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39 Years

Proposed Re-Development

555, 591, 595 and 603 March Road

Functional Servicing and Stormwater Management Report

555, 591, 595 and 603 MARCH ROAD
RE-DEVELOPMENT

FUNCTIONAL SERVICING AND
STORMWATER MANAGMENT REPORT

Prepared by:

NOVATECH

Suite 200, 240 Michael Cowpland Drive

Kanata, Ontario

K2M 1P6

November 11, 2022

Ref: R-2022-165

Novatech File No. 122125

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November 11, 2022

March + Main Developments Inc. and
591-595 March Road Developments Inc.
109 Atlantic Avenue, Unit 302B
Toronto, Ontario M6K 1X4

Attention: Mr. Daniel Byrne

Dear Mr. Byrne:

Re: Functional Servicing and SWM Report
555, 591, 595 & 603 March Road Re-Development
Ottawa, Ontario
Novatech File No.: 122125

Enclosed is a copy of the 'Functional Servicing and Stormwater Management Report' for the proposed re-development of the 555, 591, 595 and 603 March Road properties in the City of Ottawa. This report has been prepared to support a Zoning By-Law Amendment application.

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

Yours truly,

NOVATECH

François Thauvette, P. Eng.
Senior Project Manager

FT/dm

cc: Julie Candow (City of Ottawa

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

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1.0 INTRODUCTION

Novatech has been retained by March + Main to prepare a Functional Servicing and Stormwater Management Report related to the proposed re-development of the 555, 591, 595 & 603 March Road properties. The purpose of this report is to demonstrate that the proposed development can be serviced by the municipal infrastructure (watermain, sanitary and storm sewer) surrounding the subject site. The following tasks have been included in our analysis:

- Prepare Functional Servicing and Grading plans, including new on-site watermains and separate sanitary and storm sewers
- Prepare an Overall Conceptual Stormwater Management Plan

This report is being submitted in support of a Zoning By-Law Amendment application.

1.1 Site Description and Development Concept

The subject site is in Ottawa (Kanata) and is bounded by Terry Fox Drive to the north, Hines Road to the west, March Road to the east, and other commercial/industrial lots to the south. The proposed re-development will include the 555, 591, 595 & 603 March Road properties. The merged properties cover an area of approximately 5.55 hectares.

The existing 555, 595 and 603 March Road properties are currently occupied by commercial buildings with associated parking lots. The 595 March Road property is currently vacant, as is the western portion of the 555 March Road property. The legal description of the subject site as indicated on the Topographical Plan of Survey prepared by Annis, O'Sullivan, Vollbekk Ltd. is designated as Block 1 Registered Plan 4M-1104 and Part of Lot 9, Concession 3, Geographic Township of March, Ottawa. Refer to **Figure 1** for an aerial view of the subject site.

Figure 1: Aerial View of the Existing Site

The intent is to redevelop the subject site as a mixed-use development with residential, commercial retail, office space in addition to parkland uses. The phased development will include the addition of approximately 2,100 residential units (yellow), 14,350 m^2 of office space (blue), 3,000 m^2 of retail space (red), and 3450 m^2 of parkland (green) space. Refer to **Figure 2** for a conceptual site layout and development blocks (prepared by others).

Figure 2: Conceptual Site Layout and Development Blocks

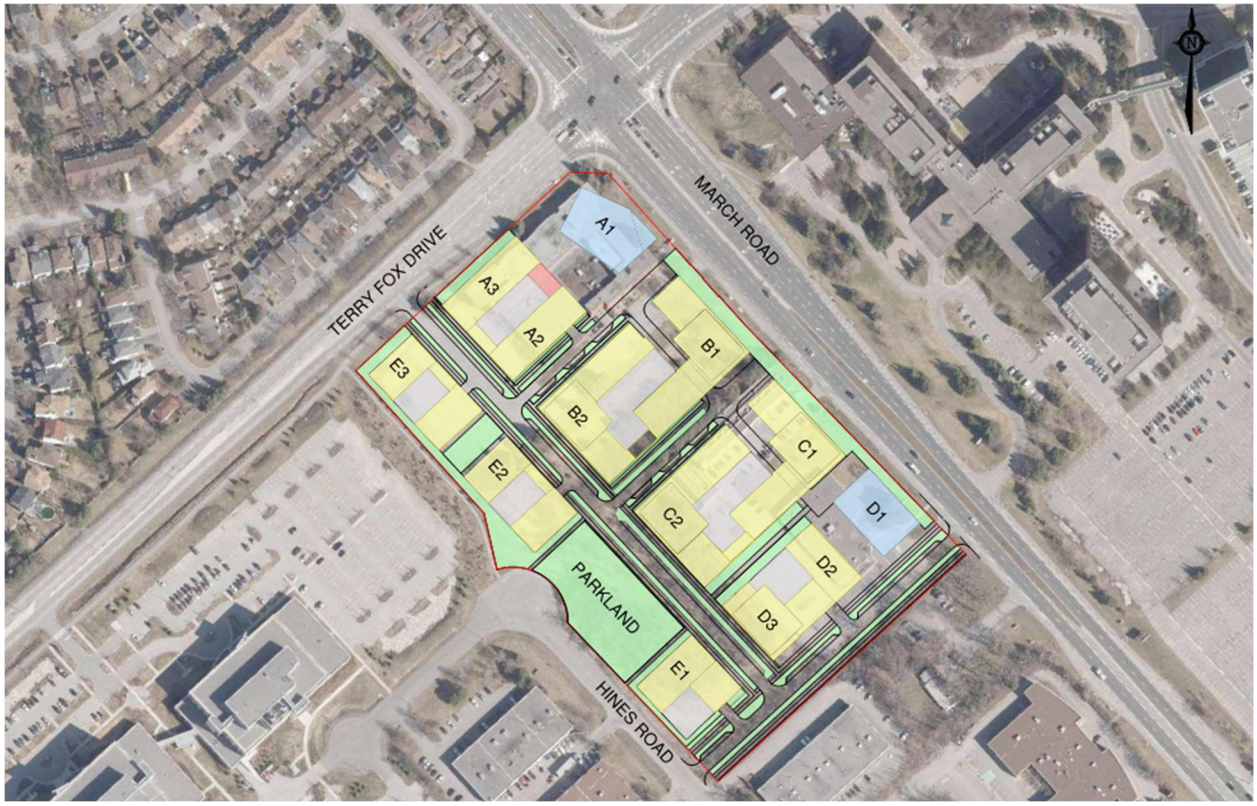


Image Source (geoOttawa) for all Figures

Table 1 summarizes the proposed development statistics for each block.

Table 1: Proposed Block Breakdown

Proposed Mixed-Use Development	Block Area (ha)**	Residential Floor Area (m^2) / Unit Count*		Office Space (m^2)	Commercial Space (m^2)
Block A	1.00	12,743	182	8,115	1,162
Block B	0.93	47,410	677	-	-
Block C	0.86	44,349	634	-	467
Block D	0.85	20,521	293	6,209	1,296
Block E	1.91	21,984	314	-	-
Total	**5.55**	**147,007**	**2100**	**14,324**	**2,925**

*Projected unit count based on average unit size of 70m^2 GFA.
** Includes adjacent internal roadway areas

The full build-out for the proposed development is anticipated to span several years. The construction of new sanitary and storm sewers as well as the looping of a new on-site watermain network, while maintaining service to the existing buildings (if applicable), will be a significant factor in the overall phasing of the development. The proposed re-development will also include new internal roadways, Right-of-Way (R.O.W.) improvements along Terry Fox Drive and March Road, and the creation of Privately Owned Public Spaces (POPS).
It is anticipated that the design will continue to be refined to determine an appropriate residential density, a suitable commercial retail and office mix, optimize pedestrian and cycling connectivity, and advance the design of the POPS and outdoor amenity spaces. The proposed development will also provide an opportunity to implement stormwater management control measures (i.e.: water quantity and quality) to mitigate the impacts of the highly impervious site and to reduce peak flows to the local storm sewer systems. Servicing and stormwater management designs will be refined as part of each phase of the development through the appropriate future development application process. The property owner will be responsible for securing planning and engineering approvals for all phases of the development. Refer to **Appendix A** for project-related correspondence.

Although not included in this report, any re-design of the surface works within the municipal Right-of-Way (R.O.W.) would be required to follow the City's Roadway Modification Approval (RMA) process.

***IMPORTANT NOTE**: This report is based on the conceptual full build-out of the proposed development. Although phasing is discussed in the report, the analysis does not take into consideration all possible phasing options and iterations. Interim servicing may be required during various phases of construction and development. Refer to **Section 7.0** of the report for further details. A more comprehensive approach to the overall phasing of the development will need to be determined at the detailed design stage for each development block or group of blocks.*

1.1 Existing Municipal Infrastructure

Based on a review of the geoOttawa website, the City of Ottawa pre-consultation notes, the Record Drawings and UCC plans obtained from the City of Ottawa; it was determined that the following municipal infrastructure is available within the municipal Right-of-Ways fronting the subject site:

March Road

- Storm sewers: Concrete 300mm dia. to 750mm dia. (flowing south)
- Sanitary Sewers: Not available
- Watermain: Not available

Terry Fox Drive

- Storm sewers: Concrete 300mm dia. (flowing east), 900mm dia. (on north side of roadway)
- Sanitary Sewers: Not available
- Watermain: 400mm dia. DI

Hines Road

- Storm sewers: Concrete 300mm dia. (DICB at SW property corner flowing south)
- Sanitary Sewers: 600mm dia. AC
- Watermain: 400mm dia. DI

1.2 Required Permits and Approvals

The development application process will require the review and approval of numerous Authorities having jurisdiction (i.e., City of Ottawa, MECP, MVCA, etc.). **Table 1.1** identifies the permits and approvals anticipated to be required as part of the future development of the subject site.

Table 1.1: Anticipated Required Permits and Approvals

Authority Having Jurisdiction	Required Permit or Approval	Trigger for Permit or Approval	Comments
City of Ottawa	Zoning By-Law Amendment	**Request to change current zoning**	-
City of Ottawa	Site Plan Control Approval	**Development**	-
City of Ottawa	Roadway Modification Approval (RMA)	**Roadway modifications within the municipal R.O.W.**	-
Ministry of Environment, Conservation and Parks (MECP)	Environmental Compliance Approval (ECA)	Construction of new sewers within Municipal Right-of-Way, and/or new on-site SWM facility servicing multiple properties.	ECA by Transfer of Review and/or Direct Submission to the MECP in Toronto

1.3 Design Guidelines and Reference Documents

The following design guidelines have been used to establish the servicing and stormwater management requirements for the proposed mixed-use development:

- Ottawa Sewer Design Guidelines (2012) and Technical Bulletins (2010-present)
- Ottawa Design Guidelines for Water Distribution (2010) & Tech. Bulletins (2010-present)
- Ministry of the Environment Design Guidelines for Sewage Works (2008)
- Ministry of the Environment Stormwater Management Planning and Design Manual (2003)
- Ministry of the Environment Design Guidelines for Drinking Water Systems (2008)
- Fire Underwriters Survey (FUS) Water Supply for Public Fire protection

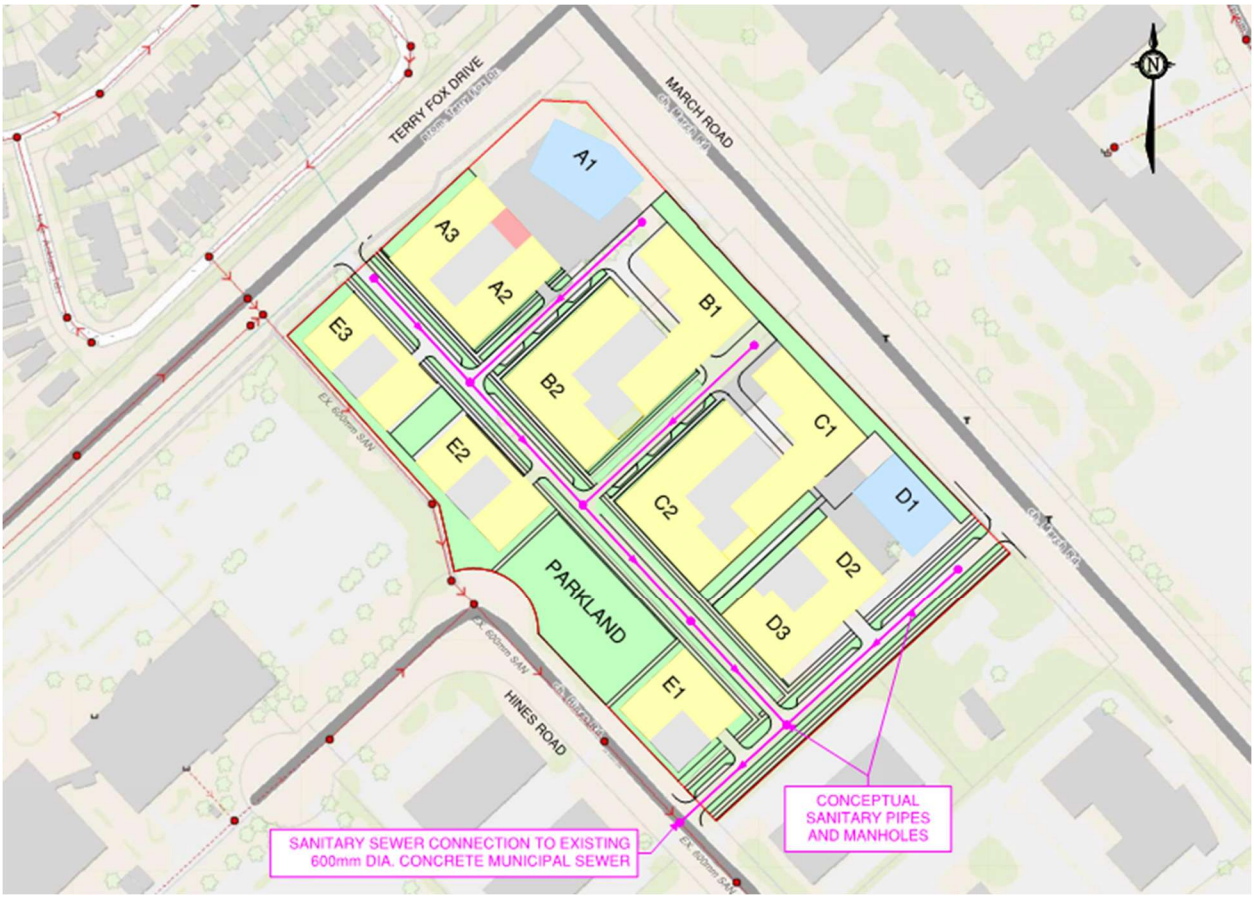
The following Reference Document(s) have also been reviewed to assist in the preparation of this report:

- MVCA's – Shirley's Brook 2016 Summary Report.

2.0 SANITARY SERVICING

Under pre-development conditions, sanitary sewage flows from the properties are being directed to the 600mm dia. sanitary sewer in Hines Road via two (2) outlet connections. Under post-development conditions, sanitary flows from the proposed development will continue to be directed to the municipal sanitary sewer in Hines Road as it is the only available outlet. Similar to pre-development conditions, it is anticipated that sewer easements will be required under post-development conditions. Refer to **Figure 3** showing the existing sanitary sewer infrastructure and conceptual servicing layout.

Figure 3: Conceptual Sanitary Servicing



The objective of the sanitary servicing design is to calculate the theoretical sanitary sewage flows, establish a functional sewage outlet(s), and to confirm that the sanitary trunk sewer in Hines Road has adequate capacity for the proposed development. A servicing agreement will be required if multiple property parcels are serviced by a common on-site sanitary sewer system. Additional investigations will be required to review and assess the potential re-use of the existing on-site sanitary sewers and connections to the Hines Road trunk sewer as possible interim conditions depending on the proposed phases of development.

2.1 Sanitary Servicing Design Criteria

The City of Ottawa Design Guidelines and MOE Design Guidelines (when applicable) were used to calculate the theoretical sanitary flows for the proposed mixed-use development. **Table 2** summarizes the design criteria used in the preliminary analysis.

Table 2: Sanitary Servicing Design Criteria

Design Parameter	Criteria
Residential Use – Apartment	1.8 Persons/unit (based on mix of 1, 2 & 3-Bedroom)
Residential Use – Average Sewage Flow	280 L/Person/Day (Tech Bulletin ISTB-2018-01)
Residential Peaking Factor	Harmon Equation (Max.4.0, Min. 2.0)
Office Use (9.3m^2/ person)	75 L/employee/day

Commercial Use – Avg. Flow	28,000 L/gross ha/day
Peaking Factor (Office/Retail)	1.5 x Avg. Day
Infiltration Allowance	0.33 L/s/effective gross hectare
Minimum Municipal Sewer Size	200mm dia.
Minimum Depth of Cover (Municipal)	2.0m (unless insulation is provided)

2.2 Sanitary Servicing Design

The theoretical sanitary sewage flows for the proposed development have been calculated using the design criteria listed above. **Table 2.1** summarizes the preliminary sanitary flows for the proposed development based on the Conceptual Site Plan (prepared by others).

