- There is adequate capacity within the existing infrastructure to service the development.

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 combined sewer within in the MacLaren Street right-of-way.
- Stormwater control is to be provided by underground storage pipe. A 90mm diameter Tempest LMF ICD will be utilized to restrict the site flows to the calculated allowable rate.
- The major overland flow route has been provided on the grading plan, to convey flow to the MacLaren Street right-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:



Ryan Good, C.E.T
Design Technologist
Land Development Engineering

Reviewed by:



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

**Appendix A
Legal Plan**

TOPOGRAPHIC PLAN OF SURVEY OF

LOTS 47 AND 48
SOUTH MACLAREN STREET
REGISTERED PLAN 15558
CITY OF OTTAWA
Surveyed by Annis, O'Sullivan, Vollebakk Ltd.

Scale 1 : 150
Metric
DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND
CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

Surveyor's Certificate
I CERTIFY THAT:
1. This survey and plan are correct and in accordance with the Surveys
Act and the Surveyors Act and the regulations made under them.
2. The survey was completed on the 10th day of March, 2025.
Date March 12, 2025
Andrew Shep
Ontario Land Surveyor

Notes & Legend

Denotes	
—□—	Survey Monument Planted
—■—	Survey Monument Found
SIB	Standard Iron Bar
SSIB	Short Standard Iron Bar
IB	Iron Bar
CC	Cut Cross
CP	Concrete Pin
(WIT)	Witness
Meas.	Measured
Acc.	Accepted
Prop.	Proportioned
(AOG)	Annis, O'Sullivan, Vollebakk Ltd.
(P1)	Registered Plan 15558
(P2)	(AOG) Plan Dated March 2, 1987
(P3)	Carleton Condominium Plan 273
(P4)	Plan SR-7408
(P5)	Plan 4R-16462
(P7)	(AOG) Plan Dated February 1, 1994
(P9)	(857) Plan Dated November 24, 1972
(P10)	(JDB) Plan Dated April 6, 2016
(P11)	(647) Plan Dated August 19, 1971
(P12)	(1692) Plan Dated September 19, 2013
(P13)	(647) Field Notes Dated May 31, 1971
(P14)	(671) Plan November 6, 1987
—OHV—	Overhead Wires
○ M+S	Maintenance Hole (Sanitary)
○ up	Utility Pole
□ CB	Catch Basin
□ B	Bollard
△ S	Sign
BF	Board Fence
+ 65.00	Location of Elevations
+ 65.00	Top of Concrete Curb Elevation
C/L	Centreline
○	Deciduous Tree
○ FH	Fire Hydrant
○ CRW	Concrete Retaining Wall
○ PO-M	Metal Pole
○ TB-B	Bell Terminal Box
T/G	Top of Grate
GM	Gas Meter

Topographic data was collected under Winter Conditions.
Snow cover and ice preclude determining location and
elevation of some topographical data that is otherwise visible.

ELEVATION NOTES

- Elevations shown are geodetic and are referred to the CGVD28 geodetic datum,
derived from Geodetic Survey of Canada Benchmark No. 3818
having an elevation of 70.385 metres.
- It is the responsibility of the user of this information to verify that the job benchmark
has not been altered or disturbed and that its relative elevation and description
agrees with the information shown on this drawing.

Bearings are grid, derived from Can-Net 2016 Real Time Network GPS
observations, MTM Zone 9 (78°30' West Longitude) NAD-83
(CSRS) (2010).

For bearing comparisons, a rotation of
1°39'20" counter-clockwise was applied to bearings on plans P2, P3, P7,
1°38'10" counter-clockwise was applied to bearings on plan P10.
1°38'40" counter-clockwise was applied to bearings on plans P5

SITE AREA = 1189 m²



Appendix B
Approved Servicing and SWM Reports (2011) and Pre - Consultation
Meeting Minutes (2026)

**280 McLaren Street
Ottawa, Ontario
Servicing Design Brief**

**260 MACLAREN STREET
OTTAWA, ONTARIO**

SERVICING DESIGN BRIEF

Prepared by:

**NOVATECH ENGINEERING CONSULTANTS LTD.
240 Michael Cowpland Dr. - Suite 200
Ottawa, Ontario
K2M 1P6**

**File No.: 110166
Report Reference No.: R-2011-110
September 17, 2010 (R-2010-169)
Revised July 06, 2011**

July 06, 2011

City of Ottawa
Planning and Growth Management Department
Development Review (Urban) Services Branch
Infrastructure Approvals Division
110 Laurier Avenue West, 4th Floor
Ottawa ON, K1P 1J1

Attention: Mrs. Natasha Baird

Dear Sir:

**Reference: 260 MacLaren Street
Servicing Design Brief
Our File No.: 110166**

Enclosed herein is the revised Servicing Design Brief for the proposed MacLaren Residential development located on the south side of MacLaren Street, between O'Connor Street and Metcalfe Street. This design brief reflects the changes made to the site plan which include:

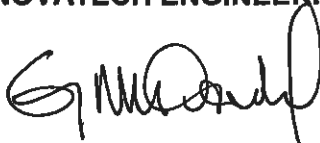
- Building height reduced from 9 storey to 7 storey;
- Condominium units count increased from 63 to 65;
- Underground parking count increased from 66 to 69 spaces;
- Entrance to underground parking flipped to east side of building.

This brief is submitted in support of the rezoning and site plan applications and outlines how the site will be serviced, as well as demonstrates adequate services for sanitary sewers, storm sewers, and water services.

Trusting this report is adequate for your purposes. Should you have any questions, or require additional information, please contact us.

Yours truly,

NOVATECH ENGINEERING CONSULTANTS LTD.



Greg MacDonald, P.Eng
Senior Project Manager

JAG/jag

M:\2010\110166\DATA\Reports\Design Brief\20100917-110166-SERVICINGBRIEF(Rev-20110617).doc

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Figure 3: Existing Conditions

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Appendix B: Hydrant Flow Data
Appendix C: Correspondence
Appendix D: Servicing Study Guidelines Checklist

1.0 INTRODUCTION

The proposed MacLaren Tower Residential (260 MacLaren Street) development is located on the south side of MacLaren Street, mid-block between O'Connor Street and Metcalfe Street in the City of Ottawa, as shown in Figure 1 – Key Plan. The proposed development will consist of a 7 storey tower with 65 condominium units. Also, a total of approximately 69 underground parking spaces will be provided on 3 levels of underground parking. Refer to Figure 2 – Site Plan for details.

As identified in the City of Ottawa's Zoning By-law, this site is currently designated as R4T [479] – Residential Fourth Density Subzone T, Exception 479; a mix of medium and high density residential units. The zoning amendment will revise the site's current designation to R5B [491] H(19) – Residential Fifth Density Subzone B, Exception 491, Height Restriction: 19 meters; a mix of medium and high density residential units.

The subject site consists of approximately 0.12 ha and is currently occupied by surface parking, as shown in Figure 3 – Existing Conditions.

This servicing design brief will outline how the site will be serviced, as well will demonstrate that the existing sanitary and storm sewers and watermain are available with adequate capacity to service the development.

2.0 SANITARY SEWER

The development will be serviced by a 200 mm dia. service that will connect to the existing 375 mm dia. combined sewer on MacLaren Street.

Proposed development flows, based on the City's guidelines for residential units, retail, and office space are presented below and are compared to the design flows based on zoning.

Proposed Average Sanitary Flows Under Proposed Zoning

MacLaren Tower

Residential: $Q_{SAN} = 65 \text{ units} \times 1.8 \text{ persons/unit} \times 350 \text{ L/cap/day} = 40,950 \text{ L/day}$

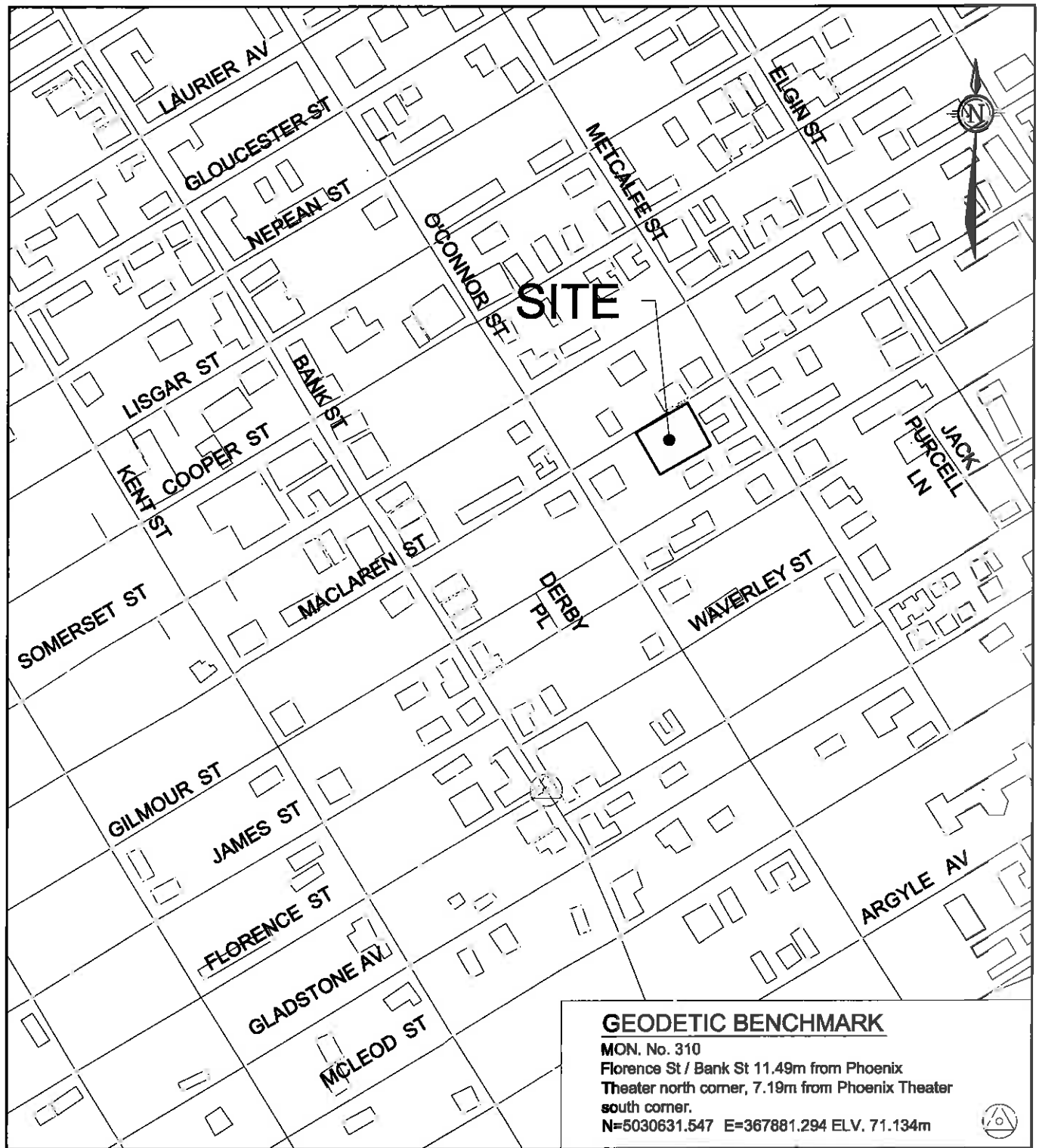
Average Sanitary Flow = $40,950 \text{ L/day} = 0.47 \text{ L/sec}$

Peak Sanitary Flow = 1.88 L/sec (with PF = 4.22 $\therefore$ use 4.0 $\Rightarrow$ max)

Therefore,

Total Site Average Sanitary Flow = 0.47 L/sec

Total Site Peak Sanitary Flow = 1.88 L/sec (with PF)



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 Facsimile (613) 254-5867
 Email: novatech@novatech-eng.com

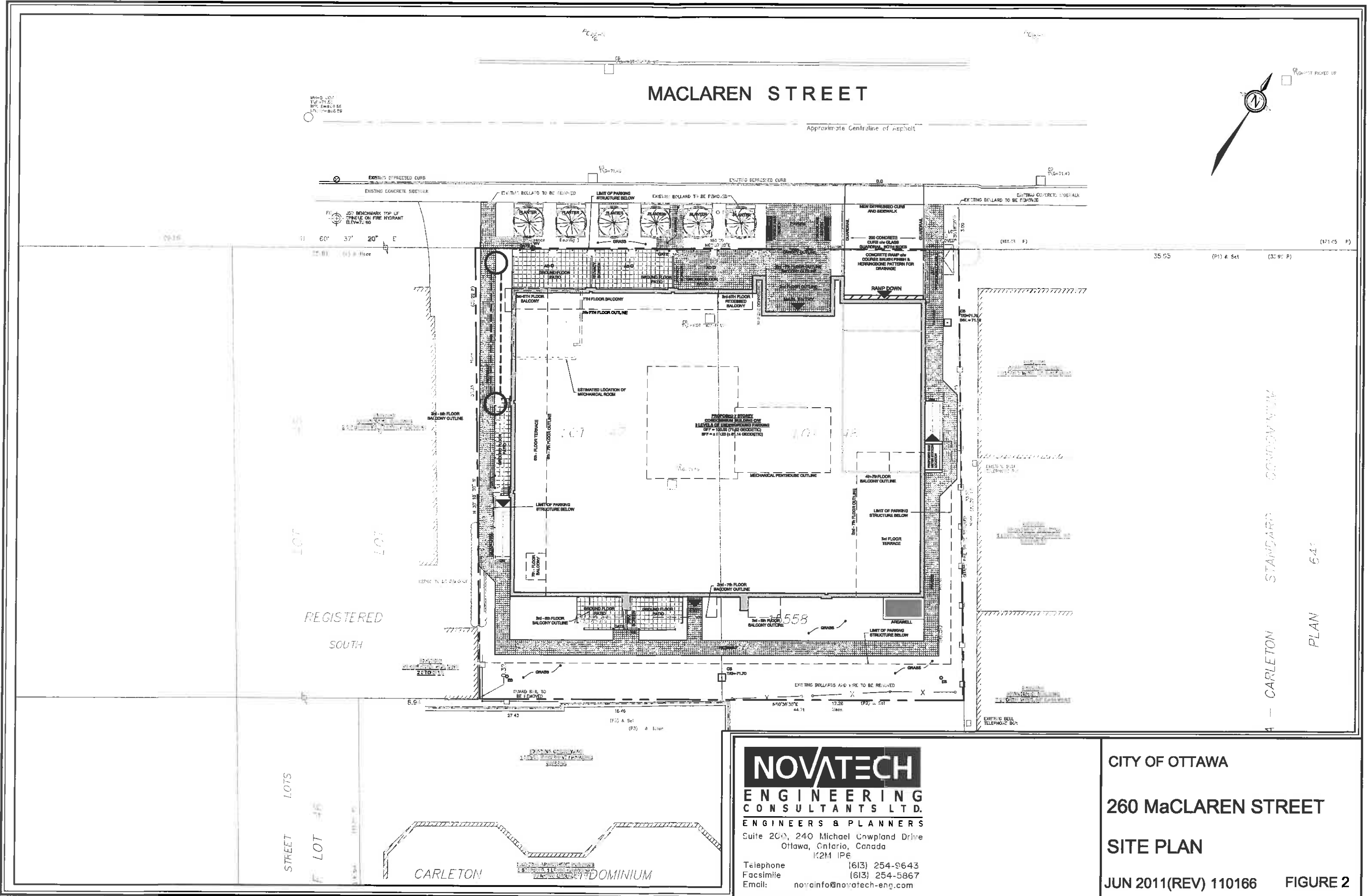
CITY OF OTTAWA

260 MaCLAREN STREET

KEY PLAN

JUN 2011(REV) 110166 FIGURE 1

MA2010110166CADDesignFiguresDesign Brief110166-FIG 1 - 3.dwg, SITE PLAN FIG2, Jul 04, 2011 - 2:13pm, myoung



Calculated Average Sanitary Flows Under Current Zoning

Currently, the site is zoned R4T [479], a mix of medium and high density residential units. Zoning flows are calculated using the City's general population densities from Table 4.1 of the City of Ottawa Sewer Design Guidelines and are as follows:

Site Area = 0.12 ha

Population Density = 1800 people/ha

Population = 0.12ha * 1800 people/ha = 216 people

Average Sanitary flow = 216 people * (350L/person/day) / (86400s/day) = 0.88 L/sec

Peak Sanitary flow = 3.52 L/sec (with PF = 4.136 $\therefore$ use 4.0 $\Rightarrow$ max)

Therefore, the development sanitary flows under the proposed zoning are less than the flows calculated under the existing zoning.

3.0 STORMWATER

Stormwater flows from the site are currently conveyed to the existing combined sewer system via on-site catchbasins and overland flows. As part of this development, all stormwater will be controlled on site and discharged via a 200 mm dia. service that will connect to the existing 375 mm dia. combined sewer on MacLaren Street.

The City will require that on-site stormwater management be implemented to control post-development stormwater discharge from the 5 & 100 year storm events to a flow based on an allowable runoff coefficient (C) of 0.40, a time of concentration (t_c) of 20 minutes, and 2-year design storm. This is quite a restrictive covenant (due to the combined sewer) and will require on-site storage in terms of a superpipe in addition to rooftop controls. Preliminary calculations result in the requirement to construct a 1500 mm diameter superpipe, approximately 35 meters in length along either or both of the east side and west side of the underground parking structure within the site. Outlet flows will be controlled by an orifice.

The site will be graded such that flows in excess of the 100-year storm event will be conveyed overland to MacLaren Street. Erosion and sediment control measures will be implemented during all phases of construction and inspected regularly. A separate stormwater management report will be submitted as part of the site plan application.

4.0 WATERMAIN

The proposed development will be serviced by a 150 mm dia. service that will connect to the existing 300 mm dia. watermain on MacLaren Street. A shut off valve will be provided at the property line of the site as per City of Ottawa Specifications. The water meter will be located in the basement level mechanical room of the building. Similarly, a remote receptacle will be located at the surface near the entrance to the building on the exterior.

Estimated domestic water demands for the development are roughly the same as the proposed development sanitary flows listed above in Section 2.0.

MacLaren Tower

Average daily demand (L/sec): $Q_{\text{WATER}} = 40,950 \text{ L/day} \div 86,400 \text{ sec/day}$
 $= 0.47 \text{ L/sec}$

Using a peak factor of 2.5, the required maximum daily demand yields:

$$Q_{\text{WATER}} = 1.17 \text{ L/sec}$$

Using a peak factor of 2.2, the required maximum hour demand yields:

$$Q_{\text{WATER}} = 2.57 \text{ L/sec}$$

Estimated water demands for the development are as follows (based on fixture units):

MacLaren Tower

Estimated domestic demand (max peak day) = 110 igpm = 8.33 L/sec

Based on the data provided by the City, the existing watermain in the area are adequate to service this development. A copy of the watermain data is attached.

The building will be provided with standpipe and sprinkler system for fire protection. Typically the fire demand for a development of this type is in the order of 700 US gal/min (approx. 600 igpm). The available supply at 20 psi is in the neighbourhood of 2000 igpm around the site, based on the hydrant data supplied by the City.

5.0 CONCLUSIONS

Based on the foregoing, adequate sanitary, storm and water services are available to support this development.

NOVATECH ENGINEERING CONSULTANTS LTD.

Prepared by:



Justin Gauthier, B.Eng.
Junior Engineer

Reviewed by:



Greg MacDonald, P.Eng.
Senior Project Manager

APPENDIX A
Excerpts from Ottawa Sewer Design Guidelines

SECTION 4

SANITARY SEWER SYSTEMS

specifically the downtown core. The construction of new combined sewer systems is no longer permitted in the City of Ottawa other than for the replacement of existing combined sewers within the City's defined Combined Sewer Area (see Section 5.1.6).

New storm drainage systems cannot be connected to existing combined sewers except as an interim measure where sewer separation is to be ultimately implemented or where circumstances allow no other alternative.

Section 5 discusses combined sewers in greater detail since their design must consider peak storm flows.

4.2.4 Private Sanitary Servicing

Private servicing consists mainly of private sewage collection and treatment systems on individual lots and do not form part of these guidelines.

4.3 GENERAL POPULATION DENSITIES

Pre-zoned Land – When lands are zoned for a specific residential use and detailed information is not available, the following population densities shall apply:

Table 4.1 Population Densities

Unit Type (Min Lot Area M ²)	Zoning (And all similar zonings)	Persons per unit ¹	Units per net ha avg. ²	Persons (per net ha) ³	Persons (per gross ha) ⁴
Res-Single Family (600)	R1A-B*	3.4	16.7	57	34
Res-Single Family (501)	R1C-E*	3.4	20.0	68	41
Res-Single Family (441)	R1F-H*	3.4	22.7	77	47
Res-Single Family (360)	R1I-K*	3.4	27.8	94	57
Res-Single Family (270)	R1L-N*	3.4	37.1	126	76
Res-Single Family (197)	R1P-Q*	3.4	50.8	173	105
Res-Semi-detached (278)	R2A-B*	2.7	36.0	97	59
Res-Semi-detached (232)	R2C*	2.7	43.1	116	71
Res-Semi-detached (180)	R2D-E*, G*	2.7	55.6	150	91
Res-Semi-detached (135)	R2F*	2.7	74.1	200	121
Townhouse (170)	R3F*, R4A-B*	2.7	58.8	159	96
Townhouse (110)	R3M*	2.7	90.9	246	149
Res-Duplex (441)	R2A-C*	2.3	45.4	104	63
Res-Duplex (360)	R2D*, R3F-G*	2.3	55.6	128	77
Res-Duplex (270)	R2E-F*, R3K*	2.3	74.1	170	103
Res-Duplex (197)	R2G*, R4F*	2.3	101.6	234	141
Res-Triplex (557)	R3A-C*	2.3	53.9	124	75

SECTION 4

SANITARY SEWER SYSTEMS

Unit Type (Min Lot Area M ²)	Zoning (And all similar zonings)	Persons per unit ¹	Units per net ha avg. ²	Persons (per net ha) ³	Persons (per gross ha) ⁴
Res-Triplex (330)	R3D-E*, H-J*, L*, N*, R4C-E*	2.3	90.9	209	127
Apartments:					
Low Density		1.8	100	180	
Medium Density		1.8	300	540	
High Density		1.8	1000	1800	
Very High Density ⁵		1.8	1000 +	1800 +	

*) former City of Ottawa zoning designation.

1) from 1996 census data.

2) new suburban construction, 5-year average (1997-2001), except apartments data which is based on site plans & duplex density which is an assumed average.

3) "net ha" refers to population densities per hectare of purely residential land (i.e. area of the building lots only including private parking and roads but excluding all public road rights-of-way and all other non-residential uses such as parks, stormwater management facilities, commercial developments, schools, community centres, etc.).

4) "gross ha" refers to population densities per hectare of residential and all other non-residential land uses such as streets, schools and parks. Numbers provided apply to large subdivision situations. For smaller residential situations the persons per gross ha will be higher, about 75% of the persons per net ha.

5) apartment densities in the downtown have been as high as 4,000 units/net ha. Proposals with a units/net ha density greater than 1000 will be evaluated on a case-by-case basis.

Development Proposed Land – When the number and type of housing units within a proposed development are known, the calculation of population for the proposed development shall be based on the following:

Table 4.2 Per Unit Populations

Unit Type	Persons Per Unit
Single Family	3.4
Semi-detached	2.7
Duplex	2.3
Townhouse (row)	2.7
Apartments:	
Bachelor	1.4
1 Bedroom	1.4
2 Bedroom	2.1
3 Bedroom	3.1
Average Apt.	1.8

SECTION 4

SANITARY SEWER SYSTEMS

4.4.1 Calculation of Peak Design Flows

The formulae and parameters to be applied in the calculation of peak design flows (standard peak flow design parameters) for new or infill developments are illustrated in Figure 4.3 and described as follows:

Figure 4.3 Peak Flow Design Parameters Summary

AVERAGE WASTEWATER FLOWS:

Residential Average Flow:	350 L/c/day
Commercial Average Flow:	50,000 L/gross ha/d
Institutional Average Flow:	50,000 L/gross ha/d
Average Light Industrial Flow:	35,000 L/gross ha/d
Average Heavy Industrial Flow	55,000 L/gross ha/d

PEAKING FACTORS:

Residential Peak factor: Harmon Equation

$$P.F. = 1 + \left(\frac{14}{4 + \left(\frac{P}{1000} \right)^{\frac{1}{2}}} \right) * K$$

where: P=Population
K=Correction Factor = 1

Commercial Peak factor:	1.5
Institutional Peak factor:	1.5
Industrial Peak Factor:	Per Figure in Appendix 4-B

PEAK EXTRANEEOUS FLOWS: (design event)

Infiltration Allowance: 0.28 L/s/effective gross ha (for all areas)

Less than 10 ha.

Foundation Drain Allowance: 5.0 L/s/gross ha (if necessary for existing partially separated and combined areas only)

10 ha – 100 ha

Foundation Drain Allowance: 3.0 L/s/gross ha (if necessary for existing partially separated and combined areas only)

Greater than 100 ha

Foundation Drain Allowance: 2.0 L/s/gross ha (if necessary for existing partially separated and combined areas only)

APPENDIX B
Hydrant Flow Data

Justin Gauthier

From: Crowder, Murray [Murray.Crowder@ottawa.ca]
Sent: Monday, November 15, 2010 9:33 AM
To: j.gauthier@novatech-eng.com
Subject: RE: Hydrant Flow Data Request (MacLaren Street)
Attachments: MacLaren @ Metcalfe.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Note: the computed flows are approximate and performed for hydrant colour coding purposes, thus these values are not intended for design purposes.

Justin Gauthier

Company: Novatech Engineering Consultants Ltd.

Tel: 254-9643x217

Fax: 254-5867

Location: MacLaren @ Metcalfe

Request_dt: 10-11-15-09:30:51

Email: j.gauthier@novatech-eng.com

Inspection Date	Flow Hydrant	Residual Hydrant	Pressure (psi)		Dynamic	Pitot	Flow (l/gpm) actual	@ 20 psi
			Static	Static				
2009/08/07	6630223	6630224	54	54	>46	40	886	1935
2009/08/07	6630224	6630230	56	56	>48	44	929	2093
2009/08/07	6630226	6630244	60	60	>52	48	970	2314
2009/08/07	6630244	6630226	62	62	>54	44	929	2275
2009/07/07	6830002	6630999	56	56	>48	28	741	1670
2009/07/07	6830004	6830008	56	56	>48	38	863	1945
2009/07/07	6830006	6830002	56	56	>48	32	792	1785

Murray Crowder

Technical Support
Drinking Water Operations Branch
Environmental Services Department
City of Ottawa
951 Clyde Avenue, Ottawa, On K1Z 5A6
Mail Code 06-65

Tel: (613) 580-2424 x 22231
Fax: (613) 728-4183
e-mail: murray.crowder@ottawa.ca

From: Justin Gauthier [<mailto:j.gauthier@novatech-eng.com>]

Sent: November 11, 2010 1:44 PM

To: Crowder, Murray

Subject: Hydrant Flow Data Request (MacLaren Street)

Importance: High

Hi Murray,

Yet another request (please respond to this one first); we are currently working on a Site Plan located at 260 MacLaren Street. I send this e-mail requesting that you please provide me with hydrant flow data (static, fire flows @ 20 psi, etc.) for the following hydrants:

H006, H004 on Metcliffe;
H002, H226, H244 on MacLaren;
H223, H224 on O'Connor.

Refer to attached sketch for hydrant locations, they are located on City of Ottawa grid 366-030 & 368-030.

Could you please also send me the sketch from your program showing the watermain sizes you have on file for the above-mentioned streets around the site, as you have in the past (if you have it for SAN & STM as well), thanks in advance.

I'm in a little bit of a rush for the information, so a quick response would be greatly appreciated.
(Note, all are needed as soon as possible: MacLaren – 1st, Bruyère/St. Andrew – 2nd, Lockhart – 3rd)

Should you have any questions, or require additional information, don't hesitate to contact me.

Regards,

Justin Gauthier, B.A.Sc.
EIT

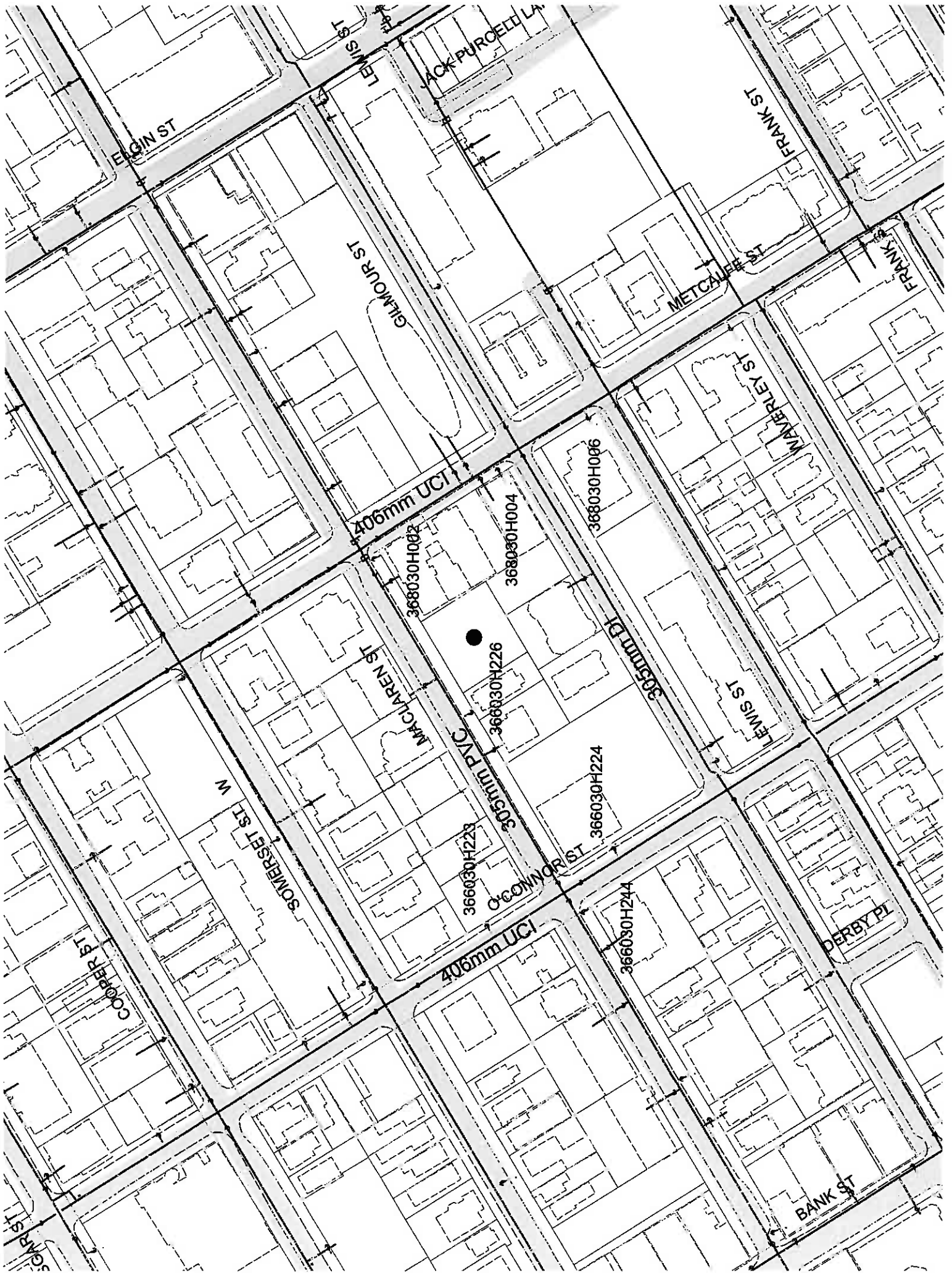
Novatech Engineering Consultants Ltd.
Suite 200, 240 Michael Cowpland Drive
Kanata, Ontario, Canada, K2M 1P6
Phone: 613.254.9643 x217
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APPENDIX C

Correspondence

Justin Gauthier

From: Coombe, Bruce [Bruce.Coombe@ottawa.ca]
Sent: Friday, September 24, 2010 9:35 AM
To: j.gauthier@novatech-eng.com
Subject: 260 Maclaren Street

Follow Up Flag: Follow up
Flag Status: Completed

Justin,

Sanitary

The proposed peak sanitary discharge of 1.84 L/sec for the redevelopment was reviewed by Infrastructure Services and was found to be less than the present flow from the site. All sanitary connections must be equipped with full port back water valves and foundation drains must be connected to the storm sewer system.

Storm

The allowable storm runoff coefficient for this site should be calculated using a 2-year design storm, time of concentration of 20 minutes, $C=0.40$ and store up to the 100 year storm on site. Please note that the storm flow plus the wastewater flow under post development conditions should not exceed existing conditions.

Thanks, Bruce

Bruce Coombe, C.E.T.

Project Manager, Infrastructure Approvals

Development Review Urban Services Branch

Planning & Growth Management Department

110 Laurier Avenue West, Ottawa, Ontario K1P 1J1

(613) 580-2424 ext. 27803

Fax (613) 560-6006

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Justin Gauthier

From: Coombe, Bruce [Bruce.Coombe@ottawa.ca]
Sent: Tuesday, September 21, 2010 11:54 AM
To: j.gauthier@novatech-eng.com
Subject: FW: 260 MacLaren Street (Rev.)
Attachments: location_plan.jpg

Follow Up Flag: Follow up
Flag Status: Completed

Justin,

Here is the water boundary conditions for the above development. I will send you SWM criteria and any other comments shortly when I receive them from Infrastructure Services (ie. sanitary flows, etc.)

Thanks, Bruce

The following are boundary conditions, HGL, for hydraulic analysis at intersection of Metcalfe and MacLaren (see attached PDF for location).

Max Day + FF = 111 m with the provided fire flow of 44.16 l/s

Minimum Pressure during Peak Hour = 106.1 m

Max Pressure Check = 115.9 m

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

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

From: Justin Gauthier [mailto:j.gauthier@novatech-eng.com]
Sent: September 14, 2010 11:13 AM
To: Coombe, Bruce
Subject: RE: 260 MacLaren Street (Rev.)

Hi Bruce,

The following is in response to the information you require to obtain water boundary conditions:

- Location of Service: on east side of building fronting MacLaren Street, the mechanical room is located from the end of the building where the 8th floor terrace is shown to approximately where the 1st planter along the building ends;
- Type of development (plus # of Units): 9 storey apartment/condo building with 63 units (as shown on the site plan);
- Amount of Fire Flow required: mechanical informed that 44.16 L/s with fire pump (700 US gal/min) would be required;

- Average daily demand (L/sec): based on City of Ottawa = $350 \text{ L/c/d} * 63 \text{ units} * 1.8 \text{ c/unit} = 39,690 \text{ L/d} = 0.46 \text{ L/s}$;
- Maximum daily demand (L/sec): based on City of Ottawa = $2.5 * \text{avg. day} = 2.5 * 0.46 \text{ L/s} = 1.15 \text{ L/s}$
based on MOE (less than 500 c) = $4.9 * \text{avg. day} = 4.9 * 0.46 \text{ L/s} = 2.25 \text{ L/s}$;
- Maximum hour demand (L/sec): based on City of Ottawa = $2.2 * \text{max. day} = 2.2 * 1.15 \text{ L/s} = 2.53 \text{ L/s}$
based on MOE (less than 500 c) = $7.4 * \text{avg. day} = 7.4 * 0.46 \text{ L/s} = 3.40 \text{ L/s}$.

⇒ The mechanical informed that the max peak day to size the meter would be 8.33 L/s (110 imp gal/min), there seems to be a large variance.

Don't hesitate to call if you want to discuss any issues.

Also, do you have any expected timeline for the other information requested previously?

Should you have any questions, or require additional information, don't hesitate to contact me.

Regards,

Justin Gauthier, B.A.Sc.

EIT

Novatech Engineering Consultants Ltd.

Suite 200, 240 Michael Cowpland Drive

Kanata, Ontario, Canada, K2M 1P6

Phone: 613.254.9643 x217

Fax: 613.254.5867

Email: j.gauthier@novatech-eng.com

Website: www.novatech-eng.com

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From: Coombe, Bruce [<mailto:Bruce.Coombe@ottawa.ca>]

Sent: Thursday, September 09, 2010 9:04 AM

To: j.gauthier@novatech-eng.com

Subject: RE: 260 MacLaren Street

Justin,

I require the following information in order to obtain water boundary conditions:

Location of Service

Type of development (plus # of Units)

Amount of Fire Flow required

Average daily demand (L/sec)

Maximum daily demand (L/sec)

-all in accordance with the City's New Water Design Guidelines

Thanks, Bruce

From: Justin Gauthier [<mailto:j.gauthier@novatech-eng.com>]

Sent: September 08, 2010 3:06 PM

To: Coombe, Bruce

Subject: 260 MacLaren Street

Hi Bruce,

I am working on the 260 MacLaren Street project which is located between O'Connor St and Metcalfe St. Find attached PDF's showing the site location and proposed development. If you could please inform of the design criteria's for the site as well as if you have specific instructions with regards to connection locations/constraints. Also, if you could please provide the w/m boundary conditions as well as the schematic showing the servicing information of the area in question (location, direction, size, etc.). Thanks in advance for your help.

