NOVATECH

Engineers, Planners & Landscape Architects

Engineering

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

Planning

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

Landscape Architecture

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

530 Brisebois Crescent and Part of 265 Centrum Boulevard Ottawa, Ontario

Serviceability Report

530 BRISEBOIS CRESCENT AND PART OF 265 CENTRUM BOULEVARD

OTTAWA, ONTARIO

SERVICEABILITY REPORT

Prepared For:

Forum Asset Management

Prepared By:

NOVATECH
Engineers, Planners & Landscape Architects

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

Issued: December 12, 2025
Revised: April 30, 2026

Ref: R-2025-119
Novatech File: 122170

April 30, 2026 BY EMAIL

City of Ottawa
Planning and Growth Management Department
110 Laurier Avenue West, 4th Floor
Ottawa, Ontario
K1P 1J1

Attention: Justin Armstrong, Senior Engineer – Infrastructure Applications

Dear Justin:

Re: 530 Brisebois Crescent and Part of 265 Centrum Boulevard
Serviceability Report
Our File No.: 122170

Please find enclosed the revised report entitled "530 Brisebois Crescent and Part of 265 Centrum Boulevard – Serviceability Report" dated April 30, 2026. This report outlines the preliminary servicing design for the proposed development with respect to water, sanitary and storm servicing, and stormwater management. Revisions were made to this report to address supportability comments received from the City of Ottawa dated January 15, 2026. This revised serviceability report is submitted in support of an application for *Zoning By-law Amendment*.

If you have any questions, please contact the undersigned.

Yours truly,

NOVATECH

Drew Blair, P.Eng.
Senior Project Manager | Land Development Engineering

cc: Vimal Lad, Forum Asset Management

TABLE OF CONTENTS

List of Figures

List of Tables

List of Appendices

1.0. INTRODUCTION

Novatech has been retained by Forum Asset Management (Forum), c/o EP Real Estate Development Ltd, to prepare a Serviceability Report for the property located at 530 Brisebois Crescent and Part of 265 Centrum Boulevard (Subject Site) within the City of Ottawa as part of an ongoing P3 partnership between Forum and the City of Ottawa. The purpose of this report is to demonstrate that the Subject Site can be serviced utilizing the existing municipal infrastructure surrounding the proposed development.

Refer to **Figure 1** – Key Plan highlights the site location.

2.0. EXISTING DEVELOPMENT

The Subject Site is approximately 1.08 hectares in size and is currently unoccupied. The property is bound by existing commercial buildings and associated parking lots to the west, an existing stormwater management facility (SWM Facility) and park lands to the east, Centrum Boulevard and Brisebois Crescent to the south, and Highway 174 and future OC Transpo LRT Station to the North. The topography of the site and surrounding area gradually slopes away from Centrum Boulevard down towards Highway 174 (south to north).

Refer to **Figure 2** – Existing Conditions / Aerial Plan View.

3.0. PROPOSED DEVELOPMENT

The Subject Site is proposed to be developed as two separate lots, Lot A and Lot B.

530 Brisebois Crescent (Lot A) will be developed as three residential towers on one underground structure, each provided with entrances off Brisebois Crescent to associated underground parking areas. The proposed Lot A development is described as follows:

<u>Building 2</u>

- Tower A – 30-storey residential tower (312 units) including a 3-storey podium

<u>Building 3</u>

- Tower B – 35-storey residential tower (approximate 380 units).
- Tower C – 40-storey residential tower (approximate 438 units).
- Shared 6-storey podium

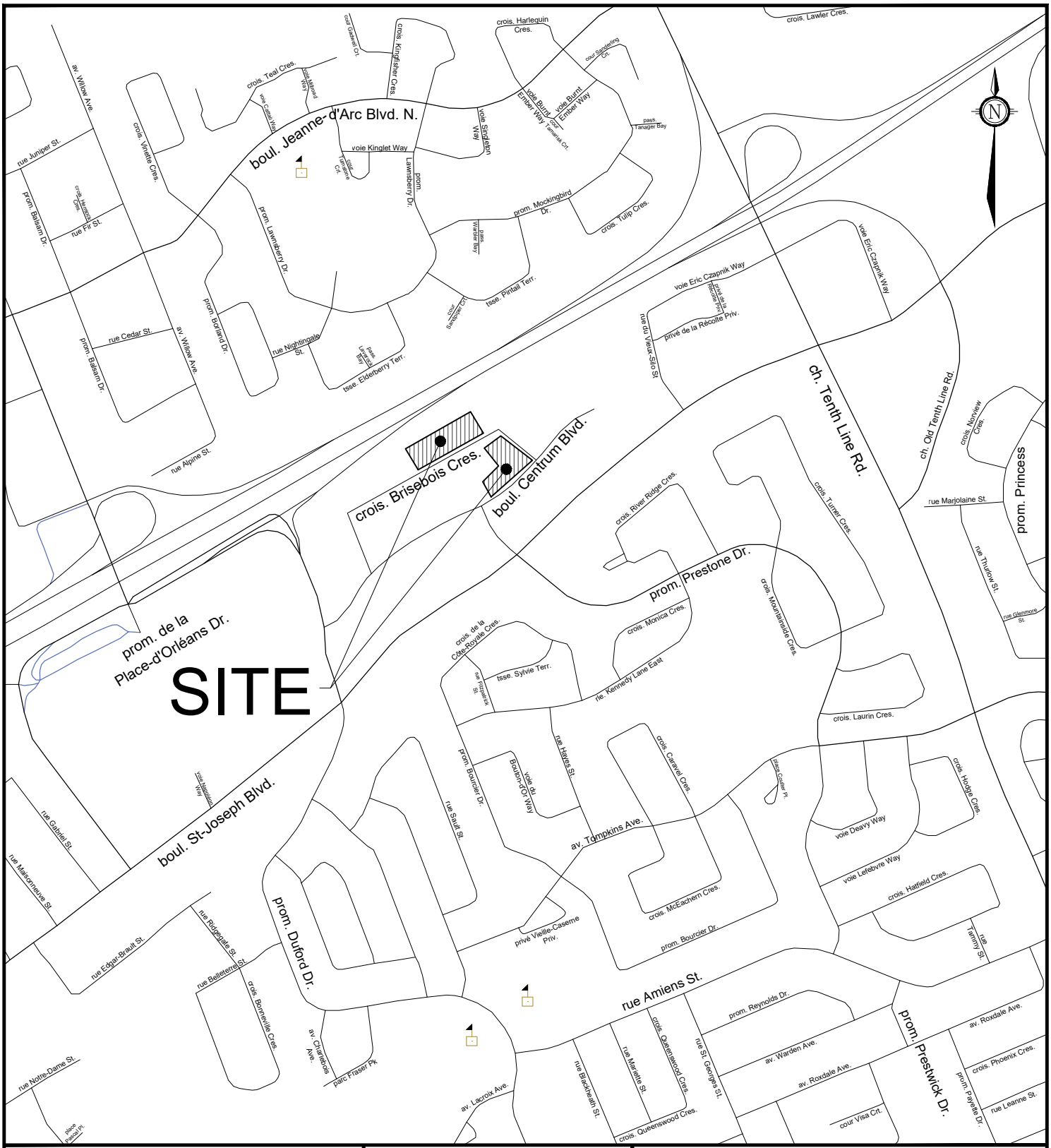
Part of 265 Centrum Boulevard (Lot B) will be developed as one building, provided with an entrance off Brisebois Crescent to associated underground parking areas. The proposed Lot B development is described as follows:

<u>Building 1</u>

- Tower D – 30-storey residential tower (312 units) including a 6-storey podium and commercial areas (400m^2)
- Tower E – 9-storey mid-rise residential building (63 units) including commercial/retail areas (160m^2)
- Community Centre – 2-floors of commercial and amenities areas (1,500m^2 per floor)
- Shared 1-storey podium

The proposed residential buildings/towers will host a total of approximately 1,500 residential units consisting of a combination of one-, two- and three-bedroom units, including townhomes along Brisebois Crescent within the Lot A development.

Figure 3 – Concept Plan shows an overview of the proposed development plan.



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

265 CENTRUM and 530 BRISEBOIS

KEY PLAN

SCALE		
NOT TO SCALE		
DATE	JOB	FIGURE
APR 2026	122170	FIGURE 1

M:\2022\122170\CAD\Civil\Figures\Serviceability\122170-FIG.dwg, FIGURE 1 (KeyPlan), Dec 09, 2025 - 4:09pm, smatthews

SHT8X11.DWG - 216mmx279mm

LEGEND

EXISTING MAJOR OVERLAND FLOW DIRECTION

EXISTING SWM FACILITY

BRISEBOIS CRESCENT

EXISTING PARK

CENTRUM BOULEVARD

265 CENTRUM and 530 BRISEBOIS

EXISTING CONDITIONS / AERIAL PLAN VIEW

SCALE 1 : 750 (0, 10, 20, 30)

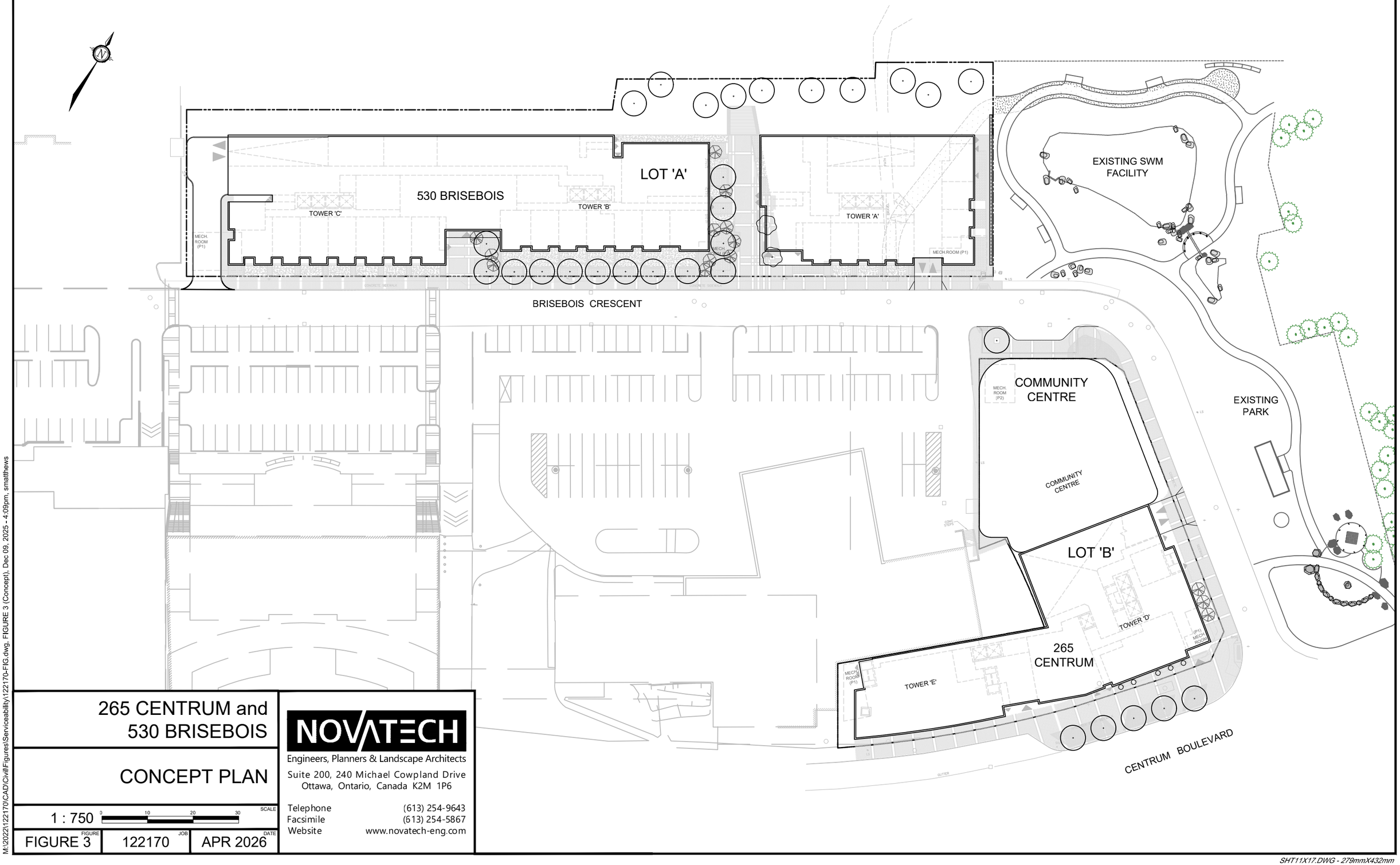
FIGURE	JOB	DATE
FIGURE 2	122170	APR 2026

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

M:\2022\122170\CAD\Civil\Figures\Serviceability\122170-FIG.dwg, FIGURE 2 (Ecdn), Apr 29, 2026 - 3:08pm, smatthews

SHT11X17.DWG - 279mmX432mm



265 CENTRUM and 530 BRISEBOIS

CONCEPT PLAN

1 : 750 SCALE (0, 10, 20, 30)

FIGURE	JOB	DATE
FIGURE 3	122170	APR 2026

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

M:\2022\122170\CAD\Civil\Figures\Serviceability\122170-FIG.dwg, FIGURE 3 (Concept), Dec 09, 2025 - 4:09pm, smatthews

SHT11X17.DWG - 279mmX432mm

4.0. WATER SERVICING

The Subject Site's water distribution system will be serviced separately for Lot A and Lot B. Existing watermain infrastructure within Brisebois Crescent and Centrum Boulevard will provide water supply to the proposed Lot A and Lot B developments.

The existing 200mm dia. watermain within Brisebois Crescent will service the Lot A development with two (2) connections complete with new isolation valves. As the Lot A development's daily water demand is greater than 50 cubic meters, the Lot A water distribution system will be connected internally to provide a looped system to a single City Water Meter. There are multiple existing fire hydrants along the north side of Brisebois Crescent which are available to service the Lot A development.

The Lot B development will also be serviced by the existing 200mm dia. watermain within Brisebois Crescent, complete with a new isolation valve. The existing 300mm dia. watermain service stub off Centrum Blvd will provide a second watermain connection. As the Lot B development's daily water demand is greater than 50 cubic meters, the Lot B water distribution system will be connected internally to provide a looped system to a single City Water Meter. Multiple existing fire hydrants are located on Brisebois Crescent and Centrum Boulevard which are available to service the Lot B development.

Refer to **Figure 4** – Conceptual Servicing for additional information.

Water demand and fire flow calculations have been prepared based on the current concept plans for the Subject Site which features a total of approximately 1,505 units and approximately 560m^2 of commercial/retail areas. Water distribution demands for the Subject Site will be separated for Lot A and Lot B for the purposes of hydraulic analysis. The projected population, residential water demands, and commercial demands for the Subject Site have been calculated based on design criteria in Section 4 of the City of Ottawa Design Guidelines for Water Distribution, including all applicable Technical Bulletins issued by the City of Ottawa. Fire flows are calculated using the Fire Underwriters Survey method using assumptions on building construction and sprinkler requirements. Conceptual water distribution and fire flow demands are summarized in **Table 4.1** below with detailed calculations sheets included in **Appendix B**.

Table 4.1: Water Demand Summary

Lot	Demand Type	Unit Count / Commercial Area (m^2)	Avg. Daily Demand (L/s)	Max. Daily Demand (L/s)	Peak Hour Demand (L/s)	FUS Fire Flow (L/s)
Lot A	Residential – Building 2 (Tower A)	312 units	1.82	4.55	10.01	83
	Residential – Building 3 (Towers B & C)	818 units	4.77	11.93	26.24	100
	Totals – Lot A	**1130 units**	**6.59**	**16.48**	**36.25**	**100**
Lot B	Residential – Building 1 (Towers D & E)	375 units	2.19	5.47	12.03	150
	Commercial – Building 1 (Towers D & E)	560m^2	0.02	0.03	0.05	
	Commercial – Building 1 (Community Centre)	2,500m^2	0.08	0.12	0.22	100
	Totals – Lot B	**375 units**	**2.29**	**5.62**	**12.30**	**150**

265 CENTRUM and 530 BRISEBOIS

CONCEPTUAL SERVICING

1 : 750 SCALE

FIGURE 4 | 122170 JOB | APR 2026 DATE

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

SHT11X17.DWG - 279mmX432mm

Boundary conditions have been provided by the City of Ottawa for the Subject Site. Four (4) connection points were specified in the boundary conditions: two (2) for the Lot A development, and two (2) for the Lot B development. The boundary conditions are based on a previous concept plan for the development which proposed an approximate total of 1,250 units. The current proposed concept plan for the Subject Site proposed approximately 1,500 units. Due to the increase in units, the calculated residential water demands have increased for the Subject Site. Boundary condition analysis is based on approximate unit counts from the previous concept plan. Municipal watermain boundary conditions provided by the City of Ottawa, and corresponding population calculations can be found in **Appendix B**.

The following design criteria were taken from Section 4.2.2 – 'Watermain Pressure and Demand Objectives' of the City of Ottawa Design Guidelines for Water Distribution:

- Normal operating pressures are to range between 345 kPa (50 psi) and 552 kPa (80 psi) under Max Day demands
- Minimum system pressures are to be 276 kPa (40 psi) under Peak Hour demands
- Minimum system pressures are to be 140 kPa (20 psi) under Max Day + Fire flow demands

The hydraulic requirements and boundary condition results are summarized in **Table 4.2** below.

Table 4.2: Boundary Condition Results Summary

Lot	Operating Conditions	Domestic Demands (L/s)	Fire Flow (L/s)	Min/Max Allowable Pressure (m/psi)	Avg. Boundary Condition Pressure Provided (m/psi)
Lot A	High Pressure (Max HGL)	5.59	N/A	56.2 / 80 (Max)	47.1 / 67.0
	Peak Hour	30.75	N/A	28.1 / 40 (Min)	40.9 / 58.1
	Max Daily + Fire Flow	13.98	150	14.1 / 20 (Min)	23.3 / 33.2
Lot B	High Pressure (Max HGL)	1.78	N/A	56.2 / 80 (Max)	45.7 / 65.0
	Peak Hour	9.54	N/A	28.1 / 40 (Min)	40.5 / 57.6
	Max Daily + Fire Flow	4.36	150	14.1 / 20 (Min)	32.2 / 45.8

Based on boundary conditions provided by the City of Ottawa, it is anticipated that the proposed water distribution network will provide adequate operating pressures for the Lot A and Lot B developments. Under each operating condition, residual watermain pressures are within the allowable pressure ranges as specified by the City of Ottawa Design Guidelines for Water Distribution. Minimal pipe losses are anticipated from each building's watermain service to their respective connection to existing watermain infrastructure.

Hydraulic analysis of the Subject Site will be completed as part of the detailed design for the Site Plan Application. Each operation condition will be analyzed separately for the proposed Lot A development and the proposed Lot B development. Hydraulic analysis will accurately portray the proposed unit counts and population based on future revisions to the Subject Site's concept plan. It is anticipated that an increase in residential water demands will not shift watermain operating pressures outside of the listed allowable ranges under each operating condition. During the detailed design for Site Plan Application, boundary conditions may be requested once again based on final unit counts and residential water demands.

5.0. SANITARY SERVICING

The Subject Site is currently vacant and not serviced by any existing sanitary sewers. The surrounding lands are currently serviced by an existing 250mm dia. sanitary sewer within Brisebois Crescent. The existing Brisebois Crescent sanitary sewer conveys wastewater northeast within servicing easements through the existing park lands (east of the Subject Site). The existing 250mm dia. sanitary sewer within the park lands servicing easement connects to an existing 525mm dia. sanitary trunk sewer, which conveys flows across Highway 174 and ultimately to the Robert O. Pickard Environmental Centre. The *Sanitary Drainage Area Plan* (C106011-SAN) and corresponding sanitary sewer design sheet from the approved report titled *Orleans Town Centre Lands (WEST) – Serviceability and Stormwater Management Report* (Novatech, January 2008) is included in **Appendix C**.

It is proposed to service the Lot A development with one 250mm dia. sanitary service connection to the existing 250mm dia. sanitary sewer within Brisebois Crescent. This sanitary service connection will outlet downstream of existing municipal sanitary manhole (MHSA52938).

It is proposed to service the Lot B development with one 250mm dia. sanitary service connection to the existing 250mm dia. sanitary sewer within Brisebois Crescent. This sanitary service connection will outlet downstream of existing municipal sanitary manhole (MHSA52942).

Refer to **Figure 4** – Conceptual Servicing for additional information.

The total theoretical peak sanitary flow from the proposed development was calculated based on the following criteria from Section 4 of the City of Ottawa Sewer Design Guidelines, including all applicable Technical Bulletins issued by the City of Ottawa. Proposed sanitary flows for the Subject Site and are based on a total population of 2832, provided from a total of 1505 units:

- Total Site Area = 1.28 ha (Lot A = 0.71 ha, Lot B = 0.37 ha)
- Apartment (Studio) = 1.4 persons/unit
- Apartment (1-Bedroom) = 1.4 persons/unit
- Apartment (2-Bedroom) = 2.1 persons/unit
- Apartment (3-Bedroom) = 3.1 persons/unit
- Residential Average Flow = 280 L/c/day
- Commercial Average Flow = 28,000 L/ha/day
- Residential Peaking Factor = Harmon Equation & Harmon Correction Factor (k = 0.8)
- Commercial Peaking Factor = 1.5
- Infiltration Rate = 0.33 L/s/ha
- Minimum Velocity = 0.6 m/s
- Manning's n = 0.013

Preliminary sanitary flows for the proposed development are summarized in **Table 5.1** below with detailed calculations included in **Appendix C**.

Table 5.1: Sanitary Peak Flows Summary

Flow Type	Population	Area (ha)	Sanitary Peak Flows (L/s)
Residential	2832	-	27.27
Commercial	-	0.31	0.15
Infiltration	-	1.08	0.36
Total Proposed Sanitary Peak Flow			**27.78**
Existing Sanitary Capacity in the Brisebois Cres Sanitary Sewer			**28**

Preliminary calculations determined the peak sanitary flow produced by the proposed Lot A and Lot B development to be **27.78 L/s**. Correspondence provided by the City of Ottawa Infrastructure & Water Services Department has confirmed based on water meter data, there is approximately **28 L/s** available capacity in the 250mm dia. Brisebois Crescent sanitary sewer. The City of Ottawa determined, based on a high-level review, there is approximately **36 L/s** capacity available within the 525mm dia. sanitary trunk sewer which receives flows from the existing Brisebois Crescent sanitary sewer. Correspondence provided by the City of Ottawa regarding downstream sanitary capacity is included in **Appendix C**.

The full flow capacity of the proposed 250mm dia. sanitary services at minimum grade (1%) is calculated to be 60.2 L/s. Based on preliminary calculations, the proposed sanitary building services can adequately service the proposed Lot A and Lot B developments.

Based on the information received from the City of Ottawa, the existing 250mm dia. sanitary sewer within Brisebois Crescent and the 525mm dia. trunk sewer has capacity available to accommodate the proposed peak sanitary flows from the Subject Site.

6.0. STORM SERVICING & STORMWATER MANAGEMENT

Currently, stormwater for the Lot A development sheet drains across Lot A towards Highway 174 and is collected by the adjacent roadway ditch. Stormwater for the Lot B development currently sheet drains to the north and is collected by a series of roadway catchbasins within Brisebois Crescent, which outlet to the existing SWM Facility northeast of the Subject Site.

Refer to **Figure 5** – Conceptual Grading for additional information.

Storm servicing and stormwater management for the proposed Lot A and Lot B developments will include internal stormwater storage tanks to accommodate rooftop drains from each building, with 375mm dia. (Lot A) and 250mm dia. (Lot B) storm services outletting to existing storm sewer infrastructure.

Controlled rooftop stormwater flows from the Lot A development (530 Brisebois Crescent) will be conveyed by a 375mm storm service to the existing storm manhole (MHST73112) located to the north of Lot A. Described as the *North Sewer* in the approved report titled *Orleans Town Centre Lands (WEST) – Serviceability and Stormwater Management Report* (Novatech, January 2008), the existing *North Sewer* bypasses the existing SWM Facility, flows through an existing Stormceptor unit and outlets directly to the existing 750mm dia. storm sewer downstream of the existing SWM Facility. The proposed Lot A development will provide on-site internal storage to attenuate flows to the allowable release rate which is outlined in the approved report titled *North Private Storm Sewer Design Brief – Commercial Drive* (Novatech, June 2012). Quality control will be provided by the existing Stormceptor unit as part of the *North Sewer*. Refer to excepts from the approved *2012 North Private Storm Sewer Design Brief* and the approved *Storm Drainage Area Plan* (109004-NSTM) located in **Appendix E** for additional information.