Table 2.1: Theoretical Post-Development Sanitary Flows

Proposed Block ID	Peak Res. Flow (L/s)	Peak Office Flow (L/s)	Peak Retail Flow (L/s)	Infiltration Allowance (L/s)	Peak Sewage Flow (L/s)
Block A	3.45	1.14	0.06	0.31	4.96
Block B	11.83	-	-	0.33	12.16
Block C	11.13	-	0.02	0.32	11.47
Block D	5.41	0.87	0.06	0.34	6.68
Block E	5.78	-	-	0.53	6.31
Total	**37.61**	**2.01**	**0.14**	**1.83**	**41.59**

*Represents rounded values. Excludes minimal park block sewage flows.

As stated above, all sanitary sewage flows from the proposed development will be directed to the sanitary trunk sewer in Hines Road. On-site flows will be collected by the private sewers and directed towards the south end of the subject site before discharging into the 600mm dia. sanitary trunk sewer in Hines Road. Based on preliminary calculations, it is anticipated that the on-site sanitary sewers will range from 250mm-300mm dia. in size. Based on a connection depth of approximately 5.0m and on-site sewer pipe slopes ranging from 0.35% to 0.80%, the on-site gravity sanitary sewer system should have a potential depth of cover of approximately 2.7m at the top end of the system. Refer to **Appendix B** for preliminary sanitary sewage calculations and to **Appendix F** for the **Conceptual Servicing Plan (C-1)** for further details.

2.3 Sanitary Servicing Summary and Conclusions

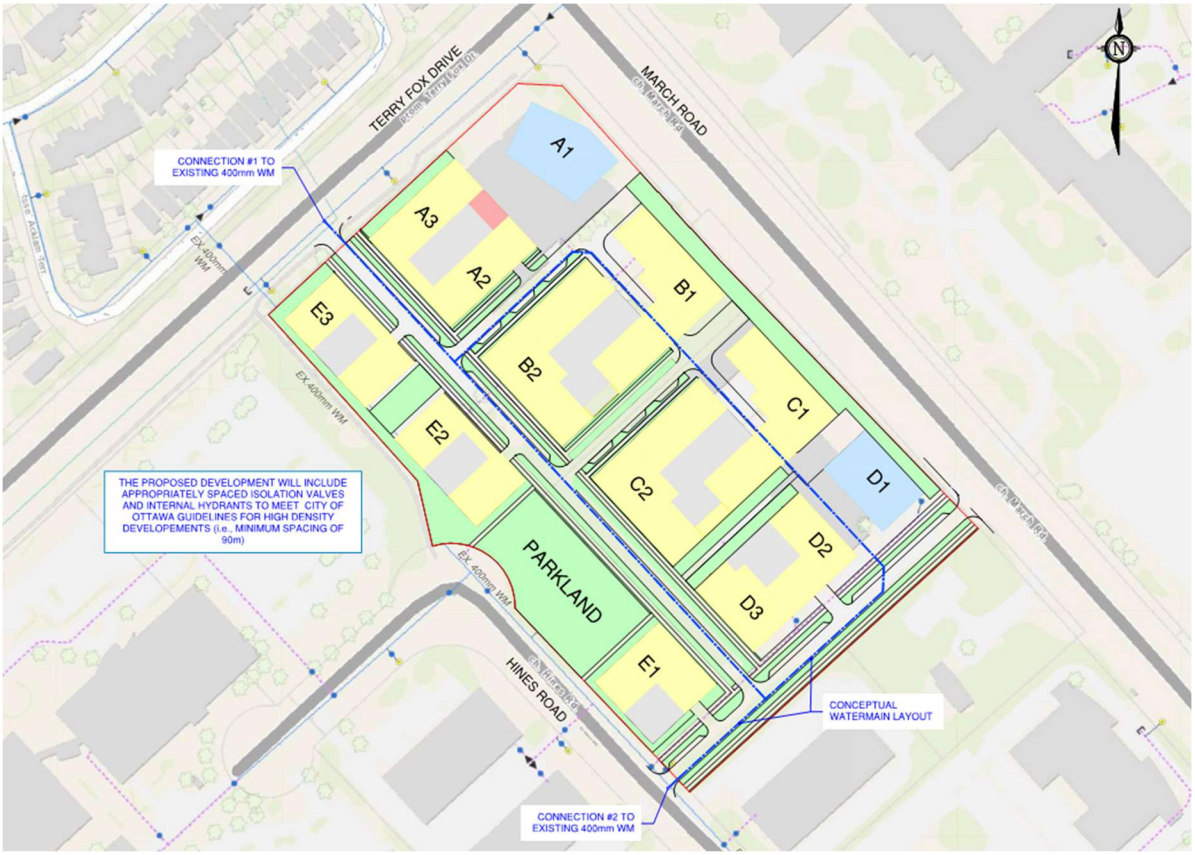
The sanitary servicing design is based on the applicable City of Ottawa and MOE Design Guidelines. Based on correspondence received from the City of Ottawa (included in the pre-consultation notes included in **Appendix A**), it is anticipated that the sanitary trunk sewer in Hines Road has adequate capacity to accommodate the proposed development.

As noted previously, the proposed development is anticipated to span several years. The proposed sanitary works will need to correspond to the increased servicing needs of the specific development phase(s). The servicing designs and analyses will be refined as part of each phase of development through the appropriate approvals process.

3.0 WATER SERVICING

Under pre-development conditions, water demands for the properties (for domestic use and firefighting purposes) are being provided by private watermains and hydrants fed off of two (2) connections to the 400mm dia. DI watermain in Hines Road. An existing servicing easement is located along the west property line, between Terry Fox Drive and Hines Road. Under post-development conditions, the proposed development will continue to be fed by the surrounding municipal watermain network. The new private looped network will include connections to the watermains in Hines Road as well as in Terry Fox Drive. There are currently no watermains in March Road, fronting the subject site. New easements may be required under post-development conditions. The subject site is located within the City of Ottawa 2W2C watermain pressure zone. Refer to **Figure 4** showing the existing watermain infrastructure and conceptual servicing layout.

Figure 4: Conceptual Water Servicing Layout



The objective of the conceptual watermain layout is to establish a functional design that would provide an adequate (redundant) looped water supply for both domestic use and firefighting purposes to all blocks within the proposed development. As described above, the proposed development will require connections to the existing 400mm dia. municipal watermains in Hines Road and Terry Fox Drive. Most buildings will require two (2) water supply services to allow for redundancy as the anticipated daily water demands will be greater than 50m^3/day (0.58 L/s).

3.1 Water Servicing Design Criteria

The City of Ottawa Design Guidelines and MOE Design Guidelines (when applicable) were used to calculate the theoretical domestic water demands for the proposed mixed-use development. **Table 3** summarizes the design criteria used in the preliminary analysis.

Table 3: Water Servicing Design Criteria

Design Parameter	Criteria
Residential Use – Apartment	1.8 Persons/unit (based on mix of 1, 2 & 3-Bedroom)
Residential Use – Average Daily Demand	280 L/Person/Day (Tech Bulletin ISTB-2021-03)
Max. Day Peaking Factor (Residential)	2.0 x Avg. Day Demand (MOE Table 3-1)*
Peak Hour Peaking Factor (Residential)	3.0 x Avg. Day Demand (MOE Table 3-1)*
Office Use (9.3m^2/ person)	75 L/employee/day
Commercial Retail Use – Avg. Flow	28,000 L/gross ha/day
Max. Day Peaking Factor (Office/Retail)	1.5 x Avg. Day Demand
Peak Hour Peaking Factor (Office/Retail)	1.8 x Max Day Demand
Minimum Municipal Watermain Size	150mm dia.
Minimum Depth of Cover	2.4m (unless insulation is provided)
Normal operating system pressure range	345 kPa (50psi) to 483 kPa (70psi), Max 80psi
Minimum system pressure under Peak Hour condition	276 kPa (40psi)
Minimum system pressure under Max Day + Fire condition	140 kPa (20psi)

*Residential peaking factors were taken from Table 3-1 (MOE Design Guidelines for Drinking Water Systems for a population of 3,001 to 10,000 persons.

3.2 Water Supply Servicing Design

The theoretical water demands for domestic use and firefighting purposes have been calculated using the design criteria listed above. Fire flow requirements for the various types of buildings within the development (i.e.: mixed-use mid-rise, and high-rise buildings with podiums) were calculated using the Fire Underwriters Survey (FUS) method based on general building construction materials, horizontal setbacks, and Occupancy Hazards based on type of use. All buildings are assumed to be sprinklered. **Table 3.1** summarizes the preliminary demands for the proposed development based on the Conceptual Site Plan (prepared by others).

Table 3.1: Theoretical Post-Development Water Demands

Proposed Block ID	Proposed Mixed-Use	Average Day Demand (L/s)*	Max. Day Demand (L/s)*	Peak Hour Demand (L/s)*	Max Fire Flow per FUS (L/s)**
Block A	Res./Office/Retail	1.86	3.32	5.34	233
Block B	Residential	3.95	7.90	11.85	317
Block C	Res./ Retail	3.71	7.42	11.13	300
Block D	Res./Office/Retail	2.33	4.35	6.80	250
Block E	Res./Parkland	1.83	3.66	5.49	167
Total	**-**	**13.68**	**26.65**	**40.62**	

*Represents rounded values. Excludes minimal park block demands.
**Represents Max FUS value calculated for each block
** Res./Office Buildings (Limited Combustible Occupancy Hazard), Commercial (Combustible Occupancy Hazard)
**High-Rise Podium buildings assumed to be Modified Fire-Resistive Construction
**All buildings assumed to be sprinklered

The anticipated domestic water demands, and fire flow requirements were provided to the City of Ottawa to generate the municipal watermain network boundary conditions. **Table 3.2** summarizes the City's municipal watermain boundary conditions and preliminary hydraulic analysis results.

Table 3.2: **Preliminary Hydraulic Analysis Results and Watermain Boundary Conditions**

Municipal Watermain Boundary Condition	Boundary Condition Head of Water (m)	Normal Operating Pressure Range (psi)	Anticipated WM Pressure (psi)*
Connection # 1 to the 400mm dia. WM in Terry Fox Drive			
Minimum HGL (Peak Hour Demand)	125.1 m	40 psi (min.)	~ 58 psi
Maximum HGL (Max Day Demand)	130.8 m	50-70 psi	~ 66 psi
Max Day + Fire Flow (Max FF of 233 L/s - Block A)	> 118.4 m	20 psi (min.)	> 48 psi
Max Day + Fire Flow (Max FF of **317 L/s** - Block B)	118.4 m	20 psi (min.)	~ 48 psi
Max Day + Fire Flow (Max FF of 300 L/s - Block C)	> 118.4 m	20 psi (min.)	> 48 psi
Max Day + Fire Flow (Max FF of 250 L/s - Block D)	> 118.4 m	20 psi (min.)	> 48 psi
Max Day + Fire Flow (Max FF of **167 L/s** - Block E)	124.0 m	20 psi (min.)	~ 56 psi

Connection # 2 to the 400mm dia. WM in Hines Road			
Minimum HGL (Peak Hour Demand)	125.1 m	40 psi (min.)	~ 59 psi
Maximum HGL (Max Day Demand)	130.8 m	50-70 psi	~ 68 psi
Max Day + Fire Flow (Max FF of 233 L/s - Block A)	> 117.8 m	20 psi (min.)	> 49 psi
Max Day + Fire Flow (Max FF of **317 L/s** - Block B)	117.8 m	20 psi (min.)	~ 49 psi
Max Day + Fire Flow (Max FF of 300 L/s - Block C)	> 117.8 m	20 psi (min.)	> 49 psi
Max Day + Fire Flow (Max FF of 250 L/s - Block D)	> 117.8 m	20 psi (min.)	> 49 psi
Max Day + Fire Flow (Max FF of **167 L/s** - Block E)	123.8 m	20 psi (min.)	~ 58 psi

Design pressure = (HGL – Watermain elevation) x 1.42197 PSI/m
*Based on the following approximate ground elevations as provided by the City of Ottawa:

- Connection #1 in Terry Fox Drive (ground elevation = 84.2 m)
- Connection #2 in Hines Road (ground elevation = 83.3 m)

Based on preliminary calculations, it is anticipated that the pressure within the municipal watermain network will be adequate, and within the normal operating pressure ranges during the Peak Hour, and Maximum Day + Fire Flow conditions. Given the height of the proposed buildings, booster pumps will be required to provide adequate water pressure to the upper floors. The proposed development will include a private (looped) watermain network with appropriately placed isolation valves and appropriately spaced hydrants to meet City of Ottawa's guidelines for high density developments (i.e., minimum spacing of 90m). A multi-hydrant approach to firefighting will be required to supply adequate fire flow to the proposed buildings using both existing municipal hydrants and new private on-site hydrants. This multi-hydrant approach to firefighting is in accordance with the City of Ottawa's Technical Bulletin ISTB-2018-02. Refer to **Appendix C** for preliminary water demand and FUS calculations, watermain boundary conditions, and correspondence from the City of Ottawa and to **Appendix F** for the **Conceptual Servicing Plan (C-1).**

3.3 Water Servicing Summary and Conclusions

The domestic water demands, and FUS fire flow requirements are based on the applicable City of Ottawa and MOE Design Guidelines. Based on a preliminary hydraulic analysis, it is anticipated that the municipal watermain network surrounding the subject site, along with a looped private watermain network will provide the necessary water for domestic use and firefighting purposes for the proposed development within the normal operating pressure ranges as defined by the City of Ottawa. As noted previously, the proposed development is anticipated to span several years, and the proposed watermain works will need to correspond to the increased servicing needs of the specific development phase(s). The servicing designs and detailed hydraulic network analysis will be refined as part of each phase of development, through the appropriate approvals process.

4.0 Storm Servicing and Stormwater Management

4.1 Pre-Development Conditions

Under pre-development conditions, stormwater flows are currently being directed to distinct storm sewers in Terry Fox Drive, March Road, and Hines Road, with the majority of flow being directed to March Road. Storm flows include both uncontrolled sheet drainage and controlled flows.

4.1.1 Pre-Development Stormwater Quantity Control

Previous engineering design drawings and stormwater management reports were reviewed to determine the pre-development flows from the 555, 591, 595 & 603 March Road properties. The pre-development flows to the storm sewer systems in Terry Fox Drive, March Road, and Hines Road are summarized in **Table 4**. Refer to **Appendix D** for preliminary calculations and to **Appendix E** for excerpts from the previous SWM Reports and Engineering Design Drawings used to establish the (assumed) allowable release rates to each of the storm sewer systems based on pre-development conditions. Also refer to **Appendix F** for the **Pre-Development Storm Drainage Area Plan (C-3)** for the associated drainage areas. Although requested, the City of Ottawa was not able to provide us with the Storm Drainage Area Plan(s) for the existing storm sewers in Terry Fox Drive, March Road, or Hines Road to confirm our allowable release rate assumptions.

Table 4: Pre-Development Release Rates

Existing Property Parcel	Drainage Area ID	Drainage Area (ha)	Runoff Coefficient Cw	Q Flow (L/s)	Storm Sewer Outlet Location	Total Pre-Dev. Flow (L/s)*
603 March Rd.	A-1	0.167	0.61	12.4	Terry Fox Drive	**21.4**
	A-2	0.887	0.77			
	OS-1	0.043	0.31	7.8*		
	OS-6	0.010	0.20	1.2*		
595/603 March Rd.	B-1	0.106	0.28	95.2	March Road	**321.9**
	B-2	1.800	0.45			
591 March Rd.	B-3	0.130	0.90	42.0		
555 March Rd.	B-4	0.495	0.44	36.0		
	B-5	1.924	0.39	55.0		
	OS-2	0.085	0.31	15.6*		
595/603 March Rd.	OS-3	0.085	0.63	29.9*		
555 March Rd.	OS-4	0.085	0.70	33.0*		
603 March Rd.	OS-7	0.016	0.20	2.0*		
591/595/603 March Rd.	OS-8	0.106	0.20	13.2*		
555 March Rd.	C-1	0.042	0.20	19.4	Hines Road	**52.8**
	OS-5	0.110	0.54	33.4*		
	TOTAL	**6.091**	-	**396.1**	-	**396.1**

*Represents uncontrolled 100-year off-site flows, which are included in the totals.

