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Proposed 6-Storey Residential Development 280 O'Connor Street, Ottawa

Development Servicing Study and Stormwater Management Report

PROPOSED 6-STOREY RESIDENTIAL DEVELOPMENT
280 O'CONNOR STREET

DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT

Prepared by:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
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August 9, 2019

Ref: R-2019-105
Novatech File No. 118074

August 9, 2019

Polo IV Properties Inc.
2120 Woodcrest Road
Ottawa, ON
K1H 6H8
c/o AK Global Management Inc.

Attention: Mr. Tony Kazarian

Dear Sir:

Re: Development Servicing Study and Stormwater Management Report
Proposed 6-Storey Residential Development
280 O'Connor Street, Ottawa, ON
Novatech File No.: 118074

Enclosed is a copy of the 'Development Servicing Study and Stormwater Management Report' for the proposed 6-storey residential development located at 280 O'Connor Street, in the City of Ottawa. This report addresses the approach to site servicing and stormwater management and is submitted in support of a site plan control application.

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

Yours truly,

NOVATECH

François Thauvette, P. Eng.
Senior Project Manager

cc: John Wu (City of Ottawa)
Junxiang Guan (Smith + Andersen)

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1.0 INTRODUCTION

The new 6-storey residential building is being proposed by Polo IV Properties Inc. and Novatech has been retained to complete the site servicing and stormwater management design for this project.

1.1 Purpose

This report addresses the approach to site servicing and stormwater management and is being submitted in support of a site plan control application.

1.2 Site Description and Location

The subject site is approximately 0.161 hectares in size and currently consists of three (3) multi-unit residential buildings with surface parking accessible off Gilmour Street. The properties (formerly 278 & 280 O'Connor Street and 347 Gilmour Street) will be merged into a single property to accommodate the proposed development. The subject site is located on the northwest corner of O'Connor and Gilmour Streets. Residential lots abut the property to the north, south and west. A multi-storey commercial tower and surface parking lot are located on the east side of O'Connor Street. The legal description of the subject site is designated as Lots 12 and 13 (West O'Connor Street) and Lot 43 (North Gilmour Street), Registered Plan 15558, City of Ottawa.

Figure 1 – **Aerial Plan** provides an aerial view of the site.

1.3 Pre-Consultation Information

A pre-consultation meeting was held with the City of Ottawa on February 5th, 2019, at which time the client was advised of the general submission requirements. Subsequent meetings were held with the City on March 28th and on May 2nd, 2019. Refer to **Appendix A** for a summary of the correspondence related to the proposed development.

Based on a review of **O. Reg. 525/98: Approval Exemptions**, a Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) is anticipated to be required because the storm flows from this site are ultimately being directed into a combined sewer in O'Connor Street. A pre-consultation meeting has not been held with the MECP.

The subject site is located within the jurisdiction of the Rideau Valley Conservation Authority (RVCA). Based on discussions with the RVCA, stormwater quality control will not be required for this development as the storm sewer flows are being directed into a combined sewer.

1.4 Proposed Development

The proposed development will consist of a new 6-storey residential building adjoining two (2) Heritage Houses facing O'Connor Street. The proposed 6-storey residential building will be serviced by extending new laterals to the municipal sanitary sewer, storm sewer and watermain in Gilmour Street. Barrier-free access to the proposed building will be provided off O'Connor and Gilmour Streets. Access to the underground parking levels will be provided off Gilmour Street. The Heritage Houses will be incorporated into the overall design of the site and will be serviced internally by the new building.

1.5 Reference Material

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

[1] The Geotechnical Investigation Report (Ref. No. PG4799-1, Rev. 1), prepared by Paterson Group on August 1, 2019.

2.0 SITE SERVICING

The objective of the site servicing design is to provide proper sewage outlets, a suitable domestic water supply and to ensure that appropriate fire protection is provided for the proposed development. The servicing criteria, the expected sewage flows, and the water demands are to conform to the City of Ottawa municipal design guidelines for sewer and water distribution systems. Refer to the subsequent sections of the report for further details.

The City of Ottawa Servicing Study Guidelines for Development Applications requires that a Development Servicing Study Checklist be included to confirm that each applicable item is deemed complete and ready for review by City of Ottawa Infrastructure Approvals. A completed checklist is enclosed in **Appendix B** of the report.

2.1 Sanitary Sewage

The proposed residential development will be serviced by a new 200mm dia. sanitary sewer connected to the existing 250mm dia. sanitary sewer in Gilmour Street.

The City of Ottawa design criteria were used to calculate the theoretical sanitary flows for the proposed development. The following design criteria were taken from Section 4 – 'Sanitary Sewer Systems' and Appendix 4-A - 'Daily Sewage Flow for Various Types of Establishments' of the City of Ottawa Sewer Design Guidelines:

Residential and Commercial Uses

- Residential Units (Studio or 1-Bedroom): 1.4 people per unit
- Residential Units (2-Bedroom): 2.1 people per unit
- Residential Units (3-Bedroom): 3.1 people per unit
- Residential Units (4-Bedroom): 3.4 people per unit
- Average Daily Residential Sewage Flow: 280 L/person/day
- Residential Peaking Factor = 3.6 (Harmon Equation)
- Infiltration Allowance: 0.33 L/s/ha x 0.161 ha site = 0.05 L/s

Table 1 identifies the theoretical sanitary flows for the proposed residential development based on the above design criteria.

Table 1: Theoretical Post-Development Sanitary Flows

Residential Use	Unit Count	Design Population	Average Flow (L/s)	Peaking Factor	Peak Flow (L/s)	Total Flow (L/s)
New Building						
Studio / 1-Bedroom	37	52	0.17	3.6	0.61	0.61
2-Bedroom	23	49	0.16	3.6	0.58	0.58
Heritage Houses						
1-Bedroom	3	5	0.02	3.6	0.07	0.07
3-Bedroom	1	4	0.01	3.6	0.04	0.04
4-Bedroom	1	4	0.01	3.6	0.04	0.04
Infiltration Allowance	-	-	-	-	-	0.05
Total	-	**114**	**0.37**	-	-	**1.39**

A 200mm dia. sanitary gravity sewer at a minimum slope of 1.0% has a full flow conveyance capacity of 34.2 L/s and will have enough capacity to convey the theoretical sanitary flows for the proposed development.

2.2 Water

The proposed residential development will be serviced by a new 150mm dia. water service connected to the existing 300mm dia. watermain in Gilmour Street. The water service has been sized to provide the required domestic water demand and fire flow. A shut-off valve will be provided on the proposed water service. The water meter will be located within the water entry room, with a remote meter on the exterior face of the building.

2.2.1 Domestic Water Demands and Watermain Analysis

The City of Ottawa design criteria were used to calculate the theoretical water demands for the proposed development. The following design criteria were taken from Section 4 – 'Water Distribution Systems' of the Ottawa Design Guidelines – Water Distribution:

- Residential Units (Studio or 1 Bedroom): 1.4 people per unit
- Residential Units (2 Bedroom): 2.1 people per unit
- Average Daily Residential Water Demand: 350 L/person/day (City Water Table 4.2)
- Maximum Day Demand Peaking Factor = 2.5 x Avg. Day Demand (City Water Table 4.2)
- Peak Hour Demand Peaking Factor = 2.2 x Max. Day Demand (City Water Table 4.2)

Table 2 identifies the theoretical domestic water demands for the development based on the above design criteria.

Table 2: Theoretical Water Demand for the Proposed Development

Residential Use	Unit Count	Design Population	Average Day Demand (L/s)	Max. Day Demand (L/s)	Peak Hour Demand (L/s)
New Building					
Studio / 1-Bedroom	37	52	0.21	0.53	1.16
2-Bedroom	23	49	0.20	0.50	1.10
Heritage Houses					
1-Bedroom	3	5	0.02	0.05	0.11
3-Bedroom	1	4	0.02	0.05	0.11
4-Bedroom	1	4	0.02	0.05	0.11
Total	-	**114**	**0.47**	**1.18**	**2.59**

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

Preliminary domestic water demands, and fire flow requirements were provided to the City of Ottawa. These values were used to generate the municipal watermain network boundary conditions. **Table 2.1** summarizes the watermain boundary conditions and the results of the hydraulic analysis related to the domestic demands. It is anticipated that a booster pump will likely be required to increase pressure to the upper floors of the building.

Table 2.1 : Hydraulic Boundary Condition Provided by the City

Municipal Watermain Boundary Condition	Boundary Condition	Domestic Demand (L/s)	Normal Operating Pressure Range (psi)	Design Pressure (psi)*
Minimum HGL (Peak Hour Demand)	106.9m	2.59	40 psi (min.)	50.1
Maximum HGL (Max Day Demand)	115.0m	1.18	50-70 psi	61.6
Max Day + Fire Flow HGL	107.3m	200 + 1.18	20 psi (min.)	50.7

*Based on a building floor elevation of 71.60m

As indicated above, the existing municipal watermain should provide adequate system pressures, within the normal operating pressure ranges specified by the City of Ottawa.

2.2.2 Water Supply for Fire-Fighting

The proposed building will be fully sprinklered and supplied with a fire department (siamese) connection. The siamese connection will be located on the south side of the building, within 45m of the existing municipal fire hydrant on the SE corner of Gilmour Street and Derby Place.

The Fire Underwriters Survey (FUS) was used to estimate fire flow requirements for the proposed building. Based on information provided by the architect, a 6-storey, sprinklered building, constructed using non-combustible materials was used in the calculations.

Table 2.2 summarizes the fire flow requirements for the proposed building, based on FUS calculations.

Table 2.2: Fire Flow Requirements for the Proposed Development

Type of Uses	Fire Flow Demand USGPM (L/s)
Proposed Residential Building	3,170 USGPM (200 L/s)

Refer to **Appendix C** for a copy of the preliminary FUS fire flow calculations and correspondence from the City of Ottawa.

The fire flow requirements include both sprinkler system and hose allowances in accordance with the OBC and NFPA 13. The sprinkler systems will be designed by the fire protection (sprinkler) contractor as this process involves detailed hydraulic calculations based on building layout, pipe runs, head losses, fire pump requirements, etc. Fire flow requirements calculated using the FUS method tend to generate higher values when compared to flows being calculated using the OBC and NFPA.

As discussed with the City of Ottawa during the design process, a multi-hydrant approach to fire-fighting is anticipated. There are 3 Class AA (blue bonnet) hydrants within 75m of the proposed development (one hydrant on the SE corner of Gilmour Street/Derby Place, another on the SE corner of Gilmour Street/O'Connor Street and a third hydrant across from the subject site on the east side of O'Connor Street. Based on the City of Ottawa Technical Bulletin ISTB-2018-02, Class AA (blue bonnet) hydrants have a minimum capacity 95 L/s (at a pressure of 20 PSI). The combined maximum flow from these hydrants will exceed the Max Day + Fire Flow requirement (201 L/s) of the proposed development. This multi-hydrant approach to fire-fighting

is in accordance with the City of Ottawa Technical Bulletin ISTB-2018-02. The existing municipal watermain network should therefore have adequate water supply for the proposed development and will provide adequate system pressures for both 'Max Day + Fire Flow' and 'Peak Hour' conditions, within the normal operating pressure ranges.

2.3 Storm Drainage and Stormwater Management

The proposed storm outlet for the site is the existing 525mm dia. storm sewer in Gilmour Street, which currently flows into a combined sewer in O'Connor Street. The proposed storm drainage and stormwater management design for the site is discussed in the following sections of the report.

2.3.1 Stormwater Management Criteria and Objectives

The stormwater management criteria and objectives for the site are as follows:

- Maximize the use of on-site storage on the building roof to minimize the size of the internal SWM storage tank.
- Provide best measures to attempt to control the post-development flows from the site to a target 2-year release rate specified by the City of Ottawa. Control post-development flows from the portion of the site being developed (i.e. new building, excluding Heritage Houses), for storms up to and including the 100-year design event.
- Minimize the impact on the existing combined sewer in O'Connor Street by reducing the post-development storm flows from the site, when compared to current conditions.
- Provide guidelines to ensure that site preparation and construction is in accordance with the current Best Management Practices for Erosion and Sediment Control.

2.3.2 Pre-Development Conditions and Allowable Release Rate

The uncontrolled pre-development flows from the 0.161 ha site were calculated using the Rational Method to be 37.4 L/s during the 1:5-year design event and 71.6 L/s during the 1:100-year design event. Refer to **Appendix D** for detailed calculations. There are currently no water quantity or water quality control measures being provided on site.

As specified by the City of Ottawa, the target allowable release rate from the site was calculated using the Rational Method, to be approximately 13.8 L/s, based on a 10-minute rainfall intensity, using a 2-year return period (City of Ottawa IDF Curves) and a runoff coefficient of 0.40.

T_c = 10 min C =0.40
I_{5yr} = 76.81 mm/hr A = 0.161 ha

Q_{allow} = 2.78 CIA
= 2.78 x 0.40 x 76.81 x 0.161
= 13.8 L/s

2.3.3 Post-Development Conditions

The proposed site will be serviced by connecting to the existing 525mm dia. storm sewer in Gilmour Street. As part of the stormwater management (SWM) strategy, stormwater runoff from the building roof will be attenuated using control flow roof drains. In addition to this, stormwater runoff from the lower roof terraces and ground level amenity areas will be directing to an internal stormwater storage tank and controlled prior to being discharged into the municipal sewer in

Gilmour Street. Due to the requirement to maintain and protect the existing Heritage Houses on the eastern portion of the property, runoff from the front yards will continue to sheet drain uncontrolled towards O'Connor Street. Similarly, runoff from the entrance to the underground parking and a portion of the side yard along Gilmour Street will sheet drain directly towards the municipal right-of-way. Refer to plan 118074-SWM for drainage areas and details.

2.3.3.1 Areas A-1 and A-2: Uncontrolled Direct Runoff

The runoff from these sub-catchment areas will flow overland towards the roadway catch basins in Gilmour and O'Connor Streets. The uncontrolled post-development flows from sub-catchment area A-1 were calculated using the Rational Method to be approximately 7.8 L/s during the 5-year design event and 15.0 L/s during the 100-year design event. Similarly, the uncontrolled post-development flows from sub-catchment area A-2 were calculated to be approximately 0.5 L/s during the 5-year design event and 0.9 L/s during the 100-year design event. Refer to **Appendix D** for detailed calculations.

2.3.3.2 Area R-1 – Controlled Flow from Building Roof

The post-development flow from this sub-catchment area will be attenuated by using seven (7) Watts adjustable 'Accutrol' control flow roof drains (model number RD-100-A-ADJ) prior to being directed to the proposed storm service.

Table 3 summarizes the post-development design flows from this sub-catchment area as well as the type of roof drains, the maximum anticipated ponding depths, storage volumes required, and storage volumes provided for both the 5-year and the 100-year design events.

Table 3: Design Flow and Roof Drain Table

Roof Drain ID & Drainage Area (ha)	Number of Roof Drains	Watts Roof Drain Model ID (Weir Opening)	Controlled Flow per Drain (L/s)		Approximate Ponding Depth Above Drains (m)		Storage Volume Required (m^3)		Max. Storage Available (m^3)
			5-Yr	100-Yr	5-Yr	100-Yr	5-Yr	100-Yr	
RD-1 (0.009 ha)	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.10	0.14	1.6	3.9	4.5
RD-2 (0.006 ha)	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.10	0.14	1.0	2.5	2.9
RD-3 (0.003 ha)	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.09	0.13	0.3	0.9	1.2
RD-4 (0.010 ha)	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.11	0.14	1.8	4.2	5.0
RD-5 (0.008 ha)	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.10	0.14	1.3	3.2	3.7
RD-6 (0.008 ha)	1	RD-100-A-ADJ (Closed)	0.32	0.32	0.10	0.14	1.3	3.1	3.4
RD-7 (0.017 ha)	1	RD-100-A-ADJ (1/4 Exposed)	0.79	0.87	0.10	0.13	2.6	6.3	8.4
Total Roof (0.061 ha)	**7**	**-**	**2.71**	**2.79**	**-**	**-**	**9.9**	**24.1**	**29.1**

Refer to **Appendix D** for detailed SWM calculations and to **Appendix E** for roof drain information. As indicated in the table above, the building roof will provide sufficient storage for both the 5-year and 100-year design events.