Controlled rooftop stormwater flows from the Lot B development (Part of 265 Centrum Boulevard) will be conveyed by a 250mm storm service to the existing municipal storm manhole (MHST52228) within Brisebois Crescent. Described as the *South Sewer* in the approved *2008 Serviceability Report*, existing storm sewer infrastructure conveys flows to the existing SWM Facility, which outlets to the existing 750mm dia. storm sewer. The proposed Lot B development will provide on-site internal storage to attenuate flows to the allowable release rate which is described in the approved *2008 Serviceability Report*. Refer to excepts from the *2008 Serviceability Report*, the approved *Storm Drainage Area Plan* (C106011-STM) and coinciding storm sewer design sheet located in **Appendix F** for details**.**

LEGEND

POST-DEVELOPMENT MAJOR OVERLAND FLOW DIRECTION

65.75 PROPOSED FINISHED FLOOR ELEVATION

530 BRISEBOIS

TOWER 'C'

TOWER 'B'

TOWER 'A'

LOT 'A'

BRISEBOIS CRESCENT

EXISTING SWM FACILITY

SITE BENCHMARK
CC ON CONCRETE PAD
ELEVATION = 65.59

COMMUNITY CENTRE

EXISTING PARK

LOT 'B'

265 CENTRUM

TOWER 'D'

TOWER 'E'

CENTRUM BOULEVARD

265 CENTRUM and 530 BRISEBOIS

CONCEPTUAL GRADING

1 : 750 SCALE

FIGURE 5 | 122170 | APR 2026

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

M:\2022\122170\CAD\Civil\Figures\Serviceability\122170-FIG5.dwg, FIGURE 5 (CGR), Apr 29, 2026 - 3:14pm, smatthews

SHT11X17.DWG - 279mmX432mm

Refer to **Figure 4** – Conceptual Servicing for additional information.

As described in the pre-consultation notes, stormwater flows in excess of the allowable release rate, up to and including the 100-year storm event, must be detained on site. For both Lot A and Lot B, the building's stormwater runoff is to be conveyed to internal storage tanks from each building rooftop's uncontrolled roof drains. The controlled flows from the internal storage tanks are to be released via an orifice or a pump. This design will feature an internal emergency overflow from the internal storage tank to the outlet storm sewer in the event of an orifice blockage, or any disruption to the pump(s) operation.

Preliminary stormwater management calculations have been completed for the Subject Site. The allowable release rate for the Lot A development (0.713 ha), utilizing the existing *North Sewer,* has been calculated to be **77.1 L/s** (108.1 L/s/ha), based on Table 2.1 in the *2012 North Private Storm Sewer Design Brief*. Quantity control measures will be provided by the proposed underground storage tanks. Quality control is provided by the existing Stormceptor unit. Excerpts regarding the Lot A development's allowable release rate from *2012 North Private Storm Sewer Design Brief* are included in **Appendix E**.

The allowable release rate for the proposed Lot B development (0.367 ha) is governed by the *South Sewer* and ultimately the existing SWM Facility, which was designed in the approved 2008 *Serviceability Report*. The existing SWM Facility was designed assuming uncontrolled flow with a runoff coefficient of 0.90 for the Lot B development area. Using time of concentration of 10minutes and applicable rainfall data (104.2 mm/hr), the allowable release rate has been calculated to be **95.7 L/s** for the Lot B development. Quantity control measures are to be provided by the proposed underground storage tanks. Quality control will be provided by the existing SWM Facility. The storm sewer design sheet, *Storm Drainage Area Plan* (C106011-STM) and excerpts from the *2008 Serviceability Report* which outline the existing SWM Facility design are included in **Appendix F**.

The preliminary stormwater management calculations for the Subject Site are summarized below in **Table 6.1.** Detailed preliminary stormwater management calculations are included in **Appendix D**.

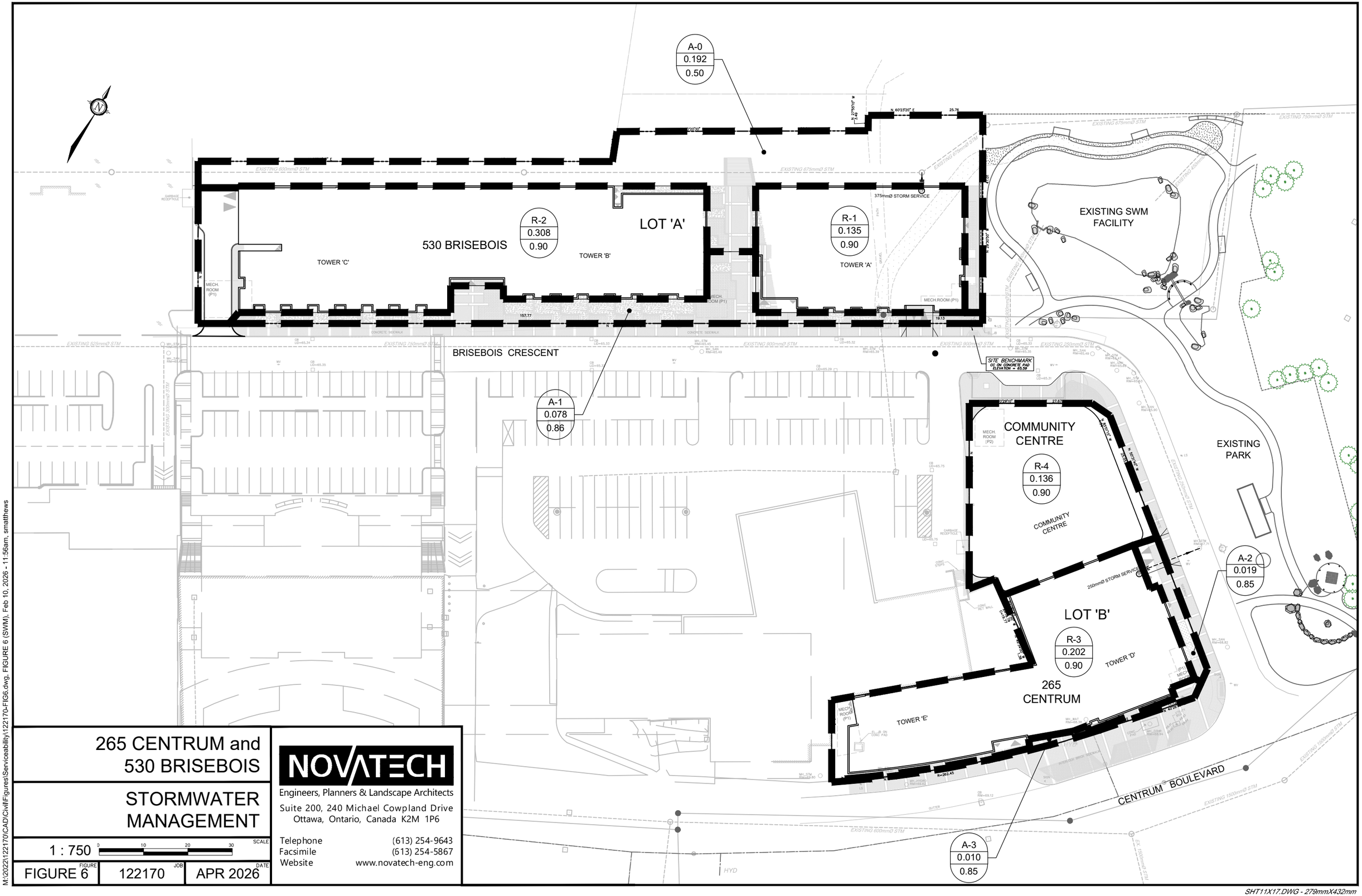
Refer to **Figure 6** – Stormwater Management for details.

Table 6.1: Stormwater Management Summary

Development (Outlet)	Area ID	Area (ha)	100-Year Weighted C_{100}	100-Year Storm Event	
				Flow (L/s)	Required Volume (cu.m)
Lot A (*North Sewer)*	R-1	0.135	1.00	3.79	79.5
	R-2	0.308	1.00	3.79	226.7
	Total Proposed Release Rate – Lot A			**7.58**	**306.2**
	[1]Allowable Release Rate – *North Sewer*			**77.10**	-
Lot B *(South Sewer)*	R-3	0.202	1.00	3.79	133.4
	R-4	0.136	1.00	3.79	80.3
	A-1	0.078	0.95	36.90	-
	A-2	0.019	0.95	8.90	-
	Total Proposed Release Rate – Lot B			**53.38**	**213.7**
	[2]Allowable Release Rate – *South Sewer*			**95.70**	-

1 – Refer to **Appendix E** for excerpts from the *North Private Storm Sewer Design Brief – Commercial Drive* (Novatech, June 2012) outlining allowable release rates from the Lot A development to the *North Sewer* system.

2 – Refer to **Appendix F** for documents from the *Orleans Town Centre Lands (WEST) – Serviceability and Stormwater Management Repor*t (Novatech, January 2008) outlining the existing SWM Facility design which utilizes the *South Sewer* system.



265 CENTRUM and 530 BRISEBOIS

STORMWATER MANAGEMENT

1 : 750 SCALE

FIGURE 6 | 122170 | APR 2026

FIGURE | JOB | DATE

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

M:\2022\122170\CAD\Civil\Figures\Serviceability\122170-FIG6.dwg, FIGURE 6 (SWM), Feb 10, 2026 - 11:56am, smatthews

SHT11X17.DWG - 279mmX432mm

As summarized in Table 6.1, the Lot A and Lot B development both meet allowable release rates for controlled stormwater conveyance to the *North Sewer* and *South Sewer* systems, respectively, up to and including the 100-year storm event.

It should be noted that detailed calculations outlined in **Appendix F** include various areas of proposed direct runoff from the Lot A and Lot B developments. Landscaped areas north of the Lot A development buildings will continue to follow pre-development conditions of draining to the north towards Highway 174 and be collected by the adjacent roadside ditch. Under pre-development conditions, stormwater flows during the 100-year event to the north ditch are approximately 90.4 L/s. Under post-development conditions, described as drainage area "A-0", stormwater flows to the north ditch are calculated to be approximately 54.4 L/s during the 100-year event. It is anticipated there will be no net negative impacts to the existing drainage flows offsite to the north ditch.

The small areas sheet-draining to Brisebois Crescent from the Lot A and Lot B developments (drainage areas "A-1" and "A-2") are to be captured by existing roadway catchbasins. It is anticipated that the small area of direct runoff to Brisebois Crescent from the Subject Site will not increase stormwater flows to the existing SWM Facility beyond the allowable volumes described in the approved *2008 Serviceability Report*. The existing SWM Facility was designed assuming uncontrolled flow with a runoff coefficient of 0.90 for the Lot B development, most of which is now captured and conveyed by controlled roof drains. It is anticipated the overall allowable release rate of 145 L/s from the SWM facility will be maintained. Some additional control measures could be implemented within the existing catchbasins on Brisebois Crescent to control the inflows to the *South Sewer* if determined to be required during the detail design Site Plan Application process.

Direct runoff areas from the Lot B development to Centrum Boulevard, described as drainage area "A-3", are minimal and are not expected to negatively impact on the downstream storm sewer system on Centrum Boulevard.

During storms in excess of the 100-year storm event, site grading will provide an overland flow route to the existing Brisebois Crescent and the existing SWM Facility, and ultimately outletting to the downstream Taylor Creek Watershed. The ultimate overland flow outletting from the existing SWM Facility is anticipated to be the same volumes that the approved SWM Facility currently operate under.

The *2008 Serviceability Report* includes a hydrologic model to generate hydrographs for the OTC West Lands. An assumption described by this model was that rooftop storage had been modeled assuming a maximum release rate of 40 L/s/ha. The total rooftop storage area for the Subject Site is approximately 0.781 ha, which in total conveys 15.16 L/s of controlled stormwater flows. Based on the presented values, the allowable maximum release of 40 L/s/ha from rooftop storage is maintained.

The approved quality control level for the existing Stormceptor unit servicing the *North Sewer* is 70% TSS removal level as designed in the approved *North Private Storm Sewer Design Brief* (Novatech, 2012). The approved quality control level for the existing SWM facility servicing the *South Sewer* is 70% TSS removal level as designed in the approved *2008 Serviceability Report*. Only stormwater runoff from the rooftop drainage areas in Lot A is directed to the *North Sewer* and is typically considered clean for the purpose of protecting water quality for aquatic habitat. Clean stormwater runoff from the rooftop drainage areas in Lot B and a minimal amount of additional exterior hard surface area drainage directed to the roadway catchbasins on Brisebois Crescent will be conveyed to the existing SWM facility. These flows should still fall within the approved treatment volumes and quality levels for the approved SWM facility.

The existing SWM Facility access road is within the proposed Lot A development footprint. As part of the Lot A development, the access road is to be relocated to be within the SWM Facility block.

In summary, the existing storm sewer infrastructure can service the proposed Lot A and Lot B development, and appropriate stormwater management methods can be used to meet allowable release rates and quality levels (70% TSS overall) as outlined in previous governing servicing studies and reports as well as previously approved stormwater quality requirements. A complete stormwater management analysis will be provided as part of the detailed design Site Plan Application process.

7.0. EROSION AND SEDIMENT CONTROL MEASURES

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

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

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

8.0. CONCLUSIONS AND RECOMMENDATIONS

This revised Serviceability Report has evaluated the serviceability (water distribution, sanitary and storm servicing) and stormwater management for the proposed 530 Brisebois Crescent and Part of 265 Centrum Boulevard within Ottawa, Ontario.

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

- Water distribution, including both domestic and fire protection, can be provided for the Subject Site by connecting to existing 200mm dia. and 300mm dia. watermain infrastructure within Brisebois Crescent and Centrum Boulevard.
- Sanitary servicing for the Subject Site can be provided by installing the proposed 250mm dia. sanitary services which convey sanitary flows to the existing 250mm dia. sanitary sewer within Brisebois Crescent.
- Storm servicing can be provided for the proposed development utilizing on-site internal stormwater storage tanks in the buildings outletting to the existing storm sewer infrastructure (both *North Sewer* and *South Sewers*). Allowable release rates can be achieved for controlled stormwater conveyance to the *North Sewer* and *South Sewer* systems.
- There should be no increase in flows to the existing downstream Taylor Creek Watershed, no increase in erosion or flooding risk is anticipated.
- Quantity control of stormwater can be provided for the Subject Site through stormwater storage in the proposed internal storage tanks for each building.
- Quality control for the *North Sewer* will be provided by the existing Stormceptor on the 750mm outlet and the existing SWM facility will provide quality control for the *South Sewer* on Brisebois Crescent.
- Stormwater runoff from rooftop drainage and landscaped areas is generally considered clean, thus the proposed development will not require additional quality control measures.
- The existing SWM Facility access road is to be relocated within the SWM Facility block as part of the Lot A development.
- Temporary erosion and sediment control measures will be required during construction.

9.0. CLOSURE

This revised report entitled "530 Brisebois Crescent and Part of 265 Centrum Boulevard – Serviceability Report" is submitted in support of an application for Zoning By-law Amendment for review and approval.

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

NOVATECH

Prepared by:

Billy McEwen, B.A.Sc., EIT
Land Development Engineering

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

Reviewed by:

Drew Blair, P.Eng.
Senior Project Manager | Land Development Engineering

APPENDIX A
Pre-Consultation Notes

File No.: *No PC number*

May 16, 2025

Vimal Lad, Senior Manager
Forum Asset Management
Via email: vimal@forumam.com
cc. Dayna Gilbert, daynag@forumam.com

Subject: **Pre-Consultation: Meeting Feedback**
Proposed Zoning By-law Amendment Application – 530 Brisebois, part of 265 Centrum Boulevard (Forum Lands)

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on May 5, 2025.

Pre-Consultation Preliminary Assessment

1 ☐	**2** ☐	**3** ☒	**4** ☐	**5** ☐

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

Next Steps

- A review of the proposal and materials submitted for the above-noted pre-consultation has been undertaken. For your application 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.

- In your 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.

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

- 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 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. 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:

1. **Official Plan** designates these lands as Hub and Evolving Neighbourhood in Schedule B8 - Suburban (East) Transect.

2. **Orleans Corridor Secondary Plan** (SP) applies to these lands and designates them Station Core, Station Periphery, and Greenspace. Comments herein are made based on the current version of the SP, acknowledging there are existing appeals which may result in changes to the SP designations and policies.

    a. A portion of the lands are over a **Greenspace** portion of land, which are intended for different uses such as parks, open space, and natural areas. I acknowledge that your current appeals may result in a revision to this area as you are contemplating a different form of parkland dedication. If the appeals do not result in a modification to this area you will have to revise your design to show consistency with the greenspace designation.

    b. The portion of lands that are part of 265 Centrum Boulevard are designated **Station Core**.

        i. 5.1(1) states these are Design Priority Areas and so a visit to the UDRP is required before submission.

        ii. 5.1(5) require active frontages for all buildings and encourage retail uses fronting public streets, which I am happy to see in your current concept.

iii. 5.1(6) states the “City should… work with development proponents to create privately-owned publicly accessible spaces (POPS) in the form of urban plazas”. Consistent with 6.4(9) – quoted later in these comments – a small POPS opportunity exists in front of building F-D.

iv. 5.1(7) and 5.1(9) require that cycling and pedestrian connectivity & infrastructure is made a priority, and your submission should show how you are going above and beyond in this respect. Please also refer to 6.4(9) below for added justification.

c. The lands at the north extent, 530 Brisebois, are designated **Station Periphery**.

i. 5.2(4) states that “non-residential uses, including locally-oriented services, amenities, and institutions, that support the goals of this plan and the principal residential function of this designation, may be permitted”. I think there is opportunity to provide a mix of uses in this area to contribute to the future high-density town centre. Please comment.

ii. Demonstrate how you are connecting to an active transportation network (5.2(5)), providing for *extensive* tree canopy coverage (5.2(6)), and again, prioriziting pedestrian and cycling infrastructure (5.2(8)).

d. Place d’Orleans Town Centre Station Area policies provide additional design suggestions that should be considered:

i. 6.4(7) states that the Town Centre will serve as a major employment hub, seeking a future 10,000 jobs. Is there any consideration towards providing some level of employment in any of your buildings?

ii. 6.4(9) states that existing angled parking should be removed/reconfigured to provide cycling/walking or other public realm improvements. There is opportunity to provide a POPS in line with comments provided under the Station Core section.

iii. 6.4(14) states that buildings shall contribute to the Place d’Orléans Town Centre Station skyline, during the day and night, through a diversity of building heights and architectural expressions. As buildings that will set the stage for future high rise intensification in the Town Centre the City will expect a high standard of design and we would like to see more detail in your UDRP submission

e. There are additional Site Specific Policies 6.4(21), 6.4(32) that may apply but it is presumed these will be addressed by your appeals.

f. Please note the following High-rise policies:

   i. 4.6(5) “The implications of each proposed high-rise building on the skyline shall be demonstrated to ensure an appropriate diversity of heights within any existing or planned cluster of high-rise buildings, and generally a downward transition of building heights away from the closest O-Train station”

   ii. 4.6(6) “Where a single podium forms the base for more than one high-rise building, an at-grade pedestrian connection may be required through the podium to the interior of the site”

3. Design Comments (in extension/addition to policy comments above)

   a. There are opportunities for a greater mix of uses on your lands, particularly the three proposed high rises in the Station Periphery zone which are currently purely residential. We had previous discussions around providing some small scale retail on the ground floors of the buildings flanking the pedestrian connection. I also have a comment about potential for employment.

   b. There is a strange lot line/parcel fabric between your lands and the development on the YMCA site. I understand there is also a fair grade change from the south to north end of those lands. Greater design detail and consideration should be provided for your ZBLA in order to ensure the design of those two areas are not conflicting.

   c. Where are you building in tree planting areas in the development? Most of the design speaks about the building envelope, but I am also thinking about landscaping/tree opportunities on site. Preliminary design appears to show quite limited space for landscaping, tree planting, etc.

      i. OP Section 4.1.3 directs trees to be planted along public streets. Confirm there is sufficient room with your current setbacks.

      ii. OP Section 4.8.2 seeks a forest canpy target of 40% with guidelines for development in 4.8.2(3). Among these policies, space for mature, healthy trees shall be preserved, and development shall create tree planting areas within the site. There is potential to not only reserve space along property lines but to build up soil volumes and planting areas on-site.

   d. Is there an opportunity to create outdoor community spaces (i.e., community gardens) to create more permeable landscaping via the public realm? The OCDSP emphasizes new park space, community programming and POPS opportunities.

i. 4.16 of the Plan promotes enhancing tree canopy and increasing permeable landscaping by adding street trees where streets are reconstructed, or as part of public realm contributions through development. Protecting natural areas will build resilience to future flood risks and increased stormwater runoff. Sustainable design practices will be encouraged to support climate resiliency and reduce the urban heat island effect.

e. Rights-of-way – how are you tying building design into the public realm, considering policy that seeks to reconfigure angled on-street parking along Centrum Frontage specifically. Please also consider Urban Design comments about Brisebois right-of-way.

f. Bicycle and pedestrian priority is described throughout Secondary Plan policy. The ZBLA will be a good opportunity to ensure high quality cycling facilities are provided in the new development, for example a 1:1 ratio for bike parking to residential units (4.12 of OCSP), a proportion of bike parking at ground level and additional cycling-related facilities like wash/repair stations integrated into the building amenities.

g. While green roofs are shown, they appear to be minimal. Please explore opportunities to increase the amount of green roofing on podiums.

4. Explore opportunities to create affordable housing

   a. OP section 4.2.2(4) states that “In accordance with the City’s 10-Year Housing and Homelessness Plan, the City shall set a target that 20 per cent of all new residential units be affordable. Of all affordable units, 70 per cent are to be targeted to households whose needs fall within the definition of core affordability, and the remaining 30 per cent are to be targeted to households whose needs fall within the definition of market-affordability”.

   b. The More Homes Built Faster Act, 2022 introduced exemptions and discounts from municipal development-related charges (MDRCs) for affordable residential units. These exemptions and discounts came into effect on June 1, 2024. Please let us know in your submission if you are interested in exploring this program.

5. Section 37 requirements / Community Benefits Charge

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

6. There is no parking requirement for any vehicular parking as this is a Protected Major Transit Station Area.

7. Wind study is required and shall generally avoid adverse impacts on surrounding parks, public spaces, and future amenity/POPS areas, should they be proposed.

8. Public access easement will be secured at minimum along the pedestrian access between towers and connecting between Brisebois and future LRT.

9. The lands just north of your development are Ontario Hydro owned. It is recommended that you contact them prior to submission in order to collect any design requirements that may be required.

10. Consider also the presence of Highway 174 and whether any setbacks are required. I do not believe any would be required because of your distance from the right-of-way but you should also contact the Ministry of Transportation prior to submission as the highway is being uploaded to the Province.

Urban Design

Comments:

11. Submission Requirements

    a. Urban Design Brief. Please see attached customized Terms of Reference to guide the preparation.

        i. Please see checked boxes for elements that should be included in the Urban Design Brief.

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

        iii. Please note that the Urban Design Brief will also serve as the submission to the Urban Design Review Panel (see notes below).

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

        i. Site Plan

        ii. Landscape Plan, conceptual may suffice

        iii. Building Floor Plans, particularly the ground floor plan, conceptual may suffice

iv. Grading Plans, conceptual building sections may suffice

v. Wind analysis, please include the proposed towers on the abutting YMCA site for context to ensure the full impacts will be understood and assessed

vi. Shadow Analysis, please include the massing of the proposed towers on the abutting YMCA site for context to ensure the full impacts will be understood and assessed

12. The site is located within a Design Priority Area according to Schedule C7A of the Official Plan and is subject to review by the Urban Design Review Panel. UDRP review occurs within the preconsultation stage prior to the submission of an application. To proceed with UDRP review, please contact udrp@ottawa.ca.

13. 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)

14. Height variation and transition

    The proposed design shows four buildings with their heights transitioning down from the west side of the site. Providing varied heights is a direction of the secondary plan. However, the rationale of the proposed heights and transition is unclear. To closely follow the direction of the Secondary Plan, the tallest building should be located where the pedestrian connection to the future LRT station is.

    Policy reference:

    a. Policy 4.6.5 of the Secondary Plan, regarding high-rise buildings, states: The implications of each proposed high-rise building on the skyline shall be demonstrated to ensure an appropriate diversity of heights within any existing or planned cluster of high-rise buildings, and generally a downward transition of building heights away from the closest O-Train station.

    b. Additional policies regarding transition can be found in section 6.4 Place d'Orléans Town Centre Station Area.

15. Tower separations – Building D

    Building D is situated very close to the interior lot lines. The proposed design may not be in conformity with the Secondary Plan and the ZBL. It is inconsistent with City's guidelines for high-rise buildings. However, given the lot geometry and configuration, and particularly the currently circulated applications for the abutting lot, reduced tower setbacks from the interior lot lines may be contemplated.

    Policy reference:

a. Policy 4.6.4 regarding high-rise buildings states: A minimum tower separation of 25 metres is required between the tower elements of high-rise buildings. If site constraints are demonstrated to result in the loss of a tower due to provision of this setback, a minimum tower separation of 23 metres may be permitted.

16. Brisebois – right-of-way, street cross sections, and building setbacks

Brisebois has a protected right-of way of approximately 18m and 12m. The street was designed and constructed to support much lower development intensities (shown in the current zoning) than the proposed. The current street cross section is asymmetrical. The majority of the roadway and sidewalk are located off centre with the sidewalk located right along the property line of the right-of-way (see attached PDF). In principle, a more generous public realm between building faces is required in order to support the proposed very high-density developments. This may be achieved through increased right-of-way width or increased building setback.

It is noted that the proposed development on the YMCA site has varied building setbacks ranging from 0 to 2m to 7m (see attached PDF). The conceptual street cross section shows that on the 18m portion of the street, without building setbacks there will be no street trees along the north side of Brisebois. Please also note this conceptual street cross section does not accommodate any cycling infrastructure.

The current proposal for 530 Brisebois shows a 2m building setback from the property line along the 18m portion of Brisebois, which is hardly sufficient to accommodate a row of mature street trees which need room for both the roots and the canopies. In general, a minimum building setback of 3m is required when residential units are located at grade, which is shown in the current proposal, to ensure minimum privacy and comfort. When private outdoor patios are proposed, additional building setbacks are required.