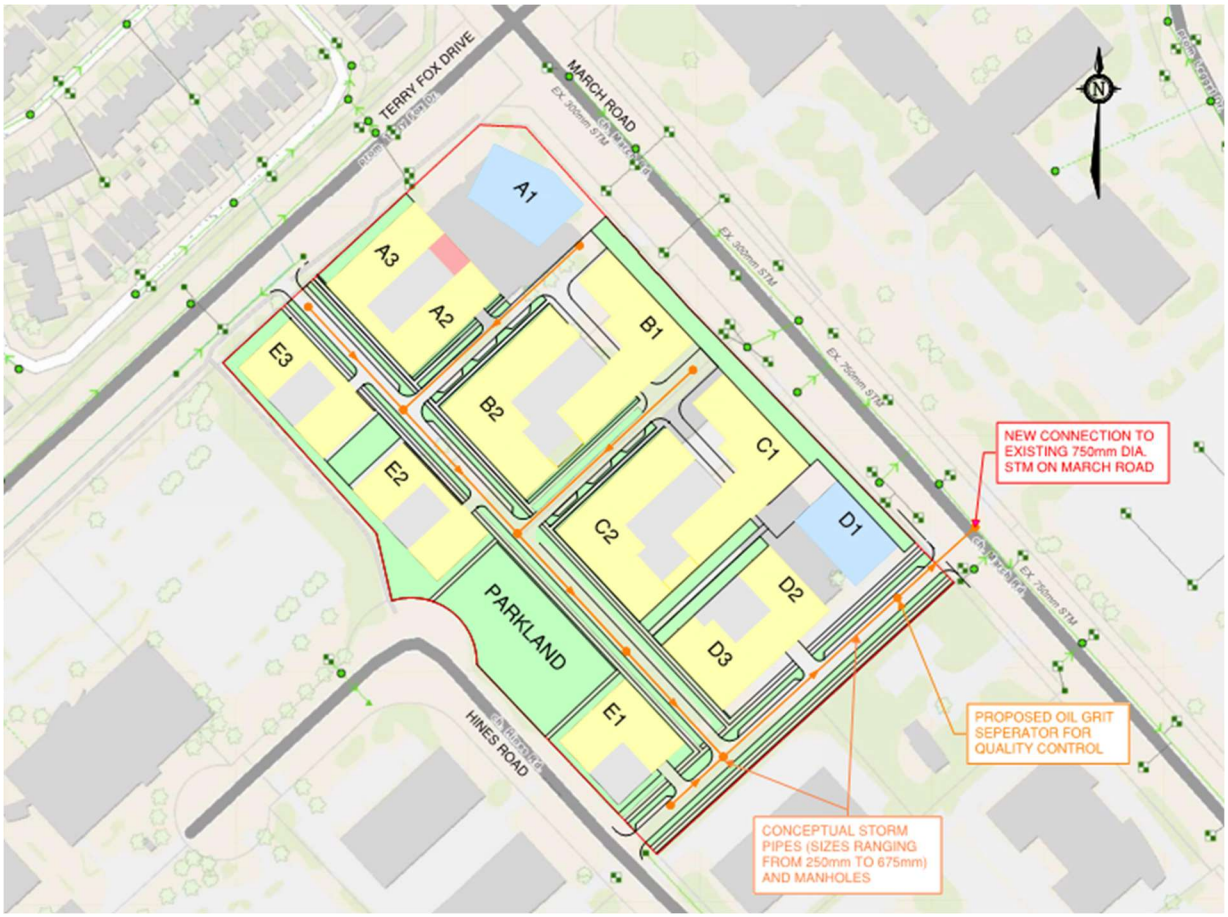
4.1.2 Pre-Development Stormwater Quality Control

The existing 555, 591, 595 & 603 March Road properties are located within the Mississippi Valley Conservation Authority (MVCA) catchment area. Based on a review of previous stormwater management reports, engineering design drawings and observations made in the field, on-site stormwater quality control measures were implemented as part of previous designs. It is assumed that an 'Enhanced' Level of Protection (i.e.: 80% TSS removal) would have been required for sites tributary to Shirley's Brook as is currently recommended by the MVCA.

4.2 Post-Development Conditions

Under post-development conditions, stormwater flows from the proposed development will continue to be directed to multiple storm sewer outlets (i.e., in Terry Fox Drive and March Road) with minimal flow being directed to the Hines Road storm sewer. Except for minimal direct runoff from landscaped areas along the north and east property lines, most of the on-site flows will be collected by the private sewers and directed towards the southeast corner of the property before discharging into the existing 750mm dia. storm sewer in March Road. It is anticipated that the on-site storm sewers will range from 250mm-675mm dia. in size. Based on a connection depth of approximately 2.3m and on-site sewer pipe slopes ranging from 0.18% to 0.50%, the on-site storm system should have a potential depth of cover of approximately 2.1m at the top end of the system. Similar to pre-development conditions, it is anticipated that sewer easements will be required under post-development conditions. Refer to **Figure 5** showing the existing storm sewer infrastructure and conceptual servicing layout.

Figure 5: Conceptual Storm Servicing Layout



The objective of the storm servicing design is to calculate the theoretical storm flows, to provide an overall storm servicing and stormwater management (SWM) concept, to establish functional storm sewer outlets; and to confirm the storm sewers in Terry Fox Drive, March Road and Hines Road have adequate capacity for the proposed development. A servicing agreement will be required if multiple property parcels are serviced by a common on-site storm sewer system. Additional investigations will be required to review and assess the potential re-use of the existing storm sewer outlets (if it is deep enough) as possible interim conditions depending on the proposed phases of development.

4.2.1 Storm Servicing and SWM Design Criteria

The City of Ottawa Design Guidelines were used to calculate the theoretical storm flows for the proposed development. **Table 4.1** summarizes the design criteria used in the preliminary analysis.

Table 4.1: Storm Sewer Design Criteria

Design Parameter	Criteria
SWM Quantity Control	Per previous design release rates (See Tables 4 and 4.2 for details), which is more stringent than the criteria provided by the City of Ottawa in the pre-consultation meeting minutes (i.e., Controlling 100-year post-development flows to a maximum allowable 5-year pre-development release rate based on a maximum C_w=0.5 and a 10 min. T_c.)
SWM Quality Control	Enhanced Level of Protection (i.e., 80% TSS Removal) per MVCA recommendations
Stormwater Design	Rational Method
IDF Rainfall Data	Ottawa Sewer Design Guidelines
Initial Time of Concentration (Tc)	10 minutes (minimum)
Minimum Velocity	0.8 m/s
Maximum Velocity	3.0 m/s
Minimum Diameter	250mm dia.

The intent is to use a combination of inlet control devices (ICD) and flow control roof drains to attenuate post-development storm flows from the proposed site. Post-development flows will be controlled to a maximum release rate equivalent to (or less than) the total pre-development flows for each of the respective storm sewer system, as identified in **Table 4**. Storm flows will be controlled up to and including the 100-year design storm. Stormwater will be temporarily stored within the underground storm sewer system, on surface depressions, on the building roofs, and/or within internal SWM storage tanks. A conceptual stormwater management plan has been developed for the proposed development, based on the conceptual site plan (prepared by others). Refer to **Figure 6** showing the conceptual post-development SWM catchment areas.

Figure 6: Conceptual Stormwater Management Plan

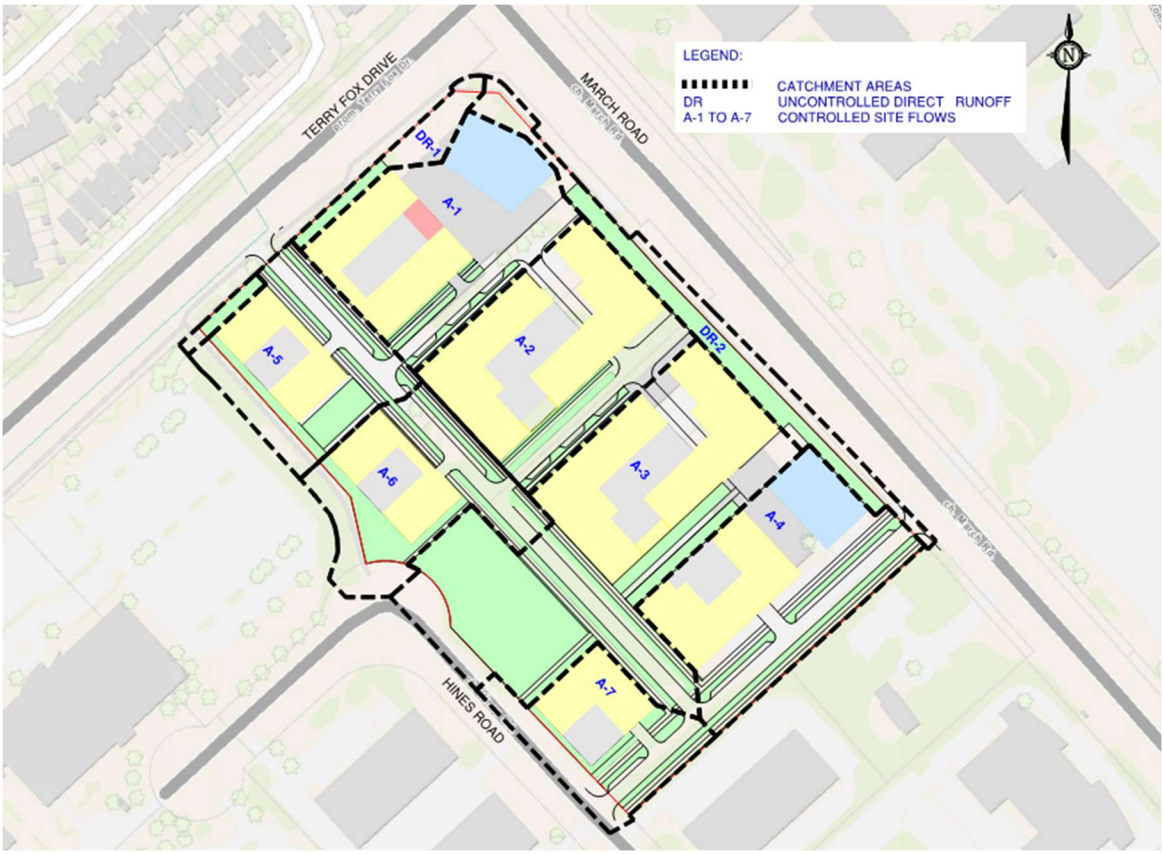


Table 4.2 summarizes the post-development flow and anticipated storage requirements for each of the site drainage areas.

Table 4.2: Conceptual Post-development Stormwater Management Summary

Area ID	Area (ha)	1:5 Year Weighted C_w	Storm Sewer Outlet Location	5-Year Storm	100-Year Storm	
				Release (L/s)	Release (L/s)	Storage Vol. Req'd (m^3)
DR-1	0.15	0.20	Terry Fox Drive	8.8	18.9	N/A
Total Post-Development Flow to Terry Fox Dr.				**8.8**	**18.9**	-
Pre-Development Flow to Terry Fox Drive*				**21.40**		
DR-2	0.35	0.20	March Road	20.2	43.3	N/A
A-1	0.81	0.70		40.0	40.0	225.3
A-2	0.84	0.84		40.0	40.0	300.7
A-3	1.48	0.64		75.0	75.0	360.7
A-4	0.83	0.76		40.0	40.0	256.7
A-5	0.59	0.65		30.0	30.0	142.4
A-6	0.59	0.68		30.0	30.0	156.8
A-7	0.44	0.71		22.0	22.0	124.9
Total Post-Development Flow to March Road				**297.2**	**320.3**	**1,567.6**
Pre-Development Flow to March Road*				**321.9**		

Total Post-Development Flow to Hines Road	**-**	**-**	-
Pre-Development Flow to Hines Road*	**52.8**		
Total Overall Post-Development Flow	**306.0**	**339.2**	**1,567.6**
Total Overall Pre-Development Flow	**396.1**		

*Pre-development values as indicated in Table 4.

In order to meet the pre-development release rates a total storage volume of approximately 1,600m^3 is anticipated to be required on site during the 100-year design event. Although not indicated in the table above, the total storage requirements for the site, during the 5-year design storm, are anticipated to be in the order of approximately 600m^3. As stated above, this would include a combination of underground storage within the on-site storm sewer system, on surface depressions, on the building roofs and/or within internal SWM storage tanks. Refer to **Appendix D** for preliminary calculations and to **Appendix F** for the **Post-Development Drainage Area Plan (C4.0)** for the associated drainage areas.

4.2.2 Stormwater Quality Control

The subject site is located within the Mississippi Valley Conservation Authority (MVCA) catchment area and is tributary to the Shirley's Brook, which is considered a cool-warm watercourse. Based on preliminary feedback from the MVCA, surface parking lots and drive aisles will require an 'Enhanced' Level of Protection (i.e., 80% TSS removal). Landscaped areas and roof tops are considered clean for the purposes of water quality and aquatic habitat protection. This level of quality control can be achieved via a treatment train combining possible raingardens, bio-swales in landscaped areas and mechanical treatment units such as an oil-grit separator installed near the downstream end of the on-site storm sewer system, prior to discharging storm flows into the municipal storm sewer in March Road. As indicated in the MVCA's Shirley's Brook 2016 Summary Report, the MVCA recommends that thermal mitigation measures be implemented in the overall SWM design. These measures could include the use of surface storage within landscaped areas (as opposed to within roadways and large parking lots), the use of internal or underground SWM storage tanks. Based on the concept plan, most of the parking will be provided within the buildings and/or underground, thus eliminating the potential for stormwater management within large parking lots prone to increase water temperatures. The use of white or green roof is another potential means of keeping stormwater temperatures lower. The SWM design, including both water quantity control measures, water quality control measures and thermal mitigation measures, will be refined at the detailed design stage. Refer to **Appendix A** for correspondence from the MVCA.

4.3 Storm Servicing and SWM Summary and Conclusions

The storm servicing and SWM design is based on the applicable City of Ottawa Design Guidelines and MVCA recommendations for water quality treatment. Based on preliminary calculations, total storage volume of approximately 600m^3 is anticipated to be required on site during the 5-year design event, while approximately 1,600m^3 of storage is anticipated to be required during the 100-year design event. It is anticipated that the necessary storage will be achieved by a combination of underground storage within the on-site storm sewer system, storage on surface depressions, storage on the building roofs and/or within internal SWM storage tanks. On-site quality control measures will be provided to ensure an 'Enhanced' Level of water quality treatment prior to discharging the stormwater into municipal storm sewer systems. Thermal mitigation measures will also be incorporated into the SWM design where possible. Based on preliminary analysis, it is anticipated that the storm sewers in Terry Fox Drive and Hines Road have adequate capacity to accommodate the proposed development.

As noted previously, the proposed development is anticipated to span several years. The proposed storm drainage and SWM works will need to correspond to the increased servicing needs of the specific development phase(s). The servicing designs and analyses will be refined as part of each phase of development, through the appropriate approvals process.

5.0 UTILITIES

Utilities such as gas, Hydro, and telecommunication services currently exist within the subject site and surrounding Right-of-Ways. Utility servicing will need to be designed and coordinated with the respective utility companies/providers as part of the various future development phases.

6.0 SITE GRADING

The existing site currently drops approximately 3m from the northwest property corner (~84.6m) down to the southeast property corner (~81.6m). With the exception of the northern portion of the 603 March Road property, the site is significantly lower than the surrounding roadways on the north (Terry Fox Drive), east (March Road) and west (Hines Road) sides. As a result of the existing topography, the major overland flow route for stormwater runoff drains south towards the neighboring property (525 March Road).

Under post-development conditions, the proposed site elevations will be dictated by the existing municipal roadway elevations surrounding the site. The internal roadways will therefore drop from approximately 83.3m and 83.6m at the proposed site entrance off Hines Road and Terry Fox Drive down to approximately 82.4m at the proposed entrance off March Road. The ground floor elevations of the proposed buildings will need to be set at appropriate elevations to tie into the proposed internal roadways and boulevards and to protect the buildings from potential flooding by meeting Minimum Building Elevations (MBE) guidelines set out by the City of Ottawa. The existing grades around the perimeter property lines will be maintained. To prevent the major overland flow route from draining onto the neighboring property to the south, a retaining wall with a minimum top of wall elevation varying from approximately 82.7m to 83.75m will be required along the south property line. This will ensure the major overland flow route is directed towards March Road. Refer to **Appendix F** for the **Conceptual Grading Plan** (C-2) for details.

The proposed grading and drainage designs will need to correspond to the needs of the specific development phase(s). The grading and drainage designs will be refined as part of each phase of development, through the appropriate approvals process.

7.0 DEVELOPMENT PHASING

The re-development of the subject site is anticipated to span several years. The construction of new sanitary and storm sewers and the looping of new on-site watermain networks, while maintaining service to the existing buildings (if applicable), will be a significant factor in the overall phasing of the development.