2.3.3.3 Area R-2: Controlled Flow from the Roof Terraces and Rear-Yard Amenity

Stormwater runoff from this sub-catchment area will be captured by the lower terrace drains and outdoor amenity area drains and directed to an internal stormwater storage tank. Stormwater collected within the storage tank will be pumped up to the proposed storm service and released into the existing storm sewer in Gilmour Street. A pump (designed by the mechanical consultant) is required to control flow from the tank to a maximum rate of 6.0 L/s (95 USGPM), which corresponds to the maximum allowable flow for this catchment area. It is anticipated that a "stand-by" pump will be provided for emergency and/or maintenance purposes. An emergency power supply will likely be provided. An emergency overflow pipe will also be installed by the mechanical contractor, from the top of the internal storage tank exiting the building through the existing foundation wall near the southeast corner of the site. The storm service will be equipped with a backflow prevention device to protect the building from any potential sewer back-ups.

Table 3.1 summarizes the post-development design flows and storage volumes for both the 5-year and 100-year design events.

Table 3.1: Internal Stormwater Storage Tank and Pumped Flow

Design Event	Post-Development Conditions		
	Pumped Design Flow (L/s)	Volume Required (m^3)	Volume Provided (m^3)
1:5 Year	6.0 L/s	5.3 m^3	>21.0 m^3
1:100 Year	6.0 L/s	15.7 m^3	
1:100 Year + 20% IDF increase	6.0 L/s	20.6 m^3	

As indicated in the table above, the internal stormwater storage tank will provide adequate storage for both the 5-year and 100-year design events, including an increased volume due to a 20% increase in rainfall intensity. Refer to **Appendix D** for detailed calculations.

2.3.3.4 Stormwater Flow Summary

Table 3.1 provides a summary of the total post-development flows from the site and compares them to the uncontrolled pre-development flows and target release rate specified by the City of Ottawa.

Table 3.1: Stormwater Flows Comparison Table

Design Event	Pre-Development Conditions		Post-Development Conditions					
	Uncontrolled Flow (L/s)	Target Release Rate (L/s)	A-1 Flow (L/s)	A-2 Flow (L/s)	R-1 Flow (L/s)	R-2 Flow (L/s)	Total Flow (L/s)	Reduction in Flow (L/s or %)*
5-Yr	37.4	13.8	7.8	0.5	2.7	6.0	17.0	20.4 or 55%
100-Yr	71.6	13.8	15.0	0.9	2.8	6.0	24.7	46.9 or 66%

*Reduced flow compared to uncontrolled pre-development conditions.

As indicated in the table above, both the 5-year and 100-year post-development flows from the site will exceed the target allowable release rate specified by the City of Ottawa. As discussed with the City during the design process, this is due to the uncontrolled direct runoff from area A-1 (Heritage Houses and front yards facing O'Connor Street that are being maintained and protected). Although the target release rate of 13.8 L/s is slightly exceeded, this still represents significant reductions in total site flow rate when compared to the respective pre-development conditions.

2.3.4 Stormwater Quality Control

The subject site is located within the jurisdiction of the Rideau Valley Conservation Authority (RVCA). Based on discussions with the RVCA, stormwater quality control will not be required for this development as the storm sewer in Gilmour Street flows directly into a combined sewer in O'Connor Street. Refer to **Appendix A** for a copy of the correspondence received from the RVCA.

3.0 SITE GRADING

The existing site is relatively flat, with elevations varying from approximately 72.0m near the northwest property corner down to approximately 71.3m near the southeast property corner at the intersection of O'Connor and Gilmour Streets. The existing site generally slopes in a south-easterly direction. The finished floor elevation (FFE) of the proposed residential building will be set at an elevation of 71.60m to tie into the existing sidewalk elevations along O'Connor and Gilmour Streets. The existing floor elevations of the Heritage Houses will be maintained at approximately 72.44m and 72.89m. The grades along the north and west property lines will be maintained. Refer to the enclosed Grading and Erosion & Sediment Control Plans (118074-GR) for details.

4.0 GEOTECHNICAL INVESTIGATIONS

A Geotechnical Investigation Report has been prepared by Paterson Group for the proposed project. Refer to the Geotechnical Report[1] for subsurface conditions, construction recommendations and geotechnical inspection requirements.

5.0 EROSION AND SEDIMENT CONTROL

To mitigate erosion and to prevent sediment from entering the storm sewer system, temporary erosion and sediment control measures will be implemented on-site during construction in accordance with the Best Management Practices for Erosion and Sediment Control. This includes the following temporary measures:

- Filter bags will be placed under the grates of nearby catchbasins, manholes and will remain in place until vegetation has been established and construction is completed.
- Silt fencing will be placed per OPSS 577 and OPSD 219.110 along the surrounding construction limits.
- Mud mats will be installed at the site entrances.
- Street sweeping and cleaning will be performed, as required, to suppress dust and to provide safe and clean roadways adjacent to the construction site.
- On-site dewatering is to be directed to a sediment trap and/or gravel splash pad and discharged safely to an approved outlet as directed by the engineer.

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

6.0 CONCLUSION

This report has been prepared in support of a site plan control application for the proposed residential development located at 280 O'Connor Street.

The conclusions are as follows:

- The proposed 6-storey residential building will be serviced by extending new laterals to the municipal sanitary sewer, storm sewer and watermain in Gilmour Street.
- The building will be sprinklered and supplied with a fire department siamese connection. The siamese connection will be located within 45m of the municipal fire hydrant at the intersection of Gilmour Street and Derby Place.
- The site flows from sub-catchment areas A-1 and A-2 will be uncontrolled. The flows from sub-catchment area R-1 will be attenuated using control flow roof drains, while flows from area R-2 will be directed to an internal SWM tank and controlled prior to being discharged into the municipal storm sewer system.
- The total post-development site flow will be approximately 17.0 L/s during the 5-year design event and 24.7 L/s during the 100-year event. Post-development flows will be reduced by approximately 20.4 L/s (or 55%) during the 5-year event and by as much as 46.9 L/s (or 66%) during the 100-year design event, when compared to current conditions.
- Regular inspection and maintenance of the building services, roof drains, internal SWM storage system, pumps and tank is recommended to ensure that the storm drainage system is clean and operational.
- Temporary erosion and sediment control measures are to be provided during construction.

It is recommended that the proposed site servicing and stormwater management design be approved for implementation.

NOVATECH

Prepared by:

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

Servicing Reviewed by:

François Thauvette, P. Eng.
Senior Project Manager

APPENDIX A

Correspondence

Francois Thauvette

From: Gauthier, Steve <Steve.Gauthier@ottawa.ca>
Sent: Friday, February 8, 2019 12:32 PM
To: Kayla Blakely
Subject: FW: 278-280 O'Connor, 347 Gilmour Follow Up Comments

Hi Kayla,

Please see below comments from Leslie Collins, the Heritage Planner who participated to the pre-consultation. Feel free to contact her directly should you have any questions.

Regards,

Steve Gauthier **RPP**
Planner | Urbaniste
Development Review | Examen des projets d'aménagement
Planning Department | Service de l'urbanisme
City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 27889
ottawa.ca/planning / ottawa.ca/urbanisme

From: Collins, Lesley
Sent: Wednesday, February 06, 2019 12:57 PM
To: Gauthier, Steve <Steve.Gauthier@ottawa.ca>
Subject: 278-280 O'Connor, 347 Gilmour Follow Up Comments

Hi Steve,

Here are some follow up heritage comments from yesterday's pre-consultation on 278-280 O'Connor and 347 Gilmour Street.

Process Comments

- These properties are Category 2 buildings in the Centretown Heritage Conservation District, designated under Part V of the Ontario Heritage Act. Any proposal to demolish, remove or alter any of these buildings requires approval under the Ontario Heritage Act.

- An application for demolition and alteration under the Ontario Heritage Act would be required for this proposal in addition to any Planning applications. The application would require Council approval after consultation with Built Heritage Sub-Committee and Planning Committee. The application form and requirements can be found on the City's website:
    - https://ottawa.ca/en/city-hall/planning-and-development/heritage-conservation/changes-heritage-properties

- A Cultural Heritage Impact Statement (CHIS) is also required for this project. The CHIS must examine the potential impacts of the proposed development on the designation properties and the cultural heritage value and attributes of the Centretown Heritage Conservation District. This would include addressing the rationale for full and partial demolition. If the applicant proceeds

with the application, their heritage consultant can contact me directly about the detailed requirements and background information for the CHIS. In general, the CHIS should follow the Council approved guidelines for these documents. These guidelines are available here:

- https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#guide-preparing-cultural-heritage-impact-statements

Comments on the Proposal

- Based on the information provided, heritage staff have significant concerns with the concept proposed for this site. The full and substantial demolition of three designated heritage buildings is not appropriate. If new development is to occur on this site it must be sensitive to the on-site context as well as the intact residential context on Gilmour Street to the south. Appropriate transitions must be provided and the buildings must be incorporated into any proposed development in a sensitive manner. I would suggest that the applicant/architect work closely with their heritage consultant to examine alternatives to the current proposal. Elements including full or substantial retention of the heritage buildings, use of compatible building materials, appropriate setbacks, linkages and landscape treatment should all be considered. Projects that include the successful integration of house-form heritage buildings into new residential developments include 417-419 Laurier Avenue East, 269-275 McLeod Street and 31 Russell Avenue. Larger projects that include retention and integration of heritage buildings in their entirety include 150 Elgin Street and 1140 Wellington Street West. These projects all illustrate what I was trying to convey by the use of the term meaningful incorporation.
- The proposal must consider the guidelines regarding integration of heritage buildings into new developments in Section 6.5 of the Centretown CDP and Section VII 5.5 of the Centretown Heritage Conservation District Guidelines.
- The designation of this site as four storeys in the Centretown Secondary Plan was clearly intended to ensure conservation of the buildings on the site while allowing for some intensification on the site.

If the proponent has any questions about the above or the heritage application process, please tell them to contact me.

Thanks,

Lesley

Lesley Collins, MCIP RPP
Heritage Planner II | Urbaniste responsable du patrimoine II
Heritage and Urban Design Branch|Dir du patrimoine & esthétique urbaine
Planning, Infrastructure and Economic Development Department |
Services de planification, d'infrastructure et de développement économique
City of Ottawa | Ville d'Ottawa
613.580.2424 ext. | poste 21586

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Francois Thauvette

From: Gauthier, Steve <Steve.Gauthier@ottawa.ca>
Sent: Thursday, July 4, 2019 11:28 AM
To: Kayla Blakely
Cc: Greg Mignon
Subject: RE: 278, 280 O'Connor Street and 347 Gilmour Street Submission list

Hi Kayla,

John indicated that his only comments were that given it is a combined sewer area, storm water management is to be C0.4, 2 year's storm to control up to 100 year's storm event, and MOE approval will be required.

Regards,

Steve Gauthier **RPP**
Planner | Urbaniste
Development Review | Examen des projets d'aménagement
Planning Department | **Service de l'urbanisme**
City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 27889
ottawa.ca/planning / ottawa.ca/urbanisme

From: Kayla Blakely <k.blakely@novatech-eng.com>
Sent: July 2, 2019 3:22 PM
To: Gauthier, Steve <Steve.Gauthier@ottawa.ca>
Cc: Greg Mignon <g.mignon@novatech-eng.com>
Subject: RE: 278, 280 O'Connor Street and 347 Gilmour Street Submission list

Hi Steve,

We wanted to touch base regarding the above proposal as we do not recall receiving any preliminary comments from engineering staff following our initial pre-consultation meeting of February 5th (other than the list of required studies and plans). Would it be possible to consult with John Wu and forward any engineering comments/requirements which should be considered in preparing our submission?

Thank you,

Kayla Blakely, Planner
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 | Fax: 613.254.5867

From: Gauthier, Steve <Steve.Gauthier@ottawa.ca>
Sent: Friday, March 8, 2019 2:57 PM
To: Kayla Blakely <k.blakely@novatech-eng.com>
Subject: 278, 280 O'Connor Street and 347 Gilmour Street Submission list

Hi Kayla,

My apologies for the delay.

I have to reiterate, in addition to the pre-consultation discussion and the comments you have already received from our Heritage Planner, that Development Review is of the opinion that a 9-storey height at this location is not justified.

Don't hesitate to contact me should you wish to further discuss.

Steve Gauthier **RPP**
Planner | Urbaniste
Development Review | Examen des projets d'aménagement
Planning Department | **Service de l'urbanisme**
City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 27889
ottawa.ca/planning / ottawa.ca/urbanisme

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This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

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APPLICANT'S STUDY AND PLAN IDENTIFICATION LIST

Legend: **S** indicates that the study or plan is required with application submission.
A indicates that the study or plan may be required to satisfy a condition of approval/draft approval.

For information and guidance on preparing required studies and plans refer to:

http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans

S/A	Number of copies	ENGINEERING		S/A	Number of copies
S	15	1. Site Servicing Plan	2. Site Servicing Study / Brief	S	3
S	15	3. Grade Control and Drainage Plan	4. Geotechnical Study / Slope Stability Study	S	3
		5. Composite Utility Plan	6. Groundwater Impact Study		
		7. Servicing Options Report	8. Wellhead Protection Study		
S	7	9. Transportation Impact Study / Brief	10.Erosion and Sediment Control Plan / Brief	S	3
S	3	11.Storm water Management Report / Brief	12.Hydro geological and Terrain Analysis		
		13.Hydraulic Water main Analysis	14.Noise / Vibration Study (If on-site stationary noise source)	S	3
		15.Roadway Modification Design Plan	16.Confederation Line Proximity Study		

S/A	Number of copies	PLANNING / DESIGN / SURVEY		S/A	Number of copies
		17.Draft Plan of Subdivision	18.Plan Showing Layout of Parking Garage		
		19.Draft Plan of Condominium	20.Planning Rationale	S	3
S	15	21.Site Plan	22.Minimum Distance Separation (MDS)		
		23.Concept Plan Showing Proposed Land Uses and Landscaping	24.Agrology and Soil Capability Study		
		25.Concept Plan Showing Ultimate Use of Land	26.Cultural Heritage Impact Statement		
S	15	27.Landscape Plan (showing existing trees)	28.Archaeological Resource Assessment Requirements: **S** (site plan) **A** (subdivision, condo)		
S	2	29.Survey Plan	30.Shadow Analysis	S	3
S	3	31.Architectural Building Elevation Drawings (dimensioned)	32.Design Brief (includes the Design Review Panel Submission Requirements)	S	3
S	3	33.Wind Analysis			

S/A	Number of copies	ENVIRONMENTAL		S/A	Number of copies
S	3	34.Phase 1 Environmental Site Assessment	35.Impact Assessment of Adjacent Waste Disposal/Former Landfill Site		
		36.Phase 2 Environmental Site Assessment (depends on the outcome of Phase 1)	37.Assessment of Landform Features		
		38.Record of Site Condition	39.Mineral Resource Impact Assessment		
		40.Tree Conservation Report	41.Environmental Impact Statement / Impact Assessment of Endangered Species		
		42.Mine Hazard Study / Abandoned Pit or Quarry Study			

S/A	Number of copies	ADDITIONAL REQUIREMENTS		S/A	Number of copies
		43.	44.		