Should you have any questions, or require additional information, don't hesitate to contact me.

Regards,

Justin Gauthier, B.A.Sc.

EIT

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Location 1



APPENDIX D
Servicing Study Guidelines Checklist

Development Servicing Study Checklist

4.1 General Content	Addressed (Y/N/NA)	Section	Comments
Executive Summary (for larger reports only).	NA		
Date and revision number of the report.	Y	Cover	
Location map and plan showing municipal address, boundary, and layout of proposed development.	Y		Figures 1, 2 and 3
Plan showing the site and location of all existing services.	Y		Figures 2 and 3
Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Y	1.0	
Summary of Pre-consultation Meetings with City and other approval agencies.	N		
Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defensible design criteria.	Y	2.0 - 4.0	
Statement of objectives and servicing criteria.	Y		Addressed in Section 2.0, 3.0. 4.0.
Identification of existing and proposed infrastructure available in the immediate area.	Y		Figures 2 and 3
Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	NA		
Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighboring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	N		Will be addressed in Site plan application.

Development Servicing Study Checklist

4.1 General Content	Addressed (Y/N/NA)	Section	Comments
Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	NA		
Proposed phasing of the development, if applicable.	NA		
Reference to geotechnical studies and recommendations concerning servicing.	N		
All preliminary and formal site plan submissions should have the following information:			
Metric scale	Y	ALL	
North arrow (including construction North)	Y	ALL	
Key plan	Y	ALL	
Name and contact information of applicant and property owner	Y	ALL	
Property limits including bearings and	Y	ALL	
Existing and proposed structures and parking	Y	ALL	
Easements, road widening and rights-of-way	Y	ALL	
Adjacent street names	Y	ALL	

Development Servicing Study Checklist

4.2 Water	Addressed (Y/N/NA)	Section	Comments
Confirm consistency with Master Servicing Study, if available.	Y	5.0	Also refer to Appendix B for Hydrant Flow data.
Availability of public infrastructure to service proposed development.	Y		Figures 2 and 3
Identification of system constraints.	Y	4.0	
Identify boundary conditions.	Y	4.0	
Confirmation of adequate domestic supply and pressure.	Y	4.0	
Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Y	4.0	
Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	Y	4.0	
Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design.	NA		
Address reliability requirements such as appropriate location of shut-off valves.	Y	4.0	
Check on the necessity of a pressure zone boundary modification.	NA		
Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range.	Y	4.0	
Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	Y	4.0	
Description of off-site required feeder mains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	NA		
Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Y	4.0	
Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N		Figure 3 shows main.

Development Servicing Study Checklist

4.3 Wastewater	Addressed (Y/N/NA)	Section	Comments
Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Y	2.0	
Confirm consistency with Master Servicing Study and/or justifications for deviations.	Y	2.0	
Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	Y	2.0	
Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Y	2.0	
Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Y	2.0	
Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Y	2.0	
Description of proposed sewer network including sewers, pumping stations, and forcemains.	Y	2.0	Figures 2 and 3
Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	NA		
Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	NA		
Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	NA		
Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	NA		
Special considerations such as contamination, corrosive environment etc.	NA		

Development Servicing Study Checklist

4.4 Stormwater	Addressed (Y/N/NA)	Section	Comments
Description of drainage outlets and downstream constraints including legality of outlet (i.e. municipal drain, right-of-way, watercourse, or private property).	Y	3.0	
Analysis of the available capacity in existing public infrastructure.	Y	3.0	
A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns and proposed drainage patterns.	Y		Figures 2 and 3
Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Y	3.0	
Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	NA		
Description of stormwater management concept with facility locations and descriptions with references and supporting information.	Y	3.0	
Set-back from private sewage disposal systems.	NA		
Watercourse and hazard lands setbacks.	NA		
Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	NA		
Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	Y	3.0	
Storage requirements (complete with calcs) and conveyance capacity for 5 yr and 100 yr events.	Y	3.0	
Identification of watercourse within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	NA		
Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Y	3.0	
Any proposed diversion of drainage catchment areas from one outlet to another.	NA		
Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and SWM facilities.	Y	3.0	
If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	NA		

Development Servicing Study Checklist

4.4 Stormwater	Addressed (Y/N/NA)	Section	Comments
Identification of municipal drains and related approval requirements.	NA		
Description of how the conveyance and storage capacity will be achieved for the development.	Y	3.0	
100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Y	3.0	
Inclusion of hydraulic analysis including HGL elevations.	N		
Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Y	3.0	
Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	NA		
Identification of fill constrains related to floodplain and geotechnical investigation.	NA		

Development Servicing Study Checklist

4.5 Approval and Permit Requirements	Addressed (Y/N/NA)	Section	Comments
Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	NA		
Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N		
Changes to Municipal Drains.	N		
Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	NA		

4.6 Conclusion	Addressed (Y/N/NA)	Section	Comments
Clearly stated conclusions and recommendations.	Y	5.0	
Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	NA		
All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario.	Y	5.0	

**280 McLaren Street
Ottawa, Ontario
Stormwater Management Report**

**260 MacLAREN STREET
OTTAWA, ONTARIO**

STORMWATER MANAGEMENT REPORT

Prepared by:

**NOVATECH ENGINEERING CONSULTANTS LTD.
240 Michael Cowpland Dr. - Suite 200
Ottawa, Ontario
K2M 1P6**

**File No.: 110166
Report Reference No.: R-2011-111
November 22, 2010 (R-2010-177)
Revised July 06, 2011**

July 06, 2011

City of Ottawa
Planning and Growth Management Department
Development Review (Urban) Services Branch
Infrastructure Approvals Division
110 Laurier Avenue West, 4th Floor
Ottawa ON, K1P 1J1

Attention: Mrs. Natasha Baird

Dear Sir:

**Reference: 260 MacLaren Street
Stormwater Management Report
Our File No.: 110166**

Enclosed herein is the revised Stormwater Management Report for the proposed MacLaren Residential development located on the south side of MacLaren Street, between O'Connor Street and Metcalfe Street. This revised report reflects the changes made to the site plan which include:

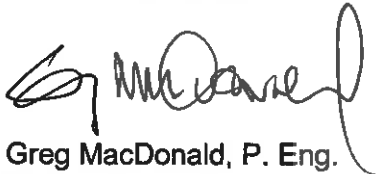
- Building height reduced from 9 storey to 7 storey;
- Condominium units count increased from 63 to 65;
- Underground parking count increased from 66 to 69 spaces;
- Entrance to underground parking flipped to east side of building.

This report is submitted in support of the rezoning and site plan applications and presents a stormwater management solution for the re-development of the site.

Trusting this report is adequate for your purposes. Should you have any questions, or require additional information, please contact us.

Yours truly,

NOVATECH ENGINEERING CONSULTANTS LTD.



Greg MacDonald, P. Eng.
Senior Project Manager

JAG/jag

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 Appendix B: SWM Calculations
 Appendix C: Zurn Roof Drain/Hydrovex Information
 Appendix D: Correspondence

List of Attached Drawings

- 110166-GP General Plan of Services
 110166-GR Grading and Erosion Control Plan
 110166-STM Stormwater Management Plan

1.0 INTRODUCTION

The proposed MacLaren Tower Residential (260 MacLaren Street) development is located on the south side of MacLaren Street, mid-block between O'Connor Street and Metcalfe Street in the City of Ottawa, as shown in Figure 1 – Key Plan. The proposed development will consist of a 7 storey tower with 65 condominium units. Also, a total of approximately 69 underground parking spaces will be provided on 3 levels of underground parking. Refer to Figure 2 – Site Plan for details.

The MacLaren Tower will be serviced by connecting to the existing 375 mm dia. combined sewer on MacLaren Street.

The existing site consists of approximately 0.12 ha and is currently occupied by surface parking, as shown in Figure 3 – Existing Conditions.

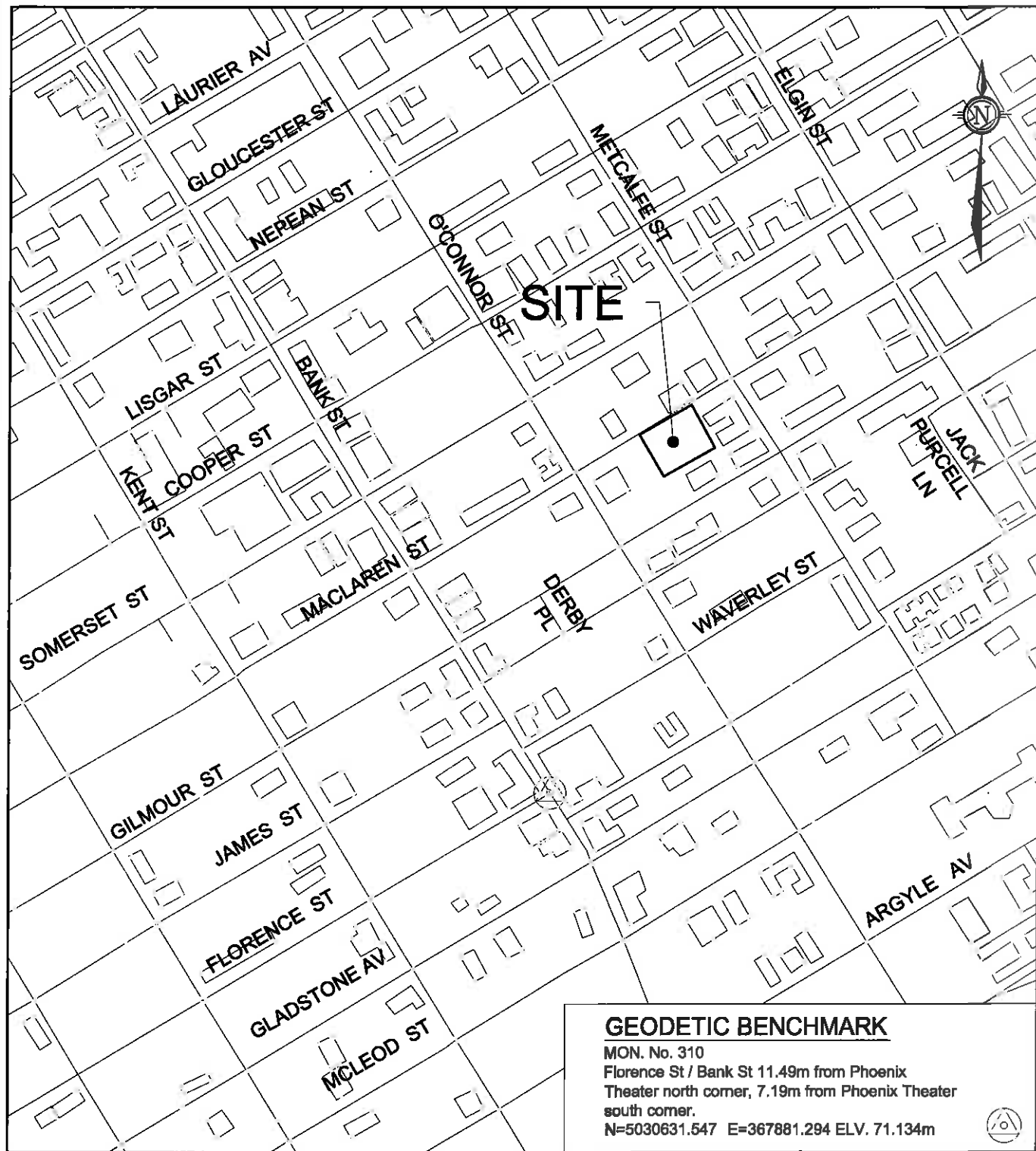
This stormwater management report will outline the site's stormwater management plan to illustrate how stormwater runoff will be managed.

2.0 CRITERIA

Through correspondence with the City of Ottawa and Novatech Engineering's 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 a 2-year allowable release rate calculated using a runoff coefficient (C) of 0.40 and a time of concentration (T_c) of 20 minutes, as per City of Ottawa requirements. This is a stringent requirement, since the sewer within the street is a combined sanitary and storm;
- Determine size and location of drainage system components;
- 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 (this is the maximum height of the controlled roof drain); 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 combined sewer on MacLaren Street.



GEODETIC BENCHMARK

MON. No. 310
 Florence St / Bank St 11.49m from Phoenix
 Theater north corner, 7.19m from Phoenix Theater
 south corner.
 N=5030631.547 E=367881.294 ELV. 71.134m



NOVATECH

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 CONSULTANTS LTD.**

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CITY OF OTTAWA

260 MaCLAREN STREET

KEY PLAN

JUN 2011(REV) 110166 FIGURE 1

M:\2010\110166\CAD\Design\Figures\Design Brief\110166-FIG 1 - 3.dwg, KEYPLAN FIG1, Jul 04, 2011 - 2:13pm, myyoung

SHT&X11.DWG - 216mmX278mm



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CITY OF OTTAWA

260 MaCLAREN STREET

EXISTING CONDITIONS

JUN 2011(REV) 110166

FIGURE 3

3.0 EXISTING CONDITIONS

3.1 THE SITE

Under existing conditions, the site consists of a paved surface parking area. Refer to Figure 3 for existing conditions. Stormwater flows from the site are currently conveyed to the existing 375 mm combined sewer system via on-site catchbasins and overland flows.

As part of this development, all stormwater will be controlled on site and discharged via a 200 mm dia. service that will connect to the existing 375 mm dia. combined sewer on MacLaren Street. The proposed storm service connection to the building will be equipped with a backwater valve.

3.2 ALLOWABLE RELEASE RATE

The allowable release rate will be calculated using a runoff coefficient (C) of 0.40 and a time of concentration (T_c) of 20 minutes (as per City of Ottawa requirements). The allowable release rate for the proposed 0.12 ha development was calculated using the Rational Method to be 6.88 L/s as follows:

$$\begin{aligned} \text{Total Drainage Area (A)} &= 0.12 \text{ ha (0.1189 ha)} & Q_{\text{allow}} &= 2.78 \text{ CIA} \\ \text{Runoff Coefficient (C}_{\text{allow}}) &= 0.40 & Q_{\text{allow}} &= 2.78 \times 0.40 \times 52.03 \text{ mm/hr} \times 0.12 \text{ ha} \\ \text{Intensity (I}_{2\text{allow}}) &= 52.03 \text{ mm/hr} & Q_{\text{allow}} &= 6.88 \text{ L/s} \end{aligned}$$

4.0 PROPOSED DEVELOPMENT CONDITIONS

The proposed development flow from the site will be controlled using a combination of roof top storage and superpipe.

4.1 DRAINAGE AREAS

The drainage areas are highlighted in the Storm Drainage Area Plan (110166-STM) enclosed in the back of this report. The following is a detailed description of how the flows from each area will be managed.

Table 4.1 Drainage Area Descriptions

Drainage Area No	Total area (ha)	Runoff Coefficient - C	Description
A-01	0.034	0.46	Directed to Superpipe
A-02	0.019	0.78	Directed to Superpipe
R-01	0.010	0.95	Controlled – Roof Drains
R-02	0.006	0.95	Controlled – Roof Drains
R-03	0.008	0.95	Controlled – Roof Drains
R-04	0.012	0.95	Controlled – Roof Drains
R-05	0.005	0.95	Controlled – Roof Drains
R-06	0.003	0.95	Controlled – Roof Drains
R-07	0.011	0.95	Controlled – Roof Drains

R-08	0.005	0.95	Controlled – Roof Drains
R-09	0.003	0.95	Controlled – Roof Drains
R-10	0.003	0.95	Controlled – Roof Drains
Total =	0.12		

Drainage Area A-01 and A-02 are the surficial runoff at the ground elevation and outlets from around the perimeter of the site to the superpipe. Drainage Areas R-01 through R-10 are rooftop areas large enough for surface storage, therefore allowing controlled flow. These are not directed to the superpipe, but rather discharge directly to the street sewer.

All the stormwater runoff from controlled roof top areas, along with drainage areas A-01, A-02 will flow internally and then be directed out of the building through a direct connection to the existing combined sewer on MacLaren Street (for areas R-01 to R-10) and to the superpipe (for areas A-01 and A-02). Flows from all drainage areas will be directed to the existing 375 mm combined pipe on MacLaren Street.

4.2 PROPOSED DEVELOPMENT CONTROLLED FLOWS

The proposed development flow from Areas R-01 through R-10 was calculated using the Rational Method to be 12.22 L/s for the 5-year storm event and 21.95 L/s for the 100-year storm event. Both events exceed the maximum allowable flow for these areas (refer to Appendix B for detailed calculations). Therefore, flow controls will be required.

Due to the extent of hard surface areas and the limited allowable release rate, runoff from the roof will be restricted to maximize the use of available storage. Flow from the building roof will be controlled by modified Zurn rooftop drains. Flow through these drains is dependent on the height of water above the drain (H- Head) and the number of notches in the drain. The flow rate for a standard Zurn roof drain (per 1 notch) is 5 G.P.M. per inch of head (1.49 L/s per 100 mm of ponding), but this can be reduced by modifying the weir. Zurn roof drain information, including the specification for the weir can be found in Appendix C. Flow from each rooftop area has been summarized in Table 4.2 (detailed calculations can be found in Appendix B).

The Modified Rational Method was used to determine the storage volume used for the various rooftop drainage areas. Based on a controlled flow provided via the Zurn rooftop drains, the ponding depth on the roof above the drains will vary between 0.090 – 0.111 m for the 5-year storm event and 0.118 – 0.141 m for the 100-year storm event (as determined through iterative calculations between the release rate, head, and corresponding storage). Refer to Appendix B for details outlining the modified rational method used, the ponding depth, and stage-storage curves for each controlled drainage area.

Table 4.2 Roof Drain Flow Summary

Area No	Zurn Specification	G P M per Inch of Head	ZURN ROOFDRAIN CONTROL PARAMETERS			
			5-Year Event		100-Year Event	
			Depth (m)	Total Flow (L/s)	Depth (m)	Total Flow (L/s)
R-01	ZCF121-1W-X4-Z-105-10-77	1.25	0.107	0.40	0.136	0.51
R-02	ZCF121-1W-X4-Z-105-10-77	1.25	0.102	0.38	0.131	0.49
R-03	ZCF121-1W-X4-Z-105-10-77	1.25	0.107	0.40	0.137	0.51
R-04	ZCF121-1W-X4-Z-105-10-77	1.25	0.111	0.41	0.141	0.52
R-05	ZCF121-1W-X4-Z-105-10-77	1.25	0.100	0.37	0.127	0.47
R-06	ZCF121-1W-X4-Z-105-10-77	1.25	0.090	0.34	0.118	0.44
R-07	ZCF121-1W-X4-Z-105-10-77	1.25	0.110	0.41	0.139	0.52
R-08	ZCF121-1W-X4-Z-105-10-77	1.25	0.101	0.38	0.130	0.48
R-09	ZCF121-1W-X4-Z-105-10-77	1.25	0.090	0.34	0.119	0.44
R-10	ZCF121-1W-X4-Z-105-10-77	1.25	0.090	0.33	0.118	0.44
			Total =	3.76	Total =	4.83

4.3 PROPOSED DEVELOPMENT FLOWS TO SUPERPIPE**4.3.1 Remaining Allowable Release Rate**

The maximum allowable proposed development flow for the remaining areas is the allowable release rate for the entire site less the flow from the controlled roof areas (R-1 – R-10). The following table indicates the allowable release rate for the entire site, the controlled runoff from the roof (areas R-1 – R-10), and the remaining allowable release rate for the site for both the 5-year and 100-year storm events.

Table 4.3.1 Remaining Allowable Release Rate Summary

Area		Flow (L/s)	
		5-Year	100-Year
Entire Site (Legal Boundary)	Allowable	6.88	6.88
R-1 – R-9	Roof drains-Controlled	3.76	4.83
Remaining Allowable Flow		3.12	2.05

The uncontrolled proposed development flow from Areas A-01, A-02 was calculated using the Rational Method (see calculations in Appendix B for full details) with a time of concentration (T_c) of 20 minutes.

Post development flow from Area A-01, A-02 are summarized in Table 4.3.2.

Table 4.3.2 Proposed Development Uncontrolled Flows Summary

Area No	POST DEVELOPMENT UNCONTROLLED RUNOFF										
	5-Year Event					100-Year Event					
	C	Tc (min)	I (mm/hr)	Area (ha)	Q (L/s)	C	Tc (min)	I (mm/hr)	Area (ha)	Q (L/s)	
A-01	0.46	20	70.25	0.0345	3.09	0.53	20	119.95	0.0345	6.07	
A-02	0.78	20	70.25	0.0186	2.84	0.88	20	119.95	0.0186	5.42	
			Total =		5.93				Total =		11.49

Based on the above calculations, the 5-year uncontrolled flow is 5.93 L/s and the 100-year uncontrolled flow is 11.49 L/s. The flow from these areas will be directed to a 675 mm dia. superpipe to be controlled via a Hydrovex vertical flow regulator to 1.16 L/s and 2.05 L/s for the 5-year and 100-year events, respectively.

4.4 MAJOR OVERLAND DRAINAGE

In the case of a storm event greater than the 100-year, scuppers will be included in the building design at a depth of 0.15 m from the roof drain to provide an overflow for excess runoff. An overland drainage flow route for major system runoff will be provided by grading the site such that excess stormwater runoff will flow overland towards MacLaren Street.

5.0 EROSION AND SEDIMENT CONTROL MEASURES

Temporary and permanent erosion and sediment control measures will be implemented prior to, during and after construction; and will be inspected regularly.

To prevent sediment and debris from entering the storm system during construction, the following erosion and sediment control measures will be implemented during construction in accordance with the "Guidelines on Erosion and Sediment Control for Urban Construction Sites" (Government of Ontario, May 1987):

- Filter cloth will be placed under the grates of all area drains and remain in place until vegetation has been established and construction is completed;
- Street sweeping and cleaning will be performed on all roads adjacent to active construction on a regular basis;
- Stockpiles will be stabilized against erosion, and;
- Silt fence will be placed along the surrounding property lines to prevent contaminated surface runoff from migrating towards adjacent sites and straw bale check dams will be used if necessary.

As for permanent measures, seeding of disturbed areas and establishing grass growth will be utilized.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of this report, a stormwater management scheme has been identified that will achieve the allowable release rate required by the City. Therefore, the following recommendations are provided:

- On-site stormwater management will be provided to control the stormwater discharge from the 5-year and 100-year storm events per City of Ottawa requirements by utilizing a combination of roof top controls and a 675 mm dia. superpipe.
- Stormwater discharge from the site for the 5-year storm event will be controlled to (4.92 L/s) which is less than the allowable flow rate of 6.88 L/s.
- Stormwater discharge from the site for the 100-year storm event will be controlled to (6.88 L/s) which is less or equal than the allowable flow rate of 6.88 L/s.
- The site will be graded such that flows in excess of the 100-year storm event will be conveyed overland to MacLaren Street.
- Sediment and erosion control measures will be implemented during construction.
- Details of the proposed stormwater management plan can be found on the drawing contained at the back of the report.

7.0 CLOSURE

This report has been prepared in accordance with the requirements for site plan submission and is hereby submitted for approval.

NOVATECH ENGINEERING CONSULTANTS LTD.

Prepared by:

Justin Gauthier, B.Eng.
Junior Engineer

Reviewed by:



Greg MacDonald, P.Eng.
Senior Project Manager

APPENDIX A
IDF CURVES, RATIONAL METHOD, RUNOFF

RATIONAL METHOD

The Rational Method was used to determine both the allowable runoff as well as the proposed development runoff for the site. The equation is as follows:

$$Q=2.78 \text{ CIA}$$

Where:

Q is the runoff in L/s

C is the weighted runoff coefficient*

I is the rainfall intensity in mm/hr**

A is the area in hectares

*The weighted runoff coefficient is determined for each of the catchment areas as follows:

$$C = \frac{(A_{perv} \times C_{perv}) + (A_{imp} \times C_{imp})}{A_{tot}}$$

Where:

A_{perv} is the pervious area in hectares

C_{perv} is the pervious area runoff coefficient (C_{perv}=0.20)

A_{imp} is the impervious area in hectares

C_{imp} is the impervious area runoff coefficient (C_{imp}=0.90)

A_{tot} is the catchment area (A_{perv} + A_{imp}) in hectares

** The rainfall intensity is taken from the City of Ottawa IDF Curves with a time of concentration of 20 min (refer to attached IDF Curves) as specified by the City of Ottawa.

ALLOWABLE RELEASE RATE AS SPECIFIED BY THE CITY

The allowable release rate was calculated for the 0.1189 ha re-developed site, using a runoff coefficient (C) of 0.40 and a time of concentration (T_c) of 20 minutes, as specified by the City of Ottawa.

Drainage Area (A) = 0.1189 ha

Runoff Coefficient (C) = 0.40

Intensity (I₂) = 52.03 mm/hr

$$Q_5 = 2.78 \text{ CIA}$$

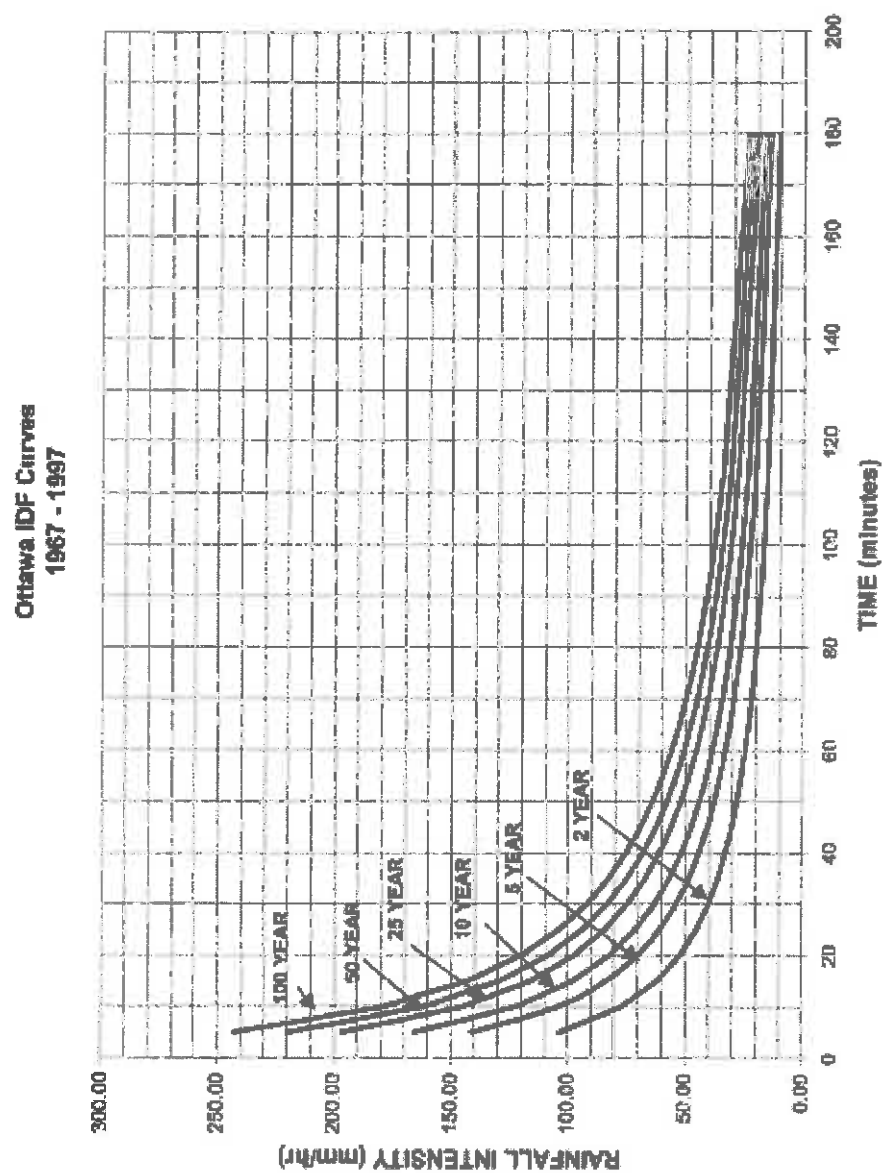
$$Q_5 = 2.78 \times 0.40 \times 52.03 \text{ mm/hr} \times 0.1189 \text{ ha}$$

$$Q_5 = 6.88 \text{ L/s}$$

Ottawa Sewer Design Guidelines

APPENDIX 5-A

OTTAWA INTENSITY DURATION FREQUENCY (IDF) CURVE



City of Ottawa

Appendix 5-A.1

November 2004

* IDF CURVE FROM OTTAWA SEWER DESIGN GUIDELINES – NOV 2004

APPENDIX B
SWM CALCULATIONS

Runoff Coefficients

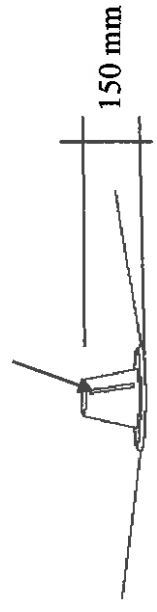
Drainage Area	Total Area (m ²)	Hardsurfaced Area		Grassed Area		5-Year Runoff Coefficient	100-Year Runoff Coefficient
		Area (m ²)	C	Area (m ²)	C		
R-1	95.3	95.3	0.95	0.0	0.2	0.95	1.00
R-2	61.9	61.9	0.95	0.0	0.2	0.95	1.00
R-3	80.0	80.0	0.95	0.0	0.2	0.95	1.00
R-4	116.4	116.4	0.95	0.0	0.2	0.95	1.00
R-5	54.3	54.3	0.95	0.0	0.2	0.95	1.00
R-6	34.1	34.1	0.95	0.0	0.2	0.95	1.00
R-7	106.7	106.7	0.95	0.0	0.2	0.95	1.00
R-8	53.4	53.4	0.95	0.0	0.2	0.95	1.00
R-9	28.5	28.5	0.95	0.0	0.2	0.95	1.00
R-10	27.8	27.8	0.95	0.0	0.2	0.95	1.00
A-1	344.7	127.7	0.9	217.0	0.2	0.46	0.53
A-2	185.8	154.9	0.9	30.9	0.2	0.78	0.88
Total	1188.8	940.9	0.93	247.9	0.20	0.78	0.84

Zurn Roof Drains

Opening	G.P.M. Per Inch of Head	L.P.M. Per Inch (25 mm) of Head	L/s Per Metre of Head	L/s Per 0.15 m of Head
Standard - X1	5.00	22.730	14.915	2.237
Reduced - X2	3.75	17.048	11.186	1.678
Reduced - X3	2.50	11.365	7.458	1.119
Max Reduced - X4	1.25	5.683	3.729	0.559



No. of Notches



SAMPLE CALCULATION:

AREA R-01

Number of notches (N) = 1
Head (H) = 0.107 m for 5-year event
Head (H) = 0.136 m for 100-year event

$Q_{5\text{ all}} = 3.729 \text{ L/s/m/notch} \times H \times N$
 $Q_{5\text{ all}} = 3.729 \text{ L/s/m/notch} \times .107 \text{ m} \times 1 \text{ notch}$
 $Q_{5\text{ all}} = 0.40 \text{ L/s}$
 $Q_{100\text{ all}} = 3.729 \text{ L/s/m/notch} \times H \times N$
 $Q_{100\text{ all}} = 3.729 \text{ L/s/m/notch} \times .136 \text{ m} \times 1 \text{ notch}$
 $Q_{100\text{ all}} = 0.51 \text{ L/s}$

Controlled Flow

5 YR

Area No	Area (ha)	C _{iw}	Time (min)	Intensity mm/hr	Uncontrolled runoff L/s	Control System	Zum Model Number	Release Rate (L/s/m of head)	Notches	Depth (m)	Controlled Flow (L/s)	Storage available (m ³)	Storage used (m ³)
R-1	0.0095	0.95	20.00	70.25	1.77	Zum Roof Drain	ZCF121-1W-X4-Z-105-10-77	3.73	1	0.107	0.40	4.765	1.72
R-2	0.0062	0.95	20.00	70.25	1.15	Zum Roof Drain	ZCF121-1W-X4-Z-105-10-77	3.73	1	0.102	0.38	2.955	0.92
R-3	0.0030	0.95	20.00	70.25	1.48	Zum Roof Drain	ZCF121-1W-X4-Z-105-10-77	3.73	1	0.107	0.40	3.670	1.33
R-4	0.0116	0.95	20.00	70.25	2.16	Zum Roof Drain	ZCF121-1W-X4-Z-105-10-77	3.73	1	0.111	0.41	5.617	2.28
R-5	0.0054	0.95	20.00	70.25	1.01	Zum Roof Drain	ZCF121-1W-X4-Z-105-10-77	3.73	1	0.100	0.37	2.714	0.76
R-6	0.0034	0.95	20.00	70.25	0.63	Zum Roof Drain	ZCF121-1W-X4-Z-105-10-77	3.73	1	0.090	0.34	1.704	0.37
R-7	0.0107	0.95	20.00	70.25	1.98	Zum Roof Drain	ZCF121-1W-X4-Z-105-10-77	3.73	1	0.110	0.41	5.132	2.01
R-8	0.0053	0.95	20.00	70.25	0.99	Zum Roof Drain	ZCF121-1W-X4-Z-105-10-77	3.73	1	0.101	0.38	2.443	0.74
R-9	0.0028	0.95	20.00	70.25	0.53	Zum Roof Drain	ZCF121-1W-X4-Z-105-10-77	3.73	1	0.080	0.34	1.224	0.27
R-10	0.0028	0.95	20.00	70.25	0.52	Zum Roof Drain	ZCF121-1W-X4-Z-105-10-77	3.73	1	0.080	0.33	1.231	0.26
Roof storage	0.0658	0.95	20.00	70.25	12.22	-	-	-	-	-	3.76	31.46	10.66
A-1	0.0345	0.46	20.00	70.25	3.09	no control	-	-	-	-	-	0.00	0.00
A-2	0.0186	0.78	20.00	70.25	2.84	no control	-	-	-	-	-	0.00	0.00
Superpipe	0.0530	0.67	20.00	70.25	5.93	ICD	-	-	-	-	1.16	0.00	0.00
Total:	0.1189				18.15						4.92	31.46	16.84

Note: In all cases, there is only one notch in the Zum roof drain and flows through each drain is further reduced with and adjustable weir. See Zum roof drains sheet and adjustable weir specification for more details on the reduction of flow.

100 YR

Area ID	Area (ha)	C _{100yr}	Time (min)	Intensity mm/hr	Uncontrolled runoff L/s	Control System	Zum Model Number	Release Rate (L/s/m of head)	Notches	Depth (m)	Controlled Flow (L/s)	Storage available (m ³)	Storage used (m ³)
R-1	0.0095	1.00	20.00	119.95	3.18	Zum Roof Drain	ZCF121-1W-X4-Z-105-10-77	3.73	1	0.136	0.51	4.765	3.56
R-2	0.0062	1.00	20.00	119.95	2.07	Zum Roof Drain	ZCF121-1W-X4-Z-105-10-77	3.73	1	0.131	0.49	2.955	1.97
R-3	0.0030	1.00	20.00	119.95	2.67	Zum Roof Drain	ZCF121-1W-X4-Z-105-10-77	3.73	1	0.137	0.51	3.670	2.79
R-4	0.0116	1.00	20.00	119.95	3.88	Zum Roof Drain	ZCF121-1W-X4-Z-105-10-77	3.73	1	0.141	0.52	5.617	4.65
R-5	0.0054	1.00	20.00	119.95	1.81	Zum Roof Drain	ZCF121-1W-X4-Z-105-10-77	3.73	1	0.127	0.47	2.714	1.65
R-6	0.0034	1.00	20.00	119.95	1.14	Zum Roof Drain	ZCF121-1W-X4-Z-105-10-77	3.73	1	0.118	0.44	1.704	0.84
R-7	0.0107	1.00	20.00	119.95	3.56	Zum Roof Drain	ZCF121-1W-X4-Z-105-10-77	3.73	1	0.139	0.52	5.132	4.13
R-8	0.0053	1.00	20.00	119.95	1.78	Zum Roof Drain	ZCF121-1W-X4-Z-105-10-77	3.73	1	0.130	0.48	2.443	1.59
R-9	0.0028	1.00	20.00	119.95	0.95	Zum Roof Drain	ZCF121-1W-X4-Z-105-10-77	3.73	1	0.119	0.44	1.224	0.62
R-10	0.0028	1.00	20.00	119.95	0.93	Zum Roof Drain	ZCF121-1W-X4-Z-105-10-77	3.73	1	0.118	0.44	1.231	0.60
Roof storage	0.0658	1.00	20.00	119.95	21.95	-	-	-	-	-	4.83	31.46	22.39
A-1	0.0345	0.63	20.00	119.95	6.07	no control	-	-	-	-	-	0.00	0.00
A-2	0.0186	0.88	20.00	119.95	5.42	no control	-	-	-	-	-	0.00	0.00
Superpipe	0.0530	0.65	20.00	119.95	11.49	ICD	-	-	-	-	2.05	0.00	12.35
Total:	0.1189				33.44						6.88	31.46	34.74

Note: In all cases, there is only one notch in the Zum roof drain and flows through each drain is further reduced with and adjustable weir. See Zum roof drains sheet and adjustable weir specification for more details on the reduction of flow.

