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PROPOSED MULTI-STOREY RETIREMENT RESIDENCE 1174 CARP ROAD

Assessment of Adequacy of Public Services Report

**PROPOSED MULTI-STOREY RETIREMENT RESIDENCE
1174 CARP ROAD**

**ASESSMENT OF ADEQUACY OF
PUBLIC SERVICES REPORT**

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June 18, 2024

Revised November 20, 2024

Ref: R-2024-059

Novatech File No. 123126

November 20, 2024

Le Group Maurice
2400 rue des Nations, bureau 137
Saint-Laurent (Québec)
H4R 3G4

Attention: Ms. Yveline Roc, Directrice développement

**Re: Assessment of Adequacy of Public Services Report
Proposed Retirement Residence
1174 Carp Road, Ottawa, ON
Novatech File No.: 123126**

Enclosed is a copy of the revised 'Assessment of Adequacy of Public Services Report' for the proposed retirement residence located at 1174 Carp Road in the City of Ottawa. The purpose of this report is to demonstrate that the proposed development can be serviced by the existing municipal infrastructure adjacent to the subject site. This report is being submitted in support of a Zoning By-Law Amendment application.

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

NOVATECH



François Thauvette, P. Eng.
Senior Project Manager

cc: Ryan Brault (City of Ottawa)
Rheal Labelle (Hobin Architecture Inc.)
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Jacob Bolduc (Fotenn)

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1.0 INTRODUCTION

Novatech has been retained by Le Groupe Maurice to assess the adequacy of the existing public services related to the proposed re-development of the 1174 Carp Road property. The purpose of this report is to demonstrate that the proposed development can be serviced by the existing municipal infrastructure. This report is being submitted in support of a Zoning By-Law Amendment application.

1.1 Location and Site Description

The subject site consists of the property at 1174 Carp Road and covers an approximate area of 1.827 hectares. The existing site is currently occupied by an existing RV dealership. The property is surrounded by Hazeldean Road to the northwest, Carp Road to the northeast, existing residential properties to the southeast and currently undeveloped lands to the southwest. An existing drainage ditch currently runs along the northwest, southwest and southeast perimeter of the site, directing stormwater runoff to a 750mm diameter storm sewer that runs from the southeast side of the site and outlets through the Crossing Bridge subdivision. The existing 750mm dia. storm outlet is located within a 4.0m easement. The legal description of the subject site as indicated on the Topographical Plan of Survey prepared by Annis, O'Sullivan, Vollbakk Ltd. is designation as Part of Lot 23, Concession 12 and Part of Road Allowance Between Concessions 11 and 12 (Closed by By-Law 39-95, INST. N731789), Geographic Township of Goulbourn, City of Ottawa.

Figure 1: Aerial View of the Subject Site



Image Source: geoOttawa (City of Ottawa)

1.2 Pre-Consultation Information

An initial pre-consultation meeting was held with the City of Ottawa on April 25, 2023, at which time the client was advised of the general submission requirements. A follow-up meeting with City staff was also held on December 8, 2023. The Mississippi Valley Conservation Authority (MVCA) was also consulted regarding the proposed development and recommended an 'Enhanced' Level of Protection, equivalent to a long-term average removal of 80% Total Suspended Solids (TSS).

Based on a review of **O. Reg. 525/98: Approval Exemptions**, a Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) will be required as storm flows are being directed to existing drainage ditches on three sides of the property. Refer to **Appendix A** for a summary of the correspondence related to the proposed development.

1.3 Proposed Development

The proposed development will consist of a multi-storey retirement residence with approximately 413 units. The building will include underground parking, indoor amenity space including a small cinema, art room, hair salon, pool, fitness spaces, and activity lounges, as well as ancillary facilities such as a café/bistro, bar lounge, health offices, and a pharmacy. The remainder of the subject site will consist of surface parking spaces, access roads, a loading area and outdoor amenity space, including a central courtyard. The proposed building will be serviced by the municipal sanitary sewer and watermain in Carp Road, while stormwater flows will continue to be directed towards the existing drainage ditches surrounding the property. A dedicated City Parkland block located on the west side of the building will occupy approximately 10% (or 0.183 ha) of the total 1.827 ha site.

1.4 Reference Material

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

- ¹ Carp River Watershed/Subwatershed Study, prepared by Robinson Consultants, project no. 00056, dated December 2004.
- ² Preliminary Geotechnical Investigation, Proposed Residential Development, 1174 Carp Road (Project: 101785.003), prepared by Gemtec, dated May 31, 2023.

2.0 SITE SERVICING

The objective of this report is to demonstrate that proper sewage outlets (sanitary and storm) as well as a suitable domestic water supply and appropriate fire protection are available for the proposed development. The servicing criteria, the expected sewage flows, and water demands are to conform to the requirements of the City of Ottawa municipal design guidelines for sewer and water distribution systems. Stormwater flows will continue to be directed into the existing drainage ditches surrounding the property and will thus be directed into the municipal storm sewer located within the Crossing Bridge subdivision to the south. The storm flows will eventually outlet into Poole Creek, a tributary to the Carp River. On-site stormwater management will be implemented to meet the requirements of the City of Ottawa and MVCA.

2.1 Sanitary Servicing

The existing site currently consists of a trailer and RV sales centre. It is anticipated that the existing building is currently serviced by the municipal 250mm dia. sanitary sewer in Carp Road as there is no municipal sanitary sewer fronting the subject site within the Hazeldean Road Right-of-Way. Under post-development conditions, the proposed building will continue to be serviced by the municipal 250mm dia. sanitary sewer in Carp Road. The theoretical peak sanitary flows from the development have been calculated based on criteria in the City of Ottawa Sewer Design Guidelines and subsequent Technical Bulletins.

As the City of Ottawa's request, the theoretical sanitary flows for the proposed development have been broken down into residential and commercial components instead of using an all-inclusive flow often applied to institutional residences. The commercial components were subdivided to account for the various on-site amenities used by the residents, including a hair

salon, café/bistro and bar lounge, swimming pool with showers, health offices, and building staff. Some of the other on-site amenities such as the small cinema, art room, activity lounges and pharmacy were excluded from the calculations as they will not generate additional flows.

Based on previous discussions with the City of Ottawa, the dedicated Parkland block is not expected to generate any sewage flows as there is no municipal sanitary sewer fronting this parcel. Additionally, the fit-out plan for the proposed parkland does not propose servicing the park based on its designation as an Urban Plaza, as per the City of Ottawa Park Development Manual. Refer to **Table 1** for a summary of the preliminary sanitary sewage flows and to **Appendix B** for detailed calculations.

Table 1: Preliminary Theoretical Post-Development Sanitary Flows

Residential Units	Unit Count	Design Population	Average Flow (L/s)**	Peaking Factor	Peak Flow (L/s)
1-Bedroom	311	436	1.41	3.59	5.06
2-Bedroom	94	197	0.64		2.30
3-Bedroom	8	25	0.08		0.29
Sub-Total	413	658	2.13*	-	7.65*
Commercial Flows	Unit Count	Design Population	Average Flow (L/s)**	Peaking Factor	Peak Flow (L/s)
Hair Salon	-	2 seats	0.02	1.5	0.02
Café/Bistro & Bar Lounge	-	80 seats	0.12		0.18
Pool/Fitness + Showers	-	100 users	0.05		0.07
Health Offices – Medical Staff	-	3 persons	0.01		0.01
Health Offices – Office Staff	-	1 person	0.00		0.00
Health Offices – Patients	-	200 persons	0.06		0.09
Auxiliary Staff	-	30 persons	0.03		0.05
Sub-Total	-	-	0.29*	-	0.42*
City Parkland	N/A				
Infiltration Allowance	-	1.827 ha.	-	-	0.60
Total	-	-	2.42*	-	8.67*

*Represents rounded values.

**Average daily sewage flow values taken from the Ottawa Sewer Design Guidelines, Appendix 4-A, and subsequent technical bulletins.

The existing 250mm dia. sanitary sewer in Carp Road is approximately 3.3m deep, with an invert elevation of 123.0m+/- and a top of pipe elevation of 123.3m+/- at the anticipated connection location. Carp Road has an approximate elevation of 126.3m+/- at the proposed service connection location. The 250mm dia. sanitary sewer in Carp Road has sufficient capacity to accommodate the proposed development based on correspondence with the City of Ottawa. Refer to **Figure 2** showing the existing sanitary sewer infrastructure and conceptual servicing layout.

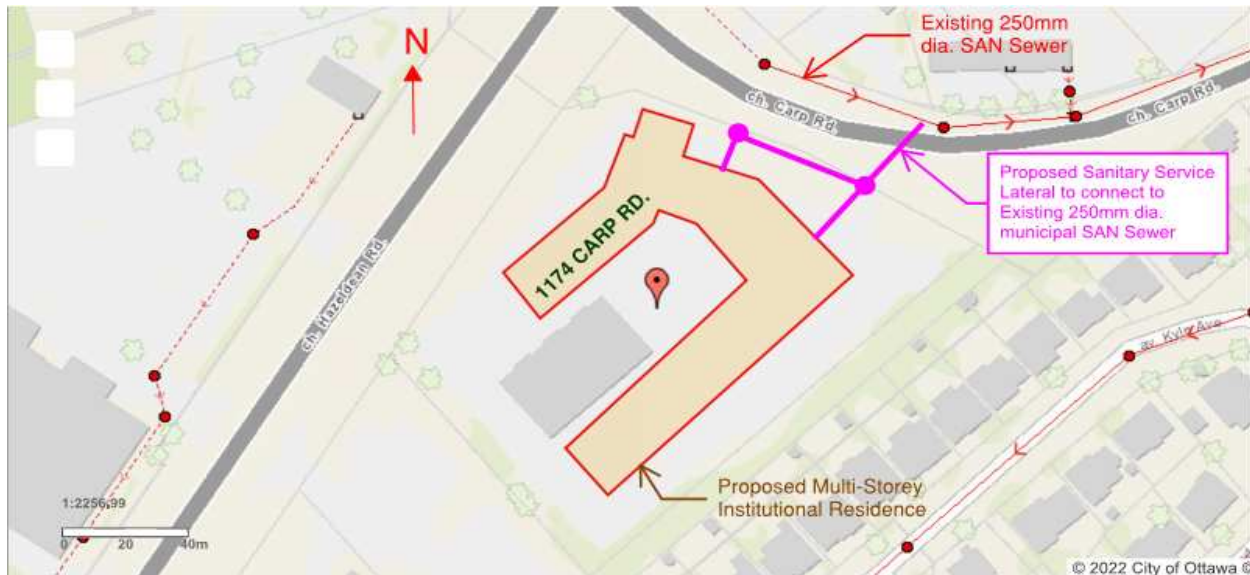
Figure 2: Conceptual Sanitary Servicing Layout

Image Source: geoOttawa (City of Ottawa)

Refer to **Appendix B** for preliminary sanitary flows analysis and correspondence with the City of Ottawa confirming the design parameters for the proposed development and the municipal sanitary sewer capacity. The sanitary sewage calculations and servicing design will be refined as part of the subsequent Site Plan Control application to the City of Ottawa.

2.2 Water Supply for Domestic Use and Firefighting

The existing site currently consists of a trailer and RV sales centre. Based on a review of the geoOttawa website, the existing building is currently serviced by the 400mm dia. municipal watermain in Carp Road. There appear to be no connections to the existing 400mm/600mm (backbone) watermain that is running along the south side of Hazeldean Road. The subject site is located within the City of Ottawa 3W pressure zone and the Stittsville Elevated Water Tank is located diagonally across the street on the northeast corner of Hazeldean and Carp Roads.

Under post-development conditions, the proposed building will continue to be serviced by the 400mm dia. municipal watermain in Carp Road. It is unclear at this time if the City would allow a new connection to the larger watermain in Hazeldean Road, however, the anticipated daily water demands will be greater than 50m³/day (~0.58 L/s), therefore, the proposed development will require two (2) water supplies for redundancy purposes per City guidelines. It is not anticipated that the City Parkland block will require a water service, as the fit-out plan for the proposed parkland does not propose servicing the park based on its designation as an Urban Plaza, as per the City of Ottawa Park Development Manual. However, if a domestic water supply is needed for the City Parkland block, it will need to be fed off the 400mm dia. backbone watermain in Hazeldean Road as City parks are not typically fed via a private watermain network. Refer to **Figure 3** showing the existing watermain infrastructure and conceptual servicing layout.

Figure 3: Conceptual Water Servicing Layout

Image Source: geoOttawa (City of Ottawa)

Preliminary water demand and fire flow calculations have been prepared for the proposed development based on criteria in the City of Ottawa Design Guidelines for Water Distribution Systems and subsequent Technical Bulletins.

As the City of Ottawa's request, the theoretical domestic water demands for the proposed development have been broken down into residential and commercial components instead of using an all-inclusive flow often applied to institutional residences. The commercial components were subdivided to account for the various on-site amenities used by the residents, including a hair salon, café/bistro and bar lounge, swimming pool with showers, health offices, and building staff. Some of the other on-site amenities such as the small cinema, art room, activity lounges and pharmacy were excluded from the calculations as they will not generate additional flows.

Given the size of the development, the fire flow requirements were calculated using the Fire Underwriters Survey (FUS) method, based on a fully sprinklered building, its size (storeys), footprint, and non-combustible construction materials. Refer to **Table 2** below for a summary of the water demands and to **Appendix C** for detailed calculations.

Table 2: Preliminary Theoretical Post-Development Water Demand and FUS Fire Flow

Residential Units	Unit Count	Design Population	Avg. Daily Demand (L/s)	Max. Day Demand (L/s)	Peak Hr Demand (L/s)	FUS Fire Flow (L/s)
1-Bedroom	311	436	1.41	3.53	7.77	200
2-Bedroom	94	197	0.64	1.60	3.52	
3-Bedroom	8	25	0.08	0.20	0.44	
Sub-Total	413	658	2.13*	5.33*	11.73*	

Commercial Demand	Unit Count	Design Population	Avg. Daily Demand (L/s)	Max. Day Demand (L/s)	Peak Hr Demand (L/s)	
Hair Salon	-	2 seats	0.02	0.03	0.05	
Café/Bistro & Bar Lounge	-	80 seats	0.12	0.18	0.324	
Pool/Fitness + Showers	-	100 users	0.05	0.07	0.135	
Health Offices – Medical Staff	-	3 persons	0.01	0.02	0.03	
Health Offices – Office Staff	-	1 person	<0.01	<0.01	0.01	
Health Offices – Patients	-	200 persons	0.06	0.09	0.162	
Auxiliary Staff	-	30 persons	0.03	0.05	0.08	
Sub-Total	-	-	0.29*	0.44*	0.79*	
Parkland	N/A					
Total	-	-	2.42*	5.77*	12.52*	-

*Represents rounded values

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

- Normal operating pressures are to range between 345 kPa (50 psi) and 483 kPa (70 psi) under Max Day demands.
- Minimum system pressures are to be 276 kPa (40 psi) under Peak Hour demands.
- Minimum system pressures are to be 140 kPa (20 psi) under Max Day + Fire Flow demands.

Table 2.1 summarizes preliminary hydraulic analysis results based on municipal watermain boundary conditions provided by the City, assuming two (2) water supplies, as indicated in the correspondence from the City of Ottawa.