8.0 CONCLUSIONS AND RECOMMENDATIONS

The conceptual servicing, grading and stormwater management figures, plans and preliminary calculations illustrate 'how' the proposed mixed-use development can be serviced. The proposed grading, servicing and SWM designs will need to correspond to the needs of the specific development phase(s) and will be refined as part of each phase of development, through the appropriate approvals process. The preliminary servicing and SWM analysis, in consultation with the City of Ottawa, confirms the following:

Sanitary Servicing

- The proposed redevelopment can be accommodated by constructing new on-site sanitary sewers and providing a new connection to the sanitary trunk sewer in Hines Road.
- It is anticipated that the existing municipal sanitary sewer infrastructure has adequate capacity to service the proposed redevelopment (based on correspondence from the City of Ottawa).
- Drainage agreements will be required if multiple property parcels are serviced by a common on-site sanitary sewer system.

Water Supply Servicing

- The proposed redevelopment can be accommodated by constructing a new looped on-site watermain with connections to the municipal watermains in Terry Fox Drive and Hines Road.
- The existing municipal watermain infrastructure has adequate pressure and flow to meet the anticipated increased domestic demands and fire flow requirements of the proposed development.

Storm Drainage and Stormwater Management

- The proposed redevelopment can be accommodated by constructing new on-site storm sewers and providing new connections to the nearby municipal storm sewers.
- The proposed redevelopment provides an opportunity to control post-development flows, thus reducing peak flows to the nearby municipal storm sewer systems.
- Drainage agreements will be required if multiple property parcels are serviced by a common on-site storm sewer system.
- Stormwater management objectives (i.e.: quantity control measures) can be met by using a combination of control flow roof drains, inlet control devices (ICD) within the on-site storm sewer systems and/or the use of underground and/or internal SWM storage tanks. The post-development flows will be controlled for all storm up to and including the 100-year event.
- Stormwater management quality control objectives (i.e., an Enhanced Level of Protection, or 80% TSS removal and thermal mitigation measures) can be achieved via a treatment train combining possible raingardens, bio-swales in landscaped areas and mechanical treatment units such as an oil-grit separator installed near the downstream end of the on-site storm sewer system, prior to discharging storm flows into the municipal storm sewer in March Road.

Utilities

- Utilities and telecommunication services currently exist within the development area. Utility servicing will be designed and coordinated with the respective utility companies/providers as part of the various development phases.

Development Phasing

- The re-development of the 555, 591, 595 and 603 March Road properties will be completed in multiple phases, spanning many years, and will require important servicing installations to accommodate the proposed development.

NOVATECH

Prepared by:

Devang Maratha, E.I.T.

Reviewed by:

François Thauvette, P. Eng.
Senior Project Manager

APPENDIX A

Project Correspondence

Date: August 19, 2022

ADDRESS: 555, 591, 595 & 603 March Road
Pre-Consultation Meeting Minutes
Meeting Date: July 26, 2022

Attendee	Role	Organization
Lisa Stern	File Lead	City of Ottawa
Allison Hamlin	Manager	
Randolph Wang	Urban Designer	
Julie Candow	Infrastructure Project Manger	
Mike Giampa	Transportation	
Jeff Goettling	Parks Planning	
Mike Schmidt	Policy Planning	
Greg Winters	Planner	Novatech
James Ireland		
Francois Thauvette	Engineer	
Brad Byvelds	Transportation Engineer	
Daniel Byrne	Land Owner	Main and Main Developments
Fel Petti		

Comments from the Applicant:

1. Rezoning and site plan for a mixed use development with heights ranging from 6-30 storeys at the corner of Terry Fox and March Road.

Planning Comments:

Applications:

1) The application will require an Official Plan Amendment and Major Zoning Bylaw Amendment. The application form, timeline and fee can be found here. It is recommended that the application wait for the approval of the new Official Plan by the Province for submission, as the Council adopted Official Plan permits residential uses in this area. Until such a time as the "New" Official Plan is approved, the more restrictive policy between the two plans applies.

2) A high level concept was provided at the preconsultation. A subsequent preconsultation for a site plan/plan of subdivision will be required when more information about form of development, public realm and phasing has been determined. The below notes constitute a preconsultation for the Official Plan Amendment and Rezoning only.

    a) A Plan of subdivision may be required to facilitate the dedication of public roadways through the site.
    b) This site is appropriate for a master site plan. Through this process, high-level servicing and transportation studies would be approved. The urban design component should also address the expectations for the public realm for each phase being constructed, such as urban design treatments for buildings to ensure that each phase compliments one another and the expectations are guided in the long term. It is also recommended to consider the transitory land uses throughout the phases.

3) The subject lands are designated Urban Employment Area in the existing Official Plan. Site Specific Policy3.6.5.9 applies to the Kanata North Technology Park which states that residential uses may be permitted by an amendment to the zoning bylaw provided that criteria including:
   a) A secondary plan is prepared to the City's Satisfaction
   b) Residential uses are linked to adjacent areas by roadways and pathways
   c) The amelioration of potential adverse impacts from adjacent non-residential uses can be achieved.

   An amendment to this plan is required.

4) The Council Adopted Official Plan designates this area as the Kanata North Economic District and March Road is identified as a Mainstreet Corridor. The Kanata North Economic District permits high density residential and mixed use development within "activity centres" generally within 600 metres of the planned transit way stations at Terry Fox and Station Road.
   a) The policies of 6.6.3.2 provide guidance to how the area should develop including:
      i) A focus on active transportation modes;
      ii) Creating a finer gride pattern and introducing new private or public streets and walkways. Consider new connections to reduce the block length including exploring one or more new intersections between Solandt/March Road and Terry Fox/March Road;
      iii) Providing a signature urban plazas that will be framed by buildings with additional at grade private spaces for cafés, restaurants and other arts, entertainment and makerspace ;
      iv) Development shall not require minimum parking;
      v)) On March Road, engage visitors, residents and employees through the combination of right of way and elements within the front yard setback such as double rows of trees, lighting, signage, furniture, a variety of digital, interactive and other forms of public art, and the definition provided by adjacent landscaping and buildings. This corridor will be enhanced overtime with the introduction of bus rapid transit, cycling lanes separated from vehicles, and over time replacing surface parking adjacent to the street

5) The site Zoned IG6 S183, IP6[1084] H(12) S 183 and IP6[1149] H(12) S 183 which permit industrial uses.

Policy and Guidelines

6) The subject lands are located within the boundaries of the Kanata North Technology Park, adjacent to a future Bus Rapid Transit station at the March Road and Terry Fox intersection. There are a number of relevant policy and guideline documents that should help guide the design of this development. Please provide an analysis of the following documents and any others that may apply in the Planning Rationale and Design Brief:

   - Bird-safe Design guidelines
   - Transit Oriented Development guidelines
   - Urban Design Guidelines for High-rise Buildings

Comments:

7) More detail is needed to better understand this proposal, what the design objectives will be and how the community will be designed as a whole, particularly if it will be developed over a long period of time and through multiple phases.

8) Additional detail and analysis is needed to better evaluate important aspects of proposal, including:

    a) Connectivity to the surrounding community and proposed development on the Nokia site and how that influences proposed land uses;
    b) How well the pedestrian/bicycle circulation works on site and connecting to the larger area;
    c) What will the public realm treatment be (what will the pedestrian experience be and what is anticipated for the raised parking garages) – are the proposed rights of way wide enough from a functionality and design perspective;
    d) Where will the stepbacks on the building be and how big are they;
    e) Open space strategy (what is the interface between the public and private lands and what is envisioned for the POPs.).
    f) Road tenures and widths.
    g) Parkland Dedication, location and configuration.

    Additional discussions with City Staff regarding the above is required prior to submission – more than one meeting will be required. A summary of these discussions is requirement of a complete Planning Rationale.

9) A high-level master planning document is needed as part of your submission to help ensure a cohesive vision for the design for the entire area and a consistent design approach throughout the various phases. This should include the policy and regulatory framework, contextual analysis, the vision, design objectives and guidelines, connectivity and circulation, landscaping strategy, street sections, design precedents, phasing strategy, open space network, building heights, massing and renderings with an emphasis on the pedestrian experience, etc. As per the direction of the Council adopted Official Plan, a concept plan is required to determine:

    a) Locations of proposed land uses, including retail uses, building density and heights;
    b) Connectivity studies to examine where active transportation linkages are needed. It is recommended that the extension of Hines Road as a public road connection to Terry Fox Drive be explored;
    c) Shared parking or other possible solutions such as autonomous vehicles will be explored;
    d) A parks plan to identify parks requirement based upon the maximum potential for development anticipated

10) The Planning Rationale should discuss surrounding land uses and contain an evaluation of Provincial D-6 guidelines to ensure compatibility of contemplated residential uses.

11) Are there any standards proposed for architectural expression or sustainability? (for example Net Zero or Passive House).

12) Please be cognizant of the new Official Plan and the intent for high performance development standards.

13) The Planning Rationale should discuss how community benefit is provided. Please discuss Section 37, part of this analysis should include a synopsis of discussions with the Ward Councilllor. However, please note that the Community Benefits Charge is expected to be applicable at the time of submission rather than Section 37.

Urban Design (Randolph.wang@ottawa.ca):

1. A Design Brief is required. The Terms of Reference of the Design Brief is attached for convenience.
    a. Please engage a wind engineer in the master site plan process. Although a detailed quantitative study may be conducted at a later stage a qualitative analysis to ensure the master plan works well for micro-climate and pedestrian comfort will be necessary and helpful.
2. The site is located within a Design Priority Area under the new Official Plan. However, UDRP review is optional for the Kanata North Business Park based on new OP.
3. The preliminary master plan concept presented at the preconsultation displays considerable planning and urban design merits. However, a number of practical issues will need to be addressed, including the location and size of a new park and the design of the street network including potential signalized intersection on March Road, etc. It is anticipated that the master site plan layout will change after the above-mentioned practical issues are successfully addressed.
    a. The approach to block patten design and built form shown in the preliminary master plan is appropriate. However, the development appears to be “very dense” despite the overall modest unit count.
    b. The direction to create a mix of uses is appropriate although the detailed mix requires further study and confirmation;
    c. The location, scale, and viability of commercial/retail require further study. Is March Road the most appropriate location for commercial/retail? Who might be the most likely users of the commercial/retail facilities and where will they likely come from by which mode of transportation? Should the commercial/retail cater to the employees in the business park? If so, should the commercial/retail space be located at a place most convenient to these potential clients by foot?
    d. A mix of mid-rise and high-rise bult forms is appropriate. Are there opportunities for low-rise ground-oriented housing types at this location?
    e. The conceptual street cross sections are of good scale in general. However, the master plan only contemplates proportionally narrow streets. Should there be a variety of street typologies with both narrow and wide streets being contemplated?
    f. The courtyard spaces between buildings are also appropriate. However, most of them appear to be proportionally narrow.
    g. The idea of at grade parking wrapped around by active uses require further study. A large portion of the at grade space may be occupied by loading, garage storage, etc. Where at grade parking is contemplated, considerations should be given to future adaptive uses, which require careful considerations of things such as floor to ceiling height.

4. In addition to the above comments on the site design itself, moving forward, please continue to explore, articulate, and illustrate the following critical edge conditions:
    a. The vision and characteristics of March Road, which will require coordination with the all stakeholders including the City and the proponent of the "Nokia site" across the street.
        i. What will the street cross section (between buildings) look like?
        ii. How should the street be animated?
        iii. Should buildings on March Road have a street address on that street?
        iv. Will buildings on March Road require pick-up and drop-off facilities on March Road? If so, how should these facilities be designed?
    b. The vision and characteristics of Terry Fox, with recognition that it is practically a one-sided street.
    c. The relationship with the abutting properties to the south and the west.
        i. Do these abutting properties have potential to be redeveloped and intensified?
        ii. If so, how will the redevelopment and intensification on these properties look like and how should the master plan of this site respond to and be prepared for the future conditions on these abutting property?
        iii.

Parks (jeff.goettling@ottawa.ca)

1. The Owner/ proponent is to anticipate a land first requirement for parkland dedication. This in accordance to the new Official Plan Section 4.4.1 2) b) and as stated in the Council approved Parks and Recreation Master Plan Sections 4, 6, and 7.2.

2. Based on the draft 'March Road Kanata Redevelopment Pre-Application Consultation' document dated July 2022 indicating a mix of proposed commercial (office/ retail) and residential units, the development application shall include a parkland dedication/ conveyance (land dedication and park development). This in accordance with the City's Parkland Dedication By-law No. 2009-95 (subject to a 2022 update) and the Parkland Development Manuel (most current edition).

3. Has there been any past Parkland Dedication credited to the subject property parcel(s)? If so, please provide the associated documentation for Parks and Facilities Planning (PFP) review/ consideration. The conveyance of land for purposes or the payment of money in-lieu of accepting the conveyance is not required for development, redevelopment, subdivisions or consents, where it is known, or can be demonstrated that the required parkland conveyance or money in-lieu thereof has been previously satisfied.

4. Parks and Facilities Planning (PFP) requests that the proponent describe in detail within the planning rationale or by other means how the application will meet the Parkland Dedication (By-law No. 2009-95) requirements.

5. PFP recognizes that the current development proposal (for an official plan and zoning by-law amendment) is subject to further revisions and development details. Due in part to the limited existing public parkland in the Kanata North Technology Park (KNTP), PFP will require parkland and (at a minimum) a constructed Parkette for the proposed development.

6. The following parkland dedication requirements are based on the new Parkland Dedication By-law that is anticipated to take effect in September 2022. The current parkland dedication (estimate per the provided information) has been calculated on the assumption that the 13.609 acre (5.507 ha) site will be 85% residential and 15% commercial (office/ retail).

- 20% of the gross land area for the residential component 10 storeys (high-rise) or greater:
  1.722 acres (1.101 ha) x 25% (park conveyance) = 0.680 acres (0.275 ha)
- 65% of the gross land area for the residential component 5 to 9 storeys (mid-rise):
  8.846 acres (3.580ha) x 15% (park conveyance) = 1.326 acres (0.536 ha)

- 15% of the gross land area for the commercial:
  2.041 acres (0.826 ha) x 2% (park conveyance) = 0.040 acres (0.016 ha)

The above calculations (including the percentage estimates for high-rise and mid-rise gross land areas) are based on the '3d Massing' page 11 illustration from the draft 'March Road Kanata Redevelopment Pre-Application Consultation' document dated July 2022. Refer to the below image for reference.

Therefore, an approximate 2.046 acre (0.827 ha) Parkette preferably located in the southern corner of the site adjacent to Hines Road will be required (land dedication and park construction) as described within the Park Development Manual - 2nd Edition section 2.4.4 PARK DEVELOPMENT MANUAL (ottawa.ca) or most current edition. The Parkette shall supplement the neighbourhood's park network and shall not be considered as the sole classification of parkland in this community. PFP requests a 50% minimum park street frontage located on a non-arterial/ non-major collector public road.

7. PFP requests that the planned new Public Park (Parkette) location, shape and size be identified on a revised new concept/ site plan.

8. The proponent will need to ensure that they are aware of the 'Park Development Local Servicing Provisions (effective 2014)' for the provision of parks located outside of the greenbelt. Refer to the following web link Fees and funding programs | City of Ottawa In summary, the construction costs associated with local parks are identified as part of the provision for local servicing, which means the emplacement of the infrastructure is the financial responsibility of the developer/ landowner. The current 2021 applicable active rate for the local park servicing requirement is $692,796.00 per hectare.

9. PFP requests that a Parkland Dedication holding provision be placed over the entire site or on the remaining site area after the first development application is submitted (for example, once a phasing plan is in place). The condition to lift the hold will be that the Parkland Dedication for the entire or remaining portion of the site is delineated, conveyed and funded. This to occur when the first development application is submitted/ approved including the roadway delineation(s).

10. A landowner's agreement will be required for the Parkland Dedication and associated construction if there is proposed to be more than one owner/ applicant for the site. A cost sharing agreement and area parks plan among all the landowners will be required. This to coordinate several developers, ensure collaboration, allocate the required parkland dedication and to obtain the most optimal park location for the above noted area(s). This to include assembling one or more larger park(s). Where such a park cost sharing agreement is required, the City shall require the submission of a copy of the executed agreement to the City as a condition of site plan approval.

11. Pursuant to the new 2022 OP policies Section 6.6.3.2 Kanata North Economic District: 1b) 4b) and 4d), one or more public accessible urban plaza(s) will be required to meet the residential development needs of the Kanata North Economic District. The urban plaza requirement is in addition to the Parkland Dedication requirement [land dedication and park development (one Parkette)].

12. The urban plaza requirements and identified 'Green Spine'/ 'Proposed MUP' streets should be directed by a Design Guideline Study (created specifically for the development site). All Study and Study terms of reference [e.g. design plan(s), details, material palette(s)] and construction shall be completed to the satisfaction and approval of the General Manager, Planning, Real Estate and Economic Development Department (PRED). The Study shall be initiated and paid for by the subject development/ land owner(s).