The current proposal also shows that the community centre has no setback on the south side of the 18m portion of Brisebois. The proposal also shows a 2.5m setback for both the community centre and Building D along the 12m portion of Brisebois. While street trees may be possible on the 18m portion of the street (without cycling infrastructure) as shown on the conceptual street cross section by the developer of the YMCA site it is unclear if there are rooms for street trees along the 12m portion of Brisebois.

Street cross section design is critical to the ZBLA process as they will determine the appropriateness of right-of-way and requirements for building setbacks in order to achieve the objectives of the Secondary Plan. The design of the cross section must take into consideration: 1) the anticipated highest service levels for pedestrians and cyclists (for example is a minimum 3m sidewalk required instead of 2m?); 2) rooms for mature street trees; 3) the necessary vehicular circulations

including EMS, fire trucks, delivery services, and 4) the desirable on-street parking that supports street-oriented commercial uses. Street cross sections may vary. There may be wider portions and narrow portions. Variations can break up long street walls and contribute to a more interesting and rich pedestrian experience, and supports commercial uses (see attached PDF).

Policy reference:

a. Policy 4.2.5a, a general policy regarding public realm, states: All new local and private streets shall be designed as follows: a. Include sidewalks, soft landscaping and street trees.

b. Policy 5.1.7 regarding Station Core states: The creation of pedestrian and cycling infrastructure will be prioritized throughout the Station Core designation. Design for wherever vehicular access crosses the pedestrian or cycling network, pedestrian and cycling movements will have priority.

c. Policy 5.2.6 regarding Station Periphery states: Extensive tree canopy coverage in open spaces will be provided.

d. Policy 5.2.8 regarding Station Periphery states: The creation of pedestrian and cycling infrastructure will be prioritized throughout the Station Periphery designation.

e. Policy 6.4.6 regarding Place d'Orléans Town Centre Station Area states: Include public art, trees and soft landscaping to ensure that the Town Centre is liveable, attractive and supportive of the community's wellbeing.

f. Policy 6.4.10 regarding Place d'Orléans Town Centre Station Area states: All development on parcels in the Place d'Orléans Town Centre Station Area that propose a private street network shall design all new streets as follows: a. Sidewalks will be provided on both sides of any new private street; b. Provide, at regular intervals, street furniture elements for rest and/or shelter; d. Provide soft landscaping and street trees.

17. Connection to future LRT station at 530 Brisebois Crescent

The proposed design provides a 12m wide open space between Buildings A and B. This may be too narrow to accommodate all elements of active transportation, the potential high foot and bike traffic generated by the proposed high intensity development, while providing spaces for the growth of trees. Small at grade commercial uses with potential for outdoor patio and seating can be appropriate and viable at this location. Additional space may be required to support such uses. Overall, a wider aperture at this location is required. This wider aperture may be achieved by moving and rotating Building A (see attached PDF).

Policy reference:

a. Policy 5.2.6 regarding Station Periphery states: Extensive tree canopy coverage in open spaces will be provided.

b. Policy 6.4.21.b regarding Orleans Town Centre Station Area states: An active transportation connection to the future Orleans Town Centre O-Train Station may be required and is independent from the required parkland conveyance.

18. Corner of Centrum and Brisebois

In the proposed design, the corner of Centrum and Brisbois is pinched. The proposed development should attempt to achieve the vision of the Secondary Plan by providing an urban plaza at the corner of Centrum and Brisbois. This may require building D to move north (see attached PDF).

Policy reference:

a. Policy 6.4.32 states: To support the transformation of Centrum Boulevard into a vibrant and walkable urban commercial street with a well-connected public realm, properties located between Place d'Orléans Drive and the eastern access to Brisebois Crescent may be required to locate their required conveyed parkland along Centrum Boulevard's frontage to establish a contiguous urban plaza that includes elements such as public art, trees and landscaping and street furniture.

19. The community centre

The inclusion of a community centre in the proposal is exciting. However, as indicated above the new facility may be surrounded by a quite pinched public realm with difficulties to accommodate many desirable pedestrian and cycling amenities. Is the current proposed location the only viable option? Could the community centre be located in the podium of Building A (or perhaps replace Building A) so that it can be integrated with the existing park and the future connection to the LRT?

Policy reference:

a. Policy 4.2.4 regarding built form and public realm states: Co-location of cultural, institutional, and recreational uses in mid-rise and high-rise buildings is encouraged. This may include locating schools, community centres or museums in the podium of a mixed-use building containing apartments or offices on the upper floors.

b. Policy 6.4.15 regarding Orleans Town Centre Station Area states: Co-location of cultural, institutional and recreational uses in mid and high-rise residential buildings is encouraged.

20. Public realm activation and relationship between abutting properties

The proposed design generally does a fairly good job with respect to animating and activating public realm. However, the back of house functions occupies the entire east façade of Building A facing the public park. This issue may be addressed by relocating the proposed community centre as discussed above. In addition, the relationship between the community centre and the proposed development on the abutting YMCA site requires careful considerations due to their close proximity and potential incompatibility of uses.

Policy reference:

a. Policy 4.2.6 states: New buildings shall, where possible, include active frontages facing the public realm, such as along public or private streets, multi-use pathways, City parks (including linear parks and the Voyageur Creek Greenway) and Privately-Owned Public Spaces (POPS).

b. Policy 4.2.10 states: New development shall frame their adjacent streets and parks to animate public spaces and create comfortable pedestrian environments in the public realm and avoid long expanses of blank walls.

21. Street wall

A rigid street wall formed by a very long continuous podium with a uniform height and setback may not be most attractive and conducive to achieving the objectives of the Secondary Plan and other applicable plans. A row of perfectly aligned towers as shown in the proposed design won't be much help either. Some precedent images provided by the applicant previously offer some useful insights into how these towers may be designed with greater porosity at the podium levels, and greater variations in architecture design. Is it possible to articulate such objectives through the ZBLA?

Engineering

Comments:

22. General Comments

a. See the SPIL for required engineering studies and plans to support the ZBLA.

b. An Assessment of Adequacy of Public Services Study, including stormwater management strategy, will be required to demonstrate sufficient capacity with existing services and should refer to existing studies for the area.

c. Refer to the appropriate background studies completed for OTC West to demonstrate available capacity and support the servicing design for ZBLA.

d. Any potential ECA requirements can be discussed at SPC stage.

e. Note there is a Road Resurfacing planned for Centrum Boulevard within the next 1-2 years. Three year moratoriums are placed on future road cuts following road resurfacing.

f. Ensure any requirements of applicable subwatershed studies are met (Taylor Creek).

23. Water Comments

a. Residential developments consisting of more than 50 dwelling units shall be connected with a minimum of two water services, separated by an isolation valve, to avoid the creation of a vulnerable service area.

b. Serviceability report to demonstrate adequate supply and hydrant coverage for fire protection.

c. Proposed City Water Meter locations to be shown on servicing plan.

d. Water Data Card will be required to size water meters (future SPC requirement)

e. Civil consultant must request boundary conditions from the City's assigned Project Manager prior to first submission. Water Boundary condition requests must include the location of the service (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 connction(s) to City main.

ii. Type of development

iii. The amount of fire flow required (per OBC or FUS see City WDG ISTB-2021-03).

iv. Average daily demand: ___ l/s.

v. Maximum daily demand: ___l/s.

vi. Maximum hourly daily demand: ___ l/s.

24. Sanitary Comments

a. As discussed during the pre-consultation meeting, the proposed sanitary flows exceed what was originally contemplated for these parcels as part of the original OTC west servicing design. As such, the existing sewers may have limited capacity to support the proposed increase in residential density. The City has received the anticipated sanitary flow quantity from

Novatech and will explore available capacity in both the 250mm local sewer, and the 525mm outlet sewer.

b. Also discussed during the pre-consultation meeting was Forum's opinion that any sanitary capacity should be prioritized for Forum's development due to contractual agreements with the City. As mentioned, the City operates on a first come, first served basis when it comes to available sanitary capacity. That is, apart from flows allocated in the previous agreement's master servicing study, additional sanitary capacity cannot be set aside for a given project until that project is approved and registered with the City. In this case, any available capacity for flows exceeding those that were originally allocated to these parcels at the master servicing level, would not be able to be prioritized to Forum prior to registering the associated Site Plan Agreements with the City.

25. Storm Comments

a. The Stormwater Management Criteria, for the subject site, is to be based on the following:

I. The criteria as set forth in governing servicing studies and reports for the OTC West lands, as well as the criteria set forth in the Ottawa Sewer Design Guidelines, as applicable.

II. Application of the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.

III. For separated sewer systems built up until 2016, the design of the storm sewers were based on a 5-year storm; storm systems after such time are, generally, based on a 2-year level-of-service.

IV. In separated areas, the pre-development runoff shall be the lower of the existing coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).

V. A calculated time of concentration (cannot be less than 10 minutes).

VI. Flows to the storm sewer in excess of the allowable release rate, up to and including the 100-year storm event, must be detained on site.

VII. Storm sewer outlets should not be submerged.

VIII. Quality control is to be provided to enhanced level (80% TSS removal)

26. Servicing Comments (Storm, Sanitary and Water Supply)

    a. 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. Monitoring maintenance holes should be located in an accessible location on private property near the property line (ie. Not in a parking area).

    d. 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.

        i. Std Dwg S11 (For rigid main sewers) – lateral must be less that 50% the diameter of the sewermain,

        ii. Std Dwg S11.2 (for rigid main sewers using bell end insert method) – for larger diameter laterals where manufactured inserts are not available; lateral must be less that 50% the diameter of the sewermain,

        iii. Connections to maintenance holes 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.

Feel free to contact Justin Armstrong, Senior Engineer - Infrastructure Applications, for follow-up questions.

Noise

Comments:

27. Road noise study required at site plan control only.

Feel free to contact Mike Giampa, TES, for follow-up questions.

Transportation

Comments:

28. 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.

29. Corner Sight Triangle:

    a. Arterial/Arterial: overlapping 5m x 15m triangles

    b. Arterial/Collector: overlapping 5m x 15m triangles
    c. Collector/Collector: overlapping 5m x 15m triangles
    d. Arterial/Local: 3m x 9m with the longer dimension along the arterial road
    e. Collector/Local: 3m x 9m with the longer dimension along the collector road
    f. Local/Local: 3m x 3m

30. A TIA is warranted, please proceed to Step 2 Scoping. The application will not be deemed complete without Step 2 being submitted at least 14 calendar days prior to a Phase 3 pre-consultation or formal application. A TIA Strategy report (Step 3) with the Synchro files will be required at or prior to the formal application.

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

Environment & Forestry

Environmental Planning and Forestry staff were not circulated due to timing on this pre-consultation, but preliminary comments are provided by Kelly Livingstone. Please follow up with Kelly if you want more detail, and/or Hayley Murray for clarification on standard TCR/LP requirements and Amy McPherson on the Bird Friendly Design Guidelines.

Comments:

31. A Tree Conservation Report and Landscape Plan are required

32. Tree Conservation Report requirements. The following Tree Conservation Report (TCR) requirements have been adapted from the Schedule E of the Urban Tree Protection Guidelines – for more information on these requirements please contact hayley.murray@ottawa.ca

    a. A Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City

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

    c. The TCR must contain 2 separate plans/maps:

i. Plan/Map 1 - show existing conditions with tree cover information.

ii. Plan/Map 2 - show proposed development with tree cover information.

d. The TCR must list all trees on site, as well as off-site trees if the CRZ (critical root zone) extends into the developed area, by species, diameter, and health condition. Please note that averages can be used if there are forested areas.

e. Please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)

f. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained.

g. The removal of trees on a property line will require the permission of both property owners.

h. All retained trees must be shown, and all retained trees within the area impacted by the development process must be protected as per City guidelines available at Tree Protection Specification or by searching Ottawa.ca

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

j. Removal of a City tree is not permitted unless justified. If justified, monetary compensation for the value of the tree must be paid before a tree removal permit is issued.

33. 4. Landscape Plan (LP) requirements.

a. Landscape Plan Terms of Reference must be adhered to for all tree planting: Click Here. For more information on these requirements please contact hayley.murray@ottawa.ca

34. Additional Elements for Tree Planting in the Right of Way:

a. Please ensure any retained trees are shown on the LP

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

c. Soil Volume - Please demonstrate as per the Landscape Plan Terms of Reference that the available soil volumes for new plantings will meet or exceed the minimum soil volumes requested.

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

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

f. Minimum Setbacks

    i. Maintain 1.5m from sidewalk or MUP/cycle track or water service laterals.

    ii. Maintain 2.5m from curb

    iii. Coniferous species require a minimum 4.5m setback from curb, sidewalk, or MUP/cycle track/pathway.

    iv. Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing, except where otherwise approved in naturalization / afforestation areas.

    v. Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.

g. Tree specifications

    i. Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.

    ii. Maximize the use of large deciduous species wherever possible to maximize future canopy coverage.

    iii. Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and if possible, include watering and warranty as described in the specification.

    iv. No root barriers, dead-man anchor systems, or planters are permitted.

    v. No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

h. Hard surface planting

    i. If there are hard surface plantings, a planting detail must be provided.

    ii. Curb style planters are highly recommended.

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

    iv. Trees are to be planted at grade.

35. Bird-Safe Design Guidelines will apply as this is a significant high-rise development proposal and will have a large impact on birds. It is important that the guidelines are considered early on in the process. “Bird-safe glass or integrated protection measures may be required through conditions of site plan approval for projects involving large expanses of glazing. However, it is important that the Bird-Safe Design Guidelines do not have a significant impact on the affordability or timelines of the respective project. Recognize that corporate standards or other design requirements may limit or preclude use of bird-safe glass or integrated protection measures in cases of small-scale commercial buildings”

Feel free to contact Kelly Livingstone, for follow-up questions.

Parkland

Comments:

36. Cash-in-lieu of parkland / parkland dedication

    a. Parkland Dedication By-law No. 2022-280

37. Parkland dedication is applicable to the full extent of the site. Parkland dedication is requested exclusively in the form of land, located at the corner of Centrum Boulevard and Brisebois Crescent, and to be coordinated with a community centre design.

38. PFP is in receipt of correspondence from the applicant dated April 9, 2025 and will prepare a response.

39. PFP will require that the zoning by-law amendment include the requirement for the community center.

Feel free to contact Jessica Button, Parks Planner, for follow-up questions.

Other

40. 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

- A Zoning By-law Amendment will be required for the current proposed phase of development.
    - Additional information regarding fees related to planning applications can be found here.
- 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.
    - 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.
- 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,
Kelly Livingstone, MCIP RPP
Senior Planner, Development Review East
City of Ottawa

c.c. Justin Armstrong, Senior Engineer
Kris Haynes, Senior Project Manager
Kevin Wherry, Manager, Parks and Facilities Planning
Claire O'Donnell, Program Manager, Parks and Facilities Planning
Jessica Button, Team Lead, Parks and Facilities Planning
Randolph Wang, Senior Planner, Urban Design
Mike Giampa, Senior Engineer, Infrastructure Approvals
Simon Deiaco, Senior Planner, Strategic Initiatives
Hayley Murray, Planning Forester
Amy McPherson, Natural Systems

APPENDIX B
Water Servicing Information

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

Boundary Condition Request

Novatech Project #: 122170
Project Name: Centrum Blvd Towers - Lot A
Date: 12/10/2025
Input By: Billy McEwen
Reviewed By: Drew Blair
Drawing Reference: Sketch/Figure/Drawing

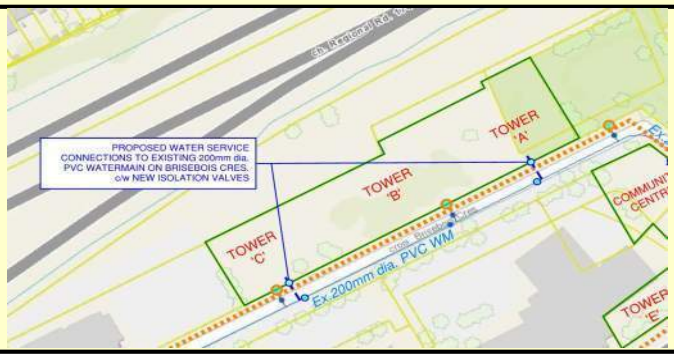
Legend: Input by User | No Input Required | Calculated Cells →

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

Small System = NO

	# of Dwellings	Area (ha.)	Pop. Equiv.	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
Residential Input						
Singles			0	0.00	0.00	0.00
Semis / Townhomes			0	0.00	0.00	0.00
Apartments (2-BR)			0	0.00	0.00	0.00
Apartments (1-BR)			0	0.00	0.00	0.00
Apartments (Avg)	1130		2034	6.59	16.48	36.25
Industrial / Commercial / Institutional (ICI) Input						
Industrial Area - Light				0.00	0.00	0.00
Industrial Area - Heavy				0.00	0.00	0.00
Commercial Area				0.00	0.00	0.00
Institutional Area				0.00	0.00	0.00
Other Area				0.00	0.00	0.00
Totals	**1130**	**0.00**	**2034.00**	**6.59**	**16.48**	**36.25**

Summary

i. Type of Development and Units:	Multi-Storey Residential Towers (Tower A = 312 units, Tower B & Tower C = 818 units)		
ii. Site Address:	530 Brisebois Crescent, Orleans, ON		
iii. Proposed Water Service Connection Location(s):			
Water service connections to the existing 200mm dia. watermain on Brisebois Cres.			
iv. Average Day Flow Demand:		6.59	L/s
v. Peak Hour Flow Demand:		36.25	L/s
vi. Maximum Day Flow Demand:		16.48	L/s
vii. Required Fire Flow #1:		100	L/min
viii. Required Fire Flow #2:		150	L/min
ix. Required Fire Flow #3:		183	L/min

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

Boundary Condition Request

Novatech Project #: 122170
Project Name: Centrum Blvd Towers - Lot B
Date: 12/10/2025
Input By: Billy McEwen
Reviewed By: Drew Blair
Drawing Reference: Sketch/Figure/Drawing

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

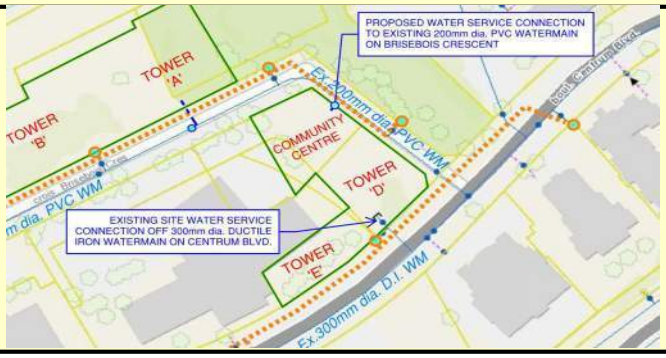
Reference: Ottawa Design Guidelines - Water Distribution (2010 and TBs)
MOE Design Guidelines for Drinking-Water Systems (2008)
Fire Underwriter's Survey Guideline (2020)
Ontario Building Code, Part 3 (2012)

Small System = NO

	# of Dwellings	Area (ha.)	Pop. Equiv.	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
Residential Input						
Singles			0	0.00	0.00	0.00
Semis / Townhomes			0	0.00	0.00	0.00
Apartments (2-BR)			0	0.00	0.00	0.00
Apartments (1-BR)			0	0.00	0.00	0.00
Apartments (Avg)	375		675	2.19	5.47	12.03
Industrial / Commercial / Institutional (ICI) Input						
Industrial Area - Light				0.00	0.00	0.00
Industrial Area - Heavy				0.00	0.00	0.00
Commercial Area		0.311		0.10	0.15	0.27
Institutional Area				0.00	0.00	0.00
Other Area				0.00	0.00	0.00
Totals	**375**	**0.31**	**675.00**	**2.29**	**5.62**	**12.30**

Summary

i. Type of Development and Units:	Multi Storey Residential Towers & Community Centre (Tower D = 312 units, Tower E = 63 units)
ii. Site Address:	265 Centrum Boulevard, Orleans, ON
iii. Proposed Water Service Connection Location(s):	Water service connection to the existing 200mm dia. watermain on Briseboise Cres. and the existing 300mm dia. watermain service stub off Centrum Blvd.



iv. Average Day Flow Demand:	2.29	L/s
v. Peak Hour Flow Demand:	12.30	L/s
vi. Maximum Day Flow Demand:	5.62	L/s
vii. Required Fire Flow #1:	100	L/min
viii. Required Fire Flow #2:	150	L/min
ix. Required Fire Flow #3:	183	L/min

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

Design Parameters

Residential					
Unit Type	**Singles**	**Semis/ Towns**	**Apts (2-BR)**	**Apts (1-BR)**	**Apts (Avg)**
Population Equiv.	3.4	2.7	2.1	1.4	1.8
Dailly Demand	L/per person/day				
Average Demand	280				
Basic Demand	200				

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

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

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

Boundary Conditions
530 Brisebois Crescent

Provided Information

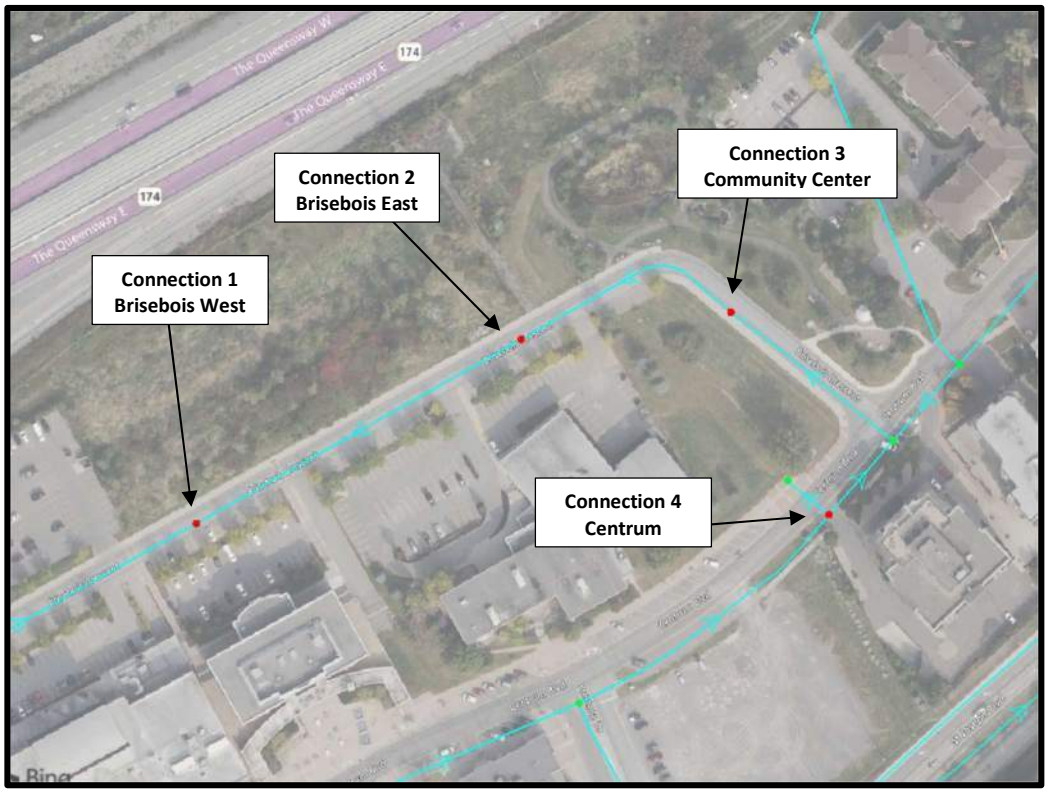
Lot A – 530 Brisebois Crescent (Connections 1 & 2)

Scenario	Demand	
	L/min	L/s
Average Daily Demand	335	5.59
Maximum Daily Demand	839	13.98
Peak Hour	1,845	30.75
Fire Flow Demand #1	6,000	100.00
Fire Flow Demand #2	9,000	150.00
Fire Flow Demand #3	11,000	183.33

Lot B – 281 Centrum Boulevard (Connections 3 & 4)

Scenario	Demand	
	L/min	L/s
Average Daily Demand	107	1.78
Maximum Daily Demand	262	4.36
Peak Hour	572	9.54
Fire Flow Demand #1	6,000	100.00
Fire Flow Demand #2	9,000	150.00
Fire Flow Demand #3	11,000	183.33

Location



Results

Connection 1 – Brisebois West

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	114.6	67.6
Peak Hour	108.4	58.7
Max Day plus Fire Flow #1	103.1	51.2
Max Day plus Fire Flow #2	95.9	40.9
Max Day plus Fire Flow #3	90.0	32.5

[1] Ground Elevation = 67.1 m

Connection 2 – Brisebois East

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	114.6	66.3
Peak Hour	108.4	57.4
Max Day plus Fire Flow #1	103.7	50.7
Max Day plus Fire Flow #2	97.1	41.3
Max Day plus Fire Flow #3	91.7	33.7

[1] Ground Elevation = 68.0 m

Connection 3 – Community Center

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	114.6	65.4
Peak Hour	108.6	56.8
Max Day plus Fire Flow #1	105.5	52.4
Max Day plus Fire Flow #2	100.5	45.4
Max Day plus Fire Flow #3	96.5	39.7

[1] Ground Elevation = 68.7 m

Connection 4 – Centrum

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	114.7	64.6
Peak Hour	108.8	56.2
Max Day plus Fire Flow #1	108.3	55.6
Max Day plus Fire Flow #2	106.1	52.3
Max Day plus Fire Flow #3	104.3	49.8

[1] Ground Elevation = 69.3 m

Notes

1. The IWSD has recently updated their water modelling software. Any significant difference between previously received BC results and newly received BC results could be attributed to this update.
2. Demands for proposed Connection 4 at existing water main stub were assigned to upstream junction at Centrum Boulevard off the public looped watermains. The engineer must calculate headloss off the dead-end main.