Table 2.1: Hydraulic Boundary Conditions Provided by the City

Municipal Watermain Boundary Condition	Boundary Condition Head of Water (m)	Normal Operating Pressure Range (psi)	Anticipated WM Pressure (psi)*
Assuming Two (2) Connections to the 400mm dia. WM in Carp Road			
Minimum HGL (Peak Hour Demand)	156.8 m	40 psi (min.)	~ 45 psi
Maximum HGL (Max Day Demand)	160.7 m	50-70 psi	~ 50 psi
HGL Max Day + Fire Flow (FF=200 L/s)	156.3 m	20 psi (min.)	~ 44 psi

*Based on an approximate ground elevation of ~125.3m at the WM connection points in Carp Road.

Based on preliminary calculations and correspondence received from the City of Ottawa, it is anticipated that the pressure within the municipal watermain network will be adequate and within the normal operating pressure range during the Peak Hour and Max Day + Fire Flow Conditions. Given the height of the proposed building, it is anticipated that booster pumps will be required to provide adequate water pressure to the upper floors.

A multi-hydrant approach to firefighting will be required to supply the fire flows calculated above. Based on a review of the geoOttawa website, there appear to be a few Class AA (blue bonnet) municipal fire hydrants within 150m of the site. Based on the City of Ottawa Technical Bulletin ISTB-2018-02, Class AA (blue bonnet) hydrants within 75m of the building should provide a maximum capacity of 95 L/s each while hydrants between 75m and 150m should provide a maximum capacity of 63 L/s (at a pressure of 20 PSI). The combined theoretical maximum flow from the municipal hydrants and private on-site hydrants will exceed the Max Day + Fire Flow requirements of the proposed development. This multi-hydrant approach to firefighting is in accordance with the City of Ottawa Technical Bulletin ISTB-2018-02.

Table 2.2 summarizes the theoretical combined fire flow available from the nearby fire hydrants and compares it to the fire flow demands based on the FUS calculations.

Table 2.2: Theoretical Fire Protection Summary Table

Institutional Residence	(FUS) Fire Flow Demand (L/s)	Fire Hydrant(s) within 75m (~ 95 L/s each)	Fire Hydrant(s) within 150m (~ 63 L/s each)	Theoretical Combined Available Fire Flow (L/s)
Entire Building	200	2-4	2	>200

Refer to **Appendix C** for preliminary domestic water demand, FUS fire flow calculations and correspondence with the City of Ottawa related to the municipal watermain network and fire flow available for the proposed development. An updated analysis will need to be provided as part of the subsequent Site Plan Control application to the City of Ottawa.

2.3 Storm Drainage and Stormwater Management

Stormwater currently sheet drains uncontrolled towards the existing drainage ditches surrounding the property. Runoff from the ditches is being directed into the municipal storm sewer located within the Crossing Bridge subdivision to the south, which eventually outlets into Poole Creek, a tributary to the Carp River.

Under post-development conditions, the 1.827 ha property will be split into two parcels: the 1.644 ha subject site and the 0.183 ha City Parkland block. Storm flows will include a combination of uncontrolled direct runoff, controlled building roof and site flows, as well as controlled flow from the dedicated City Parkland block. The existing drainage ditches surrounding the property will need to be maintained as they are also conveying stormwater runoff from the Hazeldean Road Right-of-Way as well as from other adjacent properties. Refer to **Figure 4** showing the existing drainage ditches, existing storm sewer infrastructure and conceptual servicing layout.

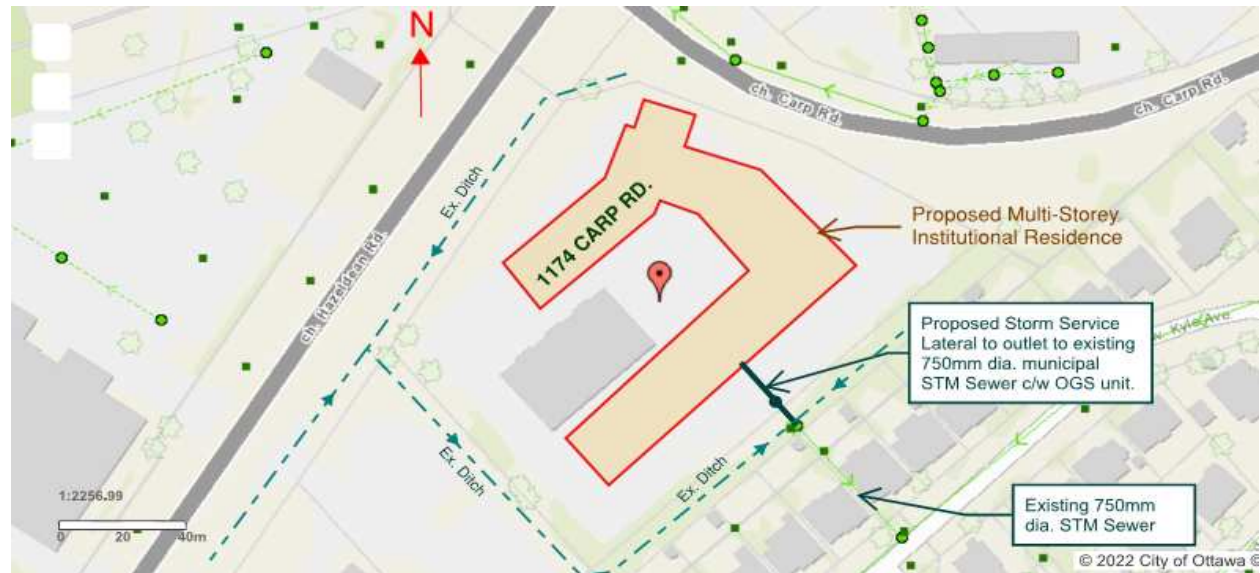
Figure 4: Conceptual Storm Servicing Layout

Image Source: geoOttawa (City of Ottawa)

The existing 750mm dia. storm sewer to the south is approximately 1.1m deep, with a top of pipe elevation of 120.58m+/- and an approximate invert elevation of 119.83m+/- . The ditch elevation is approximately 120.90+/- at the existing DICB (low point). Based on a review of the elevation of the underground parking structure and internal SWM cistern relative to the existing drainage ditch and 750mm dia. outlet sewer, the controlled post-development storm flows from the building will need to be pumped. The pump(s) will protect the building from any potential backflow within the municipal storm sewer system and/or drainage ditch to the south.

Refer to **Figure 5** showing the conceptual stormwater management plan and approach to on-site stormwater management for the 1.644 ha subject site and 0.183 ha City Parkland block.

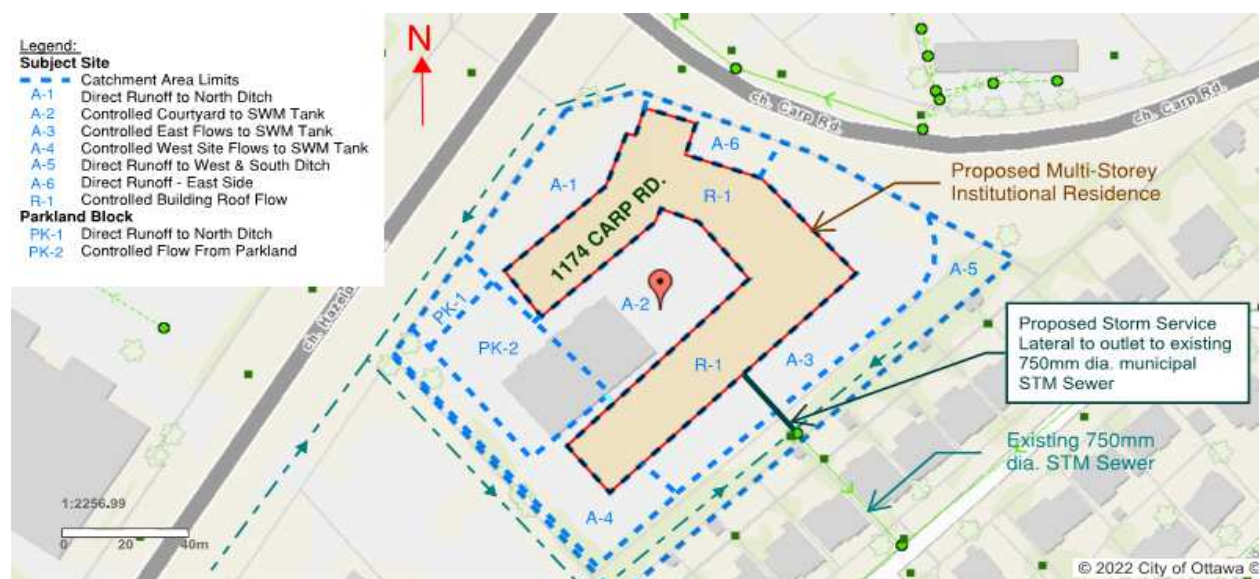
Figure 5: Conceptual Stormwater Management Plan

Image Source: geoOttawa (City of Ottawa)

Based on correspondence from the pre-consultation meetings with the City of Ottawa on-site stormwater management (SWM), including both quantity and quality control measures will be required. Based on a maximum weighted runoff coefficient ($C_w=0.50$), a time of concentration of 10 minutes and a 5-year rainfall intensity from the current City of Ottawa IDF curves, the allowable release rate for the entire 1.827 ha property was calculated using the Rational Method to be approximately **264.6 L/s**.

$$Q_{\text{allow(property)}} = 2.78 \times 0.5 \times 104.2\text{mm/hr} \times 1.827\text{ha} = 264.6 \text{ L/s}$$

Based on a review of an old Crossing Bridge - Storm Drainage Plan (97005-STM) prepared by Novatech in the 1990s, the subject site was part of a larger 4.56 ha drainage area tributary to the existing drainage ditches and thus to the 750mm dia. storm sewer that runs through the Crossing Bridge subdivision to the south. As indicated on plan 97005-STM, the 4.56 ha tributary drainage area has an allowable runoff coefficient of 0.75. Refer to **Appendix E** for a copy of the Storm Drainage Plan (97005-STM). As a check, we calculated the allowable release rate for the 4.56 ha tributary area upstream of the 750mm dia. storm sewer, of which the 1.827 ha property represents approximately 40% of the area. Using an allowable runoff coefficient of $C_w=0.75$, a time of concentration of 20 minutes and a rainfall intensity of 67 mm/hr (per former Township of Goulbourn IDF curves), the allowable release for the 4.56 ha drainage area was calculated to be approximately 637 L/s, which is slightly less than the conveyance capacity (~687 L/s) of the existing 750mm dia. storm outlet. Using this approach would result in an allowable release rate of approximately 254.8 L/s (40% of 637 L/s) for the property, which is very similar to the allowable release rate calculated in the paragraph above.

$$Q_{\text{allow(tributary area)}} = 2.78 \times 0.75 \times 67\text{mm/hr} \times 4.56\text{ha} = 637 \text{ L/s}$$

$$Q_{\text{allow(property)}} = 637 \text{ L/s} \times 0.40 = 254.8 \text{ L/s}$$

This seems to indicate that the allowable release rate specified by the City is generally in line with the anticipated flows for which the 750mm dia. storm sewer was designed. Refer to **Appendix D** for preliminary SWM calculations and to **Appendix E** for details.

Subject Site (1.644 hectares)

Based on a weighted runoff coefficient ($C_w=0.50$) and a time of concentration of 10 minutes, the allowable release rate for the 1.644 ha subject site (excl. the Parkland block) was calculated to be approximately **238.1 L/s**. The allowable release rate will have to be allotted to the various catchment areas on site, depending on the relative size and imperviousness as well as the potential storage available within the sub-catchment areas. For the purpose of this report and preliminary calculations, the 1.644 ha site was divided into the following sub-catchment areas with an estimated allotted 100-year allowable release rate:

- A-1: Direct Runoff to North Ditch (~0.090 ha) – Allotted release rate = 35-55 L/s
- A-2 to A-4: Controlled SWM Tank Flow (~0.743 ha) – Allotted release rate = 35-50 L/s
- A-5: Direct Runoff to West & South Ditches (~0.255 ha) – Allotted release rate = 35-55 L/s
- A-6: Direct Runoff - East Side (~0.069 ha) – Allotted release rate = 15-33 L/s
- R-1: Controlled Building Roof Flow (~0.487 ha) – Allotted release rate = 20-45 L/s

Table 3 compares the post-development flows from the proposed development to the allowable release rate specified by the City of Ottawa, for both the 5-year and the 100-year design events. Refer to **Appendix D** for preliminary SWM calculations and to **Appendix A** for a copy of the correspondence from the City of Ottawa.

Table 3: Preliminary Stormwater Flow Comparison Table – 1.644 ha Subject Site

Design Event	Pre-Dev. Conditions	Post-Development Conditions Drainage Areas A-1 to A-6 & R-1						
	Allowable Release Rate (L/s)	A-1 Flow (L/s)	A-2 to A-4 (L/s)*	A-5 Flow (L/s)	A-6 Flow (L/s)	R-1 Flow (L/s)*	Total Flow (L/s)	Over-Controlled (L/s)
5-Yr	238.1	18.0	35.0	16.6	7.0	16.6	93.2	~ 145L/s (61%)
100-Yr		34.6	35.0	35.0	14.1	20.0	138.7	~ 99L/s (42%)

*Represents controlled flow.

It is anticipated that a pump(s) within the internal SWM storage tank and the use of control flow roof drains will be required to control flows from catchment areas A-2, A-3, A-4 and R-1.

Table 3.1 summarizes the approximate storage volume requirements for the various sub-catchment areas, based on the controlled release rates. As indicated above, it will be possible to significantly over-control post-development site flows if desired. Alternatively, it may also be possible to reduce the internal SWM cistern storage requirements if a larger pump(s) is utilized and controlled flows are increased to match the maximum allowable release rate for the 1.644 ha subject site. The intent of these preliminary calculations was to determine the storage requirements using a reasonably sized pump(s), while over-controlling post-development site flows to minimize the potential impacts on the receiving storm sewer system and existing drainage ditch.

Table 3.1: Preliminary Stormwater Storage Requirements Table – 1.644 ha Subject Site

Design Event	Post-Development Storage Volume Requirements					
	A-1 Direct Runoff	A-2 to A-4 SWM Tank (m³)*	A-5 Direct Runoff (m³)	A-6 Direct Runoff (m³)	R-1 Roof Drains (m³)*	Total Site (m³)
5-Yr	-	~ 84	-	-	~ 94	~178
100-Yr	-	~ 217	-	-	~ 210	~427

*Represents preliminary calculations only.

Refer to **Appendix D** for preliminary SWM calculations and to **Figure 5** showing the conceptual stormwater management plan.

The subject site is located within the jurisdiction of the Mississippi Valley Conservation Authority (RVCA) and is tributary to Poole Creek and ultimately to the Carp River. Based on preliminary feedback from the City of Ottawa and the MVCA, an 'Enhanced' Level of Protection, equivalent to a long-term average removal of 80% Total Suspended Solids (TSS), with at least 90% of the total rainfall being captured and treated, will be required for the on-site access roads and surface parking areas. Runoff from landscaped areas and building roofs are considered clean for the purpose of protecting water quality for aquatic habitat.

Thermal mitigation measures will need to be incorporated into the site design to meet water temperature targets as described in the previously approved Carp River Watershed/Subwatershed Study¹. The intent is to provide on-site stormwater management (storage) within a combination of underground SWM storage chambers, within an internal SWM cistern, or on light coloured (white) building roofs. Further details will be provided at the detailed design stage.