Meeting Date: February 5, 2019

Application Type: Official Plan Amendment, Major Zoning By-law Amendment and Site Plan Control

File Lead (Assigned Planner): Steve Gauthier

Infrastructure Approvals Project Manager: John Wu

Site Address (Municipal Address): 278, 280 O'Connor Street and 347 Gilmour Street

*Preliminary Assessment: 1☐ 2☐ 3☐ 4☐ 5☐

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

It is important to note that the need for additional studies and plans may result during application review. If following the submission of your application, it is determined that material that is not identified in this checklist is required to achieve complete application status, in accordance with the Planning Act and Official Plan requirements, the Planning and Growth Management Department will notify you of outstanding material required within the required 30 day period. Mandatory pre-application consultation will not shorten the City's standard processing timelines, or guarantee that an application will be approved. It is intended to help educate and inform the applicant about submission requirements as well as municipal processes, policies, and key issues in advance of submitting a formal development application. This list is valid for one year following the meeting date. If the application is not submitted within this timeframe the applicant must again pre-consult with the Planning and Growth Management Department.

Francois Thauvette

From: Eric Lalande <eric.lalande@rvca.ca>
Sent: Friday, July 26, 2019 12:20 PM
To: Francois Thauvette
Cc: Steve Matthews
Subject: RE: 280 O'Connor St. - Residential Development - RVCA Pre-Consultation

Hi Francois,

That would be correct, the RVCA would have no quality control requirements for combined storm sewers, however, as part of your servicing report please confirm that the system is connected, As it is not showing in the information that I have available.

Thank you,

Eric Lalande, MCIP, RPP
Planner, Rideau Valley Conservation Authority
613-692-3571 x1137

From: Francois Thauvette <f.thauvette@novatech-eng.com>
Sent: Thursday, July 25, 2019 2:19 PM
To: Eric Lalande <eric.lalande@rvca.ca>
Cc: Steve Matthews <S.Matthews@novatech-eng.com>
Subject: 280 O'Connor St. - Residential Development - RVCA Pre-Consultation

Hi Eric,

We are working on a 6-storey residential development with underground parking located at 280 O'Connor Street (formerly the 278 & 280 O'Connor St. and 247 Gilmour St. properties). Although the proposed development will include on-site stormwater quantity control, we assume there will be no requirement for stormwater quality control as the storm sewer in Gilmour St. flows into a combined sewer in O'Connor Street. This has been our experience on other projects located within a combined sewer area, in the City of Ottawa

Please review and confirm if our assumption is correct.

Regards,

François Thauvette, P. Eng., Senior Project Manager | Land Development & Public Sector Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 219 | Cell: 613.276.0310 | Fax: 613.254.5867

APPENDIX B

Development Servicing Study Checklist

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

N/A ☐ Executive Summary (for larger reports only).

☑ Date and revision number of the report.

☑ Location map and plan showing municipal address, boundary, and layout of proposed development.

☑ Plan showing the site and location of all existing services.

☑ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.

☑ Summary of Pre-consultation Meetings with City and other approval agencies.

N/A ☐ Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.

☑ Statement of objectives and servicing criteria.

☑ Identification of existing and proposed infrastructure available in the immediate area.

☑ Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).

☑ Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.

N/A ☐ Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.

N/A ☐ Proposed phasing of the development, if applicable.

☑ Reference to geotechnical studies and recommendations concerning servicing.

☑ All preliminary and formal site plan submissions should have the following information:

- Metric scale
- North arrow (including construction North)
- Key plan
- Name and contact information of applicant and property owner
- Property limits including bearings and dimensions
- Existing and proposed structures and parking areas
- Easements, road widening and rights-of-way
- Adjacent street names

4.2 Development Servicing Report: Water

N/A ☐ Confirm consistency with Master Servicing Study, if available

☑ Availability of public infrastructure to service proposed development

☑ Identification of system constraints

☑ Identify boundary conditions

☑ Confirmation of adequate domestic supply and pressure

☑ Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.

N/A ☐ Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.

N/A ☐ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design

☑ Address reliability requirements such as appropriate location of shut-off valves

N/A ☐ Check on the necessity of a pressure zone boundary modification.

☑ Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range

☑ Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.

N/A ☐ Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.

☑ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.

☑ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

4.3 Development Servicing Report: Wastewater

☑ Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).

N/A ☐ Confirm consistency with Master Servicing Study and/or justifications for deviations.

☑ Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.

N/A ☐ Description of existing sanitary sewer available for discharge of wastewater from proposed development.

N/A ☐ Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)

N/A ☐ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.

☑ Description of proposed sewer network including sewers, pumping stations, and forcemains.

N/A ☐ Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).

N/A ☐ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.

N/A ☐ Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.

N/A ☐ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.

N/A ☐ Special considerations such as contamination, corrosive environment etc.

4.4 Development Servicing Report: Stormwater Checklist

☑ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)

☑ Analysis of available capacity in existing public infrastructure.

☑ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.

☑ Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.

☑ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.

☑ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.

N/A ☐ Set-back from private sewage disposal systems.

N/A ☐ Watercourse and hazard lands setbacks.

☑ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.

N/A ☐ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.

- [x] Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- [ ] N/A Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- [x] Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.
- [x] Any proposed diversion of drainage catchment areas from one outlet to another.
- [x] Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- [ ] N/A If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.
- [x] Identification of potential impacts to receiving watercourses
- [ ] N/A Identification of municipal drains and related approval requirements.
- [x] Descriptions of how the conveyance and storage capacity will be achieved for the development.
- [x] 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.
- [ ] N/A Inclusion of hydraulic analysis including hydraulic grade line elevations.
- [x] Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.
- [ ] N/A Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.
- [ ] N/A Identification of fill constraints related to floodplain and geotechnical investigation.

4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

NOTED ☐ Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.

NOTED ☐ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.

N/A ☐ Changes to Municipal Drains.

N/A ☐ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

4.6 Conclusion Checklist

☑ Clearly stated conclusions and recommendations

TBD ☐ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.

☑ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario

APPENDIX C

Water Demands, FUS Calculations and City of Ottawa Boundary Conditions

Francois Thauvette

From: Wu, John <John.Wu@ottawa.ca>
Sent: Friday, July 19, 2019 8:50 AM
To: Francois Thauvette
Subject: RE: 280 O'Connor Residential Development - Request for WM Boundary Conditions
Attachments: 280 Oconnor July 2019.pdf

Here is the result:

The following are boundary conditions, HGL, for hydraulic analysis at 280 O'Connor (zone 1W) assumed to be connected to the 305mm on Gilmour (see attached PDF for location).

Minimum HGL = 106.9m

Maximum HGL = 115.0m

MAxDay + FireFlow (200L/s)= 107.3m

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

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

John

From: Francois Thauvette <f.thauvette@novatech-eng.com>
Sent: July 17, 2019 9:41 AM
To: Wu, John <John.Wu@ottawa.ca>
Cc: Steve Matthews <S.Matthews@novatech-eng.com>
Subject: 280 O'Connor Residential Development - Request for WM Boundary Conditions

Hi John,

We are working on a proposed 6-storey residential development (including 2 heritage houses facing O'Connor Street), see attached geoOttawa map showing the proposed site location (formerly the 278 & 280 O'Connor St. & 347 Gilmour St. properties). We are sending you this e-mail to request watermain boundary conditions for a proposed water service

connection to the 300mm dia. WM along Gilmour Street. The anticipated water demands for the proposed development are as follows:

- Average Day Demand = 0.47 L/s
- Max. Day Demand = 1.18 L/s
- Peak Hour Demand = 2.59 L/s
- Max Daily + Fire Flow = 201 L/s (FUS fire flow of 200 L/s)*

*Based on a non-combustible, 6-storey building with an unsupervised sprinkler system, per the architectural design. See attached FUS calculation sheet for details.

Please note that we anticipate requiring a multi-hydrant approach to fire fighting. There are 3 Class AA (blue bonnet hydrants in close proximity to the proposed development (one hydrant on the SE corner of Gilmour St./Derby Place, another on the SE corner of Gilmour St./O'Connor St. and a third hydrant across from the subject site on the east side of O'Connor St.).

Regards,

François Thauvette, P. Eng., Senior Project Manager | Land Development & Public Sector Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 219 | Cell: 613.276.0310 | Fax: 613.254.5867

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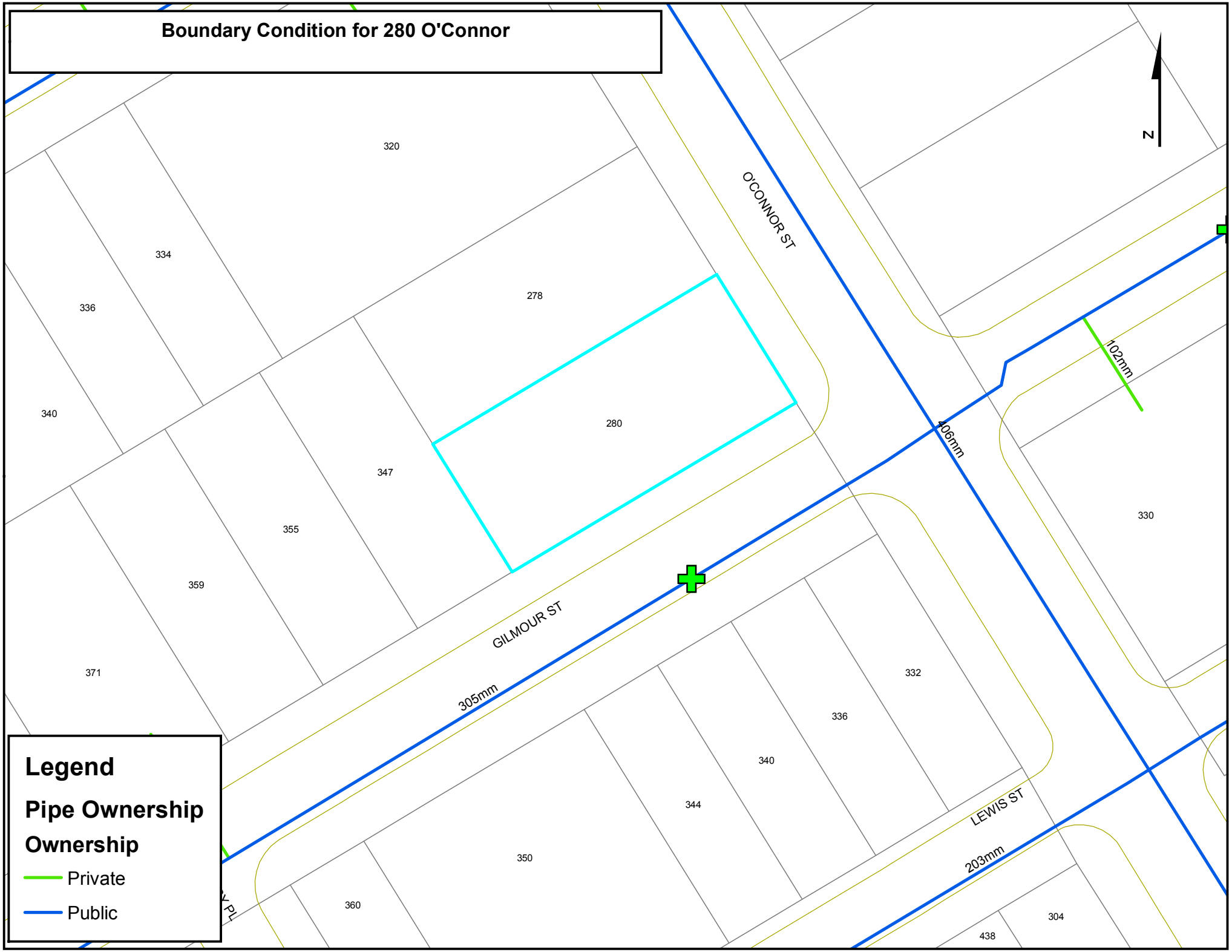

Boundary Condition for 280 O'Connor
N
O'CONNOR ST
GILMOUR ST
LEWIS ST
320
334
336
278
280
340
347
355
359
371
330
332
336
340
344
350
360
304
438
102mm
406mm
305mm
203mm
Legend
Pipe Ownership
Ownership
Private
Public

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 118074
Project Name: 280 O'Connor
Date: 7/16/2019
Input By: S.Matthews
Reviewed By: F.Thauvette

Legend: Input by User; No Information or Input Required

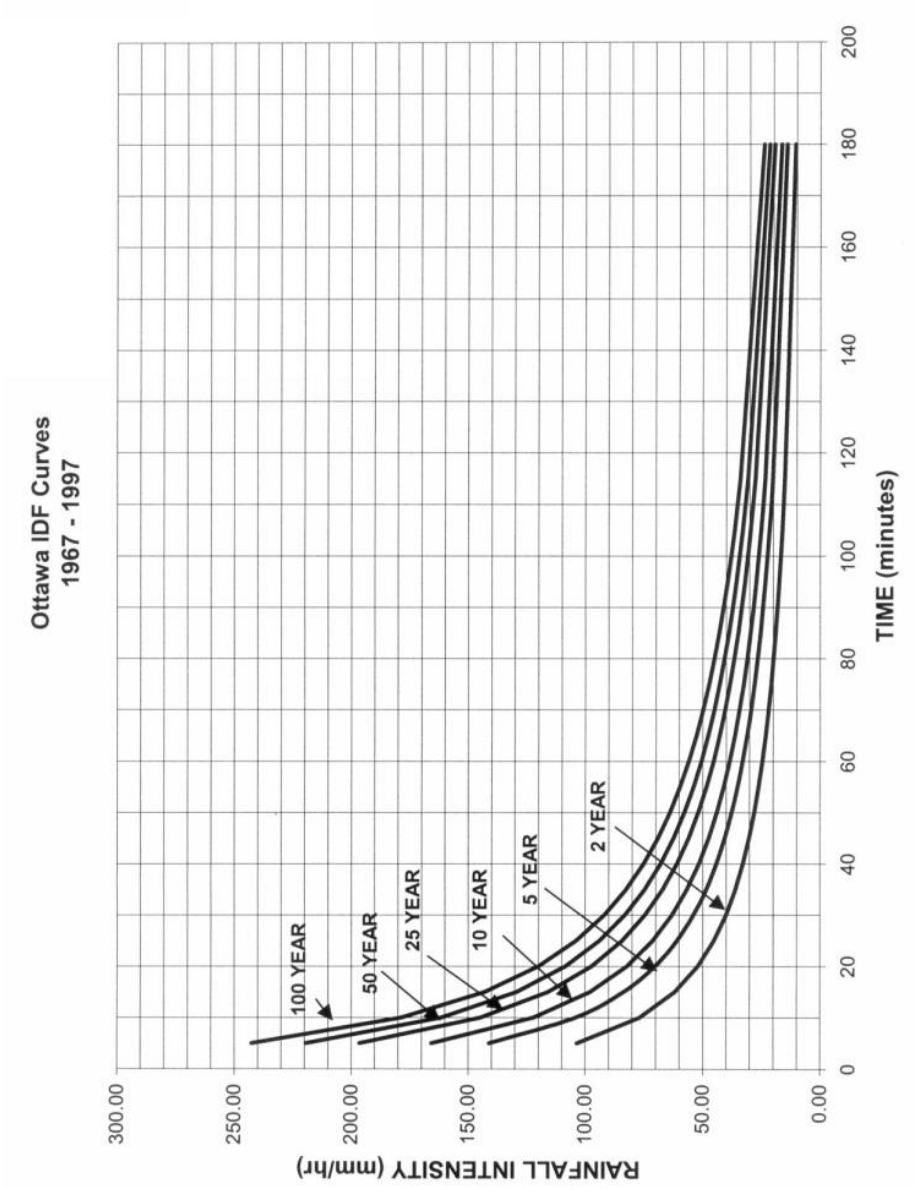
Building Description: 6-Storey Residential Building
Non-combustible construction