Disclaimer

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

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

Boundary Condition Request

Novatech Project #: 122170
Project Name: Centrum Blvd Towers - Lot A
Date: 6/25/2025
Input By: Billy McEwen
Reviewed By: Drew Blair
Drawing Reference: Sketch/Figure/Drawing

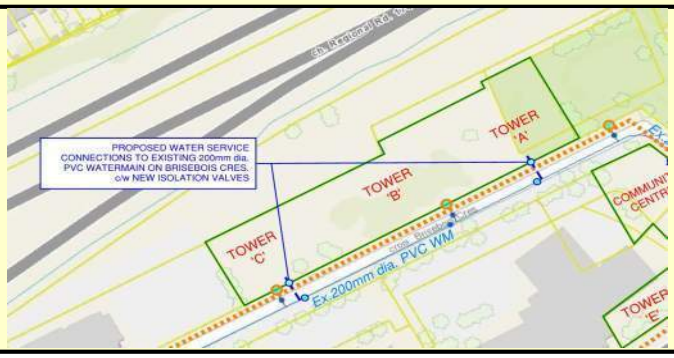
Legend: Input by User | No Input Required | Calculated Cells →

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

Small System = NO

	# of Dwellings	Area (ha.)	Pop. Equiv.	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
Residential Input						
Singles			0	0.00	0.00	0.00
Semis / Townhomes			0	0.00	0.00	0.00
Apartments (2-BR)			0	0.00	0.00	0.00
Apartments (1-BR)			0	0.00	0.00	0.00
Apartments (Avg)	958		1725	5.59	13.98	30.75
Industrial / Commercial / Institutional (ICI) Input						
Industrial Area - Light				0.00	0.00	0.00
Industrial Area - Heavy				0.00	0.00	0.00
Commercial Area				0.00	0.00	0.00
Institutional Area				0.00	0.00	0.00
Other Area				0.00	0.00	0.00
Totals	**958**	**0.00**	**1725.00**	**5.59**	**13.98**	**30.75**

Summary

i. Type of Development and Units:	Multi-Storey Residential Towers (Tower A = 268 units, Tower B = 325 units, Tower C = 365 units)		
ii. Site Address:	530 Brisebois Crescent, Orleans, ON		
iii. Proposed Water Service Connection Location(s):			
Water service connections to the existing 200mm dia. watermain on Brisebois Cres.			
iv. Average Day Flow Demand:		5.59	L/s
v. Peak Hour Flow Demand:		30.75	L/s
vi. Maximum Day Flow Demand:		13.98	L/s
vii. Required Fire Flow #1:		100	L/min
viii. Required Fire Flow #2:		150	L/min
ix. Required Fire Flow #3:		183	L/min

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

Design Parameters

Residential					
Unit Type	**Singles**	**Semis/ Towns**	**Apts (2-BR)**	**Apts (1-BR)**	**Apts (Avg)**
Population Equiv.	3.4	2.7	2.1	1.4	1.8
Dailly Demand	L/per person/day				
Average Demand	280				
Basic Demand	200				

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

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

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

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

Boundary Condition Request

Novatech Project #: 122170
Project Name: Centrum Blvd Towers - Lot B
Date: 6/25/2025
Input By: Billy McEwen
Reviewed By: Drew Blair
Drawing Reference: Sketch/Figure/Drawing

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

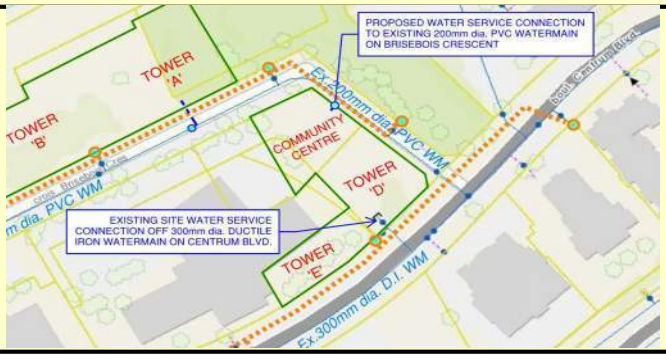
Reference: Ottawa Design Guidelines - Water Distribution (2010 and TBs)
MOE Design Guidelines for Drinking-Water Systems (2008)
Fire Underwriter's Survey Guideline (2020)
Ontario Building Code, Part 3 (2012)

Small System = NO

	# of Dwellings	Area (ha.)	Pop. Equiv.	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
Residential Input						
Singles			0	0.00	0.00	0.00
Semis / Townhomes			0	0.00	0.00	0.00
Apartments (2-BR)			0	0.00	0.00	0.00
Apartments (1-BR)			0	0.00	0.00	0.00
Apartments (Avg)	289		521	1.69	4.22	9.29
Industrial / Commercial / Institutional (ICI) Input						
Industrial Area - Light				0.00	0.00	0.00
Industrial Area - Heavy				0.00	0.00	0.00
Commercial Area		0.288		0.09	0.14	0.25
Institutional Area				0.00	0.00	0.00
Other Area				0.00	0.00	0.00
Totals	**289**	**0.29**	**521.00**	**1.78**	**4.36**	**9.54**

Summary

i. Type of Development and Units:	Multi Storey Residential Towers & Community Centre (Tower D = 246 units, Tower E = 43 units)
ii. Site Address:	281 Centrum Boulevard, Orleans, ON
iii. Proposed Water Service Connection Location(s):	Water service connection to the existing 200mm dia. watermain on Briseboise Cres. and the existing 300mm dia. watermain service stub off Centrum Blvd.



iv. Average Day Flow Demand:	1.78	L/s
v. Peak Hour Flow Demand:	9.54	L/s
vi. Maximum Day Flow Demand:	4.36	L/s
vii. Required Fire Flow #1:	100	L/min
viii. Required Fire Flow #2:	150	L/min
ix. Required Fire Flow #3:	183	L/min

Water Demand Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

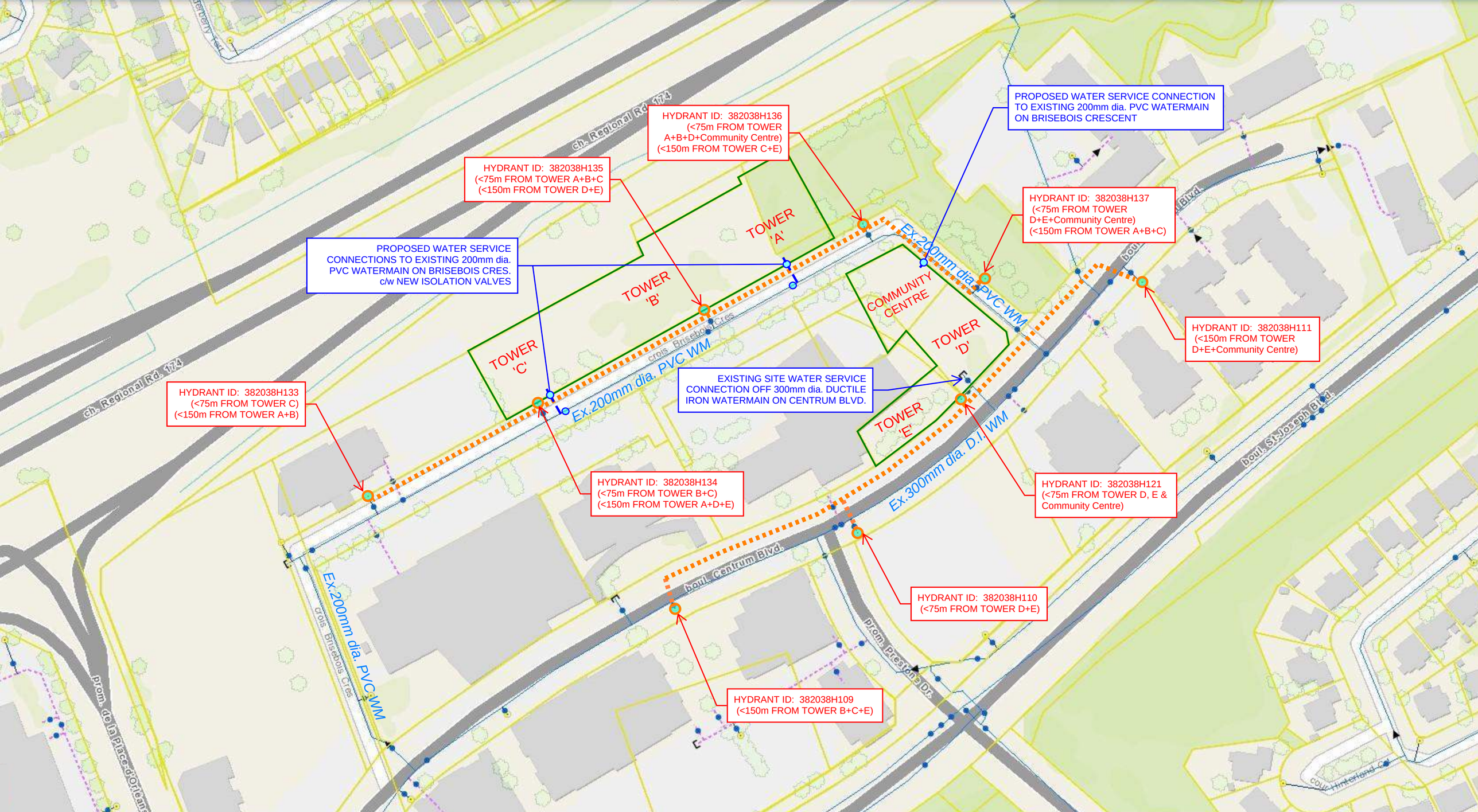
Design Parameters

Residential					
Unit Type	**Singles**	**Semis/ Towns**	**Apts (2-BR)**	**Apts (1-BR)**	**Apts (Avg)**
Population Equiv.	3.4	2.7	2.1	1.4	1.8
Dailly Demand	L/per person/day				
Average Demand	280				
Basic Demand	200				

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

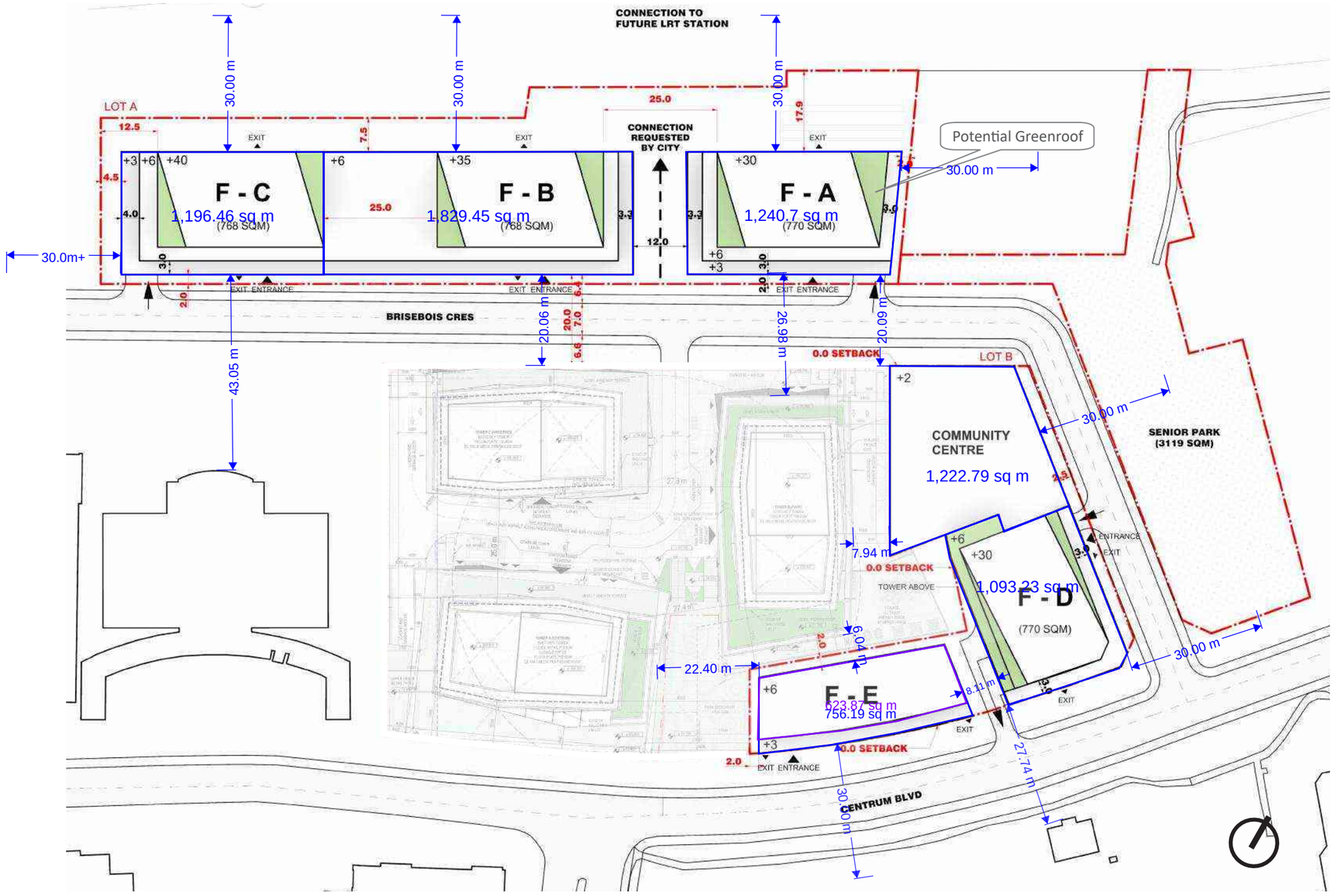
Institutional / Commercial / Industrial				
Industrial		**Commercial**	**Institutional**	**Other Use**
Light	**Heavy**			
L/gross ha/day				L/m²/day
35,000	55,000	28,000	28,000	5
10,000	17,000	17,000	17,000	3

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


HYDRANT ID: 382038H136
(<75m FROM TOWER
A+B+D+Community Centre)
(<150m FROM TOWER C+E)
HYDRANT ID: 382038H135
(<75m FROM TOWER A+B+C
(<150m FROM TOWER D+E)
PROPOSED WATER SERVICE
CONNECTIONS TO EXISTING 200mm dia.
PVC WATERMAIN ON BRISEBOIS CRES.
c/w NEW ISOLATION VALVES
PROPOSED WATER SERVICE CONNECTION
TO EXISTING 200mm dia. PVC WATERMAIN
ON BRISEBOIS CRESCENT
HYDRANT ID: 382038H137
(<75m FROM TOWER
D+E+Community Centre)
(<150m FROM TOWER A+B+C)
TOWER
'A'
TOWER
'B'
TOWER
'C'
COMMUNITY
CENTRE
TOWER
'D'
TOWER
'E'
Ex.200mm dia. PVC WM
Ex.200mm dia. PVC WM
Ex.300mm dia. D.I. WM
Ex.200mm dia. PVC WM
EXISTING SITE WATER SERVICE
CONNECTION OFF 300mm dia. DUCTILE
IRON WATERMAIN ON CENTRUM BLVD.
HYDRANT ID: 382038H111
(<150m FROM TOWER
D+E+Community Centre)
HYDRANT ID: 382038H133
(<75m FROM TOWER C)
(<150m FROM TOWER A+B)
HYDRANT ID: 382038H134
(<75m FROM TOWER B+C)
(<150m FROM TOWER A+D+E)
HYDRANT ID: 382038H121
(<75m FROM TOWER D, E &
Community Centre)
HYDRANT ID: 382038H110
(<75m FROM TOWER D+E)
HYDRANT ID: 382038H109
(<150m FROM TOWER B+C+E)
ch. Regional Rd. 174
ch. Regional Rd. 174
crois. Brisebois Cres.
crois. Brisebois Cres.
boul. Centrum Blvd.
prom. Preston Pkwy Dr.
prom. de la Place-d'Orléans
boul. St-Joseph Blvd.
boul. St-Joseph Blvd.
cour Hinterland Cr.

Stand Alone Option - Forum

Site Plan



Stats

Zone	GCA*		GFA**		# Units***
	Metric (sm)	Imperial (sf)	Metric (sm)	Imperial (sf)	75sm/unit
LOT A (NORTH)					
Lot Area	7,175.94 sm/77,241.8 sf				
Forum A	23,630	*254,353.32*	20,086	*216,200.32*	268
Forum B	28,705	*308,980.62*	24,399	*262,633.53*	325
Forum C	32,247	*347,107.78*	27,410	*295,041.62*	365
SUB-TOTAL AREA	**84,582**	*910,442*	**71,895**	*773,875*	**959**
LOT FSI	10				
LOT B (FORUM D & E)					
Lot Area	2,248.4 sm/ 24,202.1 sf				
Forum D (Residential)	21,706	*233,640.15*	18,450	*198,594.13*	246
Forum D (Commercial)	360	*3,875.04*	324	*3,487.54*	
Forum E (Residential)	3,830	*41,225.04*	3,255	*35,041.29*	43
Forum E (Commercial)	520	*5,597.28*	468	*5,037.55*	
SUB-TOTAL AREA	**26,416**	*284,338*	**22,497**	*242,161*	**1,324**
LOT FSI	12				
LOT B (Community Centre)					
Lot Area	1,323.1 sm/ 14,241.8 sf				
Community Centre	2,452	*26,393.33*	2,084	*22,434.33*	
SUB-TOTAL AREA	**2,452**	*26,393*	**2,084**	*22,434*	**289**
LOT FSI	2				
TOTAL SITE AREA	**10,747.5 sm/ 115,685.8 sf**				
TOTAL AREA	**113,450**	*1,221,173*	**96,476**	*1,038,470*	**1,248**
OVERALL FSI	**9**				
EXISTING SENIOR PARK					
Lot Area	3,118.83 sq.m/ 33,570.83 sf				

** GCA calcuated from exterior wall*

*** GFA 85% (Residential) 90% (Commercial)*

**** Average Unit Size 75 sq.m*

FUS - Fire Flow Calculations

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 122170
Project Name: Forum Lands - Lot A - Forum A
Date: 6/6/2025
Input By: Billy McEwen
Reviewed By: Drew Blair
Drawing Reference: Sketch/Figure/Drawing

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

Building Description: 30 Storey Building with 6 Storey Podium
Type II - Non-combustible construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Type V - Wood frame		1.5	0.8	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	Yes	0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Podium Level Footprint (m^2)	1250			
		Total Floors/Storeys (Podium)	6			
		Tower Footprint (m^2)	770			
		Total Floors/Storeys (Tower)	24			
		Protected Openings (1 hr)	Yes			
		A, Total Effective Floor Area (m^2)			**1,875**	
	F	**Base fire flow without reductions**				**8,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**6,800**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-3,403**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	26000	100%		
				Cumulative Total	**-50%**	
5	**Exposure Surcharge per**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	>30m		0%	**1,700**
		East Side	>30m		0%	
		South Side	20.1 - 30 m		10%	
		West Side	10.1 - 20 m		15%	
				Cumulative Total	**25%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**5,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**83**
				or	USGPM	1,321

FUS - Fire Flow Calculations

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 122170
Project Name: Forum Lands - Lot A - Forum B
Date: 6/6/2025
Input By: Billy McEwen
Reviewed By: Drew Blair
Drawing Reference: Sketch/Figure/Drawing

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

Building Description: 35 Storey Building with 6 Storey Podium
Type II - Non-combustible construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Type V - Wood frame		1.5	0.8	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	Yes	0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Podium Level Footprint (m^2)	1830			
		Total Floors/Storeys (Podium)	6			
		Tower Footprint (m^2)	770			
		Total Floors/Storeys (Tower)	29			
		Protected Openings (1 hr)	Yes			
		A, Total Effective Floor Area (m^2)			**2,745**	
	F	**Base fire flow without reductions**				**9,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**7,650**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-3,789**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	33000	99%		
				Cumulative Total	**-50%**	
5	**Exposure Surcharge per**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	>30m		0%	**1,913**
		East Side	10.1 - 20 m		15%	
		South Side	20.1 - 30 m		10%	
		West Side	2Hr Firewall		0%	
				Cumulative Total	**25%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**6,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**100**
				or	USGPM	1,585

FUS - Fire Flow Calculations

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 122170
Project Name: Forum Lands - Lot A - Forum C
Date: 6/6/2025
Input By: Billy McEwen
Reviewed By: Drew Blair
Drawing Reference: Sketch/Figure/Drawing

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

Building Description: 40 Storey Building with 6 Storey Podium
Type II - Non-combustible construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Type V - Wood frame		1.5	0.8	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	Yes	0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Podium Level Footprint (m^2)	1200			
		Total Floors/Storeys (Podium)	6			
		Tower Footprint (m^2)	770			
		Total Floors/Storeys (Tower)	34			
		Protected Openings (1 hr)	Yes			
		A, Total Effective Floor Area (m^2)			**1,800**	
	F	**Base fire flow without reductions**				**7,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**5,950**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-2,941**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	33000	99%		
				Cumulative Total	**-49%**	
5	**Exposure Surcharge per**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	>30m		0%	**0**
		East Side	2Hr Firewall		0%	
		South Side	>30m		0%	
		West Side	>30m		0%	
				Cumulative Total	**0%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**3,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**50**
				or	USGPM	793

FUS - Fire Flow Calculations

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 122170
Project Name: Forum Lands - Lot B - Forum D
Date: 6/6/2025
Input By: Billy McEwen
Reviewed By: Drew Blair
Drawing Reference: Sketch/Figure/Drawing

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

Building Description: 30 Storey Building with 6 Storey Podium
Type II - Non-combustible construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Type V - Wood frame		1.5	0.8	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	Yes	0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Podium Level Footprint (m^2)	1100			
		Total Floors/Storeys (Podium)	6			
		Tower Footprint (m^2)	770			
		Total Floors/Storeys (Tower)	24			
		Protected Openings (1 hr)	Yes			
		A, Total Effective Floor Area (m^2)			**1,650**	
	F	**Base fire flow without reductions**				**7,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**5,950**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-2,966**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	25000	100%		
				Cumulative Total	**-50%**	
5	**Exposure Surcharge per**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	2Hr Firewall		0%	**1,785**
		East Side	>30m		0%	
		South Side	20.1 - 30 m		10%	
		West Side	3.1 - 10 m		20%	
				Cumulative Total	**30%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**5,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**83**
				or	USGPM	1,321

FUS - Fire Flow Calculations

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 122170
Project Name: Forum Lands - Lot B - Forum E
Date: 6/6/2025
Input By: Billy McEwen
Reviewed By: Drew Blair
Drawing Reference: Sketch/Figure/Drawing

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

Building Description: 6 Storey Building with 3 Storey Podium
Type II - Non-combustible construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Type V - Wood frame		1.5	0.8	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	Yes	0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Podium Level Footprint (m^2)	760			
		Total Floors/Storeys (Podium)	4			
		Tower Footprint (m^2)	650			
		Total Floors/Storeys (Tower)	2			
		Protected Openings (1 hr)	No			
		A, Total Effective Floor Area (m^2)			**2,930**	
	F	**Base fire flow without reductions**				**10,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**8,500**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-4,211**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	4300	99%		
				Cumulative Total	**-50%**	
5	**Exposure Surcharge per**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	3.1 - 10 m		20%	**5,100**
		East Side	3.1 - 10 m		20%	
		South Side	20.1 - 30 m		10%	
		West Side	20.1 - 30 m		10%	
				Cumulative Total	**60%**	
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

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 122170
Project Name: Forum Lands - Lot B - Community Centre
Date: 6/6/2025
Input By: Billy McEwen
Reviewed By: Drew Blair
Drawing Reference: Sketch/Figure/Drawing

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

Building Description: Two-Storey Community Centre
Type II - Non-combustible construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Type V - Wood frame	No	1.5	0.8	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	Yes	0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	1250			
		Number of Floors/Storeys	2			
		Protected Openings (1 hr) if C<1.0	No			
		Area of structure considered (m^2)			**2,500**	
	F	**Base fire flow without reductions**				**9,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**7,650**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-3,825**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	2500	100%		
				Cumulative Total	**-50%**	
5	**Exposure Surcharge**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	20.1 - 30 m		10%	**2,295**
		East Side	>30m		0%	
		South Side	2Hr Firewall		0%	
		West Side	3.1 - 10 m		20%	
				Cumulative Total	**30%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**6,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**100**
				or	USGPM	1,585

APPENDIX C
Sanitary Servicing Information

Project No. 122170
Project Name: 265 Centrum Blvd and 530 Brisebois Cres
Project Location: Ottawa, ON

Date: December 2025

Proposed Peak Sanitary Flows - 265 Centrum Boulevard & 265 Brisebois Crescent

Santiary Sewer Design Parameters - Section 4 City of Ottawa Sewer Design Guidelines (2012), Technical Bulletin ISTB 2018-01

Type of Use	Daily Demand Volume	
Residential	280	L/person/day
Population Calculation - Studio / 1-Bedroom	1.4	persons/unit
Population Calculation - 2-Bedroom	2.1	persons/unit
Population Calculation - 3-Bedroom	3.1	persons/unit
Commercial Areas	28,000	L/ha/day
Exfiltration	0.33	L/s/ha

Residential and Commercial Peak Factors - Section 4 City of Ottawa Sewer Design Guidelines (2012), Technical Bulletin ISTB 2018-01

Conditions	Peaking Factor
Residential (Harmon Formula)	4.0 (max)
Residential (Harmon Correction Factor)	0.8
Commercial	1.5