City Parkland Block (0.183 hectares)

Based on a weighted runoff coefficient ($C_w=0.50$) and a time of concentration of 10 mins., the allowable release rate for the 0.183 ha Parkland block was calculated to be approximately **26.5L/s**. The allowable release rate will have to be allotted to the various catchment areas on site, depending on the relative size and imperviousness as well as the potential storage available within the sub-catchment areas. For the purpose of this report and preliminary calculations, the 0.183 ha site was divided into the following sub-catchment areas with an estimated allotted 100-year allowable release rate:

- PK-1: Direct Runoff to North Ditch (~0.019 ha) – Allotted release rate = 2.0-6.0 L/s
- PK-2: Controlled Flow within City Parkland (~0.164 ha) – Allotted release rate = 20-24 L/s

Table 3.2 compares the post-development flows from the proposed Parkland block to the allowable release rate specified by the City of Ottawa, for both the 5-year and the 100-year design events. Refer to **Appendix D** for preliminary SWM calculations and to **Appendix A** for a copy of the correspondence from the City of Ottawa.

Table 3.2: Preliminary Stormwater Flow Comparison Table – 0.183 ha Parkland Block

Design Event	Pre-Dev. Conditions	Post-Development Conditions Drainage Areas PK-1 and PK-2			
	Allowable Release Rate (L/s)	PK-1 Flow (L/s)	PK-2 Flow (L/s)	Total Flow (L/s)	Over-Controlled (L/s)
5-Yr	26.5	1.1	22.6	23.7	~ 3L/s (10%)
100-Yr		2.4	24.0	26.4	-

It is anticipated that the use of an inlet control device (ICD) will be required to control flows from catchment area PK-2. **Table 3.3** summarizes the approximate storage volume requirements for the various sub-catchment areas, based on a controlled release rate.

Table 3.3: Preliminary Stormwater Storage Requirements Table – 0.183 ha Parkland Block

Design Event	Post-Development Storage Volume Requirements		
	PK-1 Direct Runoff	PK-2 Parkland (m ³)	Total (m ³)
5-Yr	-	~ 5	~ 5
100-Yr	-	~ 18	~ 18

Represents preliminary calculations only.

Refer to **Appendix D** for preliminary SWM calculations and to **Figure 5** showing the conceptual stormwater management plan. If the total flows from the 1.644 ha subject site are significantly over-controlled, it may be possible to increase the allowable release rate for the City Parkland block to eliminate the need for any surface and/or underground storage at this location. This will need to be determined at the detailed design stage. On-site quality control measures will not be required for the City Parkland Block.

The intention is to provide an emergency overland flow route both for the private development and parkland block towards the existing drainage ditch along the southeast and southwest

property lines while ensuring the protection of the neighboring residential properties along Kyle Avenue. A complete stormwater management (SWM) analysis will be included as part of the subsequent Site Plan Control submission to the City of Ottawa, including both the 1.644 ha subject site and 0.183 ha City Parkland block.

3.0 Geotechnical Investigation

The Preliminary Geotechnical Investigation Report² has been prepared by Gemtec for the proposed development. The depth to bedrock surface across the site ranges from 3.5-4.9 metres below existing grade. The bedrock should not impact the site servicing infrastructure, and the building has been designed to ensure the underground parking level is generally above the bedrock. The average groundwater level ranges from 2.2-3.5 metres below the surface and there are currently no grade raise restrictions on-site. The existing soil conditions will need to be accounted for at the detailed design stage. Refer to the Preliminary Geotechnical Investigation² for further details.

4.0 CONCLUSION

Based on our analysis of the information available, the existing municipal sewers will have adequate capacity to service the proposed development. The existing municipal watermain network will provide adequate water supply for the proposed development. On-site stormwater management will be implemented to meet the requirements of the City of Ottawa and the Mississippi Valley Conservation Authority. The findings of the Preliminary Geotechnical Investigation should have minimal impact on the site servicing and will be accounted for at the detailed design stage. A complete servicing, grading and SWM design will be included as part of the subsequent Site Plan Control submission to the City of Ottawa.

NOVATECH

Prepared by:



Ben Barkley
CAD Technologist

Reviewed by:



François Thauvette, P. Eng.
Senior Project Manager

APPENDIX A
Project Correspondence

Pre-Application Consultation Meeting Minutes

Property Address: 1174 Carp Road

Location: Virtual – Microsoft Teams

Meeting Date: April 25, 2023

Attendees: Project Team:

Jacob Bolduc – Planner, FOTENN
Bipin Dhillon – Planner, FOTENN
Daniel Archambault – Le Groupe Maurice
Yveline Roc – Le Groupe Maurice
Mohamad Faraj– Le Groupe Maurice
Wendy Brawley – Hobin Architecture

City of Ottawa:

Sarah Ezzio – Planner, City of Ottawa
Molly Smith – Urban Design, City of Ottawa
Julie Candow – Engineer, City of Ottawa
Neeti Paudel – Transportation, City of Ottawa
Daniela Gomes Tavares Correia – Parks, City of Ottawa

Policies/Designations of the site

- Official Plan – Suburban (West) Transect, Neighbourhood Designation with an Evolving Neighbourhood Overlay
 - Mainstreet Corridor
- Zoning – AM9, Arterial Mainstreet Subzone 9

Applicant's Comments on the Proposal:

- The proposal is for a new retirement home to be developed by La Groupe Maurice. The proposed facility would be the second developed in Ottawa by this group, with the first being currently under construction at 211 Centrum Boulevard.
- The proposal is expected to include approximately 400 residential units for seniors, in a mix of typologies including studios, one-bedrooms, two-bedrooms, and three bed-room units.
- The building will have a range of care offered with the units, from independent living to assisted living. The majority are expected to be independent, but there will be a variety of services located in the building such as health services and recreational facilities, that will be offered to residents on an “a la carte” model.
- Upon review of the land use definitions in the City of Ottawa’s Zoning By-Law (e.g. retirement home, residential care facility), the proponent identified the use would best fit the land use of “retirement home,” as it is to provide a combination of rooming and dwelling units.

Engineering

- The engineering comments are provided in the memo attached to this email.

Should you have any questions or require additional information, please contact [Julie Candow](#).

Planning and Urban Design

General Comments:

- The OP policies for Traditional Mainstreet direct complementary uses to support 15-minute neighbourhoods such as convenience, retail, and personal service. Please provide some at-grade retail (open to the community) in support of these policies.
- Please show the park on the site plan, as it will be important to see how it will fit into the site's design. Please also be aware that it is a sensitive land use in the Sun Shadow ToR. Parks, Urban Design and Planning would be happy to meet to further discuss the location.
- Sites with a Mainstreet Corridor designation have a target of 10% proportion of large-household dwellings for intensification and a minimum requirement of 5%, please provide a mix of unit sizes including 2- and 3-bedrooms.
- Please provide continuous sidewalks along the Hazeldean and Carp Road frontages, as well as direct pedestrian connections to all site entrances.
- We are concerned for how viable trees will be if an underground parking garage is proposed over the entirety of the property, please ensure sufficient soil volumes are provided and that trees will get enough sunlight. Please also explore a garage footprint that is only directly under the building.
- There should be a strong landscape plan for the internal courtyard and extends around the building to create a connection to the public realm.
 - Please provide street trees, and also consider retaining the tree at the corner of Carp and Hazeldean (and integrating into the "book-end" architectural focus of the building) through the Tree Conservation Report if it is in good health.

Setbacks, Scale and Massing:

- The transition to the adjacent south low-rise community through lower podiums is appreciated. Please continue to implement a 45-degree angular plane in your analysis.
 - Could the three-storey podium be shifted towards Hazledean, to increase the rear yard setback?
- The plans appear to have the 'front of house' at the south with no relationship to the street. The main entrance should not be facing the rear property line and should be facing Carp Road with a secondary main entrance on Hazeldean to create a stronger relationship with the street.
- There are concerns with reducing the rear yard setback requirement, as well as with the location of the underground parking access. A significant landscape buffer needs to be proposed between this access and the rear property line to reduce headlight and light spillover, the current setbacks are not sufficient. This can be achieved with rows of coniferous tree plants, shrubs and a board fence.
- The loading location is concerning, please explore other areas to relocate the loading so that its not immediately adjacent to the rear-yards of the adjacent neighbourhood.

May 3, 2023

Design Brief and UDRP

- A Design Brief is required. The Terms of Reference is provided as an attachment, and all items highlighted in yellow are to be addressed.
 - ***Note. The Design Brief submittal should have a section which addresses these pre-consultation comments.***
- Both wind and shadow studies are required. Please refer to the Terms of Reference for the [wind analysis](#) and [shadow analysis](#) to conduct the studies and evaluate the impacts. A wind study is required for development proposals that are more than twice the height of adjacent existing buildings and greater than 5-storeys in height.
- Attendance at the Urban Design Review Panel will be required, the site is on the cusp of the Design Priority Area while also proposing height and density warranting UDRP review. Please contact udrp@ottawa.ca for details of submission requirements and scheduling.

Planning Process Comments

- Please stay tuned to the High-Performance Development Standards, which will come into effect on July 1, 2023. It is recommended that an energy consultant is engaged at the same time as building architectural drawings be developed, and a completed HPDS checklist will be required at submission. Please see the Overview attached to this email.
- Please note that the City is currently developing an implementation strategy to respond to the Provincial Bill 109 and there will be some forthcoming changes to the planning process. It is likely that concurrent site plan and rezoning applications will not be accepted as of July 1, 2023.
- Please discuss the details of the proposal with the ward councillor and neighbouring property Owners prior to application submission.
- The application will be subject to public consultation (conducted through the posting of on-site signage, the notification of community groups, and through the City of Ottawa's DevApps website); the statutory public meeting for Zoning By-law Amendments is Planning Committee, however, please note that the Councillor may also ask for a Community Information and Comment Session.

Please contact [Sarah Ezzio](#) and [Molly Smith](#) for follow-up questions on the Planning and Urban Design comments.

Transportation

- The site triggers a TIA. Start this process as soon as possible. Sight lines for the access need to be assessed as part of the TIA. There is a possibility that this may have to be restricted to a right in right out access. Recommend exploring the possibility of another RIRO access on Hazeldean as far from the intersection as possible. Ensure throat length requirements are met.
- Ensure that the development proposal complies with the Right-of-Way protection requirements of the Official Plan's Schedule C16.

- Sidewalks should be provided along Hazeldean and Carp.
- AODA legislation applies to the site.
 - Clearly define accessible parking stalls and ensure they meet AODA standards (include an access aisle next to the parking stall and a pedestrian curb ramp at the end of the access aisle, as required).
 - Please consider using the City's Accessibility Design Standards, which provide a summary of AODA requirements. <https://ottawa.ca/en/city-hall/creating-equal-inclusive-and-diverse-city/accessibility-services/accessibility-design-standards-features#accessibility-design-standards>
- On site plan:
 - Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
 - Turning templates will be required for all accesses showing the largest vehicle to access the site; required for internal movements and at all access (entering and exiting and going in both directions). Truck turn around from loading zone?
- Noise Impact Studies required for the following:
 - Road
 - Stationary (due to the proximity to neighbouring exposed mechanical equipment) or (if there will be any exposed mechanical equipment due to the proximity to neighbouring noise sensitive land uses)

Feel free to contact [Neeti Paudel](#) for follow up questions relating to the transportation comments.

Forestry

Project Comments:

- The design of the site including underground parking and softscape areas must provide sufficient space and soil volume to plant large-growing trees. The required soil volumes are provided in the Landscape Plan information below.
 - Please provide the setback distance between the proposed underground parking edge and property lines.
- The Landscape Plan must show how you propose to support the City's target of 40% canopy cover for the urban area.
- The Landscape Plan must address how the High Performance Development Standards (HPDS) related to trees will be achieved.

TCR requirements:

1. The TCR must list all trees on site, as well as off-site trees if the CRZ extends into the developed area, by species, diameter and health condition
 - a) please identify trees by ownership – private onsite, private on adjoining site, city owned, boundary (trees on a property line)
2. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained

3. 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
4. The location of tree protection fencing must be shown on the plan
5. 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.
6. For more information on the process or help with tree retention options, contact Nancy Young (Nancy.young@ottawa.ca) or review the [City of Ottawa website](#).

LP tree planting requirements:

The new Official Plan requires that "On urban properties subject to site plan control or community planning permits, development shall create tree planting areas within the site and in the adjacent boulevard, as applicable, that meet the soil volume requirements in any applicable City standards or best management practices or in accordance with the recommendation of a Landscape Architect;"

Minimum Setbacks

- Maintain 1.5m from sidewalk or MUP/cycle track or water service laterals.
- Maintain 2.5m from curb
- Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.
- 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. Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when **planting around overhead primary conductors**.

Tree specifications

- Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
- Maximize the use of large deciduous species wherever possible to maximize future canopy coverage
- Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).
- Plant native trees whenever possible
- No root barriers, dead-man anchor systems, or planters are permitted.
- No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

Hard surface planting

- Curb style planter is highly recommended
- No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.
- Trees are to be planted at grade

Soil Volume

- Please document on the LP that adequate soil volumes can be met:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)

Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

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

Tree Canopy

- The landscape plan shall show how the proposed tree planting will replace and increase canopy cover on the site over time, to support the City's 40% urban forest canopy cover target.
- At a site level, efforts shall be made to provide as much canopy cover as possible, through tree planting and tree retention, with an aim of 40% canopy cover at 40 years, as appropriate.
- Indicate on the plan the projected future canopy cover at 40 years for the site.

Feel free to contact [Nancy Young](#), for follow-up questions.

High Performance Development Standards

The City has adopted a suite of High Performance Development Standards to improve the climate change resiliency of new developments. While these are not yet being fully implemented, it is recommended to provide the following details on the Landscape Plan:

- For parking lots, provide 1 new tree for every 5 parking spaces to help cool the landscape of the site.
- Confirm sufficient Soil volumes to support canopy cover on site (30m³ for street trees)
- Proposed species must not include invasive species and target a minimum of 50% native species

Environmental Planning

- The proposed change of use may require a record of site condition, please determine through the Environmental Site Assessment process.
- There are no natural heritage features on this site that would trigger an EIS. An EIS is not required.
- Please review and incorporate bird safe design elements. A review of the building elevations indicate that some of the risk factors for birds are present including glass and related design traps such as corner glass and fly-through conditions, ventilation grates and open pipes, landscaping, light pollution. More guidance and solutions are available in the guidelines which can be found [here](#).
- Please add features that reduce the urban heat island effect (see OP 10.3.3) produced by the parking lot and a building footprint. For example, this impact can be reduced by

adding large canopy trees, green roofs or vegetation walls, or constructing the parking lot or building differently.

Please contact [Matthew Hayley](#), Environmental Planner, for follow-up questions.

Parks

Please demonstrate how the proposal meets the requirements under the Parkland Dedication By-law, as amended. Provide details regarding the provision of new park. Describe how the proposal meets the policies in Subsection 4.4 – Parks and Recreation Facilities – of the Official Plan and respond to the needs assessments outlined in the Parks and Facilities Master Plan.