13. Parks and Facilities Planning (PFP) is currently undertaking a legislated replacement of the Parkland Dedication By-law, with the new by-law to be considered by City Council on August 31, 2022. The by-law recommended for approval by Council increases the required parkland conveyance for mid-rise and high-rise residential development, and includes one-year transition policies for in-stream development and building permit applications or those that will be submitted and meet the requirements for completeness by September 1, 2022.

To ensure you are aware of parkland dedication requirements for your proposed development, we encourage you to familiarize yourself with the staff report and recommended by-law that were recommended for Council approval by Planning Committee on July 7, 2022. For any questions or information, please contact the project lead at Kersten.Nitsche@ottawa.ca .

Engineering (Julie.candow@ottawa.ca)

1. The Servicing Study Guidelines for Development Applications are available at the following address: https://ottawa.ca/en/planning-development-and-construction/developing-property/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#servicing-study-guidelines-development-applications

2. Servicing and site works shall be in accordance with the following documents:
   - ⇨ Ottawa Sewer Design Guidelines (October 2012)
   - ⇨ Ottawa Design Guidelines – Water Distribution (2010)
   - ⇨ Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007, revised 2008)
   - ⇨ City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
   - ⇨ City of Ottawa Environmental Noise Control Guidelines (January 2016)
   - ⇨ City of Ottawa Park and Pathway Development Manual (2012)
   - ⇨ City of Ottawa Accessibility Design Standards (2012)

- ⇨ Ottawa Standard Tender Documents (latest version)
- ⇨ Ontario Provincial Standards for Roads & Public Works (2013)

3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x.44455).

4. Watermain Infrastructure:

   a) The site is currently serviced by two private watermains fed by a 406mm diameter watermain on Hines Road. The future internal watermain network must be looped and capacity should be available in the 406 mm diameter main to ensure normal operating pressures are met under a basic day, peak hour and max day plus fire flow scenario. A water boundary condition request is needed for any new water connection to the City main.

   b) Existing watermain connections may be considered for interim phasing. Further comments to be provided at the Site Plan Control stage.

   c) As per Section 4.4.7.2 of the Ottawa Design Guidelines – Water Distribution, a DMA (District Metering Area) chamber will be required for private developments serviced by a connection 150mm or larger.

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

      i. Location of service

      ii. Type of development and the amount of fire flow required (as per OBC Section 7.2.11 or FUS for fire flows 9,000 L/min or above – See technical bulletin ISTB 2021-03).

      iii. Average daily demand: ___ l/s.

      iv. Maximum daily demand: ___l/s.

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

5. Sanitary / Storm Infrastructure:

   a) The site is currently serviced by the 600 mm diameter backbone sanitary sewer on Hines Road. It is anticipated that capacity will be available in the trunk sewer to accommodate the site. The future connection to the backbone sewer should be discussed with Asset Management once a concept / phasing plan is available. Additional information on sewer capacity will be available once the Wastewater Master Plan is complete (anticipated Fall 2022).

   b) Existing sanitary / storm connections may be considered for interim phasing. Further comments to be provided at the Site Plan Control stage. Please confirm the location and size of the existing service laterals onsite. If the existing service laterals are to be re-used, please provide CCTV inspection reports to confirm the condition of the existing services.

   c) New services must be grouped in a common trench to minimize the number of road cuts.

d) A monitoring maintenance hole for storm and sanitary sewers shall be required just inside the property line for all non-residential building connections from a private sewer to a public sewer. See the sewer use by-law for details.

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

   a) The 5-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.

   b) The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).

   c) A calculated time of concentration (Cannot be less than 10 minutes).

   d) Flows to the storm sewer in excess of the 5-year storm release rate, up to and including the 100-year storm event, must be detained on site.

   e) Quality control to be provided as specified by the MVCA.

7. MECP ECA Requirements

   An MECP Environmental Compliance Approval will be required for this application unless the proposed development meets the following exemption criteria:

   a) Is designed to service one lot or parcel of land;

   b) Discharges into a storm sewer that is not a combined sewer;

   c) Does not service industrial land or a structure located on industrial land; and

   d) Is not located on industrial land. O.Reg. 525/98, s. 3; O.Reg. 40/15, s. 4.

8. Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.

Transportation (mike.giampa@ottawa.ca)

1. A TIA is warranted- please proceed to scoping. Study area has already been confirmed.
2. The application will not be deemed complete until the submission of the draft step 2-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
3. Although a full review of the TIA Strategy report (Step 4) is not required prior to an application, it is strongly recommended. Synchro files are required at Step 4 to deem the application complete.
4. March Road access is currently restricted, but a full movement could be explored with a protected traffic signal.
5. ROW protections on both March Road and Terry Fox Drive are 44.5m.
6. Corner sight triangle: no less then 5m x 5m
7. A Road Noise Impact Study is required
8. If the internal road network is private, then throat length requirements should follow the TAC guidelines for arterial roads.
9. If the internal road network is public, proper pedestrian and cycling infrastructure is required.
10. Please note that all new applications must use the NEW TRANS Trip Generation Manual when forecasting site generated trips using this manual.

Forestry (mark.richardson@ottawa.ca)

TCR requirements:

1. a Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City
    a. an approved TCR is a requirement of Site Plan approval.
    b. A preliminary TCR should be included with any zoning application
2. Any removal of privately-owned trees 10cm or larger in diameter, or city-owned trees of any diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.
3. the TCR must list all trees on site, as well as off-site trees if the CRZ extends into the developed area, by species, diameter and health condition
    a. groupings of trees may be combined as stands using averages, and overall tree health information
4. please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)
5. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained
6. All retained trees must be shown, and all retained trees within the area impacted by the development process must be protected as per City guidelines available at Tree Protection Specification or by searching Ottawa.ca
        a. the location of tree protection fencing must be shown on the plan
7. the City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.
8. For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca or on City of Ottawa

LP tree planting requirements:

For additional information on the following please contact adam.palmer@Ottawa.ca

Minimum Setbacks

- Maintain 1.5m from sidewalk or MUP/cycle track or water service laterals.
- Maintain 2.5m from curb
- Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.
- Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing, except where otherwise approved in naturalization / afforestation areas. Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.

Tree specifications

- Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
- Maximize the use of large deciduous species wherever possible to maximize future canopy coverage
- Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).
- Plant native trees whenever possible

- No root barriers, dead-man anchor systems, or planters are permitted.
- No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

Hard surface planting

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

Soil Volume

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

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

Please note that these soil volumes are not applicable in cases with Sensitive Marine Clay.

Sensitive Marine Clay

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

Tree Canopy Cover

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

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

These pre-con comments are valid for one year. If you submit a development application(s) after this time, you may be required to meet for another pre-consultation meeting and/or the submission requirements may change. You are as well encouraged to contact us for a follow-up meeting if the plan/concept will be further refined.
Please contact me at Lisa.Stern@ottawa.ca or at 613-580-2424 extension 21108 if you have any questions.

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 here:

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

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

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		3
A	3	36.Phase 2 Environmental Site Assessment (depends on the outcome of Phase 1)	37.Assessment of Landform Features		3
	3	38.Record of Site Condition	39.Mineral Resource Impact Assessment		3
S	3	40.Tree Conservation Report	41.Environmental Impact Statement / Impact Assessment of Endangered Species		3
	3	42.Mine Hazard Study / Abandoned Pit or Quarry Study	43.Integrated Environmental Review (Draft, as part of Planning Rationale)		3

S/A	Number of copies	ADDITIONAL REQUIREMENTS		S/A	Number of copies
S	1	44. Applicant's Public Consultation Strategy (may be provided as part of the Planning Rationale)	45.Site Lighting Plan		3
A	1	46. Site Lighting Certification Letter	47.		

Meeting Date: July 26, 2022

Application Type: *Rezoning (Official Plan Amendment)*

File Lead (Assigned Planner): Lisa Stern

Infrastructure Approvals Project Manager: Julie Candow

Site Address (Municipal Address):555 March Road

*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, Real Estate and Economic Development 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, Real Estate and Economic Development Department.

Francois Thauvette

From: Mercedes Liedtke <mliedtke@mvc.on.ca>
Sent: Tuesday, October 25, 2022 9:03 AM
To: Francois Thauvette; Jane Cho
Subject: RE: 555, 591, 595 and 603 March Road - Mixed-Use Development - MVCA Pre-Consultation

Good Morning Francois,

The subject properties are not regulated by MVCA under Ontario Regulation 153/06. An enhanced level of water quality treatment (80% TSS Removal) is recommended for the site. Shirley's brook is considered a cool-warm watercourse, and MVCA recommends thermal mitigation.

The Shirley's Brook and Watts Creek Subwatershed Study provides further information regarding Shirley's Brook. MVCA completed a Catchment Report for Shirley's Brook in 2016 as a part of the City Stream Watch program which may also provide some relevant background materials.

Please let me know if you have any questions.

Thank you,

Mercedes Liedtke, MSc.| Environmental Planner | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON K7C 3P1
www.mvc.on.ca | t. 613 253 0006 ext. 267 | f. 613 253 0122 | mliedtke@mvc.on.ca

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From: Francois Thauvette <f.thauvette@novatech-eng.com>
Sent: October 24, 2022 10:03 AM
To: Mercedes Liedtke <mliedtke@mvc.on.ca>; Jane Cho <jcho@mvc.on.ca>
Subject: 555, 591, 595 and 603 March Road - Mixed-Use Development - MVCA Pre-Consultation

Hi Mercedes and Jane,

As discussed during our Teams call this morning, we are working on a large mixed-use development at 555, 591, 595 and 603 March Road (merged properties). See attached concept plan for details. The intent is to direct most of the site storm flows (excl. narrow landscaped areas adjacent to the property lines) towards the municipal storm sewer which flows south in March Road. The on-site SWM design will include both the stormwater quantity control measures specified by the City of Ottawa in addition to any stormwater quality control measures required by the MVCA (assumed to be an 'Enhanced' Level of Protection or 80% TSS Removal). Please review and confirm the stormwater quality control requirements for the subject site. We will use this e-mail as a record of our pre-consultation with the MVCA.

Regards,

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

APPENDIX B

Preliminary Sanitary Sewage Calculations, Sanitary Sewer Design Sheet

NOVATECH
Engineers, Planners & Landscape Architects

555, 591, 595 AND 603 MARCH ROAD SANITARY FLOWS

BLOCK ID	RESIDENTIAL				OFFICE		RETAIL		INFILTRATION			Total Flow (l/s)
	Units	Pop.	Peak Factor	Peak Flow (l/s)	Floor Area (m^2)	Peak Flow (L/s)	Floor Area (m^2)	Peak Flow (L/s)	Total Area (ha)	Accum. Area (ha)	Infilt. Flow (l/s)	
Block A	182	328	3.2	3.45	8115	1.14	1162	0.06	0.95	0.95	0.31	4.96
Block B	677	1219	3.0	11.83					1.00	1.00	0.33	12.16
Block C	634	1141	3.0	11.13			467	0.02	0.97	0.97	0.32	11.47
Block D	293	527	3.2	5.41	6209	0.87	1296	0.06	1.02	1.02	0.34	6.68
Block E	314	565	3.2	5.78					1.62	1.62	0.53	6.31
Total	**2100**	**3780**		**37.61**		**2.01**		**0.14**	**5.55**		**1.83**	**41.59**

Design Parameters:

- Average Apartment = 1.8 persons/unit

Section 4.0 Ottawa Sewer Design Guidelines

- Average Domestic Flow	280	L/person/day
- Office Flow (9.3m2/person)	75	L/person/day)
- Retail Area Flow	28000	L/gross ha/day)
- Extraneous Flows	0.33	l/s/ha
Residential Peaking Factor	Harmon Equation	
Commercial Peaking Factor	1.5	

Project No. 122125
Project Name: 555, 591, 595 and 603 March Road
Project Location: Ottawa

Engineers, Planners & Landscape Architects

Date: November 2022

Sanitary Sewer Design Sheet

		Residential Flow				Commercial / Retail Flow								PIPE					
FROM	TO	TOTAL POPULATION	PEAK FACTOR	PEAK FLOW (l/s)	ACCUM PEAK FLOW (l/s)	AREA (ha)	PEAK FACTOR	PEAK FLOW (l/s)	ACCUM PEAK FLOW (l/s)	INFL AREA	INFL FLOW (L/s)	ACCUM INFL FLOW (L/s)	TOTAL PEAK FLOW (l/s)	PIPE SIZE (mm)	PIPE SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	VELOCITY (m/s)	Q/Qfull
SANMH 113	SANMH 103	328	3.2	3.45	3.45	0.930	1.5	1.20	1.20	0.95	0.31	0.31	4.97	250	0.35	110.4	35.1	0.7	14.1%
SANMH 101	SANMH 103	189	3.2	1.96	1.96	0.000		0.00	0.00	0.41	0.14	0.14	2.10	250	0.35	66.6	35.1	0.7	6.0%
SANMH 103	SANMH 105	189	3.2	1.96	7.37	0.000		0.00	1.20	0.36	0.12	0.57	9.14	250	0.35	78.2	35.1	0.7	26.0%
SANMH 115	SANMH 105	2360	3.0	22.96	22.96	0.000		0.00	0.00	2.05	0.68	0.68	23.64	250	0.50	109.9	42.0	0.9	56.3%
SANMH 105	SANMH 111	0	0.0	0.00	30.33	0.047	1.5	0.02	1.22	0.46	0.15	1.40	32.95	250	0.80	74.4	53.1	1.1	62.0%
SANMH 111	SANMH 107	0	0.0	0.00	30.33	0.000		0.00	1.22	0.00	0.00	1.40	32.95	250	0.80	66.3	53.1	1.1	62.0%
SANMH 117	SANMH 107	527	3.2	5.41	5.41	0.750	1.5	0.93	0.93	0.93	0.31	0.31	6.65	250	0.35	109.0	35.1	0.7	18.9%
SANMH 107	SANMH 109	187	3.1	1.86	37.61	0.000		0.00	2.15	0.39	0.13	1.83	41.59	300	0.50	55.1	68.3	1.0	60.9%
SANMH 109	EX 600mm SAN	0	0.0	0.00	37.61	0.000		0.00	2.15	0.00	0.00	1.83	41.59	300	0.50	12.7	68.3	1.0	60.9%

Notes: Refer to Peak Sanitary Flow Calculation sheet for detailed peak flows calculations.