Step			Input		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Wood frame		1.5	0.8	
		Ordinary construction		1		
		Non-combustible construction	Yes	0.8		
		Modified Fire resistive construction (2 hrs)		0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	808.8			
		Number of Floors/Storeys	6			
		Area of structure considered (m^2)			**4,853**	
	F	**Base fire flow without reductions**				**12,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**10,200**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-4,080**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	No	-10%		
				Cumulative Total	**-40%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	10.1 - 20 m		15%	**5,610**
		East Side	20.1 - 30 m		10%	
		South Side	20.1 - 30 m		10%	
		West Side	3.1 - 10 m		20%	
				Cumulative Total	**55%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**12,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**200**
				or	USGPM	3,170
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	2.5
		Required Volume of Fire Flow (m^3)			m^3	1800

APPENDIX D

IDF Curves and SWM Calculations

APPENDIX 5-A OTTAWA INTENSITY DURATION FREQUENCY (IDF) CURVE



Proposed Residential Building
280 O'Connor Street

Pre - Development										
Description	Area (ha)	$A_{impervious}$ (ha) C=0.9	A_{gravel} (ha) C=0.6	$A_{pervious}$ (ha) C=0.2	Weighted C_{w5}	Weighted C_{w100}	1:5 Year Flow (L/s)	1:100 Year Flow (L/s)	Allowable C_{value}	Allowable Flow 2 year (L/s)
Total Site Area	0.161	0.136	0.004	0.021	0.80	0.90	37.4	71.6	0.4	13.8

Post - Development : Uncontrolled Site								
Area	Description	Area (ha)	A_{imp} (ha) C=0.9	A_{perv} (ha) C=0.2	C_5	C_{100}	Uncontrolled Flow (L/s) 5 year	Uncontrolled Flow (L/s) 100 year
A-1	Direct Runoff to O'Connor Street	0.040	0.027	0.013	0.67	0.76	7.8	15.0
A-2	Direct Runoff to Gilmour Street	0.003	0.001	0.002	0.53	0.60	0.5	0.9
R-1	Controlled Flow Roof Drains	0.061	0.061	0.000	0.90	1.00	15.9	30.3
R-2	Controlled Internal SWM Tank	0.057	0.057	0.000	0.90	1.00	14.9	28.3
	Summed Area Check:	0.161					T_c = 10mins	T_c = 10mins

Post - Development : Total Flows for Controlled Site + Uncontrolled Runoff						
Area	Description	Flow (L/s) 5 year	Flow (L/s) 100 year	Storage Required (m^3) 5 year	Storage Required (m^3) 100 year	Provided (m^3)
A-1	Direct Runoff to O'Connor Street	7.8	15.0	-	-	-
A-2	Direct Runoff to Gilmour Street	0.5	0.9	-	-	-
R-1	Controlled Flow Roof Drains	2.7	2.8	9.9	24.0	28.3
R-2	Controlled Internal SWM Tank	6.0	6.0	5.3	15.7	> 21.0
	Totals :	**17.0**	**24.7**	**15.2**	**39.7**	**28.3**
	Over Controlled:	-3.2	-10.9			

Proposed Residential Building
Novatech Project No. 118074
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-1 Direct Runoff to O'Connor Street

OTTAWA IDF CURVE

Area =	0.040	ha	Qallow =	7.8	L/s
C =	0.67		Vol(max) =	0.0	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	141.18	10.56	2.77	0.83
10	104.19	7.79	0.00	0.00
15	83.56	6.25	-1.54	-1.39
20	70.25	5.25	-2.54	-3.05
25	60.90	4.55	-3.24	-4.86
30	53.93	4.03	-3.76	-6.77
35	48.52	3.63	-4.16	-8.74
40	44.18	3.30	-4.49	-10.77
45	40.63	3.04	-4.75	-12.83
50	37.65	2.82	-4.98	-14.93
55	35.12	2.63	-5.17	-17.05
60	32.94	2.46	-5.33	-19.18
65	31.04	2.32	-5.47	-21.33
70	29.37	2.20	-5.60	-23.50
75	27.89	2.09	-5.71	-25.68
80	26.56	1.99	-5.81	-27.87
85	25.37	1.90	-5.89	-30.06
90	24.29	1.82	-5.98	-32.27

Proposed Residential Building
Novatech Project No. 118074
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-1 Direct Runoff to O'Connor Street

OTTAWA IDF CURVE

Area =	0.040	ha	Qallow =	15.0	L/s
C =	0.76		Vol(max) =	0.0	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	242.70	20.41	5.39	1.62
10	178.56	15.02	0.00	0.00
15	142.89	12.02	-3.00	-2.70
20	119.95	10.09	-4.93	-5.91
25	103.85	8.73	-6.28	-9.42
30	91.87	7.73	-7.29	-13.12
35	82.58	6.94	-8.07	-16.95
40	75.15	6.32	-8.70	-20.87
45	69.05	5.81	-9.21	-24.86
50	63.95	5.38	-9.64	-28.91
55	59.62	5.01	-10.00	-33.01
60	55.89	4.70	-10.32	-37.14
65	52.65	4.43	-10.59	-41.30
70	49.79	4.19	-10.83	-45.48
75	47.26	3.97	-11.04	-49.69
80	44.99	3.78	-11.23	-53.92
85	42.95	3.61	-11.40	-58.16
90	41.11	3.46	-11.56	-62.42

Proposed Residential Building
Novatech Project No. 118074
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-2 Uncontrolled Runoff to Gilmour Street

OTTAWA IDF CURVE

Area =	0.003	ha	Qallow =	0.5	L/s
C =	0.53		Vol(max) =	0.0	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	141.18	0.62	0.16	0.05
10	104.19	0.46	0.00	0.00
15	83.56	0.37	-0.09	-0.08
20	70.25	0.31	-0.15	-0.18
25	60.90	0.27	-0.19	-0.29
30	53.93	0.24	-0.22	-0.40
35	48.52	0.21	-0.24	-0.51
40	44.18	0.19	-0.26	-0.63
45	40.63	0.18	-0.28	-0.75
50	37.65	0.17	-0.29	-0.88
55	35.12	0.15	-0.30	-1.00
60	32.94	0.14	-0.31	-1.13
65	31.04	0.14	-0.32	-1.25
70	29.37	0.13	-0.33	-1.38
75	27.89	0.12	-0.34	-1.51
80	26.56	0.12	-0.34	-1.64
85	25.37	0.11	-0.35	-1.77
90	24.29	0.11	-0.35	-1.90

Proposed Residential Building
Novatech Project No. 118074
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-2 Uncontrolled Runoff to Gilmour Street

OTTAWA IDF CURVE

Area =	0.003	ha	Qallow =	0.9	L/s
C =	0.60		Vol(max) =	0.0	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	242.70	1.21	0.32	0.10
10	178.56	0.89	0.00	0.00
15	142.89	0.72	-0.18	-0.16
20	119.95	0.60	-0.29	-0.35
25	103.85	0.52	-0.37	-0.56
30	91.87	0.46	-0.43	-0.78
35	82.58	0.41	-0.48	-1.01
40	75.15	0.38	-0.52	-1.24
45	69.05	0.35	-0.55	-1.48
50	63.95	0.32	-0.57	-1.72
55	59.62	0.30	-0.60	-1.96
60	55.89	0.28	-0.61	-2.21
65	52.65	0.26	-0.63	-2.46
70	49.79	0.25	-0.64	-2.71
75	47.26	0.24	-0.66	-2.96
80	44.99	0.23	-0.67	-3.21
85	42.95	0.21	-0.68	-3.46
90	41.11	0.21	-0.69	-3.71

Proposed Residential Building
Novatech Project No. 118074
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2 Controlled Flow-Internal SWM Tank

OTTAWA IDF CURVE

Area = 0.057 ha Qallow = 6.0 L/s
C = 0.90 Vol(max) = 5.3 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	20.13	14.13	4.24
10	104.19	14.86	8.86	5.32
15	83.56	11.92	5.92	5.32
20	70.25	10.02	4.02	4.82
25	60.90	8.68	2.68	4.03
30	53.93	7.69	1.69	3.04
35	48.52	6.92	0.92	1.93
40	44.18	6.30	0.30	0.72
45	40.63	5.79	-0.21	-0.56
50	37.65	5.37	-0.63	-1.89
55	35.12	5.01	-0.99	-3.27
60	32.94	4.70	-1.30	-4.69
65	31.04	4.43	-1.57	-6.13
70	29.37	4.19	-1.81	-7.61
75	27.89	3.98	-2.02	-9.10
90	24.29	3.46	-2.54	-13.70
105	21.58	3.08	-2.92	-18.41
120	19.47	2.78	-3.22	-23.21
135	17.76	2.53	-3.47	-28.08
150	16.36	2.33	-3.67	-33.00

Proposed Residential Building
Novatech Project No. 118074
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2 Controlled Flow-Internal SWM Tank

OTTAWA IDF CURVE

Area = 0.057 ha Qallow = 6.0 L/s
C = 1.00 Vol(max) = 15.7 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	38.46	32.46	9.74
10	178.56	28.29	22.29	13.38
15	142.89	22.64	16.64	14.98
20	119.95	19.01	13.01	15.61
25	103.85	16.46	10.46	15.68
30	91.87	14.56	8.56	15.40
35	82.58	13.09	7.09	14.88
40	75.15	11.91	5.91	14.18
45	69.05	10.94	4.94	13.34
50	63.95	10.13	4.13	12.40
55	59.62	9.45	3.45	11.38
60	55.89	8.86	2.86	10.29
65	52.65	8.34	2.34	9.14
70	49.79	7.89	1.89	7.94
75	47.26	7.49	1.49	6.70
90	41.11	6.51	0.51	2.78
105	36.50	5.78	-0.22	-1.36
120	32.89	5.21	-0.79	-5.67
135	30.00	4.75	-1.25	-10.10
150	27.61	4.38	-1.62	-14.62

Proposed Residential Building
Novatech Project No. 118074
REQUIRED STORAGE - 1:100 YR + 20% IDF Increase
AREA R-2 Controlled Flow-Internal SWM Tank

OTTAWA IDF CURVE

Area = 0.057 ha Qallow = 6.0 L/s
C = 1.00 Vol(max) = 20.6 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	46.15	40.15	12.05
10	214.27	33.95	27.95	16.77
15	171.47	27.17	21.17	19.05
20	143.94	22.81	16.81	20.17
25	124.62	19.75	13.75	20.62
30	110.24	17.47	11.47	20.64
35	99.09	15.70	9.70	20.38
40	90.17	14.29	8.29	19.89
45	82.86	13.13	7.13	19.25
50	76.74	12.16	6.16	18.48
55	71.55	11.34	5.34	17.61
60	67.07	10.63	4.63	16.66
65	63.18	10.01	4.01	15.64
70	59.75	9.47	3.47	14.56
75	56.71	8.99	2.99	13.44
90	49.33	7.82	1.82	9.81
105	43.80	6.94	0.94	5.92
120	39.47	6.26	0.26	1.84
135	36.00	5.70	-0.30	-2.40
150	33.13	5.25	-0.75	-6.75

Proposed Residential Building
Novatech Project No. 118074
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drain #1**

OTTAWA IDF CURVE

Area =	0.009	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	3.18	2.86	0.86
10	104.19	2.35	2.03	1.22
15	83.56	1.88	1.56	1.41
20	70.25	1.58	1.26	1.51
25	60.90	1.37	1.05	1.58
30	53.93	1.21	0.89	1.61
35	48.52	1.09	0.77	1.62
40	44.18	0.99	0.67	1.62
45	40.63	0.91	0.59	1.61
50	37.65	0.85	0.53	1.58
55	35.12	0.79	0.47	1.55
60	32.94	0.74	0.42	1.52
65	31.04	0.70	0.38	1.48
70	29.37	0.66	0.34	1.43
75	27.89	0.63	0.31	1.39
90	24.29	0.55	0.23	1.23
105	21.58	0.49	0.17	1.05
120	19.47	0.44	0.12	0.85

Proposed Residential Building
Novatech Project No. 118074
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drain #1**

OTTAWA IDF CURVE

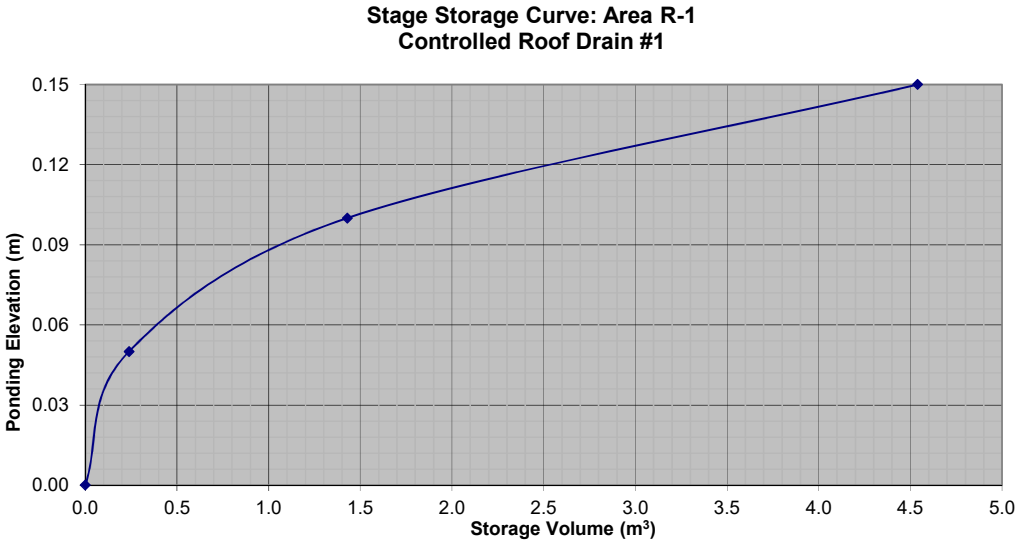
Area =	0.009	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	3.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	6.07	5.75	1.73
10	178.56	4.47	4.15	2.49
15	142.89	3.58	3.26	2.93
20	119.95	3.00	2.68	3.22
25	103.85	2.60	2.28	3.42
30	91.87	2.30	1.98	3.56
35	82.58	2.07	1.75	3.67
40	75.15	1.88	1.56	3.74
45	69.05	1.73	1.41	3.80
50	63.95	1.60	1.28	3.84
55	59.62	1.49	1.17	3.87
60	55.89	1.40	1.08	3.88
65	52.65	1.32	1.00	3.89
70	49.79	1.25	0.93	3.89
75	47.26	1.18	0.86	3.88
90	41.11	1.03	0.71	3.83
105	36.50	0.91	0.59	3.74
120	32.89	0.82	0.50	3.62

Watts Accutrol Flow Control Roof Drains:		RD-100-A-ADJ set to Closed			
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3) Required**	**Provided**
1:5 Year	0.32	0.32	10	1.6	4.5
1:100 Year	0.32	0.32	14	3.9	4.5

Roof Drain Storage Table for Area RD 1

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	9.53	0.2
0.10	38.11	1.4
0.15	86.32	4.5



Proposed Residential Building
Novatech Project No. 118074
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drain #2**

OTTAWA IDF CURVE

Area =	0.006	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.26	1.94	0.58
10	104.19	1.67	1.35	0.81
15	83.56	1.34	1.02	0.92
20	70.25	1.12	0.80	0.97
25	60.90	0.98	0.66	0.98
30	53.93	0.86	0.54	0.98
35	48.52	0.78	0.46	0.96
40	44.18	0.71	0.39	0.93
45	40.63	0.65	0.33	0.89
50	37.65	0.60	0.28	0.85
55	35.12	0.56	0.24	0.80
60	32.94	0.53	0.21	0.75
65	31.04	0.50	0.18	0.69
70	29.37	0.47	0.15	0.63
75	27.89	0.45	0.13	0.57
90	24.29	0.39	0.07	0.37
105	21.58	0.35	0.03	0.16
120	19.47	0.31	-0.01	-0.06