1. The site being developed is more than 4,000 m², therefore, the City will place a priority on acquisition of land for park(s) as per the Planning Act, Parkland Dedication By-law and Parkland First Policy.
2. With the proposed development on the site, parkland dedication is required. Pursuant to Section 3 of [Parkland Dedication \(By-law No. 2022-280\) | City of Ottawa](#), as amended, at the time of Site Plan Control application, parkland shall be dedicated and conveyed to the City by the Owner as follows:
 - Total site area: 18,293 m²
 - For mixed-use development, the parkland requirement for each use will be based upon the above rates prorated proportionately to the GFA allocated to each use.
 - For residential:
 - Number of residential units: 400 units
 - 1 ha parkland/600 units, up to 10% of the site area
 - For commercial, 2% of the site area
 - For other uses (residential care facility), 5% of the site area
3. While the parkland will be conveyed to the City at the time of Site Plan Control, if a stand-alone Zoning By-law Amendment application is submitted, the concept plan for site development must show the parkland dedication at the time of application submission.
4. The parkland is to consider a direct connection to existing pedestrian network.
5. The parkland is to be located to maximize frontage on a public street, with the minimum being at least one frontage, preferably two frontages, as per the New Official Plan Section 4.4.6 e) "A preferred minimum of 50 per cent of the park perimeter shall be continuous frontage on abutting streets; Sidewalks shall be provided along the entirety of a park's street frontages in all cases in all transects, and required on local roads that lead directly to parks". The preferred location for the park is East, along Carp Road.
6. Park is to be developed as per the [Park Development Local Servicing Provisions](#).
7. A Facility Fit Plan must be provided for review and approval by Parks and Facility Planning prior to Site Plan Control approval.
8. The [Park Development Manual](#) provides an outline of the Facility Fit Plan requirements, as well as the typical amenities based on park size. The applicable Park Development Rate can be found at [Fees and funding programs | City of Ottawa](#).

May 3, 2023

9. The applicant is invited to consult with the Park's Planner to discuss the location and share of the parkland, the Facility Fit Plan requirements and Cost Estimate.

Please contact [Daniela Gomes Tavares Correia](#), Parks and Facilities Planning, for follow-up questions.

MVCA

- The Mississippi Valley Conservation Authority (MVCA) confirms that a portion of the The subject property is not regulated by the Mississippi Valley Conservation Authority (MVCA) under Ontario Regulation 153/06, *Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*. A permit from the Conservation Authority will not be required for the proposed development.
- If stormwater management is required, MVCA will review the plans with a focus on water quantity, with respect to flooding and erosion.

Please contact [Mercedes Liedtke](#), at MVCA for any questions on these comments.

General Comments

Zoning By-Law Amendment (minor) and Site Plan Control (Complex) applications are required based on the concept proposed at the Pre-application consultation meeting. The list of required plans and studies are attached to this email.

Please refer to the links to "Guide to preparing studies and plans" and fees for general information. Additional information is available related to building permits, development charges, and the Accessibility Design Standards. Be aware that other fees and permits may be required, outside of the development review process. You may obtain background drawings by contacting informationcentre@ottawa.ca.

These pre-con comments are generally valid for one year, unless impacted by business process changes in response to Bill 109. You may be required to meet for another pre-consultation meeting and/or the submission requirements may change. You are as well encouraged to contact us for a follow-up meeting if the plan/concept will be further refined.



MEMO

Date: April 27, 2023

To / Destinataire	Sarah Ezzio, Planner
From / Expéditeur	Julie Candow, Project Manager, Infrastructure Approvals
Subject / Objet	Pre-Application Consultation 1174 Carp Road

Please note the following information regarding the engineering design submission for the above noted site:

1. The Servicing Study Guidelines for Development Applications are available at the following address: <https://ottawa.ca/en/planning-development-and-construction/development-information-residents/development-application-20#section-servicing-study-guidelines-for-development-applications>
2. Servicing and site works shall be in accordance with the following documents:
 - ⇒ Ottawa Sewer Design Guidelines (October 2012)
 - ⇒ Ottawa Design Guidelines – Water Distribution (2010)
 - ⇒ Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
 - ⇒ City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
 - ⇒ City of Ottawa Environmental Noise Control Guidelines (January, 2016)
 - ⇒ City of Ottawa Park and Pathway Development Manual (2012)
 - ⇒ City of Ottawa Accessibility Design Standards (2012)
 - ⇒ Ottawa Standard Tender Documents (latest version)
 - ⇒ Ontario Provincial Standards for Roads & Public Works (2013)
3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at geoinformation@ottawa.ca or by phone at (613) 580-2424 x.44455).

4. Watermain Infrastructure:

- a) There is a 406mm diameter watermain along the entire Hazeldean Road and Carp Road frontage;
- b) Water frontage fees will apply;
- c) Individual residential facilities with a basic day demand greater than 50 m³/day shall be connected with a minimum of two water services, separated by an isolation valve, to avoid the creation of a vulnerable service area (as per Tech Bulletin 2021-03).
- d) Please submit a boundary condition request for this application:

Water Boundary condition requests must include the location of the services and the expected loads required by the proposed development. Please provide an email to Julie Candow (Julie.candow@ottawa.ca) with the following information:

- i. Location of services
- ii. Type of development and the amount of fire flow required (as per OBC Section 7.2.11 or FUS for fire flows 9,000 L/min or above – See technical bulletin ISTB 2021-03).
- iii. Average daily demand: ____ l/s.
- iv. Maximum daily demand: ____ l/s.
- v. Maximum hourly daily demand: ____ l/s.

5. Sanitary / Storm Infrastructure:

- a) There is an available 250 mm diameter sanitary sewer fronting the site on Carp Road. Sanitary flows should be directed to Carp Road.
- b) There is an existing storm drainage ditch which appears to service 1174 Carp Road and 6310 Hazeldean Road located along the southern boundary of the site within the 10m landscape buffer. The ditch outlets to a 750mm storm sewer which outlets between two residential houses into the existing Crossing Bridge subdivision. Please verify if any drainage easements exist with respect to this storm drainage ditch.
- c) Storm flows should continue to be directed towards the existing drainage ditch and 750mm storm sewer which outlets to the Crossing Bridge subdivision.
- d) The storm flows from the existing drainage ditch outletting from 6310 Hazeldean Road must continue to be accommodated.
- e) Please confirm if the existing 10m landscape buffer at the southern boundary of the site was a condition of subdivision registration or registered on titled for any homes within the existing Crossing Bridge subdivision to the south.



- f) New services must be grouped in a common trench to minimize the number of road cuts.
- 6. The Stormwater Management Criteria, for the subject site, is to be based on the following:
 - a) Meet an allowable release rate based on the pre-development Rational Method Coefficient or a maximum of 0.50, employing the City of Ottawa IDF parameters for a 5-year storm with a calculated time of concentration equal to or greater than 10 minutes;
 - b) Attenuate all storms up to and including the City of Ottawa 100-year storm event on site.
 - c) Quality control to be provided to "Enhanced" level of treatment (80% TSS removal).
- 7. An MECP Environmental Compliance Approval is not anticipated to be required for this application assuming the proposed development meets the following criteria:
 - a) Is designed to service one lot or parcel of land;
 - b) Discharges into a storm sewer that is not a combined sewer;
 - c) Does not service industrial land or a structure located on industrial land; and
 - d) Is not located on industrial land. O.Reg. 525/98, s. 3; O.Reg. 40/15, s. 4.
- 8. Phase 1 ESAs and Phase 2 ESAs must conform to Ontario Regulation 153/04.

Should you have any questions or require additional information, please contact me directly at (613) 580-2424, ext. 13850 or by email at Julie.candow@ottawa.ca.

APPENDIX B

Preliminary Sanitary Sewage Calculations and E-mail Correspondence from the City of Ottawa

1174 Carp Road - Proposed Multi-Storey Retirement Residence

SANITARY SEWAGE ANALYSIS

Residential		
Number of 1-Bedroom/Studio Apartments	311	
Number of Persons per 1-Bdrm/Studio Apartment	1.4	
Number of 2-Bedroom Apartments	94	
Number of Persons per 2-Bdrm Apartment	2.1	
Number of 3-Bedroom Apartments	8	
Number of Persons per 3-Bdrm Apartment	3.1	
Total Design Population	658	
Average Daily Sanitary Flow	280	L/c/day
Peak Factor (Harmon Formula)	3.59	
Peak Residential Flow	7.65	L/s
Commercial		
Hair Salon - Stations	2	
Hair Salon - Avg. Daily Flow	650	L/s/day
Café/Bistro & Bar Lounge - Seats	80	
Café/Bistro & Bar Lounge - Avg. Daily Flow	125	L/s/day
Pool/Spa/Fitness + Shower Users	100	
Pool/Spa/Fitness - Avg. Daily Flow	40	L/c/day
Health Offices - Medical Staff	3	
Medical Staff - Avg. Daily Flow	275	L/c/day
Health Offices - Office Staff	1	
Med. Office Staff - Avg. Daily Flow	75	L/c/day
Health Offices - Patients	200	
Patients - Avg. Daily Flow	25	L/c/day
Auxiliary Staff	30	
Auxiliary Staff - Avg. Daily Flow	75	L/c/day
Commercial Peaking Factor	1.5	
Peak Commercial Flow	0.42	L/s
Extraneous Flow		
Site Area	1.827	ha
Infiltration Allowance	0.33	L/s/ha
Peak Extraneous Flows	0.60	L/s
Total Peak Sanitary Flow	8.67	L/s

*Average daily sewage flow values taken from the Ottawa Sewer Design Guidelines, Appendix 4-A, and subsequent technical bulletins.

Kynan Dsa

From: Brault, Ryan <ryan.brault@ottawa.ca>
Sent: Thursday, November 14, 2024 11:59 AM
To: Francois Thauvette
Cc: Kynan Dsa
Subject: RE: 1174 Carp Road - Phase 3 Pre-Consultation Feedback Discussion (123126)

Good Morning François,

I have received confirmation from our Asset Management team that the Carp Road sewer has sufficient capacity to allow for the proposed development – assumed at 8.3L/s. Please proceed with the adjusted population and respective flow rate for your next submission. Additionally, please expand and elaborate within the report on the flow justification(s) for all auxiliary uses: commercial and “open” kitchen, dining area(s), activity/lounge/game room(s), employee/staff rooms and areas, cinema, art room, bistro, pool/spa, fitness areas, pharmacy, hair salon, health offices, etc.. Dependent on the justification, we may require additional flows to be accounted for, within reason. I have also confirmed with our Asset Management team that there is reasonable buffer capacity in the sewers to allow for additional flows if needed.

Please note that as the file progresses to the Site Plan application stage, we will require the flows to be reassessed based on any changes/confirmation of building details (ie. ratio of nursing style units vs. more residential style units).

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

Regards,

Ryan Brault, M.Eng., P.Eng
Project Manager - Infrastructure Approvals

City of Ottawa
Development Review - West Branch
Planning, Development, and Building Services
110 Laurier Ave West, 4th Floor East;
Ottawa ON K1P 1J1
Tel: 613-580-2424 x 32540

From: Francois Thauvette <f.thauvette@novatech-eng.com>
Sent: November 07, 2024 1:28 PM
To: Brault, Ryan <ryan.brault@ottawa.ca>
Cc: Kynan Dsa <k.dsa@novatech-eng.com>
Subject: RE: 1174 Carp Road - Phase 3 Pre-Consultation Feedback Discussion (123126)

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Hi Ryan,

As a follow-up to our Teams call earlier this morning and to the e-mail chain below, we are providing additional information for your consideration. Included in the attached e-mail are sanitary sewage and domestic water demand calculations based on 2 different approaches (i.e., all-inclusive 400L/person/day for 'Other Institutional Residences' assuming 1 person per bed vs. the standard 280 L/person/day based on the variable design population per unit size + auxiliary uses and staff).

The domestic water demand values using the 2 distinct approaches range as follows:

- Average Day Demand: 1.9 L/s - 2.2 L/s
- Max Day Demand: 4.8 L/s – 5.4 L/s
- Peak Hour Demand: 10.5 L/s – 11.9 L/s

While the peak sanitary sewage flow values range from 7.6 L/s – 8.3 L/s.

Please review the calculations using the 2 distinct approaches and advise how you would like us to present the information in the updated Assessment of Adequacy of Public Services Report to address the City comments. Please also share this information with the Asset Management Department so that we can get feedback re: City Engineering review comment # 33. Please provide a written response by next week (Nov. 11-15) to give us sufficient time to revise our documents and address all comments. Our client would like us to make the resubmission to the City the week of Nov. 25, 2024.

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

Regards,

François Thauvette, P. Eng., Sr. Project Manager | Land Development & Public-Sector Engineering

NOVATECH

Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | T: 613.254.9643 Ext: 219 | C: 613.276.0310

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

From: Brault, Ryan <ryan.brault@ottawa.ca>

Sent: Wednesday, November 6, 2024 10:34 AM

To: Francois Thauvette <f.thauvette@novatech-eng.com>

Cc: Kynan Dsa <k.dsa@novatech-eng.com>

Subject: RE: 1174 Carp Road - Phase 3 Pre-Consultation Feedback Discussion (123126)

Good Morning François,

I'm happy to discuss the below comments. My schedule is currently open tomorrow (7th) morning between 9-10am and 11-11:45am, and in the afternoon between 1:30-3:30pm. Please let me know if any of those times work for you – feel free to send a meeting invitation as confirmation.

Regards,

Ryan Brault, M.Eng., P.Eng

Project Manager - Infrastructure Approvals

City of Ottawa

Development Review - West Branch
Planning, Development, and Building Services
110 Laurier Ave West, 4th Floor East;
Ottawa ON K1P 1J1
Tel: 613-580-2424 x 32540

From: Francois Thauvette <f.thauvette@novatech-eng.com>
Sent: November 05, 2024 1:17 PM
To: Brault, Ryan <ryan.brault@ottawa.ca>
Cc: Kynan Dsa <k.dsa@novatech-eng.com>
Subject: FW: 1174 Carp Road - Phase 3 Pre-Consultation Feedback Discussion (123126)

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Hi Ryan,

We are sending this e-mail to request a brief Teams call with you (if necessary) to clarify a few of the City review comments. Our responses to your inquiries are provided below and we want to make certain you are OK with the responses and design approach before making a formal re-submission at the end of the month. If you would like to discuss further, please advise when you might have time for a brief Teams call later this week. It should take less than 20 minutes.

See e-mail below for details.

Regards,

François Thauvette, P. Eng., Sr. Project Manager | Land Development & Public-Sector Engineering

NOVATECH

Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | T: 613.254.9643 Ext: 219 | C: 613.276.0310

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From: Kynan Dsa <k.dsa@novatech-eng.com>
Sent: Tuesday, November 5, 2024 12:14 PM
To: Francois Thauvette <f.thauvette@novatech-eng.com>
Subject: 1174 Carp Road - Phase 3 Pre-Consultation Feedback Discussion (123126)

Hi François,

Please find below a summary of the items for discussion with the City based on the Phase 3 pre-consultation review comments for the 1174 Carp Road project:

1. **31:** The calculations are based on 1 person per bed, instead of the typical residential values (i.e., 1.4 people per 1-bdrm apartment unit, 2.1 people per 2-bdrm unit, etc.), which we feel is more appropriate for a retirement home.
2. **32:** The calculations are based on an average flow rate of 400L/person/day for 'Other Institutional Residences', taken directly from Appendix 4-A of the City of Ottawa Sewer Design Guidelines, as opposed to the 280 L/person/day for a typical residential use. We feel this larger value is appropriate and includes auxiliary uses and staff.
3. **34:** Based on previous discussions with the City's Park Department, there is no intention to provide sanitary or water services for the Park Block. The feasibility of servicing the Park Block will be a challenge as there is no municipal sanitary sewer along Hazeldean and connecting to the 406mm feedermain is not desired, or typically approved. This is stated in the report, but we can certainly elaborate.
4. **81:** Parkland Servicing comments appear to be generic and do not reflect the previous discussions with City staff.