Design Parameters:

City of Ottawa Sewer Design Guidelines (Appendix 4-A)

- Extraneous Flows 0.33 l/s/ha
- Commercial Peaking Factor 1.5

APPENDIX C

Preliminary Water Demand and FUS Calculations, Municipal Watermain Boundary Conditions

NOVATECH
Engineers, Planners & Landscape Architects

555-603 MARCH ROAD
WATER DEMAND

JOB NO. 122125
DATE PREPARED: OCTOBER 2022

BLOCK ID	Residential Demand (L/s)					Office Demand (L/s)				Retail Demand (L/s)				Total Demand (L/s)		
	Apartment Unit Count	Total Population	Avg Day	Max. Daily	Peak Hour	Floor Area (m^2)	Avg Day	Max. Daily	Peak Hour	Floor Area (m^2)	Avg Day	Max. Daily	Peak Hour	Avg Day	Max. Daily	Peak Hour
Block A	182	328	1.06	2.13	3.19	8115.0	0.757	1.136	2.045	1162.0	0.038	0.056	0.102	1.86	3.32	5.34
Block B	677	1219	3.95	7.90	11.85	0.0	0.000	0.000	0.000	0.0	0.000	0.000	0.000	3.95	7.90	11.85
Block C	634	1141	3.70	7.40	11.09	0.0	0.000	0.000	0.000	467.0	0.015	0.023	0.041	3.71	7.42	11.13
Block D	293	527	1.71	3.42	5.12	6209.0	0.580	0.869	1.565	1296.0	0.042	0.063	0.113	2.33	4.35	6.80
Block E	314	565	1.83	3.66	5.49	0.0	0.000	0.000	0.000	0.0	0.000	0.000	0.000	1.83	3.66	5.49
Total	2100	3780												**13.68**	**26.65**	**40.62**

Design Parameters:

Average Apartment	**1.8**	person/unit
Section 4.0 Ottawa Sewer Design Guidelines		
- Average Domestic Flow	280	L/person/day
- Office Flow (9.3m2/person)	75	L/person/day)
- Retail Area Flow	28000	L/(gross ha/day)

Peaking Factors: Table 3-1 MOE Guideline for Drinking Water systems (pop. 3001-10000) & Section 3.4.3

Max. Daily Demand:		
- Residential	2.0	x Avg Day
- Office/Retail	1.5	x Avg Day
Peak Hourly Demand:		
- Residential	3.0	x Avg Day
- Office/Retail	1.8	x Max Day

FUS - Fire Flow Calculations

As per 2020 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 122125
Project Name: 555-603 March Road, Building A2-A3
Date: 10/6/2022
Input By: DMM
Reviewed By: F. Thauvette

Legend: Input by User; No Information or Input Required

Building Description: 8 & 6-Storey Mixed Use Buildings with Podium
Type II - Non-combustible construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Type V - Wood frame		1.5	0.8	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	Yes	0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Podium Level Footprint (m^2)	2771			
		Total Floors/Storeys (Podium)	2			
		Tower Footprint (m^2)	1859			
		Total Floors/Storeys (Tower)	6			
		Protected Openings (1 hr)				
		Area of structure considered (m^2)			**11,119**	
	F	**Base fire flow without reductions**				**19,000**
		F = 220 C (A)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**16,150**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction (100% sprinkler coverage of building used)**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-8,075**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Total	**-50%**	
5	**Exposure Surcharge (cumulative %, Maximum Exposure Adjustment Charge Used)**				**Surcharge**	
	(3)	North Side	> 45.1m		0%	**5,653**
		East Side	10.1 - 20 m		15%	
		South Side	20.1 - 30 m		10%	
		West Side	20.1 - 30 m		10%	
				Cumulative Total	**35%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**14,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**233**
				or	USGPM	3,699
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	3
		Required Volume of Fire Flow (m^3)			m^3	2520

FUS - Fire Flow Calculations

As per 2020 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 122125
Project Name: 555-603 March Road, Building B2
Date: 10/6/2022
Input By: DMM
Reviewed By: F. Thauvette

Legend: Input by User; No Information or Input Required

Building Description: 25-Storey Residential Building with Podium
Type II - Non-combustible construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Type V - Wood frame		1.5	0.8	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	Yes	0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Podium Level Footprint (m^2)	3068			
		Total Floors/Storeys (Podium)	6			
		Tower Footprint (m^2)	744			
		Total Floors/Storeys (Tower)	19			
		Protected Openings (1 hr)				
		Area of structure considered (m^2)			**14,169**	
	F	**Base fire flow without reductions**				**21,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**17,850**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction (100% sprinkler coverage of building used)**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-8,925**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Total	**-50%**	
5	**Exposure Surcharge (cumulative %, Maximum Exposure Adjustment Charge Used)**				**Surcharge**	
	(3)	North Side	20.1 - 30 m		10%	**9,818**
		East Side	0 - 3 m		25%	
		South Side	20.1 - 30 m		10%	
		West Side	20.1 - 30 m		10%	
				Cumulative Total	**55%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**19,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**317**
				or	USGPM	5,020
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	4
		Required Volume of Fire Flow (m^3)			m^3	4560

FUS - Fire Flow Calculations

As per 2020 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 122125
Project Name: 555-603 March Road, Building C2
Date: 10/6/2022
Input By: DMM
Reviewed By: F. Thauvette

Legend: Input by User; No Information or Input Required

Building Description: 24-Storey Mixed-Use Building with Podium
Type II - Non-combustible construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Type V - Wood frame		1.5	0.8	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	Yes	0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Podium Level Footprint (m^2)	3069			
		Total Floors/Storeys (Podium)	6			
		Tower Footprint (m^2)	744			
		Total Floors/Storeys (Tower)	18			
		Protected Openings (1 hr)				
		Area of structure considered (m^2)			**14,173**	
	F	**Base fire flow without reductions**				**21,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**17,850**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction (100% sprinkler coverage of building used)**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-8,925**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Total	**-50%**	
5	**Exposure Surcharge (cumulative %, Maximum Exposure Adjustment Charge Used)**				**Surcharge**	
	(3)	North Side	20.1 - 30 m		10%	**8,925**
		East Side	0 - 3 m		25%	
		South Side	10.1 - 20 m		15%	
		West Side	> 45.1m		0%	
				Cumulative Total	**50%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**18,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**300**
				or	USGPM	4,756
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	4
		Required Volume of Fire Flow (m^3)			m^3	4320

FUS - Fire Flow Calculations

As per 2020 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 122125
Project Name: 555-603 March Road, Building D2-D3
Date: 10/6/2022
Input By: DMM
Reviewed By: F. Thauvette

Legend: Input by User; No Information or Input Required

Building Description: 7 & 24-Storey Mixed-Use Buildings with Podium
Type II - Non-combustible construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Type V - Wood frame		1.5	0.8	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	Yes	0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Podium Level Footprint (m^2)	2363			
		Total Floors/Storeys (Podium)	4			
		Tower Footprint (m^2)	1238			
		Total Floors/Storeys (Tower)	20			
		Protected Openings (1 hr)				
		Area of structure considered (m^2)			**10,932**	
	F	**Base fire flow without reductions**				**18,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**15,300**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction (100% sprinkler coverage of building used)**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-7,650**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Total	**-50%**	
5	**Exposure Surcharge (cumulative %, Maximum Exposure Adjustment Charge Used)**				**Surcharge**	
	(3)	North Side	10.1 - 20 m		15%	**6,885**
		East Side	10.1 - 20 m		15%	
		South Side	30.1- 45 m		5%	
		West Side	20.1 - 30 m		10%	
				Cumulative Total	**45%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**15,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**250**
				or	USGPM	3,963
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	3
		Required Volume of Fire Flow (m^3)			m^3	2700

FUS - Fire Flow Calculations

As per 2020 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 122125
Project Name: 555-603 March Road, Building E3
Date: 10/6/2022
Input By: DMM
Reviewed By: F. Thauvette

Legend: Input by User; No Information or Input Required

Building Description: 6 & 8-Storey Residential Building with Podium
Type II - Non-combustible construction

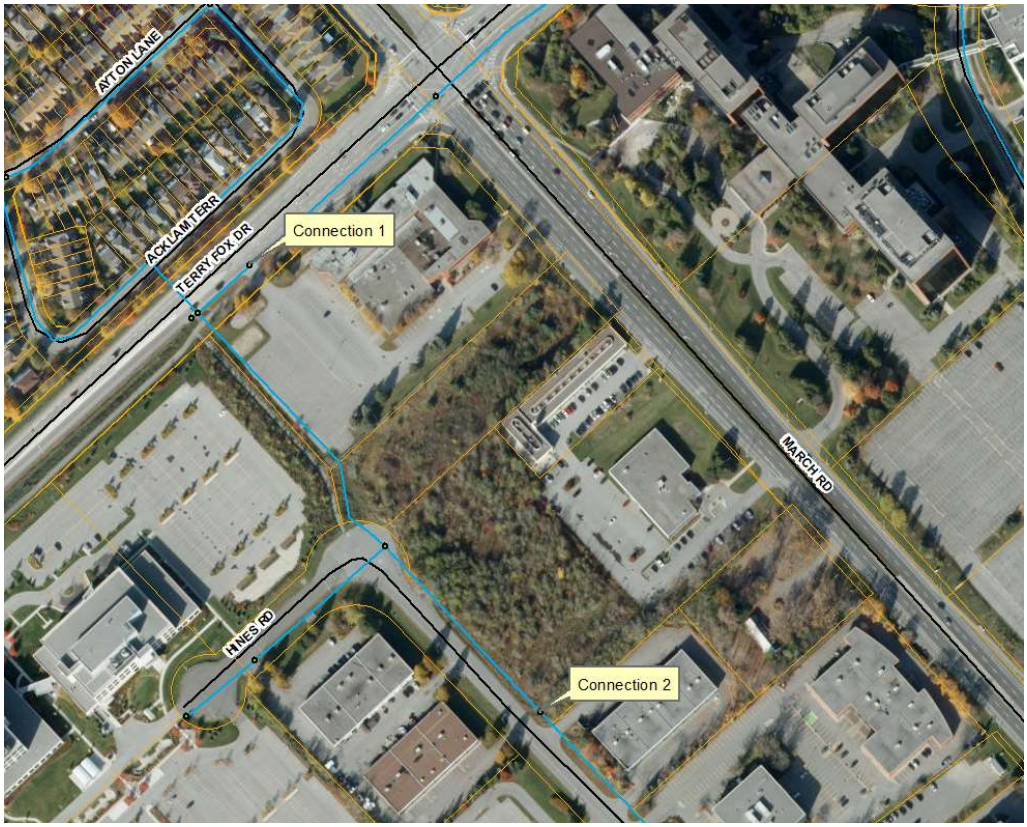
Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Type V - Wood frame		1.5	0.8	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	Yes	0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Podium Level Footprint (m^2)	1618			
		Total Floors/Storeys (Podium)	2			
		Tower Footprint (m^2)	1075			
		Total Floors/Storeys (Tower)	6			
		Protected Openings (1 hr)				
		Area of structure considered (m^2)			**6,462**	
	F	**Base fire flow without reductions**				**14,000**
		F = 220 C (A)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**11,900**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction (100% sprinkler coverage of building used)**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-5,950**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Total	**-50%**	
5	**Exposure Surcharge (cumulative %, Maximum Exposure Adjustment Charge Used)**				**Surcharge**	
	(3)	North Side	> 45.1m		0%	**4,165**
		East Side	20.1 - 30 m		10%	
		South Side	20.1 - 30 m		10%	
		West Side	10.1 - 20 m		15%	
				Cumulative Total	**35%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**10,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**167**
				or	USGPM	2,642
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	2
		Required Volume of Fire Flow (m^3)			m^3	1200

Boundary Conditions
555, 591, 595 and 603 March Road

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	822	13.70
Maximum Daily Demand	1,602	26.70
Peak Hour	2,436	40.60
Fire Flow Demand #1	10,000	166.67
Fire Flow Demand #2	19,000	316.67

Location



Results

Connection 1 – Terry Fox Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.8	66.2
Peak Hour	125.1	58.1
Max Day plus Fire 1	124.0	56.6
Max Day plus Fire 2	118.4	48.7

Ground Elevation = 84.2 m

Connection 2 – Hines Rd.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.8	67.5
Peak Hour	125.1	59.4
Max Day plus Fire 1	123.8	57.6
Max Day plus Fire 2	117.8	49.1

Ground Elevation = 83.3 m

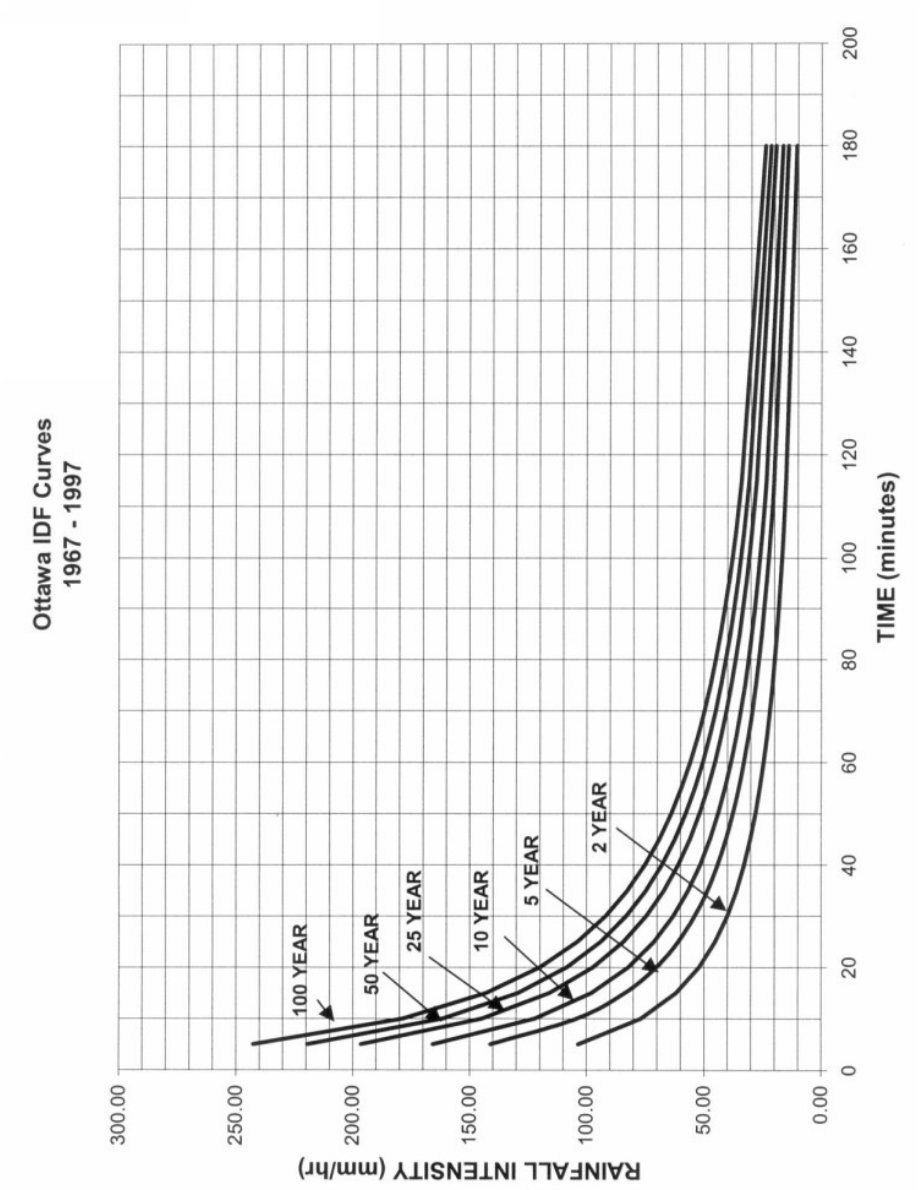
Disclaimer

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

APPENDIX D

IDF Curves, Preliminary SWM Calculations, Storm Sewer Design Sheet

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



Proposed Multi-Tower Development
555, 591, 595 and 603 March Road

Pre - Development : Site Flows

Description	Area (ha)	$A_{impervious}$ (ha) C=0.9	$A_{pervious}$ (ha) C=0.2	Weighted C_{W5}	Weighted C_{W100}	1:2 Year Flow (L/s)	1:5 Year Flow (L/s)	1:100 Year Flow (L/s)	Allowable Flows from Existing Reports	Allowable Flow * to Storm Sewer (L/s)
Pre-Development Area Tributary to **March Road**	4.832	1.554	3.278	0.43	0.49	438.6	595.1	1178.5	**321.90**	**321.9**
Pre-Development Area Tributary to **Terry Fox Drive**	1.110	0.799	0.311	0.70	0.79	166.8	226.3	435.3	**21.40**	**21.4**
Pre-Development Area Tributary to **Hines Road**	0.149	0.053	0.096	0.45	0.52	14.3	19.4	38.2	**52.77**	**52.8**
Site to be Developed	**5.551**	**2.220**	**3.331**	**0.48**	**0.55**	**568.8**	**771.8**	**1515.7**		
Off-Site Tributary Area OS-1	**0.043**	**0.007**	**0.036**	**0.31**	**0.37**	**2.8**	**3.8**	**7.8**		
Off-Site Tributary Area OS-2	**0.085**	**0.014**	**0.071**	**0.31**	**0.37**	**5.7**	**7.7**	**15.6**		
Off-Site Tributary Area OS-3	**0.085**	**0.052**	**0.033**	**0.63**	**0.71**	**11.4**	**15.5**	**29.9**		
Off-Site Tributary Area OS-4	**0.085**	**0.060**	**0.025**	**0.70**	**0.78**	**12.6**	**17.1**	**33.0**		
Off-Site Tributary Area OS-5	**0.110**	**0.053**	**0.057**	**0.54**	**0.61**	**12.6**	**17.1**	**33.4**		
Off-Site Tributary Area OS-6	**0.010**	**0.000**	**0.010**	**0.20**	**0.25**	**0.4**	**0.6**	**1.2**		
Off-Site Tributary Area OS-7	**0.016**	**0.000**	**0.016**	**0.20**	**0.25**	**0.7**	**0.9**	**2.0**		
Off-Site Tributary Area OS-8	**0.106**	**0.000**	**0.106**	**0.20**	**0.25**	**4.5**	**6.1**	**13.2**		