Allowable release rate:

Area	0.1189 ha
C	0.4
t _c	20 min
I ₂	52.03
Q allowable = 2.78 x C x I x A	
	6.88 L/s

Summary table

	Area ID	Area (ha)	Allowable release rate (L/s)	5 year event L/s	100 year event L/s	Storage available (m ³)	Storage used 100 year event (m ³)
Roof	R-1 - R-10	0.066	3.81	3.76	4.83	31.46	22.39
Superpipe	A-1 - A-2	0.053	3.07	1.16	2.05	0.00	12.35
Total:		0.119	6.878	4.92	6.88	31.46	34.74

REQUIRED STORAGE - 5-YEAR EVENT									
AREA		R-1		BUILDING ROOF					
OTTAWA IDF CURVE		Area = 0.10 C = 0.95		ha		Qallow = Vol(max) =		Vol = Notches = 1	
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m³)					
5	141.18	3.55	3.15	0.95					
10	104.19	2.82	2.22	1.33					
15	83.56	2.10	1.70	1.53					
20	70.25	1.77	1.37	1.64					
25	60.90	1.53	1.13	1.70					
30	53.93	1.36	0.96	1.72					
35	48.52	1.22	0.82	1.72					
40	44.18	1.11	0.71	1.71					
45	40.63	1.02	0.62	1.68					
50	37.65	0.95	0.55	1.64					
55	35.12	0.88	0.48	1.60					
60	32.94	0.83	0.43	1.55					
65	31.04	0.78	0.38	1.49					
70	29.37	0.74	0.34	1.42					
75	27.89	0.70	0.30	1.36					
80	26.56	0.67	0.27	1.29					
85	25.37	0.64	0.24	1.22					
90	24.29	0.61	0.21	1.14					

Notes: Vol = Qnet x time
Qnet = Q - Qallow

Ponding Depth (5-Year Storm)				
Area m ²	V m ³	H m		
0.00	0.00	0.00		
0.42	0.00	0.01		
1.69	0.01	0.02		
3.81	0.04	0.03		
6.78	0.09	0.04		
10.59	0.18	0.05		
15.25	0.30	0.06		
20.76	0.48	0.07		
27.11	0.72	0.08		
34.31	1.03	0.09		
42.36	1.41	0.10		
51.25	1.88	0.11		
60.99	2.44	0.12		
71.58	3.10	0.13		
83.02	3.87	0.14		
95.30	4.77	0.15		

Linear Interpolation				
0.11	H	0.10	H =	0.107 m
1.88	1.72	1.41	Qallow =	0.40 L/s

Note: Qallow is the flow rate through an overcontrolled Zum Roof Drain (3.73 L/s/m of head.)

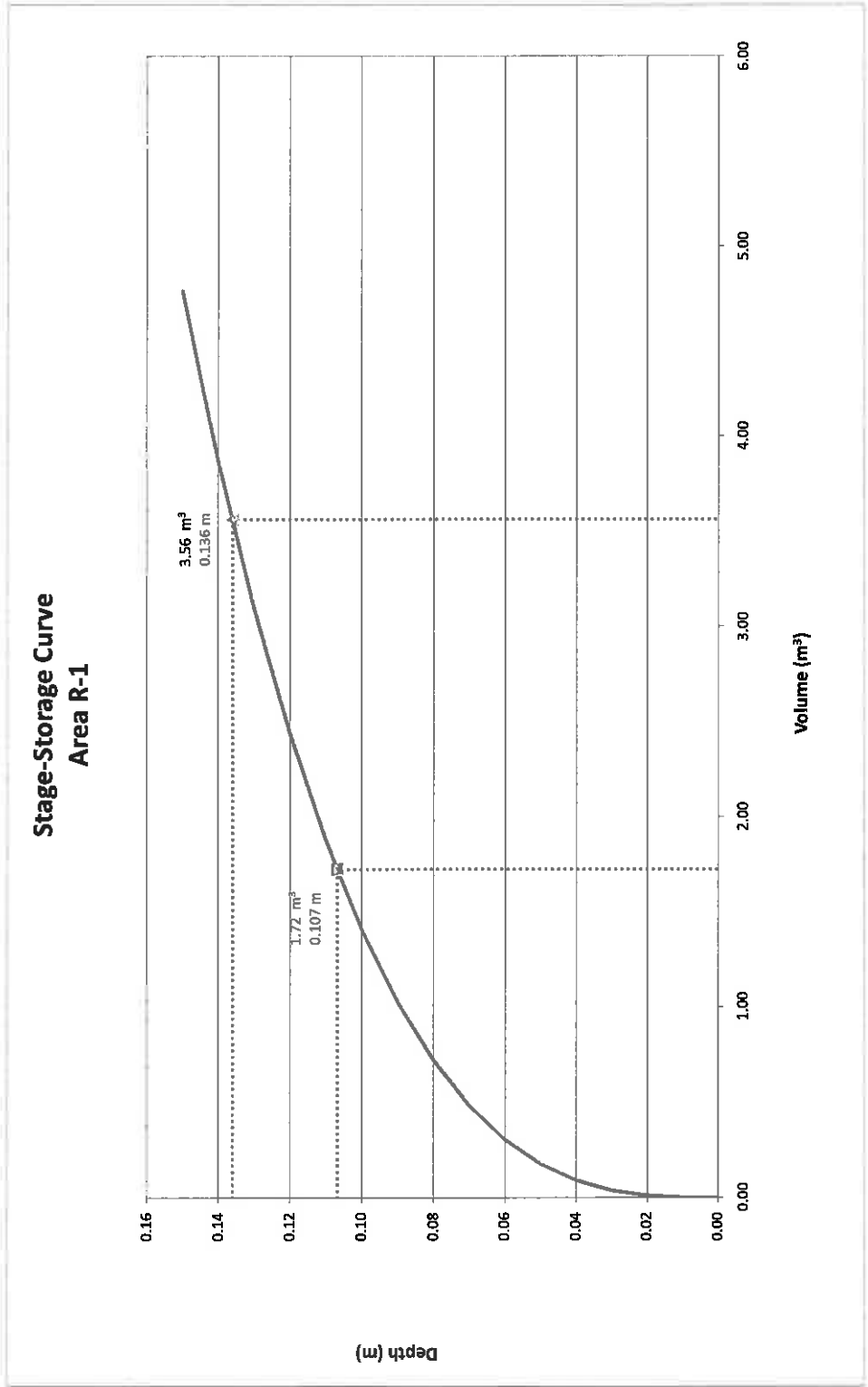
REQUIRED STORAGE - 100-YEAR EVENT											
AREA		R-1		BUILDING ROOF							
OTTAWA IDF CURVE		Area = 0.010		ha		Qallow = 0.51		Vol(max) = 3.56			
C = 1.00								Notches = 1			
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)							
5	0.15	0.00	-0.51	-0.15							
10	178.56	4.73	4.22	2.53							
15	142.86	3.79	3.28	2.95							
20	119.95	3.18	2.67	3.20							
25	103.85	2.75	2.24	3.36							
30	91.87	2.43	1.92	3.46							
35	82.58	2.19	1.68	3.52							
40	75.15	1.99	1.48	3.55							
45	69.05	1.83	1.32	3.56							
50	63.95	1.69	1.18	3.55							
55	59.62	1.58	1.07	3.53							
60	56.89	1.48	0.97	3.50							
65	52.65	1.39	0.88	3.45							
70	49.79	1.32	0.81	3.40							
75	47.26	1.25	0.74	3.34							
80	44.99	1.19	0.68	3.27							
85	42.95	1.14	0.63	3.20							
90	41.11	1.09	0.58	3.13							

Notes: Vol = Qnet x time
Qnet = Q - Qallow

Ponding Depth (5-Year Storm)				
Area m ²	V m ³	H m		
0.00	0.00	0.00		
0.42	0.00	0.01		
1.69	0.01	0.02		
3.81	0.04	0.03		
6.78	0.09	0.04		
10.59	0.18	0.05		
15.25	0.30	0.06		
20.76	0.48	0.07		
27.11	0.72	0.08		
34.31	1.03	0.09		
42.36	1.41	0.10		
51.25	1.88	0.11		
60.99	2.44	0.12		
71.58	3.10	0.13		
83.02	3.87	0.14		
95.30	4.77	0.15		

Linear Interpolation				
0.14	H	0.13	H =	0.136 m
3.87	3.56	3.10	Qallow =	0.51 L/s

Note: Qallow is the flow rate through an overcontrolled Zum Roof Drain (3.73 L/s/m of head.)



REQUIRED STORAGE - 5-YEAR EVENT									
AREA		R-2		BUILDING ROOF					
OTTAWA IDF CURVE									
Area =		0.006		ha		Qallow =		0.38	
C =		0.95				Vol(max) =		0.92	
						Notches =		1	
Time (min)	Intensity (mm/hr)	Q (L/s)	Q (L/s)	Q (L/s)	Q (L/s)	Q (L/s)	Q (L/s)	Vol (m ³)	
5	141.18	2.31	1.93	1.32	0.99	0.89	0.79	0.58	
10	104.19	1.70	1.37	0.99	0.77	0.62	0.50	0.41	
15	83.56	1.37	1.15	0.77	0.62	0.50	0.41	0.34	
20	70.25	1.15	0.99	0.62	0.50	0.41	0.34	0.28	
25	60.90	1.00	0.88	0.50	0.41	0.34	0.28	0.24	
30	53.93	0.88	0.79	0.41	0.34	0.28	0.24	0.20	
35	48.52	0.79	0.72	0.34	0.28	0.24	0.20	0.16	
40	44.18	0.72	0.66	0.28	0.24	0.20	0.16	0.13	
45	40.63	0.66	0.62	0.24	0.20	0.16	0.13	0.10	
50	37.65	0.62	0.57	0.19	0.16	0.13	0.10	0.08	
55	35.12	0.57	0.54	0.16	0.13	0.10	0.08	0.05	
60	32.94	0.54	0.51	0.13	0.10	0.08	0.05	0.04	
65	31.04	0.51	0.48	0.10	0.08	0.05	0.04	0.03	
70	29.37	0.48	0.46	0.08	0.05	0.04	0.03	0.02	
75	27.89	0.46	0.43	0.05	0.04	0.03	0.02	0.02	
80	26.56	0.43	0.42	0.04	0.03	0.02	0.02	0.01	
85	25.37	0.42	0.40	0.02	0.02	0.01	0.01	0.01	
90	24.29	0.40	0.40	0.02	0.02	0.01	0.01	0.01	

Notes: Vol = Qnet x time
Qnet = Q - Qallow

Ponding Depth (5-Year Storm)				
Area m ²	V m ³	H m	H m	H m
0.00	0.00	0.00	0.00	0.00
0.26	0.00	0.01	0.01	0.01
1.05	0.01	0.02	0.02	0.02
2.36	0.02	0.03	0.03	0.03
4.20	0.06	0.04	0.04	0.04
6.57	0.11	0.05	0.05	0.05
9.46	0.19	0.06	0.06	0.06
12.87	0.30	0.07	0.07	0.07
16.81	0.45	0.08	0.08	0.08
21.28	0.64	0.09	0.09	0.09
26.27	0.88	0.10	0.10	0.10
31.78	1.17	0.11	0.11	0.11
37.82	1.51	0.12	0.12	0.12
44.39	1.92	0.13	0.13	0.13
51.48	2.40	0.14	0.14	0.14
59.10	2.96	0.15	0.15	0.15

Linear Interpolation				
0.11	H	0.10	H	0.102 m
1.17	0.92	0.88	Q _{allow}	

Note: Qallow is the flow rate through an overcontrolled Zurn Roof Drain (3.73 L/s/m of head.)

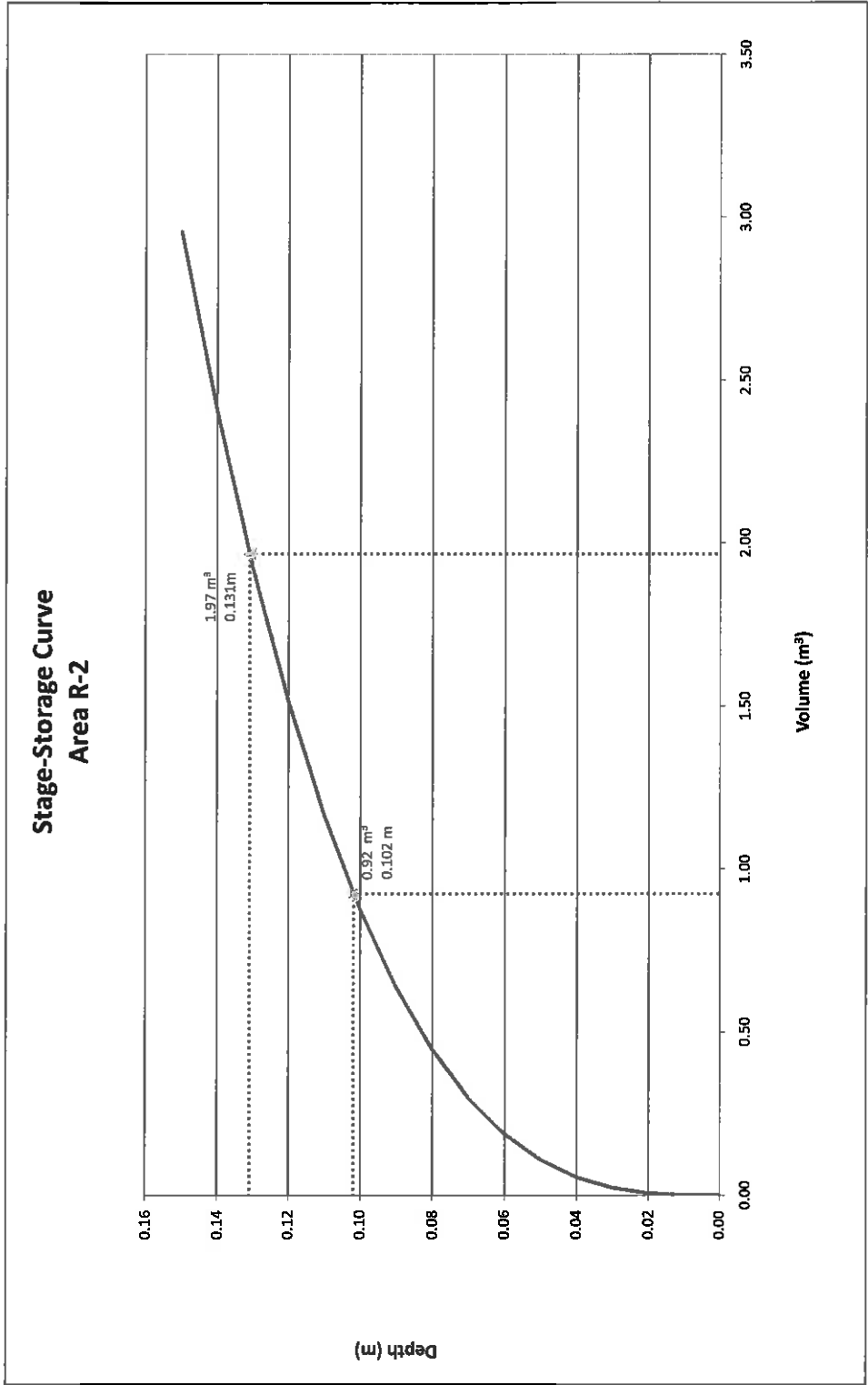
REQUIRED STORAGE - 100-YEAR EVENT									
AREA		R-2		BUILDING ROOF					
OTTAWA IDF CURVE									
Area =		0.006		ha		Qallow =		0.49	
C =		1.00				Vol(max) =		1.97	
						Notches =		1	
Time (min)	Intensity (mm/hr)	Q (L/s)	Q (L/s)	Qnet (L/s)	Vol (m ³)				
5	242.70	4.18	3.69	2.58	1.11				
10	178.56	3.07	2.46	1.97	1.55				
15	142.89	2.46	1.97	1.58	1.77				
20	119.95	2.07	1.79	1.30	1.89				
25	103.85	1.79	1.58	1.09	1.95				
30	91.87	1.58	1.42	0.93	1.97				
35	82.58	1.42	1.29	0.80	1.96				
40	75.15	1.29	1.19	0.70	1.93				
45	69.05	1.19	1.10	0.61	1.89				
50	63.95	1.10	1.03	0.54	1.83				
55	59.62	1.03	0.96	0.47	1.77				
60	55.89	0.96	0.91	0.42	1.70				
65	52.65	0.91	0.86	0.37	1.62				
70	49.79	0.86	0.81	0.32	1.54				
75	47.26	0.81	0.77	0.28	1.46				
80	44.99	0.77	0.74	0.25	1.37				
85	42.96	0.74	0.71	0.22	1.27				
90	41.11	0.71	0.71	0.22	1.18				

Notes: Vol = Qnet x time
Qnet = Q - Qallow

Ponding Depth (100-Year Storm)				
Area m ²	V m ³	H m	H m	H m
0.00	0.00	0.00	0.00	0.00
0.26	0.00	0.01	0.01	0.01
1.05	0.01	0.02	0.02	0.02
2.36	0.02	0.03	0.03	0.03
4.20	0.06	0.04	0.04	0.04
6.57	0.11	0.05	0.05	0.05
9.46	0.19	0.06	0.06	0.06
12.87	0.30	0.07	0.07	0.07
16.81	0.45	0.08	0.08	0.08
21.28	0.64	0.09	0.09	0.09
26.27	0.88	0.10	0.10	0.10
31.78	1.17	0.11	0.11	0.11
37.82	1.51	0.12	0.12	0.12
44.39	1.92	0.13	0.13	0.13
51.48	2.40	0.14	0.14	0.14
59.10	2.96	0.15	0.15	0.15

Linear Interpolation				
0.14	H	0.13	H	0.131 m
2.40	1.97	1.92	Q _{allow}	

Note: Qallow is the flow rate through an overcontrolled Zurn Roof Drain (3.73 L/s/m of head.)



REQUIRED STORAGE - 5-YEAR EVENT						
AREA	R-3		BUILDING ROOF			
OTTAWA IDF CURVE						
Area =	0.008	ha	Gallow =	0.40		
C =	0.95		Vol(max) =	1.32		
			Notches =	1		
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m³)		
5	141.18	2.98	2.58	0.77		
10	104.19	2.20	1.80	1.08		
15	83.66	1.76	1.36	1.23		
20	70.25	1.48	1.08	1.30		
25	60.90	1.29	0.89	1.33		
30	53.93	1.14	0.74	1.33		
35	48.52	1.02	0.62	1.31		
40	44.18	0.93	0.53	1.28		
45	40.63	0.86	0.46	1.24		
50	37.65	0.80	0.40	1.19		
55	35.12	0.74	0.34	1.13		
60	32.94	0.70	0.30	1.07		
65	31.04	0.66	0.26	1.00		
70	29.37	0.62	0.22	0.93		
75	27.89	0.59	0.19	0.85		
80	26.56	0.56	0.16	0.77		
85	25.37	0.54	0.14	0.69		
90	24.29	0.51	0.11	0.61		

Notes: Vol = Qnet x time
Qnet = Q - Qallow

Ponding Depth (5-Year Storm)				
Area m ²	V m ³	H m		
0.00	0.00	0.00		
0.33	0.00	0.01		
1.30	0.01	0.02		
2.94	0.03	0.03		
5.22	0.07	0.04		
8.16	0.14	0.05		
11.74	0.23	0.06		
15.98	0.37	0.07		
20.88	0.56	0.08		
26.42	0.79	0.09		
32.62	1.09	0.10		
39.47	1.45	0.11		
46.97	1.88	0.12		
55.13	2.39	0.13		
63.94	2.98	0.14		
73.40	3.67	0.15		

Linear Interpolation

Area m ²	H m	Qallow =	H =
0.11	0.10	0.107 m	
1.45	1.09	0.107 m	

Note: Qallow is the flow rate through an overcontrolled Zum Roof Drain (3.73 L/s/m of head.)

REQUIRED STORAGE - 100-YEAR EVENT						
AREA		R-3	BUILDING ROOF			
OTTAWA IDF CURVE						
Area =		0.008	ha	Gallow =		0.51
C =		100		Vol(max) =		2.79
				Notches =		1
Time (min)	Intensity (mm/hr)	Q (L/s)		Qnet (L/s)	Vol (m ³)	
5	242.70	5.40		4.89	1.47	
10	178.56	3.97		3.46	2.08	
15	142.89	3.18		2.67	2.40	
20	119.95	2.67		2.16	2.59	
25	103.85	2.31		1.80	2.70	
30	91.87	2.04		1.53	2.76	
35	82.58	1.84		1.33	2.78	
40	75.15	1.67		1.16	2.79	
45	69.05	1.54		1.03	2.77	
50	63.95	1.42		0.91	2.74	
55	59.62	1.33		0.82	2.69	
60	55.89	1.24		0.73	2.64	
65	52.65	1.17		0.66	2.58	
70	49.79	1.11		0.60	2.51	
75	47.26	1.05		0.54	2.43	
80	44.99	1.00		0.49	2.35	
85	42.95	0.96		0.45	2.27	
90	41.11	0.91		0.40	2.18	

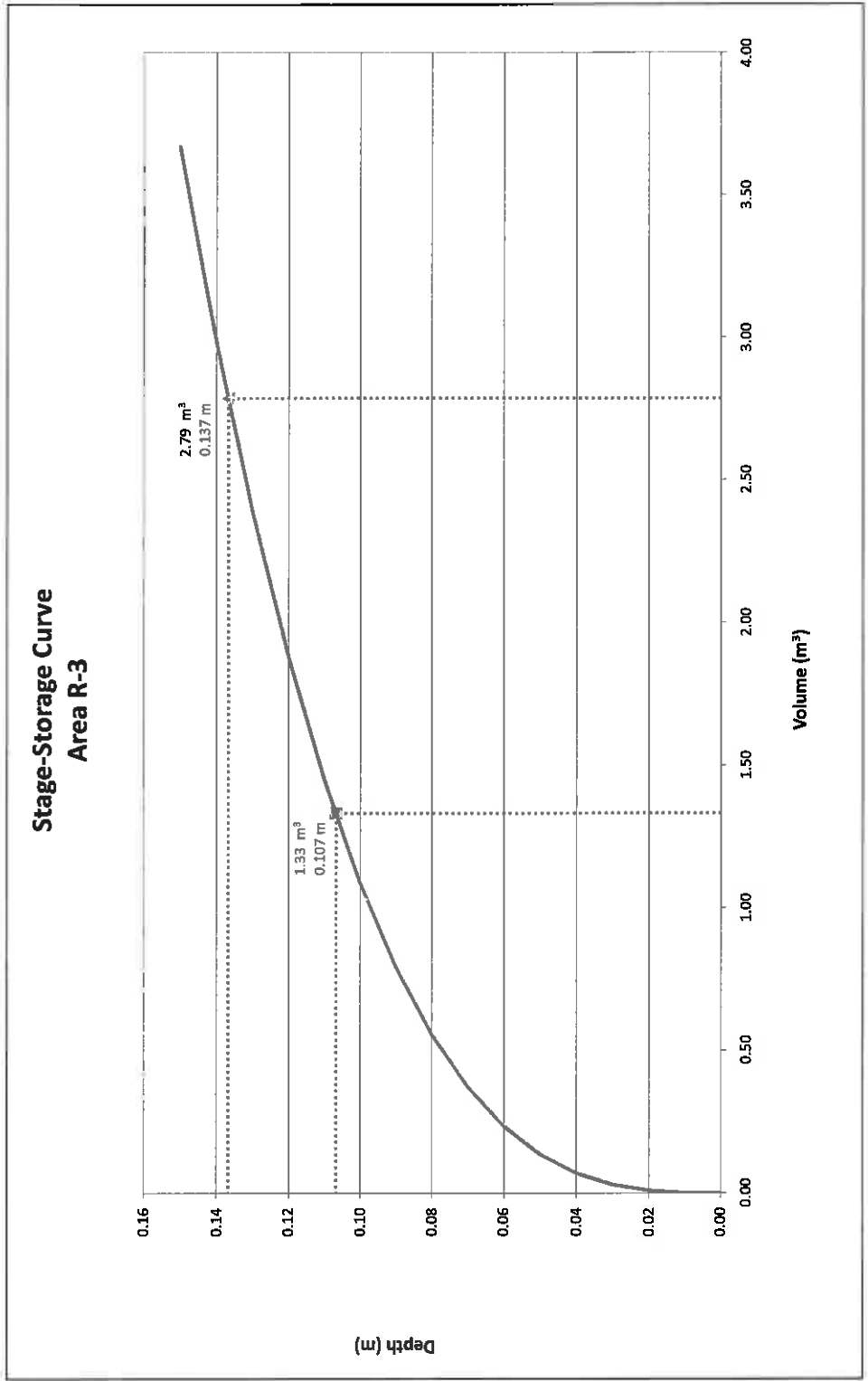
Notes: Vol = Qnet x time
Qnet = Q - Qallow

Ponding Depth (100-Year Storm)				
Area m ²	V m ³	H m		
0.00	0.00	0.00		
0.33	0.00	0.01		
1.30	0.01	0.02		
2.94	0.03	0.03		
5.22	0.07	0.04		
8.16	0.14	0.05		
11.74	0.23	0.06		
15.98	0.37	0.07		
20.88	0.56	0.08		
26.42	0.79	0.09		
32.62	1.09	0.10		
39.47	1.45	0.11		
46.97	1.88	0.12		
55.13	2.39	0.13		
63.94	2.98	0.14		
73.40	3.67	0.15		

Linear Interpolation

Area m ²	H m	Qallow =	H =
0.14	0.13	0.137 m	
2.98	2.39	0.137 m	

Note: Qallow is the flow rate through an overcontrolled Zum Roof Drain (3.73 L/s/m of head.)



REQUIRED STORAGE - 5-YEAR EVENT									
AREA		R-4		BUILDING ROOF					
OTTAWA IDF CURVE		Area = 0.012		ha		Qallow = 0.41			
C = 0.95						V _o (max) = 2.28			
						Notches = 1			
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)					
5	141.18	4.34	3.93	1.18					
10	104.19	3.20	2.79	1.68					
15	83.56	2.57	2.16	1.94					
20	70.25	2.16	1.75	2.10					
25	60.90	1.87	1.46	2.19					
30	53.93	1.66	1.25	2.25					
35	48.52	1.49	1.08	2.27					
40	44.18	1.36	0.95	2.28					
45	40.63	1.25	0.84	2.27					
50	37.65	1.16	0.75	2.24					
55	35.12	1.08	0.67	2.21					
60	32.94	1.01	0.60	2.17					
65	31.04	0.95	0.54	2.12					
70	29.37	0.90	0.49	2.07					
75	27.89	0.86	0.45	2.01					
80	26.56	0.82	0.41	1.95					
85	25.37	0.78	0.37	1.89					
90	24.29	0.75	0.34	1.82					

Notes: Vol = Qnet x time
Qnet = Q - Qallow

Ponding Depth (5-Year Storm)			
Area m ²	V m ³	H m	
0.00	0.00	0.00	
0.50	0.00	0.01	
2.00	0.01	0.02	
4.49	0.04	0.03	
7.99	0.11	0.04	
12.48	0.21	0.05	
17.97	0.36	0.06	
24.46	0.57	0.07	
31.95	0.85	0.08	
40.44	1.21	0.09	
49.93	1.66	0.10	
60.41	2.22	0.11	
71.90	2.88	0.12	
84.38	3.66	0.13	
97.86	4.57	0.14	
112.34	5.62	0.15	

Linear Interpolation			
0.12	H	0.11	H = 0.111 m
2.88	H	2.22	Qallow = 0.41 m

Note: Qallow is the flow rate through an overcontrolled Zurn Roof Drain (3.73 L/s/m of head.)

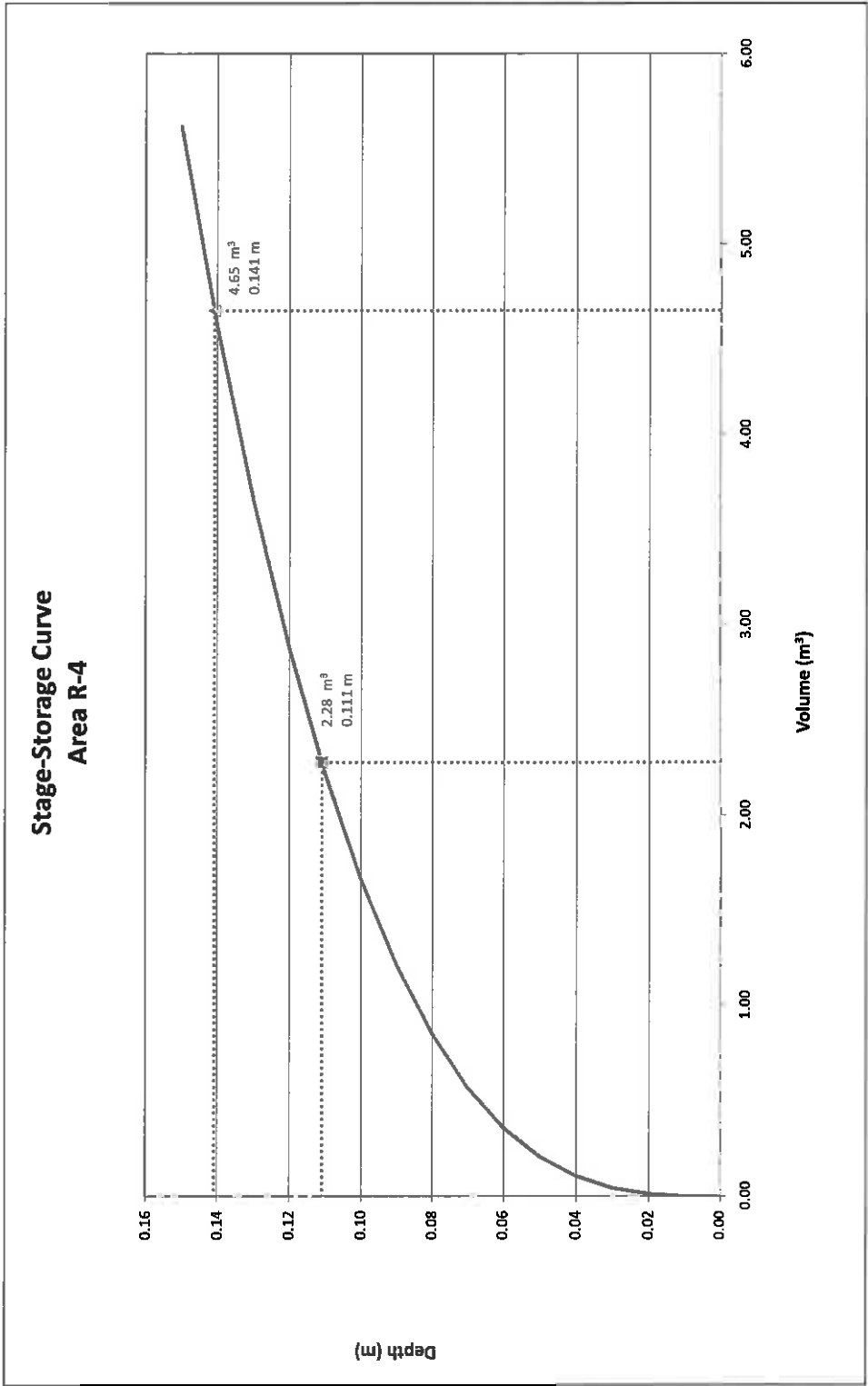
REQUIRED STORAGE - 100-YEAR EVENT									
AREA		R-4		BUILDING ROOF					
OTTAWA IDF CURVE		Area = 0.012		ha		Gallow = 0.52		Vol(max) = 4.65	
C = 1.00						Notches = 1			
Time (min)	Intensity (mm/hr)	Q (l/s)	Qnet (l/s)	Vol (m ³)					
5	242.70	7.85	7.33	2.20					
10	178.56	5.78	5.26	3.15					
15	142.89	4.62	4.10	3.69					
20	119.95	3.88	3.36	4.03					
25	103.85	3.36	2.84	4.26					
30	91.87	2.97	2.45	4.41					
35	82.58	2.67	2.15	4.52					
40	75.15	2.43	1.91	4.59					
45	69.05	2.23	1.71	4.63					
50	63.95	2.07	1.55	4.65					
55	59.62	1.93	1.41	4.65					
60	55.89	1.81	1.29	4.64					
65	52.65	1.70	1.18	4.61					
70	49.79	1.61	1.09	4.58					
75	47.26	1.53	1.01	4.54					
80	44.99	1.46	0.94	4.49					
85	42.95	1.39	0.87	4.43					
90	41.11	1.33	0.81	4.37					

Notes: Vol = Qnet x time
Qnet = Q - Qallow

Ponding Depth (100-Year Storm)			
Area m ²	V m ³	H m	
0.00	0.00	0.00	
0.50	0.00	0.01	
2.00	0.01	0.02	
4.49	0.04	0.03	
7.99	0.11	0.04	
12.48	0.21	0.05	
17.97	0.36	0.06	
24.46	0.57	0.07	
31.95	0.85	0.08	
40.44	1.21	0.09	
49.93	1.66	0.10	
60.41	2.22	0.11	
71.90	2.88	0.12	
84.38	3.66	0.13	
97.86	4.57	0.14	
112.34	5.62	0.15	

Linear Interpolation			
0.15	H	0.14	H = 0.141 m
5.62	H	4.57	Qallow = 0.62 m

Note: Qallow is the flow rate through an overcontrolled Zurn Roof Drain (3.73 L/s/m of head.)



REQUIRED STORAGE - 5-YEAR EVENT													
AREA		R-5		BUILDING ROOF									
OTTAWA IDF CURVE		ha				Qallow =		0.37					
Area =		0.005				Vol(max) =		0.76					
C =		0.95				Notches =		1					
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)									
5	141.18	2.02	1.65	0.50									
10	104.19	1.49	1.12	0.67									
15	83.56	1.20	0.83	0.75									
20	70.25	1.01	0.64	0.76									
25	60.90	0.87	0.50	0.75									
30	53.93	0.77	0.40	0.73									
35	48.52	0.70	0.33	0.68									
40	44.18	0.63	0.26	0.63									
45	40.63	0.58	0.21	0.57									
50	37.65	0.54	0.17	0.51									
55	35.12	0.50	0.13	0.44									
60	32.94	0.47	0.10	0.37									
65	31.04	0.45	0.08	0.29									
70	29.37	0.42	0.05	0.21									
75	27.89	0.40	0.03	0.13									
80	26.56	0.38	0.01	0.05									
85	25.37	0.36	-0.01	-0.03									
90	24.29	0.35	-0.02	-0.12									

Notes: Vol = Qnet x time
Qnet = Q - Qallow

Ponding Depth (5-Year Storm)				
Area m ²	V m ³	H m		
0.00	0.00	0.00		
0.24	0.00	0.01		
0.97	0.01	0.02		
2.17	0.02	0.03		
3.86	0.05	0.04		
6.03	0.10	0.05		
8.69	0.17	0.06		
11.82	0.28	0.07		
15.44	0.41	0.08		
19.54	0.59	0.09		
24.13	0.80	0.10		
29.19	1.07	0.11		
34.74	1.39	0.12		
40.78	1.77	0.13		
47.29	2.21	0.14		
54.29	2.71	0.15		

Linear Interpolation				
0.12	H	0.11	H =	0.100 m
1.39	Q	1.07	Qallow =	0.07 L/s

Note: Qallow is the flow rate through an overcontrolled Zum Roof Drain (3.73 L/s/m of head.)