81a(i): As previously discussed with City staff, the intent is to drain storm flows from the Park Block into the existing roadside ditch along Hazeldean Road. There is no municipal storm sewer outlet available fronting the Park Block.

81a(ii) and a(iii): Refer to comment 34 above re: sanitary and water servicing for the park.

5. **82 (k):** We would like to discuss the approach for on-site SWM specifically related to the Park block with City staff.

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

Thanks,

Kynan D'sa, B.A.Sc. (Engineering) (He/Him)

NOVATECH

Engineers, Planners & Landscape Architects

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

Tel: 613.254.9643 Ext. 276 | Cell: 705.821.2278

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APPENDIX C

Preliminary Water Demands, FUS Calculations, Watermain Boundary Conditions and E-mail Correspondence from the City of Ottawa

1174 Carp Road: Proposed Multi-Storey Retirement Residence

WATER ANALYSIS

DOMESTIC WATER DEMANDS

Residential Use	Post-Development	
Number of 1-Bedroom/Studio Apartments	311	
Number of Persons per 1-Bdrm/Studio Apartment	1.4	
Number of 2-Bedroom Units	94	
Persons per 2-Bedroom Unit	2.1	
Number of 3-Bedroom Units	8	
Persons per 3-Bedroom Unit	3.1	
Total Number of Units	413	
Total Design Population	658	
Average Day Demand (280 L/c/day)	2.13	L/s
Maximum Day Demand (2.5 x avg. day)	5.33	L/s
Peak Hour Demand (2.2 x max. day)	11.73	L/s
Commercial/Staff Use		
Hair Salon (2 stations, Avg=650L/station/day)	0.02	L/s
Café/Bistro & Bar Lounge (80 seats, Avg=125L/s/day)	0.12	L/s
Pool/Spa/Fitness + Showers (100 users ,Avg=40L/c/day)	0.05	L/s
Health Offices - Medical Staff (3 persons, 275 L/c/day)	0.01	L/s
Health Offices - Office Staff (1 person, 75 L/c/day)	0.00	L/s
Health Offices - Patients (200 persons, 25 L/c/day)	0.06	L/s
Auxiliary Staff (30 persons, Avg=75L/c/day)	0.03	L/s
Maximum Day Demand (1.5 x avg. day)	0.44	L/s
Peak Hour Demand (1.8 x max. day)	0.79	L/s
Total Average Day Demand	2.43	L/s
Total Maximum Day Demand	5.77	L/s
Total Peak Hour Demand	12.52	L/s

BOUNDARY CONDITIONS (PROVIDED BY THE CITY)

Maximum HGL =	160.7	m
Minimum HGL =	156.8	m
Max Day + Fire Flow =	156.3	m

PRESSURE TESTS

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

Average Ground Elevation	125.3 m
High Pressure Test = (Max HGL - Avg.Ground Elev.) x 1.42 PSI/m (should be between 50- 70 PSI)	
High Pressure =	50.3 PSI
Low Pressure Test = (Min. HGL - Avg. Ground Elev.) x 1.42 PSI/m (should be > 40 PSI)	
Low Pressure =	44.8 PSI
Max Day + Fire Flow Test = (Max Day + Fire Flow - Avg. Ground Elev.) x 1.42 PSI/m (should be > 20 PSI)	
Max Day + Fire Flow Pressure =	44.1 PSI

FUS - Fire Flow Calculations

As per 2020 Fire Underwriter's Survey Guidelines



Engineers, Planners & Landscape Architects

Novatech Project #: 123126
Project Name: 1174 Carp Road - Institutional Residence
Date: May 21, 2024
Input By: Chris Visser
Reviewed By: François Thauvette

Legend

Input by User
 No Information or Input Required

Building Description: Multi-Storey Building - Retirement Facility
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	
		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) - Averaged over 9 stories	4773		
		Number of Floors/Storeys	9		
		Protected Openings (1 hr)			
		Area of structure considered (m ²)		26,252	
	F	Base fire flow without reductions			
		$F = 220 C (A)^{0.5}$			29,000
Reductions or Surcharges					
3	Occupancy hazard reduction or surcharge		FUS Table 3	Reduction/Surcharge	
	(1)	Non-combustible		-25%	
		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%	
		Standard Water Supply	Yes	-10%	
		Fully Supervised System	Yes	-10%	
		Cumulative Sub-Total		-50%	
		Area of Sprinklered Coverage (m ²)	42957	100%	
		Cumulative Total		-50%	-12,325
5	Exposure Surcharge		FUS Table 5	Surcharge	
	(3)	North Side	>30m	0%	
		East Side	>30m	0%	
		South Side	>30m	0%	
		West Side	>30m	0%	
		Cumulative Total		0%	
Results					
6	(1) + (2) + (3)	Total Required Fire Flow, rounded to nearest 1000L/min		L/min	12,000
		(2,000 L/min < Fire Flow < 45,000 L/min)		L/s	200
				USGPM	3,170

Chris Visser

From: Brault, Ryan <ryan.brault@ottawa.ca>
Sent: Wednesday, May 29, 2024 8:43 AM
To: Francois Thauvette
Cc: Chris Visser
Subject: RE: 1174 Carp Road - Retirement Residence Development - Request for Municipal WM Boundary Conditions (123126)
Attachments: 1174 Carp Road Boundary Condition(27 May 2024).docx

Good Morning François,

Please find the attached boundary conditions.

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

Regards,

Ryan Brault, M.Eng., P.Eng
Project Manager - Infrastructure Approvals

City of Ottawa
Development Review - West Branch
Planning, Development, and Building Services
110 Laurier Ave West, 4th Floor East;
Ottawa ON K1P 1J1
Tel: 613-580-2424 x 32540

From: Francois Thauvette <f.thauvette@novatech-eng.com>
Sent: May 24, 2024 8:49 AM
To: Brault, Ryan <ryan.brault@ottawa.ca>
Cc: Chris Visser <c.visser@novatech-eng.com>
Subject: RE: 1174 Carp Road - Retirement Residence Development - Request for Municipal WM Boundary Conditions (123126)

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Hi Ryan,

We found a typo in the calculations, so we are re-sending the request for WM boundary conditions with the updated (reduced domestic water demand values).

- Average Day Demand = 1.9 L/s
- Maximum Day Demand = 4.8 L/s

- Peak Hour Demand = 10.5 L/s
- FUS Fire Flow = 200 L/s

Also attached is a sketch showing the existing municipal watermains, general servicing configuration and fire hydrant locations related to the proposed development. Since the domestic water demands are greater than 50m³/day, twin services will be required to provide the necessary redundancy per City standards. The building services will be fed off the 400mm dia. watermain in Carp Road.

Apologies for the confusion.

Regards,

François Thauvette, P. Eng., Sr. Project Manager | Land Development & Public-Sector Engineering
NOVATECH

Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | T: 613.254.9643 Ext: 219 | C: 613.276.0310

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From: Francois Thauvette
Sent: Wednesday, May 22, 2024 2:59 PM
To: 'Ryan.Brault@Ottawa.ca' <Ryan.Brault@Ottawa.ca>
Cc: Chris Visser <c.visser@novatech-eng.com>
Subject: 1174 Carp Road - Retirement Residence Development - Request for Municipal WM Boundary Conditions (123126)

Hi Ryan,

We are sending this e-mail to request municipal watermain boundary conditions related to the proposed re-development of the 1174 Carp Road property. The preliminary anticipated water demands for the proposed Institutional Residence are as follows:

- Average Day Demand = 2.5 L/s
- Maximum Day Demand = 6.3 L/s
- Peak Hour Demand = 13.8 L/s
- FUS Fire Flow = 200 L/s

Also attached is a sketch showing the existing municipal watermains, general servicing configuration and fire hydrant locations related to the proposed development. Since the domestic water demands are greater than 50m³/day, twin services will be required to provide the necessary redundancy per City standards. The building services will be fed off the 400mm dia. watermain in Carp Road.

Regards,

François Thauvette, P. Eng., Sr. Project Manager | Land Development & Public-Sector Engineering
NOVATECH

Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | T: 613.254.9643 Ext: 219 | C: 613.276.0310

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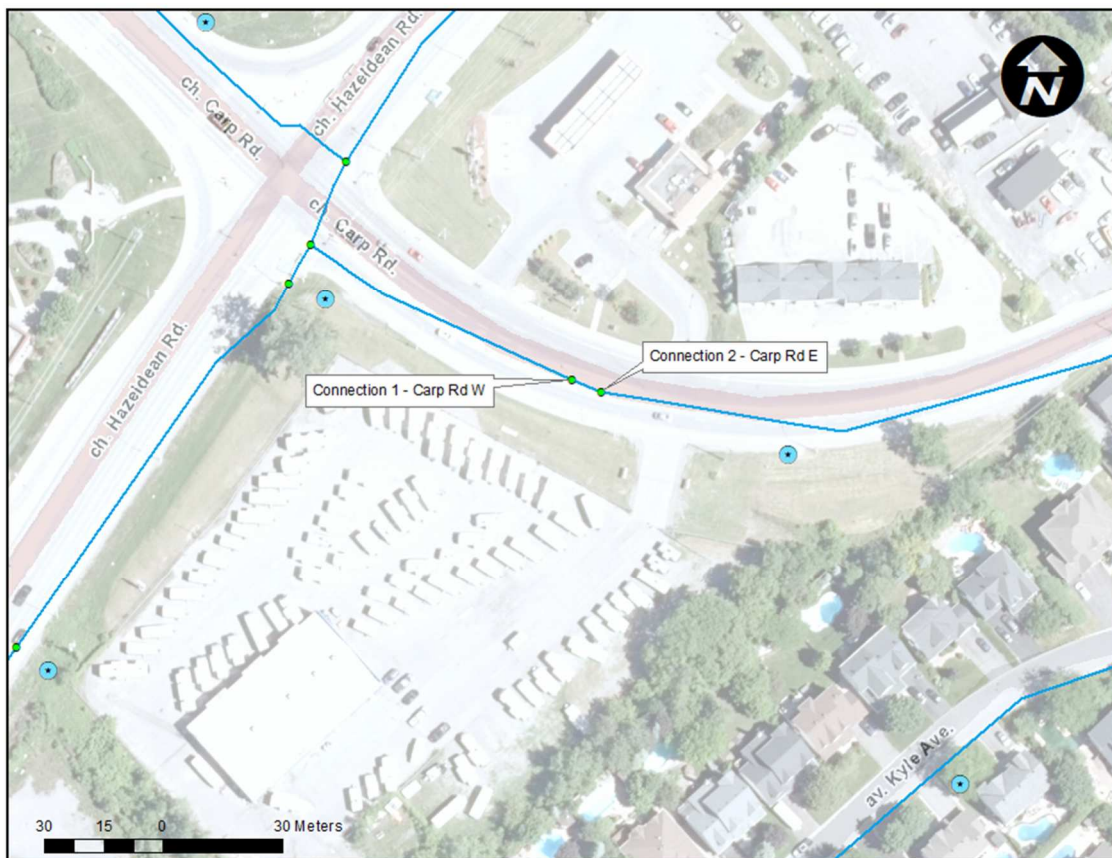
'

Boundary Conditions 1174 Carp Road

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	115	1.92
Maximum Daily Demand	287	4.79
Peak Hour	632	10.54
Fire Flow Demand #1	12,000	200.00

Location



Results

Connection 1 – Carp Rd W

Demand Scenario	Head (m)	Pressure¹ (psi)
Maximum HGL	160.7	50.4
Peak Hour	156.8	44.9
Max Day plus Fire Flow #1	156.3	44.1

¹ Ground Elevation = 125.3 m

Connection 2 – Carp Rd E

Demand Scenario	Head (m)	Pressure¹ (psi)
Maximum HGL	160.7	50.4
Peak Hour	156.8	44.8
Max Day plus Fire Flow #1	156.2	44.0

¹ Ground Elevation = 125.3 m

Note

1. Any connection to a watermain 400 mm or larger should be approved by DWS as per the Water Design Guidelines Section 2.4 Review by Drinking Water Services.

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.

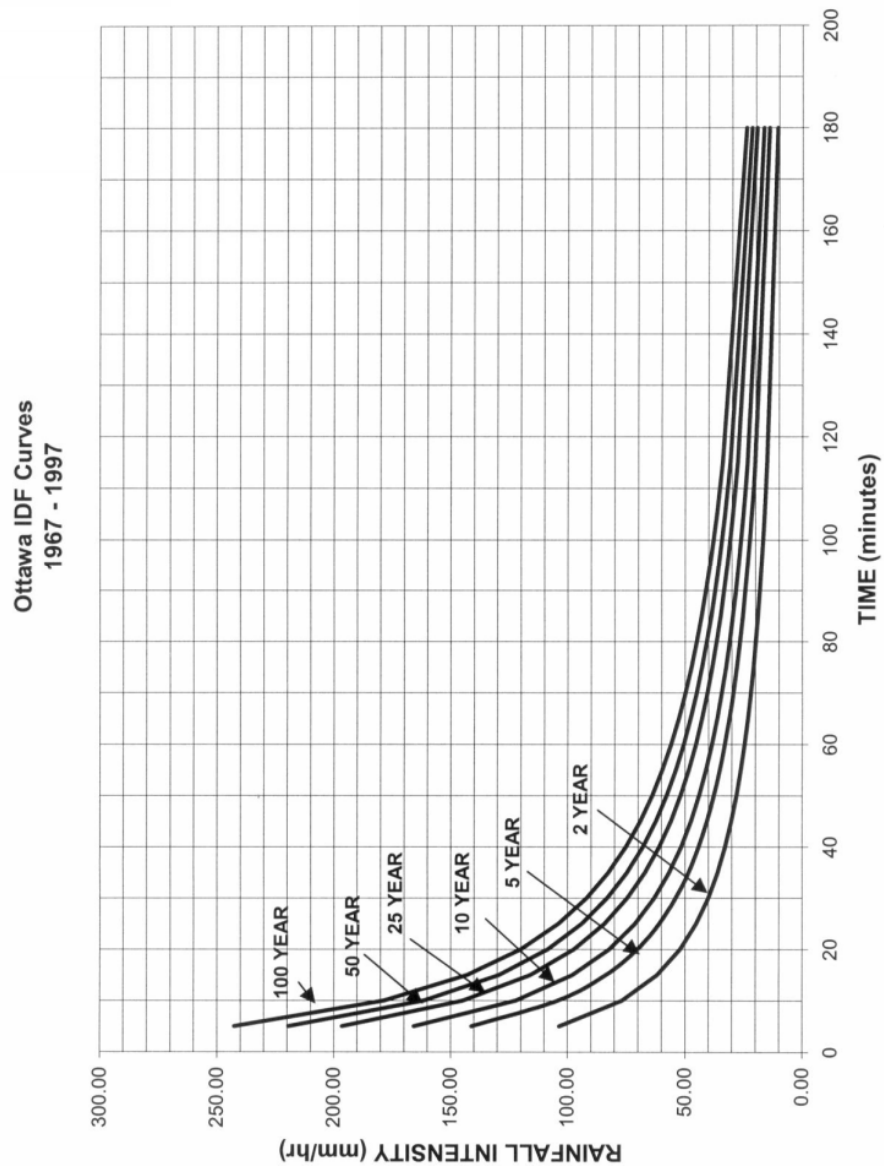
APPENDIX D

IDF Curves and Preliminary SWM Calculations

Ottawa Sewer Design Guidelines

APPENDIX 5-A

OTTAWA INTENSITY DURATION FREQUENCY (IDF) CURVE



Proposed Multi-Storey Institutional Residence
1174 Carp Road

Pre - Development Stormwater Flows											
Description	Area (ha)	A _{imperv} (ha) C=0.9	A _{gravel} (ha) C=0.7	A _{pervious} (ha) C=0.2	Weighted C _{w2.5}	Weighted C _{w100}	2-Year Flow (L/s)	5-Year Flow (L/s)	100-Year Flow (L/s)	Allowable C _{w5}	Allowable Flow Year (L/s)
Subject Site (Excl. Parkland block)	1.644	1.040	0.100	0.504	0.67	0.76	236.3	320.6	622.4	0.50	238.1
Dedicated City Parkland	0.183	0.037	0.000	0.146	0.34	0.40	13.3	18.1	36.5	0.50	26.5
Total Area to be redeveloped	1.827	1.077	0.100	0.650	0.64	0.73	249.7	338.7	658.9	0.50	264.6