Summed Area Check: 6.091

Post - Development : Site Flows

Area	Description	Area (ha)	A_{imp} (ha) C=0.9	A_{perv} (ha) C=0.2	C_{W5}	C_{W100}	Uncontrolled Flow (L/s)			Controlled Flow (L/s)		Storage Required ** (m^3)	
							2 year	5 year	100 year	5 year	100 year	5 year	100 year
DR-1	**Direct Runoff to Terry Fox**	**0.152**	**0.000**	**0.152**	**0.20**	**0.25**	**6.5**	**8.8**	**18.9**	-	-	-	-
DR-2	**Direct Runoff to March Road**	**0.349**	**0.000**	**0.349**	**0.20**	**0.25**	**14.9**	**20.2**	**43.3**	-	-	-	-
A-1	**Block A + ROW**	**0.812**	**0.584**	**0.228**	**0.70**	**0.79**	-	-	-	**40.0**	**40.0**	**85.8**	**225.3**
A-2	**Block B + ROW**	**0.841**	**0.771**	**0.070**	**0.84**	**0.94**	-	-	-	**40.0**	**40.0**	**119.8**	**300.7**
A-3	**Block C + ROW**	**1.484**	**0.938**	**0.546**	**0.64**	**0.72**	-	-	-	**75.0**	**75.0**	**133.5**	**360.7**
A-4	**Block D + ROW**	**0.831**	**0.661**	**0.170**	**0.76**	**0.85**	-	-	-	**40.0**	**40.0**	**99.7**	**256.7**
A-5	**Portion of Block E + ROW + Offsite Flow**	**0.585**	**0.373**	**0.212**	**0.65**	**0.73**	-	-	-	**30.0**	**30.0**	**52.6**	**142.4**
A-6	**Portion of Block E + ROW + Offsite Flow**	**0.594**	**0.410**	**0.184**	**0.68**	**0.77**	-	-	-	**30.0**	**30.0**	**59.1**	**156.8**
A-7	**Portion of Block E + ROW + Offsite Flow**	**0.443**	**0.325**	**0.118**	**0.71**	**0.80**	-	-	-	**22.0**	**22.0**	**47.7**	**124.9**
	Summed Area Check:	6.091					T_c = 10mins		**Totals:**	**306.0**	**339.2**	**598.2**	**1567.6**

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122125
REQUIRED STORAGE - 1:5 YEAR EVENT
Block A + ROW

OTTAWA IDF CURVE

Area =	0.812	ha	Qallow =	40.0	L/s
C =	0.70		Vol(max) =	85.8	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	141.18	224.14	184.14	55.24
10	104.19	165.42	125.42	75.25
15	83.56	132.66	92.66	83.39
20	70.25	111.53	71.53	85.84
25	60.90	96.68	56.68	85.02
30	53.93	85.62	45.62	82.11
35	48.52	77.03	37.03	77.76
40	44.18	70.15	30.15	72.36
45	40.63	64.50	24.50	66.16
50	37.65	59.78	19.78	59.34
55	35.12	55.76	15.76	52.02
60	32.94	52.30	12.30	44.29
65	31.04	49.29	9.29	36.21
70	29.37	46.63	6.63	27.85
75	27.89	44.28	4.28	19.24
80	26.56	42.17	2.17	10.42
85	25.37	40.28	0.28	1.41
90	24.29	38.56	-1.44	-7.77

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122125
REQUIRED STORAGE - 1:100 YEAR EVENT
Block A + ROW

OTTAWA IDF CURVE

Area =	0.812	ha	Qallow =	40.0	L/s
C =	0.79		Vol(max) =	225.3	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	242.70	432.41	392.41	117.72
10	178.56	318.13	278.13	166.88
15	142.89	254.58	214.58	193.13
20	119.95	213.71	173.71	208.45
25	103.85	185.02	145.02	217.53
30	91.87	163.68	123.68	222.62
35	82.58	147.12	107.12	224.96
40	75.15	133.88	93.88	225.32
45	69.05	123.02	83.02	224.16
50	63.95	113.94	73.94	221.83
55	59.62	106.23	66.23	218.55
60	55.89	99.58	59.58	214.50
65	52.65	93.80	53.80	209.81
70	49.79	88.71	48.71	204.57
75	47.26	84.19	44.19	198.86
80	44.99	80.16	40.16	192.76
85	42.95	76.53	36.53	186.29
90	41.11	73.24	33.24	179.52

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122125
REQUIRED STORAGE - 1:5 YEAR EVENT
Block B + ROW

OTTAWA IDF CURVE

Area =	0.841	ha	Qallow =	40.0	L/s
C =	0.84		Vol(max) =	119.8	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	141.18	277.83	237.83	71.35
10	104.19	205.05	165.05	99.03
15	83.56	164.44	124.44	111.99
20	70.25	138.25	98.25	117.90
25	60.90	119.84	79.84	119.76
30	53.93	106.13	66.13	119.03
35	48.52	95.48	55.48	116.51
40	44.18	86.95	46.95	112.69
45	40.63	79.96	39.96	107.88
50	37.65	74.10	34.10	102.30
55	35.12	69.12	29.12	96.10
60	32.94	64.83	24.83	89.39
65	31.04	61.09	21.09	82.26
70	29.37	57.80	17.80	74.77
75	27.89	54.88	14.88	66.97
80	26.56	52.27	12.27	58.91
85	25.37	49.92	9.92	50.61
90	24.29	47.80	7.80	42.11

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122125
REQUIRED STORAGE - 1:100 YEAR EVENT
Block B + ROW

OTTAWA IDF CURVE

Area =	0.841	ha	Qallow =	40.0	L/s
C =	0.94		Vol(max) =	300.7	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	242.70	532.01	492.01	147.60
10	178.56	391.41	351.41	210.84
15	142.89	313.23	273.23	245.91
20	119.95	262.93	222.93	267.52
25	103.85	227.64	187.64	281.45
30	91.87	201.38	161.38	290.48
35	82.58	181.01	141.01	296.13
40	75.15	164.72	124.72	299.33
45	69.05	151.36	111.36	300.67
50	63.95	140.19	100.19	300.57
55	59.62	130.70	90.70	299.30
60	55.89	122.52	82.52	297.08
65	52.65	115.40	75.40	294.07
70	49.79	109.14	69.14	290.39
75	47.26	103.59	63.59	286.13
80	44.99	98.62	58.62	281.38
85	42.95	94.16	54.16	276.20
90	41.11	90.12	50.12	270.63

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122125
REQUIRED STORAGE - 1:5 YEAR EVENT
Block C + ROW

OTTAWA IDF CURVE

Area =	1.484	ha	Qallow =	75.0	L/s
C =	0.64		Vol(max) =	133.5	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	141.18	374.30	299.30	89.79
10	104.19	276.24	201.24	120.74
15	83.56	221.53	146.53	131.88
20	70.25	186.25	111.25	133.50
25	60.90	161.45	86.45	129.67
30	53.93	142.97	67.97	122.35
35	48.52	128.63	53.63	112.63
40	44.18	117.14	42.14	101.14
45	40.63	107.72	32.72	88.33
50	37.65	99.83	24.83	74.48
55	35.12	93.12	18.12	59.80
60	32.94	87.34	12.34	44.43
65	31.04	82.30	7.30	28.49
70	29.37	77.87	2.87	12.06
75	27.89	73.94	-1.06	-4.78
80	26.56	70.42	-4.58	-21.97
85	25.37	67.26	-7.74	-39.48
90	24.29	64.39	-10.61	-57.27

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122125
REQUIRED STORAGE - 1:100 YEAR EVENT
Block C + ROW

OTTAWA IDF CURVE

Area =	1.484	ha	Qallow =	75.0	L/s
C =	0.72		Vol(max) =	360.7	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	242.70	725.19	650.19	195.06
10	178.56	533.52	458.52	275.11
15	142.89	426.96	351.96	316.76
20	119.95	358.41	283.41	340.09
25	103.85	310.29	235.29	352.93
30	91.87	274.50	199.50	359.09
35	82.58	246.74	171.74	360.65
40	75.15	224.53	149.53	358.87
45	69.05	206.32	131.32	354.56
50	63.95	191.09	116.09	348.27
55	59.62	178.15	103.15	340.40
60	55.89	167.01	92.01	331.24
65	52.65	157.30	82.30	320.99
70	49.79	148.77	73.77	309.83
75	47.26	141.20	66.20	297.89
80	44.99	134.43	59.43	285.27
85	42.95	128.34	53.34	272.05
90	41.11	122.84	47.84	258.32

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122125
REQUIRED STORAGE - 1:5 YEAR EVENT
Block D + ROW

OTTAWA IDF CURVE

Area =	0.831	ha	Qallow =	40.0	L/s
C =	0.76		Vol(max) =	99.7	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	141.18	246.83	206.83	62.05
10	104.19	182.17	142.17	85.30
15	83.56	146.09	106.09	95.48
20	70.25	122.82	82.82	99.39
25	60.90	106.47	66.47	99.70
30	53.93	94.28	54.28	97.71
35	48.52	84.83	44.83	94.13
40	44.18	77.25	37.25	89.40
45	40.63	71.03	31.03	83.79
50	37.65	65.83	25.83	77.49
55	35.12	61.41	21.41	70.65
60	32.94	57.60	17.60	63.35
65	31.04	54.27	14.27	55.67
70	29.37	51.35	11.35	47.68
75	27.89	48.76	8.76	39.41
80	26.56	46.44	6.44	30.91
85	25.37	44.35	4.35	22.20
90	24.29	42.46	2.46	13.31

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122125
REQUIRED STORAGE - 1:100 YEAR EVENT
Block D + ROW

OTTAWA IDF CURVE

Area =	0.831	ha	Qallow =	40.0	L/s
C =	0.85		Vol(max) =	256.7	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	242.70	474.66	434.66	130.40
10	178.56	349.21	309.21	185.53
15	142.89	279.46	239.46	215.52
20	119.95	234.59	194.59	233.51
25	103.85	203.10	163.10	244.65
30	91.87	179.67	139.67	251.40
35	82.58	161.50	121.50	255.15
40	75.15	146.96	106.96	256.71
45	69.05	135.04	95.04	256.62
50	63.95	125.08	85.08	255.23
55	59.62	116.61	76.61	252.81
60	55.89	109.31	69.31	249.53
65	52.65	102.96	62.96	245.55
70	49.79	97.38	57.38	240.98
75	47.26	92.42	52.42	235.89
80	44.99	87.99	47.99	230.35
85	42.95	84.01	44.01	224.43
90	41.11	80.40	40.40	218.17

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122125
REQUIRED STORAGE - 1:5 YEAR EVENT
Portion of Block E + ROW + Offsite Flow

OTTAWA IDF CURVE

Area =	0.585	ha	Qallow =	30.0	L/s
C =	0.65		Vol(max) =	52.6	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	141.18	148.45	118.45	35.54
10	104.19	109.56	79.56	47.74
15	83.56	87.86	57.86	52.07
20	70.25	73.87	43.87	52.64
25	60.90	64.03	34.03	51.05
30	53.93	56.71	26.71	48.07
35	48.52	51.02	21.02	44.13
40	44.18	46.46	16.46	39.50
45	40.63	42.72	12.72	34.35
50	37.65	39.59	9.59	28.78
55	35.12	36.93	6.93	22.88
60	32.94	34.64	4.64	16.70
65	31.04	32.64	2.64	10.31
70	29.37	30.88	0.88	3.72
75	27.89	29.32	-0.68	-3.04
80	26.56	27.93	-2.07	-9.94
85	25.37	26.68	-3.32	-16.96
90	24.29	25.54	-4.46	-24.09

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122125
REQUIRED STORAGE - 1:100 YEAR EVENT
Portion of Block E + ROW + Offsite Flow

OTTAWA IDF CURVE

Area =	0.585	ha	Qallow =	30.0	L/s
C =	0.73		Vol(max) =	142.4	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	242.70	287.53	257.53	77.26
10	178.56	211.54	181.54	108.92
15	142.89	169.29	139.29	125.36
20	119.95	142.10	112.10	134.53
25	103.85	123.03	93.03	139.54
30	91.87	108.84	78.84	141.90
35	82.58	97.83	67.83	142.44
40	75.15	89.02	59.02	141.66
45	69.05	81.80	51.80	139.87
50	63.95	75.77	45.77	137.30
55	59.62	70.64	40.64	134.10
60	55.89	66.22	36.22	130.39
65	52.65	62.37	32.37	126.24
70	49.79	58.99	28.99	121.74
75	47.26	55.98	25.98	116.93
80	44.99	53.30	23.30	111.84
85	42.95	50.89	20.89	106.53
90	41.11	48.70	18.70	101.00

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122125
REQUIRED STORAGE - 1:5 YEAR EVENT
Portion of Block E + ROW + Offsite Flow

OTTAWA IDF CURVE

Area =	0.594	ha	Qallow =	30.0	L/s
C =	0.68		Vol(max) =	59.1	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	141.18	159.27	129.27	38.78
10	104.19	117.54	87.54	52.53
15	83.56	94.26	64.26	57.84
20	70.25	79.25	49.25	59.10
25	60.90	68.70	38.70	58.05
30	53.93	60.84	30.84	55.51
35	48.52	54.73	24.73	51.94
40	44.18	49.85	19.85	47.63
45	40.63	45.83	15.83	42.75
50	37.65	42.48	12.48	37.43
55	35.12	39.62	9.62	31.76
60	32.94	37.16	7.16	25.79
65	31.04	35.02	5.02	19.58
70	29.37	33.14	3.14	13.17
75	27.89	31.46	1.46	6.58
80	26.56	29.97	-0.03	-0.17
85	25.37	28.62	-1.38	-7.04
90	24.29	27.40	-2.60	-14.04

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122125
REQUIRED STORAGE - 1:100 YEAR EVENT
Portion of Block E + ROW + Offsite Flow

OTTAWA IDF CURVE

Area =	0.594	ha	Qallow =	30.0	L/s
C =	0.77		Vol(max) =	156.8	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	242.70	307.67	277.67	83.30
10	178.56	226.36	196.36	117.81
15	142.89	181.14	151.14	136.03
20	119.95	152.06	122.06	146.47
25	103.85	131.64	101.64	152.47
30	91.87	116.46	86.46	155.63
35	82.58	104.68	74.68	156.83
40	75.15	95.26	65.26	156.62
45	69.05	87.53	57.53	155.34
50	63.95	81.07	51.07	153.22
55	59.62	75.58	45.58	150.43
60	55.89	70.86	40.86	147.08
65	52.65	66.74	36.74	143.28
70	49.79	63.12	33.12	139.09
75	47.26	59.90	29.90	134.57
80	44.99	57.03	27.03	129.76
85	42.95	54.45	24.45	124.70
90	41.11	52.12	22.12	119.42

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122125
REQUIRED STORAGE - 1:5 YEAR EVENT
Portion of Block E + ROW + Offsite Flow

OTTAWA IDF CURVE

Area =	0.443	ha	Qallow =	22.0	L/s
C =	0.71		Vol(max) =	47.7	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	141.18	124.06	102.06	30.62
10	104.19	91.56	69.56	41.74
15	83.56	73.43	51.43	46.28
20	70.25	61.73	39.73	47.68
25	60.90	53.51	31.51	47.27
30	53.93	47.39	25.39	45.70
35	48.52	42.64	20.64	43.33
40	44.18	38.83	16.83	40.39
45	40.63	35.70	13.70	37.00
50	37.65	33.09	11.09	33.26
55	35.12	30.86	8.86	29.25
60	32.94	28.95	6.95	25.02
65	31.04	27.28	5.28	20.59
70	29.37	25.81	3.81	16.01
75	27.89	24.51	2.51	11.28
80	26.56	23.34	1.34	6.44
85	25.37	22.29	0.29	1.49
90	24.29	21.34	-0.66	-3.54

Proposed Multi-Tower Residential Developpement
Novatech Project No. 122125
REQUIRED STORAGE - 1:100 YEAR EVENT
Portion of Block E + ROW + Offsite Flow

OTTAWA IDF CURVE

Area =	0.443	ha	Qallow =	22.0	L/s
C =	0.80		Vol(max) =	124.9	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	242.70	239.19	217.19	65.16
10	178.56	175.97	153.97	92.38
15	142.89	140.82	118.82	106.94
20	119.95	118.21	96.21	115.45
25	103.85	102.34	80.34	120.51
30	91.87	90.54	68.54	123.37
35	82.58	81.38	59.38	124.70
40	75.15	74.06	52.06	124.94
45	69.05	68.05	46.05	124.33
50	63.95	63.03	41.03	123.08
55	59.62	58.76	36.76	121.31
60	55.89	55.08	33.08	119.10
65	52.65	51.88	29.88	116.55
70	49.79	49.07	27.07	113.69
75	47.26	46.57	24.57	110.57
80	44.99	44.34	22.34	107.23
85	42.95	42.33	20.33	103.69
90	41.11	40.52	18.52	99.98

555, 591, 595 and 603 March Road - 5 Year Storm Sewer Design Sheet

LOCATION				PROPOSED SEWER							
FROM	TO	TOTAL AREA	PEAK FLOW	PIPE SIZE	PIPE SLOPE	LENGTH	CAPACITY	FULL FLOW VELOCTY	TIME OF FLOW	EXCESS CAPACITY	Q/Qfull
		(Ha.)	Q (l/s)	(mm)	(%)	(m)	(l/s)	(m/s)	(min.)	(l/s)	
STMMH 139	STMMH 121	0.810	40.00	375.0	0.25	111.9	87.75	0.79	2.35	47.75	0.46
STMMH 141	STMMH 123	0.840	40.00	375.0	0.25	111.4	87.75	0.79	2.34	47.75	0.46
STMMH 119	STMMH 121	0.590	30.00	375.0	0.25	65.1	87.75	0.79	1.37	57.75	0.34
STMMH 121	STMMH 123	0.590	100.00	450.0	0.25	78.0	142.70	0.90	1.45	42.70	0.70
STMMH 123	STMMH 125	1.480	215.00	600.0	0.18	74.6	260.77	0.92	1.35	45.77	0.82
STMMH 125	STMMH 127	1.480	215.00	600.0	0.18	66.5	260.77	0.92	1.20	45.77	0.82
STMMH 133	STMMH 127	0.440	22.00	250.0	0.50	33.2	42.09	0.86	0.65	20.09	0.52
STMMH 127	OGS UNIT	0.830	277.00	675.0	0.18	109.4	356.99	1.00	1.83	79.99	0.78
OGS UNIT	EX. STM MH	0.000	277.00	675.0	0.18	49.3	356.99	1.00	0.82	79.99	0.78

***Note: Storm sewer design sheet flows are peak controlled flows.**

Definitions
Q = 2.78 AIR
Q = Peak Flow, in Litres per second (L/s)
A = Area in hectares (ha)
I = 5 YEAR Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min Velocity = 0.76 m/sec.
3) 5 Year intensity = 998.071 / (time + 6.053)$^{0.814}$
10 Year intensity = 1174.184 / (time + 6.014)$^{0.816}$
100 Year intensity = 1735.688 / (time + 6.014)$^{0.820}$

APPENDIX E

Excerpts from Previous SWM Reports and Design Drawings

555 MARCH ROAD
STORMWATER MANAGEMENT PLAN
CITY OF OTTAWA

Prepared by:

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

July 16, 2007
Revised August 23, 2007
Revised September 13, 2007
Revised September 21, 2007

Ref: R-2007-110
Novatech File No. 105081

TABLE OF CONTENTS

1.0 INTRODUCTION

An existing building, located at 555 March Road is being renovated and converted to a recreational establishment (fitness facility) resulting in a requirement for the expansion of the existing parking lot, to accommodate additional vehicles at the site. The site is bound by undeveloped land to the southwest, at the rear of the subject property, March Road to the east and commercial buildings to the north and south. A key plan and existing conditions information for the property are shown in Figure 1.