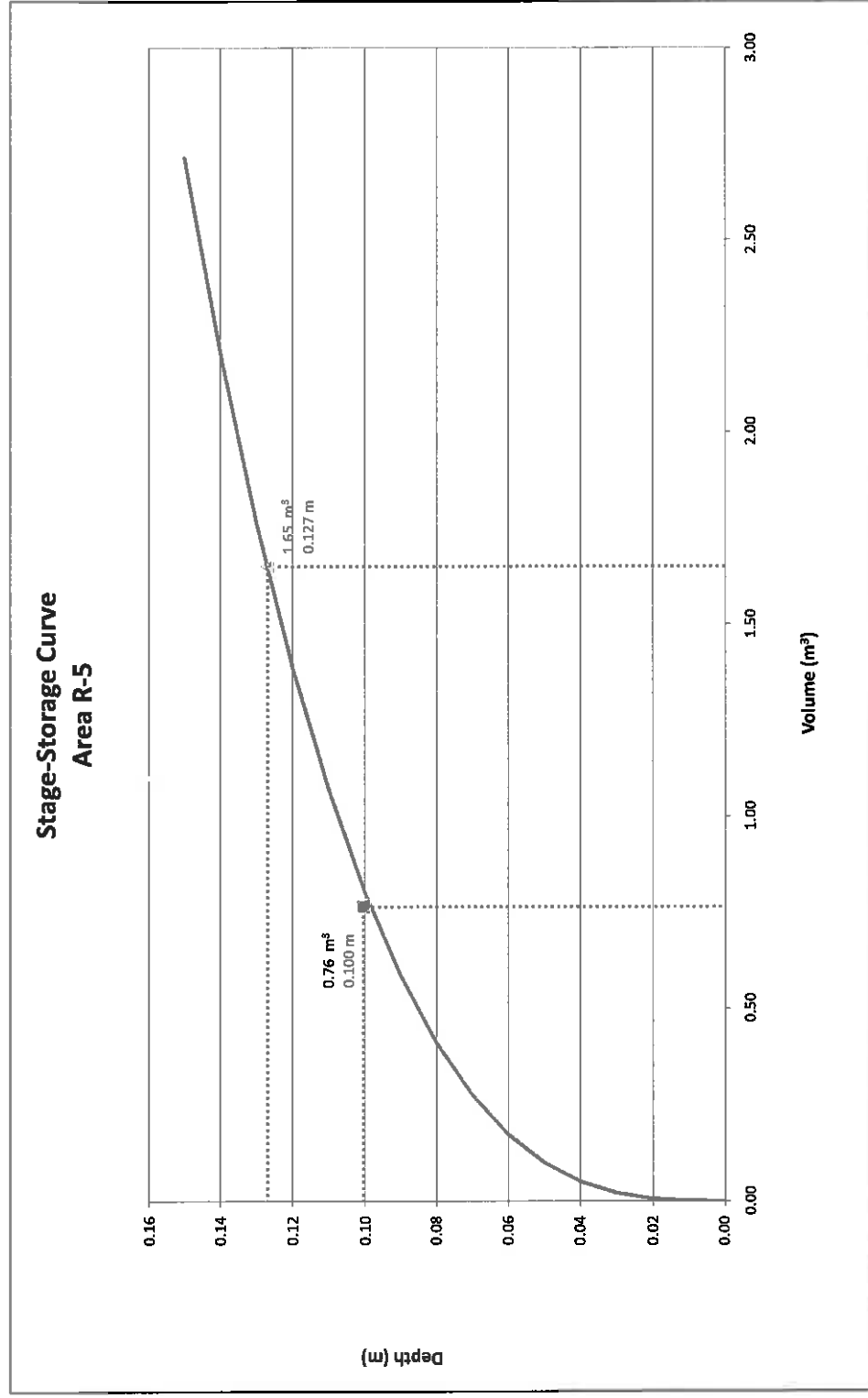
REQUIRED STORAGE - 100-YEAR EVENT									
AREA		R-5		BUILDING ROOF					
OTTAWA IDF CURVE		ha		Qallow =		0.47			
A ₆₃ =		0.005		Vol(max) =		1.65			
C =		1.00		Notches =		1			
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)					
5	242.70	3.66	3.19	0.96					
10	178.56	2.69	2.22	1.33					
15	142.89	2.16	1.69	1.52					
20	119.95	1.81	1.34	1.61					
25	103.85	1.57	1.10	1.65					
30	91.87	1.39	0.92	1.65					
35	82.58	1.25	0.78	1.63					
40	75.15	1.13	0.66	1.59					
45	69.05	1.04	0.57	1.54					
50	63.95	0.97	0.50	1.49					
55	59.62	0.90	0.43	1.42					
60	55.89	0.84	0.37	1.34					
65	52.65	0.79	0.32	1.27					
70	49.79	0.75	0.28	1.18					
75	47.26	0.71	0.24	1.09					
80	44.99	0.68	0.21	1.00					
85	42.95	0.65	0.18	0.91					
90	41.11	0.62	0.15	0.81					

Notes: Vol = Qnet x time
Qnet = Q - Qallow

Ponding Depth (100-Year Storm)				
Area m ²	V m ³	H m		
0.00	0.00	0.00		
0.24	0.00	0.01		
0.97	0.01	0.02		
2.17	0.02	0.03		
3.86	0.05	0.04		
6.03	0.10	0.05		
8.69	0.17	0.06		
11.82	0.28	0.07		
15.44	0.41	0.08		
19.54	0.59	0.09		
24.13	0.80	0.10		
29.19	1.07	0.11		
34.74	1.39	0.12		
40.78	1.77	0.13		
47.29	2.21	0.14		
54.29	2.71	0.15		

Linear Interpolation				
0.13	H	0.12	H =	0.127 m
1.77	Q	1.39	Qallow =	0.47 L/s

Note: Qallow is the flow rate through an overcontrolled Zum Roof Drain (3.73 L/s/m of head.)



REQUIRED STORAGE - 5-YEAR EVENT									
AREA		R-6 BUILDING ROOF							
OTTAWA IDF CURVE		Area = 0.003		ha		Qallow =		0.34	
C = 0.95						Vol(max) =		0.37	
						Notches =		1	
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m³)					
5	141.18	1.27	0.93	0.28					
10	104.19	0.94	0.60	0.36					
15	83.56	0.75	0.41	0.37					
20	70.25	0.63	0.29	0.35					
25	60.90	0.55	0.21	0.31					
30	53.93	0.49	0.15	0.26					
35	48.52	0.44	0.10	0.20					
40	44.18	0.40	0.06	0.14					
45	40.63	0.37	0.03	0.07					
50	37.65	0.34	0.00	0.00					
55	35.12	0.32	-0.02	-0.08					
60	32.94	0.30	-0.04	-0.16					
65	31.04	0.28	-0.06	-0.24					
70	29.37	0.26	-0.08	-0.32					
75	27.89	0.25	-0.09	-0.40					
80	26.56	0.24	-0.10	-0.48					
85	25.37	0.23	-0.11	-0.57					
90	24.29	0.22	-0.12	-0.66					

Notes: Vol = Qnet x time
Qnet = Q - Qallow

Ponding Depth (5-Year Storm)				
Area m ²	V m ³	H m		
0.00	0.00	0.00		
0.15	0.00	0.01		
0.61	0.00	0.02		
1.36	0.01	0.03		
2.42	0.03	0.04		
3.79	0.06	0.05		
5.45	0.11	0.06		
7.42	0.17	0.07		
9.69	0.26	0.08		
12.27	0.37	0.09		
15.15	0.50	0.10		
18.33	0.67	0.11		
21.81	0.87	0.12		
25.60	1.11	0.13		
29.69	1.39	0.14		
34.08	1.70	0.15		

Linear Interpolation				
H	Q	H	Q	H
0.10	0.37	0.09	0.37	0.090 m
0.50	0.37	0.37	0.37	0.090 m

Note: Qallow is the flow rate through an overcontrolled Zurn Roof Drain (3.73 L/s/m of head.)

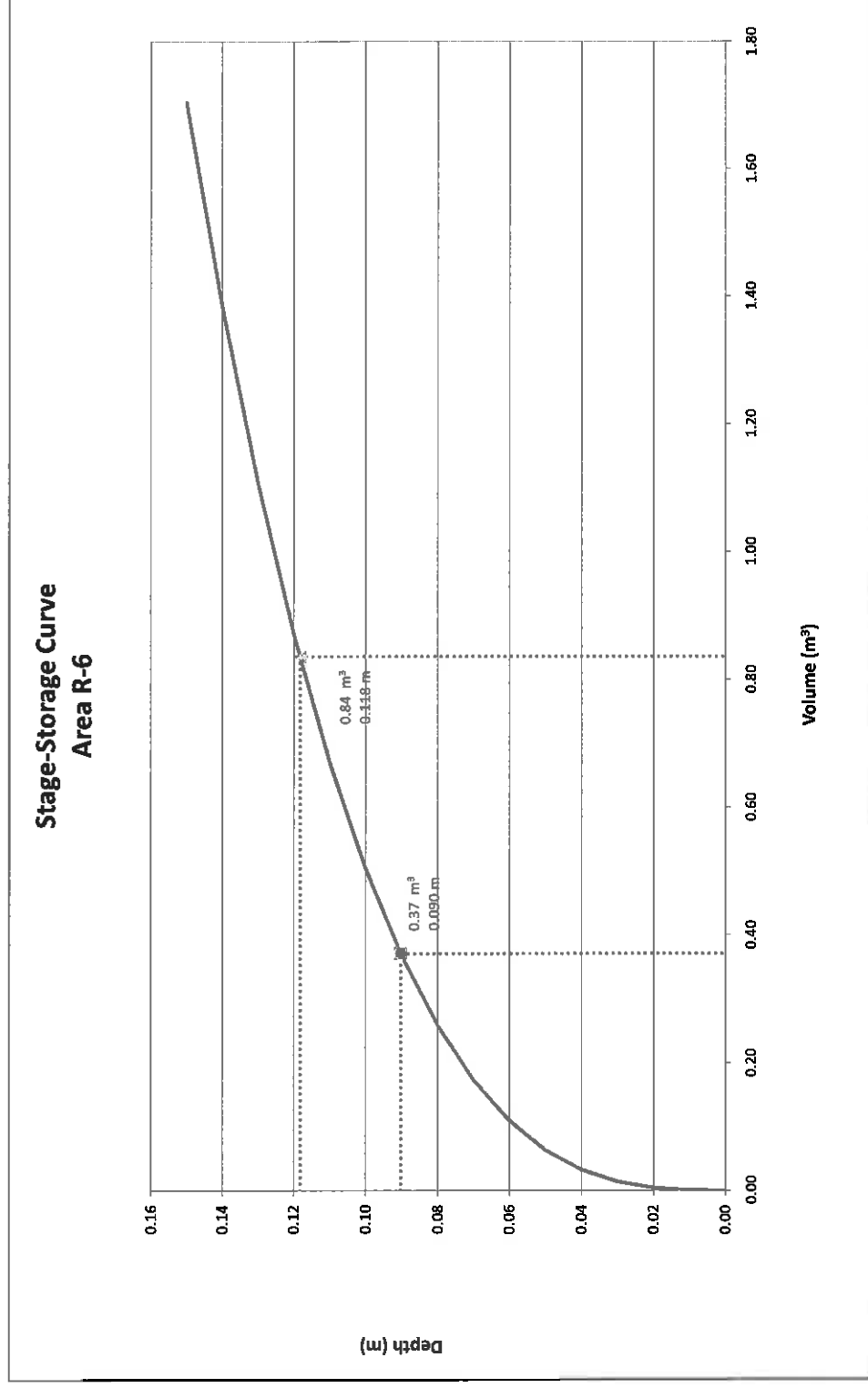
REQUIRED STORAGE - 100-YEAR EVENT									
AREA		R-6		BUILDING ROOF					
OTTAWA IDF CURVE				Area = 0.003 ha		Qallow =		0.44	
C = 1.00						Vol(max) =		0.84	
						Notches =		1	
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)					
5	242.70	2.30	1.86	0.56					
10	178.56	1.69	1.25	0.75					
15	142.89	1.36	0.91	0.82					
20	119.95	1.14	0.70	0.84					
25	103.85	0.98	0.54	0.82					
30	91.87	0.87	0.43	0.77					
35	82.58	0.78	0.34	0.72					
40	75.15	0.71	0.27	0.65					
45	69.05	0.65	0.21	0.58					
50	63.95	0.61	0.17	0.50					
55	59.62	0.56	0.12	0.41					
60	55.89	0.53	0.09	0.32					
65	52.65	0.50	0.06	0.23					
70	49.79	0.47	0.03	0.13					
75	47.26	0.45	0.01	0.03					
80	44.99	0.43	-0.01	-0.07					
85	42.95	0.41	-0.03	-0.17					
90	41.11	0.39	-0.05	-0.27					

Notes: Vol = Qnet x time
Qnet = Q - Qallow

Ponding Depth (100-Year Storm)				
Area m ²	V m ³	H m		
0.00	0.00	0.00		
0.15	0.00	0.01		
0.61	0.00	0.02		
1.36	0.01	0.03		
2.42	0.03	0.04		
3.79	0.06	0.05		
5.45	0.11	0.06		
7.42	0.17	0.07		
9.69	0.26	0.08		
12.27	0.37	0.09		
15.15	0.50	0.10		
18.33	0.67	0.11		
21.81	0.87	0.12		
25.60	1.11	0.13		
29.69	1.39	0.14		
34.08	1.70	0.15		

Linear Interpolation				
H	Q	H	Q	H
0.12	0.84	0.11	0.67	0.118 m
0.87	0.84	0.67	0.67	0.118 m

Note: Qallow is the flow rate through an overcontrolled Zurn Roof Drain (3.73 L/s/m of head.)



REQUIRED STORAGE - 5-YEAR EVENT						
AREA	R-7	BUILDING ROOF				
OTTAWA IDF CURVE						
Area =	0.011	ha	Qallow =		0.41	
C =	0.95		Vol(max) =		2.01	
			Notches =		1	
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m³)		
5	141.18	3.98	3.57	1.07		
10	104.19	2.94	2.53	1.52		
15	83.56	2.35	1.94	1.75		
20	70.25	1.98	1.57	1.88		
25	60.90	1.72	1.31	1.96		
30	53.93	1.52	1.11	2.00		
35	48.52	1.37	0.96	2.01		
40	44.18	1.25	0.84	2.00		
45	40.63	1.14	0.73	1.98		
50	37.65	1.06	0.65	1.95		
55	35.12	0.99	0.58	1.91		
60	32.94	0.93	0.52	1.87		
65	31.04	0.87	0.46	1.81		
70	29.37	0.83	0.42	1.75		
75	27.89	0.79	0.38	1.69		
80	26.56	0.75	0.34	1.62		
85	25.37	0.71	0.30	1.55		
90	24.29	0.68	0.27	1.48		

Notes: Vol = Qnet x time
Qnet = Q - Qallow

Ponding Depth (5-Year Storm)				
Area m ²	V m ³	H m		
0.00	0.00	0.00		
0.46	0.00	0.01		
1.82	0.01	0.02		
4.11	0.04	0.03		
7.30	0.10	0.04		
11.41	0.19	0.05		
16.42	0.33	0.06		
22.35	0.52	0.07		
29.20	0.78	0.08		
36.95	1.11	0.09		
45.62	1.52	0.10		
55.20	2.02	0.11		
65.69	2.63	0.12		
77.10	3.34	0.13		
89.42	4.17	0.14		
102.65	5.13	0.15		

Linear Interpolation				
0.11	H	0.10	H =	0.110 m
2.02	2.01	1.52	Qallow =	0.41

Note: Qallow is the flow rate through an overcontrolled Zum Roof Drain (3.73 L/s/m of head.)

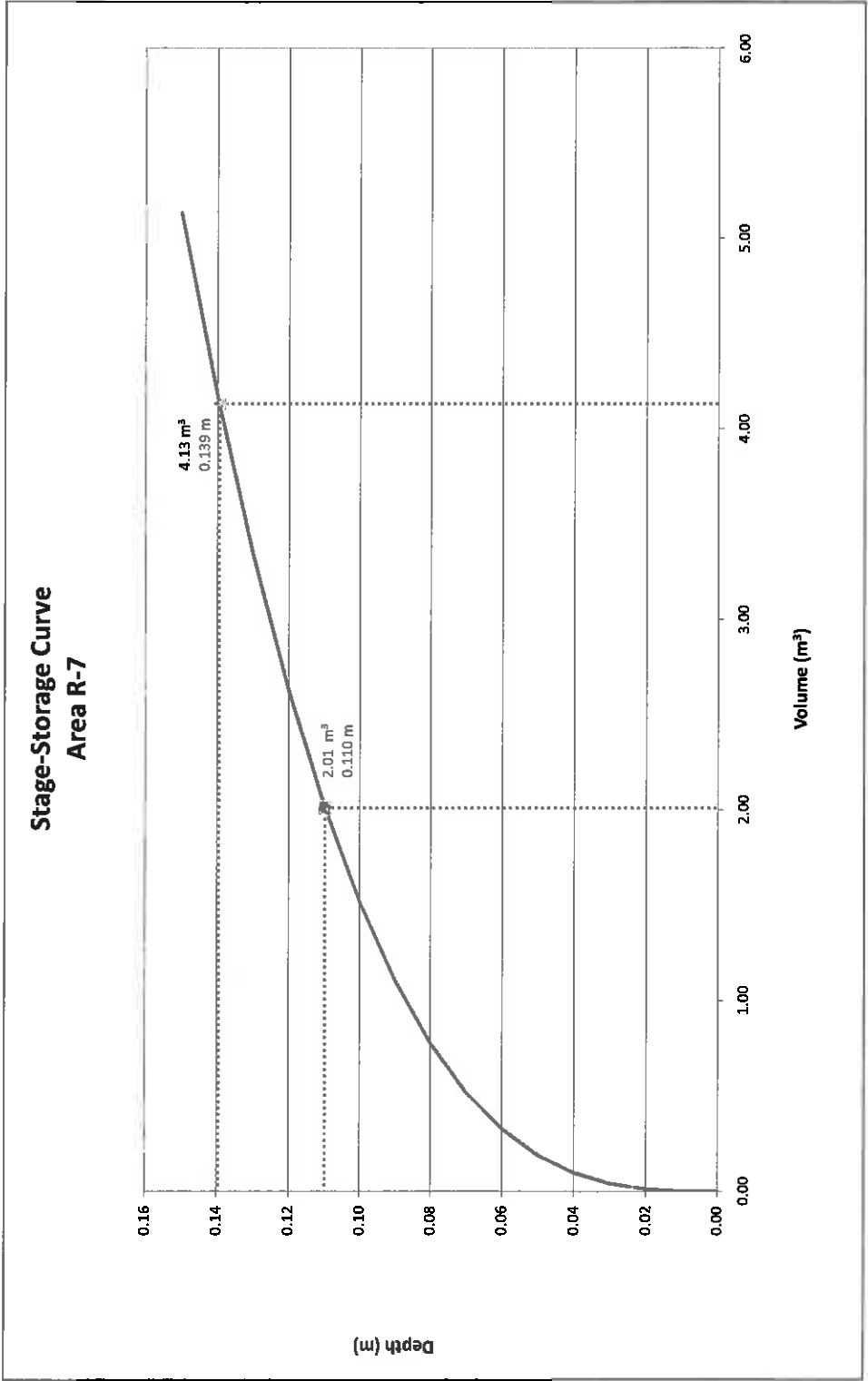
REQUIRED STORAGE - 100-YEAR EVENT						
AREA		R-7	BUILDING ROOF			
OTTAWA IDF CURVE						
Area =	0.011	ha	Qallow =	0.52		
C =	1.00		Vol(max) =	4.13		
			Notches =		1	
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)		
5	242.70	7.20	6.68	2.00		
10	178.56	5.30	4.78	2.87		
15	142.89	4.24	3.72	3.35		
20	119.95	3.56	3.04	3.65		
25	103.85	3.08	2.56	3.84		
30	91.87	2.72	2.20	3.97		
35	82.58	2.45	1.93	4.05		
40	75.15	2.23	1.71	4.10		
45	69.05	2.05	1.53	4.13		
50	63.95	1.90	1.38	4.13		
55	59.62	1.77	1.25	4.12		
60	55.89	1.66	1.14	4.10		
65	52.65	1.56	1.04	4.06		
70	49.79	1.48	0.96	4.02		
75	47.26	1.40	0.88	3.97		
80	44.99	1.33	0.81	3.91		
85	42.95	1.27	0.75	3.85		
90	41.11	1.22	0.70	3.78		

Notes: Vol = Qnet x time
Qnet = Q - Qallow

Ponding Depth (100-Year Storm)				
Area m ²	V m ³	H m		
0.00	0.00	0.00		
0.46	0.00	0.01		
1.82	0.01	0.02		
4.11	0.04	0.03		
7.30	0.10	0.04		
11.41	0.19	0.05		
16.42	0.33	0.06		
22.35	0.52	0.07		
29.20	0.78	0.08		
36.95	1.11	0.09		
45.62	1.52	0.10		
55.20	2.02	0.11		
65.69	2.63	0.12		
77.10	3.34	0.13		
89.42	4.17	0.14		
102.65	5.13	0.15		

Linear Interpolation				
0.14	H	0.13	H =	0.139 m
4.17	4.13	3.34	Qallow =	0.52 L/s

Note: Qallow is the flow rate through an overcontrolled Zum Roof Drain (3.73 L/s/m of head.)



REQUIRED STORAGE - 5-YEAR EVENT									
AREA		R-8		BUILDING ROOF					
OTTAWA IDF CURVE									
Area =		0.005		ha		Qallow =		0.38	
C =		0.95				Vol(max) =		0.74	
						Notches =		1	
Time (min)	Intensity (mm/hr)	Q (L/s)		Qnet (L/s)		Vol (m ³)			
5	141.18	1.99		1.62		0.49			
10	104.19	1.47		1.10		0.66			
15	83.56	1.18		0.80		0.72			
20	70.25	0.99		0.62		0.74			
25	60.90	0.86		0.48		0.73			
30	53.93	0.76		0.39		0.70			
35	48.52	0.68		0.31		0.65			
40	44.18	0.62		0.25		0.60			
45	40.63	0.57		0.20		0.54			
50	37.65	0.53		0.16		0.47			
55	35.12	0.50		0.12		0.40			
60	32.94	0.46		0.09		0.32			
65	31.04	0.44		0.06		0.25			
70	29.37	0.41		0.04		0.17			
75	27.89	0.39		0.02		0.08			
80	26.56	0.37		0.00		0.00			
85	25.37	0.36		-0.02		-0.09			
90	24.29	0.34		-0.03		-0.17			

Notes: Vol = Qnet x time
Qnet = Q - Qallow

Ponding Depth (5-Year Storm)				
Area m ²	V m ³	H m		
0.00	0.00	0.00		
0.22	0.00	0.01		
0.87	0.01	0.02		
1.95	0.02	0.03		
3.47	0.05	0.04		
5.43	0.09	0.05		
7.82	0.16	0.06		
10.64	0.25	0.07		
13.90	0.37	0.08		
17.59	0.53	0.09		
21.72	0.72	0.10		
26.28	0.96	0.11		
31.27	1.25	0.12		
36.70	1.59	0.13		
42.57	1.99	0.14		
48.86	2.44	0.15		

Linear Interpolation				
0.11	H	0.10	H =	0.101 m
0.96	0.74	0.72	Q _{allow} =	0.38 L/s

Note: Qallow is the flow rate through an overcontrolled Zum Roof Drain (3.73 L/s/m of head.)

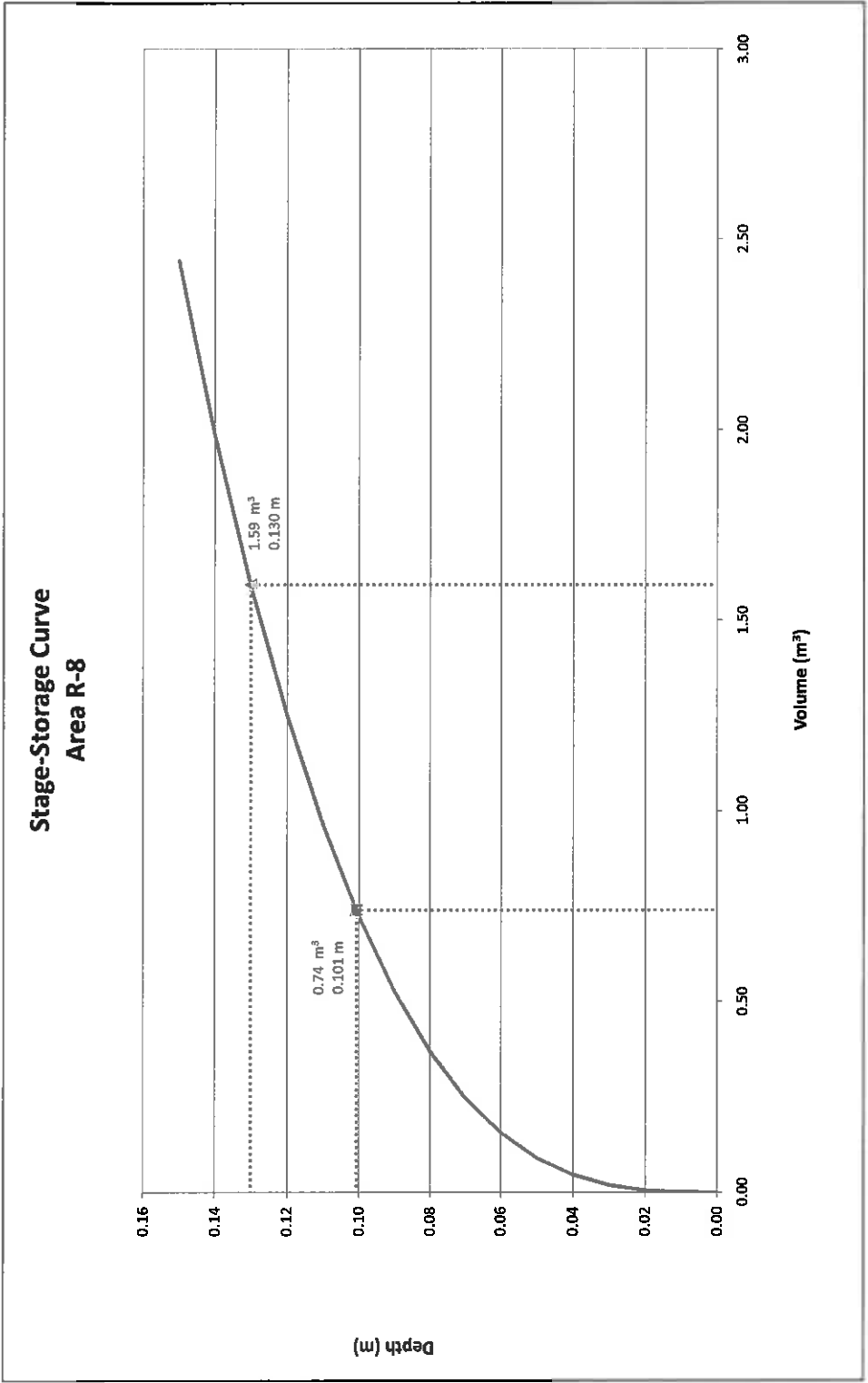
REQUIRED STORAGE - 100-YEAR EVENT									
AREA		R-8		BUILDING ROOF					
OTTAWA IDF CURVE									
Area =		0.005		ha		Q _{allow} =		0.48	
C =		1.00				Vol(max) =		1.39	
						Notches =		1	
Time (min)	Intensity (mm/hr)	Q (L/s)		Q _{net} (L/s)		Vol (m ³)			
5	242.70	3.61		3.13		0.94			
10	178.56	2.65		2.17		1.30			
15	142.89	2.12		1.64		1.48			
20	119.95	1.78		1.30		1.56			
25	103.85	1.54		1.06		1.59			
30	91.87	1.36		0.88		1.59			
35	82.58	1.23		0.75		1.57			
40	75.15	1.12		0.64		1.53			
45	69.05	1.03		0.54		1.47			
50	63.95	0.95		0.47		1.41			
55	59.62	0.89		0.40		1.34			
60	55.89	0.83		0.35		1.26			
65	52.65	0.78		0.30		1.17			
70	49.79	0.74		0.26		1.09			
75	47.26	0.70		0.22		1.00			
80	44.99	0.67		0.19		0.90			
85	42.95	0.64		0.16		0.80			
90	41.11	0.61		0.13		0.70			

Notes: Vol = Qnet x time
Qnet = Q - Qallow

Ponding Depth (100-Year Storm)				
Area m ²	V m ³	H m		
0.00	0.00	0.00		
0.22	0.00	0.01		
0.87	0.01	0.02		
1.95	0.02	0.03		
3.47	0.05	0.04		
5.43	0.09	0.05		
7.82	0.16	0.06		
10.64	0.25	0.07		
13.90	0.37	0.08		
17.59	0.53	0.09		
21.72	0.72	0.10		
26.28	0.96	0.11		
31.27	1.25	0.12		
36.70	1.59	0.13		
42.57	1.99	0.14		
48.86	2.44	0.15		

Linear Interpolation				
0.14	H	0.13	H =	0.130 m
1.99	1.59	1.59	Q _{allow} =	0.48 L/s

Note: Qallow is the flow rate through an overcontrolled Zum Roof Drain (3.73 L/s/m of head.)



REQUIRED STORAGE - 5-YEAR EVENT									
AREA		R-9		BUILDING ROOF					
OTTAWA IDF CURVE									
Area =		0.003		ha		Gallow =		0.34	
C =		0.95				Vol(max) =		0.27	
						Notches =		1	
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)					
5	141.18	1.06	0.72	0.22					
10	104.19	0.78	0.44	0.27					
15	83.56	0.63	0.29	0.26					
20	70.25	0.53	0.19	0.23					
25	60.90	0.46	0.12	0.18					
30	53.93	0.41	0.07	0.12					
35	48.52	0.36	0.02	0.05					
40	44.18	0.33	-0.01	-0.02					
45	40.63	0.31	-0.03	-0.09					
50	37.65	0.28	-0.06	-0.17					
55	35.12	0.26	-0.08	-0.25					
60	32.94	0.25	-0.09	-0.33					
65	31.04	0.23	-0.11	-0.42					
70	29.37	0.22	-0.12	-0.50					
75	27.89	0.21	-0.13	-0.59					
80	26.56	0.20	-0.14	-0.67					
85	25.37	0.19	-0.15	-0.76					
90	24.29	0.18	-0.16	-0.85					

Notes: Vol = Qnet x time
Qnet = Q - Qallow

Ponding Depth (5-Year Storm)				
Area m ²	V m ³	H m		
0.00	0.00	0.00		
0.11	0.00	0.01		
0.44	0.00	0.02		
0.98	0.01	0.03		
1.74	0.02	0.04		
2.72	0.05	0.05		
3.92	0.08	0.06		
5.33	0.12	0.07		
6.96	0.19	0.08		
8.81	0.26	0.09		
10.88	0.36	0.10		
13.16	0.48	0.11		
15.67	0.63	0.12		
18.39	0.80	0.13		
21.32	1.00	0.14		
24.48	1.22	0.15		

Linear Interpolation				
0.10	H	0.09	H =	0.090 m
0.36	0.27	0.26	Qallow =	0.31 L/s

Note: Qallow is the flow rate through an overcontrolled Zurn Roof Drain (3.73 L/s/m of head.)

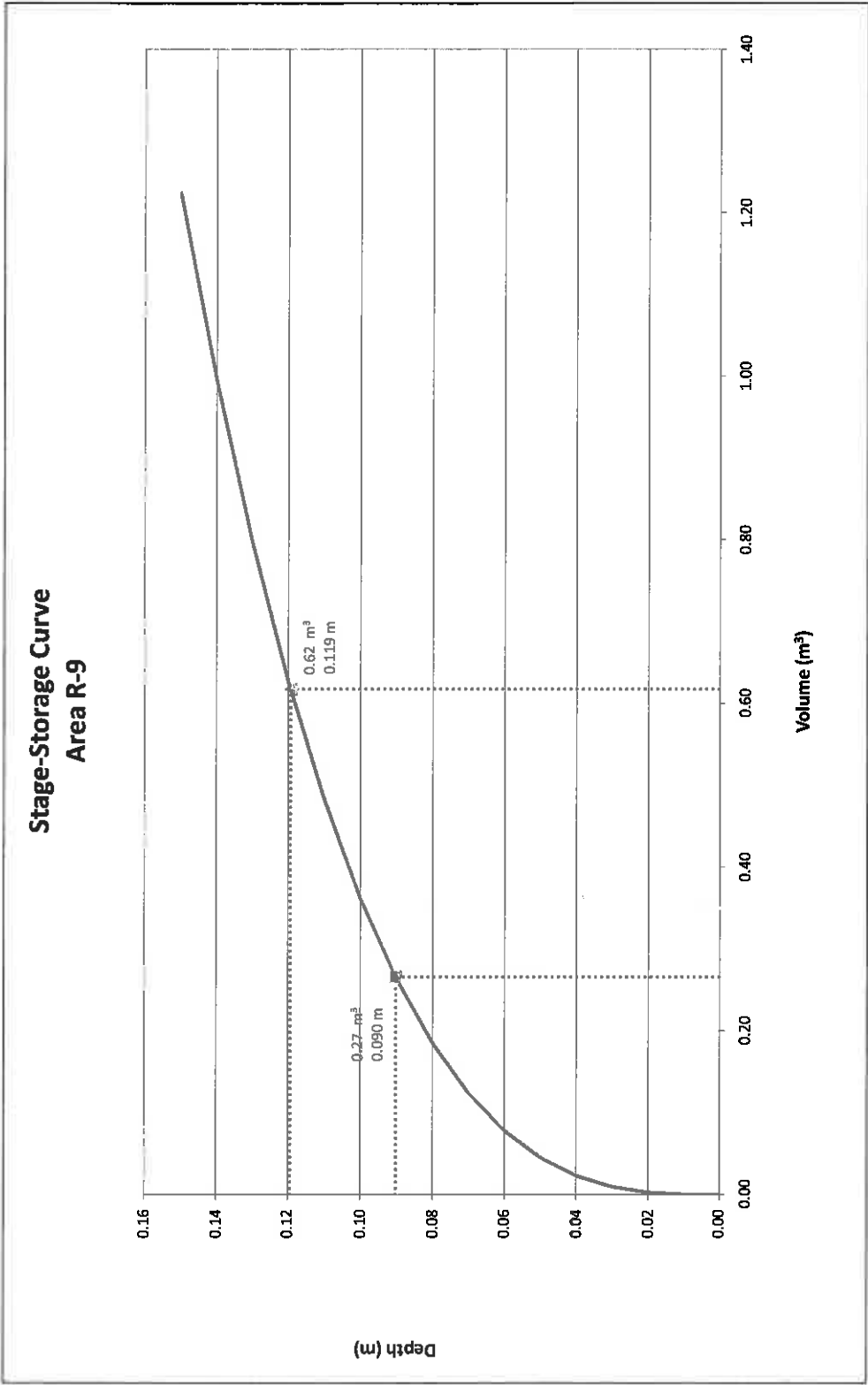
REQUIRED STORAGE - 100-YEAR EVENT									
AREA		R-9		BUILDING ROOF					
OTTAWA IDF CURVE									
Area =		0.003		ha		Qallow =		0.44	
C =		1.00				Vol(max) =		0.62	
						Notches =		1	
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)					
5	242.70	1.92	1.48	0.44					
10	178.56	1.41	0.97	0.58					
15	142.89	1.13	0.69	0.62					
20	119.95	0.95	0.50	0.61					
25	103.85	0.82	0.38	0.57					
30	91.87	0.73	0.28	0.51					
35	82.58	0.65	0.21	0.44					
40	75.15	0.59	0.15	0.36					
45	69.05	0.55	0.10	0.27					
50	63.95	0.51	0.06	0.18					
55	59.62	0.47	0.03	0.09					
60	55.89	0.44	0.00	-0.01					
65	52.65	0.42	-0.03	-0.11					
70	49.79	0.39	-0.05	-0.21					
75	47.26	0.37	-0.07	-0.32					
80	44.99	0.36	-0.09	-0.43					
85	42.95	0.34	-0.10	-0.53					
90	41.11	0.33	-0.12	-0.65					

Notes: Vol = Qnet x time
Qnet = Q - Qallow

Ponding Depth (100-Year Storm)				
Area m ²	V m ³	H m		
0.00	0.00	0.00		
0.11	0.00	0.01		
0.44	0.00	0.02		
0.98	0.01	0.03		
1.74	0.02	0.04		
2.72	0.05	0.05		
3.92	0.08	0.06		
5.33	0.12	0.07		
6.96	0.19	0.08		
8.81	0.26	0.09		
10.88	0.36	0.10		
13.16	0.48	0.11		
15.67	0.63	0.12		
18.39	0.80	0.13		
21.32	1.00	0.14		
24.48	1.22	0.15		

Linear Interpolation				
0.12	H	0.11	H =	0.119 m
0.63	0.62	0.48	Qallow =	0.64 L/s

Note: Qallow is the flow rate through an overcontrolled Zurn Roof Drain (3.73 L/s/m of head.)