T_c = 10mins

Post - Development Stormwater Flows -Subject Site															
Area	Description	Area (ha)	A _{imp} (ha) C=0.9	A _{perv} (ha) C=0.2	C _{2.5}	C ₁₀₀	Uncontrolled Flow (L/s)			Controlled Flow (L/s)			Storage Required (m ³)		
							2-year	5-year	100-year	2-year	5-year	100-year	2-year	5-year	100-year
A-1	Direct Runoff to North Ditch	0.090	0.063	0.027	0.69	0.78	13.3	18.0	34.6						
A-2	Controlled Courtyard (To SWM Tank)	0.260	0.169	0.091	0.66	0.74									
A-3	Controlled Site Flows East (To SWM Tank)	0.343	0.274	0.069	0.76	0.85									
A-4	Uncontrolled Site Flows - West Road	0.140	0.109	0.031	0.75	0.83									
A-2 to A-4	Combined Controlled Site Flows (to SWM Tank)	0.743	0.552	0.191	0.72	0.81				35.0	35.0	35.0	51.2	83.4	216.7
A-5	Direct Runoff to West & South Ditches	0.255	0.009	0.246	0.22	0.28	12.2	16.6	35.0						
A-6	Direct Runoff - East Side	0.069	0.015	0.054	0.35	0.41	5.2	7.0	14.1						
R-1	Controlled Building Roof Flows	0.487	0.487	0.000	0.90	1.00				15.8	16.6	20.0	62.5	93.9	210.1
Totals :		1.644	-	-	-	-	30.7	41.6	83.8	50.8	51.6	55.0	113.7	177.3	426.8
						Total On-Site Stormwater Flows -Subject Site :				81.4	93.2	138.7			

T_c = 10mins

2.7

Weeping Tile Flow Allowance

Post - Development Stormwater Flows -Parkland Block															
Area	Description	Area (ha)	A _{imp} (ha) C=0.9	A _{perv} (ha) C=0.2	C _{2.5}	C ₁₀₀	Uncontrolled Flow (L/s)			Controlled Flow (L/s)			Storage Required (m³)		
							2-year	5-year	100-year	2-year	5-year	100-year	2-year	5-year	100-year
PK-1	Direct Runoff to North Ditch	0.019	0.000	0.019	0.20	0.25	0.8	1.1	2.4						
PK-2	Controlled Flow within City Parkland	0.164	0.051	0.113	0.42	0.48				20.9	22.6	24.0	2.8	5.1	17.5
Totals :		0.183	-	-	-	-	0.8	1.1	2.4	20.9	22.6	24.0	2.8	5.1	17.5
Total On-Site Stormwater Flows -Parkland Block :										21.7	23.7	26.4			
							Total On-Site Stormwater Flows :			103.1	116.9	165.1			

Proposed Multi-Storey Institutional Residence

Novatech Project No. 123126

Uncontrolled Runoff - 1:2 YEAR EVENT

AREA A-1 Uncontrolled Runoff to Existing Ditch

OTTAWA IDF CURVE
Area = 0.090 ha Qallow = 13.3 L/s
C = 0.69 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	17.88	4.62	1.39
10	76.81	13.26	0.00	0.00
15	61.77	10.66	-2.60	-2.34
20	52.03	8.98	-4.28	-5.13
25	45.17	7.80	-5.46	-8.19
30	40.04	6.91	-6.35	-11.42
35	36.06	6.23	-7.03	-14.77
40	32.86	5.67	-7.59	-18.21
45	30.24	5.22	-8.04	-21.71
50	28.04	4.84	-8.42	-25.26
55	26.17	4.52	-8.74	-28.85
60	24.56	4.24	-9.02	-32.47
65	23.15	3.60	-26.18	39.78
70	21.91	3.78	-9.48	-39.80
75	20.81	3.59	-9.67	-43.50
90	18.14	3.13	-10.13	-54.69
105	16.13	2.79	-10.47	-65.99
120	14.56	2.78	15.52	111.77
135	13.30	2.30	-10.96	-88.81
150	12.25	2.12	-11.14	-100.30

Proposed Multi-Storey Institutional Residence

Novatech Project No. 123126

Uncontrolled Runoff - 1:5 YEAR EVENT

AREA A-1 Uncontrolled Runoff to Existing Ditch

OTTAWA IDF CURVE
Area = 0.090 ha Qallow = 18.0 L/s
C = 0.69 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	24.37	6.39	1.92
10	104.19	17.99	0.00	0.00
15	83.56	14.43	-3.56	-3.21
20	70.25	12.13	-5.86	-7.03
25	60.90	10.51	-7.47	-11.21
30	53.93	9.31	-8.68	-15.62
35	48.52	8.38	-9.61	-20.18
40	44.18	7.63	-10.36	-24.86
45	40.63	7.01	-10.97	-29.63
50	37.65	6.50	-11.49	-34.46
55	35.12	6.06	-11.92	-39.35
60			-17.99	-64.76
65	31.04	5.36	-12.63	-49.25
70	29.37	5.07	-12.92	-54.25
75	27.89	4.81	-13.17	-59.28
90	24.29	4.19	-13.79	-74.49
105	21.58	3.73	15.75	99.23
120	19.47	3.36	-14.63	-105.31
135	17.76	3.07	-14.92	-120.86
150	16.36	2.82	-15.16	-136.47

Proposed Multi-Storey Institutional Residence

Novatech Project No. 123126

Uncontrolled Runoff - 1:100 YEAR EVENT

AREA A-1 Uncontrolled Runoff to Existing Ditch

OTTAWA IDF CURVE
Area = 0.090 ha Qallow = 34.6 L/s
C = 0.78 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	47.06	12.44	3.73
10	178.56	34.62	0.00	0.00
15	142.89	27.71	-6.92	-6.22
20	119.95	23.26	-11.36	-13.64
25	103.85	20.14	-14.49	-21.73
30	91.87	17.81	-16.81	-30.26
35	82.58	16.01	-18.61	-39.08
40	75.15	14.57	-20.05	-48.13
45	69.05	13.39	-21.23	-57.33
50	63.95	12.40	-22.22	-66.67
55	59.62	11.56	-23.06	-76.11
60	55.89	10.84	-23.79	-85.63
65	52.65	10.21	-24.42	-95.22
70	49.79	9.65	-24.97	-104.87
75	47.26	9.16	-25.46	-114.57
90	41.11	7.97	-26.65	-143.92
105	36.50	7.08	-27.55	-173.54
120	32.89	6.38	-28.25	-203.36
135	30.00	5.82	-28.81	-233.34
150	27.61	5.35	-29.27	-263.43

Proposed Multi-Storey Institutional Residence

Novatech Project No. 123126

Uncontrolled Runoff - 1:100 YR + 20% IDF Increase

AREA A-1 Uncontrolled Runoff to Existing Ditch

OTTAWA IDF CURVE
Area = 0.090 ha Qallow = 41.5 L/s
C = 0.78 Vol(max) = 0.0 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	56.47	14.93	4.48
10	214.27	41.55	0.00	0.00
15	171.47	33.25	-8.30	-7.47
20	143.94	27.91	-13.64	-16.36
25	124.62	24.16	-17.38	-26.08
30	110.24	21.38	-20.17	-36.31
35	99.09	19.21	-22.33	-46.90
40	90.17	17.49	-24.06	-57.75
45	82.86	16.07	-25.48	-68.80
50	76.74	14.88	-26.67	-80.00
55	71.55	13.87	-27.67	-91.33
60	67.07	13.01	-28.54	-102.75
65	63.18	12.25	-29.30	-114.26
70	59.75	11.59	-29.96	-125.84
75	56.71	11.00	-30.55	-137.49
90	49.33	9.57	-31.98	-172.70
105	43.80	8.49	-33.06	-208.25
120	39.47	7.65	-33.89	-244.04
135	36.00	6.98	-34.57	-280.00
150	33.13	6.42	-35.12	-316.11

Proposed Multi-Storey Institutional Residence				
Novatech Project No. 123126				
Uncontrolled Runoff - 1:2 YEAR EVENT				
AREAS A-2 to A-4 Controlled Flow From Internal SWM Tank				
OTTAWA IDF CURVE				
Area = 0.743 ha		Qallow = 35.0 L/s		
C = 0.72		Vol(max) = 51.2 m3		
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	154.04	119.04	35.71
10	76.81	114.23	79.23	47.54
15	61.77	91.87	56.87	51.18
20	52.03	77.39	42.39	50.86
25	45.17	67.18	32.18	48.27
30	40.04	59.56	24.56	44.20
35	36.06	53.63	18.63	39.12
40	32.86	48.88	13.88	33.31
45	30.24	44.98	9.98	26.93
50	28.04	41.71	6.71	20.12
55	26.17	38.92	3.92	12.95
60	24.56	36.52	1.52	5.49
65	23.15	34.43	-0.57	-2.21
70	21.91	32.59	-2.41	-10.12
75	20.81	30.96	-4.04	-18.20
80	19.83	29.49	-5.51	-26.43
85	18.94	28.18	-6.82	-34.80
90	18.14	26.98	-8.02	-43.29
95	17.41	25.90	-9.10	-51.88
100	16.75	24.91	-10.09	-60.56

Proposed Multi-Storey Institutional Residence				
Novatech Project No. 123126				
Uncontrolled Runoff - 1:5 YEAR EVENT				
AREAS A-2 to A- Controlled Flow From Internal SWM Tank				
OTTAWA IDF CURVE				
Area = 0.743 ha		Qallow = 35.0 L/s		
C = 0.72		Vol(max) = 83.4 m3		
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	209.97	174.97	52.49
10	104.19	154.97	119.97	71.98
15	83.56	124.27	89.27	80.35
20	70.25	104.48	69.48	83.38
25	60.90	90.57	55.57	83.36
30	53.93	80.21	45.21	81.37
35	48.52	72.16	37.16	78.04
40	44.18	65.72	30.72	73.72
45	40.63	60.43	25.43	68.65
50	37.65	56.00	21.00	63.00
55	35.12	52.24	17.24	56.89
60	32.94	49.00	14.00	50.39
65	31.04	46.17	11.17	43.57
70	29.37	43.68	8.68	36.48
75	27.89	41.48	6.48	29.15
80	26.56	39.51	4.51	21.63
85	25.37	37.73	2.73	13.93
90	24.29	36.12	1.12	6.07
95	23.31	34.66	-0.34	-1.93
100	22.41	33.33	-1.67	-10.04

Proposed Multi-Storey Institutional Residence				
Novatech Project No. 123126				
Uncontrolled Runoff - 1:100 YEAR EVENT				
AREAS A-2 to A-4 Controlled Flow From Internal SWM Tank				
OTTAWA IDF CURVE				
Area = 0.743 ha		Qallow = 35.0 L/s		
C = 0.81		Vol(max) = 216.7 m3		
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	404.66	369.66	110.90
10	178.56	297.71	262.71	157.63
15	142.89	238.25	203.25	182.92
20	119.95	199.99	164.99	197.99
25	103.85	173.14	138.14	207.22
30	91.87	153.17	118.17	212.71
35	82.58	137.68	102.68	215.64
40	75.15	125.29	90.29	216.70
45	69.05	115.13	80.13	216.35
50	63.95	106.63	71.63	214.89
55	59.62	99.41	64.41	212.56
60	55.89	93.19	58.19	209.50
65	52.65	87.78	52.78	205.83
70	49.79	83.01	48.01	201.66
75	47.26	78.79	43.79	197.05
80	44.99	75.01	40.01	192.07
85	42.95	71.62	36.62	186.75
90	41.11	68.54	33.54	181.14
95	39.43	65.75	30.75	175.27
100	37.90	63.20	28.20	169.18

Proposed Multi-Storey Institutional Residence				
Novatech Project No. 123126				
Uncontrolled Runoff - 1:100 YR + 20% IDF Increase				
AREAS A-2 to A- Controlled Flow From Internal SWM Tank				
OTTAWA IDF CURVE				
Area = 0.743 ha		Qallow = 35.0 L/s		
C = 0.81		Vol(max) = 278.9 m3		
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	485.59	450.59	135.18
10	214.27	357.25	322.25	193.35
15	171.47	285.90	250.90	225.81
20	143.94	239.99	204.99	245.99
25	124.62	207.77	172.77	259.16
30	110.24	183.81	148.81	267.85
35	99.09	165.22	130.22	273.46
40	90.17	150.35	115.35	276.84
45	82.86	138.15	103.15	278.52
50	76.74	127.96	92.96	278.87
55	71.55	119.29	84.29	278.17
60	67.07	111.83	76.83	276.60
65	63.18	105.33	70.33	274.30
70	59.75	99.62	64.62	271.39
75	56.71	94.55	59.55	267.96
80	53.99	90.02	55.02	264.08
85	51.54	85.94	50.94	259.80
90	49.33	82.25	47.25	255.17
95	47.32	78.90	43.90	250.23
100	45.48	75.84	40.84	245.01

Proposed Multi-Storey Institutional Residence					
Novatech Project No. 123126					
Uncontrolled Runoff - 1:2 YEAR EVENT					
AREA A-5 Uncontrolled Runoff to Existing Ditches					
OTTAWA IDF CURVE					
Area =	0.255	ha	Qallow =	12.2	L/s
C =	0.22		Vol(max) =	0.0	m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	103.57	16.50	4.26	1.28	
10	76.81	12.23	0.00	0.00	
15	61.77	9.84	-2.40	-2.16	
20	52.03	8.29	-3.95	-4.74	
25	45.17	7.19	-5.04	-7.56	
30	40.04	6.38	-5.86	-10.54	
35	36.06	5.74	-6.49	-13.63	
40	32.86	5.24	-7.00	-16.80	
45	30.24	4.82	-7.42	-20.03	
50	28.04	4.47	-7.77	-23.30	
55	26.17	4.17	-8.07	-26.62	
60	24.56	3.91	-8.32	-29.96	
65	23.15	3.69	-8.55	-33.33	
70	21.91	3.49	-8.74	-36.72	
75	20.81	3.32	-8.92	-40.14	
80	19.83	3.16	-9.08	-43.56	
85	18.94	3.02	-9.22	-47.01	
90	18.14	2.89	-9.34	-50.46	
95	17.41	2.77	-9.46	-53.93	
100	16.75	2.67	-9.57	-57.40	