Proposed Residential Building
Novatech Project No. 118074
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drain #2**

OTTAWA IDF CURVE

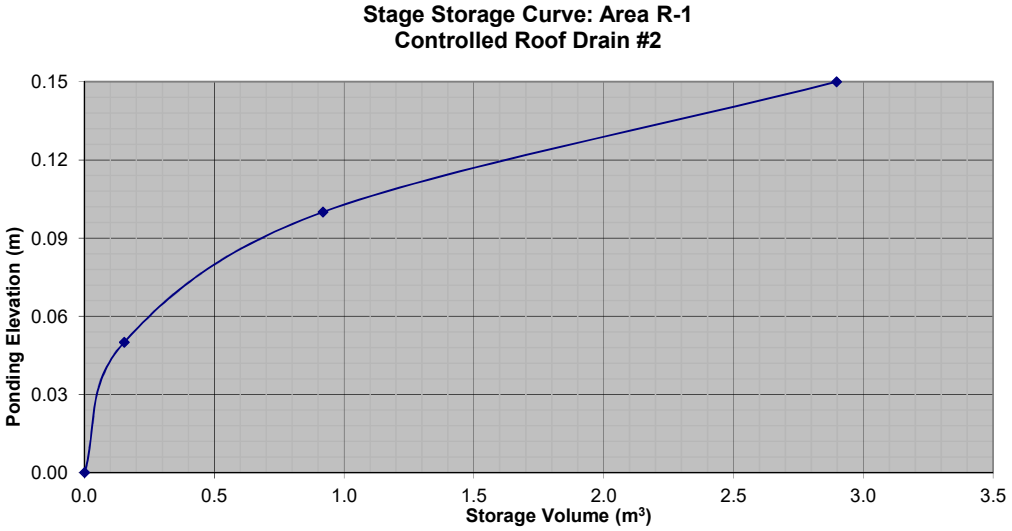
Area =	0.006	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	2.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	4.32	4.00	1.20
10	178.56	3.18	2.86	1.71
15	142.89	2.54	2.22	2.00
20	119.95	2.13	1.81	2.18
25	103.85	1.85	1.53	2.29
30	91.87	1.63	1.31	2.37
35	82.58	1.47	1.15	2.41
40	75.15	1.34	1.02	2.44
45	69.05	1.23	0.91	2.45
50	63.95	1.14	0.82	2.45
55	59.62	1.06	0.74	2.44
60	55.89	0.99	0.67	2.43
65	52.65	0.94	0.62	2.41
70	49.79	0.89	0.57	2.38
75	47.26	0.84	0.52	2.34
90	41.11	0.73	0.41	2.22
105	36.50	0.65	0.33	2.07
120	32.89	0.59	0.27	1.91

Watts Accutrol Flow Control Roof Drains:		RD-100-A-ADJ set to Closed			
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3) Required**	**Provided**
1:5 Year	0.32	0.32	10	1.0	2.9
1:100 Year	0.32	0.32	14	2.5	2.9

Roof Drain Storage Table for Area RD 2

Elevation	Area RD 2	Total Volume
m	m^2	m^3
0.00	0	0
0.05	6.12	0.2
0.10	24.49	0.9
0.15	54.68	2.9



Proposed Residential Building
Novatech Project No. 118074
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drain #3**

OTTAWA IDF CURVE

Area =	0.003	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	1.13	0.81	0.24
10	104.19	0.83	0.51	0.31
15	83.56	0.67	0.35	0.31
20	70.25	0.56	0.24	0.29
25	60.90	0.49	0.17	0.25
30	53.93	0.43	0.11	0.20
35	48.52	0.39	0.07	0.14
40	44.18	0.35	0.03	0.08
45	40.63	0.33	0.01	0.01
50	37.65	0.30	-0.02	-0.06
55	35.12	0.28	-0.04	-0.13
60	32.94	0.26	-0.06	-0.20
65	31.04	0.25	-0.07	-0.28
70	29.37	0.24	-0.08	-0.36
75	27.89	0.22	-0.10	-0.44
90	24.29	0.19	-0.13	-0.68
105	21.58	0.17	-0.15	-0.93
120	19.47	0.16	-0.16	-1.18

Proposed Residential Building
Novatech Project No. 118074
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drain #3**

OTTAWA IDF CURVE

Area =	0.003	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	0.9	m3

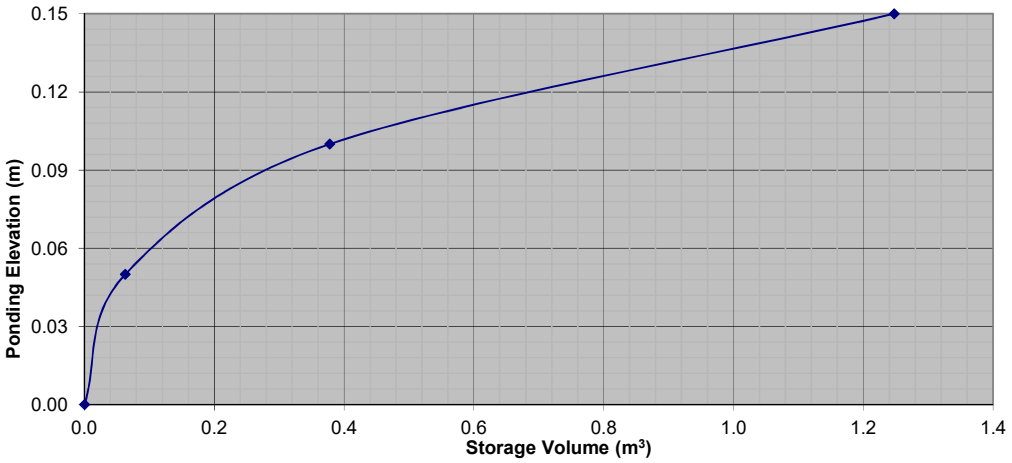
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	2.16	1.84	0.55
10	178.56	1.59	1.27	0.76
15	142.89	1.27	0.95	0.86
20	119.95	1.07	0.75	0.90
25	103.85	0.92	0.60	0.91
30	91.87	0.82	0.50	0.90
35	82.58	0.73	0.41	0.87
40	75.15	0.67	0.35	0.84
45	69.05	0.61	0.29	0.79
50	63.95	0.57	0.25	0.75
55	59.62	0.53	0.21	0.69
60	55.89	0.50	0.18	0.64
65	52.65	0.47	0.15	0.58
70	49.79	0.44	0.12	0.52
75	47.26	0.42	0.10	0.45
90	41.11	0.37	0.05	0.25
105	36.50	0.32	0.00	0.03
120	32.89	0.29	-0.03	-0.20

Watts Accutrol Flow Control Roof Drains:		RD-100-A-ADJ set to Closed			
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3) Required**	**Provided**
1:5 Year	0.32	0.32	9	0.3	1.2
1:100 Year	0.32	0.32	13	0.9	1.2

Roof Drain Storage Table for Area RD 3

Elevation	Area RD 3	Total Volume
m	m^2	m^3
0.00	0	0
0.05	2.52	0.1
0.10	10.08	0.4
0.15	24.7	1.2

Stage Storage Curve: Area R-1
Controlled Roof Drain #3



Proposed Residential Building
Novatech Project No. 118074
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drain #4**

OTTAWA IDF CURVE

Area =	0.010	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	3.39	3.07	0.92
10	104.19	2.50	2.18	1.31
15	83.56	2.01	1.69	1.52
20	70.25	1.69	1.37	1.64
25	60.90	1.46	1.14	1.71
30	53.93	1.30	0.98	1.76
35	48.52	1.17	0.85	1.78
40	44.18	1.06	0.74	1.78
45	40.63	0.98	0.66	1.77
50	37.65	0.90	0.58	1.75
55	35.12	0.84	0.52	1.73
60	32.94	0.79	0.47	1.70
65	31.04	0.75	0.43	1.66
70	29.37	0.71	0.39	1.62
75	27.89	0.67	0.35	1.57
90	24.29	0.58	0.26	1.42
105	21.58	0.52	0.20	1.25
120	19.47	0.47	0.15	1.06

Proposed Residential Building
Novatech Project No. 118074
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drain #4**

OTTAWA IDF CURVE

Area =	0.010	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	4.2	m3

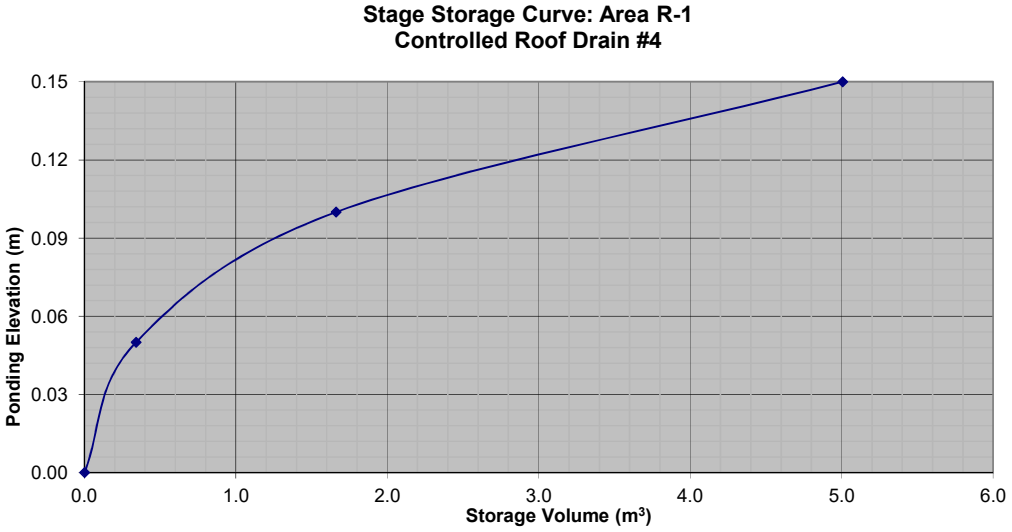
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	6.48	6.16	1.85
10	178.56	4.77	4.45	2.67
15	142.89	3.81	3.49	3.14
20	119.95	3.20	2.88	3.46
25	103.85	2.77	2.45	3.68
30	91.87	2.45	2.13	3.84
35	82.58	2.20	1.88	3.96
40	75.15	2.01	1.69	4.05
45	69.05	1.84	1.52	4.11
50	63.95	1.71	1.39	4.16
55	59.62	1.59	1.27	4.20
60	55.89	1.49	1.17	4.22
65	52.65	1.41	1.09	4.23
70	49.79	1.33	1.01	4.24
75	47.26	1.26	0.94	4.24
90	41.11	1.10	0.78	4.20
105	36.50	0.97	0.65	4.12
120	32.89	0.88	0.56	4.02

Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.32	0.32	11	1.8	5.0
1:100 Year	0.32	0.32	14	4.2	5.0

Roof Drain Storage Table for Area RD 4

Elevation	Area RD 4	Total Volume
m	m^2	m^3
0.00	0	0
0.05	13.64	0.3
0.10	39.21	1.7
0.15	94.56	5.0



Proposed Residential Building
Novatech Project No. 118074
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drain #5**

OTTAWA IDF CURVE

Area =	0.008	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.72	2.40	0.72
10	104.19	2.01	1.69	1.01
15	83.56	1.61	1.29	1.16
20	70.25	1.35	1.03	1.24
25	60.90	1.17	0.85	1.28
30	53.93	1.04	0.72	1.29
35	48.52	0.93	0.61	1.29
40	44.18	0.85	0.53	1.27
45	40.63	0.78	0.46	1.25
50	37.65	0.73	0.41	1.22
55	35.12	0.68	0.36	1.18
60	32.94	0.63	0.31	1.13
65	31.04	0.60	0.28	1.08
70	29.37	0.57	0.25	1.03
75	27.89	0.54	0.22	0.98
90	24.29	0.47	0.15	0.80
105	21.58	0.42	0.10	0.60
120	19.47	0.38	0.06	0.40

Proposed Residential Building
Novatech Project No. 118074
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drain #5**

OTTAWA IDF CURVE

Area =	0.008	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	3.2	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	5.20	4.88	1.46
10	178.56	3.82	3.50	2.10
15	142.89	3.06	2.74	2.46
20	119.95	2.57	2.25	2.70
25	103.85	2.22	1.90	2.85
30	91.87	1.97	1.65	2.96
35	82.58	1.77	1.45	3.04
40	75.15	1.61	1.29	3.09
45	69.05	1.48	1.16	3.13
50	63.95	1.37	1.05	3.15
55	59.62	1.28	0.96	3.16
60	55.89	1.20	0.88	3.16
65	52.65	1.13	0.81	3.15
70	49.79	1.07	0.75	3.13
75	47.26	1.01	0.69	3.11
90	41.11	0.88	0.56	3.02
105	36.50	0.78	0.46	2.91
120	32.89	0.70	0.38	2.77

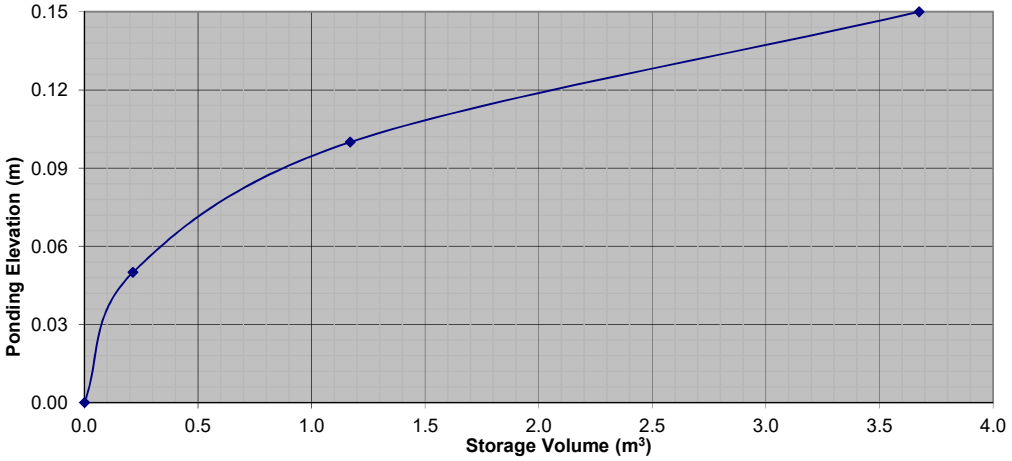
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.32	0.32	10	1.3	3.7
1:100 Year	0.32	0.32	14	3.2	3.7

Roof Drain Storage Table for Area RD 5

Elevation	Area RD 5	Total Volume
m	m^2	m^3
0.00	0	0
0.05	8.55	0.2
0.10	29.72	1.2
0.15	70.44	3.7

Stage Storage Curve: Area R-1
Controlled Roof Drain #5



Proposed Residential Building
Novatech Project No. 118074
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drain #6**

OTTAWA IDF CURVE

Area =	0.008	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.68	2.36	0.71
10	104.19	1.98	1.66	1.00
15	83.56	1.59	1.27	1.14
20	70.25	1.34	1.02	1.22
25	60.90	1.16	0.84	1.26
30	53.93	1.03	0.71	1.27
35	48.52	0.92	0.60	1.27
40	44.18	0.84	0.52	1.25
45	40.63	0.77	0.45	1.22
50	37.65	0.72	0.40	1.19
55	35.12	0.67	0.35	1.15
60	32.94	0.63	0.31	1.10
65	31.04	0.59	0.27	1.05
70	29.37	0.56	0.24	1.00
75	27.89	0.53	0.21	0.95
90	24.29	0.46	0.14	0.77
105	21.58	0.41	0.09	0.57
120	19.47	0.37	0.05	0.36