REQUIRED STORAGE - 5-YEAR EVENT									
AREA		R-10 BUILDING ROOF							
OTTAWA IDF CURVE		ha							
Area = 0.003		0.95							
C = 0.003									
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m³)					
5	141.18	1.04	0.70	0.21					
10	104.19	0.76	0.43	0.26					
15	83.56	0.61	0.28	0.25					
20	70.25	0.52	0.18	0.22					
25	60.90	0.45	0.11	0.17					
30	53.93	0.40	0.06	0.11					
35	48.52	0.36	0.02	0.04					
40	44.18	0.32	-0.01	-0.03					
45	40.63	0.30	-0.04	-0.10					
50	37.65	0.28	-0.06	-0.18					
55	35.12	0.26	-0.08	-0.26					
60	32.94	0.24	-0.09	-0.34					
65	31.04	0.23	-0.11	-0.42					
70	29.37	0.22	-0.12	-0.50					
75	27.89	0.20	-0.13	-0.59					
80	26.56	0.19	-0.14	-0.67					
85	25.37	0.19	-0.15	-0.76					
90	24.29	0.18	-0.16	-0.85					

Notes: Vol = Qnet x time
Qnet = Q - Qallow

Ponding Depth (5-Year Storm)				
Area m²	V m³	H m		
0.00	0.00	0.00		
0.11	0.00	0.01		
0.44	0.00	0.02		
0.99	0.01	0.03		
1.75	0.02	0.04		
2.74	0.05	0.05		
3.94	0.08	0.06		
5.36	0.13	0.07		
7.01	0.19	0.08		
8.87	0.27	0.09		
10.95	0.36	0.10		
13.24	0.49	0.11		
15.76	0.63	0.12		
18.50	0.80	0.13		
21.45	1.00	0.14		
24.63	1.23	0.15		

Linear Interpolation:				
0.09	H	0.08	H =	0.090 m
0.27	0.26	0.19	Qallow =	0.03 L/s

Note: Qallow is the flow rate through an overcontrolled Zum Roof Drain (3.73 L/s/m of head.)

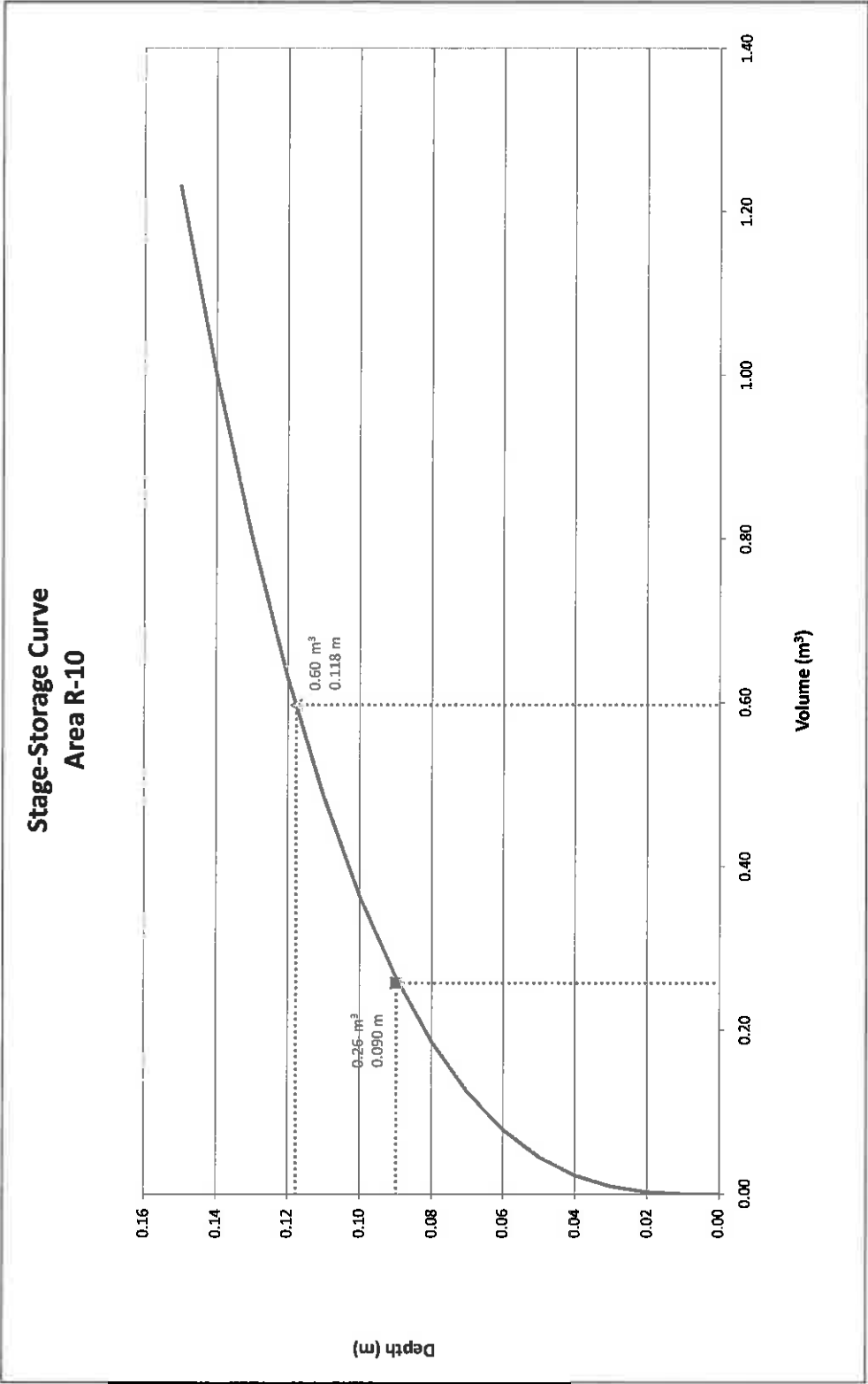
REQUIRED STORAGE - 100-YEAR EVENT									
AREA		R-10 BUILDING ROOF							
OTTAWA IDF CURVE		ha							
Area = 0.003		1.00							
C = 0.003									
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m³)					
5	242.70	1.87	1.43	0.43					
10	178.56	1.38	0.94	0.56					
15	142.89	1.10	0.66	0.60					
20	119.95	0.93	0.49	0.58					
25	103.85	0.80	0.36	0.54					
30	91.87	0.71	0.27	0.48					
35	82.58	0.64	0.20	0.42					
40	75.15	0.58	0.14	0.34					
45	69.05	0.53	0.09	0.25					
50	63.95	0.49	0.05	0.16					
55	59.62	0.46	0.02	0.07					
60	55.89	0.43	-0.01	-0.03					
65	52.65	0.41	-0.03	-0.13					
70	49.79	0.38	-0.06	-0.23					
75	47.26	0.36	-0.08	-0.34					
80	44.99	0.35	-0.09	-0.44					
85	42.95	0.33	-0.11	-0.55					
90	41.11	0.32	-0.12	-0.66					

Notes: Vol = Qnet x time
Qnet = Q - Qallow

Ponding Depth (100-Year Storm)				
Area m²	V m³	H m		
0.00	0.00	0.00		
0.11	0.00	0.01		
0.44	0.00	0.02		
0.99	0.01	0.03		
1.75	0.02	0.04		
2.74	0.05	0.05		
3.94	0.08	0.06		
5.36	0.13	0.07		
7.01	0.19	0.08		
8.87	0.27	0.09		
10.95	0.36	0.10		
13.24	0.49	0.11		
15.76	0.63	0.12		
18.50	0.80	0.13		
21.45	1.00	0.14		
24.63	1.23	0.15		

Linear Interpolation:				
0.12	H	0.11	H =	0.118 m
0.63	0.60	0.49	Qallow =	0.24 L/s

Note: Qallow is the flow rate through an overcontrolled Zum Roof Drain (3.73 L/s/m of head.)



REQUIRED STORAGE - 5-YEAR EVENT					SUPERPIPE	
AREA A-1, A-2		A-1, A-2				
OTTAWA IDF CURVE		ha			Qallow =	
Area = 0.0530					Vol(max) =	
C = 0.57						
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)		
5	141.18	11.93	10.77	3.23		
10	104.19	8.80	7.64	4.58		
15	83.56	7.06	5.90	5.31		
20	70.25	5.93	4.77	5.73		
25	60.90	5.14	3.98	5.98		
30	53.93	4.56	3.40	6.11		
35	48.52	4.10	2.94	6.17		
40	44.18	3.73	2.57	6.17		
45	40.63	3.43	2.27	6.13		
50	37.65	3.18	2.02	6.06		
55	35.12	2.97	1.81	5.96		
60	32.94	2.78	1.62	5.84		
65	31.04	2.62	1.46	5.70		
70	29.37	2.48	1.32	5.55		
75	27.89	2.36	1.20	5.38		
80	26.56	2.24	1.08	5.20		
85	25.37	2.14	0.98	5.01		
90	24.29	2.05	0.89	4.82		

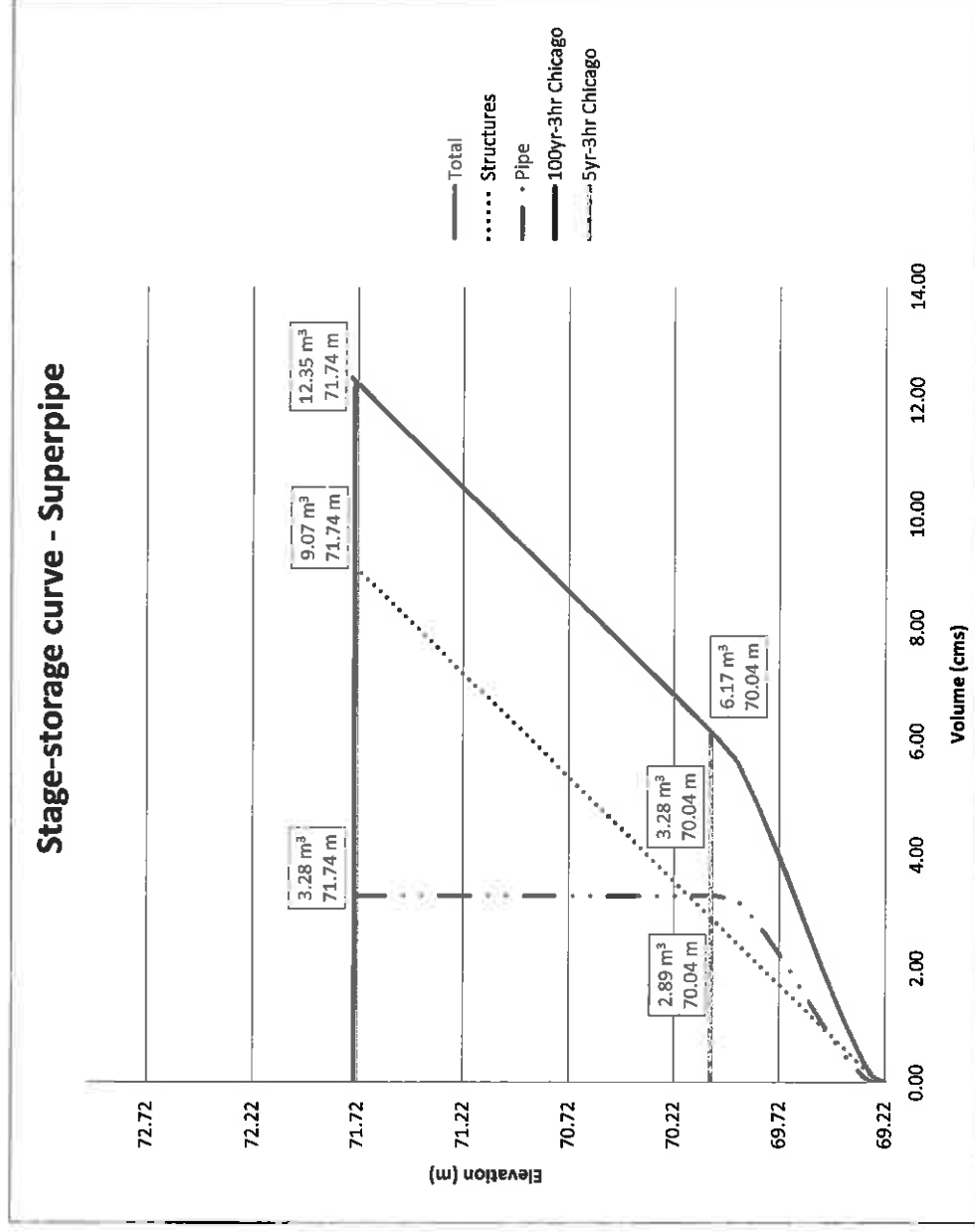
Notes: Vol = Qnet x time
Qnet = Q - Qallow

REQUIRED STORAGE - 100-YEAR EVENT					SUPERPIPE	
AREA A-1, A-2		A-1, A-2				
OTTAWA IDF CURVE		ha			Qallow =	
Area = 0.0530					Vol(max) =	
C = 0.65						
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m ³)		
5	242.70	23.24	21.19	6.36		
10	176.56	17.10	15.05	9.03		
15	142.89	13.69	11.64	10.47		
20	119.95	11.49	9.44	11.33		
25	103.85	9.95	7.90	11.84		
30	91.87	8.80	6.75	12.15		
35	82.58	7.91	5.86	12.30		
40	75.15	7.20	5.15	12.35		
45	69.05	6.61	4.56	12.32		
50	63.95	6.13	4.08	12.23		
55	59.62	5.71	3.66	12.08		
60	55.89	5.35	3.30	11.89		
65	52.65	5.04	2.99	11.67		
70	49.79	4.77	2.72	11.42		
75	47.26	4.53	2.48	11.14		
80	44.99	4.31	2.26	10.84		
85	42.95	4.11	2.06	10.53		
90	41.11	3.94	1.89	10.19		

Notes: Vol = Qnet x time
Qnet = Q - Qallow

**260 MacLAREN STREET
STAGE-STORAGE CURVE - PROPOSED SUPERPIPE**

Elevation	Volume		
	Structures (m ³)	Pipe (m ³)	Total (m ³)
69.22	0.00	0.00	0.00
69.27	0.09	0.00	0.09
69.28	0.11	0.01	0.11
69.32	0.26	0.09	0.35
69.42	0.62	0.51	1.13
69.52	0.99	1.06	2.04
69.62	1.35	1.66	3.01
69.72	1.71	2.26	3.97
69.82	2.08	2.80	4.88
69.92	2.44	3.20	5.65
70.02	2.81	3.28	6.09
70.12	3.17	3.28	6.45
70.22	3.54	3.28	6.82
70.32	3.90	3.28	7.18
70.42	4.27	3.28	7.55
70.52	4.63	3.28	7.91
70.62	5.00	3.28	8.28
70.72	5.36	3.28	8.64
70.82	5.73	3.28	9.01
70.92	6.09	3.28	9.37
71.02	6.46	3.28	9.74
71.12	6.82	3.28	10.10
71.22	7.19	3.28	10.47
71.32	7.55	3.28	10.83
71.42	7.92	3.28	11.20
71.52	8.28	3.28	11.56
71.62	8.65	3.28	11.93
71.72	9.01	3.28	12.29
71.75	9.12	3.28	12.40

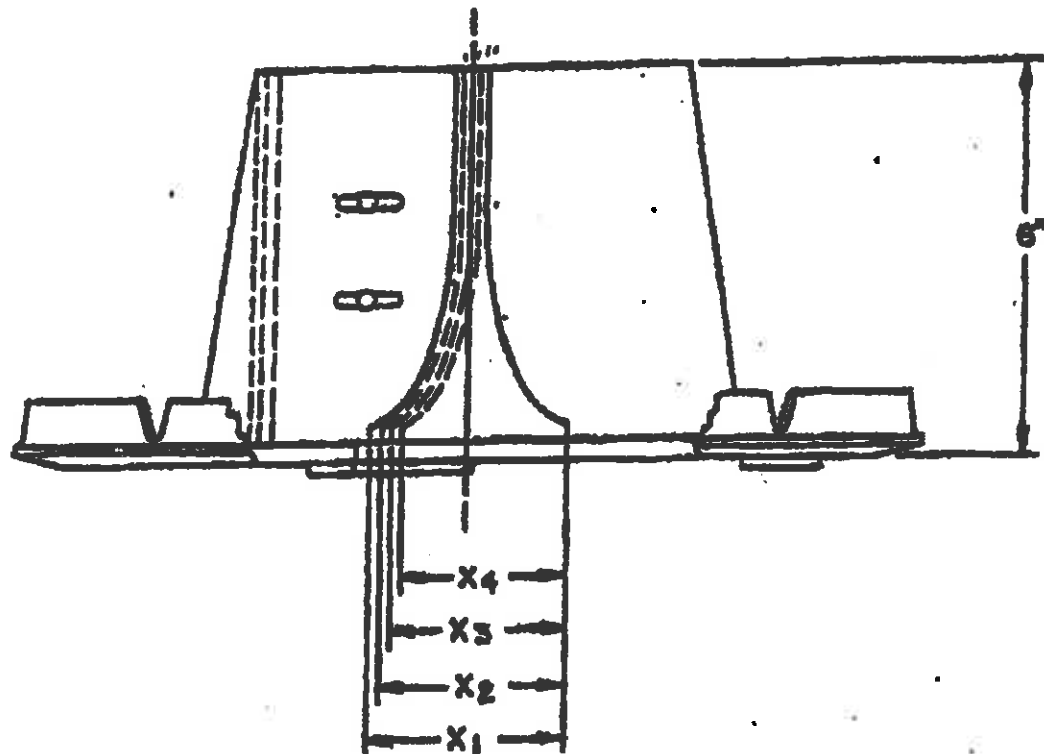


APPENDIX C

ZURN ROOF DRAIN/HYDROVEX INFORMATION

NOTE:

ADJUSTABLE WEIR CAN BE ADJUSTED TO FLOW AT VARIOUS RATES. FOR SIZING CONTACT ZURN IND. INC.



OPENING	GPM PER INCH OF HEAD	MAX FLOW GPM
X ₁	10.5	60.50
X ₂	7.5	45.25
X ₃	5.0	30.15
X ₄	2.5	15.25

ADJUSTABLE WEIR FOR SLOPED-ROOF
"CONTROL-FLO" ROOF DRAIN

PRODUCT NUMBER

Z-105-10-77

© 1988 BY
ZURN IND., INC.

ZURN

a subsidiary of FROD-ZURN

ZURN INDUSTRIES, INC.
ERIE, PA. U.S.A. 16512

DRAWING NUMBER

P-13521



SVHV Vertical Vortex Flow Regulator

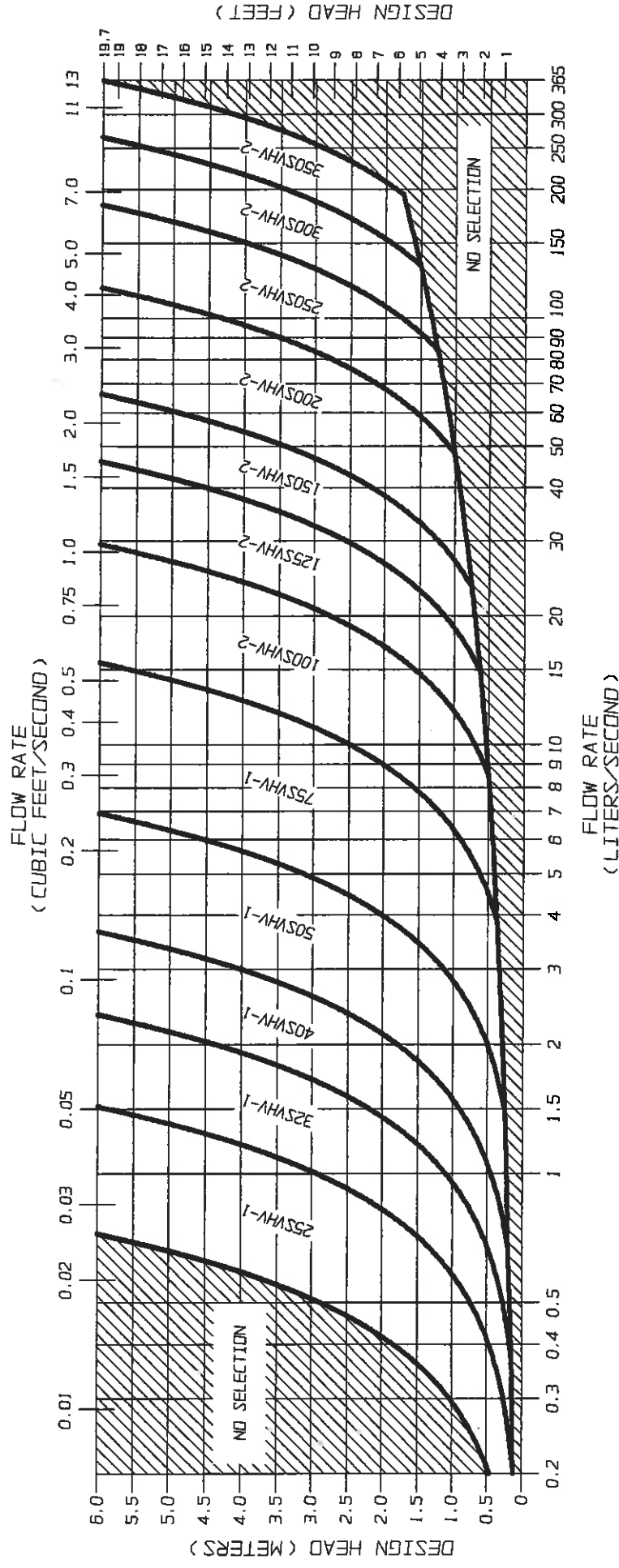


FIGURE 2 - SVHV

JOHN MEUNIER

APPENDIX D
CORRESPONDENCE

Justin Gauthier

From: Coombe, Bruce [Bruce.Coombe@ottawa.ca]
Sent: Friday, September 24, 2010 9:35 AM
To: j.gauthier@novatech-eng.com
Subject: 260 Maclaren Street

Follow Up Flag: Follow up
Flag Status: Completed

Justin,

Sanitary

The proposed peak sanitary discharge of 1.84 L/sec for the redevelopment was reviewed by Infrastructure Services and was found to be less than the present flow from the site. All sanitary connections must be equipped with full port back water valves and foundation drains must be connected to the storm sewer system.

Storm

The allowable storm runoff coefficient for this site should be calculated using a 2-year design storm, time of concentration of 20 minutes, $C=0.40$ and store up to the 100 year storm on site. Please note that the storm flow plus the wastewater flow under post development conditions should not exceed existing conditions.

Thanks, Bruce

Bruce Coombe, C.E.T.

Project Manager, Infrastructure Approvals

Development Review Urban Services Branch

Planning & Growth Management Department

110 Laurier Avenue West, Ottawa, Ontario K1P 1J1

(613) 580-2424 ext. 27803

Fax (613) 560-6006

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ATTACHED DRAWINGS

- 110166-GP GENERAL PLAN OF SERVICES
- 110166-GR GRADING AND EROSION CONTROL PLAN
- 110166-STM STORMWATER MANAGEMENT PLAN

260 MacLaren - 2025 Redesign
Precon Minutes

September 9, 2025

Claridge Homes
c/o Victoria St Pierre
Via email: victoria.st.pierre@claridgecomes.com

**Subject: Pre-Consultation: Meeting Feedback
Proposed Site Plan Control Revision Application – 260 MacLaren
Street**

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on August 27, 2025.

Pre-Consultation Preliminary Assessment

Next Steps

1. A review of the proposal and materials submitted for the above-noted pre-consultation has been undertaken. For your next submission, please submit the required Application Form, together with the necessary studies and/or plans to planningcirculations@ottawa.ca, copy (cc:) to the file lead and planning support.
2. In your subsequent pre-consultation or application submission, please ensure that all comments or issues detailed herein are addressed. A detailed cover letter stating how each issue has been addressed is requested with the submission materials. Please coordinate the numbering of your responses within the cover letter with the comment number(s) herein.
3. Please note, if your development proposal changes significantly in scope, design, or density it is recommended that a subsequent pre-consultation application be submitted.
4. If the Urban Design Review Panel (UDRP) Report is listed as a required submission material in the Study and Plan Identification List, the applicant must visit the UDRP prior to formally submitting the planning application. The UDRP report is required for the application to be considered complete.

Supporting Information and Material Requirements

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

- The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on [Ottawa.ca](https://ottawa.ca). These ToR and Guidelines outline

the specific requirements that must be met for each plan or study to be deemed adequate.

Consultation with Technical Agencies

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

Planning

Comments:

Official Plan

1. Section 5 – Downtown Core Transect

- a. 5.1.1 4) The public realm in the Downtown Core should be of a consistently high quality that compensates for the smaller public, private and semi-private spaces available in the core.
- b. 5.1.1 5) Has a focus on reducing the urban heat island effect, improving tree plantings and greening, provided shaded areas, and other general climate adaptation policies such as reducing impervious surfaces.
- c. 5.1.2.3) Outlines how parking should be managed, outlining it is not required in new development other than visitor parking for large-scale development.
 - i. It also further outlines that parking should be located underground and never at-grade along the frontage of a property. Currently the proposal includes parking in the side yard which is visible from the street.

2. Section 5 – Evolving Neighbourhood Overlay

- a. This overlay signifies and supports intensification within the neighbourhood designation, including guidance for a change in character from suburban to urban to allow new built forms and more diverse functions of land.

3. Section 6 – Neighbourhood Designation

Central and East Downtown Core Secondary Plan

- 4. Section 3.1 of the Secondary Plan speaks to built-form policies, noting that development will contribute positively to the entire adjacent public realm. Include functional main entrance directly accessible from the public realm on the ground floor, usable indoor and outdoor amenity spaces, lower floor articulation with a high degree of transparency and functional permeability, and lack of blank walls which do not contribute to the activity of the public realm. It also notes that

vehicular facilities must minimize all visual and functional impacts on the public realm.

5. Section 3.3 outlines that sustainable modes of transportation will be prioritized.
6. 3.3.2 15) – Development will ensure the provision of ample protected bicycle parking for residents and visitors.
7. 3.3.2 18) – Development will minimize the provision of motor vehicle parking. Alternatives should be prioritized over increases in the parking supply.

Centretown Character Area (Central Area)

8. Policies within this character area speak to maintaining the character of the neighbourhood, accommodating residential growth, accommodating a diverse population, enhancing the public realm, supporting active modes of transportation and transit, promoting design excellence, among other goals
 - a. Staff encourage you review these policies to determine how the proposal be revised to best achieve the goals and policy direction of the Secondary Plan.
 - b. Where a building greater than six storeys is proposed adjacent to a property where the maximum height is four storeys or adjacent to built heritage resources, a stepping of heights or increased setbacks should be provided to achieve an appropriate transition.
9. Local Mixed-use
 - d. Limited mixed-uses at-grade are supported within the centretown central character area.

10.9-storeys – Maximum heights

Zoning By-law

11.R5B (491) H19

12.Heritage Overlay

13.Mature Neighbourhood Overlay

Other:

14.Centretown Heritage Conservation District

Comments:

- 15.Staff have strong concerns with the proposed parking garage located on the ground floor of the subject lands, for which the blank walls will detract from the

activation and functionality of the front yard along the public realm, negatively impact the heritage attributes of the surrounding context, and limit available soft landscaping and amenity area in the interior and rear yards.

- a. Should parking continue to be proposed, staff would likely not be opposed to reductions in parking if only visitor parking be provided, provided that it be located underground or located interior to the building along the western wall and not visible from the street, to allow for higher levels of glazing and transparency along the front façade which will better activate and animate the public realm.
 - i. Staff are generally supportive of reductions in residential parking given the OP and SP policies.
 - b. Providing for further functional permeability along the frontage is highly encouraged by staff. Preference is for additional at-grade residential units with direct access to the front yard, with another option being small scale mixed-uses in-line with the secondary plan policies and in conformity with the HCD requirements.
 - c. Additionally, reducing the size of the parking garage can allow for more efficient internal configurations such as more functional garbage rooms and internalizing all bicycle parking spaces.
16. Staff highly encourage improving the greening and landscaping of the site to include private and public trees and increased soft landscaping. Additional outdoor amenity area should be provided within the rear yard.
 - a. Greening improvements can also achieve the goals of improving the urban tree canopy and reduction of urban heat island effect.
17. Staff request the implementation of a 1:1 ratio of bicycle parking spaces per dwelling unit in order to achieve the goals of the OP and SP which support multi-modal and active modes of transportation.
18. Please include large-household dwelling units in accordance with the Growth Management Policies of the OP and Diversity policies of the SP to support a more diverse group of residents within the building. This would be three-bedroom or similar sized unit (2 bedroom + den).
19. A Site Plan Revision will be required. We will update the SPIL to outline all plans and reports needed to form a complete application. As the previously approved reports would be beyond their validity period, please be aware that updates to these reports will be required.
20. If relief from aspects of the zoning by-law requirements are requested, a zoning by-law amendment will be required.



Please feel free to reach out to Nastassia Pratt – Planner I, Jack Smith – Planner II, or Jean-Charles Renaud – Planner III, for follow-up questions,

Urban Design

Comments:

Submission Requirements

21. An Urban Design Brief is required. Please see attached customized Terms of Reference to guide the preparation of the submission.
 - a. The Urban Design Brief should be structured by generally following the headings highlighted under **Section 3 – Contents of these Terms of Reference**.
 - b. Please note that the Urban Design Brief will also serve as the submission to the Urban Design Review Panel if it is not exempted from review (see notes below).
22. Additional drawings and studies are required as shown on the SPIL. Please follow the terms of reference ([Planning application submission information and materials | City of Ottawa](#)) to prepare these drawings and studies. These include (ie. The UDRP drawings):
 - a. Elevations.
 - b. Landscape Plan.

Urban Design Review Panel Review and Report

23. The site is located in a Heritage Conservation District and may be subject to review by the Urban Design Review Panel subject to the discretion of the file lead and urban designer. UDRP review occurs within the Preconsultation stage. To proceed with a UDRP review, please contact udrp@ottawa.ca.
24. The submission of a UDRP report is a requirement for deeming an application complete. Please follow the instructions provided in the Terms of Reference available here: [Urban Design Review Panel Report \(ottawa.ca\)](#)

Recommendations

25. As relief from the zoning will be required for the reduction of parking, it is recommended that all the parking to the south of the ground floor plan be removed and added to the request for relief.
26. Staff recommend the parking on the west side of the ground floor plan be shifted completely within the building footprint and the associated drive aisle be reduced to the minimum requirements.

27. Staff recommend the spaces on the ground floor facing the public right-of-way be increased and employed to improve the activation of the frontage.
28. Analyze the neighbouring context, both existing and planned, to determine whether a step back above the fourth floor would be recommended.
29. It is recommended that main entrance of the building provide additional architectural elements to stand out on the façade.
30. Staff recommend the entrance to any parking within the building be set back from the front façade and designed to be a less prominent feature than the pedestrian entrance.

Feel free to contact Christopher Moise, Urban Designer, for follow-up questions.

Engineering

Comments:

31. The Stormwater Management Criteria, for the subject site, is to be based on the following:
 - a. Application of the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
 - b. For a combined sewer system, the maximum $C = 0.4$ or the pre-development C value, whichever is less. In the absence of other information, the allowable release rate shall be based on a 2-year storm event.
 - c. A calculated time of concentration (cannot be less than 10 minutes).
 - d. Flows to the storm sewer in excess of the 2-year storm release rate, up to and including the 100-year storm event, must be detained on site.
 - e. Storm sewer outlets should not be submerged.
 - f. The quantity control criteria for this site will be 100-year post-development to 2-year pre-development, $C=0.4$, or can be calculated.
32. For areas with deep services (Storm, Sanitary and/or Water Supply):
 - a. Provide existing servicing information and the recommended location for the proposed connections. Services should ideally be grouped in a common trench to minimize the number of road cuts.
 - b. Connections to trunk sewers and easement sewers are typically not permitted.

- c. Provide information on the monitoring manhole requirements – should be located in an accessible location on private property near the property line (ie. Not in a parking area).
- d. Review provision of a high-level sewer.
- e. Sewer connections to be made above the springline of the sewermain as per:
 - i. Std Dwg S11.1 for flexible main sewers – connections made using approved tee or wye fittings.
 - ii. Std Dwg S11 (For rigid main sewers) – lateral must be less than 50% the diameter of the sewermain,
 - iii. Std Dwg S11.2 (for rigid main sewers using bell end insert method) – for larger diameter laterals where manufactured inserts are not available; lateral must be less than 50% the diameter of the sewermain,
 - iv. Connections to manholes permitted when the connection is to rigid main sewers where the lateral exceeds 50% the diameter of the sewermain. – Connect obvert to obvert with the outlet pipe unless pipes are a similar size.

33. An MECP Environmental Compliance Approval (under ToRP, additional works), for SWM discharging into a municipal combined sewermain, will be required for the proposed development. A Ministry contact has been provided below but please work with City staff on the need (or not) of an application.

- a. Patrick Lalonde at (613) 521-3450 or Patrick.Lalonde@ontario.ca

34. Water

- a. Boundary Conditions can be provided, please submit data for calculations. Fire hydrant analysis can be provided, upon request, with map showing FH information to be included.
- b. Water Data Card (future requirement for SPC)
- c. Water Boundary condition requests must include the location of the service (map or plan with connection location(s) indicated) and the expected loads required by the proposed development, including calculations. Please provide the following information:
 - i. Location of service
 - ii. Type of development

- iii. The amount of fire flow required (per OBC or FUS).
- iv. Average daily demand: ____ l/s.
- v. Maximum daily demand: ____ l/s.
- vi. Maximum hourly daily demand: ____ l/s.

35. Fire-fighting flow rate(s) – Use OBC FF Calculations and if exceeds 9000 L/s for Daily Demand, use FUS method. Refer to ISTB Bulletin 2024-05. Please also note that the Water Supply By-law has been updated this year, please refer to By-law 2025-227.

36. Geotechnical to speak to how to protect footing drains, if GW is impacted, as well as hydrostatic pressure if a membrane is used. In the event GW is impacted, any Internal drains designed to catch effluent due to breach of membrane are to connect to sanitary lateral.

Noise

Comments:

37. Noise requirements – A Noise Study is required due to proximity to O'Connor and Metcalfe Streets. Please include Stationary Noise, particularly pertaining to any roof top units of this proposed development and impact on occupants of this and any nearby buildings.

Feel free to contact Shawn Wessel, A.Sc.T., rcji, Infrastructure Project Manager, at shawn.wessel@ottawa.ca for follow-up questions.

Transportation

Comments:

38. Right-of-way protection.

- a. See [Schedule C16 of the Official Plan](#).
- b. Any requests for exceptions to ROW protection requirements must be discussed with Transportation Planning and concurrence provided by Transportation Planning management.

39. The Screening Form has indicated that the Safety Trigger has have been met. This development would not generate sufficient traffic to warrant a TIA report. The consultant is to address how they plan to enable and encourage travel by sustainable modes (i.e., to make walking, cycling, transit, carpooling and telework more convenient, accessible, safe, and comfortable). Please complete the City of Ottawa's *TDM Measures Checklist*.

40. MacLaren Street is classified as a Local Road. There is no additional protected ROW limits identified in the OP.
41. Ensure that the development proposal complies with the Right-of-Way protection requirements of the Official Plan's Schedule C16. The city's right-of-way limits are to be labelled on the drawings.
42. The Owner acknowledges and agrees that all private accesses to Roads shall comply with the City's Private Approach By-Law being By-Law No. 2003-447 as amended <https://ottawa.ca/en/living-ottawa/laws-licences-and-permits/laws/law-z/private-approach-law-no-2003-447> or as approved through the Site Plan control process.
43. The concrete sidewalk should be 2.0 metres in width and be continuous and depressed through the proposed access.
44. The closure of an existing private approach shall reinstate the sidewalk, shoulder, curb, and boulevard to City standards.
45. The consultant should review the sight distance to the access and any obstructions that may hinder the view of the driver.
46. The purchaser, tenant or sub-lessee acknowledges the unit being rented/sold is not provided with any on-site parking and should a tenant/purchaser have a vehicle for which they wish to have parking that alternative and lawful arrangements will need to be made to accommodate their parking need at an alternative location. The Purchaser/Tenant also acknowledges that the availability and regulations governing on-street parking vary; that access to on street parking, including through residential on-street parking permits issued by the City cannot be guaranteed now or in the future; and that a purchaser, tenant, or sub-lessee intending to rely on on-street parking for their vehicle or vehicles does so at their own risk.
47. The Owner shall be required to enter into maintenance and liability agreement for all pavers, plant and landscaping material placed in the City right-of-way and the Owner shall assume all maintenance and replacement responsibilities in perpetuity.
48. Bicycle parking spaces are required as per Section 111 of the Ottawa Comprehensive Zoning By-law. Bicycle parking spaces should be in safe, secure places near main entrances and preferably protected from the weather.

Feel free to contact Wally Dubyk, Transportation Project Manager, for follow-up questions.

Environment

Comments:

49. There are no triggers for an Environmental Impact Study.
50. Bird-Safe Design Guidelines - Please review and incorporate bird safe design elements, where feasible. Some of the risk factors include glass and related design traps such as corner glass and fly-through conditions, ventilation grates and open pipes, landscaping, light pollution. More guidance and solutions are available in the guidelines which can be found here:
https://documents.ottawa.ca/sites/documents/files/birdsafedesign_guidelines_en.pdf
51. Please consider if there are features that can be added reduce the urban heat island effect (see OP 10.3). For example, this impact can be reduced by adding large canopy trees, green rooves or vegetation walls, or incorporating building with low heat absorbing materials.