Sanitary Peak Flows - Residential

Building ID	Units Count				Population	Calculated Peak Factor	Sanitary Peak Flows - Residential (L/s)
	Studio / 1-Bedroom	2-Bedroom	3-Bedroom	Total			
Tower A	138	140	34	312	593	3.35	6.43
Tower B & Tower C	382	354	82	818	1533	3.14	15.59
Tower D	144	132	36	312	591	3.35	6.41
Mid-rise E	35	21	7	63	115	3.58	1.33
Totals - Residential	**699**	**647**	**159**	**1505**	**2832**	**2.97**	**27.27**

Sanitary Peak Flows - Commercial

Building ID	Commercial Area (m^2)	Sanitary Peak Flows - Commercial (L/s)
Tower D & Mid-rise E	600	0.03
Community Centre	2500	0.12
Totals - Residential	**3100**	**0.15**

Sanitary Peak Flows - Exfiltration

Building ID	Lot Area (ha)	Sanitary Peak Flows - Exfiltration (L/s)
Lot A	0.71	0.23
Lot B	0.37	0.12
Totals - Residential	**1.08**	**0.36**

Sanitary Peak Flows - Summary

Sanitary Demand Condition	Lot Area (ha)
Residential	27.27
Commercial	0.15
Exfiltration	0.36
Totals - Residential	**27.78**

Lot A - SANITARY
Population: 2126
Total Area: 0.71 ha

Lot B - SANITARY
Population: 706
Total Area: 0.36 ha
Comm. Area: 0.31 ha

LOT 'A'
530 BRISEBOIS
TOWER 'C'
TOWER 'B'
TOWER 'A'
LOT 'B'
TOWER 'D'
TOWER 'E'
265 CENTRUM
COMMUNITY CENTRE
EXISTING SWM FACILITY
EXISTING PARK
BRISEBOIS CRESCENT
CENTRUM BOULEVARD
STORM SERVICE
250mmØ SANITARY SERVICE
REDUNDANT 2 x 200mmØ WATER SERVICES c/w ISOLATION VALVE
250mmØ STORM SERVICE
250mmØ SANITARY SERVICE
200mmØ WATER SERVICE
CONNECT TO EXISTING 300mmØ WATER SERVICE
SITE BENCHMARK
CC ON CONCRETE PAD
ELEVATION = 69.59
MECH. ROOM (P1)
MECH. ROOM (P2)
GARBAGE RECEPTICLE
CONCRETE SIDEWALK
INTERLOCK BRICK SIDEWALK
EXISTING 600mmØ STM
EXISTING 675mmØ STM
EXISTING 750mmØ STM
EXISTING 900mmØ STM
EXISTING 525mmØ STM
EXISTING 300mmØ STM
EXISTING 250mmØ SAN
EXISTING 200mmØ WM
EXISTING 450mmØ SAN
EXISTING 305mmØ WM
EXISTING 975mmØ STM
EXISTING 1500mmØ STM
EXISTING 375mmØ SAN
EXISTING 450mmØ SAN
HYD

265 CENTRUM and 530 BRISEBOIS

SANITARY DRAINAGE AREAS

1 : 750 SCALE (0, 10, 20, 30)

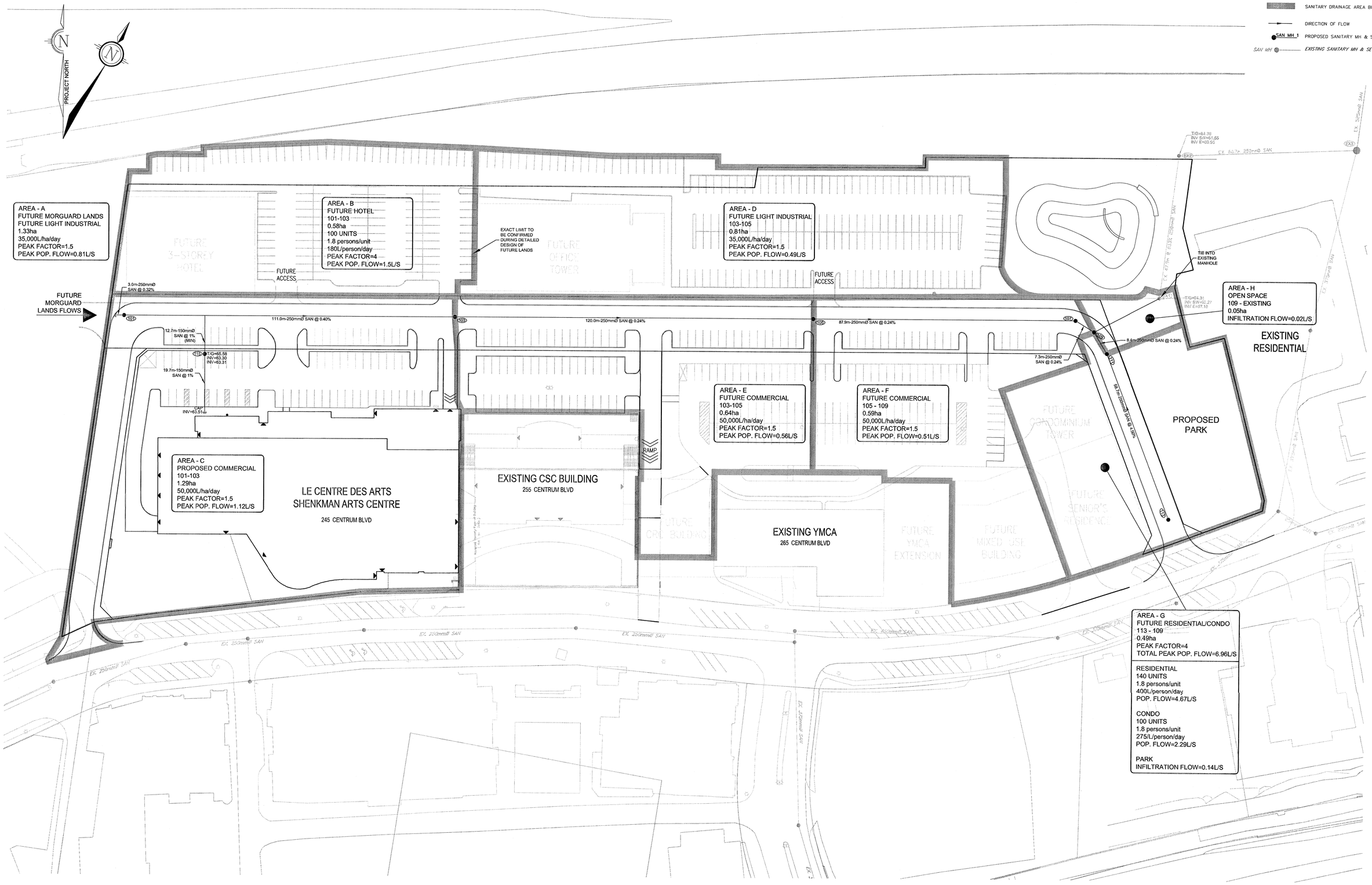
FIGURE	JOB	DATE
FIG-SAN	122170	DEC 2025

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

M:\2022\122170\CAD\Civil\Figures\Serviceability\122170-FIG4.dwg, FIGURE 4 (CGP), Dec 09, 2025 - 1:23pm, smatthews

SHT11X17.DWG - 279mmX432mm



REFER TO N&CS

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

No.	REVISION	DATE	BY
4.	ISSUED FOR CITY/MOE APPROVAL	JAN 15/08	MER
3.	RE-ISSUED FOR SITE PLAN APPROVAL	DEC 04/07	MER
2.	ISSUED FOR SITE PLAN APPROVAL	OCT 19/07	MER
1.	ISSUED FOR SITE PLAN APPLICATION	JUL 27/07	MER

LICENSED PROFESSIONAL ENGINEER J. AILEY 100079299 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER M.E. RIDDELL 100040125 PROVINCE OF ONTARIO

NOVATECH ENGINEERING CONSULTANTS LTD.
ENGINEERS & PLANNERS
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada
K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Email novatech@novatech-eng.com

DESIGN	MER
CHECKED	JA
DRAWN	RCH
CHECKED	JA
APPROVED	MER
SCALE	1:500

CITY OF OTTAWA

ORLEANS TOWN CENTRE (WEST)

SANITARY DRAINAGE AREA PLAN

PROJECT No. 106011

DATE MAY 2007

DRAWING No. C106011-SAN

PLAN81.DWG - 1000mm x 707mm

SANITARY SEWER DESIGN SHEET

NOVATECH ENGINEERING CONSULTANTS LTD

PROJECT:	106011	PROJECT:	Orleans Town Centre (West)
DESIGNED BY :	DB	DEVELOPER:	Public-Private Partnership
CHECKED BY :	JA		
DATE:	27-Jul-07		
REVISED:	19-Oct-07		
REVISED:	29-Nov-07		
ISSUED FOR MOE APPROVAL:	15-Jan-08		

LOCATION				INDIVIDUAL	CUMULATIVE	PEAK FACTOR M	POPULATION FLOW	INFILTRATION FLOW	PEAK DESIGN FLOW	PROPOSED SEWER								
AREA	LAND USE	FROM MH	TO MH	AREA (ha)	AREA (ha)		Q (p) (L/s)	Q(i) (L/s)	Q (d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	PIPE ID (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Qpeak/ Qcap	Depth of Flow/ Diameter
A	Morguard Lands/Light Industrial	101	103	1.330	1.330	1.5	0.81	0.37	1.18									
B	Future Hotel	101	103	0.580	1.910	4.0	2.31	0.53	2.84									
C	Proposed Commercial	101	103	1.290	3.200	1.5	3.43	0.90	4.32	111.0	250	251.46	DR 35	0.40	38.2	0.77	0.11	0.26
D	Future Light Industrial	103	105	0.810	4.010	1.5	3.92	1.12	5.04									
E	Future Commercial	103	105	0.640	4.650	1.5	4.48	1.30	5.78	120.0	250	251.46	DR 35	0.24	29.6	0.60	0.20	0.35
F	Future Commercial	105	107	0.590	5.240	1.5	4.99	1.47	6.46	87.9	250	251.46	DR 35	0.25	30.2	0.61	0.21	0.36
		107	109	0.000	5.240	1.5	4.99	1.47	6.46	7.3	250	251.46	DR 35	0.28	32.0	0.64	0.20	0.35
G	Future Residential/Condo	113	111	0.490	0.490	4.0	6.96	0.14	7.10	58.7	250	251.46	DR 35	4.50	128.1	2.58	0.06	0.19
		111	109		0.490	4.0	6.96	0.14	7.10	8.4	250	251.46	DR 35	0.24	29.6	0.60	0.24	0.38
H	Open Space	109	EX 1	0.050	5.780		11.95	1.62	13.56	24.6	250	251.46	DR 35	0.50	42.7	0.86	0.32	0.45
	Outlet	EX 1	EX 2		5.780		11.95	1.62	13.56	47.9	250	251.46	DR 35	0.13	21.8	0.44	0.62	0.66
	Outlet	EX 2	EX 3		5.780		11.95	1.62	13.56	60.7	250	251.46	DR 35					

Notes:

1. Q(d) = Q(p) + Q(i), where
   - Q(d) = Design Flow (L/s)
   - Q(p) = Population Flow (L/s)
   - Q(i) = Infiltration Flow (L/s)
   - A = Cumulative Area (ha.)
2. Q(i) = 0.28 L/s/ha
   - Min pipe size 250mm @ min. slope 0.24% as per City of Ottawa Sewer Design Guidelines (OSDG))
3. Population Flow Assumptions:
   - **Area A, D** — Light Industrial; 35,000 L/ha/day; Peak Factor = 1.5 (from OSDG)
   - **Area B** — Hotel; 180 L/person/day; 100 rooms; 1.8 persons/room; Peak Factor=4 (from OSDG)
   - **Area C, E, F** — Commercial; 50,000 L/ha/day; Peak Factor = 1.5 (from OSDG)
   - **Area G** — Senior's Residence; 400 L/person/day; 140 units; 1.8 persons/unit; Peak factor=4 (from OSDG); Senior's Condo's; 275 L/person/day; 100 units; 1.8 persons/unit; Peak Factor=4 (from OSDG)

LICENSED PROFESSIONAL ENGINEER — 08-Jan-15 — M.E. RIDDELL — 100040125 — PROVINCE OF ONTARIO

Billy McEwen

From: Drew Blair
Sent: Monday, December 1, 2025 9:24 AM
To: Billy McEwen
Subject: FW: Orleans | Follow-Up & Next Steps
Attachments: 2025-06-09_Orleans Master Comment Matrix_Forum Flagged Comments.pdf; Forum Proposed Zoning Timeline.pdf

Drew Blair, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 236

From: Armstrong, Justin
Sent: Wednesday, June 11, 2025 12:56 PM
To: Drew Blair
Subject: Fw: Orleans | Follow-Up & Next Steps

Hi Drew,

As a follow-up to the discussion at last week's meeting and the highlighted point below, can you let me know what exactly you are looking for (if more than simple verbal confirmation of available capacity) and I can reach out to see if it is something we can provide?

Essentially, to date I have received confirmation from staff in our Infrastructure & Water Services Department that for existing conditions:

- Brisebois - based on existing Water Meter data, there is approximately 28L/s available in the Brisebois 250mm sanitary sewer.
- Highway - based on a high level review, there is an approximate available capacity of 36L/s in the 525mm sanitary sewer crossing the highway.

Thanks,
Justin

From: Livingstone, Kelly <kelly.livingstone@ottawa.ca>
Sent: June 11, 2025 10:50 AM
To: Armstrong, Justin <justin.armstrong@ottawa.ca>
Subject: Fw: Orleans | Follow-Up & Next Steps

Hey Justin,

Let me know when you receive the sanitary info for them (highlighted item below) and whether it's something we'll provide.

Thanks,

Kelly Livingstone (he/him), RPP, MCIP
Planner 3 | Urbaniste 3
City of Ottawa | Ville d'Ottawa
kelly.livingstone@ottawa.ca, x65764

From: Vimal Lad <Vimal@forumam.com>
Sent: Tuesday, June 10, 2025 3:25 PM
To: Livingstone, Kelly <kelly.livingstone@ottawa.ca>
Cc: Dayna Gilbert <daynag@forumam.com>; Stuart Cooper <StuartC@forumam.com>
Subject: Orleans | Follow-Up & Next Steps

Hi Kelly,

Thank you again for a productive meeting last Friday with the City of Ottawa.

As a follow-up, I wanted to summarize the key items requiring coordination with you.

- Please find attached our comment matrix, highlighting Forum's flagged comments for the City's review and direction.
- We are awaiting the City's sanitary capacity assessment for our team's review. let me know when we should expect to receive this information.
- Could you please connect us with the appropriate contact regarding reducing the daylight triangle requirements at the corner of Brisebois and Centrum (currently set at 3m x 9m)?
- We would appreciate confirmation on the terms of reference for submission requirements. If possible, could you provide the City's latest TOR so we can ensure our materials meet all requirements for a complete submission?
- Lastly, please confirm if there are any concerns from the City regarding our proposed development approval timeline (attached).

Thanks greatly,
Vim

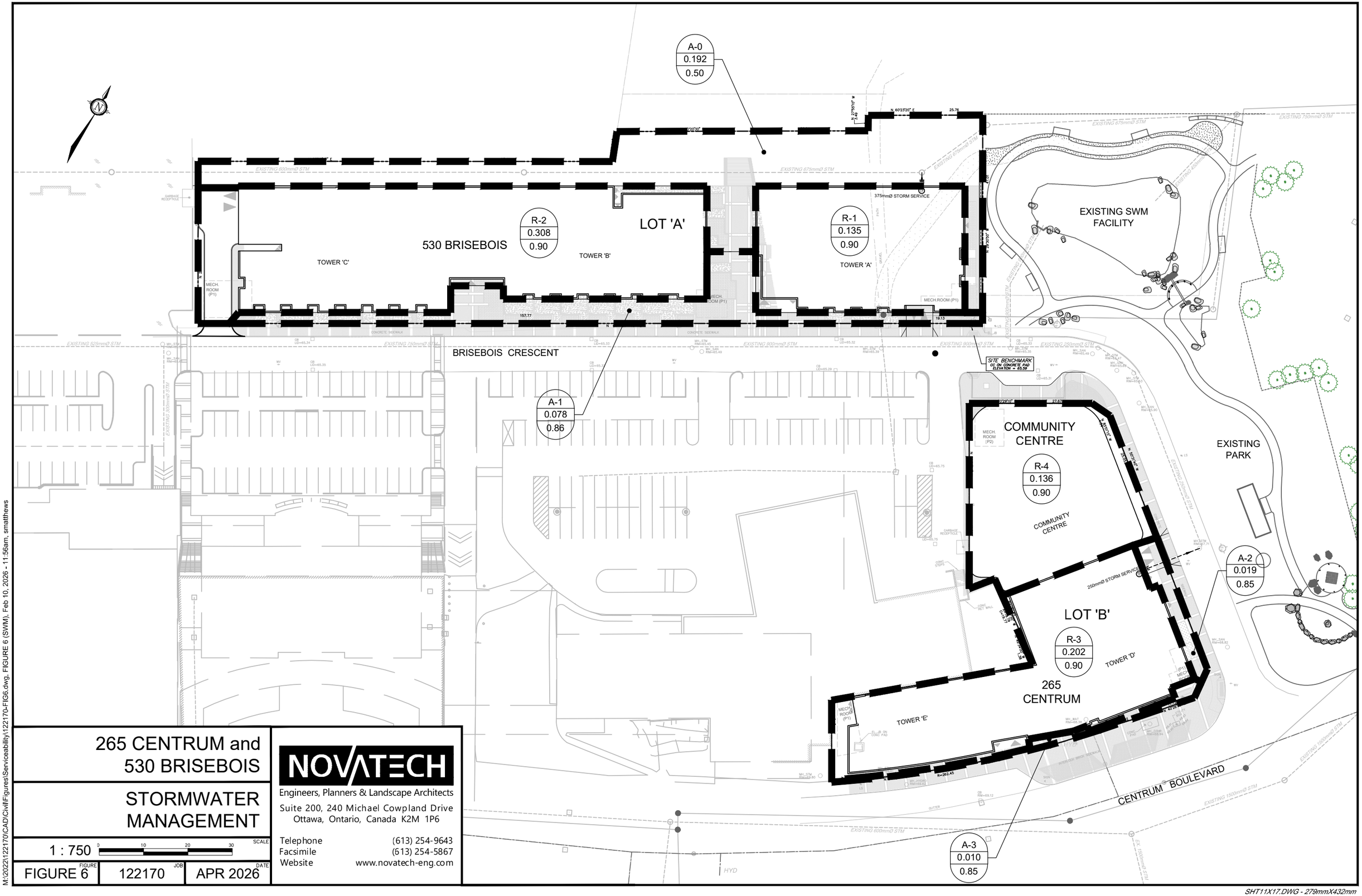
Vimal Lad
Senior Manager, Real Estate Development

Forum

Forum House at Brookfield Place
M: 647-863-7085
Vimal@forumam.com
Linkedin | Website

APPENDIX D

Storm Servicing and Stormwater Management Calculations



265 CENTRUM and 530 BRISEBOIS

STORMWATER MANAGEMENT

1 : 750 SCALE

FIGURE 6 | 122170 | APR 2026

FIGURE | JOB | DATE

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

M:\2022\122170\CAD\Civil\Figures\Serviceability\122170-FIG6.dwg, FIGURE 6 (SWM), Feb 10, 2026 - 11:56am, smatthews

SHT11X17.DWG - 279mmX432mm

Project #: 122170
Project Name: 265 Centrum 530 Brisebois
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 4/29/2026
Original Submission: Dec. 12th, 2025
Current Submission: April 30th, 2026

Proposed Multi-Tower Site Development
530 Brisebois Cres & 265 Centrum Blvd - Residential + Mixed Use Buildings

Allowable Sewer Flows

Description	Area (ha)	$A_{impervious}$ (ha) C=0.9	A_{gravel} (ha) C=0.6	$A_{pervious}$ (ha) C=0.2	Weighted C_{w5}	Weighted C_{w100}	5-Year Flow (L/s)	100-Year Flow (L/s)	Allowable C_w	Allowable Flow per Approved SWM Report (L/s)
Site Tributary to North Ditch	0.713	0.005	0.000	0.708	0.20	0.26	42.3	90.4	0.50	77.1
Site Tributary to South Sewer (from BLDG roofs)	0.367	0.008	0.025	0.359	0.26	0.32	27.2	57.8	0.90	95.7
Total Combined Site Area	1.080	0.013	0.000	1.067	0.21	0.26	65.2	138.9	0.50	172.7

T_c = 10mins

Post - Development Site Flows from 530 Brisebois Cres (LOT A) - North Sewer

Area	Description	Area (ha)	A_{imp} (ha) C=0.9	A_{perv} (ha) C=0.2	C_5	C_{100}	Uncontrolled Flow (L/s)		Controlled Flow (L/s)		Storage Required (m^3)	
							5-year	100-year	5-year	100-year	5-year	100-year
R-1	Controlled Flow Tower A	0.135	0.135	0.000	0.90	1.00	-	-	3.79	3.79	26.8	79.5
R-2	Controlled Flow Towers B+C	0.308	0.308	0.000	0.90	1.00	-	-	3.79	3.79	80.8	226.7
Totals :		0.443	-	-	-	-	**0.0**	**0.0**	**7.5**	**7.6**	**107.6**	**306.2**
							Total Site Flows :		**7.5**	**7.6**		
							T_c = 10mins	T_c = 10mins	69.6	69.5		

Post - Development Site Flows from 265 Centrum Blvd (LOT B) - South Sewer

Area	Description	Area (ha)	A_{imp} (ha) C=0.9	A_{perv} (ha) C=0.2	C_5	C_{100}	Uncontrolled Flow (L/s)		Controlled Flow (L/s)		Storage Required (m^3)	
							5-year	100-year	5-year	100-year	5-year	100-year
R-3	Controlled Flow Towers D+E	0.202	0.202	0.000	0.90	1.00	-	-	3.79	3.79	46.4	133.4
R-4	Controlled Flow Community Centre	0.136	0.136	0.000	0.90	1.00	-	-	3.79	3.79	27.1	80.3
Totals :		0.338	-	-	-	-	**0.0**	**0.0**	**7.5**	**7.6**	**73.5**	**213.7**
							Total Site Flows :		**7.5**	**7.6**		
							T_c = 10mins	T_c = 10mins	88.2	88.1		

Post - Development Uncontrolled Direct Runoff

Area	Description	Area (ha)	A_{imp} (ha) C=0.9	A_{perv} (ha) C=0.2	C_5	C_{100}	Uncontrolled Flow (L/s)		Controlled Flow (L/s)		Storage Required (m^3)	
							5-year	100-year	5-year	100-year	5-year	100-year
A-0	Uncontrolled Direct Runoff to North Ditch	0.192	0.082	0.110	0.50	0.57	27.7	54.4	-	-	-	-
A-1	Uncontrolled Runoff to Brisebois Cres	0.078	0.073	0.005	0.86	0.95	19.3	36.9	-	-	-	-
A-2	Uncontrolled Runoff to Brisebois Cres	0.019	0.018	0.001	0.85	0.95	4.7	8.9	-	-	-	-
A-3	Uncontrolled Runoff to Centrum Blvd	0.010	0.009	0.001	0.85	0.95	2.5	4.7	-	-	-	-

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122170
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-0 Uncontrolled Direct Runoff to North Ditch

OTTAWA IDF CURVE

Area =	0.192	ha	Qallow =	27.7	L/s
C =	0.50		Vol(max) =	3.0	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	141.18	37.60	9.85	2.96
10	104.19	27.75	0.00	0.00
15	83.56	22.25	-5.50	-4.95
20	70.25	18.71	-9.04	-10.85
25	60.90	16.22	-11.53	-17.30
30	53.93	14.36	-13.39	-24.10
35	48.52	12.92	-14.83	-31.14
40	44.18	11.77	-15.98	-38.36
45	40.63	10.82	-16.93	-45.71
50	37.65	10.03	-17.72	-53.16
55	35.12	9.35	-18.39	-60.70
60	32.94	8.77	-18.98	-68.31
65	31.04	8.27	-19.48	-75.98
70	29.37	7.82	-19.93	-83.69
75	27.89	7.43	-20.32	-91.45
80	26.56	7.07	-20.67	-99.24
85	25.37	6.76	-20.99	-107.06
90	24.29	6.47	-21.28	-114.91

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122170
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-0 Uncontrolled Direct Runoff to North Ditch

OTTAWA IDF CURVE

Area =	0.192	ha	Qallow =	54.4	L/s
C =	0.57		Vol(max) =	3.0	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	242.70	73.88	19.53	5.86
10	178.56	54.36	0.00	0.00
15	142.89	43.50	-10.86	-9.77
20	119.95	36.51	-17.84	-21.41
25	103.85	31.61	-22.74	-34.11
30	91.87	27.97	-26.39	-47.50
35	82.58	25.14	-29.22	-61.36
40	75.15	22.87	-31.48	-75.55
45	69.05	21.02	-33.34	-90.01
50	63.95	19.47	-34.89	-104.66
55	59.62	18.15	-36.21	-119.48
60	55.89	17.01	-37.34	-134.42
65	52.65	16.03	-38.33	-149.48
70	49.79	15.16	-39.20	-164.63
75	47.26	14.39	-39.97	-179.87
80	44.99	13.70	-40.66	-195.17
85	42.95	13.08	-41.28	-210.53
90	41.11	12.51	-41.84	-225.94