Proposed Multi-Storey Institutional Residence					
Novatech Project No. 123126					
Uncontrolled Runoff - 1:5 YEAR EVENT					
AREA A-5 Uncontrolled Runoff to Existing Ditches					
OTTAWA IDF CURVE					
Area =	0.255	ha	Qallow =	16.6	L/s
C =	0.22		Vol(max) =	0.0	m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	141.18	22.49	5.89	1.77	
10	104.19	16.60	0.00	0.00	
15	83.56	13.31	-3.29	-2.96	
20	70.25	11.19	-5.41	-6.49	
25	60.90	9.70	-6.90	-10.35	
30	53.93	8.59	-8.01	-14.41	
35	48.52	7.73	-8.87	-18.62	
40	44.18	7.04	-9.56	-22.94	
45	40.63	6.47	-10.13	-27.34	
50	37.65	6.00	-10.60	-31.80	
55	35.12	5.59	-11.00	-36.31	
60	32.94	5.25	-11.35	-40.86	
65	31.04	4.95	-11.65	-45.44	
70	29.37	4.68	-11.92	-50.06	
75	27.89	4.44	-12.15	-54.70	
80	26.56	4.23	-12.37	-59.36	
85	25.37	4.04	-12.56	-64.04	
90	24.29	3.87	-12.73	-68.73	
95	23.31	3.71	-12.88	-73.44	
100	22.41	3.57	-13.03	-78.17	

Proposed Multi-Storey Institutional Residence					
Novatech Project No. 123126					
Uncontrolled Runoff - 1:100 YEAR EVENT					
AREA A-5 Uncontrolled Runoff to Existing Ditches					
OTTAWA IDF CURVE					
Area =	0.255	ha	Qallow =	35.0	L/s
C =	0.28		Vol(max) =	0.0	m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	242.70	47.57	12.57	3.77	
10	178.56	35.00	0.00	0.00	
15	142.89	28.01	-6.99	-6.29	
20	119.95	23.51	-11.49	-13.78	
25	103.85	20.35	-14.64	-21.96	
30	91.87	18.01	-16.99	-30.58	
35	82.58	16.18	-18.81	-39.50	
40	75.15	14.73	-20.27	-48.64	
45	69.05	13.53	-21.46	-57.95	
50	63.95	12.53	-22.46	-67.38	
55	59.62	11.69	-23.31	-76.92	
60	55.89	10.95	-24.04	-86.55	
65	52.65	10.32	-24.68	-96.24	
70	49.79	9.76	-25.24	-106.00	
75	47.26	9.26	-25.73	-115.80	
80	44.99	8.82	-26.18	-125.65	
85	42.95	8.42	-26.58	-135.54	
90	41.11	8.06	-26.94	-145.47	
95	39.43	7.73	-27.27	-155.42	
100	37.90	7.43	-27.57	-165.40	

Proposed Multi-Storey Institutional Residence					
Novatech Project No. 123126					
Uncontrolled Runoff - 1:100 YR + 20% IDF Increase					
AREA A-5 Uncontrolled Runoff to Existing Ditches					
OTTAWA IDF CURVE					
Area =	0.255	ha	Qallow =	42.0	L/s
C =	0.28		Vol(max) =	0.0	m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	291.24	57.08	15.09	4.53	
10	214.27	41.99	0.00	0.00	
15	171.47	33.61	-8.39	-7.55	
20	143.94	28.21	-13.78	-16.54	
25	124.62	24.42	-17.57	-26.36	
30	110.24	21.61	-20.39	-36.70	
35	99.09	19.42	-22.57	-47.40	
40	90.17	17.67	-24.32	-58.37	
45	82.86	16.24	-25.76	-69.54	
50	76.74	15.04	-26.95	-80.86	
55	71.55	14.02	-27.97	-92.31	
60	67.07	13.15	-28.85	-103.86	
65	63.18	12.38	-29.61	-115.49	
70	59.75	11.71	-30.29	-127.20	
75	56.71	11.11	-30.88	-138.96	
80	53.99	10.58	-31.41	-150.79	
85	51.54	10.10	-31.89	-162.65	
90	49.33	9.67	-32.33	-174.56	
95	47.32	9.27	-32.72	-186.51	
100	45.48	8.91	-33.08	-198.48	

Proposed Multi-Storey Institutional Residence					
Novatech Project No. 123126					
Uncontrolled Runoff - 1:2 YEAR EVENT					
AREA A-6 Un-Controlled Runoff to Roadside Ditches					
OTTAWA IDF CURVE					
Area = 0.069 ha		Qallow = 5.2 L/s			
C = 0.35		Vol(max) = 0.0 m3			
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	103.57	7.00	1.81	0.54	
10	76.81	5.19	0.00	0.00	
15	61.77	4.17	-1.02	-0.91	
20	52.03	3.51	-1.67	-2.01	
25	45.17	3.05	-2.14	-3.21	
30	40.04	2.71	-2.48	-4.47	
35	36.06	2.44	-2.75	-5.78	
40	32.86	2.22	-2.97	-7.12	
45	30.24	2.04	-3.15	-8.49	
50	28.04	1.89	-3.29	-9.88	
55	26.17	1.77	-3.42	-11.29	
60	24.56	1.66	-3.53	-12.71	
65	23.15	1.56	-3.62	-14.14	
70	21.91	1.48	-3.71	-15.57	
75	20.81	1.41	-3.78	-17.02	
80	19.83	1.34	-3.85	-18.47	
85	18.94	1.28	-3.91	-19.93	
90	18.14	1.23	-3.96	-21.40	
95	17.41	1.18	-4.01	-22.87	
100	16.75	1.13	-4.06	-24.34	

Proposed Multi-Storey Institutional Residence					
Novatech Project No. 123126					
Uncontrolled Runoff - 1:5 YEAR EVENT					
AREA A-6 Un-Controlled Runoff to Roadside Ditches					
OTTAWA IDF CURVE					
Area = 0.069 ha		Qallow = 7.0 L/s			
C = 0.35		Vol(max) = 0.0 m3			
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	141.18	9.54	2.50	0.75	
10	104.19	7.04	0.00	0.00	
15	83.56	5.64	-1.39	-1.25	
20	70.25	4.75	-2.29	-2.75	
25	60.90	4.11	-2.92	-4.39	
30	53.93	3.64	-3.40	-6.11	
35	48.52	3.28	-3.76	-7.90	
40	44.18	2.98	-4.05	-9.73	
45	40.63	2.74	-4.29	-11.59	
50	37.65	2.54	-4.50	-13.49	
55	35.12	2.37	-4.67	-15.40	
60	32.94	2.23	-4.81	-17.33	
65	31.04	2.10	-4.94	-19.27	
70	29.37	1.98	-5.05	-21.23	
75	27.89	1.88	-5.15	-23.20	
80	26.56	1.79	-5.24	-25.17	
85	25.37	1.71	-5.32	-27.16	
90	24.29	1.64	-5.40	-29.15	
95	23.31	1.57	-5.46	-31.15	
100	22.41	1.51	-5.52	-33.15	

Proposed Multi-Storey Institutional Residence					
Novatech Project No. 123126					
Uncontrolled Runoff - 1:100 YEAR EVENT					
AREA A-6 Un-Controlled Runoff to Roadside Ditches					
OTTAWA IDF CURVE					
Area = 0.069 ha		Qallow = 14.1 L/s			
C = 0.41		Vol(max) = 0.0 m3			
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	242.70	19.23	5.08	1.52	
10	178.56	14.15	0.00	0.00	
15	142.89	11.32	-2.83	-2.54	
20	119.95	9.50	-4.64	-5.57	
25	103.85	8.23	-5.92	-8.88	
30	91.87	7.28	-6.87	-12.36	
35	82.58	6.54	-7.60	-15.97	
40	75.15	5.95	-8.19	-19.66	
45	69.05	5.47	-8.68	-23.43	
50	63.95	5.07	-9.08	-27.24	
55	59.62	4.72	-9.42	-31.10	
60	55.89	4.43	-9.72	-34.99	
65	52.65	4.17	-9.98	-38.91	
70	49.79	3.94	-10.20	-42.85	
75	47.26	3.74	-10.40	-46.81	
90	41.11	3.26	-10.89	-58.81	
105	36.50	2.89	-11.26	-70.91	
120	32.89	2.61	-11.54	-83.09	
135	30.00	2.38	-11.77	-95.34	
150	27.61	2.19	-11.96	-107.64	

Proposed Multi-Storey Institutional Residence					
Novatech Project No. 123126					
Uncontrolled Runoff - 1:100 YR + 20% IDF Increase					
AREA A-6 Un-Controlled Runoff to Roadside Ditches					
OTTAWA IDF CURVE					
Area = 0.069 ha		Qallow = 17.0 L/s			
C = 0.41		Vol(max) = 0.0 m3			
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	291.24	23.08	6.10	1.83	
10	214.27	16.98	0.00	0.00	
15	171.47	13.59	-3.39	-3.05	
20	143.94	11.40	-5.57	-6.69	
25	124.62	9.87	-7.10	-10.65	
30	110.24	8.73	-8.24	-14.84	
35	99.09	7.85	-9.13	-19.16	
40	90.17	7.14	-9.83	-23.60	
45	82.86	6.57	-10.41	-28.11	
50	76.74	6.08	-10.90	-32.69	
55	71.55	5.67	-11.31	-37.32	
60	67.07	5.31	-11.66	-41.98	
65	63.18	5.01	-11.97	-46.69	
70	59.75	4.73	-12.24	-51.42	
75	56.71	4.49	-12.48	-56.18	
90	49.33	3.91	-13.07	-70.57	
105	43.80	3.47	-13.51	-85.09	
120	39.47	3.13	-13.85	-99.71	
135	36.00	2.85	-14.12	-114.41	
150	33.13	2.63	-14.35	-129.16	

Proposed Multi-Storey Institutional Residence				
Novatech Project No. 123126				
REQUIRED STORAGE - 1:2 YEAR EVENT				
AREA R-1 Controlled Roof Drain #1 (Typical per Drain)				
OTTAWA IDF CURVE				
Area =	0.024	ha	Qallow =	0.75 L/s
C =	0.90		Vol(max) =	3.0 m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	6.22	5.47	1.64
10	76.81	4.61	3.86	2.32
15	61.77	3.71	2.96	2.66
20	52.03	3.12	2.37	2.85
25	45.17	2.71	1.96	2.94
30	40.04	2.40	1.65	2.98
35	36.06	2.17	1.42	2.97
40	32.86	1.97	1.22	2.94
45	30.24	1.82	1.07	2.88
50	28.04	1.68	0.93	2.80
55	26.17	1.57	0.82	2.71
60	24.56	1.47	0.72	2.61
65	23.15	1.39	0.64	2.50
70	21.91	1.32	0.57	2.38
75	20.81	1.25	0.50	2.25
80	19.83	1.19	0.44	2.12
85	18.94	1.14	0.39	1.98
90	18.14	1.09	0.34	1.83

Proposed Multi-Storey Institutional Residence				
Novatech Project No. 123126				
REQUIRED STORAGE - 1:5 YEAR EVENT				
AREA R-1 Controlled Roof Drain #1 (Typical per Drain)				
OTTAWA IDF CURVE				
Area =	0.024	ha	Qallow =	0.79 L/s
C =	0.90		Vol(max) =	4.5 m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	8.48	7.69	2.31
10	104.19	6.26	5.47	3.28
15	83.56	5.02	4.23	3.80
20	70.25	4.22	3.43	4.11
25	60.90	3.66	2.87	4.30
30	53.93	3.24	2.45	4.41
35	48.52	2.91	2.12	4.46
40	44.18	2.65	1.86	4.47
45	40.63	2.44	1.65	4.45
50	37.65	2.26	1.47	4.41
55	35.12	2.11	1.32	4.35
60	32.94	1.98	1.19	4.28
65	31.04	1.86	1.07	4.19
70	29.37	1.76	0.97	4.09
75	27.89	1.67	0.88	3.98
80	26.56	1.59	0.80	3.86
85	25.37	1.52	0.73	3.74
90	24.29	1.46	0.67	3.61

Proposed Multi-Storey Institutional Residence				
Novatech Project No. 123126				
REQUIRED STORAGE - 1:100 YEAR EVENT				
AREA R-1 Controlled Roof Drain #1 (Typical per Drain)				
OTTAWA IDF CURVE				
Area =	0.024	ha	Qallow =	0.95 L/s
C =	1.00		Vol(max) =	10.0 m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	16.19	15.24	4.57
10	178.56	11.91	10.96	6.58
15	142.89	9.53	8.58	7.73
20	119.95	8.00	7.05	8.46
25	103.85	6.93	5.98	8.97
30	91.87	6.13	5.18	9.32
35	82.58	5.51	4.56	9.58
40	75.15	5.01	4.06	9.75
45	69.05	4.61	3.66	9.87
50	63.95	4.27	3.32	9.95
55	59.62	3.98	3.03	9.99
60	55.89	3.73	2.78	10.01
65	52.65	3.51	2.56	9.99
70	49.79	3.32	2.37	9.96
75	47.26	3.15	2.20	9.91
80	44.99	3.00	2.05	9.85
85	42.95	2.87	1.92	9.77
90	41.11	2.74	1.79	9.68

Proposed Multi-Storey Institutional Residence				
Novatech Project No. 123126				
REQUIRED STORAGE - 1:100 YEAR + 20%				
AREA R-1 Controlled Roof Drain #1 (Typical per Drain)				
OTTAWA IDF CURVE				
Area =	0.024	ha	Qallow =	0.95 L/s
C =	1.00		Vol(max) =	12.8 m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	19.43	18.48	5.54
10	214.27	14.30	13.35	8.01
15	171.47	11.44	10.49	9.44
20	143.94	9.60	8.65	10.38
25	124.62	8.31	7.36	11.05
30	110.24	7.36	6.41	11.53
35	99.09	6.61	5.66	11.89
40	90.17	6.02	5.07	12.16
45	82.86	5.53	4.58	12.36
50	76.74	5.12	4.17	12.51
55	71.55	4.77	3.82	12.62
60	67.07	4.48	3.53	12.69
65	63.18	4.22	3.27	12.73
70	59.75	3.99	3.04	12.75
75	56.71	3.78	2.83	12.75
80	53.99	3.60	2.65	12.73
85	51.54	3.44	2.49	12.69
90	49.33	3.29	2.34	12.64

Proposed Multi-Storey Institutional Residence Novatech Project No. 123126 Uncontrolled Runoff - 1:2 YEAR EVENT				
AREA PK-1 Uncontrolled Runoff from Parkland block to Existing Ditch				
OTTAWA IDF CURVE				
Area =	0.019	ha	Qallow =	0.8 L/s
C =	0.20		Vol(max) =	0.0 m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	1.09	0.28	0.08
10	76.81	0.81	0.00	0.00
15	61.77	0.65	-0.16	-0.14
20	52.03	0.55	-0.26	-0.31
25	45.17	0.48	-0.33	-0.50
30	40.04	0.42	-0.39	-0.70
35	36.06	0.38	-0.43	-0.90
40	32.86	0.35	-0.46	-1.11
45	30.24	0.32	-0.49	-1.33
50	28.04	0.30	-0.52	-1.55
55	26.17	0.28	-0.53	-1.77
60	24.56	0.26	-0.55	-1.99
65	23.15	0.24	-0.57	-2.21
70	21.91	0.23	-0.58	-2.44
75	20.81	0.22	-0.59	-2.66
80	19.83	0.21	-0.60	-2.89
85	18.94	0.20	-0.61	-3.12
90	18.14	0.19	-0.62	-3.35
95	17.41	0.18	-0.63	-3.58
100	16.75	0.18	-0.63	-3.81