Proposed Residential Building
Novatech Project No. 118074
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drain #6**

OTTAWA IDF CURVE

Area =	0.008	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	3.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	5.13	4.81	1.44
10	178.56	3.77	3.45	2.07
15	142.89	3.02	2.70	2.43
20	119.95	2.53	2.21	2.66
25	103.85	2.19	1.87	2.81
30	91.87	1.94	1.62	2.92
35	82.58	1.74	1.42	2.99
40	75.15	1.59	1.27	3.04
45	69.05	1.46	1.14	3.08
50	63.95	1.35	1.03	3.09
55	59.62	1.26	0.94	3.10
60	55.89	1.18	0.86	3.10
65	52.65	1.11	0.79	3.09
70	49.79	1.05	0.73	3.07
75	47.26	1.00	0.68	3.05
90	41.11	0.87	0.55	2.96
105	36.50	0.77	0.45	2.84
120	32.89	0.70	0.38	2.70

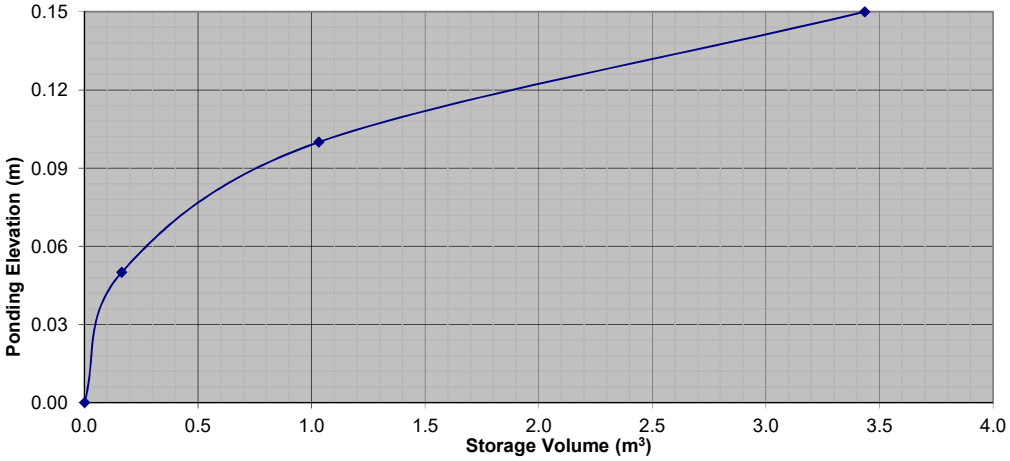
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.32	0.32	10	1.3	3.4
1:100 Year	0.32	0.32	14	3.1	3.4

Roof Drain Storage Table for Area RD 6

Elevation	Area RD 6	Total Volume
m	m^2	m^3
0.00	0	0
0.05	6.57	0.2
0.10	28.14	1.0
0.15	67.99	3.4

Stage Storage Curve: Area R-1
Controlled Roof Drain #6



Proposed Residential Building
Novatech Project No. 118074
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drain #7**

OTTAWA IDF CURVE

Area =	0.017	ha	Qallow =	0.79	L/s
C =	0.90		Vol(max) =	2.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	5.90	5.11	1.53
10	104.19	4.35	3.56	2.14
15	83.56	3.49	2.70	2.43
20	70.25	2.94	2.15	2.57
25	60.90	2.54	1.75	2.63
30	53.93	2.25	1.46	2.63
35	48.52	2.03	1.24	2.60
40	44.18	1.85	1.06	2.53
45	40.63	1.70	0.91	2.45
50	37.65	1.57	0.78	2.35
55	35.12	1.47	0.68	2.24
60	32.94	1.38	0.59	2.11
65	31.04	1.30	0.51	1.98
70	29.37	1.23	0.44	1.84
75	27.89	1.17	0.38	1.69
90	24.29	1.01	0.22	1.21
105	21.58	0.90	0.11	0.70
120	19.47	0.81	0.02	0.17

Proposed Residential Building
Novatech Project No. 118074
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drain #7**

OTTAWA IDF CURVE

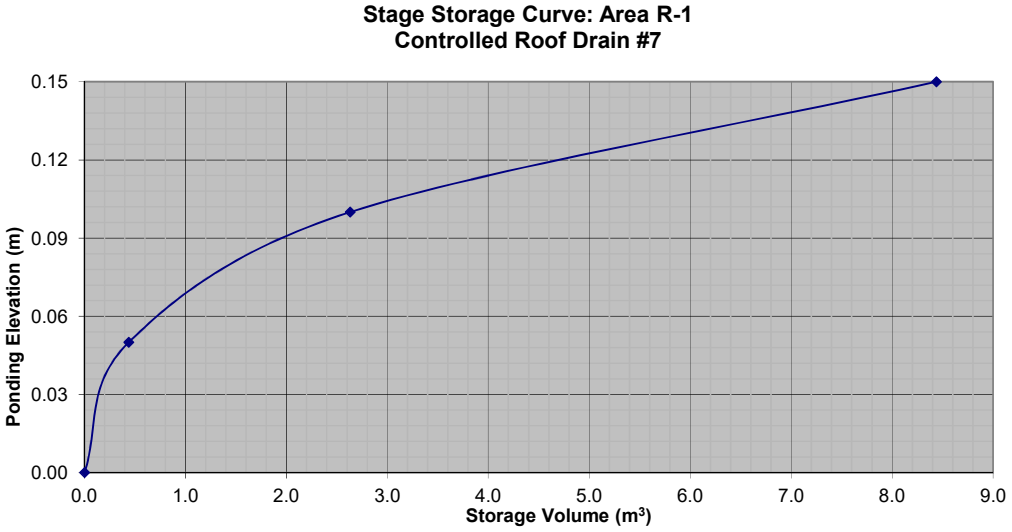
Area =	0.017	ha	Qallow =	0.87	L/s
C =	1.00		Vol(max) =	6.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	11.27	10.40	3.12
10	178.56	8.29	7.42	4.45
15	142.89	6.63	5.76	5.19
20	119.95	5.57	4.70	5.64
25	103.85	4.82	3.95	5.93
30	91.87	4.27	3.40	6.11
35	82.58	3.83	2.96	6.22
40	75.15	3.49	2.62	6.28
45	69.05	3.21	2.34	6.31
50	63.95	2.97	2.10	6.30
55	59.62	2.77	1.90	6.26
60	55.89	2.59	1.72	6.21
65	52.65	2.44	1.57	6.14
70	49.79	2.31	1.44	6.05
75	47.26	2.19	1.32	5.96
90	41.11	1.91	1.04	5.61
105	36.50	1.69	0.82	5.19
120	32.89	1.53	0.66	4.73

Watts Accutrol Flow Control Roof Drains:		RD-100-A-ADJ set to 1/4 Exposed			
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3) Required**	**Provided**
1:5 Year	0.79	0.79	10	2.6	8.4
1:100 Year	0.87	0.87	13	6.3	8.4

Roof Drain Storage Table for Area RD 7

Elevation	Area RD 7	Total Volume
m	m^2	m^3
0.00	0	0
0.05	17.55	0.4
0.10	70.19	2.6
0.15	162.03	8.4



APPENDIX E

Control Flow Rood Drain Information

WATTS®	Adjustable Accutrol Weir Tag: RD-100-A-ADJ	Adjustable Flow Control for Roof Drains

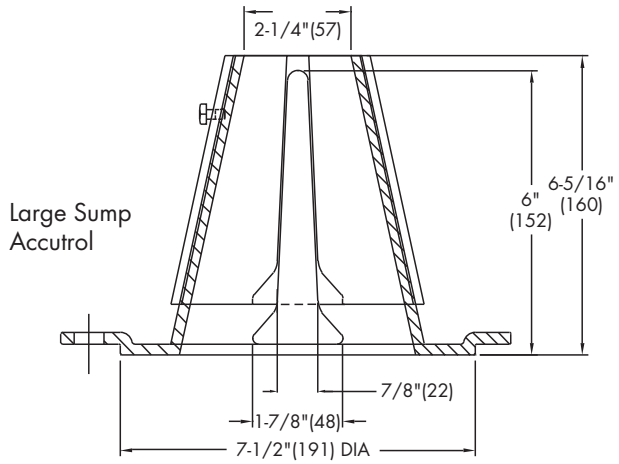
ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

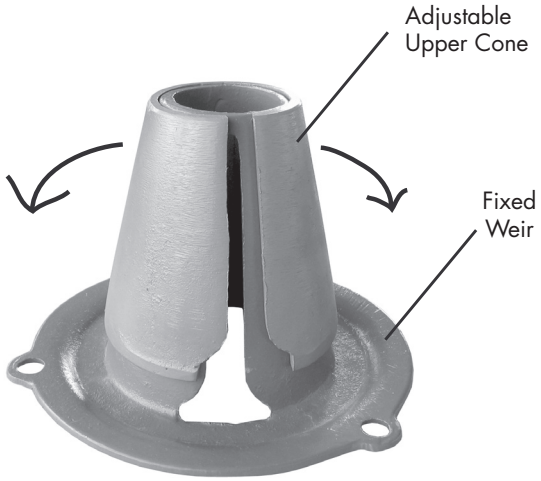
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the flow rate for depths over 2" of head, set the slot in the adjustable upper cone according to the flow rate required. Refer to Table 1 below.
Note: Flow rates are directly proportional to the amount of weir opening that is exposed.

EXAMPLE:

For example, if the adjustable upper cone is set to cover 1/2 of the weir opening, flow rates above 2"of head will be restricted to 2-1/2 gpm per inch of head.

Therefore, at 3"of head, the flow rate through the Accutrol Weir that has 1/2 the slot exposed will be:
[5 gpm (per inch of head) x 2 inches of head] + 2-1/2 gpm (for the third inch of head) = 12-1/2 gpm.





1/2 Weir Opening Exposed Shown Above

TABLE 1. Adjustable Accutrol Flow Rate Settings

Weir Opening Exposed	1"	2"	3"	4"	5"	6"
	Flow Rate (gallons per minute)					
Fully Exposed	5	10	15	20	25	30
3/4	5	10	13.75	17.5	21.25	25
1/2	5	10	12.5	15	17.5	20
1/4	5	10	11.25	12.5	13.75	15
Closed	5	5	5	5	5	5

Job Name _____ Contractor _____

Job Location _____ Contractor's P.O. No. _____

Engineer _____ Representative _____

USA: Tel: (800) 338-2581 • Fax: (828) 248-3929 • Watts.com
Canada: Tel: (905) 332-4090 • Fax: (905) 332-7068 • Watts.ca
Latin America: Tel: (52) 81-1001-8600 • Fax: (52) 81-8000-7091 • Watts.com

WATTS®
A Watts Water Technologies Company

LEGEND

PROPERTY LINE	
PROPOSED SANITARY SERVICE	
PROPOSED STORM SERVICE	
RD ○ PROPOSED CONTROLLED FLOW ROOF DRAIN	
DD □ PROPOSED DECK DRAIN	
(M) (IM) PROPOSED WATER METER AND REMOTE METER	
PROPOSED BARRIER CURB	
DC PROPOSED DEPRESSED CURB	
150mmØ PROPOSED WATER SERVICE AND DIAMETER	
VB PROPOSED VALVE & VALVE BOX	
PROPOSED CAP	
PROPOSED BUILDING ENTRANCE	
X REMOVALS	
THERMAL INSULATION FOR SHALLOW SEWERS	
PROPOSED FENCE / GUARD	
PROPOSED SITE LIGHTING	
OHW	EXISTING OVERHEAD WIRES
	EXISTING CONCRETE CURB
SANMH	EXISTING SANITARY MANHOLE & SEWER
CBMH	EXISTING CATCHBASIN MANHOLE
STMMH	EXISTING STORM MANHOLE & SEWER
CB	EXISTING CATCHBASIN C/W CATCHBASIN LEAD
HYD V&VB	EXISTING HYDRANT & VALVE
	EXISTING TREES / VEGETATION
EX UP	EXISTING UTILITY POLE
	EXISTING FENCE
300mmØ WM	EXISTING WATERMAIN
HYD	EXISTING HYDRANT C/W VALVE & LEAD
FFE	FINISHED FLOOR ELEVATION
T/FND	TOP OF FOUNDATION WALL ELEVATION
USF	UNDERSIDE OF FOOTING ELEVATION

GENERAL NOTES:

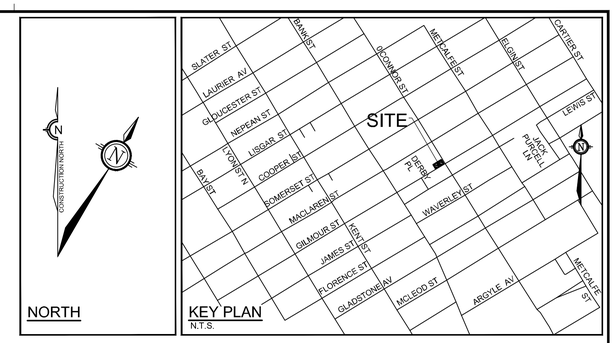
1. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
2. DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING.
3. OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
4. BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR $5,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.
5. RESTORE ALL DISTURBED AREAS ON-SITE AND OFF-SITE, INCLUDING TRENCHES AND SURFACES ON PUBLIC ROAD ALLOWANCES TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTION OF MUNICIPAL AUTHORITIES.
6. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL, ORGANIC MATERIAL AND DEBRIS UNLESS OTHERWISE INSTRUCTED BY ENGINEER. EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL. ALL CONTAMINATED MATERIAL SHALL BE DISPOSED OF AT A LICENSED LANDFILL FACILITY.
7. ALL ELEVATIONS ARE GEODETIC.
8. REFER TO GEOTECHNICAL INVESTIGATION (PG4799-1), DATED AUGUST 1, 2019, PREPARED BY PATERSON GROUP FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
9. REFER TO ARCHITECT'S AND LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILDING AND HARD SURFACED AREAS AND DIMENSIONS.
10. REFER TO THE 'DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT' (R-2019-105) PREPARED BY NOVATECH.
11. SAW CUT AND KEYGRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE-IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).

SEWER NOTES:

1. SUPPLY AND CONSTRUCT ALL SEWERS AND APPURTENANCES IN ACCORDANCE WITH THE MOST CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS.
2. SPECIFICATIONS:

ITEM	SPEC. No.
STORM SERVICE	PVC DR 35
SANITARY SERVICE	PVC DR 35
SEWER TRENCH - BEDDING (GRANULAR 'A')	
COVER (GRANULAR 'A' OR GRANULAR 'B' TYPE I WITH MAXIMUM PARTICLE SIZE=25mm)	

3. THE SANITARY SERVICE LATERAL SHALL BE EQUIPPED WITH BACKFLOW PREVENTERS WITHIN THE BUILDING FOOTPRINT AS PER CITY OF OTTAWA STANDARD DETAILS S14.1 OR S14.2. REFER TO MECHANICAL PLANS FOR DETAILS.
4. PIPE BEDDING, COVER AND BACKFILL ARE TO BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY. THE USE OF CLEAR CRUSHED STONE AS A BEDDING LAYER SHALL NOT BE PERMITTED.
5. INSULATE ALL SEWER PIPES THAT HAVE LESS THAN 1.5m COVER WITH UP TO 125mm THICK HI-40 RIGID INSULATION.
6. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GENERAL PLAN OF SERVICES INDICATING ALL APPLICABLE SERVICING AS-BUILT INFORMATION SHOWN ON THIS PLAN. AS-BUILT INFORMATION MUST INCLUDE: PIPE MATERIAL, SIZES, LENGTHS, SLOPES, INVERT AND T/G ELEVATIONS, STRUCTURE LOCATIONS AND ANY ALIGNMENT CHANGES, ETC.
7. THE OWNER SHALL REQUIRE THAT THE SITE SERVICING CONTRACTOR PERFORM FIELD TESTS FOR QUALITY CONTROL OF ALL SANITARY SEWERS. LEAKAGE TESTING SHALL BE COMPLETED IN ACCORDANCE WITH OPSS 410.07.16, 410.07.16.04 AND 407.07.24. DYE TESTING IS TO BE COMPLETED ON ALL SANITARY SERVICES TO CONFIRM PROPER CONNECTION TO THE SANITARY SEWER MAIN. THE FIELD TESTS SHALL BE PERFORMED IN THE PRESENCE OF A CERTIFIED PROFESSIONAL ENGINEER WHO SHALL SUBMIT A CERTIFIED COPY OF THE TEST RESULTS.