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122170
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-1 Uncontrolled Runoff to Brisebois Cres

OTTAWA IDF CURVE

Area =	0.078	ha	Qallow =	19.3	L/s
C =	0.86		Vol(max) =	2.1	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	141.18	26.18	6.86	2.06
10	104.19	19.32	0.00	0.00
15	83.56	15.49	-3.83	-3.44
20	70.25	13.03	-6.29	-7.55
25	60.90	11.29	-8.03	-12.04
30	53.93	10.00	-9.32	-16.78
35	48.52	9.00	-10.32	-21.68
40	44.18	8.19	-11.13	-26.71
45	40.63	7.53	-11.79	-31.82
50	37.65	6.98	-12.34	-37.01
55	35.12	6.51	-12.81	-42.26
60	32.94	6.11	-13.21	-47.56
65	31.04	5.76	-13.56	-52.90
70	29.37	5.45	-13.87	-58.27
75	27.89	5.17	-14.15	-63.67
80	26.56	4.93	-14.39	-69.10
85	25.37	4.70	-14.62	-74.54
90	24.29	4.50	-14.82	-80.01

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122170
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-1 Uncontrolled Runoff to Brisebois Cres

OTTAWA IDF CURVE

Area =	0.078	ha	Qallow =	36.9	L/s
C =	0.95		Vol(max) =	2.1	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	242.70	50.10	13.24	3.97
10	178.56	36.86	0.00	0.00
15	142.89	29.50	-7.36	-6.63
20	119.95	24.76	-12.10	-14.52
25	103.85	21.44	-15.42	-23.13
30	91.87	18.96	-17.89	-32.21
35	82.58	17.05	-19.81	-41.60
40	75.15	15.51	-21.35	-51.23
45	69.05	14.25	-22.60	-61.03
50	63.95	13.20	-23.66	-70.97
55	59.62	12.31	-24.55	-81.02
60	55.89	11.54	-25.32	-91.15
65	52.65	10.87	-25.99	-101.36
70	49.79	10.28	-26.58	-111.64
75	47.26	9.75	-27.10	-121.96
80	44.99	9.29	-27.57	-132.34
85	42.95	8.87	-27.99	-142.75
90	41.11	8.49	-28.37	-153.21

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122170
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-2 Uncontrolled Runoff to Brisebois Cres

OTTAWA IDF CURVE

Area =	0.019	ha	Qallow =	4.7	L/s
C =	0.85		Vol(max) =	0.5	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	141.18	6.35	1.66	0.50
10	104.19	4.69	0.00	0.00
15	83.56	3.76	-0.93	-0.84
20	70.25	3.16	-1.53	-1.83
25	60.90	2.74	-1.95	-2.92
30	53.93	2.43	-2.26	-4.07
35	48.52	2.18	-2.51	-5.26
40	44.18	1.99	-2.70	-6.48
45	40.63	1.83	-2.86	-7.72
50	37.65	1.69	-2.99	-8.98
55	35.12	1.58	-3.11	-10.26
60	32.94	1.48	-3.21	-11.54
65	31.04	1.40	-3.29	-12.84
70	29.37	1.32	-3.37	-14.14
75	27.89	1.26	-3.43	-15.45
80	26.56	1.20	-3.49	-16.77
85	25.37	1.14	-3.55	-18.09
90	24.29	1.09	-3.60	-19.42

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122170
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-2 Uncontrolled Runoff to Brisebois Cres

OTTAWA IDF CURVE

Area =	0.019	ha	Qallow =	8.9	L/s
C =	0.95		Vol(max) =	0.5	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	242.70	12.16	3.21	0.96
10	178.56	8.95	0.00	0.00
15	142.89	7.16	-1.79	-1.61
20	119.95	6.01	-2.94	-3.52
25	103.85	5.20	-3.74	-5.62
30	91.87	4.60	-4.34	-7.82
35	82.58	4.14	-4.81	-10.10
40	75.15	3.77	-5.18	-12.44
45	69.05	3.46	-5.49	-14.82
50	63.95	3.20	-5.74	-17.23
55	59.62	2.99	-5.96	-19.67
60	55.89	2.80	-6.15	-22.13
65	52.65	2.64	-6.31	-24.61
70	49.79	2.49	-6.45	-27.10
75	47.26	2.37	-6.58	-29.61
80	44.99	2.25	-6.69	-32.13
85	42.95	2.15	-6.80	-34.66
90	41.11	2.06	-6.89	-37.19

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122170
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-3 Uncontrolled Runoff to Centrum Blvd

OTTAWA IDF CURVE

Area =	0.010	ha	Qallow =	2.5	L/s
C =	0.85		Vol(max) =	0.3	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	141.18	3.34	0.87	0.26
10	104.19	2.46	0.00	0.00
15	83.56	1.98	-0.49	-0.44
20	70.25	1.66	-0.80	-0.96
25	60.90	1.44	-1.02	-1.54
30	53.93	1.28	-1.19	-2.14
35	48.52	1.15	-1.32	-2.77
40	44.18	1.05	-1.42	-3.41
45	40.63	0.96	-1.50	-4.06
50	37.65	0.89	-1.57	-4.72
55	35.12	0.83	-1.63	-5.39
60	32.94	0.78	-1.69	-6.07
65	31.04	0.73	-1.73	-6.75
70	29.37	0.69	-1.77	-7.43
75	27.89	0.66	-1.81	-8.12
80	26.56	0.63	-1.84	-8.82
85	25.37	0.60	-1.86	-9.51
90	24.29	0.57	-1.89	-10.21

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122170
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-3 Uncontrolled Runoff to Centrum Blvd

OTTAWA IDF CURVE

Area =	0.010	ha	Qallow =	4.7	L/s
C =	0.95		Vol(max) =	0.3	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	242.70	6.39	1.69	0.51
10	178.56	4.70	0.00	0.00
15	142.89	3.76	-0.94	-0.85
20	119.95	3.16	-1.54	-1.85
25	103.85	2.74	-1.97	-2.95
30	91.87	2.42	-2.28	-4.11
35	82.58	2.18	-2.53	-5.31
40	75.15	1.98	-2.72	-6.54
45	69.05	1.82	-2.88	-7.79
50	63.95	1.68	-3.02	-9.06
55	59.62	1.57	-3.13	-10.34
60	55.89	1.47	-3.23	-11.63
65	52.65	1.39	-3.32	-12.93
70	49.79	1.31	-3.39	-14.25
75	47.26	1.24	-3.46	-15.56
80	44.99	1.19	-3.52	-16.89
85	42.95	1.13	-3.57	-18.22
90	41.11	1.08	-3.62	-19.55

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122170
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-1 Pumped Internal SWM Tank

OTTAWA IDF CURVE

Area = 0.135 ha Qallow = 3.79 L/s
C = 0.90 Vol(max) = 17.6 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	34.98	31.20	9.36
10	76.81	25.94	22.16	13.29
15	61.77	20.86	17.08	15.37
20	52.03	17.57	13.79	16.55
25	45.17	15.26	11.47	17.21
30	40.04	13.53	9.74	17.53
35	36.06	12.18	8.39	17.63
40	32.86	11.10	7.32	17.56
45	30.24	10.21	6.43	17.36
50	28.04	9.47	5.69	17.06
55	26.17	8.84	5.05	16.68
60	24.56	8.29	4.51	16.23
65	23.15	7.82	4.03	15.73
75	20.81	7.03	3.24	14.60
90	18.14	6.13	2.34	12.65
120	14.56	4.92	1.13	8.16
150	12.25	4.14	0.35	3.18
180	10.63	3.59	-0.20	-2.12
210	9.42	3.18	-0.61	-7.62
240	8.47	2.86	-0.92	-13.29

Proposed Mixed-Use Development
Novatech Project No. 122170
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 Pumped Internal SWM Tank

OTTAWA IDF CURVE

Area = 0.135 ha Qallow = 3.79 L/s
C = 0.90 Vol(max) = 26.8 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	47.69	43.90	13.17
10	104.19	35.19	31.41	18.84
15	83.56	28.22	24.44	21.99
20	70.25	23.73	19.94	23.93
25	60.90	20.57	16.78	25.18
30	53.93	18.22	14.43	25.97
35	48.52	16.39	12.60	26.46
40	44.18	14.92	11.14	26.73
45	40.63	13.72	9.94	26.83
50	37.65	12.72	8.93	26.80
55	35.12	11.86	8.08	26.66
60	32.94	11.13	7.34	26.43
65	31.04	10.49	6.70	26.13
75	27.89	9.42	5.63	25.36
90	24.29	8.20	4.42	23.86
120	19.47	6.58	2.79	20.09
150	16.36	5.53	1.74	15.67
180	14.18	4.79	1.00	10.85
210	12.56	4.24	0.46	5.74
240	11.29	3.81	0.03	0.43

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122170
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 Pumped Internal SWM Tank

OTTAWA IDF CURVE

Area = 0.135 ha Qallow = 3.79 L/s
C = 1.00 Vol(max) = 62.9 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	91.09	87.30	26.19
10	178.56	67.01	63.23	37.94
15	142.89	53.63	49.84	44.86
20	119.95	45.02	41.23	49.48
25	103.85	38.97	35.19	52.78
30	91.87	34.48	30.69	55.25
35	82.58	30.99	27.21	57.13
40	75.15	28.20	24.42	58.60
45	69.05	25.91	22.13	59.75
50	63.95	24.00	20.22	60.65
55	59.62	22.38	18.59	61.35
60	55.89	20.98	17.19	61.89
65	52.65	19.76	15.97	62.29
75	47.26	17.73	13.95	62.77
90	41.11	15.43	11.64	62.88
120	32.89	12.35	8.56	61.63
150	27.61	10.36	6.58	59.19
180	23.90	8.97	5.19	56.00
210	21.14	7.94	4.15	52.29
240	19.01	7.13	3.35	48.20

Proposed Mixed-Use Development
Novatech Project No. 122170
REQUIRED STORAGE - 1:100 YR + 20% IDF Increase
AREA R-1 Pumped Internal SWM Tank

OTTAWA IDF CURVE

Area = 0.135 ha Qallow = 3.79 L/s
C = 1.00 Vol(max) = 79.5 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	109.30	105.52	31.66
10	214.27	80.42	76.63	45.98
15	171.47	64.35	60.57	54.51
20	143.94	54.02	50.24	60.28
25	124.62	46.77	42.98	64.47
30	110.24	41.37	37.59	67.66
35	99.09	37.19	33.40	70.15
40	90.17	33.84	30.06	72.14
45	82.86	31.10	27.31	73.74
50	76.74	28.80	25.02	75.05
55	71.55	26.85	23.07	76.12
60	67.07	25.17	21.39	76.99
65	63.18	23.71	19.92	77.71
75	56.71	21.28	17.50	78.73
90	49.33	18.51	14.73	79.54
120	39.47	14.81	11.03	79.41
150	33.13	12.43	8.65	77.84
180	28.68	10.76	6.98	75.38
210	25.37	9.52	5.74	72.29
240	22.81	8.56	4.77	68.75

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122170
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-2 Pumped Internal SWM Tank

OTTAWA IDF CURVE

Area = 0.308 ha Qallow = 3.79 L/s
C = 0.90 Vol(max) = 55.1 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	79.81	76.03	22.81
10	76.81	59.19	55.40	33.24
15	61.77	47.60	43.81	39.43
20	52.03	40.10	36.31	43.57
25	45.17	34.81	31.02	46.53
30	40.04	30.86	27.07	48.73
35	36.06	27.79	24.00	50.41
40	32.86	25.33	21.54	51.70
45	30.24	23.30	19.52	52.70
50	28.04	21.61	17.82	53.47
55	26.17	20.17	16.38	54.06
60	24.56	18.92	15.14	54.50
65	23.15	17.84	14.06	54.82
75	20.81	16.04	12.25	55.14
90	18.14	13.98	10.20	55.06
120	14.56	11.22	7.44	53.54
150	12.25	9.44	5.66	50.90
180	10.63	8.19	4.40	47.56
210	9.42	7.26	3.47	43.73
240	8.47	6.53	2.75	39.53

Proposed Mixed-Use Development
Novatech Project No. 122170
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2 Pumped Internal SWM Tank

OTTAWA IDF CURVE

Area = 0.308 ha Qallow = 3.79 L/s
C = 0.90 Vol(max) = 80.8 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	108.79	105.01	31.50
10	104.19	80.29	76.51	45.90
15	83.56	64.39	60.61	54.54
20	70.25	54.14	50.35	60.42
25	60.90	46.93	43.14	64.71
30	53.93	41.56	37.77	67.99
35	48.52	37.39	33.60	70.57
40	44.18	34.05	30.26	72.63
45	40.63	31.31	27.52	74.31
50	37.65	29.02	25.23	75.69
55	35.12	27.07	23.28	76.83
60	32.94	25.39	21.60	77.76
65	31.04	23.92	20.14	78.54
75	27.89	21.49	17.71	79.68
90	24.29	18.72	14.93	80.63
120	19.47	15.00	11.22	80.76
150	16.36	12.61	8.82	79.41
180	14.18	10.93	7.14	77.13
210	12.56	9.68	5.89	74.21
240	11.29	8.70	4.92	70.82

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122170
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2 Pumped Internal SWM Tank

OTTAWA IDF CURVE

Area = 0.308 ha Qallow = 3.79 L/s
C = 1.00 Vol(max) = 180.4 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	207.81	204.03	61.21
10	178.56	152.89	149.10	89.46
15	142.89	122.35	118.57	106.71
20	119.95	102.71	98.92	118.71
25	103.85	88.92	85.13	127.70
30	91.87	78.66	74.88	134.78
35	82.58	70.71	66.92	140.54
40	75.15	64.34	60.56	145.34
45	69.05	59.12	55.34	149.41
50	63.95	54.76	50.97	152.92
55	59.62	51.05	47.27	155.98
60	55.89	47.86	44.07	158.67
65	52.65	45.08	41.29	161.04
75	47.26	40.46	36.68	165.04
90	41.11	35.20	31.42	169.64
120	32.89	28.17	24.38	175.54
150	27.61	23.64	19.86	178.70
180	23.90	20.47	16.68	180.15
210	21.14	18.10	14.32	180.42
240	19.01	16.27	12.49	179.83

Proposed Mixed-Use Development
Novatech Project No. 122170
REQUIRED STORAGE - 1:100 YR + 20% IDF Increase
AREA R-2 Pumped Internal SWM Tank

OTTAWA IDF CURVE

Area = 0.308 ha Qallow = 3.79 L/s
C = 1.00 Vol(max) = 226.7 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	249.38	245.59	73.68
10	214.27	183.47	179.68	107.81
15	171.47	146.82	143.04	128.73
20	143.94	123.25	119.46	143.35
25	124.62	106.70	102.92	154.37
30	110.24	94.39	90.61	163.09
35	99.09	84.85	81.06	170.23
40	90.17	77.21	73.43	176.22
45	82.86	70.95	67.16	181.34
50	76.74	65.71	61.93	185.78
55	71.55	61.26	57.48	189.68
60	67.07	57.43	53.65	193.12
65	63.18	54.09	50.31	196.20
75	56.71	48.55	44.77	201.46
90	49.33	42.24	38.46	207.66
120	39.47	33.80	30.01	216.10
150	33.13	28.37	24.58	221.26
180	28.68	24.56	20.77	224.36
210	25.37	21.73	17.94	226.05
240	22.81	19.53	15.74	226.70

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122170
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-3 Pumped Internal SWM Tank

OTTAWA IDF CURVE

Area = 0.202 ha Qallow = 3.79 L/s
C = 0.90 Vol(max) = 31.2 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	52.35	48.56	14.57
10	76.81	38.82	35.03	21.02
15	61.77	31.22	27.43	24.69
20	52.03	26.30	22.51	27.01
25	45.17	22.83	19.04	28.56
30	40.04	20.24	16.45	29.61
35	36.06	18.22	14.44	30.32
40	32.86	16.61	12.82	30.78
45	30.24	15.28	11.50	31.04
50	28.04	14.17	10.39	31.16
55	26.17	13.23	9.44	31.16
60	24.56	12.41	8.63	31.05
65	23.15	11.70	7.92	30.87
75	20.81	10.52	6.73	30.30
90	18.14	9.17	5.38	29.07
120	14.56	7.36	3.57	25.73
150	12.25	6.19	2.41	21.66
180	10.63	5.37	1.59	17.12
210	9.42	4.76	0.97	12.26
240	8.47	4.28	0.50	7.17

Proposed Mixed-Use Development
Novatech Project No. 122170
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-3 Pumped Internal SWM Tank

OTTAWA IDF CURVE

Area = 0.202 ha Qallow = 3.79 L/s
C = 0.90 Vol(max) = 46.4 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	71.35	67.57	20.27
10	104.19	52.66	48.87	29.32
15	83.56	42.23	38.44	34.60
20	70.25	35.51	31.72	38.06
25	60.90	30.78	26.99	40.49
30	53.93	27.26	23.47	42.25
35	48.52	24.52	20.74	43.54
40	44.18	22.33	18.55	44.51
45	40.63	20.53	16.75	45.22
50	37.65	19.03	15.24	45.73
55	35.12	17.75	13.97	46.09
60	32.94	16.65	12.86	46.31
65	31.04	15.69	11.90	46.43
75	27.89	14.09	10.31	46.39
90	24.29	12.28	8.49	45.85
120	19.47	9.84	6.05	43.59
150	16.36	8.27	4.48	40.36
180	14.18	7.17	3.38	36.52
210	12.56	6.35	2.56	32.26
240	11.29	5.71	1.92	27.69

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122170
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-3 Pumped Internal SWM Tank

OTTAWA IDF CURVE

Area = 0.202 ha Qallow = 3.79 L/s
C = 1.00 Vol(max) = 105.7 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	136.29	132.51	39.75
10	178.56	100.27	96.49	57.89
15	142.89	80.24	76.46	68.81
20	119.95	67.36	63.57	76.29
25	103.85	58.32	54.53	81.80
30	91.87	51.59	47.80	86.05
35	82.58	46.37	42.59	89.43
40	75.15	42.20	38.41	92.19
45	69.05	38.78	34.99	94.47
50	63.95	35.91	32.13	96.39
55	59.62	33.48	29.70	98.00
60	55.89	31.39	27.60	99.37
65	52.65	29.56	25.78	100.54
75	47.26	26.54	22.75	102.38
90	41.11	23.09	19.30	104.22
120	32.89	18.47	14.69	105.75
150	27.61	15.51	11.72	105.48
180	23.90	13.42	9.64	104.08
210	21.14	11.87	8.09	101.91
240	19.01	10.67	6.89	99.18

Proposed Mixed-Use Development
Novatech Project No. 122170
REQUIRED STORAGE - 1:100 YR + 20% IDF Increase
AREA R-3 Pumped Internal SWM Tank

OTTAWA IDF CURVE

Area = 0.202 ha Qallow = 3.79 L/s
C = 1.00 Vol(max) = 133.4 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	163.55	159.77	47.93
10	214.27	120.33	116.54	69.92
15	171.47	96.29	92.51	83.26
20	143.94	80.83	77.05	92.46
25	124.62	69.98	66.19	99.29
30	110.24	61.91	58.12	104.62
35	99.09	55.65	51.86	108.91
40	90.17	50.64	46.85	112.45
45	82.86	46.53	42.75	115.41
50	76.74	43.10	39.31	117.93
55	71.55	40.18	36.39	120.10
60	67.07	37.67	33.88	121.97
65	63.18	35.48	31.69	123.60
75	56.71	31.84	28.06	126.26
90	49.33	27.70	23.92	129.16
120	39.47	22.17	18.38	132.35
150	33.13	18.61	14.82	133.39
180	28.68	16.11	12.32	133.08
210	25.37	14.25	10.46	131.84
240	22.81	12.81	9.02	129.92

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122170
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-4 Pumped Internal SWM Tank

OTTAWA IDF CURVE

Area = 0.136 ha Qallow = 3.79 L/s
C = 0.90 Vol(max) = 17.8 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	35.24	31.46	9.44
10	76.81	26.13	22.35	13.41
15	61.77	21.02	17.23	15.51
20	52.03	17.70	13.92	16.70
25	45.17	15.37	11.58	17.38
30	40.04	13.63	9.84	17.71
35	36.06	12.27	8.48	17.82
40	32.86	11.18	7.40	17.75
45	30.24	10.29	6.50	17.56
50	28.04	9.54	5.76	17.27
55	26.17	8.91	5.12	16.89
60	24.56	8.36	4.57	16.46
65	23.15	7.88	4.09	15.96
75	20.81	7.08	3.30	14.84
90	18.14	6.17	2.39	12.90
120	14.56	4.96	1.17	8.42
150	12.25	4.17	0.38	3.45
180	10.63	3.62	-0.17	-1.83
210	9.42	3.20	-0.58	-7.33
240	8.47	2.88	-0.90	-12.98

Proposed Mixed-Use Development
Novatech Project No. 122170
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-4 Pumped Internal SWM Tank

OTTAWA IDF CURVE

Area = 0.136 ha Qallow = 3.79 L/s
C = 0.90 Vol(max) = 27.1 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	48.04	44.25	13.28
10	104.19	35.45	31.67	19.00
15	83.56	28.43	24.65	22.18
20	70.25	23.90	20.12	24.14
25	60.90	20.72	16.94	25.40
30	53.93	18.35	14.56	26.22
35	48.52	16.51	12.72	26.72
40	44.18	15.03	11.25	27.00
45	40.63	13.82	10.04	27.11
50	37.65	12.81	9.03	27.08
55	35.12	11.95	8.17	26.95
60	32.94	11.21	7.42	26.73
65	31.04	10.56	6.78	26.43
75	27.89	9.49	5.70	25.67
90	24.29	8.26	4.48	24.19
120	19.47	6.62	2.84	20.44
150	16.36	5.57	1.78	16.04
180	14.18	4.83	1.04	11.23
210	12.56	4.27	0.49	6.13
240	11.29	3.84	0.06	0.83

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122170
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-4 Pumped Internal SWM Tank

OTTAWA IDF CURVE

Area = 0.136 ha Qallow = 3.79 L/s
C = 1.00 Vol(max) = 63.5 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	91.76	87.98	26.39
10	178.56	67.51	63.72	38.23
15	142.89	54.03	50.24	45.22
20	119.95	45.35	41.57	49.88
25	103.85	39.26	35.48	53.22
30	91.87	34.73	30.95	55.71
35	82.58	31.22	27.44	57.62
40	75.15	28.41	24.63	59.10
45	69.05	26.11	22.32	60.27
50	63.95	24.18	20.39	61.18
55	59.62	22.54	18.76	61.90
60	55.89	21.13	17.35	62.45
65	52.65	19.90	16.12	62.86
75	47.26	17.87	14.08	63.36
90	41.11	15.54	11.76	63.49
120	32.89	12.44	8.65	62.29
150	27.61	10.44	6.65	59.88
180	23.90	9.04	5.25	56.72
210	21.14	7.99	4.21	53.03
240	19.01	7.19	3.40	48.96

Proposed Mixed-Use Development
Novatech Project No. 122170
REQUIRED STORAGE - 1:100 YR + 20% IDF Increase
AREA R-4 Pumped Internal SWM Tank

OTTAWA IDF CURVE

Area = 0.136 ha Qallow = 3.79 L/s
C = 1.00 Vol(max) = 80.3 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	110.11	106.33	31.90
10	214.27	81.01	77.23	46.34
15	171.47	64.83	61.05	54.94
20	143.94	54.42	50.64	60.76
25	124.62	47.12	43.33	64.99
30	110.24	41.68	37.89	68.21
35	99.09	37.47	33.68	70.73
40	90.17	34.09	30.31	72.74
45	82.86	31.33	27.54	74.36
50	76.74	29.02	25.23	75.69
55	71.55	27.05	23.27	76.78
60	67.07	25.36	21.57	77.67
65	63.18	23.89	20.10	78.39
75	56.71	21.44	17.65	79.44
90	49.33	18.65	14.87	80.28
120	39.47	14.92	11.14	80.20
150	33.13	12.53	8.74	78.67
180	28.68	10.84	7.06	76.24
210	25.37	9.59	5.81	73.18
240	22.81	8.62	4.84	69.66

APPENDIX E

Storm Servicing and Stormwater Management – North Sewer

NORTH PRIVATE STORM SEWER DESIGN BRIEF
COMMERCIAL DRIVE
OTTAWA, ON

Prepared for:

OTCP GP Inc. c/o Forum

Prepared By:

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

March 2, 2012
Revised May 16, 2012
Revised June 29, 2012

Novatech File: 109039
Ref: R-2009-022

NOVATECH
ENGINEERING
CONSULTANTS LTD.

June 29, 2012

City of Ottawa
Planning and Growth Management Department
Planning and Infrastructure Approvals Branch
Infrastructures Approvals Division
110 Laurier Avenue West
4th Floor
Ottawa, Ontario
K1P 1J1

Attention: **Mr. John Sevigny**

Dear Mr. Sevigny:

Reference: **North Private Storm Sewer Design Brief**
Commercial Drive, Ottawa

Enclosed herein are two (2) copies of the revised north storm sewer design brief for the proposed private storm sewer to be installed north of Commercial Drive, to service Morguard, the Hotel, and the Office Lands. The report has been revised as per your June 6, 2012 comments and establishes the stormwater management criteria of the adjacent lands that will ultimately outlet into the sewer, and is submitted for your review and comments.

This report prepared to support the City review and approval and the MOE Approvals. A MOE ECR is required as the storm sewer and stormwater management service multiple parcels of land.

Should you have any questions, don't hesitate to contact the undersigned.