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

Forestry

Comments:

52. A Tree Conservation Report is required, in accordance with [Schedule E](#) of the Tree Protection By-law. Ownership of all trees on the subject site and with Critical Root Zones extending onto the subject site must be determined, and plans must show how they will be protected from proposed works.
53. Section 4.8.2 of the New Official Plan provides strong direction to maintain the urban forest canopy and its ecosystem services during intensification noting when considering the impacts on individual trees, planning and development decisions, including Committee of Adjustment decisions, shall give priority to the retention and protection of large, healthy trees over replacement plantings and compensation.
54. Retention of existing trees should be prioritized through the design of the building.
55. If any shared or adjacent trees are impacted by the proposal, the applicant is responsible for consulting with the owners of the trees and for obtaining signed permission if any trees must be removed. If no permission is granted, plans must be designed to allow for the full protection of these trees.
56. A geotechnical report required to confirm whether there are any landscaping constraints.

57. A Landscape Plan is required addressing all elements within the Landscape Plan Terms of Reference, including the projection of canopy cover toward the target of 40%, and confirmation of adequate soil volumes to support any proposed trees.
58. Open green space in the rear yard is preferred, to allow for both tree retention and planting. Setbacks and soil volume must be confirmed in the TCR and Landscape Plan.
59. If parking is required, consider opportunities to use permeable materials to maximize available soil volume for large-growing trees to be planted.
60. Prioritize planting large-growing trees in the ROW and rear yard to improve the public realm, increase the site's canopy cover toward the OP goal of 40% and to provide screening from adjacent properties.
61. A permit is required prior to removal of any protected trees on site. The tree permit will be released upon site plan approval. Monetary compensation for City trees must be paid before the permit is issued. Please contact the planner associated with the file or the Planning Forester, Nancy Young (Nancy.young@ottawa.ca) for information on obtaining the tree permit.
62. To ensure that no harm is caused to breeding birds, tree removal and vegetation clearing should be avoided during the migratory bird season (April 15 – August 15) as specified by The City of Ottawa's Environmental Impact Study Guidelines.

These comments have been prepared by Nancy Young on behalf of Mark Richardson. Feel free to contact Mark Richardson, Forester, for follow-up questions.

Parkland

Comments:

63. Subject to confirmation that Cash-in-Lieu of Parkland (CILP) was paid in accordance with Site Plan Agreement Instrument No OC1372477 (D07-12-11-0031), any applicable net density and/or gross floor area increase proposed for the Site Plan revision application will be subject to CILP in accordance with Parkland Dedication By-law 2022-280, as amended.

Feel free to contact Mike Russett, Parks& Facilities Planning, for follow-up questions.

Heritage

General Comments:

64. This property is located within the Centretown Heritage Conservation District (HCD).

65. A heritage permit is required to facilitate this project. It will be a Council level permit. Heritage staff can follow up with a list of submission requirements, application form and fee. A Heritage Impact Assessment will be required.
66. The property is located within a dense cluster of important buildings in the HCD, with several individually designated and Contributing properties that are adjacent, including the Mayfair Apartment next door and the J R Booth Residence National Historic Site across the street. It will be important to consider how the proposal can be designed to be sensitive to and compatible with the existing historic context.
67. There is a new HCD Plan in place for the Centretown HCD, which encourages infill of vacant lots with buildings that are designed to be sensitive and compatible with the character defining elements of the HCD as expressed through its important Contributing buildings. The Plan provides direction and guidance for achieving compatibility through the use of harmonious materials, architectural details and other design measures, particularly at the lower levels.
68. Heritage staff will review the proposal against the related policies and guidelines in the HCD Plan to ensure consistency. If updated elevations are available, staff would be happy to review them to provide more specific guidance for meeting the HCD Plan.

Preliminary Design Comments:

69. Given the cluster of significant resources in this area, the new building should be sensitively designed so that it reads as secondary to the historic buildings that are in its context.
70. It will be important to consider measures such as setbacks or stepbacks of upper floors to provide transition and mitigate massing, particularly on the low-rise buildings to the west, and to reflect the traditional residential character of MacLaren Street.
71. Consider incorporating traditional architectural elements to reflect the character the HCD, for example those of historic apartment buildings such as the use of red brick, window patterns, prominent entrances, or reflecting similar horizontal datum lines (e.g foundation/floor levels etc.), particularly for the lower levels.
72. There are some concerns about how the building is integrating parking, particularly from a streetscape contribution perspective.
73. Soft landscaping on the site is encouraged, particularly for tree planting to enhance the tree canopy in Centretown.

Feel free to contact MacKenzie Kimm, Heritage Planner, for follow-up questions.

Community issues

Centretown Community Association Comments:

74. N/A

Other

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

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

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

- a. To be eligible for the TIEG program you must meet the following criteria:
 - i. the greater of five units OR 15 per cent of the total number of units within the development must be made affordable
 - ii. provide a minimum of 15 per cent of each unit type in the development as affordable
 - iii. enter into an agreement with the city to ensure the units maintain affordable for a minimum period of 20 years at or below the city-wide average market rent for the entire housing stock based on building form and unit type, as defined by the Canada Mortgage and Housing Corporation
 - iv. must apply after a formal Site Plan Control submission, or Building Permit submission for projects not requiring Site Plan Control, and prior to Occupancy Permit issuance
- b. Please refer to the TIEG information at [Affordable housing community improvement plan](#) / [Plan d'améliorations communautaires pour le](#)



[logement abordable](#) for more details or contact the TIEG coordinator via email at affordablehousingcip@ottawa.ca.

Submission Requirements and Fees

1. Site Plan Control and Zoning By-Law Amendment Applications required.
 - a. Additional information regarding fees related to planning applications can be found [here](#).
2. The attached **Study and Plan Identification List** outlines the information and material that has been identified as either required (R) or advised (A) as part of a future complete application submission.
 - a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.
3. All of the above comments or issues should be addressed to ensure the effectiveness of the application submission review.

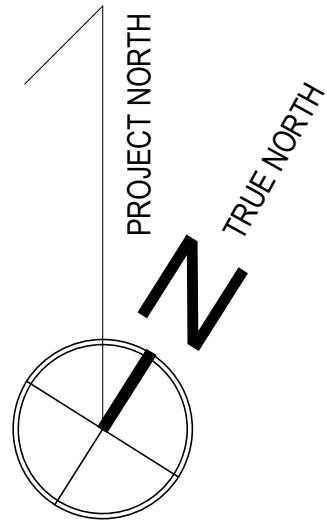
Should there be any questions, please do not hesitate to contact myself or the contact identified for the above areas / disciplines.

Yours Truly,
Jack Smith (Planner II)

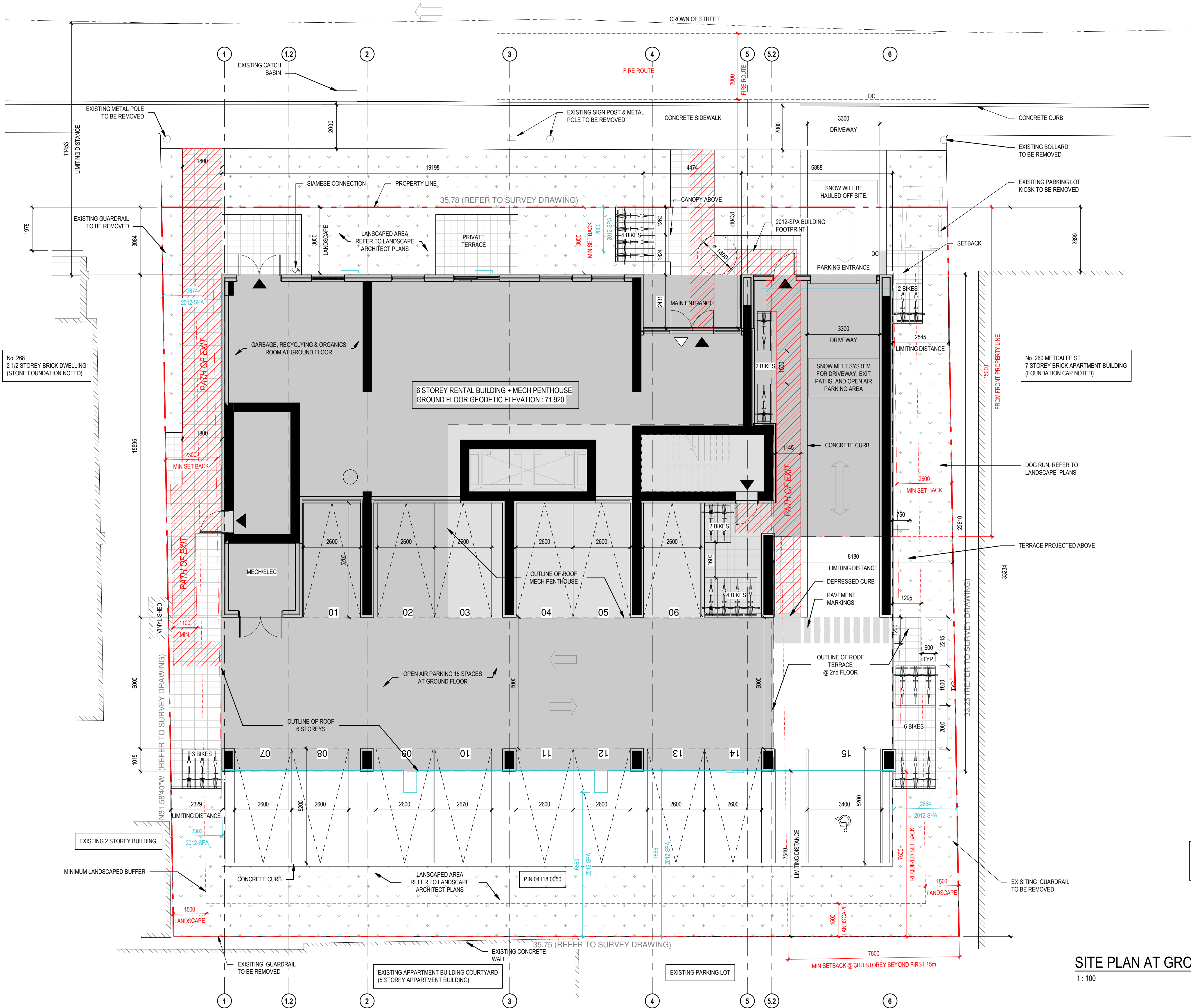
Encl. Study and Plan Identification List
Urban Design Brief Terms of Reference
List of Technical Agencies
HPDS Example Checklist
HPDS Overview for Applicants
Supplementary Development Information
ADS Site Plan Checklist

c.c. Nastassia Pratt (Planning)
JC Renaud (Planning)
Christopher Moise (Urban Design)
Shawn Wessel (Infrastructure)
Wally Dubyk (Transportation)
Matthew Hayley (Environmental)
Mark Richardson (Forestry)
Mike Russet (Parks)
MacKenzie Kimm (Heritage)

Appendix C Water Servicing



MACLAREN ST



- FOR EXISTING SITE CONDITIONS, SEE SURVEY PLAN BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD., SUBMITTED SEPARATELY.
- FOR NEW GRADES AND SITE SERVICES, SEE CIVIL ENGINEERING PLAN BY NOVATECH ENGINEERING CONSULTANTS, SUBMITTED SEPARATELY.
- FOR PROPOSED VEGETATION AND LANDSCAPE INFORMATION, SEE LANDSCAPE ARCHITECTURE PLAN BY JAMES B. LENNOX & ASSOCIATES, SUBMITTED SEPARATELY.

LEGENED	
	CURRENT BUILDING PROPOSAL
	2012-SPA BUILDING FOOTPRINT
	2012-SPA BUILDING DIMENSIONS
	REQUIRED DIMENSIONS
	PATH OF EXIT
	PAVEMENT MARKINGS
	ENTRANCE
	EXIT

CITY OF OTTAWA COMPREHENSIVE BY-LAW 2008-250 RESIDENTIAL FIFTH DENSITY ZONE RSB(1633) H(22)_AREA X ON SCHEDULE 1A		
ZONING MECHANISM	REQUIRED	PROVIDED
Maximum building height	22m	19.4m
Minimum front yard setback	3m	3.08m
Minimum east side yard setback	First 15m from prop line: 2.5m Beyond 15m: 2.5m (1st & 2nd storeys); 7.8m (3rd storey & above)	2.55m 2.55m 8.18m
Minimum west side yard setback	2.3m	2.33m
Minimum rear yard setback	7.5m	7.5m

RESIDENTIAL UNITS (PROPOSED)		
# BR	# UNITS	%
1BR	17	37%
2BR	14	30%
2BR*	5	11%
STUDIO	10	22%
TOTAL	46	100%

*2012-SPA PROVIDED 65 TOTAL RESIDENTIAL UNITS
TOTAL BARRIER FREE UNITS TO COMPLY WITH OBC MIN 15% (7)
NUMBER OF 1BR-BF: MINIMUM 4
NUMBER OF 2BR-BF: MINIMUM 2
NUMBER OF STUDIO-BF: MINIMUM 1

ZONING GROSS FLOOR AREA - RESIDENTIAL			
LEVEL	AREA / LEVEL	NO. OF LEVELS	TOTAL AREA
GROUND FLOOR	47 m ²	1	47 m ²
2ND FLOOR ZONING	480 m ²	1	480 m ²
3RD-5TH FLOOR ZONING	487 m ²	3	1460 m ²
6TH FLOOR ZONING	487 m ²	1	487 m ²
TOTAL	1500 m ²	6	2473 m ²

SITE STATISTICS			
ZONING MECHANISM	REQUIRED	2012-SPA	PROVIDED
Site Area	N/A	1189.6m ²	1189.6m ²
Building Area (OBC)	N/A	685.1m ²	635.6m ²
Parking lot Area	N/A	N/A	790.3m ²
Driveway Width RS Section-107	Min. 3.0m	+/-8.7m	3.3m
Minimum Landscaped Area of site (%) RS Section-163(9)	30%	39% (462.89m ²)	34.5% (411.0m ² /1189.6m ²)
Minimum Landscaped Area of Parking (%) RS Section-110 (1)	15%	N/A	34.3% (270.8m ² /790.3m ²)

ZONING AMENITY AREA			
ZONING MECHANISM	REQUIRED	2012-SPA	PROVIDED
Amenity Area (Part 5 Section 137)	6 m ² /unit = 276 m ² Minimum 50% of req to be communal area = 138 m ²	0 m ²	Total: 290.9 m ² Communal: 290.9 m ²

ZONING AMENITY AREA		
NAME	USE	AREA
Ground Floor		
AMENITY LANDSCAPE	COMMON AMENITY	219.7 m ²
TERRACE	PRIVATE AMENITY	10.3 m ²
2nd Floor		
TERRACE	COMMON AMENITY	60.9 m ²
TOTAL		290.9 m ²

PARKING			
ZONING MECHANISM	REQUIRED	2012-SPA	PROVIDED
Residential parking (Part 4 Section 101)	0 for first 12 units; Min 0.5/unit for units over 12 (46-12)/0.5= 17	55 (65 units)	Reg: 0 Compact: 0 BF TypeA: 1
Guest parking (Part 4 Section 102)	0 for first 12 units; Min 0.1/unit for units over 12 (46-12)/0.1= 3.4	11	Guest: 3
Total:	20	66	15
Bicycle parking (Part 4 Section 111)	Min 0.5/unit 46/0.5= 23	33 (65 units)	Horiz: 23

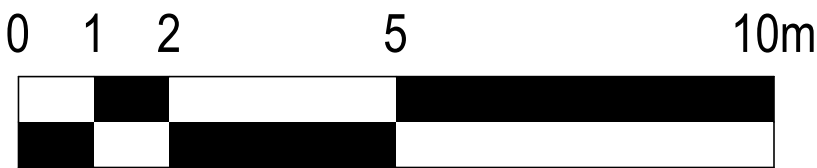
WASTE MANAGEMENT - PRIVATE PICK-UP FOR HIGH-RISE RESIDENTIAL WITH CHUTE AND CENTRAL ROOM		
TYPE	REQUIRED	PROVIDED
GARBAGE	Loose: 0.110 y/unit 0.110x46 units= 5.06 y ³	2' 3 y ³ FEL BIN
RECYCLING	GMP: 0.018 y/unit 0.018x46 units= 0.828 y ³ FIBRE: 0.038 y/unit 0.038x46 units= 1.75 y ³	1' 3 y ³ FEL BIN 1' 3 y ³ FEL BIN
ORGANICS	240L green containers for every 50 units 46/50 = 0.92	1' 240L GREEN BIN

6 STOREY RESIDENTIAL
3.2.2.5.1. GROUP C UPTO 6 STOREYS SPRINKLERED COMBUSTIBLE CONSTRUCTION
+/-3000mm PER LEVEL (LAST OCCUPIED FLOOR +15.7m ABOVE GRADE)

SITE PLAN AT GROUND FLOOR

1:100

1
A100



- NOTES GÉNÉRALES General Notes
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 - Veuillez aviser l'architecte de toute dimension erronée et/ou divergences entre ces documents et ceux des autres professionnels. / The architect must be notified of any errors, omissions and discrepancies between these documents and those of the others professionals.
 - Les dimensions sur ces documents doivent être lues et non mesurées. / The dimensions on these documents must be read and not measured.

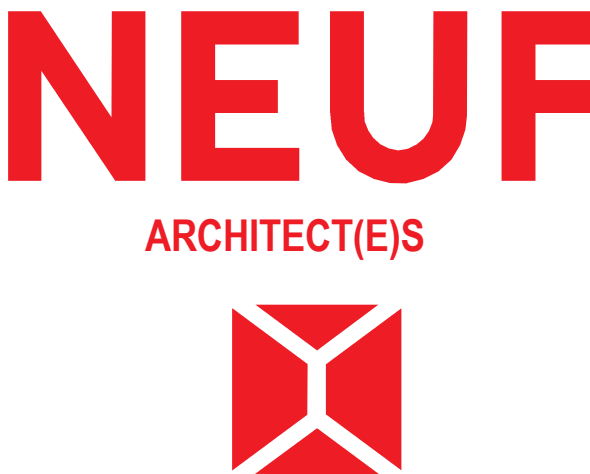
STRUCTURE Structural
Adjeleian Allen Rubeli
77 Albert Street, suite 1005, Ottawa, ON K1P 5E7
613-235-0786 aar.ca

ARCHITECTURE DE PAYSAGE Landscape Architect
James B. Lennox & Associates
3333 Carling Ave., Ottawa, ON K2H 8A4
613-722-5168 jba.ca

CIVIL Civil
Novatech Eng. Consultants Ltd.
240 Maclellan Crescent Dr., Suite 200, Ottawa, ON K2M 1P6
613-234-9463 novatecheng.com

ARCHITECTS Architect
NEUF Architects Inc.
10 Robson Street, 4th floor, Ottawa, ON K1N 5J1
613-234-2274 NEUF.ca

SCÉAU / Seal



CLIENT Client



OUVRAGE Project

260 MacLaren

EMPLACEMENT Location NO PROJET No:
260 MacLaren, Ottawa ON 12542.00

NO REVISION DATE (aa-mm-jj)
A SPA - CITY COORDINATION 2025.08.01
B SPA - CITY COORDINATION 2025.08.27
C ISSUED FOR SPA 2026.0X.XX

Preliminary
NE PAS UTILISER POUR
CONSTRUCTION
FOR SPA COORDINATION
2026-08-07

DESSINÉ PAR Drawn by
AA
DATE (aa mm JJ)
2025-02-01
TITRE DU DESSIN Drawing Title

VÉRIFIÉ PAR Checked by
CR
ÉCHELLE Scale
Comme
indiqué

SITE PLAN

REVISION Revision NO. DESSIN Dwg Number
C A100

From: Ryan Good <r.good@novatech-eng.com>

Sent: Thursday, May 28, 2026 3:31 PM

To: 'Carly Rouault' <crouault@neuf.ca>; shawn.malhotra@claridgehomes.com; 'Victoria St.Pierre' <victoria.st.pierre@claridgehomes.com>

Cc: Greg MacDonald <g.Macdonald@novatech-eng.com>; Lisa Dalla Rosa <dallarosa@fotenn.com>; Rana Ismail <rismail@neuf.ca>; Lucien Haddad <lhaddad@neuf.ca>

Subject: RE: 260 Maclaren - Site Plan Control Application

Hi Carly.

For the updated building, we will need to prepare FUS fire demand calculations. Can you please confirm the following details which will be used to complete the Fire Flow demand assessment:

- Can you confirm the buildings construction type: Wood Frame, Mass Timber, Ordinary Construction, Non-Combustible Construction, Fire resistive (2 hrs)?
- Do vertical openings have a minimum 1 hour rating between floors?
- Does the building have an adequately designed fire system (NFPA 13), if so can you confirm if it is a fully supervised system? (24/7 on-site monitoring or fire department connected alarm systems)?

Also, when we spoke earlier you mentioned there were City comments related to the Civil design. Can you please share the comments provided by the City?

Thanks!

Ryan Good, C.E.T., Design Technologist | Land Development and Public Sector Infrastructure

NOVATECH

Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 284 | Cell: 343-364-2246

The information contained in this email message is confidential and is for exclusive use of the addressee.

From: Carly Rouault <crouault@neuf.ca>

Sent: Thursday, May 28, 2026 4:14 PM

To: Lisa Dalla Rosa <dallarosa@fotenn.com>; Ryan Good <r.good@novatech-eng.com>; shawn.malhotra@claridgehomes.com; 'Victoria St.Pierre' <victoria.st.pierre@claridgehomes.com>

Cc: Greg MacDonald <g.Macdonald@novatech-eng.com>; Rana Ismail <rismail@neuf.ca>; Lucien Haddad <lhaddad@neuf.ca>; Ashleigh-Ann Moyo <moyo@fotenn.com>; James Lennox <lennox@jbla.ca>; 'Jim Burghout' <jim.burghout@claridgehomes.com>; Rana Ismail <rismail@neuf.ca>; Bryan Toky Rajamason <btrajamason@neuf.ca>

Subject: RE: 260 Maclaren - Site Plan Control Application

Hi Ryan and Lisa,

You can download the up-to-date arch A100 site plan as well as all of the documents received from the City for ZBLA. Note we have received no comments from landscape yet. These files can be downloaded by following this link (valid for 7 days):

<https://projects.neuf.ca/index.php?r=uniqueFile/view&key=1x69>

I have also attached the feedback from the city with our comments on which team they affect.

Please forward to anyone on your team who should be included and is not in CC on this email.

Refer to the building info below – this was also mostly shared in the brochure PDF 2026-05-06:

6 STOREY RESIDENTIAL

3.2.2.51. GROUP C UPTO 6 STOREYS SPRINKLERED COMBUSTIBLE CONSTRUCTION +/-3000mm PER LEVEL (LAST OCCUPIED FLOOR +/-15.5m ABOVE GRADE)

Bulding area: 635m2

Floor assemblies 1h

Wood frame construction – I have included the code excerpt below. No discussions have been had to date regarding the specifics of the fire protection system, other than fully sprinkered.

3.2.2.51. Group C, up to 6 Storeys, Sprinklered, Combustible Construction

- (1) A *building* classified as Group C, other than a *retirement home*, is permitted to conform to Sentence (2) provided
 - (a) it is *sprinklered* throughout,
 - (b) it is not more than 6 *storeys* in *building height*,
 - (c) it has a height of not more than 18 m, measured between the floor of the *first storey* and the uppermost floor level that does not serve a rooftop enclosure for elevator machinery, a stairway or a *service room* used only for service to the *building*, and
 - (d) it has a *building area* of not more than
 - (i) 9 000 m² if 1 *storey* in *building height*,
 - (ii) 4 500 m² if 2 *storeys* in *building height*,
 - (iii) 3 000 m² if 3 *storeys* in *building height*,

- (iv) 2 250 m² if 4 storeys in building height,
- (v) 1 800 m² if 5 storeys in building height, or
- (vi) 1 500 m² if 6 storeys in building height.

(2) Buildings referred to in Sentence (1) are permitted to be of *combustible construction* or *noncombustible construction* used singly or in combination, and

- (a) except as permitted by Sentence (3), floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 1 h,
- (b) roof assemblies shall have a *fire-resistance rating* not less than 1 h,
- (c) except as provided by Sentence (4), where the roof assembly has a height greater than 25 m measured from the floor of the *first storey* to the highest point of the roof assembly, the roof assembly shall be constructed of *noncombustible construction*, or *fire-retardant-treated wood* conforming to Article 3.1.4.5.,
- (d) *mezzanines* shall have a *fire-resistance rating* not less than 1 h, and
- (e) *loadbearing* walls, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

(3) In a *building* that contains *dwelling units* that have more than one *storey*, subject to the requirements of Sentence 3.3.4.2.(3), the floor assemblies, including those over *basements*, which are entirely contained within these *dwelling units*, shall have a *fire-resistance rating* not less than 1 h but need not be constructed as *fire separations*.

(4) Where *buildings* conforming to Sentence (2) include non-contiguous roof assemblies at different elevations, the roof assemblies are permitted to be evaluated separately to determine which ones are required to be constructed in accordance with Clause (2)(c).

(5) Group A, Division 2 *major occupancies*, Group E *major occupancies* and *storage garages* located in a *building* or part thereof within the scope of this Article are permitted to be constructed in accordance with this Article, provided

- (a) the Group A, Division 2 *major occupancy* and Group E *major occupancy* are located below the third *storey*, and
 - (b) the *storage garage* is located below the fourth *storey*. (See also Article 4.4.2.1.)
- (See Note A-3.2.2.51.(5) and 3.2.2.60.(4))

Thanks,



CARLY ROUAULT, OAC

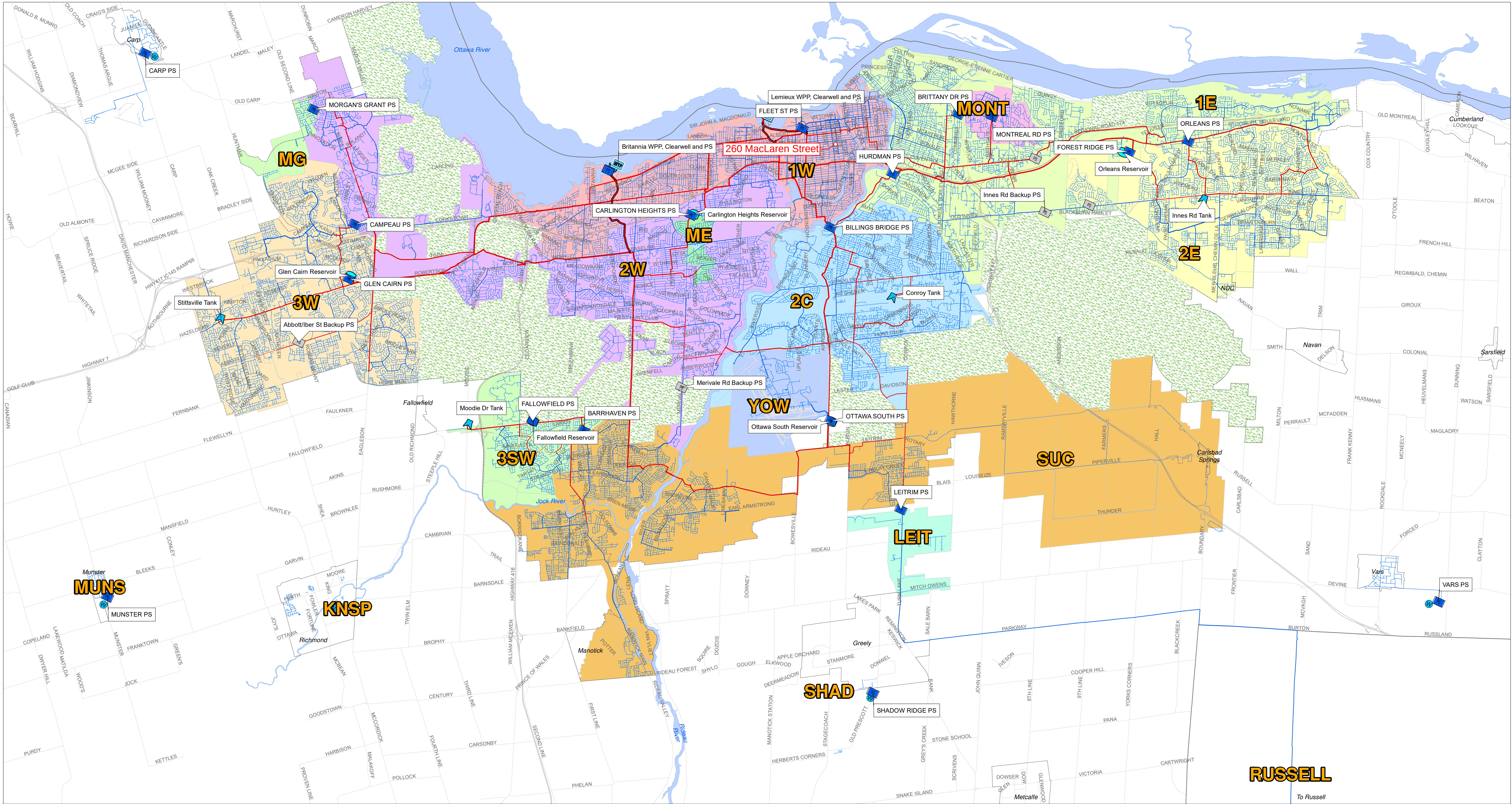
Architecte. Architect

T 514 847 1117 #333 F 514 847 2287

630, boul. René-Lévesque O. 32^e étage, Montréal (QC) H3B 1S6

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

Montréal. Ottawa. Toronto

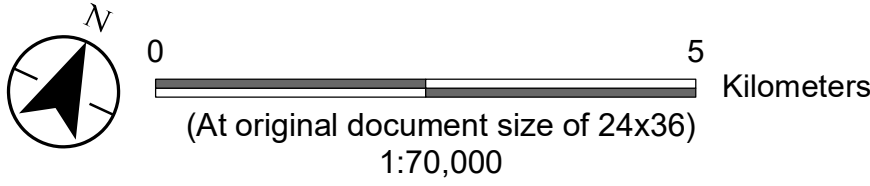


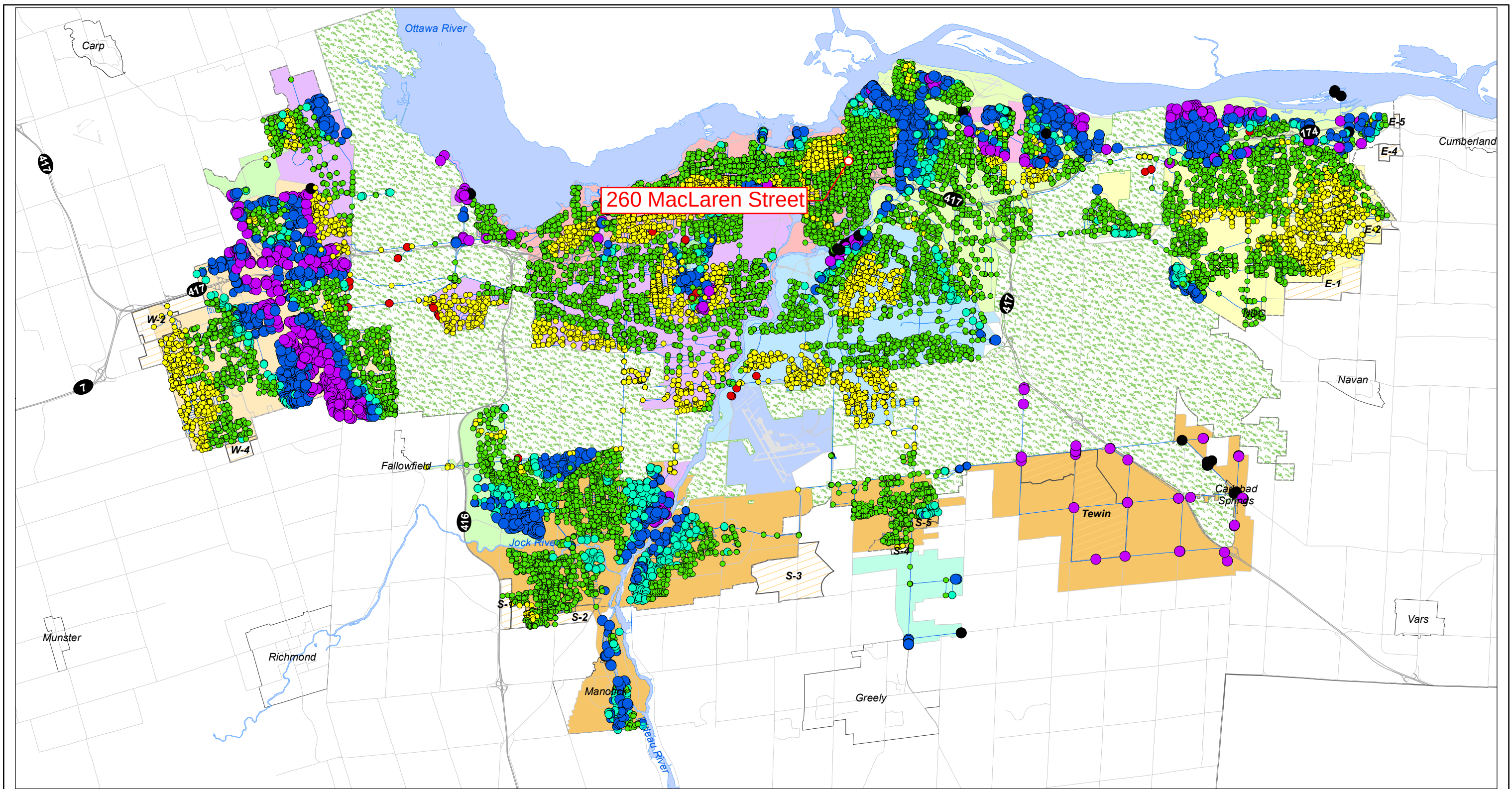
Infrastructure Master Plan - Figure 1-1
Water Distribution System Backbone
Infrastructure

Legend

	Water Purification Plant	Backbone Watermain Diameter	Distribution Watermain Diameter	Pressure Zones		
	Well					
	Clearwell					
	Elevated Tank					
	Reservoir					
	Pump Station (Active)					
	Pump Station (Backup)					

Notes
1. Coordinate System: NAD 1983 CSRS MTM 9
2. Data Sources: Original shapefiles provided by the City of Ottawa; hydraulic model exports.