WATERMAIN NOTES:

1. SUPPLY AND CONSTRUCT ALL WATERMAIN AND APPURTENANCES IN ACCORDANCE WITH THE MOST CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS.
2. SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
WATERMAIN TRENCHING	W17	CITY OF OTTAWA
THERMAL INSULATION IN SHALLOW TRENCHES	W22	CITY OF OTTAWA
THERMAL INSULATION BY OPEN STRUCTURES	W23	CITY OF OTTAWA
WATERMAIN CROSSING BELOW SEWERS	W25	CITY OF OTTAWA
WATERMAIN MATERIAL		PVC DR 18 (100mm AND LARGER)

3. EXCAVATION, INSTALLATION, BACKFILL AND RESTORATION OF ALL WATERMAINS BY THE CONTRACTOR. CONNECTIONS AND SHUT-OFFS AT THE MAIN AND CHLORINATION OF THE WATER SYSTEM SHALL BE PERFORMED BY CITY OFFICIALS. EXCAVATION, INSTALLATION OF SERVICE, BACKFILL AND RESTORATION BY THE CONTRACTOR.
4. WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE UNLESS OTHERWISE INDICATED.
5. PROVIDE MINIMUM 0.5m CLEARANCE BETWEEN OUTSIDE OF PIPES AT ALL CROSSINGS, UNLESS OTHERWISE INDICATED.
6. WATER SERVICE IS TO BE CONSTRUCTED TO WITHIN 1.0m OF FOUNDATION WALL AND CAPPED, UNLESS OTHERWISE INDICATED.

PROPOSED 150mmØ WATER SERVICE TABLE

STATION	SURFACE ELEVATION	T/WM ELEVATION	COMMENTS
0+00	71.20±	68.60± *	150mmØ WM CONNECTION TO EX. 300mmØ WM
0+01.4	71.18	68.76	CROSS ABOVE EX. BELL LINE
0+02.4	71.17	68.87 **	CROSS ABOVE 250mmØ SAN (±0.4m CLEARANCE)
0+03.9	71.15	68.82	CROSS BELOW 525mmØ STM (±0.8m CLEARANCE)
0+05.9	71.12	68.72	CROSS BELOW ABANDONED GAS
0+06.5	71.11	68.71	CROSS BELOW ABANDONED GAS
0+07.1	71.10	68.70	CROSS BELOW ABANDONED GAS
0+11.4	71.38	68.70	PROPERTY LINE / 150mmØ V&VB
0+11.8	71.40	68.70	CAP 0.5m FROM FOUNDATION WALL

* CONNECTION TO EXISTING 300mmØ WATERMAIN. EXACT ELEVATIONS TO BE FIELD DETERMINED.

** PROVIDE THERMAL INSULATION AS PER CITY OF OTTAWA DETAIL W22 IN SHALLOW TRENCHES AND/OR CITY OF OTTAWA DETAIL W23 ADJACENT TO OPEN STRUCTURES.

ROOF DRAIN TABLE: AREA R-1 (ROOF DRAINS 1 to 7)

AREA ID *	ROOF DRAIN No. (WATTS MODEL)	ROOF DRAIN OPENING SETTING	1:5 YEAR RELEASE RATE	APPROX. 5 YR PONDING DEPTH	1:100 YEAR RELEASE RATE	APPROX. 100 YR PONDING DEPTH
R-1	RD 1 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-1	RD 2 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-1	RD 3 (RD-100-A-ADJ)	CLOSED	0.32 L/s	9 cm	0.32 L/s	13 cm
R-1	RD 4 (RD-100-A-ADJ)	CLOSED	0.32 L/s	11 cm	0.32 L/s	14 cm
R-1	RD 5 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-1	RD 6 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-1	RD 7 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	10 cm	0.87 L/s	13 cm

* REFER TO THE 'DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT' (R-2019-105) PREPARED BY NOVATECH FOR DRAINAGE AREA IDENTIFIERS AND STORMWATER MANAGEMENT DETAILS.

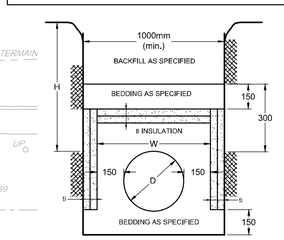
**ALL CONTROLLED FLOW ROOF DRAINS FOR THE PROPOSED BUILDING TO BE WATTS 'ADJUSTABLE ACCUTROL' ROOF DRAINS.

INTERNAL SWM STORAGE SYSTEM

DESIGN EVENT	STORAGE SYSTEM CONTROLLED FLOW	STORAGE VOLUMES REQUIRED	STORAGE VOLUMES PROVIDED
1:5 YR	6.0 L/s	5.3 m³	> 21.0 m³
1:100 YR	6.0 L/s	15.7 m³	
1:100+20%	6.0 L/s	20.6 m³	

NOTES:

1. ALL DRAINAGE FROM AREA R-2 (PROPOSED AMENITY AREA DECK DRAINS AND ALL PATIO DRAINS) TO BE DIRECTED TO THE INTERNAL STORMWATER STORAGE SYSTEM. REFER TO THE ARCHITECTURAL AND MECHANICAL PLANS FOR DETAILS.
2. REFER TO ARCHITECTURAL AND STRUCTURAL PLANS FOR EXACT SIZE AND DETAILS OF INTERNAL STORMWATER STORAGE SYSTEM.
3. REFER TO ARCHITECTURAL AND MECHANICAL PLANS FOR LOCATION AND CONNECTIONS AND DETAILS OF THE INTERNAL STORMWATER STORAGE SYSTEM.



ti = THICKNESS OF INSULATION (mm)
h = DEPTH OF COVER
W = D + 300 (1000 min.)
W = WIDTH OF INSULATION (mm)
D = O.D. OF PIPE (mm)

COVER (mm)	INSULATION THICKNESS (mm)
1500-1200	75
1200-900	100
900-600	125

INSULATION NOTES:

1. THE THICKNESS OF SEWER INSULATION SHALL BE THE EQUIVALENT OF 25mm FOR EVERY 300mm REDUCTION IN THE REQUIRED DEPTH OF COVER LESS THAN 1500mm (SEE TABLE BELOW)

INSULATION DETAIL FOR SHALLOW SEWERS
NOT TO SCALE

SITE BENCHMARK
FIRE HYDRANT
Top of Spindle
Elevation=71.89

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

OWNER INFORMATION
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No.	REVISION	DATE	BY
1	ISSUED FOR SITE PLAN APPROVAL	AUG 9/19	FST

SCALE 1:150 (1:150 0 2 4 6)

DESIGN SM | CHECKED FST | DRAWN BF / SM | CHECKED FST | APPROVED FST

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER F.S. THAUVETTE 100041399 Aug 9, 2019 PROVINCE OF ONTARIO

NOVATECH
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Website www.novatech-eng.com

LOCATION
CITY OF OTTAWA
280 O'CONNOR STREET

DRAWING NAME
GENERAL PLAN OF SERVICES

PROJECT No. 118074-00
REV # 1
DRAWING No. 118074-GP

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PLAN81.DWG - 841mm x 594mm

LEGEND

- 73.05 / + 73.03 — PROPOSED ELEVATION / *EXISTING ELEVATION*
- 2.0% — GRADE AND DIRECTION
- MAXIMUM 3:1 SIDESLOPE
- PROPOSED FENCE / GUARD
- PROPOSED SITE LIGHTING
- PROPOSED SILT FENCING (OPSD 219.110)
- DIRECTION OF MAJOR SYSTEM OVERLAND FLOW
- FFE — FINISHED FLOOR ELEVATION
- T/FND — TOP OF FOUNDATION WALL ELEVATION
- USF — UNDERSIDE OF FOOTING ELEVATION
- RD — PROPOSED CONTROLLED FLOW ROOF DRAIN
- DD — PROPOSED DECK DRAIN
- BUILDING ENTRANCE / EXIT
- PAVED DRIVEWAY
- PROPERTY LINE
- *EXISTING EDGE OF PAVEMENT*
- VALVE — *EXISTING VALVE & VALVE BOX*
- SP — *EXISTING SERVICE POST*
- HYD — *EXISTING HYDRANT*
- COMB MH — *EXISTING COMBINED MH*
- CBMH — *EXISTING CATCHBASIN*
- CB — *EXISTING CATCHBASIN MH*
- EX UP — *EXISTING UTILITY POLE C/W GUY WIRES*
- *EXISTING FENCE*
- O/H WIRES — *EXISTING OVERHEAD WIRES*
- 1:5 YR / 1:100 YR — APPROXIMATE PONDING LIMITS

PAVEMENT STRUCTURE:

LIGHT DUTY PAVEMENT
50mm HL-3 or SUPERPAVE 12.5
150mm GRANULAR "A"
300mm GRANULAR "B" TYPE II
ASPHALT GRADE PG 58-34

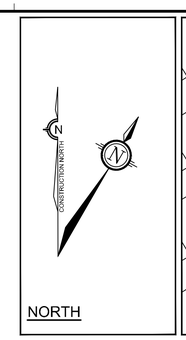
HEAVY DUTY PAVEMENT
40mm HL-3 or SUPERPAVE 12.5
50mm HL-8 or SUPERPAVE 19.0
150mm GRANULAR "A"
450mm GRANULAR "B" TYPE II
ASPHALT GRADE PG 58-34

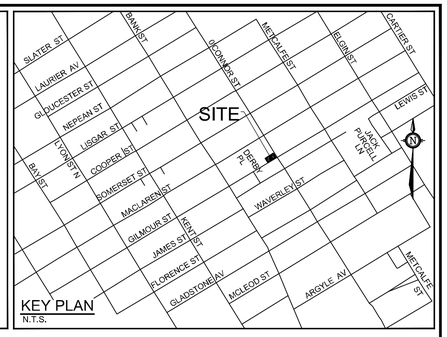
GENERAL NOTES:

1. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
2. DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING.
3. OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
4. BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR $5,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.
5. RESTORE ALL DISTURBED AREAS ON-SITE AND OFF-SITE, INCLUDING TRENCHES AND SURFACES ON PUBLIC ROAD ALLOWANCES TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTION OF THE CITY OF OTTAWA AND ENGINEER.
6. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL, ORGANIC MATERIAL AND DEBRIS UNLESS OTHERWISE INSTRUCTED BY ENGINEER. EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL. ALL CONTAMINATED MATERIAL SHALL BE DISPOSED OF AT A LICENSED LANDFILL FACILITY.
7. ALL ELEVATIONS ARE GEODETIC.
8. REFER TO GEOTECHNICAL REPORT (No. PG-4799-1, DATED AUGUST 1, 2019), PREPARED BY PATTERSON GROUP INC. FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS, AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
9. REFER TO ARCHITECT'S AND LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILDING AND HARDSURFACE AREAS AND DIMENSIONS.
10. REFER TO DEVELOPMENT SERVICING STUDY & STORMWATER MANAGEMENT REPORT(R-2019-105) PREPARED BY NOVATECH.
11. SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).

GRADING NOTES:

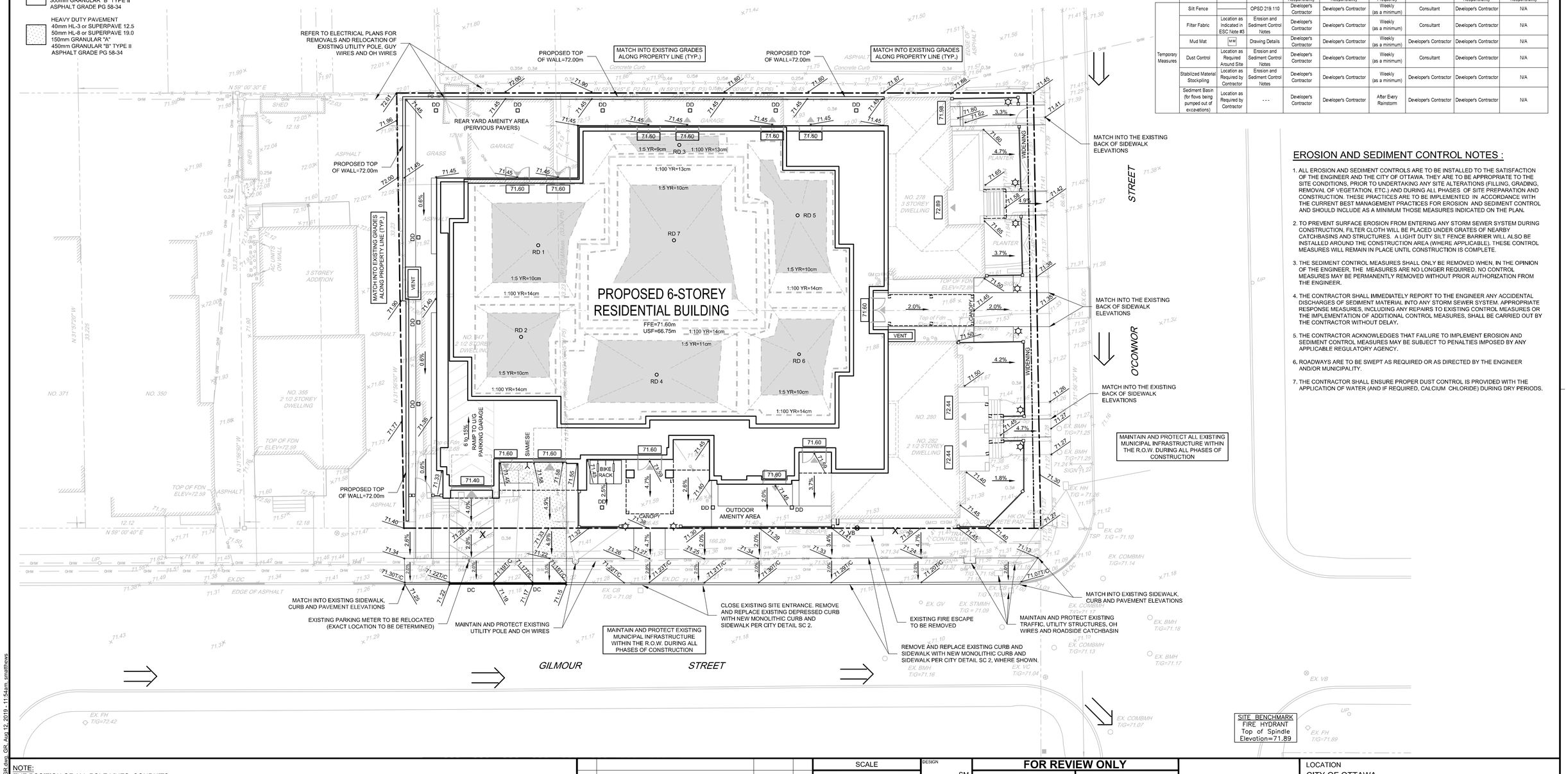
1. ALL TOPSOIL, ORGANIC OR DELETERIOUS MATERIAL MUST BE ENTIRELY REMOVED FROM BENEATH THE PROPOSED PAVED AREAS AS DIRECTED BY THE SITE ENGINEER OR GEOTECHNICAL ENGINEER.
2. EXPOSED SUBGRADES IN PROPOSED PAVED AREAS SHOULD BE PROOF ROLLED WITH A LARGE STEEL DRUM ROLLER AND INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO THE PLACEMENT OF GRANULARS.
3. ANY SOFT AREAS EVIDENT FROM THE PROOF ROLLING SHOULD BE SUB-EXCAVATED AND REPLACED WITH SUITABLE MATERIAL THAT IS FROST COMPATIBLE WITH THE EXISTING SOILS AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.
4. THE GRANULAR BASE SHOULD BE COMPACTED TO AT LEAST 100% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE. ANY ADDITIONAL GRANULAR FILL USED BELOW THE PROPOSED PAVEMENT SHOULD BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE.
5. MINIMUM OF 2% GRADE FOR ALL GRASS AREAS UNLESS OTHERWISE NOTED.
6. MAXIMUM TERRACING GRADE TO BE 3:1 UNLESS OTHERWISE NOTED.
7. ALL GRADES BY CURBS ARE EDGE OF PAVEMENT GRADES UNLESS OTHERWISE INDICATED.
8. ALL CURBS SHALL BE BARRIER CURB (150mm) UNLESS OTHERWISE NOTED AND CONSTRUCTED AS PER CITY OF OTTAWA STANDARDS (SC1.1).
9. REFER TO LANDSCAPE PLAN FOR PLANTING AND OTHER LANDSCAPE FEATURE DETAILS.
13. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GRADING PLAN INDICATING AS-BUILT ELEVATIONS OF ALL DESIGN GRADES SHOWN ON THIS PLAN.