Yours truly,

NOVATECH ENGINEERING CONSULTANTS LTD.

ON BEHALF OF...

Melanie Riddell, P. Eng
Project Manager

1.0 INTRODUCTION

It is proposed to construct a private storm sewer located within the Orleans Town Centre (OTC) West development to serve as the storm outlet for the lands north of Commercial Drive. Due to topographical constraints, the lands north of Commercial Drive cannot outlet to the storm sewer on Commercial Drive. The OTC West development is located in the City of Ottawa, north of Centrum Boulevard, and east of Place d'Orleans Drive (refer to Figure 1). The purpose of this report is to provide stormwater management criteria for the lands that will ultimately outlet into the proposed storm sewer, size a stormceptor to remove 70% of the total suspended solids (TSS), and confirm the size of the storm sewer. The sewer is located north of Commercial Drive and extends from the NW corner to the NE corner of the OTC West Lands. This design brief follows the design recommendations of *The Orleans Town Centre West Serviceability and Stormwater Management Report,* Novatech, January 2008, (OTCW Serviceability Report).

The north storm sewer will service three (3) sites: The Morguard Lands to the west, The Hotel Lands in the middle, and the Future Office Development to the east (refer to Figure 2).

The existing stormwater management facility (SWMF), located in the northeast corner of the OTC West Development, only provides quality and quantity control for the lands south of Commercial Drive and not for the lands north of Commercial Drive. The proposed storm sewer bypasses the mentioned SWMF. Thus, quality control will be achieved with the installation of a stormceptor sized to eliminate a minimum of 70% of the total suspended solids (TSS) before outletting into the approved storm outlet.

2.0 DESIGN CRITERIA

As stated above, this report follows the design recommendations of the OTCW Serviceability Report. The maximum allowable rate of stormwater discharge from the north storm sewer is 220L/s; refer to Appendix A for excerpts from the OTCW Serviceability Report. Based on the design recommendations of the OTCW Serviceability Report, Table 2.1 indicates the maximum allowable rate of stormwater discharge from the lands north of Commercial Drive that will outlet into the private storm sewer.

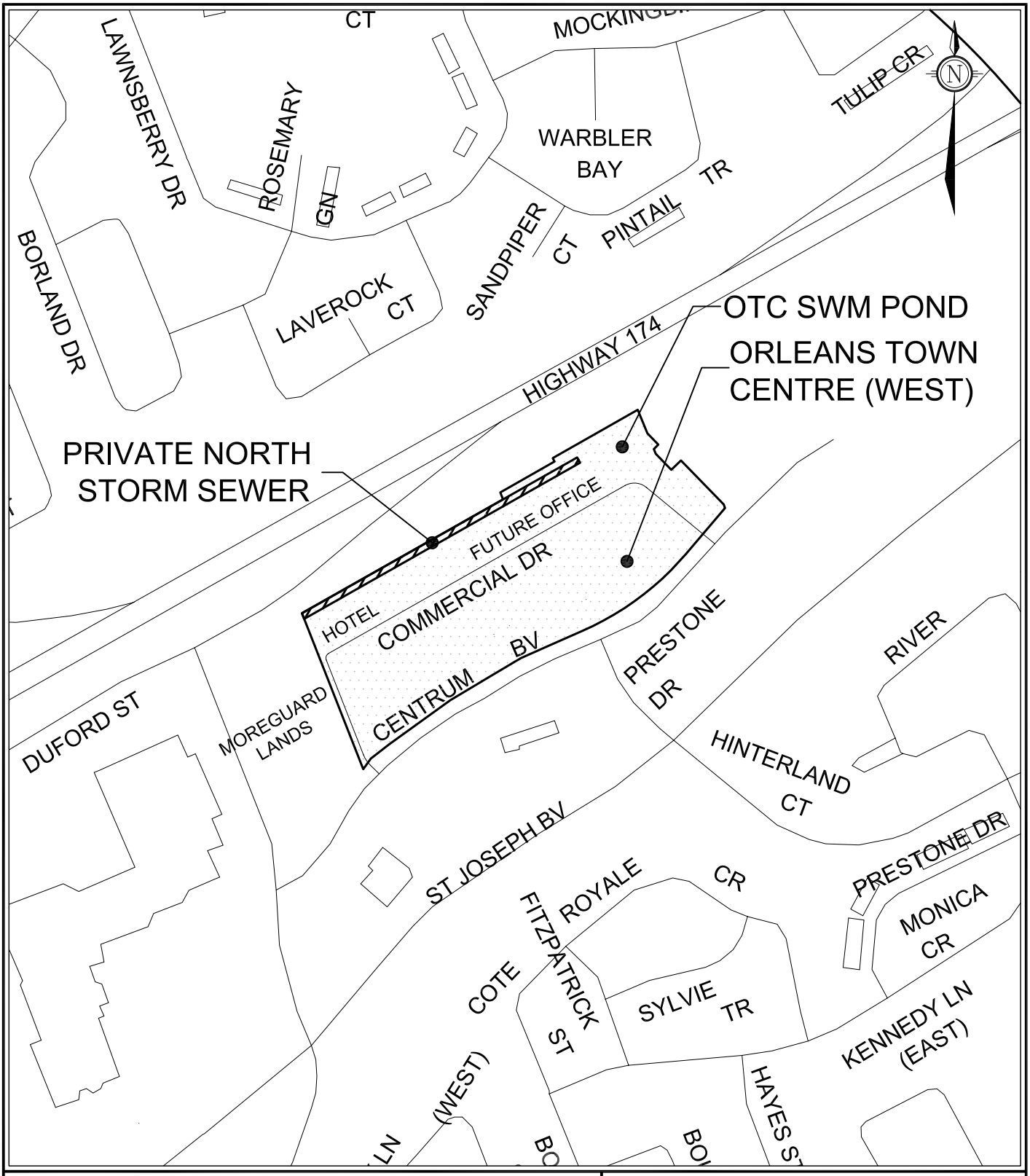
Table 2.1 – Allowable Stormwater Release Rates into the Private Storm Sewer

Land	Area	Release Rate	
	(ha)	(L/s/ha)	(L/s)
Morguard (West)	1.19	61.0	72.6
Hotel Lands (Middle)	0.58	108.1	63.1
Future Office Lands (East)	0.78	108.1	84.3
Total	**2.55**		**220**

Note: Refer to **Appendix A** for excerpts from OTC (West) Serviceability and Stormwater Management Report that confirms the maximum allowable rate of stormwater discharge from the lands north of Commercial Drive to be 220L/s.

This report will not address how each site will achieve the required stormwater criteria; however, onsite stormwater management can be achieved by utilizing several stormwater management techniques such as rooftop and surface storage. Each site will have a site specific stormwater management report prepared that details how it will achieve the maximum release rate.

The Modified Rational Method, listed below, was used to determine the stormwater flows and size the private storm sewers.

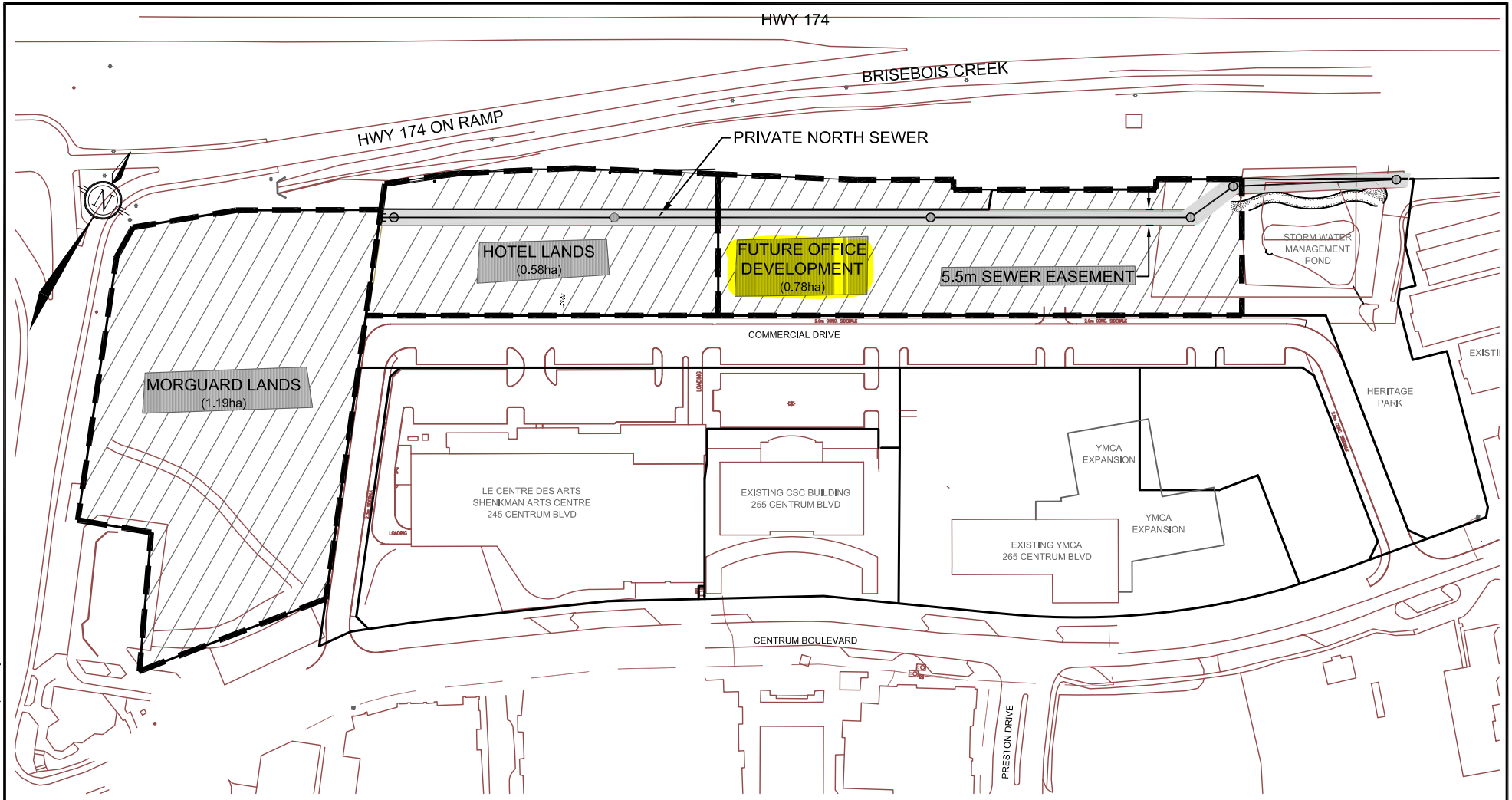


NOVATECH
ENGINEERING
CONSULTANTS LTD.
ENGINEERS & PLANNERS
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada
K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Email: novainfo@novatech-eng.com

PRIVATE NORTH STORM SEWER

KEY PLAN

JUNE 2012 109039 FIGURE 1



NOVATECH
ENGINEERING
CONSULTANTS LTD.
ENGINEERS & PLANNERS
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada
K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Email: novainfo@novatech-eng.com

PRIVATE NORTH STORM SEWER

SITE PLAN

JUNE 2012 109039 FIGURE 2

Q=2.78CIA Where Q = rate of stormwater discharge (L/s)
C = runoff coefficient (unitless)
I = rainfall intensity (mm/hr)
A = site area (ha)

The storm design sheets in Appendix B utilize the modified rational method and the former Township of Cumberland Intensity Duration Frequency (IDF) curve equations to determine the rate of uncontrolled stormwater discharge from the adjacent lands.

3.0 SITE SPECIFIC SWM DESIGN CRITERIA

As stated above, the private storm sewer will act as the storm outlet for the land north of Commercial Drive. This land is divided into three (3) distinct areas: The Morguard Lands to the west, The Hotel Site in the middle, and the Future Office Lands to the east.

3.1 Morguard Lands

The *Morguard Lands Homebase Orleans Stormwater Management Report* (Novatech, November 1990) (MLSWM) anticipated a release rate of 39L/s from the site. However, based on discussions with City staff, the more recent OTCW Serviceability Report increased the allowable stormwater release rate from the Morguard Lands to 72.6L/s. For the purposes of this report, the Morguard Lands are assumed to release stormwater at a maximum rate of 72.6L/s during the 5 and 100 year storm events. No onsite quality control will be required, as all flows entering the private north storm sewer will be treated via a downstream stormceptor.

3.2 Hotel Lands

For the purposes of this report, the Hotel Lands are assumed to release stormwater at a maximum rate of 63.1L/s during the 5 and 100 year storm events (refer to Table 2.1). No onsite quality control will be required, as all flows entering the private North Storm Sewer will be treated via a downstream stormceptor.

3.3 Future Office Development Lands

For the purposes of this report, the Future Office Development Lands are assumed to release stormwater at a maximum rate of 84.3L/s during the 5 and 100 year storm events (refer to Table 2.1). No onsite quality control will be required, as all flows entering the private North Storm Sewer will be treated via a downstream stormceptor.

4.0 PRIVATE NORTH STORM SEWER SIZING

The private north storm sewer is sized to accommodate the 5 year uncontrolled flows from the Morguard, Hotel, and Future Office Development Lands. Table 4.1 lists the 5 year accumulated uncontrolled flows from the three sites and confirms the private north storm sewer has adequate capacity to accommodate the 5 year controlled stormwater flow.

Table 4.1 – 5 Year Accumulated Uncontrolled Stormwater Release Rates

Lands	5 Year Cumulative Uncontrolled Release Rate	MH-MH	Private North Storm Sewer		
	(L/s)	(Previous Label)	Size (mm)	Slope (%)	Capacity (L/s)
Morguard	188.0	M-200	450	0.45	188.9
Hotel		200-109 (202)	525	0.25	223.9
Hotel/Office	265.0	109 (202)-204	600	0.27	333.4
Future Office	370.2	204-206	675	0.19	381.1
		206-208	675	0.22	410.0
		208-Ext	675	0.41	559.8

Note: Refer to Appendix A for a copy of the Storm Sewer Design Sheet for the Morguard, Hotel, and Future Office Development Lands from the OTCW Serviceability Report. The Stormwater Management design sheet has been updated to reflect the latest site plan, refer to Appendix A for a copy of the updated Storm sewer Design Sheet. Manhole 202 has been relabeled manhole 109 and manhole 210 has been eliminated.

5.0 STORMCEPTOR SIZING

Since the stormwater outletting into the private north storm sewer will bypass the OTC West SWMF, a stormceptor will be installed near the outlet of the sewer to provide removal of 70% TSS minimum. Storm Manhole 208 is the last manhole prior to discharging into the existing 750mm storm sewer (which serves as the outlet for all of the OTC West development lands). In order to provide quality control for the lands north of Commercial Drive, storm manhole 208 will be replaced with a stormceptor.

Hanson's Stormceptor CD sizing program was used to determine the appropriate stormceptor model to provide the required 70% TSS removal. The stormceptor has been sized based on runoff coefficients specified in the OTCW Serviceability Report: Morguard Lands (C=0.83), Hotel Lands (C=0.90), and Future Office Development Lands (C=0.90). The results indicated that a Stormceptor Model STC-2000 is sufficient to provide the required 70% TSS removal.

The owner of the stormceptor will be responsible for the maintenance of the structure; a copy of the Stormceptor System Owner's Manual is included in Appendix C.

6.0 EROSION AND SEDIMENT CONTROL

Temporary erosion and sediment control measures will be implemented onsite during construction, in accordance with the "Guidelines on Erosion and Sediment Control for Urban Construction Sites", (Government of Ontario, May 1987). These measures include:

- Placing filter fabric under all catchbasins and maintenance hatches.
- Installing silt fences around the areas under construction, as per OPSS 577 and OPSD 219.110.
- Installing straw bale check dams, as per OPSS 219.180.

7.0 CONCLUSIONS

Based on this report, the following stormwater management criteria must be included in the future design of the Morguard, Hotel, and Future Office Development Lands. A Stormwater management report will be required as part of the Site Plan Application for each site.

- The Morguard Lands must limit the rate of stormwater discharge to a maximum of 72.6L/s. Onsite quality control is not required.
- The Hotel Lands must limit the rate of stormwater discharge to a maximum of 63.1L/s. Onsite quality control is not required.
- The Future Office Development Lands must limit the rate of stormwater discharge to a maximum of 84.3L/s. Onsite quality control is not required.
- A STC-2000 stormceptor will be installed at storm manhole 208 to provide a minimum required 70%TSS removal.
- The North Private Storm Sewer is adequately sized to accommodate the 5 year uncontrolled storm flows.

NOVATECH ENGINEERING CONSULTANTS LTD.

Prepared by:

Mark Bowen

Reviewed by:

Melanie Riddell, P. Eng
Project Manager

4.4 HYDRAULIC GRADE LINE ANALYSIS

The hydraulic grade lines in the OTC West storm sewers were calculated for the 1:100 year design event. HGL elevations were calculated under steady-state conditions using the Darcy-Weisbach equation to calculate friction losses in the pipe network for a specified flow rate. Minor losses were accounted for at pipe bends; entrance and exit losses were accounted for at each manhole.

A detailed HGL analysis of the downstream sewers was not completed. Instead, the 2005 J.L. Richards report considered the worst-case scenario: The storm sewer surcharged to the ground surface (±63.5 m) at the connection to the trunk storm sewer crossing under Highway 174. The HGL of the on-site storm sewers have been modeled based on the 100 year storage elevation (63.95m).

The HGL spreadsheet calculations are provided in Appendix C.

4.5 NORTH SEWER

Due to topographical constraints, the lands north of the loop road and the adjacent Morguard lands will not be directed to the SWM facility, but will be directed to a separate, private storm sewer (North Sewer). The North Sewer will bypass the SWM pond, and outlet directly to the 750mm diameter storm outlet, and therefore on-site storage will be provided on the respective sited to attenuate flows to the allowable release rate. The flows will be quantity controlled on the respective sites by providing on-site storage to attenuate flows to the allowable release rate.

A functional design for the north sewer has been completed and the preliminary layout shown on C106011-NSTM and storm sewer design sheet is included in Appendix G.

A private Stormceptor will be installed at the downstream limit of the north storm sewers to provide quality control for both the Morguard Lands (1.19 ha) and the OTC West lands tributary to the north sewer (1.36 ha). Inflows to the north storm sewer will be controlled to a maximum of 220 L/s. The Stormceptor has been sized to provide 70% long-term TSS removal for the upstream drainage area.

The Stormceptor CD Sizing program was used to determine the appropriate Stormceptor model to provide the requisite level of quality control. The sizing program incorporates the upstream storage and controlled inflows in the analysis. The results of the water quality analysis indicate that a Stormceptor Model STC-750 will provide a long-term TSS removal rate of approximately 74%. The Stormceptor size and location will be confirmed during detailed design.

5.0 SWM FACILITY DESIGN

The proposed SWM facility has been sized to provide water quality and peak flow control for a tributary drainage area of 3.45 ha. Refer to Table 5.0-1 for a summary of the drainage areas and flows used in the analysis.

PROJECT:	**109039**
DESIGNED BY:	**RA**
CHECKED BY:	**MER**
DATE:	**March 2, 2012**

PROJECT: **Orleans Town Centre (West) North Private Storm Sewer**
DEVELOPER: **Public-Private Partnership/OTCP GP Inc.**

NOVATECH ENGINEERING CONSULTANTS LTD

Uncontrolled 5 Year Peak Flow

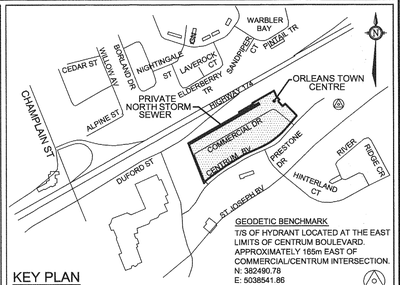
LANDS	MANHOLE		Drainage Area	Runoff Coefficient (R)	INDIV 2.78 AR	ACCUM 2.78 AR	TIME OF CONC. (min)	RAINFALL INTENSITY (mm/hr)	UNCONTROLLED PEAK FLOW Q (L/s)	PROPOSED SEWER								
	FROM	TO								TYPE OF PIPE	PIPE SIZE (mm)	PIPE ID (mm)	GRADE (%)	LENGTH (m)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min)	PERCENTAGE OF CAPACITY
Moguard	Morguard	200	1.190	0.83	2.75	2.75	20.00	68.5	**188.0**	CONC	450	448	0.45	3.8	**188.9**	1.20	0.05	100%
Hotel/Office	200	109	0.009	0.35	0.01	2.75	20.05	68.3	**188.3**	CONC	525	533	0.25	79.8	**223.9**	1.00	1.33	84%
Hotel/Office	109	204	0.550	0.84	1.28	4.03	21.38	65.7	**265.0**	CONC	600	610	0.27	110.0	**333.4**	1.14	1.61	79%
Office	204	206	0.780	0.86	1.86	5.89	22.99	62.9	**370.2**	CONC	675	685	0.19	88.9	**381.1**	1.03	1.43	97%
Office	206	208				5.89	24.42	60.6	**356.6**	CONC	675	685	0.22	18.2	**410.0**	1.11	0.27	87%
Total	208	Existing				5.89	24.69	60.2	**354.1**	CONC	675	685	0.41	56.4	**559.8**	1.52	0.62	63%
							25.31											

Controlled 5 Year Peak Flow

LANDS	MANHOLE		Drainage Area	Runoff Coefficient (R)	INDIV 2.78 AR	ACCUM 2.78 AR	TIME OF CONC. (min)	RAINFALL INTENSITY (mm/hr)	CONTROLLED RELEASE RATE (L/s)	PROPOSED SEWER								
	FROM	TO								TYPE OF PIPE	PIPE SIZE (mm)	PIPE ID (mm)	GRADE (%)	LENGTH (m)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min)	PERCENTAGE OF CAPACITY
Moguard	Morguard	200	1.190	0.83	N/A	N/A	N/A	N/A	**72.6**	CONC	450	448	0.45	3.8	**188.9**	1.20	0.05	38%
Hotel/Office	200	109	0.009	0.35	N/A	N/A	N/A	N/A	**74.0**	CONC	525	533	0.25	79.8	**223.9**	1.00	1.33	33%
Hotel/Office	109	204	0.550	0.84	N/A	N/A	N/A	N/A	**106.7**	CONC	600	610	0.27	110.0	**333.4**	1.14	1.61	32%
Office	204	206	0.780	0.86	N/A	N/A	N/A	N/A	**190.6**	CONC	675	685	0.19	88.9	**381.1**	1.03	1.43	50%
Office	206	208			N/A	N/A	N/A	N/A	**190.6**	CONC	675	685	0.22	18.2	**410.0**	1.11	0.27	46%
Total	208	Existing			N/A	N/A	N/A	N/A	**190.6**	CONC	675	685	0.41	56.4	**559.8**	1.52	0.62	34%

Notes:
1. 5 Year uncontrolled rainfall intensity curves as per former Township of Cumberland IDF curve, where I(5-year) = 879/ [Tc(min)^0.77 + 2.8]
2. Controlled release rate based on a maximum release rate of 220L/s in the North Private Storm Sewer, for the 100 year Chicago Design Storm, as outlined in Novatech's Orleans Town Centre (OTC) West Serviceability and Stormwater Management Report (January 2008).
3. Controlled release rates stated above are taken from the Storm Net Model 20120214_Post.SPF run using the 5 year 3 hour Chicago Design Storm. Refer to modeling files created as part of the 265 Centrum Boulevard Holiday Inn Express Serviceability and Stormwater Management Brief (Ref. No. R-2009-016), March 2, 2012.

NORTH

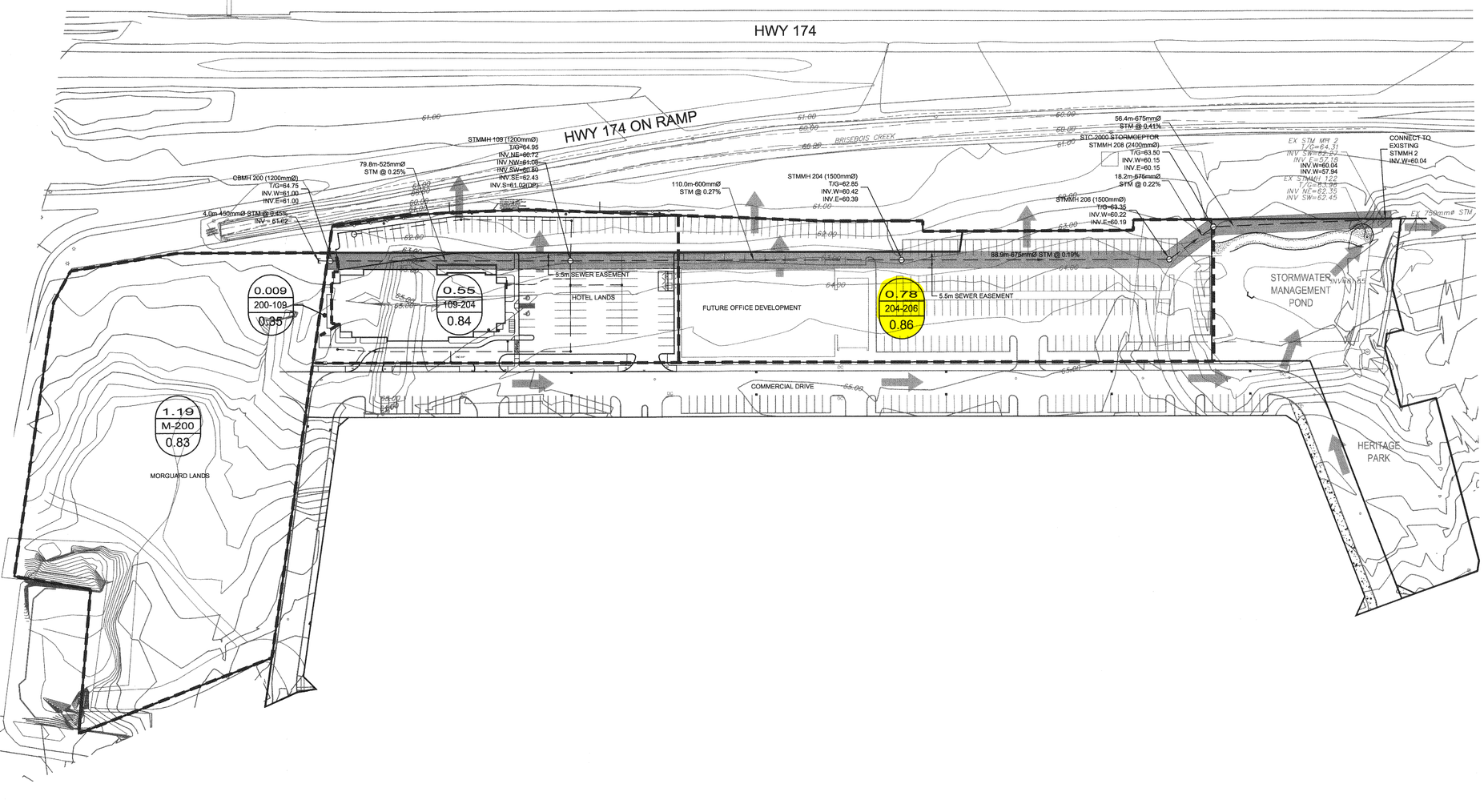


KEY PLAN
N.T.S.