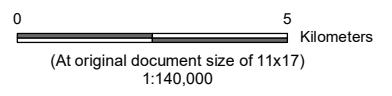
Infrastructure Master Plan - Figure 1-15
 Model Results: Existing Conditions - BSDY
 Maximum Pressures (psi)

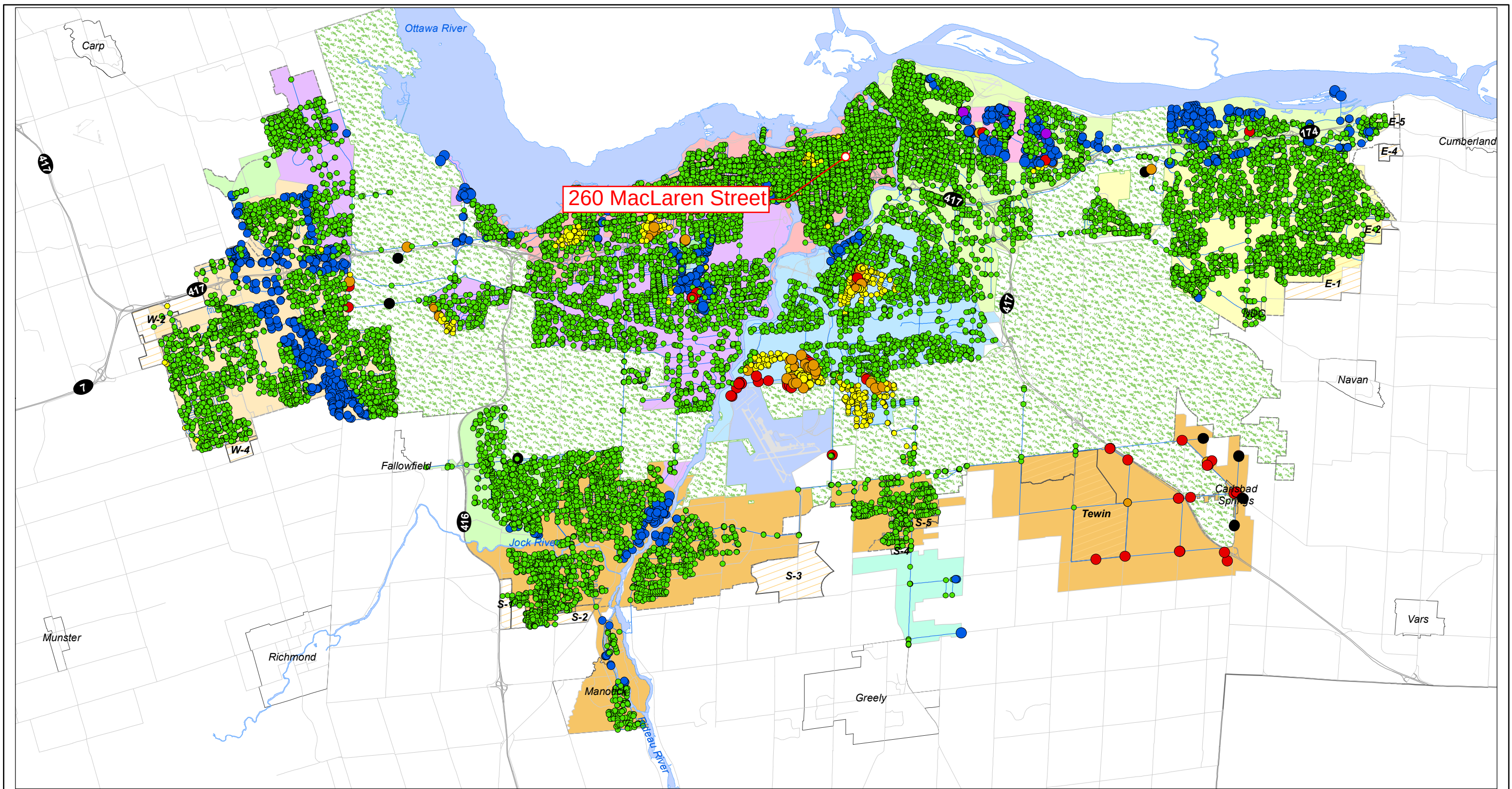
- Legend**
Maximum Pressure (psi)
- Max. Pressure ≤ 40 psi
 - 40 psi < Max. Pressure ≤ 60 psi
 - 60 psi < Max. Pressure ≤ 80 psi
 - 80 psi < Max. Pressure ≤ 82.5 psi
 - 82.5 psi < Max. Pressure ≤ 85 psi
 - 85 psi < Max. Pressure ≤ 90 psi
 - 90 psi < Max. Pressure ≤ 100 psi
 - 100 psi < Max. Pressure

- Watermains
- Urban Expansion Area
- Greenbelt

- Pressure Zones**
- | | | |
|----|------|--------------|
| 1E | 3SW | MG |
| 1W | 3W | MONT |
| 2C | EMR | SHADOW RIDGE |
| 2E | LEIT | SUC |
| 2W | ME | YOW |

Notes
 1. Coordinate System: NAD 1983 CSRS MTM 9
 2. Data Sources: Background layers and growth projections provided by the City of Ottawa; hydraulic modelling results





Infrastructure Master Plan - Figure 1-16
 Model Results: Existing Conditions - MXDY
 Minimum Pressures (psi)

Legend

Minimum Pressure (psi)

- Min. Pressure ≤ 20 psi
- 20 psi < Min. Pressure ≤ 30 psi
- 30 psi < Min. Pressure ≤ 33 psi
- 33 psi < Min. Pressure ≤ 34 psi
- 34 psi < Min. Pressure ≤ 35 psi
- 35 psi < Min. Pressure ≤ 40 psi
- 40 psi < Min. Pressure ≤ 80 psi
- 80 psi < Min. Pressure ≤ 90 psi
- 90 psi < Min. Pressure ≤ 100 psi
- 100 psi < Min. Pressure

— Watermains

Urban Expansion Area

Greenbelt

Pressure Zones

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

Notes

1. Coordinate System: NAD 1983 CSRS MTM 9
2. Data Sources: Background layers and growth projections provided by the City of Ottawa; hydraulic modelling results



0 5 Kilometers
 (At original document size of 11x17)
 1:140,000



Water Demand Design Sheet

Boundary Condition Request

Novatech Project #: 110166
Project Name: 260 MacLaren Street
Date: 6/2/2026
Input By: Ryan Good, C.E.T
Reviewed By: Anthony Meswarp, P.Eng
Drawing Reference: Nuef Site Plan - A100 - Rev C

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	Area (ha.)	Pop. Equiv.	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
Residential Input						
Singles			0.00	0.00	0.00	0.00
Semis / Townhomes			0.00	0.00	0.00	0.00
Apartments (2-BR)	19		39.90	0.13	1.23	1.85
Apartments (1-BR)	27		37.80	0.12	1.16	1.75
Apartments (Avg)			0.00	0.00	0.00	0.00
Totals	46	0.00	77.70	0.25	2.39	3.60

Summary

i. Type of Development and Units:	Multifamily Residential Apartment (6 Storey)
ii. Site Address:	260 MacLaren Street, Ottawa, ON
iii. Proposed Water Service Connection Location(s):	Connecting Building Service to the 300mm dia. water main in MacLaren Street
Sketch	
iv. Average Day Flow Demand:	0.25 L/s
v. Peak Hour Flow Demand:	3.60 L/s
vi. Maximum Day Flow Demand:	2.39 L/s
vii. Required Fire Flow #1:	9,000 L/min

Design Parameters

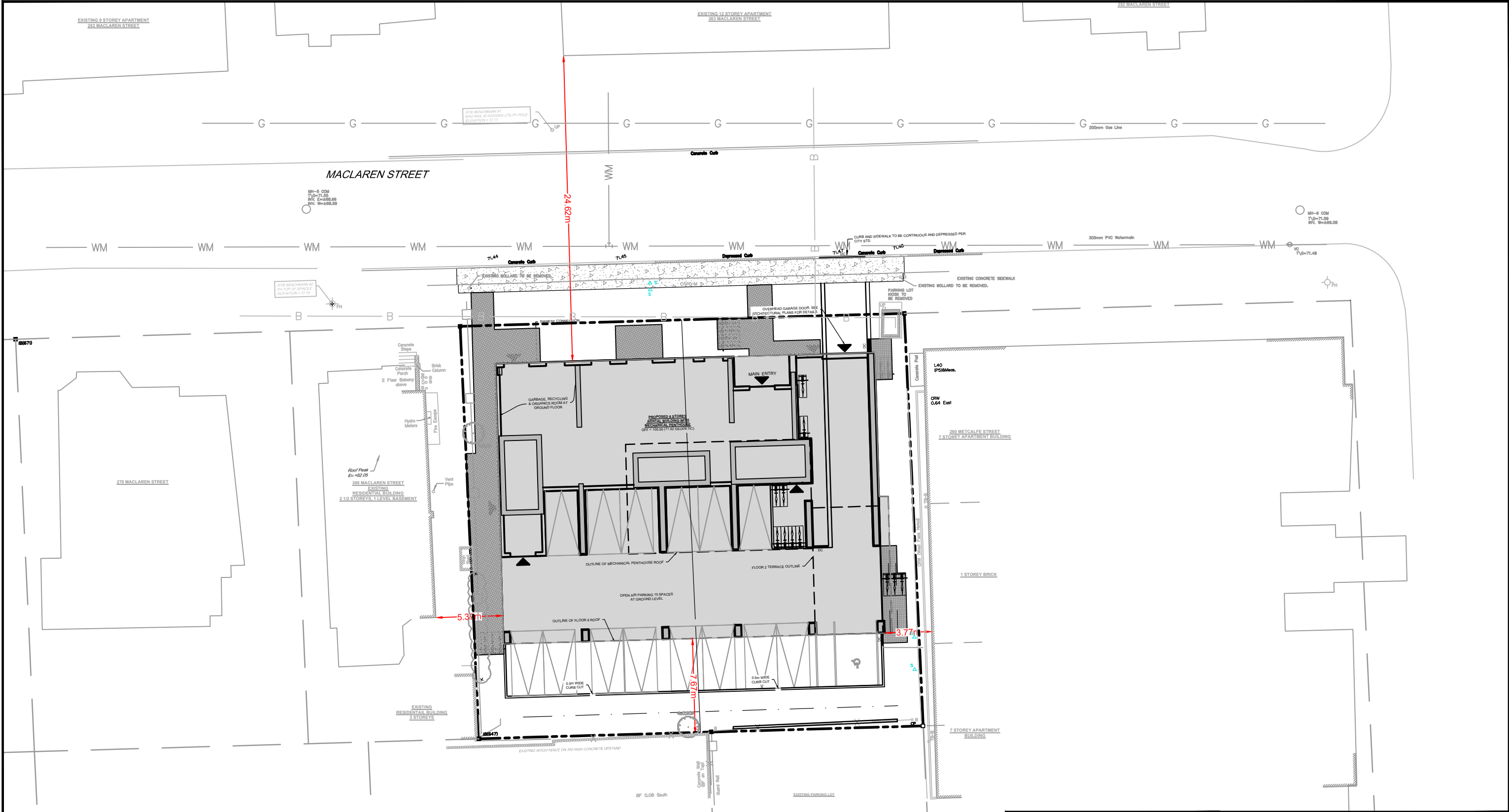
Residential					
Unit Type Population Equiv.	Singles	Semis/ Towns	Apts (2-BR)	Apts (1-BR)	Apts (Avg)
	3.4	2.7	2.1	1.4	1.8
Daily Demand	L/per person/day				
Average Demand	280				
Basic Demand	280				

Residential Peaking Factors		Max Day (x Avg Day)	Peak Hour (x Avg Day)
Small System (If Applicable) <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 (Default)	> 500	2.50	5.50

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

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

M:\2010\110166\CAD\Design\Figures\Report\Watermain\110166-SEP.dwg, SEP, Aug 12, 2026 - 4:10pm, rgood



LEGEND

--- PROPERTY LINE
32.38m 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

260 MACLAREN STREET

FUS SEPARATION

SCALE	1 : 300	0 3 6 9 12
DATE	AUG 11/2026	JOB 110166
FIGURE	SEP	

FUS - Fire Flow Calculations

Novatech Project #: 110166
Project Name: 260 MacLaren Street
Date: 8/11/2026
Input By: Ryan Good, C.E.T
Reviewed By: Anthony Mestwarf, P.Eng
Drawing Reference: 110166-SEP

Legend: Input by User

No Input Required

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

Building Description: 6 Storey Building with 1 Storey Podium
Type V - Wood frame

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	Construction Material C	Type V - Wood frame	Yes	1.5	1.5	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction		0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	Floor Area A	Podium Level Footprint (m ²)	260		2,165	
		Total Floors/Storeys (Podium)	1			
		Tower Footprint (m ²)	635			
		Total Floors/Storeys (Tower)	5			
		Protected Openings (1 hr)	No			
		A, Total Effective Floor Area (m ²)				
	F	Base fire flow without reductions				
		$F = 220 C (A)^{0.5}$				15,000
Reductions or Surcharges						
3	Occupancy hazard reduction or surcharge (1)	FUS Table 3		Reduction/Surcharge		12,750
		Non-combustible		-25%	-15%	
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	Sprinkler Reduction (2)	FUS Table 4		Reduction		-6,375
		Adequately Designed System (NFPA 13)	Yes	-30%	-30%	
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
		Cumulative Sub-Total		-50%		
		Area of Sprinklered Coverage (m ²)	3435	100%		
Cumulative Total		-50%				
5	Exposure Surcharge per (3)	FUS Table 6		Surcharge		2,295
		North Side	20.1 - 30 m		5%	
		East Side	3.1 - 10 m		0%	
		South Side	3.1 - 10 m		0%	
		West Side	3.1 - 10 m		13%	
		Cumulative Total		18%		
Results						
6	(1) + (2) + (3)	Total Required Fire Flow, rounded to nearest 1000L/min			L/min	9,000
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	150
				or	USGPM	2,378

FUS - Fire Flow Calculations

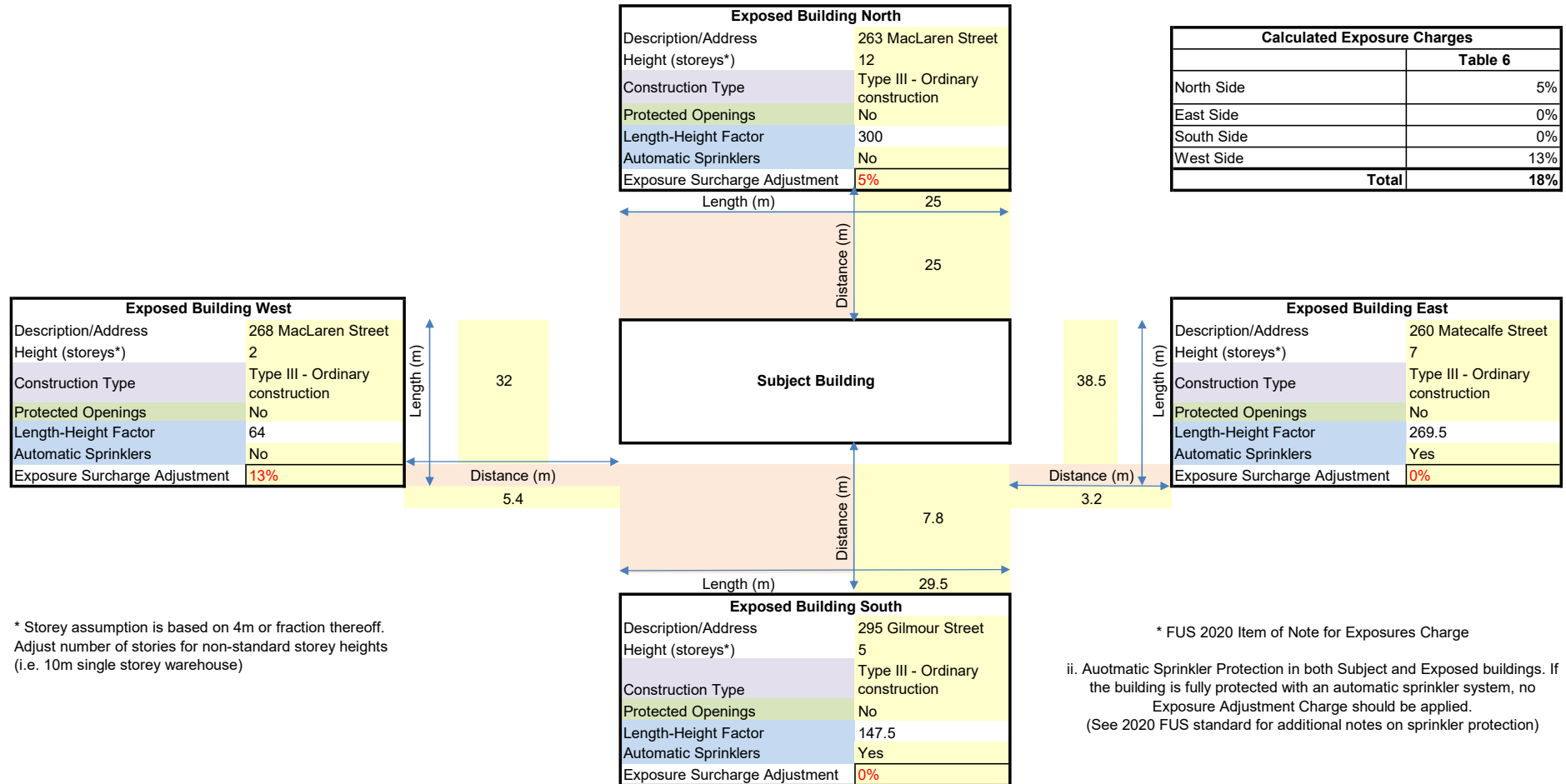
Table 6 Worksheet

To be used only if adjacent *Exposed Building* construction is known

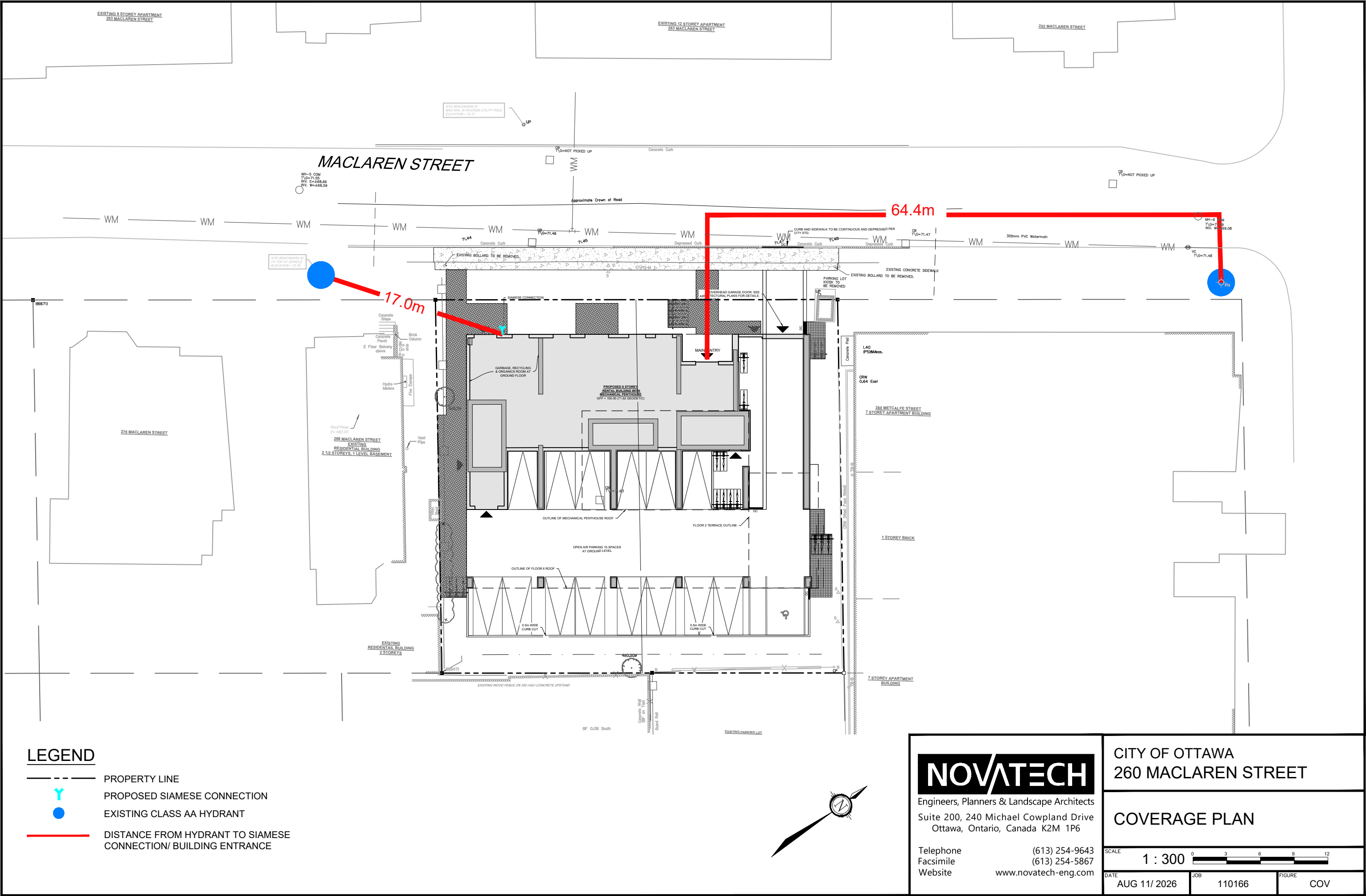
Source of Information: Measurements taken via Google Earth aerial imagery. Confirmation of sprinklered neighboring buildings based on Google Earth imagery showing siamese connections on the existing buildings.

Legend: Input by User

No Input Required



M:\2010\110166\CAD\Design\Figures\Report\Watermain\110166-COV.dwg, COV-A (SW), Aug 11, 2026 - 9:43am, rgood



From: Ryan Good <r.good@novatech-eng.com>

Sent: Thursday, August 13, 2026 2:16 PM

To: Wessel, Shawn <shawn.wessel@ottawa.ca>

Cc: Greg MacDonald <g.macdonald@novatech-eng.com>; Anthony Mestwarp <a.mestwarp@novatech-eng.com>

Subject: 260 MacLaren -

Hi Shawn,

I am working on the Civil design of the 260 MacLaren Street development (o behalf of Claridge Homes). The proposed site is 0.12ha and includes a 6-storey wood frame building, complete with exterior parking. The development contains twenty -seven (27) 1-bedroom apartments (10 studio and 17 x 1 bedroom) and nineteen (19) 2-bedroom apartments; the total design population as per the City's Water Distribution Guideline criteria is 78 persons.

Site Water Demands

Can you please provide Boundary Conditions based on the following:

Average Day Demand: 0.25L/s

Maximum Day Demand: 2.39L/s

Peak Hour Demand: 3.60L/s

Fire flow (per FUS): 150L/s

It is proposed to service the site by connecting to the existing 305mm dia. Watermain within the MacLaren Street right-of-way. Figures and Calculations are attached to this email for your reference.

In addition, can you please share the HGL in the Combined Sewer fronting the site?

Thank you,

Ryan Good, C.E.T., Design Technologist | Land Development and Public Sector Infrastructure

NOVATECH

Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 284 | Cell: 343-364-2246

The information contained in this email message is confidential and is for exclusive use of the addressee.



From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: Thursday, August 13, 2026 3:06 PM
To: Ryan Good <r.good@novatech-eng.com>
Cc: Greg MacDonald <g.Macdonald@novatech-eng.com>; Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Subject: Re: 260 MacLaren -

Thanks Ryan

I have sent request to Water Dept.

.

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji

Pronouns: he/him | Pronom: il

Project Manager - Infrastructure Approvals

Gestionnaire de projet – Approbation des demandes d’infrastructures

Development Review Central Branch | Direction de l’examen des projets d’aménagement, Centrale
Planning, Development & Building Services Department (PDBS) | Direction générale des services de la planification, de
l’aménagement et du bâtiment (DGSPAB)
City of Ottawa | Ville d'Ottawa
110 Laurier Ave. W. | 110, avenue Laurier Ouest, Ottawa ON K1P 1J1
(613) 580 2424 Ext. | Poste 33017
Int. Mail Code | Code de Courrier Interne 01-14

From: Ryan Good <r.good@novatech-eng.com>
Sent: Thursday, August 13, 2026 3:24 PM
To: Wessel, Shawn <shawn.wessel@ottawa.ca>
Cc: Greg MacDonald <g.macdonald@novatech-eng.com>; Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Subject: RE: 260 MacLaren -

Perfect, thanks Shawn!

Ryan Good, C.E.T., Design Technologist | Land Development and Public Sector Infrastructure

NOVATECH

Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 284 | Cell: 343-364-2246

The information contained in this email message is confidential and is for exclusive use of the addressee.

From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: Friday, August 21, 2026 12:43 PM
To: Ryan Good <r.good@novatech-eng.com>
Cc: Greg MacDonald <g.Macdonald@novatech-eng.com>; Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Subject: Re: 260 MacLaren -

Hello and good afternoon, Ryan.

Please find BC information attached and below.

The following are water boundary conditions, HGL, for hydraulic analysis at 260 MacLaren St (zone 1W) assumed to be connected at the location(s) identified below.: (see attached PDF for location).

305mm on MacLaren St
Minimum HGL = 107.5 m
Maximum HGL = 114.8 m
Max Day + Fire Flow (90 L/s) = 107.8 m

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

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

If you require additional information or clarification, please do not hesitate to contact me anytime.

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji

Pronouns: he/him | Pronom: il

Project Manager - Infrastructure Approvals

Gestionnaire de projet – Approbation des demandes d’infrastructures

Development Review Central Branch | Direction de l’examen des projets d’aménagement, Centrale
Planning, Development & Building Services Department (PDBS) | Direction générale des services de la planification, de
l’aménagement et du bâtiment (DGSPAB)
City of Ottawa | Ville d'Ottawa
110 Laurier Ave. W. | 110, avenue Laurier Ouest, Ottawa ON K1P 1J1
(613) 580 2424 Ext. | Poste 33017
Int. Mail Code | Code de Courrier Interne 01-14

From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: Monday, August 31, 2026 8:53 AM
To: Ryan Good <r.good@novatech-eng.com>
Cc: Greg MacDonald <g.Macdonald@novatech-eng.com>; Anthony Mestwarp <a.mestwarp@novatech-eng.com>
Subject: Re: 260 MacLaren -

Hi Ryan

Unfortunately, there was a typo, which went unnoticed.

The BC was ran with the requested fire flow of 150 L/s. The same HGL value applies. See below for the correction.

The following are water boundary conditions, HGL, for hydraulic analysis at 260 MacLaren St (zone 1W) assumed to be connected at the location(s) identified below.: (see attached PDF for location).

305mm on MacLaren St
Minimum HGL = 107.5 m
Maximum HGL = 114.8 m
Max Day + Fire Flow (150 L/s) = 107.8 m

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

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji

Pronouns: he/him | Pronom: il

Project Manager - Infrastructure Approvals

Gestionnaire de projet – Approbation des demandes d’infrastructures

Development Review Central Branch | Direction de l’examen des projets d’aménagement, Centrale
Planning, Development & Building Services Department (PDBS) | Direction générale des services de la planification, de
l’aménagement et du bâtiment (DGSPAB)

City of Ottawa | Ville d'Ottawa

110 Laurier Ave. W. | 110, avenue Laurier Ouest, Ottawa ON K1P 1J1

(613) 580 2424 Ext. | Poste 33017

Int. Mail Code | Code de Courrier Interne 01-14

shawn.wessel@ottawa.ca

Boundary Conditions for 260 MacLaren St



263

252

255

275

283

287

260

264

270

295

307

260

280

288

152mm
305mm

152mm

102mm

406mm
406mm

406mm

102mm

305mm

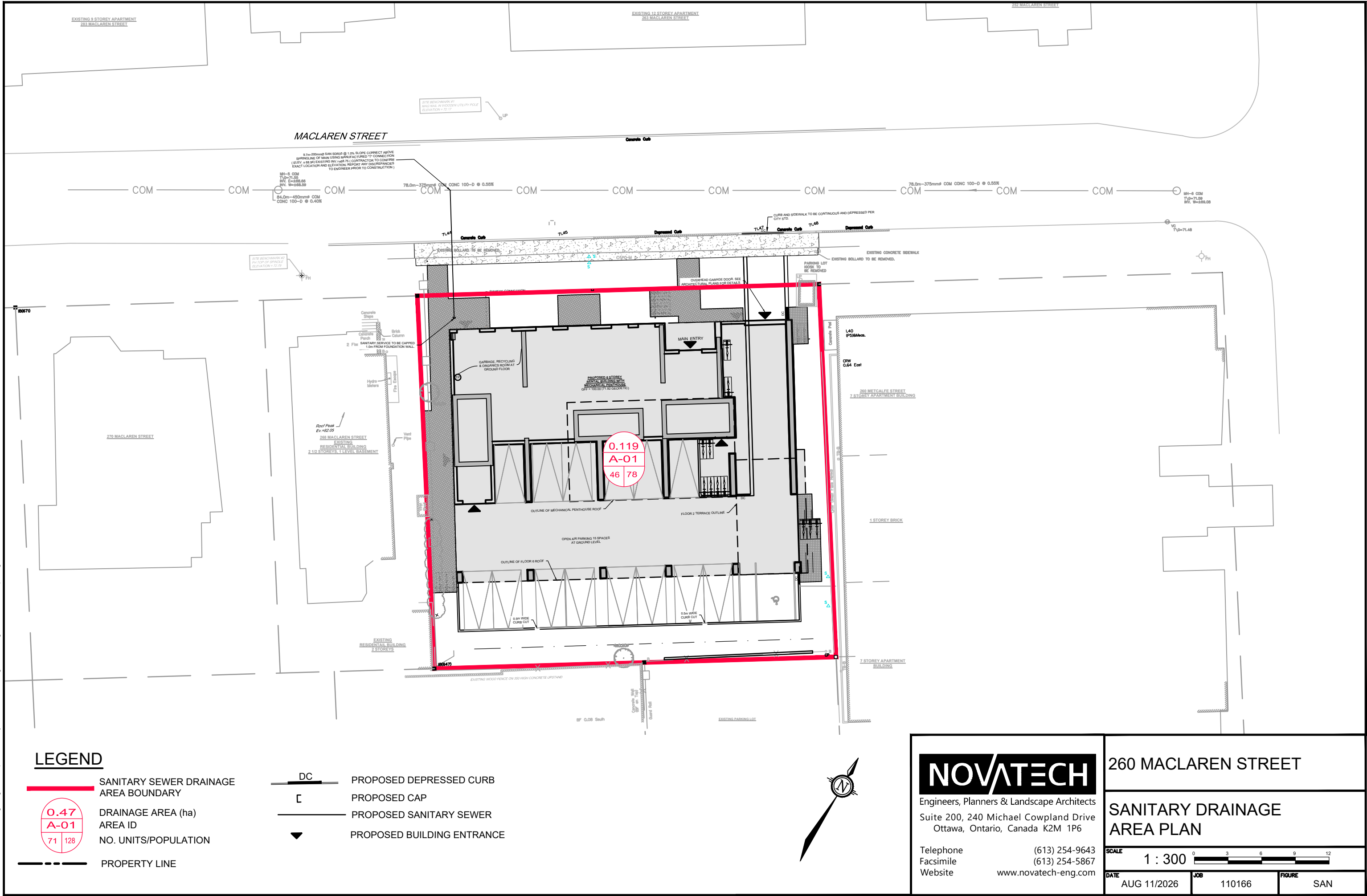
Connection

Legend

- Public
- Private

**Appendix D
Sanitary Servicing**

M:\2010\110166\CAD\Design\Figures\Report\Sanitary\110166-SAN.dwg, SAN, Aug 12, 2026 - 4:06pm, rgood



Novatech Project #:

Project Name:

Date Prepared:

Input By:

Reviewed By:

Drawing Reference:

110166

260 MacLaren Street

8/12/2026

Ryan Good, C.E.T

Anthony Mestwarp, P.Eng

110166-SAN

Legend:

PROJECT SPECIFIC INFO

USER DESIGN INPUT

CUMULATIVE CELL

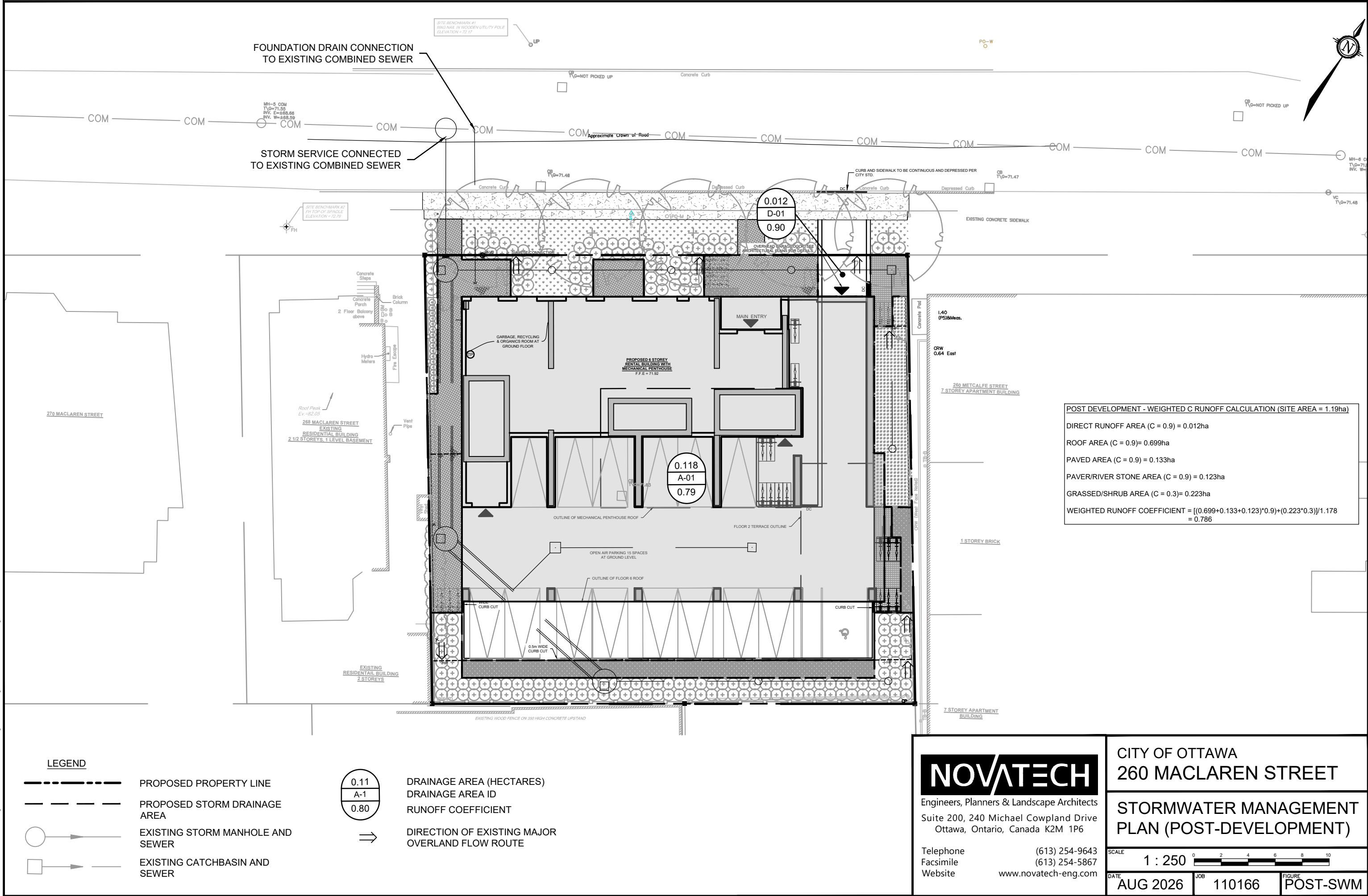
CALCULATED DESIGN CELL OUTPUT

LOCATION			DEMAND										DESIGN CAPACITY																													
AREA	FROM MH	TO MH	RESIDENTIAL FLOW										EXTRANEOUS FLOW		PROPOSED SEWER PIPE SIZING / DESIGN																											
			1 Bed Apartment	2 Bed Apartment	3 Bed Apartment	POPULATION (in 1000's)	CUMULATIVE POPULATION (in 1000's)	PEAK FACTOR M	AVG POPULATION FLOW (L/s)	PEAKED DESIGN POP FLOW (L/s)	Total Area (ha.)	Accum. Area (ha.)	DESIGN EXTRAN. FLOW (L/s)	TOTAL DESIGN FLOW (L/s)	PIPE LENGTH (m)	PIPE SIZE (mm) AND MATERIAL	PIPE ID ACTUAL (m)	ROUGH. (n)	DESIGN GRADE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Qpeak Design / Qcap																				
A-01	BLDG	MAIN	27	19	0	0.078	0.078	3.62	0.25	0.91	0.12	0.12	0.04	0.95		200 PVC	0.203	0.013	1.00	34.2	1.06	2.8%																				
Design Parameters: 1. Residential Flows <table><tr><td>-1 Bed Apartment</td><td>1.4</td><td>Person/ Unit</td></tr><tr><td>-2 Bed Apartment</td><td>2.1</td><td>Person/ Unit</td></tr><tr><td>-3 Bed Apartment</td><td>3.1</td><td>Person/ Unit</td></tr></table> <table><tr><td>Q Avg Capita Flow</td><td>280</td><td>L/cap/day</td></tr></table> 2. Commercial Flow <table><tr><td>4. M = Harmon Formula (maximum of 4.0)</td><td></td></tr><tr><td>5. K =</td><td>0.8</td></tr><tr><td>6. Commercial Peak Factor</td><td>1.0</td></tr><tr><td>7. Peak Extraneous Flow =</td><td>0.33</td><td>L/sec/ha</td></tr></table> As per City of Ottawa Sewer Design Guidelines, 2012 As per Harmon Formula As per City of Ottawa - Technical Bulletin ISTB-2018-01															-1 Bed Apartment	1.4	Person/ Unit	-2 Bed Apartment	2.1	Person/ Unit	-3 Bed Apartment	3.1	Person/ Unit	Q Avg Capita Flow	280	L/cap/day	4. M = Harmon Formula (maximum of 4.0)		5. K =	0.8	6. Commercial Peak Factor	1.0	7. Peak Extraneous Flow =	0.33	L/sec/ha	CAPACITY EQUATION Q full= (1/n) A R^(2/3)S_o^(1/2) Where : Q full = Capacity (L/s) n = Manning coefficient of roughness (0.013) A = Flow area (m²) R = Wetter perimenter (m) So = Pipe Slope/gradient						
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															7. Peak Extraneous Flow =	0.33	L/sec/ha																									

Appendix E

Storm Servicing

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CITY OF OTTAWA
260 MACLAREN STREET

**STORMWATER MANAGEMENT
PLAN (POST-DEVELOPMENT)**

SCALE 1 : 250

DATE AUG 2026 JOB 110166 FIGURE POST-SWM

TABLE 1A: Existing Conditions

Drainage Area	Area (ha)	"C"
Block 1	0.119	0.40
Total	0.119	0.40

TABLE 1B: Allowable Flows

Outlet Options	Area (ha)	"C"	Tc (min)	Q _{2 Year} (L/s)
MacLaren Street	0.119	0.40	10	10.20

Time of Concentration Tc= 10 min
 Intensity (2 Year Event) I₂= 76.81 mm/hr
 Intensity (5 Year Event) I₅= 104.19 mm/hr
 Intensity (100 Year Event) I₁₀₀= 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 2A: Post-Development Runoff Coefficient "C" - D-01