Erosion and Sediment Control Responsibilities:

	ESC Measure	Symbol	Specification	During Construction: Installation Responsibility	During Construction: Inspection/Maintenance Responsibility	During Construction: Inspection Frequency	After Construction Prior to Final Acceptance: Approval to Remove	After Construction Prior to Final Acceptance: Removal Responsibility	After Final Acceptance: Inspection/Maintenance Responsibility
Temporary Measures	Silt Fence		OPSD 219.110	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Consultant	Developer's Contractor	N/A
	Filter Fabric	Location as indicated in ESC Note #3	Erosion and Sediment Control Notes	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Consultant	Developer's Contractor	N/A
	Mud Mat	MM	Drawing Details	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Developer's Contractor	Developer's Contractor	N/A
	Dust Control	Location as Required Around Site	Erosion and Sediment Control Notes	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Consultant	Developer's Contractor	N/A
	Stabilized Material Stockpiling	Location as Required by Contractor	Erosion and Sediment Control Notes	Developer's Contractor	Developer's Contractor	Weekly (as a minimum)	Developer's Contractor	Developer's Contractor	N/A
	Sediment Basin (for flows being pumped out of excavations)	Location as Required by Contractor	---	Developer's Contractor	Developer's Contractor	After Every Rainstorm	Developer's Contractor	Developer's Contractor	N/A



EROSION AND SEDIMENT CONTROL NOTES :

1. ALL EROSION AND SEDIMENT CONTROLS ARE TO BE INSTALLED TO THE SATISFACTION OF THE ENGINEER AND THE CITY OF OTTAWA. THEY ARE TO BE APPROPRIATE TO THE SITE CONDITIONS, PRIOR TO UNDERTAKING ANY SITE ALTERATIONS (FILLING, GRADING, REMOVAL OF VEGETATION, ETC.) AND DURING ALL PHASES OF SITE PREPARATION AND CONSTRUCTION. THESE PRACTICES ARE TO BE IMPLEMENTED IN ACCORDANCE WITH THE CURRENT BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL AND SHOULD INCLUDE AS A MINIMUM THOSE MEASURES INDICATED ON THE PLAN.
2. TO PREVENT SURFACE EROSION FROM ENTERING ANY STORM SEWER SYSTEM DURING CONSTRUCTION, FILTER CLOTH WILL BE PLACED UNDER GRATES OF NEARBY CATCHBASINS AND STRUCTURES. A LIGHT DUTY SILT FENCE BARRIER WILL ALSO BE INSTALLED AROUND THE CONSTRUCTION AREA (WHERE APPLICABLE). THESE CONTROL MEASURES WILL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.
3. THE SEDIMENT CONTROL MEASURES SHALL ONLY BE REMOVED WHEN, IN THE OPINION OF THE ENGINEER, THE MEASURES ARE NO LONGER REQUIRED. NO CONTROL MEASURES MAY BE PERMANENTLY REMOVED WITHOUT PRIOR AUTHORIZATION FROM THE ENGINEER.
4. THE CONTRACTOR SHALL IMMEDIATELY REPORT TO THE ENGINEER ANY ACCIDENTAL DISCHARGES OF SEDIMENT MATERIAL INTO ANY STORM SEWER SYSTEM. APPROPRIATE RESPONSE MEASURES, INCLUDING ANY REPAIRS TO EXISTING CONTROL MEASURES OR THE IMPLEMENTATION OF ADDITIONAL CONTROL MEASURES, SHALL BE CARRIED OUT BY THE CONTRACTOR WITHOUT DELAY.
5. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
6. ROADWAYS ARE TO BE SWEPT AS REQUIRED OR AS DIRECTED BY THE ENGINEER AND/OR MUNICIPALITY.
7. THE CONTRACTOR SHALL ENSURE PROPER DUST CONTROL IS PROVIDED WITH THE APPLICATION OF WATER (AND IF REQUIRED, CALCIUM CHLORIDE) DURING DRY PERIODS.

NOTE:
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2120 WOODCREST ROAD,
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c/o AK GLOBAL MANAGEMENT INC.
TONY KAZARIAN
PHONE: (613) 592-5960
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No.	REVISION	DATE	BY
1	ISSUED FOR SITE PLAN APPROVAL	AUG 9/19	FST

SCALE: 1:150 (1:150 0 2 4 6)

DESIGN: SM
CHECKED: FST
DRAWN: BF / SM
CHECKED: FST
APPROVED: FST

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER — F.S. THAUVETTE — 100041399 — Aug. 9, 2019 — PROVINCE OF ONTARIO

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

LOCATION
CITY OF OTTAWA
280 O'CONNOR STREET

DRAWING NAME
GRADING AND EROSION & SEDIMENT CONTROL PLAN

PROJECT No. 118074-00
REV # 1
DRAWING No. 118074-GR

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LEGEND

- PROPOSED BARRIER CURB
- DC — PROPOSED DEPRESSED CURB
- DRAINAGE AREA LIMITS
- 1:5 YR / 1:100 YR — APPROXIMATE PONDING LIMITS
- PROPOSED STORM SEWER AND FLOW DIRECTION
- EMERGENCY OVERLAND FLOW ROUTE
- PROPOSED BUILDING ENTRANCE / EXIT
- STM MH — EXISTING STORM MH & SEWER
- CB — EXISTING CATCHBASIN C/W CATCHBASIN LEAD
- A-1 / 0.40 / 0.67 — POST-DEVELOPMENT AREA ID / POST-DEVELOPMENT DRAINAGE AREA (ha) / 1:5 YEAR WEIGHTED RUNOFF COEFICIENT
- PROPOSED FENCE / GUARD
- PROPOSED SITE LIGHTING
- FFE — FINISHED FLOOR ELEVATION
- T/FND — TOP OF FOUNDATION WALL ELEVATION
- USF — UNDERSIDE OF FOOTING ELEVATION
- RD — PROPOSED CONTROLLED FLOW ROOF DRAIN
- DD — PROPOSED DECK DRAIN

GENERAL NOTES:

1. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
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9. REFER TO ARCHITECT'S AND LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILDING AND HARDSURFACE AREAS AND DIMENSIONS.
10. REFER TO STORMWATER MANAGEMENT REPORT (R-2019-0105) PREPARED BY NOVATECH ENGINEERING CONSULTANTS LTD.
11. SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).
12. PROVIDE LINE/PARKING PAINTING.

ROOF DRAIN TABLE: AREA R-1 (ROOF DRAINS 1 to 7)

AREA ID *	ROOF DRAIN No. (WATTS MODEL)	ROOF DRAIN OPENING SETTING	1:5 YEAR RELEASE RATE	APPROX. 5 YR PONDING DEPTH	1:100 YEAR RELEASE RATE	APPROX. 100 YR PONDING DEPTH
R-1	RD 1 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-1	RD 2 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-1	RD 3 (RD-100-A-ADJ)	CLOSED	0.32 L/s	9 cm	0.32 L/s	13 cm
R-1	RD 4 (RD-100-A-ADJ)	CLOSED	0.32 L/s	11 cm	0.32 L/s	14 cm
R-1	RD 5 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-1	RD 6 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-1	RD 7 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	10 cm	0.87 L/s	13 cm

* REFER TO THE 'DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT' (R-2019-105) PREPARED BY NOVATECH FOR DRAINAGE AREA IDENTIFIERS AND STORMWATER MANAGEMENT DETAILS.

**ALL CONTROLLED FLOW ROOF DRAINS FOR THE PROPOSED BUILDING TO BE WATTS 'ADJUSTABLE ACCUTROL' ROOF DRAINS.

INTERNAL SWM STORAGE SYSTEM

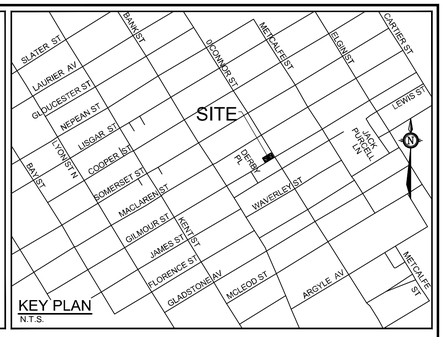
DESIGN EVENT	STORAGE SYSTEM CONTROLLED FLOW	STORAGE VOLUMES	
		REQUIRED	PROVIDED
1:5 YR	6.0 L/s	5.3 m³	> 21.0 m³
1:100 YR	6.0 L/s	15.7 m³	
1:100+20%	6.0 L/s	20.6 m³	

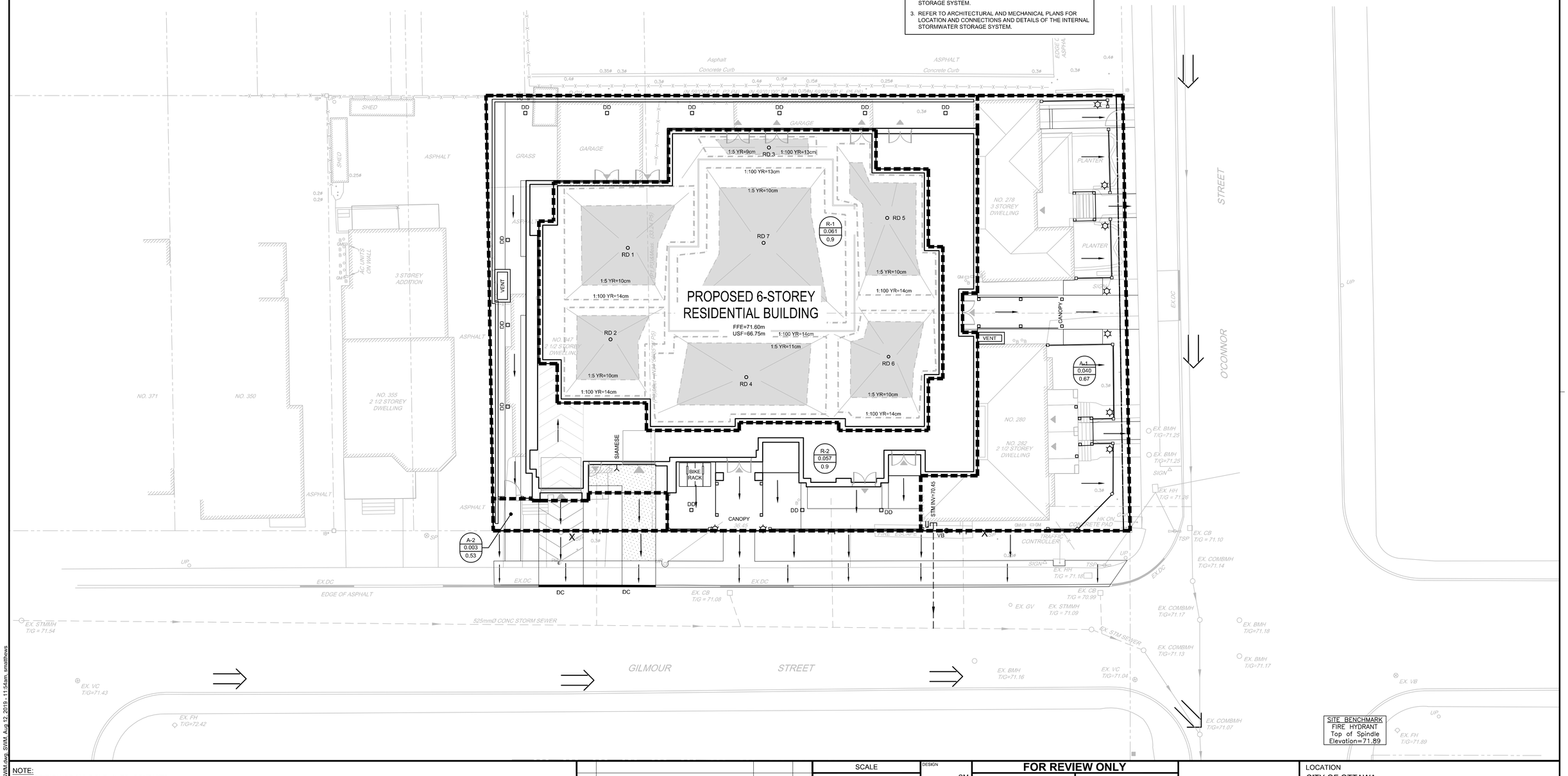
NOTES:

1. ALL DRAINAGE FROM AREA R-2 (PROPOSED AMENITY AREA DECK DRAINS AND ALL PATIO DRAINS) TO BE DIRECTED TO THE INTERNAL STORMWATER STORAGE SYSTEM. REFER TO THE ARCHITECTURAL AND MECHANICAL PLANS FOR DETAILS.
2. REFER TO ARCHITECTURAL AND STRUCTURAL PLANS FOR EXACT SIZE AND DETAILS OF INTERNAL STORMWATER STORAGE SYSTEM.
3. REFER TO ARCHITECTURAL AND MECHANICAL PLANS FOR LOCATION AND CONNECTIONS AND DETAILS OF THE INTERNAL STORMWATER STORAGE SYSTEM.

NORTH

KEY PLAN N.T.S.





SITE BENCHMARK
FIRE HYDRANT
Top of Spindle
Elevation=71.89

NOTE:
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No.	REVISION	DATE	BY
1	ISSUED FOR SITE PLAN APPROVAL	AUG 9/19	FST

SCALE
1:150
1:150
0 2 4 6

DESIGN SM
CHECKED FST
DRAWN BF / SM
CHECKED FST
APPROVED FST

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LOCATION
CITY OF OTTAWA
280 O'CONNOR STREET

DRAWING NAME
STORMWATER MANAGEMENT PLAN

PROJECT No. 118074-00
REV REV # 1
DRAWING No. 118074-SWM

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