GEODETIC BENCHMARK
T/S OF HYDRANT LOCATED AT THE EAST LIMITS OF CENTRUM BOULEVARD. APPROXIMATELY 165m EAST OF COMMERCIAL/CENTRUM INTERSECTION.
N: 5024907.78
E: 5038541.86
ELEV: 72.57

LEGEND

- 0.46 / 204-206 / 0.90 — DRAINAGE AREA (ha) / MANHOLE TO MANHOLE / RUN-OFF COEFFICIENT
- STORM DRAINAGE AREA
- STMMH 206 — PROPOSED STORM MANHOLE
- CBMH 200 — PROPOSED CATCHBASIN MANHOLE COMPLETE WITH SUBDRAIN
- TCB 2 — "T" CATCH BASIN
- PROPOSED STORM SEWER AND DIRECTION OF FLOW
- STM MH — EXISTING STORM MANHOLE & SEWER
- PRIVATE NORTH STORM SEWER EASEMENT
- MAJOR OVERLAND FLOW
- EXISTING CONTOUR LINE AND CONTOUR ELEVATION



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

No.	REVISION	DATE	BY
4.	NORTH SLOPE REVISED, REISSUED FOR APPROVAL	SEPT 4/12	MWB
3.	REISSUED FOR SITE APPROVAL	JUNE 29/12	MWB
2.	ISSUED WITH REVISED SITE PLAN APPLICATION	MAY 16/12	MWB
1.	ISSEUD FOR CITY/MOE APPROVAL	MAR 2/12	MWB

SCALE
1:750
0 10 20 30
HORIZONTAL
1:750
0 10 20 30
VERTICAL

DESIGN MWB
CHECKED JLP
DRAWN JPB
CHECKED MWB
APPROVED MER

REGISTERED PROFESSIONAL ENGINEER J.G. RIDDELL 7/9/13 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER M.E. RIDDELL 100040125 PROVINCE OF ONTARIO

NOVATECH ENGINEERING CONSULTANTS LTD.
ENGINEERS & PLANNERS
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada
K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Email: novatech@novatech-eng.com

COMMERCIAL DRIVE
FORMER GEOGRAPHIC TOWNSHIP OF CUMBERLAND
CITY OF OTTAWA

PRIVATE NORTH STORM SEWER STORM DRAINAGE AREA PLAN

PROJECT No. 109004
REV REV # 4
DRAWING No. 109004-NSTM

M:\2009\109039\CADdesign\109004-NSTM.dwg, PLANS-24x36, Sep 07, 2012 - 11:06am, channa

PLAN24x36C2012 - 914.4mmx609.6mm

APPENDIX F

Storm Servicing and Stormwater Management – South Sewer

4.0 STORM SERVICING

A Stormwater Management (SWM) Facility is proposed to provide both water quality and quantity control for approximately 3.18 ha of the subject lands. Due to topographic constraints, lands north of the loop road (1.36 ha), and the Morguard lands to the west (1.19 ha) will be serviced by a separate (private) storm sewer with a Stormceptor placed at the outlet for quality control and surface storage for quality control. This sewer will run along the north property boundary. Both the SWM facility and the north storm sewer will outlet to and existing 750mm storm pipe located in the northeast corner of the site, which currently serves as the outlet for the YMCA parking lot.

The proposed OAC building will be serviced by a 200mm storm service connecting to the proposed storm sewer system along the loop road. Refer to Figure 3 and Appendix A for the General Plan of Services. The existing 375mm diameter pipe connecting the catchbasins in the YMCA parking lot will be shortened and connected to the proposed system at STMMH108. In turn, the existing 750mm diameter pipe that previously connected the catchbasins to the outlet running along the eastern edge of OTC West will be abandoned.

All storm runoff from the CSC and YMCA buildings is tributary to the Centrum Boulevard storm sewers and has no impact on the Stormwater Management design for the OTC West lands. The YMCA parking lot will be tributary to the proposed Loop Road storm sewers. The parking lot has been designed to provide on-site storage using superpipe and surface storage. The on-site storage provided has been accounted for in the SWMHYMO modeling completed for the OTC west lands. Major system flows from the YMCA parking lot will be conveyed overland to the OTC West SWM pond via Commercial Drive. We are not proposing any changes to the storm drainage system for the YMCA parking lot.

Storm servicing for the OTC West lands will be provided using a dual drainage system: Inlet control devices (ICDs) will be installed in catchbasins to restrict inflows to the minor system to the 1:5 year event. Peak flows resulting from larger storm events will be stored in road sags or within parking lot areas. The site will be graded to create major overland flow routes to convey storm runoff that exceeds the available storage to the proposed SWM facility.

4.1 MINOR SYSTEM

The OTC West storm sewers have been designed for the 1:5 year return event with the Rational Method using an initial time of concentration of 20 minutes and the former Township of Cumberland IDF curves. This is consistent with the *Municipal Servicing Report* prepared by J.L. Richards Report (Section 2.3.2) and with the design of the downstream infrastructure and the Master Drainage plan for the area

Refer to Appendix C for attached OTC West Storm Drainage Area Plan and Storm Design Sheets and the former Township of Cumberland IDF curves.

The sewers were sized to permit free flow conveyance of the runoff generated from a 5-year design storm. The design criteria used to determine the size of the storm sewers required to service the proposed development are as follows:

- Minimum pipe size = 250 mm diameter
- Minimum catchbasin lead pipe size = 200 mm diameter
- Minimum velocity = 0.8 m/s
- Maximum velocity = 3.0 m/s

The 1:5 year event flows will be directed to the stormwater management pond for attenuation, and no surface ponding is designed for the minor event.

4.2 MAJOR SYSTEM

Major system storage will be provided within the roads and parking lots. Storm runoff that exceeds the available storage will be conveyed overland within the public ROW to the proposed SWM facility. Inlet control devices (ICDs) will be installed in the roadway and parking lot catchbasins to ensure flow into the storm sewer system does not exceed the 5-year runoff rates. Each pair of road catchbasins will be interconnected and will operate as a single inlet. Ponding will be restricted to a maximum depth of 0.30m both in the right-of-ways and the parking lot areas. Refer to the Ponding Plans in Appendix G.

The pond has sufficient capacity to capture and attenuate major system flows to the allowable release rate from the site and therefore the major system will be directed to the SWM pond. Bypassing the pond with the major overland flow would not reduce the size of the pond since the available active storage volume is dependant on:

- The invert elevation of the storm sewer inlet;
- The required permanent pool volume for water quality control; and
- The active storage depth as defined by the depth required to tie back into the existing grades.

Major overland flow routes have been designed using open channel principles to ensure that the product of the velocity (m/s) x depth (m) within the right-of-ways does not exceed 0.6.

A major system route has been provided through the park and to the east of the SWM pond as the outlet for the existing major system for Centrum Boulevard and upstream development.

4.3 SWM CRITERIA

The total drainage area to the 750mm outlet storm sewer is 5.96 ha, which includes the OTC West lands and the Morguard lands to the west. The overall allowable release rate from the site has been established as follows:

- Total allowable outflow from the site is 365 L/s (based on previous reports, see the discussion later in this section);
- The total drainage area is 5.96 ha: 4.77 ha (OTC West) + 1.19 ha (Morguard);
- Therefore, the allowable release rate is (365 / 5.96) = 61 L/s/ha.

Based on the overall allowable release rate to the OTC West storm outlet, the following SWM Criteria have been used in the design:

- The Morguard lands will be controlled to a maximum of 1.19 ha x 61 L/s/ha = 73 L/s;

- The OTC West lands will be controlled to 4.77 ha x 61 L/s/ha = 291 L/s. The OTC West SWM Facility will over-control the south area to reduce the on-site storage requirements in the north area;
- The proposed SWM facility will provide water quality and quantity control for the proposed road and the OTC West lands between the road and Centrum Boulevard;
- Parking lot and rooftop storage will be used to control inflows to the north sewer from the OTC West lands to the allowable release rate;
- The north sewer will use a Stormceptor for water quality control prior to discharging to the 750mm outlet storm sewer;
- The park serves as the major system flow route for Centrum Boulevard and has been graded to convey overland flows from Centrum Boulevard to the Cumberland Town Centre SWM Facility.

The stormwater management for this site will be directed to a wet pond as per previous design concepts and as per extensive discussions with City staff in preparation of the infrastructure agreement for the development. The MOE criteria, indicates that a minimum drainage area of 5ha is required for wet ponds, however this is based on residential sites which have lower volumetric flows than commercial sites. Therefore, the wet pond proposed for stormwater management is suitable technology for this development. The proposed development has run-off coefficients of 0.85 to 0.90 versus a typical residential development with a run-off coefficient of 0.45 to 0.55 therefore the proposed 3.45ha area will provide a similar volumetric flows to a typical 5ha residential subdivision.

The allowable release rate from this development is 365 L/s to the 750 mm storm sewer and has been determined in several previous reports, including the *Cumberland Town Centre Stormwater Management Plan* (Gesmec, February 1989); the *Commercial Drive - Orleans Town Centre Subdivision Stormwater Management Report* (Novatech, December 1992); and most recently, the *Municipal Servicing Report - Orleans Town Centre Lands* (JL Richards, November 2005). The allowable release rate from the site was calculated based on the contributing area from the OTC west lands relative to the overall drainage area to the trunk sewer.

The most recent stormwater management report for the Morguard Lands *Homebase Orleans Stormwater Management Report* (Novatech, November 1990) anticipates a release rate of 39L/s. The controlled flow from the Morguard land has been increased to 70 L/s based on discussions with City staff.

No changes are proposed to the CSC and YMCA stormwater management. All storm runoff from the CSC and YMCA buildings is tributary to the Centrum Boulevard storm sewers and has no impact on the Stormwater Management design for the OTC West lands. The YMCA parking lot will be tributary to the proposed Loop Road storm sewers. The parking lot has been designed to provide on-site storage using superpipe and surface storage. The on-site storage provided has been accounted for in the SWMHYMO modeling completed for the OTC west lands. Major system flows from the YMCA parking lot will be conveyed overland to the OTC West SWM pond via Commercial Drive.

4.4 HYDRAULIC GRADE LINE ANALYSIS

The hydraulic grade lines in the OTC West storm sewers were calculated for the 1:100 year design event. HGL elevations were calculated under steady-state conditions using the Darcy-Weisbach equation to calculate friction losses in the pipe network for a specified flow rate. Minor losses were accounted for at pipe bends; entrance and exit losses were accounted for at each manhole.

A detailed HGL analysis of the downstream sewers was not completed. Instead, the 2005 J.L. Richards report considered the worst-case scenario: The storm sewer surcharged to the ground surface (±63.5 m) at the connection to the trunk storm sewer crossing under Highway 174. The HGL of the on-site storm sewers have been modeled based on the 100 year storage elevation (63.95m).

The HGL spreadsheet calculations are provided in Appendix C.

4.5 NORTH SEWER

Due to topographical constraints, the lands north of the loop road and the adjacent Morguard lands will not be directed to the SWM facility, but will be directed to a separate, private storm sewer (North Sewer). The North Sewer will bypass the SWM pond, and outlet directly to the 750mm diameter storm outlet, and therefore on-site storage will be provided on the respective sited to attenuate flows to the allowable release rate. The flows will be quantity controlled on the respective sites by providing on-site storage to attenuate flows to the allowable release rate.

A functional design for the north sewer has been completed and the preliminary layout shown on C106011-NSTM and storm sewer design sheet is included in Appendix G.

A private Stormceptor will be installed at the downstream limit of the north storm sewers to provide quality control for both the Morguard Lands (1.19 ha) and the OTC West lands tributary to the north sewer (1.36 ha). Inflows to the north storm sewer will be controlled to a maximum of 220 L/s. The Stormceptor has been sized to provide 70% long-term TSS removal for the upstream drainage area.

The Stormceptor CD Sizing program was used to determine the appropriate Stormceptor model to provide the requisite level of quality control. The sizing program incorporates the upstream storage and controlled inflows in the analysis. The results of the water quality analysis indicate that a Stormceptor Model STC-750 will provide a long-term TSS removal rate of approximately 74%. The Stormceptor size and location will be confirmed during detailed design.

5.0 SWM FACILITY DESIGN

The proposed SWM facility has been sized to provide water quality and peak flow control for a tributary drainage area of 3.45 ha. Refer to Table 5.0-1 for a summary of the drainage areas and flows used in the analysis.

Table 5.0-1: OTC West Drainage Areas

Drainage Area	Area	Release Rate
Lands to North Sewer		
Morguard	1.19 ha	70 L/s
OTC West (Parking Lots & Rooftops)	1.36 ha	150 L/s
Total Area to North Sewer	*2.55 ha*	*220 L/s*
Lands to SWM Pond (South Sewer)		
OTC West (Loop Road & Parking Areas)	1.87 ha	
OTC West (Rooftops)	0.82 ha	
OTC West (YMCA Parking Lot)	0.49 ha	
OTC West (SWM Pond)	0.27 ha	
Total Area to SWM Pond	*3.45 ha*	*145 L/s*
Lands Draining Offsite		
OTC West (Park)	0.28 ha	

5.1 SWM FACILITY CRITERIA

5.5.1 Quantity Control

The criteria used in the design of the SWM facility are as follows:

- The total allowable release rate to the 750mm storm sewer is 365 L/s.
  (As per the Novatech Report, *Commercial Drive – Orleans Town Centre Subdivision Stormwater Management Report, 1992*)
  - The Morguard lands will be controlled to 70 L/s.
    (As per discussions with City Staff)
  - The OTC West area serviced by the north storm sewer, excluding Morguard, (bypassing the pond) will be controlled to 150 L/s.
    (As per discussions with City Staff)
  - Therefore, the SWM facility must control outflows to a maximum of 145 L/s.

5.5.2 Quality Control

The criteria used in determining the 70% TSS are as follows:

The review of several SWM reports for lands tributary to this trunk sewer, including *Municipal Servicing Report - Orleans Town Centre Lands* (J.L. Richards, November 2005) which is a compilations of previous servicing and Stormwater management reports, found the following:

- The J.L. Richards Municipal Servicing Report does not provide a specific water quality target for the OTC West lands, and the YMCA SWM report only lists requirements for quantity control. Additionally, previous Novatech reports for Commercial Drive and the Morguard lands also do not discuss the need for quality control for this site.
- Satellite imagery does not appear to show any water quality ponds within the remaining areas tributary to the trunk sewer. The majority of the area is low-density residential development and it is not anticipated that on-site water quality controls are provided for these area.
- The OTC West and Morguard Lands are tributary to a trunk storm sewer that services a total drainage area of approximately 140 ha prior to discharging to the Ottawa River. The OTC West and Morguard Lands comprise approximately 6.23 ha, or 5% of the overall tributary area to the trunk sewer.
- It appears that no water quality control is provided for the remaining areas tributary to the trunk sewer.

Therefore, providing 70% TSS removal for the OTC West and Morguard Lands is a reasonable water quality objective. Providing any greater TSS removal rate will result in no significant improvement to the overall water quality.

5.2 SWM FACILITY DESIGN

The SWM facility has been designed as per the guidelines for wet ponds as outlined in the *Stormwater Management Planning and Design Manual* (MOE, March 2003). The following design guidelines for wet pond were used:

- Minimum length to width radio of 3:1;
- Permanent pool depth of 1.1m for the wet pond;
- Minimum side slope of 3:1;

5.3 POND ACCESS

Temporary access to the SWM Facility will be through the future parking lot north of the proposed loop road via an existing access road. Permanent access will be over a depressed curb to the permanent service road. It will consist of a 4.0 m wide service road constructed of 150mm of granular 'A' overtop of 300mm of granular 'B' and covered with a minimum of 10cm of seeded topsoil. A paved pedestrian pathway will be incorporated into the pond access road. Refer to the Stormwater Management Plan included in Appendix E.

5.4 SEDIMENT FOREBAY

The sediment forebay has been sized using design guidelines provided in the *MOE SWM Planning and Design Manual* (March 2003).

The upstream drainage area to the SWM Facility (3.18 ha - not including the facility itself) has an average imperviousness of 95%. For a *Normal* level of protection (70% long-term TSS removal), the required permanent pool volume is approximately 388 m^3. Refer to design calculations in Appendix F.

Annual sediment loading to the SWM facility from the upstream drainage area has been estimated at approximately 2.3 - 3.8 m^3/yr (see design calculations in Appendix F). If the SWM facility provides a long-term TSS removal rate of 70%, then sediment will accumulate in the facility at a rate of approximately 1.6 - 2.7 m^3/yr.

The pond has been designed to allow for a minimum of 10 years of sediment accumulation. A sediment loading rate of 3.6 m^3/yr corresponds to a sediment volume of 36 m^3 over a period of 10 years.

5.5 SWMF OUTLET

Outflows from the SWM facility will be conveyed by a 450mm reverse slope pipe to an outlet structure which has been designed to provide both extended detention and peak flow control for the site. Refer to Drawing C106011-SWM, included in Appendix E, for details of the outlet structure. Design calculations are provided in Appendix F.

5.5.1 *Extended Detention*

Extended detention will be provided for the first 0.50m of active storage to allow for settling of suspended sediment in the pond. The extended detention volume will be released over a period of 12 hours through an 85 mm orifice with an invert elevation set at the normal water level of 62.45m. The orifice will be inserted into a 250 mm storm pipe embedded in a concrete weir built into the base of the outlet structure. Flows that exceed the extended detention storage volume will spill over the weir crest at an elevation of 62.95, bypassing the extended detention orifice and outflows will instead be regulated by the erosion control outlet.

5.5.2 *Peak Flow Control*

A 230 mm orifice will be installed in the 450mm pipe connecting the pond to the 750mm outlet storm sewer. This orifice will control outflows from the pond to a maximum of 144 L/s.

5.5.3 *Overflow Spillway*

The proposed SWM facility has been sized to provide sufficient storage to meet extended detention and peak flow control criteria for storms up to the July 1st, 1979 storm event. The emergency overflow route has been designed as a broad crested weir with a crest elevation of 64.10. Storm runoff that exceeds the maximum storage provided in the facility will spill over the weir into an existing ditch that outlets to the Cumberland Town Centre SWM Facility owned and operated by the City of Ottawa. The existing dry pond has a capacity of 3000m^3 which currently services the residential development to the east.

5.5.4 Stage Storage Curve

The stage-storage curve for the proposed OTC West SWM pond is provided in Table 5.5-1. Calculations are provided in Appendix E.

Table 5.5-1: OTC West SWM Facility Stage-Storage-Discharge

	Elevation (m)	Active Storage Volume (m^3)	Release Rate (L/s)
Pond Bottom	61.35	0	-
Permanent Pool	62.45	(388)[1]	-
	62.70	144	7.2
Extended Detention	62.95	309	10.7
	63.40	666	106
	63.95	1,210	136
Overflow Elev.	64.10	1,384	144

[1] Permanent pool volume.

6.0 HYDROLOGIC MODELING

The SWMHYMO hydrologic model was used to generate runoff hydrographs for the OTC West Lands and to separate the runoff hydrographs into major and minor system flows:

- Inflows to the minor system have been modeled at a maximum capture rate equivalent to the 5-year peak flow;
- Major system storage within the YMCA parking lot has been included in the SWMHYMO model, as per the *YM-YWCA Stormwater Management Report* (Gesmec, November 1995);
- Rooftop storage has been modeled assuming a maximum release rate of 40 L/s/ha, as per the 2005 J.L. Richards report;
- The Morguard lands (1.19 ha) have been modeled using a release rate of 70 L/s.
- The park (0.28 ha) outlets to the Cumberland Town Centre SWM Facility to the east of the site.

6.1 MODELING PARAMETERS

The modeling parameters used in the SWMHYMO analysis have been developed based on the proposed site plan and are representative of the proposed development. SWMHYMO subcatchment areas are shown on Figure 4. SWMHYMO modeling data is provided in Appendix E.

STORM SEWER DESIGN SHEET

PROJECT: 106011
DESIGNED BY: DB
CHECKED BY: JA
DATE: 27-Jul-07
REVISED: 19-Oct-07
REVISED: 29-Nov-07
ISSUED FOR MOE APPROVAL: 15-Jan-08

PROJECT: Orleans Town Centre (West)
DEVELOPER: Public-Private Partnership

NOVATECH ENGINEERING CONSULTANTS LTD

FROM MH	TO MH	AREA (ha) R= 0.20	AREA (ha) R= 0.55	AREA (ha) R = 0.85	AREA (ha) R = 0.90	INDIV 2.78 AR	ACCUM 2.78 AR	TIME OF CONC. (min)	RAINFALL INTENSITY (mm/hr)	PEAK FLOW Q (L/s)	PROPOSED SEWER TYPE OF PIPE	PIPE SIZE (mm)	PIPE ID (mm)	GRADE (%)	LENGTH (m)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min)	PERCENTAGE OF CAPACITY
100	102		0.12	0.17		0.59	0.59	20.00	68.5	40.1	DR 35	250	251	2.75	80.1	100.2	2.02	0.66	40%
102	104			0.21		0.50	1.08	20.66	67.1	72.8	CONC	525	533	0.16	110.8	179.1	0.80	2.30	41%
104	106			0.23	1.11	3.32	4.40	22.96	62.9	277.0	CONC	750	762	0.10	120.0	387.3	0.81	2.48	75%
106	108			0.09		0.21	4.61	25.45	59.0	272.5	CONC	750	762	0.12	42.1	402.3	0.88	0.80	68%
108	110				1.00	2.50	7.12	26.24	57.9	412.2	CONC	900	914	0.10	28.9	596.5	0.91	0.53	69%
								26.77											
116	114							20.00	68.5		DR 35	250	251	4.50	42.1	128.1	2.58	0.27	
114	112							20.27	67.9		DR 35	250	251	0.45	10.0	40.5	0.82	0.20	
112	110			0.16		0.38	0.38	20.48	67.5	25.5	DR 35	250	251	0.45	19.8	40.5	0.82	0.40	63%
								20.88											
110	118						7.49	26.77	57.2	428.7	CONC	900	914	1.00	14.2	1886.4	2.88	0.08	23%
118	Outfall	0.27				0.45	7.95	26.85	57.1	453.7	CONC	900	914	1.00	15.2	1886.4	2.88	0.09	24%
								26.94											

Notes: 1. Rainfall Intensity Curves are Township of Cumberland IDF Curves
I(5-year) = 879/ [Tc(min)^0.77 + 2.8]

I(5-year) = 879/ [(10min)^0.77 + 2.8]
= 104.2 mm/hr

LICENSED PROFESSIONAL ENGINEER
08-Jan-15
M.E. RIDDELL
100040125
PROVINCE OF ONTARIO

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

No.	REVISION	DATE	BY
4.	ISSUED FOR CITY/MOE APPROVAL	JAN 15/08	MER
3.	RE-ISSUED FOR SITE PLAN APPROVAL	DEC 04/07	MER
2.	ISSUED FOR SITE PLAN APPROVAL	OCT 19/07	MER
1.	ISSUED FOR SITE PLAN APPLICATION	JUL 27/07	MER

LICENSED PROFESSIONAL ENGINEER — M.E. RIDDELL 100040125 — PROVINCE OF ONTARIO — 08-Jan-15

LICENSED PROFESSIONAL ENGINEER — J. AILEY 100079299 — PROVINCE OF ONTARIO

NOVATECH ENGINEERING CONSULTANTS LTD.
ENGINEERS & PLANNERS
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada
K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Email: novainfo@novatech-eng.com

DESIGN	JA
CHECKED	MER
DRAWN	RCH
CHECKED	JA
APPROVED	MER
SCALE	1:500

CITY OF OTTAWA
ORLEANS TOWN CENTRE (WEST)
STORM DRAINAGE AREA PLAN

PROJECT No. 106011
DATE MAY 2007
DRAWING No. C106011–STM

PLANB1.DWG – 1000mmX707mm