Area	Surface	Ha	"C"	C _{avg}	*C ₁₀₀
Total	Hard	0.001	0.90	0.90	1.00
0.0012	Soft	0.000	0.00		

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 _{avg}	Tc (min)	Q _{2 Year} (L/s)	Q _{5 Year} (L/s)	Q _{100 Year} (L/s)
MacLaren Street	0.001	0.90	10	0.2	0.3	0.6

Time of Concentration Tc= 10 min
 Intensity (2 Year Event) I₂= 76.81 mm/hr
 Intensity (5 Year Event) I₅= 104.19 mm/hr
 Intensity (100 Year Event) I₁₀₀= 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" - A-01

Area	Surface	Ha	5 Year Event		100 Year Event	
			"C"	C _{avg}	"C" + 25%	*C _{avg}
Total	Hard	0.095	0.90	0.79	1.00	0.86
0.118	Roof	0.000	0.90		1.00	
	Soft	0.022	0.30		0.25	

TABLE 3B: 2 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-02

0.118 =Area (ha)

0.79 = 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 ³)
2 YEAR	10	76.81	19.77	5.10	14.67	8.80
	15	61.77	15.90	5.10	10.80	9.72
	20	52.03	13.40	5.10	8.30	9.95
	25	45.17	11.63	5.10	6.53	9.79
	30	40.04	10.31	5.10	5.21	9.38

TABLE 3C: 5 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-02

0.118 =Area (ha)

0.79 = 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 ³)
5 YEAR	10	104.19	26.83	6.20	20.63	12.38
	15	83.56	21.51	6.20	15.31	13.78
	20	70.25	18.09	6.20	11.89	14.26
	25	60.90	15.68	6.20	9.48	14.22
	30	53.93	13.88	6.20	7.68	13.83

TABLE 3D: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - A-02

0.118 =Area (ha)

0.86 = 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 ³)
100 YEAR	15	142.89	40.14	9.30	30.84	27.76
	20	119.95	33.69	9.30	24.39	29.27
	25	103.85	29.17	9.30	19.87	29.81
	30	91.87	25.81	9.30	16.51	29.71
	35	82.58	23.20	9.30	13.90	29.18

TABLE 3E: 100 YEAR + 20% EVENT QUANTITY STORAGE REQUIREMENT - A-02

0.118 =Area (ha)

0.86 = 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 ³)
100 YEAR + 20	20	143.94	40.43	10.8	29.68	35.62
	25	124.62	35.00	10.8	24.25	36.38
	30	110.24	30.97	10.8	20.22	36.39
	35	99.09	27.84	10.8	17.09	35.88
	40	90.17	25.33	10.8	14.58	34.99

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 4A: Catchbasin - A-01

Structures	Size Dia.(mm)	Area (m ²)	T/G	Inv OUT
CB 100	610X610	0.37	71.63	70.32
CB 101	610X610	0.37	71.65	69.76
CB 102	610X610	0.37	71.65	69.60
CBMH 300	1500	1.82	71.87	69.14
CBMH 301	1500	1.82	71.80	69.08
CBMH 302	1500	1.82	71.65	69.05

TABLE 4B: Pipe - A-01

Structures	Dia.(mm)	Area (m ²)	Upstream inv	Down stream invert	Length (m)*	Volume (m ³)
CBMH 302 - CBMH 301	838	0.55	69.08	69.06	18.40	10.15
CBMH 301 - CBMH 300	838	0.55	69.14	69.12	14.30	7.89
CBMH 300 - LD 203	250	0.05	70.76	70.70	10.65	0.52
LD 104 - LD 103	250	0.05	70.81	70.76	9.60	0.47
SUPERPIPE - CB 102	250	0.05	69.60	69.55	4.10	0.20
CB 102 - CB 101	250	0.05	69.76	69.61	14.29	0.70
CBMH 302 - LD 202	250	0.05	70.06	69.98	7.15	0.35
LD 202 - LD 201	250	0.05	70.15	70.06	8.80	0.43
LD 201 - LD 200	250	0.05	70.24	70.15	8.90	0.44
LD 200 - CB 100	250	0.05	70.32	70.24	7.50	0.37
CB 100 - LD 205	250	0.05	70.45	70.38	12.90	0.63
					Total	22.15

* Length is edge of structure to edge of structure for concrete structures

TABLE 4E: Storage Provided - A-01

Elevation (m)	System Depth (m)	CB 100 Volume (m ³)	CB 101 Volume (m ³)	CB 102 Volume (m ³)	CBMH 300 Volume (m ³)	CBMH 301 Volume (m ³)	CBMH 302 Volume (m ³)	Pipe Volume (m ³)	Total Volume (m ³)
69.05	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00
71.06	2.01	0.275	0.484	0.543	3.502	3.612	3.667	22.15	34.24
71.21	2.16	0.331	0.540	0.599	3.776	3.885	3.940	-	35.22
71.36	2.31	0.387	0.595	0.655	4.050	4.159	4.214	-	36.21
71.61	2.46	0.443	0.651	0.711	4.323	4.433	4.487	-	37.20
71.63	2.58	0.487	0.696	0.755	4.542	4.652	4.706	-	37.99
71.65	2.60	-	0.703	0.763	4.579	4.688	4.743	-	38.12

TABLE 4F: Orifice Sizing information - A-01

Control Device								
LMF		90						
Design Event	Controlled Flow (L/S)	Head (m)	Elev (m)	Outlet dia. (mm)	Volume (m ³)	Area (m ²)	Equivalent Dia. (mm)	
1:2 Year	5.10	0.48	69.63	200.00	9.95	0.0027	58.0	
1:5 Year	6.2	0.74	69.89	200.00	14.26	0.0026	58.0	
1:100 Year	9.3	1.65	70.80	200.00	29.81	0.0026	58.0	
1:100 + 20 Year	10.8	2.24	71.39	200.00	36.39	0.0026	58.0	

Orifice Control Sizing

$$Q = 0.62 \times A \times (2gh) \times (0.5 \times d)$$

Q is the release rate in m³/s

A is the orifice area in m²

g is the acceleration due to gravity, 9.81 m/s²

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

Where the equivalent controlled flow exceeds the uncontrolled flow with a 10 minute time of concentration the storm event is uncontrolled by the ICD

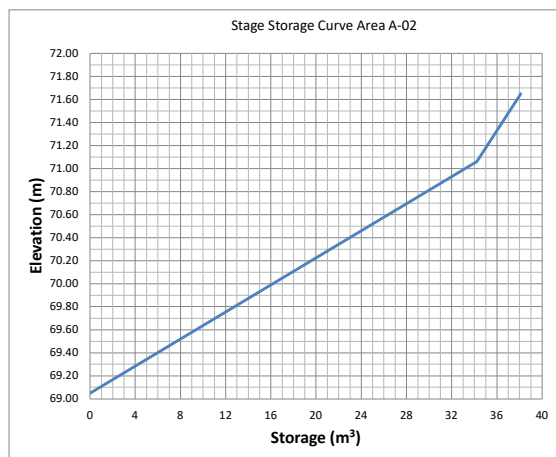


Table 9: Post-Development Stormwater Management Summary

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	0.001	0.90	1.00	N/A		MacLaren Street	0.20	N/A	N/A	0.30	N/A	N/A	0.60	N/A	N/A	N/A
A-01	0.118	0.79	0.86	LMF	90.00	MacLaren Street	5.10	0.480	N/A	6.20	0.740	N/A	9.30	1.650	29.81	38.12
Post-Development Flow							5.3	-		6.5	-		9.9	-		
Total Allowable Release Rate							10.2			10.2			10.2			

Volume III: TEMPEST INLET CONTROL DEVICES

Municipal Technical
Manual Series



SECOND EDITION

LMF (Low to Medium Flow) ICD

HF (High Flow) ICD

MHF (Medium to High Flow) ICD



IPEX

by aliaxis

IPEX Tempest™ Inlet Control Devices

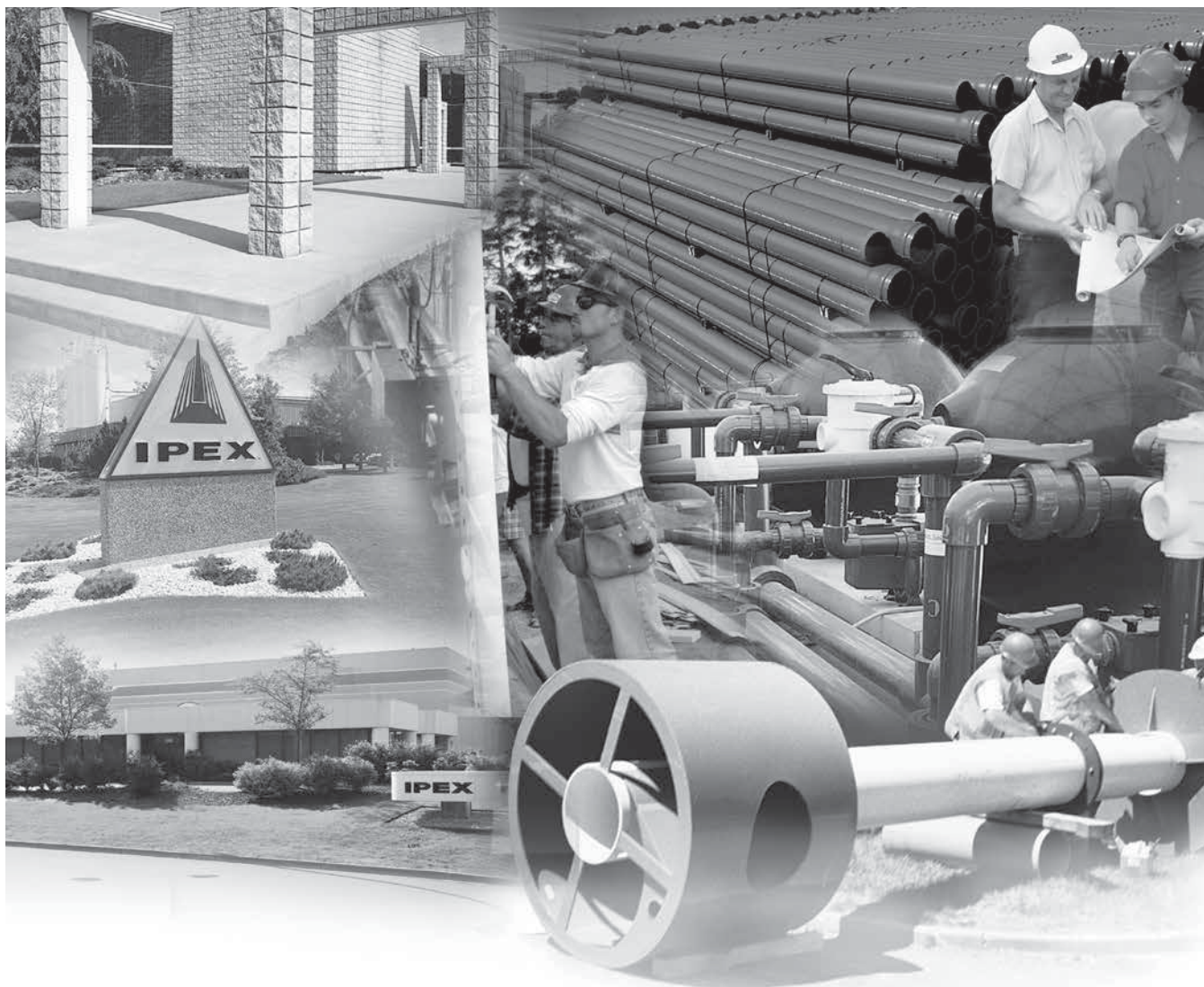
Municipal Technical Manual Series

Vol. I, 2nd Edition

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ABOUT IPEX

At IPEX, we have been manufacturing non-metallic pipe and fittings since 1951. We formulate our own compounds and maintain strict quality control during production. Our products are made available for customers thanks to a network of regional stocking locations throughout North America. We offer a wide variety of systems including complete lines of piping, fittings, valves and custom-fabricated items.

More importantly, we are committed to meeting our customers' needs. As a leader in the plastic piping industry, IPEX continually develops new products, modernizes manufacturing facilities and acquires innovative process technology. In addition, our staff take pride in their work, making available to customers their extensive thermoplastic knowledge and field experience. IPEX personnel are committed to improving the safety, reliability and performance of thermoplastic materials. We are involved in several standards committees and are members of and/or comply with the organizations listed on this page.

For specific details about any IPEX product, contact our customer service department.

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TEMPEST INLET CONTROL DEVICES Technical Manual

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PRODUCT INFORMATION: TEMPEST LOW, MEDIUM FLOW (LMF) ICD

Purpose

To control the amount of storm water runoff entering a sewer system by allowing a specified flow volume out of a catch basin or manhole at a specified head. This approach conserves pipe capacity so that catch basins downstream do not become uncontrollably surcharged, which can lead to basement floods, flash floods and combined sewer overflows.

Product Description

Our LMF ICD is designed to accommodate catch basins or manholes with sewer outlet pipes 6" in diameter and larger. Any storm sewer larger than 12" may require custom modification. However, IPEX can custom build a TEMPEST device to accommodate virtually any storm sewer size.

Available in 14 preset flow curves, the LMF ICD has the ability to provide flow rates: 2lps – 17lps (31gpm – 270gpm)

Product Function

The LMF ICD vortex flow action allows the LMF ICD to provide a narrower flow curve using a larger orifice than a conventional orifice plate ICD, making it less likely to clog. When comparing flows at the same head level, the LMF ICD has the ability to restrict more flow than a conventional ICD during a rain event, preserving greater sewer capacity.

Product Construction

Constructed from durable PVC, the LMF ICD is light weight 8.9 Kg (19.7 lbs).

Product Applications

Will accommodate both square and round applications:

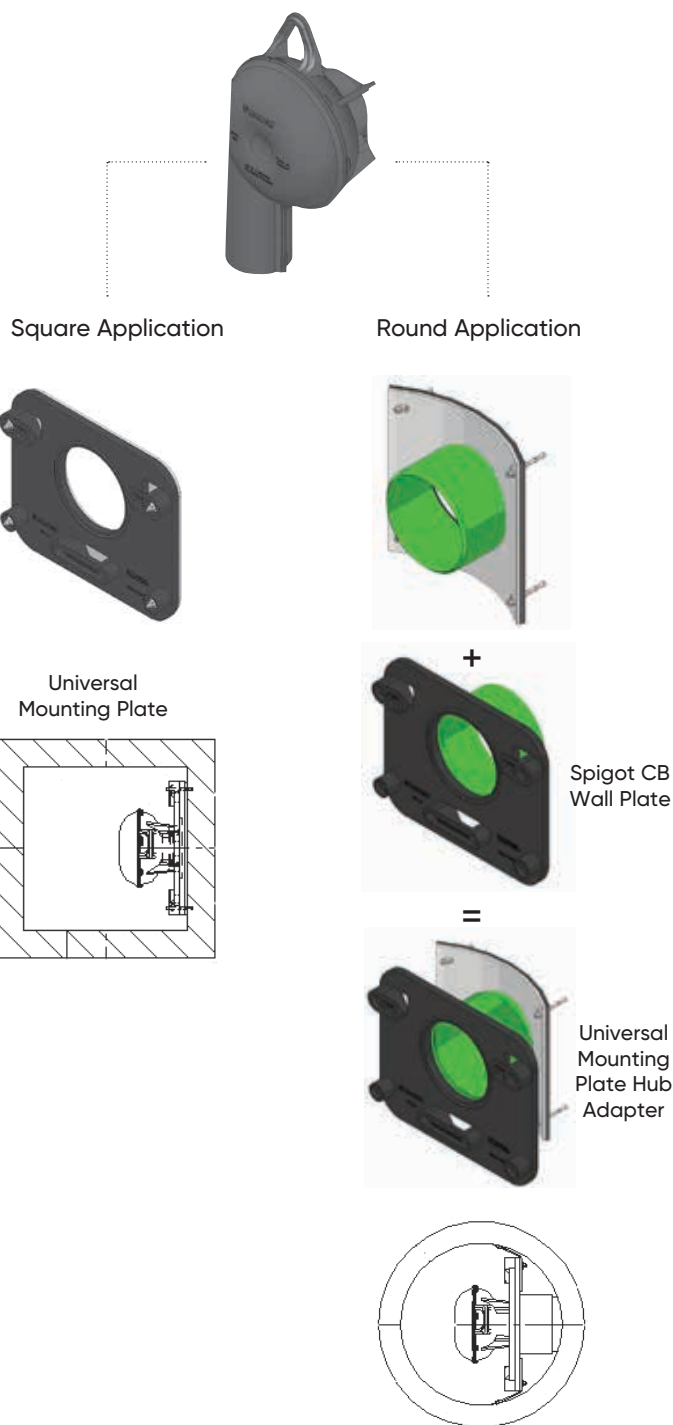


Chart 1: LMF 14 Preset Flow Curves

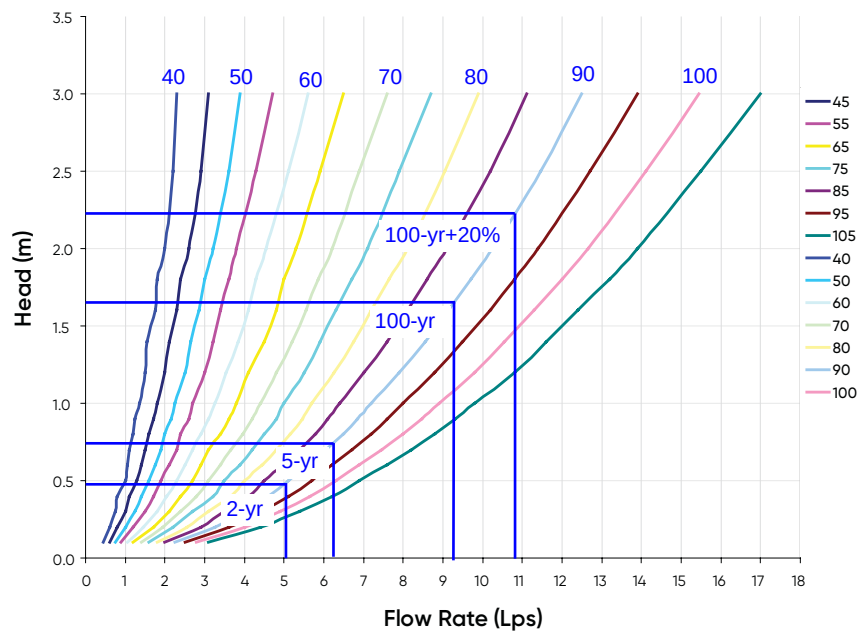
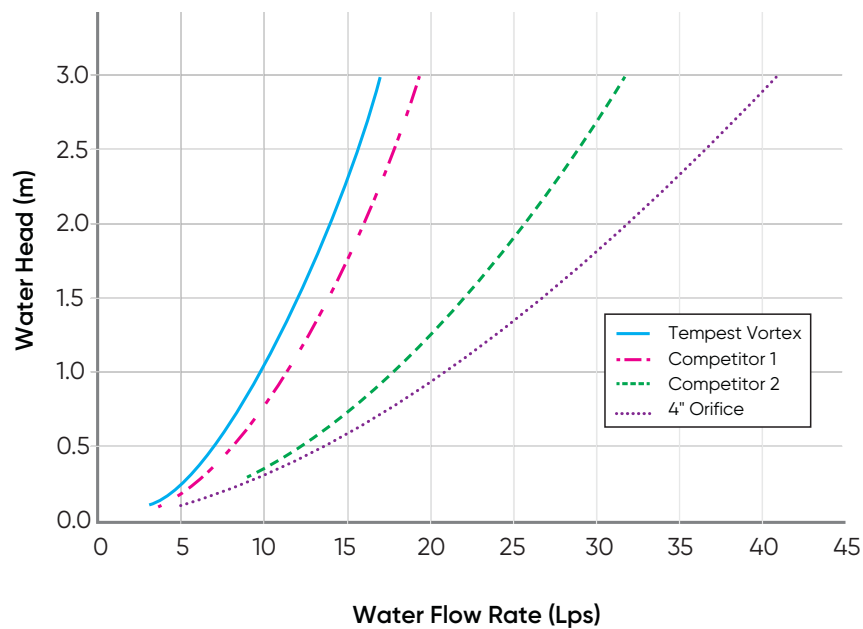


Chart 2: LMF Flow vs. ICD Alternatives



PRODUCT INSTALLATION

Instructions to assemble a TEMPEST LMF ICD into a Square Catch Basin:

STEPS:

1. Materials and tooling verification:
 - Tooling: impact drill, 3/8" concrete bit, torque wrench for 9/16" nut, hand hammer, level, and marker.
 - Material: (4) concrete anchor 3/8 x 3-1/2, (4) washers, (4) nuts, universal mounting plate, ICD device.
2. Use the mounting wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8" concrete bit to make the four holes at a minimum of 1-1/2" depth up to 2-1/2". Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Thread the nuts on the top of the anchors to protect the threads when you hit the anchors with the hammer. Remove the nuts from the ends of the anchors.
5. Install the universal mounting plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the wall mounting plate and the catch basin wall.
6. From the ground above using a reach bar, lower the ICD device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the universal mounting plate and has created a seal.



WARNING

- Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut down the pipe flush to the catch basin wall.
- Call your IPEX representative for more information or if you have any questions about our products.

Instructions to assemble a TEMPEST LMF ICD into a Round Catch Basin:

STEPS:

1. Materials and tooling verification.
 - Tooling: impact drill, 3/8" concrete bit, torque wrench for 9/16" nut, hand hammer, level and marker.
 - Material: (4) concrete anchor 3/8 x 3-1/2, (4) washers and (4) nuts, spigot CB wall plate, universal mounting plate hub adapter, ICD device.
2. Use the spigot catch basin wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8" concrete bit to make the four holes at a depth between 1-1/2" to 2-1/2". Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Thread the nuts on the top of the anchors to protect the threads when you hit the anchors with the hammer. Remove the nuts from the ends of the anchors.
5. Install the CB spigot wall plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the spigot wall plate and the catch basin wall.
6. Apply solvent cement on the hub of the universal mounting plate, hub adapter and the spigot of the CB wall plate, then slide the hub over the spigot. Make sure the universal mounting plate is at the horizontal and its hub is completely inserted onto the spigot. Normally, the corners of the universal mounting plate hub adapter should touch the catch basin wall.
7. From ground above using a reach bar, lower the ICD device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the mounting plate and has created a seal.



WARNING

- Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut back the pipe flush to the catch basin wall.
- The solvent cement which is used in this installation is to be approved for PVC.
- The solvent cement should not be used below 0°C (32°F) or in a high humidity environment. Refer to the IPEX solvent cement guide to confirm the required curing time or visit the IPEX Online Solvent Cement Training Course available at ipexna.com.
- Call your IPEX representative for more information or if you have any questions about our products.

PRODUCT TECHNICAL SPECIFICATION

General

Inlet control devices (ICD's) are designed to provide flow control at a specified rate for a given water head level and also provide odour and floatable control. All ICD's will be IPEX Tempest or approved equal.

All devices shall be removable from a universal mounting plate. An operator from street level using only a T-bar with a hook will be able to retrieve the device while leaving the universal mounting plate secured to the catch basin wall face. The removal of the TEMPEST devices listed above must not require any unbolting or special manipulation or any special tools.

High Flow (HF) Sump devices will consist of a removable threaded cap which can be accessible from street level with out entry into the catchbasin (CB). The removal of the threaded cap shall not require any special tools other than the operator's hand.

ICD's shall have no moving parts.

Materials

ICD's are to be manufactured from Polyvinyl Chloride (PVC) or Polyurethane material, designed to be durable enough to withstand multiple freeze-thaw cycles and exposure to harsh elements.

The inner ring seal will be manufactured using a Buna or Nitrile material with hardness between Duro 50 and Duro 70.

The wall seal is to be comprised of a 3/8" thick Neoprene Closed Cell Sponge gasket which is attached to the back of the wall plate.

All hardware will be made from 304 stainless steel.

Dimensioning

The Low Medium Flow (LMF), High Flow (HF) and the High Flow (HF) Sump shall allow for a minimum outlet pipe diameter of 200mm with a 600mm deep Catch Basin sump.

Installation

Contractor shall be responsible for securing, supporting and connecting the ICD's to the existing influent pipe and catchbasin/manhole structure as specified and designed by the Engineer.

PRODUCT INFORMATION: TEMPEST HF & MHF ICD

Product Description

Our HF, HF Sump and MHF ICD's are designed to accommodate catch basins or manholes with sewer outlet pipes 6" in diameter or larger. Any storm sewer larger than 12" may require custom modification. However, IPEX can custom build a TEMPEST device to accommodate virtually any storm sewer size.

Available in 5 preset flow curves, these ICDs have the ability to provide constant flow rates: 9lps (143 gpm) and greater

Product Function

TEMPEST HF (High Flow): designed to manage moderate to higher flows 15 L/s (240 gpm) or greater and prevent the propagation of odour and floatables. With this device, the cross-sectional area of the device is larger than the orifice diameter and has been designed to limit head losses. The HF ICD can also be ordered without flow control when only odour and floatable control is required.

TEMPEST HF (High Flow) Sump: The height of a sewer outlet pipe in a catch basin is not always conveniently located. At times it may be located very close to the catch basin floor, not providing enough sump for one of the other TEMPEST ICDs with universal back plate to be installed. In these applications, the HF Sump is offered. The HF Sump offers the same features and benefits as the HF ICD; however, is designed to raise the outlet in a square or round catch basin structure. When installed, the HF sump is fixed in place and not easily removed. Any required service to the device is performed through a clean-out located in the top of the device which can be often accessed from ground level.

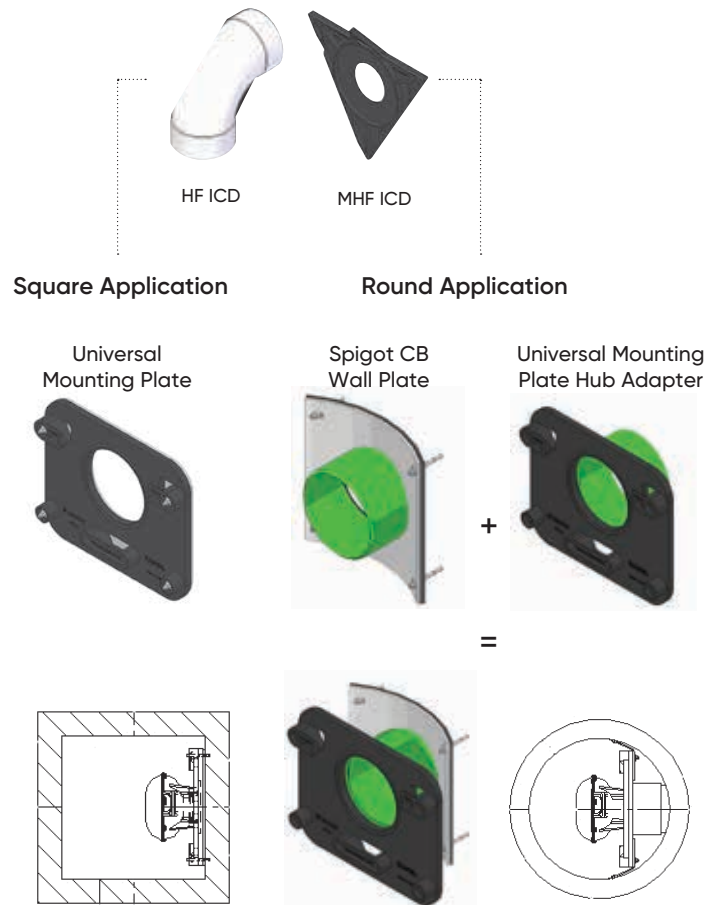
TEMPEST MHF (Medium to High Flow): The MHF plate or plug is designed to control flow rates 9 L/s (143 gpm) or greater. It is not designed to prevent the propagation of odour and floatables.

Product Construction

The HF, HF Sump and MHF ICDs are built to be light weight at a maximum weight of 6.8 Kg (14.6 lbs).

Product Applications

The HF and MHF ICD's are available to accommodate both square and round applications:



The HF Sump is available to accommodate low to no sump applications in both square and round catch basins:

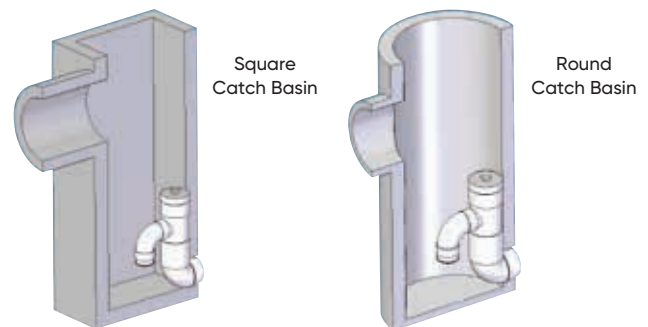
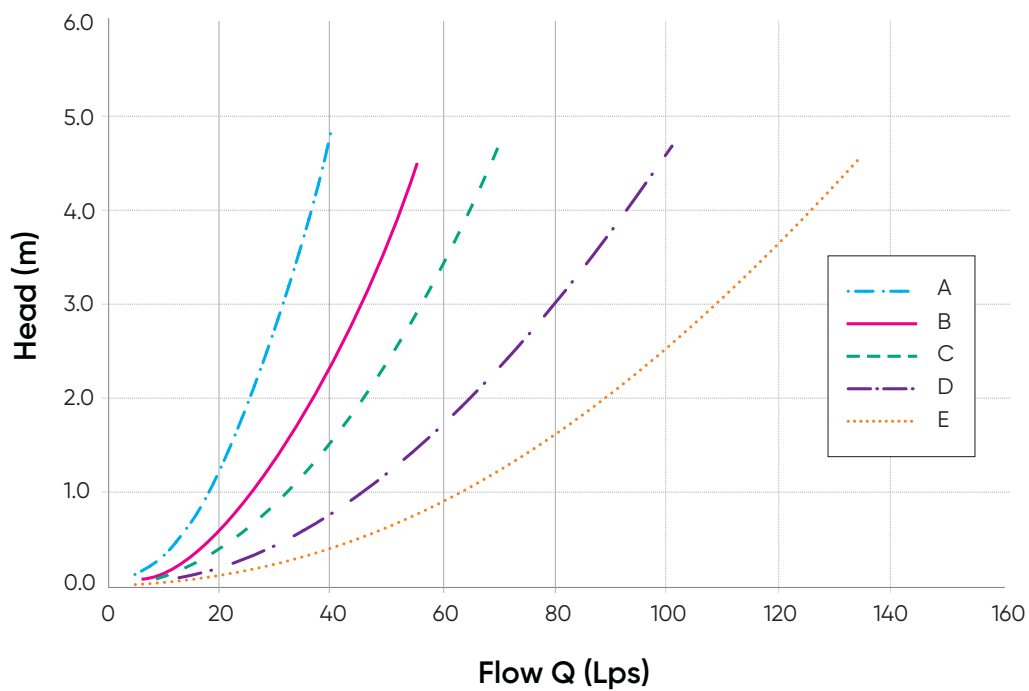


Chart 3: HF & MHF Preset Flow Curves



PRODUCT INSTALLATION

Instructions to assemble a TEMPEST HF or MHF ICD into a Square Catch Basin:

1. Materials and tooling verification:
 - Tooling: impact drill, 3/8" concrete bit, torque wrench for 9/16" nut, hand hammer, level, and marker.
 - Material: (4) concrete anchor 3/8 x 3-1/2, (4) washers, (4) nuts, universal mounting plate, ICD device
2. Use the mounting wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8" concrete bit to make the four holes at a minimum of 1-1/2" depth up to 2-1/2". Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Thread the nuts on the top of the anchors to protect the threads when you hit the anchors with the hammer. Remove the nuts from the ends of the anchors.
5. Install the universal wall mounting plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the wall mounting plate and the catch basin wall.
6. From the ground above using a reach bar, lower the device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the universal wall mounting plate and has created a seal.



WARNING

- Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut down the pipe flush to the catch basin wall.
- Call your IPEX representative for more information or if you have any questions about our products.

Instructions to assemble a TEMPEST HF or MHF ICD into a Round Catch Basin:

STEPS:

1. Materials and tooling verification.
 - Tooling: impact drill, 3/8" concrete bit, torque wrench for 9/16" nut, hand hammer, level and marker.
 - Material: (4) concrete anchor 3/8 x 3-1/2, (4) washers and (4) nuts, spigot CB wall plate, universal mounting plate hub adapter, ICD device.
2. Use the round catch basin spigot adaptor to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8" concrete bit to make the four holes at a depth between 1-1/2" to 2-1/2". Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Thread the nuts on the top of the anchors to protect the threads when you hit the anchors with the hammer. Remove the nuts from the ends of the anchors.
5. Install the spigot CB wall plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the spigot CB wall plate and the catch basin wall.
6. Put solvent cement on the hub of the universal mounting plate, hub adapter and the spigot of the CB wall plate, then slide the hub over the spigot. Make sure the universal mounting plate is at the horizontal and its hub is completely inserted onto the spigot. Normally, the corners of the hub adapter should touch the catch basin wall.
7. From ground above using a reach bar, lower the device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the wall mounting plate and has created a seal.



WARNING

- Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut down the pipe flush to the catch basin wall.
- The solvent cement which is used in this installation is to be approved for PVC.
- The solvent cement should not be used below 0°C (32°F) or in a high humidity environment. Refer to the IPEX solvent cement guide to confirm the required curing time or visit the IPEX Online Solvent Cement Training Course available at www.ipexinc.com.
- Call your IPEX representative for more information or if you have any questions about our products.

Instructions to assemble a TEMPEST HF Sump into a Square or Round Catch Basin:

STEPS:

1. Materials and tooling verification:
 - Tooling: impact drill, 3/8" concrete bit, torque wrench for 9/16" nut, hand hammer, level, mastic tape and metal strapping
 - Material: (2) concrete anchor 3/8 x 3-1/2, (2) washers, (2) nuts, HF Sump pieces (2).
2. Apply solvent cement to the spigot end of the top half of the sump. Apply solvent cement to the hub of the bottom half of the sump. Insert the spigot of the top half of the sump into the hub of the bottom half of the sump.
3. Install the 8" spigot of the device into the outlet pipe. Use the mastic tape to seal the device spigot into the outlet pipe. You should use a level to be sure that the fitting is standing at the vertical.
4. Use an impact drill with a 3/8" concrete bit to make a series of 2 holes along each side of the body throat. The depth of the hole should be between 1-1/2" to 2-1/2". Clean the concrete dust from the 2 holes.
5. Install the anchors (2) in the holes by using a hammer. Put the nuts on the top of the anchors to protect the threads when you hit the anchors. Remove the nuts from the ends of the anchors.
6. Cut the metal strapping to length and connect each end of the strapping to the anchors. Screw the nuts in place with a maximum torque of 40 N.m (30 lbf-ft). The device should be completely flush with the catch basin wall.



WARNING

- Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut down the pipe flush to the catch basin wall.
- The solvent cement which is used in this installation is to be approved for PVC.
- The solvent cement should not be used below 0°C (32°F) or in a high humidity environment. Refer to the IPEX solvent cement guide to confirm the required curing time or visit the IPEX Online Solvent Cement Training Course available at www.ipexinc.com.
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PRODUCT TECHNICAL SPECIFICATION

General

Inlet control devices (ICD's) are designed to provide flow control at a specified rate for a given water head level and also provide odour and floatable control where specified. All ICD's will be IPEX Tempest or approved equal.

All devices shall be removable from a universal mounting plate. An operator from street level using only a T-bar with a hook shall be able to retrieve the device while leaving the universal mounting plate secured to the catch basin wall face. The removal of the TEMPEST devices listed above shall not require any unbolting or special manipulation or any special tools.

High Flow (HF) Sump devices shall consist of a removable threaded cap which can be accessible from street level with out entry into the catchbasin (CB). The removal of the threaded cap shall not require any special tools other than the operator's hand.

ICD's shall have no moving parts.

Materials

ICD's are to be manufactured from Polyvinyl Chloride (PVC) or Polyurethane material, designed to be durable enough to withstand multiple freeze-thaw cycles and exposure to harsh elements.

The inner ring seal will be manufactured using a Buna or Nitrile material with hardness between Duro 50 and Duro 70.

The wall seal is to be comprised of a 3/8" thick Neoprene Closed Cell Sponge gasket which is attached to the back of the wall plate.

All hardware will be made from 304 stainless steel.

Dimensioning

The Low Medium Flow (LMF), High Flow (HF) and the High Flow (HF) Sump shall allow for a minimum outlet pipe diameter of 200mm with a 600mm deep Catch Basin sump.

Installation

Contractor shall be responsible for securing, supporting and connecting the ICD's to the existing influent pipe and catchbasin/manhole structure as specified and designed by the Engineer.

NOTES

SALES AND CUSTOMER SERVICE

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- Electrical systems
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- Municipal pressure and gravity piping systems
- Plumbing and mechanical piping systems
- PE Electrofusion systems for gas and water
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