Proposed Multi-Storey Institutional Residence Novatech Project No. 123126 Uncontrolled Runoff - 1:5 YEAR EVENT				
AREA PK-1 Uncontrolled Runoff from Parkland block to Existing Ditch				
OTTAWA IDF CURVE				
Area =	0.019	ha	Qallow =	1.1 L/s
C =	0.20		Vol(max) =	0.0 m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	1.49	0.39	0.12
10	104.19	1.10	0.00	0.00
15	83.56	0.88	-0.22	-0.20
20	70.25	0.74	-0.36	-0.43
25	60.90	0.64	-0.46	-0.69
30	53.93	0.57	-0.53	-0.96
35	48.52	0.51	-0.59	-1.24
40	44.18	0.47	-0.63	-1.52
45	40.63	0.43	-0.67	-1.81
50	37.65	0.40	-0.70	-2.11
55	35.12	0.37	-0.73	-2.41
60	32.94	0.35	-0.75	-2.71
65	31.04	0.33	-0.77	-3.01
70	29.37	0.31	-0.79	-3.32
75	27.89	0.29	-0.81	-3.63
80	26.56	0.28	-0.82	-3.94
85	25.37	0.27	-0.83	-4.25
90	24.29	0.26	-0.84	-4.56
95	23.31	0.25	-0.85	-4.87
100	22.41	0.24	-0.86	-5.18

Proposed Multi-Storey Institutional Residence Novatech Project No. 123126 Uncontrolled Runoff - 1:100 YEAR EVENT				
AREA PK-1 Uncontrolled Runoff from Parkland block to Existing Ditch				
OTTAWA IDF CURVE				
Area =	0.019	ha	Qallow =	2.4 L/s
C =	0.25		Vol(max) =	0.0 m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	3.20	0.85	0.25
10	178.56	2.36	0.00	0.00
15	142.89	1.89	-0.47	-0.42
20	119.95	1.58	-0.77	-0.93
25	103.85	1.37	-0.99	-1.48
30	91.87	1.21	-1.14	-2.06
35	82.58	1.09	-1.27	-2.66
40	75.15	0.99	-1.37	-3.28
45	69.05	0.91	-1.45	-3.90
50	63.95	0.84	-1.51	-4.54
55	59.62	0.79	-1.57	-5.18
60	55.89	0.74	-1.62	-5.83
65	52.65	0.70	-1.66	-6.48
70	49.79	0.66	-1.70	-7.14
75	47.26	0.62	-1.73	-7.80
80	44.99	0.59	-1.76	-8.47
85	42.95	0.57	-1.79	-9.13
90	41.11	0.54	-1.82	-9.80
95	39.43	0.52	-1.84	-10.47
100	37.90	0.50	-1.86	-11.14

Proposed Multi-Storey Institutional Residence Novatech Project No. 123126 Uncontrolled Runoff - 1:100 YR + 20% IDF Increase				
AREA PK-1 Uncontrolled Runoff from Parkland block to Existing Ditch				
OTTAWA IDF CURVE				
Area =	0.019	ha	Qallow =	2.8 L/s
C =	0.25		Vol(max) =	0.0 m3
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	3.85	1.02	0.30
10	214.27	2.83	0.00	0.00
15	171.47	2.26	-0.57	-0.51
20	143.94	1.90	-0.93	-1.11
25	124.62	1.65	-1.18	-1.78
30	110.24	1.46	-1.37	-2.47
35	99.09	1.31	-1.52	-3.19
40	90.17	1.19	-1.64	-3.93
45	82.86	1.09	-1.74	-4.69
50	76.74	1.01	-1.82	-5.45
55	71.55	0.94	-1.88	-6.22
60	67.07	0.89	-1.94	-7.00
65	63.18	0.83	-2.00	-7.78
70	59.75	0.79	-2.04	-8.57
75	56.71	0.75	-2.08	-9.36
80	53.99	0.71	-2.12	-10.16
85	51.54	0.68	-2.15	-10.96
90	49.33	0.65	-2.18	-11.76
95	47.32	0.62	-2.20	-12.57
100	45.48	0.60	-2.23	-13.37

Proposed Multi-Storey Institutional Storage Calculations Using Average Novatech Project No. 123126 Release Rate Equal to 50% of the Qpeak REQUIRED STORAGE - 1:2 YEAR EVENT					
AREA PK-2 Controlled Flows from Parkland Block					
OTTAWA IDF CURVE			Qpeak =	20.9	L/s
Area =	0.164	ha	Qavg =	10.5	L/s
C =	0.42		Vol(max) =	2.8	m3
(Vol calculated for Qallow-avg)					
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	103.57	19.72	9.27	2.78	
10	76.81	14.63	4.18	2.51	
15	61.77	11.76	1.31	1.18	
20	52.03	9.91	-0.54	-0.65	
25	45.17	8.60	-1.85	-2.77	
30	40.04	7.63	-2.82	-5.08	
35	36.06	6.87	-3.58	-7.52	
40	32.86	6.26	-4.19	-10.06	
45	30.24	5.76	-4.69	-12.67	
50	28.04	5.34	-5.11	-15.33	
55	26.17	4.98	-5.47	-18.04	
60	24.56	4.68	-5.77	-20.78	
65	23.15	4.41	-6.04	-23.56	
70	21.91	4.17	-6.28	-26.36	
75	20.81	3.96	-6.49	-29.19	
80	19.83	3.78	-6.67	-32.03	
85	18.94	3.61	-6.84	-34.90	
90	18.14	3.45	-7.00	-37.77	
95	17.41	3.32	-7.13	-40.66	
100	16.75	3.19	-7.26	-43.57	

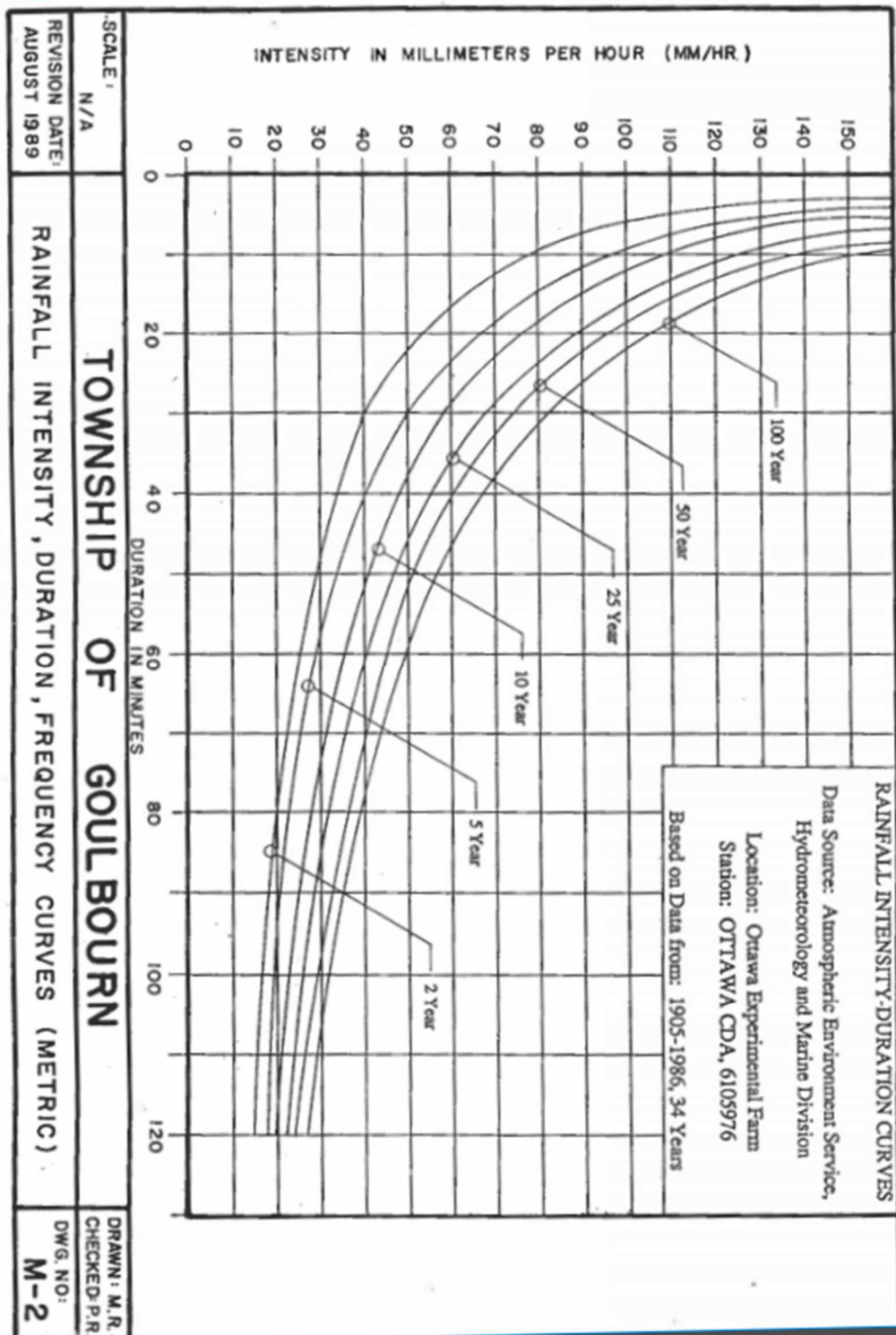
Proposed Multi-Storey Institutional R Storage Calculations Using Average Novatech Project No. 123126 Release Rate Equal to 50% of the Qpeak REQUIRED STORAGE - 1:5 YEAR EVENT				
AREA PK-2 Controlled Flows from Parkland Block				
OTTAWA IDF CURVE			Qpeak =	22.6 L/s
Area =	0.164	ha	Qavg =	11.3 L/s
C =	0.42		Vol(max) =	5.1 m3
(Vol calculated for Qallow-avg)				
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	26.88	15.58	4.68
10	104.19	19.84	8.54	5.12
15	83.56	15.91	4.61	4.15
20	70.25	13.38	2.08	2.49
25	60.90	11.60	0.30	0.44
30	53.93	10.27	-1.03	-1.86
35	48.52	9.24	-2.06	-4.33
40	44.18	8.41	-2.89	-6.93
45	40.63	7.74	-3.56	-9.62
50	37.65	7.17	-4.13	-12.39
55	35.12	6.69	-4.61	-15.22
60	32.94	6.27	-5.03	-18.10
65	31.04	5.91	-5.39	-21.01
70	29.37	5.59	-5.71	-23.97
75	27.89	5.31	-5.99	-26.95
80	26.56	5.06	-6.24	-29.96
85	25.37	4.83	-6.47	-32.99
90	24.29	4.63	-6.67	-36.04
95	23.31	4.44	-6.86	-39.11
100	22.41	4.27	-7.03	-42.20

Proposed Multi-Storey Institutional Storage Calculations Using Average Novatech Project No. 123126 Release Rate Equal to 50% of the Qpeak REQUIRED STORAGE - 1:100 YEAR EVENT					
AREA PK-2 Controlled Flows from Parkland Block					
OTTAWA IDF CURVE			Qpeak = 24.0 L/s		
Area =	0.164 ha		Qavg = 12.0 L/s		
C =	0.48		Vol(max) = 17.5 m3		
(Vol calculated for Qallow-avg)					
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)	
5	242.70	53.47	41.47	12.44	
10	178.56	39.34	27.34	16.40	
15	142.89	31.48	19.48	17.53	
20	119.95	26.43	14.43	17.31	
25	103.85	22.88	10.88	16.32	
30	91.87	20.24	8.24	14.83	
35	82.58	18.19	6.19	13.01	
40	75.15	16.56	4.56	10.93	
45	69.05	15.21	3.21	8.67	
50	63.95	14.09	2.09	6.27	
55	59.62	13.14	1.14	3.75	
60	55.89	12.31	0.31	1.13	
65	52.65	11.60	-0.40	-1.56	
70	49.79	10.97	-1.03	-4.33	
75	47.26	10.41	-1.59	-7.15	
80	44.99	9.91	-2.09	-10.02	
85	42.95	9.46	-2.54	-12.94	
90	41.11	9.06	-2.94	-15.89	
95	39.43	8.69	-3.31	-18.88	
100	37.90	8.35	-3.65	-21.90	

Proposed Multi-Storey Institutional R Storage Calculations Using Average Novatech Project No. 123126 Release Rate Equal to 50% of the Qpeak REQUIRED STORAGE - 1:100 YR + 20% IDF Increase				
AREA PK-2 Controlled Flows from Parkland Block				
OTTAWA IDF CURVE			Qpeak = 27.0 L/s	
Area = 0.164 ha			Qavg = 13.5 L/s	
C = 0.48			Vol(max) = 21.9 m3	
(Vol calculated for Qallow-avg)				
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	64.17	50.67	15.20
10	214.27	47.21	33.71	20.22
15	171.47	37.78	24.28	21.85
20	143.94	31.71	18.21	21.85
25	124.62	27.45	13.95	20.93
30	110.24	24.29	10.79	19.42
35	99.09	21.83	8.33	17.50
40	90.17	19.87	6.37	15.28
45	82.86	18.26	4.76	12.84
50	76.74	16.91	3.41	10.22
55	71.55	15.76	2.26	7.47
60	67.07	14.78	1.28	4.60
65	63.18	13.92	0.42	1.63
70	59.75	13.16	-0.34	-1.41
75	56.71	12.49	-1.01	-4.53
80	53.99	11.89	-1.61	-7.71
85	51.54	11.36	-2.14	-10.93
90	49.33	10.87	-2.63	-14.21
95	47.32	10.43	-3.07	-17.52
100	45.48	10.02	-3.48	-20.88

APPENDIX E

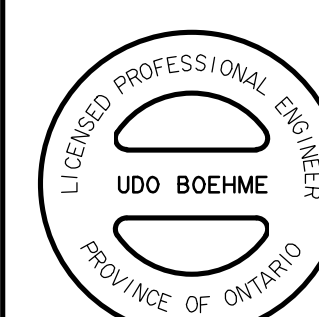
Township of Goulbourn IDF Curves, Storm Drainage Area Plan 97007-STM



Jun 11, 1997 - 15:45:36 DWG Name: K:\NOVA\97005\CONSTRUCTION\97005-STM.DWG Updated By: MSP

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMANS,
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
5.	REVISED EASEMENT LOTS 1-4	JUNE 11/97	ERD
4.	REVISED PER RMO COMMENTS	MAY 6/97	ERD
3.	ISSUED WITH STORM DRAINAGE REPORT	APR 22/97	ERD
2.	REVISED PER TOWNSHIP COMMENTS	APR 16/97	ERD
1.	ISSUED FOR COMMENTS	MAR 12/97	ERD



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DESIGN	ERD
CHECKED	UB
DRAWN	MSP
CHECKED	ERD
APPROVED	UB

SCALE	1 : 500
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TOWNSHIP OF GOULBOURN
MONARCH CONSTRUCTION LTD.
CROSSING BRIDGE-PHASE IIIB

STORM DRAINAGE PLAN

PROJECT No.	97005-I
DATE	JANUARY 1997
DRAWING No.	97005-STM