The stormwater management plan is being submitted, along with engineering drawings, as part of the approval process for the project.

2.0 CRITERIA

Based on the report entitled, "*RMOC March Road Reconstruction – Solandt Road to Klondike Road - Storm Sewer Design Brief – July 12, 1997"*, allowable release rates were established for the subject property, under post-development conditions. Based on this report the following criteria have been adopted:

- Control post-development flows from Subcatchment ID5 and ID6 to a rate of 68L/s for the 1:100 year storm event, in accordance with RMOC Dwg. No.5170-13A (See Appendix B).

- Provide guidelines to ensure that site preparation and construction is in accordance with the current Best Management Practices for Erosion and Sediment Control.

3.0 PRE-DEVELOPMENT CONDITIONS

3.1 The Site

The proposed parking lot expansion will take place in an area that is predominately undeveloped and presently serves as a point of entry for deliveries to the building.

3.2 Allowable Release Rate

Based on the March Road report, allowable release rates were established for various parts of the subject property, under post-development conditions. In accordance with RMOC Dwg. No.5170-13A which accompanies the report, the subject property is composed of three (3) subcatchment areas identified as ID4, ID5 and ID6. These areas have also been shown on NECL Dwg. 105081-SWM included in the report.

Subcatchment ID4 has an allowable release rate of 12L/s. This portion of the site is undeveloped at the present time.

Subcatchment ID5 represents the developed portion of the subject property. ID5 has an allowable release rate of 24L/s. ID5 was divided into subareas ID5a and ID5b.

Subarea ID5a represents the front portion of 555 March Road site and includes the existing building. This area is tributary to a small stormwater management pond and is fitted with an orifice to control the release rate to the 13L/s. No changes are proposed for this portion of the site. Subarea ID5b was allotted the remaining 11L/s allowable release rate.

Subcatchment ID6, with a tributary area of 1.41ha, is presently undeveloped. ID6 was allotted an allowable release rate of 44L/s for all return periods up to the 1:100year storm event.

Therefore, ID5 and ID6 have been allotted a total allowable rate of 68L/s (13L/s + 11L/s + 44L/s) for the 1:100 year storm event. ID5a remains unchanged and will retain its present 13L/s allotment. Therefore the allotment for ID5b and ID6 will be 11L/s + 44L/s = 55L/s. This 55L/s release rate conforms to the allowable release rate to the March Road storm sewer as per the approved " Certificate of Approval".

No adjustment in the release rate was made for the proposed parking lot expansion onto ID4, which is part of the subject property. Surface drainage from a small area of the 591 March Road parking lot is also presently tributary to the 555 March Road site. Any runoff from this area will be accommodated in the stormwater management plan for the subject property.

4.0 POST-DEVELOPMENT CONDITIONS

4.1 Development Proposal

Under post-development conditions there will be an increase of hard surfaced areas on the site, in the form of an expanded parking lot. Runoff from the parking lot and tributary landscape area will be captured, temporarily stored in a linear swale and released to the March Road storm sewer system, in accordance with the allotted release rates.

4.2 Post-Development Flow

Area of ID6 (undeveloped) after boundary shifting = 1.256ha

Area of parking lot (ID5b) = 0.490 ha

Area of landscaping = 0.222 ha

Modeling of the post-development site was undertaken, using SWMHYMO, to confirm the peak flows and storage volume required for the proposed land use. The following watershed information was used:

Table 1: SWMHYMO Model Input

TRIB. AREA	LAND USE	AREA [ha]	CN	TP [hrs]	SLOPE [%]
ID6 mod	Undeveloped Field	1.256	58	0.55	
ID5b	Parking Area/ Landscaping	0.716	77		1%

A Chicago storm with a 3 hour duration, based on the City of Ottawa IDF curve, was used to simulate the 1:5year and 1:100year storm events. The surficial soils map for the area, entitled "Soils of the Regional Municipality of Ottawa – Carleton, Sheet 3, Soils Survey No.58, indicates

that the subject property consist of two specific soil associations: Nepean – Farmington (N1-F1). This indicates that the site is underlain by sandy loam with good drainage.

All SYMHYMO calculations and supporting hydrographs are found in Appendix C.

The storage requirement will be accommodated in a linear swale adjacent to the parking lot, as indicated on the Stormwater Management/ Erosion and Sediment Control Plan. Based on this calculation, a storage volume of 106.6m^3 is required for the 1:5 year event and 250.9m^3 for the 1:100 year event.

A summary of storage information is shown in Table 2, as follows:

Table 2: Detention Storage and Water Levels

Design Event	Required Storage (m^3)	Water level (m)	Maximum Storage (m^3)
1:5 year	106.6	81.71	106.6
1:100 year	250.9	81.95	250.9 (81.95)

To achieve the on-site storage requirement, an orifice plate will be installed at the end of the 300mm outlet pipe.

The orifice is sized to release stormwater at a rate of 55 L/s under 1:100year design conditions. See the calculation in Appendix A.

Using $Q = cA(2gh)^{0.5}$ and solving for A

Where Q = 55 L/s
c = 0.61 sharp edged
h_w = 0.55 (81.95m)
t_w = 0.07m

A = 194mm diameter

4.3 Major Overland Flow Route

In the case of a major rainfall event in excess of the 1:100 year event or obstruction of the orifice, the swale will pond to a maximum depth of 0.65m (81.95m) at the outlet (81.30m) before flowing overland toward March Road.

4.4 Quality Control

The existing storm sewer on March Road includes a grit separation manhole near the outlet of that system. (RMOC Dwg. No.5170-13A @ STMH 243) No additional quality control is proposed for the site, beyond any enhancement occurring within the grass covered, linear swale.

5.0 Erosion and Sediment Control

5.1 Temporary Measures

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

- Silt fences around the area under construction placed as per OPSS 577 and OPSD 219.110
- Topsoil and seed any disturbed areas

The proposed erosion and sediment control measures will be implemented prior to construction and will remain in place during construction until vegetation is established. Regular inspection and maintenance of the sediment control measures will be undertaken.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The conclusions are as follows:

- An orifice plate with a diameter of 194mm will be installed at the 300mm diameter outlet pipe to restrict the flow from the site to 55L/s under 1:100year pre-development conditions, in accordance with City requirements.
- Storage of stormwater runoff, totaling 106.6m^3 and 250.9 m^3 for the 1:5year and 1:100year rainfall events, respectively will be accommodated in the proposed linear swale.
- The orifice shall be inspected and maintained on a regular basis.
- Temporary erosion and sediment control measures will be implemented during construction.

NOVATECH ENGINEERING CONSULTANTS LTD.

Prepared by:

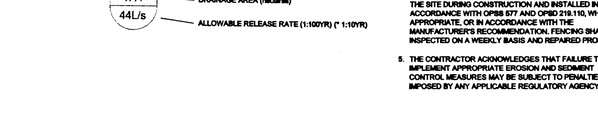
R.S. MacKichan, P. Eng.
Project Manager

LEGEND

- A-2 / 0.25 / 0.65 — AREA ID / DRAINAGE AREA (hectares) / RUN-OFF COEFFICIENT
- STORM DRAINAGE AREA
- *EXISTING SWALE C/W DIRECTION OF FLOW*
- 1:5 YEAR PONDING LEVEL
- 1:100 YEAR PONDING LEVEL
- STORM DRAINAGE AREA (PLAN 5170-13A)
- ID6 / 1.41 / 44L/s — AREA ID (PLAN 5170-13A) / DRAINAGE AREA (hectares) / ALLOWABLE RELEASE RATE (1:100YR) (* 1:10YR)

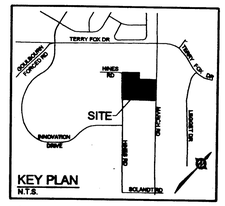
EROSION AND SEDIMENT CONTROL:

1. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE BYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THIS INCLUDES LIMITING THE AMOUNT OF EXPOSED SOIL, USING FILTER CLOTH UNDER THE GRATES OF CATCHBASINS AND MANHOLES AND INSTALLING SILT FENCES AND OTHER EFFECTIVE SEDIMENT TRAPS.
2. THE CONTRACTOR SHALL PLACE FILTER CLOTH UNDER ALL CATCHBASINS AND MANHOLE GRATES PRIOR TO AND FOR THE DURATION OF THE CONSTRUCTION ACTIVITIES. THE FILTER CLOTH IS TO REMAIN IN PLACE UNTIL ADEQUATE GRASS GROWTH IS ESTABLISHED AND ALL OUTDOOR CONSTRUCTION ACTIVITIES ARE COMPLETE. THE FILTER CLOTH SHALL BE INSPECTED ON A WEEKLY BASIS AND CLEANED AND/OR REPLACED AS REQUIRED.
3. THE STREET SHALL BE MECHANICALLY SWEPT, TO REMOVE SURPLUS SEDIMENT AND CONTAMINANTS, FOLLOWING THE COMPLETION OF THE OUTDOOR CONSTRUCTION BUT PRIOR TO THE REMOVAL OF THE CATCHBASIN FILTER CLOTHS.
4. SILT FENCING SHALL BE PROPERLY INSTALLED PRIOR TO CONSTRUCTION ACTIVITIES TO CONTROL EROSION FROM THE SITE DURING CONSTRUCTION AND INSTALLED IN ACCORDANCE WITH OPSS 577 AND OPSD 219.110, WHERE APPROPRIATE, OR IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION. FENCING SHALL BE INSPECTED ON A WEEKLY BASIS AND REPAIRED PROMPTLY.
5. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.



SECTION A-A
LINEAR SWM FACILITY DETAIL
N.T.S.

Reviewed by Infrastructure Approvals Division
Signed:
Date: October 1, 2007
Doc. No. 14723



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.

CITY OF OTTAWA RECEIVED SEP 27 2007 DEVELOPMENT SERVICES

No.	REVISION	DATE	BY
5	ISSUED FOR SITE PLAN APPROVAL	SEPT 28/07	RSC
4	ISSUED WITH REVISED SWM REPORT	SEPT 21/07	RSM
3	ISSUED WITH REVISED SWM REPORT	SEPT 6/07	RSM
2	ISSUED WITH REVISED SWM REPORT	AUG. 23/07	RSM
1	ISSUED WITH SWM REPORT	JULY 17/07	RSM

LICENSED PROFESSIONAL ENGINEER R.S. CEBRYK Sept 28/07 PROVINCE OF ONTARIO

REGISTERED PROFESSIONAL ENGINEER K.S. MACKICHAN Sept. 21/07 PROVINCE OF ONTARIO

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

DESIGN	RSM
CHECKED	RSC
DRAWN	SAM
CHECKED	RSM
APPROVED	RSC

SCALE: 1:250

CITY OF OTTAWA
555 MARCH ROAD
STORMWATER MANAGEMENT/ EROSION AND SEDIMENT CONTROL PLAN

PROJECT No. 105081
DATE JULY 2007
DRAWING No. 105081-SWM

D07-12-07-0193

14723

Drawing M:\2005\05081\CAD\design\05081swm.dwg Layout1SWM Updated SEP 26, 2007 at 8:45am by smclaughlin

STORMWATER MANAGEMENT REPORT
TUNDRA SEMICONDUCTOR CORPORATION

PROPOSED BUILDING ADDITION
AT 603 MARCH ROAD

City of Kanata

Prepared For:

Tundra Semiconductor Corporation

Submitted By:

R. V. Anderson Associates Limited
220 - 1750 Courtwood Crescent
Ottawa, Ontario
K2C 2B5

October 2001

RVA 5638

APPROVED OCT 2 1 2001

TABLE OF CONTENTS

1.0 INTRODUCTION

R.V. Anderson Associates Limited (RVA) has been retained by Tundra Semiconductor Corporation, to provide a Stormwater Management Report and detention facility design for the proposed building addition at the Tundra Semiconductor site, which is located on March Road in the former City of Kanata, now City of Ottawa. This report will outline the proposed stormwater management measures that will be implemented with the site to be in compliance with the standard City requirements.

1.1 Site Location

The site is located on the southwest side of March Road, to the northwest of the existing Tundra Semiconductor building, in the former City of Kanata, now City of Ottawa.

Note: Refer to Appendix A, Site Survey Grading & Drainage Plan (Drawing SP-01) for the site layout. This plan has been amended by RVA to include the layout of proposed stormwater detention areas, as well as survey elevations.

2.0 BACKGROUND

Following discussions with the City of Kanata, it was determined that the five-year peak post-development discharge from the disturbed area would have to equal the five-year pre-development discharge. The existing site drains mainly uncontrolled to adjacent properties. The disturbed areas will maintain this drainage pattern and also provide an area for ponding of the five-year storm. The drainage pattern and ponding areas are shown on Drawing SP-01 (Appendix A).

This report is intended to satisfy the above mentioned stormwater management objectives.

3.0 DESIGN CRITERIA

The following design criteria are proposed as a result of discussions with the City of Kanata.

Peak Flow	-	5-year peak post-development flow controlled to 5-year pre-development flow, for disturbed areas only.
Calculated Method	-	Modified Rational Method using spreadsheet.
Storage Method and Proposed Drainage	-	Ponding on site and flow to adjacent properties.
Coefficient of Runoff	-	Soft (landscaped) Surface: c=0.20 Interlocking Brick Surface: c=0.70 Hard Surface: c=0.90 Roof: c=0.95
Rainfall Intensities	-	City of Kanata IDF rainfall curve for 5 -year storm to generate the intensity formula as follows (See Appendix B for Storm Hyetographs):

$$i_{5yr} = \frac{879}{\quad}$$ --equation (1)

where:
i – Rainfall intensity (mm/hr)
T – Time (min)

4.0 STORMWATER MANAGEMENT APPROACH

The stormwater management concept best suited to the site is ponding on site for the five-year storm and flow to adjacent properties, since there are no storm sewers on the site.

For the purposes of this report, we have used a modified rational method approach. This method was selected considering the relatively small size of the drainage area for the site.

This approach involves considering the five-year storm as a three-hour storm event analyzed in five-minute time intervals. The rainfall intensity for each five-minute interval is calculated using RAIN, a program generally accepted in the industry. The RAIN program uses the City of Kanata's rainfall curves to calculate the 3-hour rainfall Hyetograph and the accumulated rainfall. For the RAIN program outputs see Appendix B for the five-year storm event.

For each five-minute interval, an associated flow is calculated in a spreadsheet using the rational method:

$$Q = \frac{CIA}{3600} \qquad \text{--equation (2)}$$

where:

Q = Flow (l/s)
C = Runoff Coefficient
I = Rainfall Intensity (mm/hr)
A = Area (m^2)

The flow contributing to storage is the five-year rainfall intensity. The quantity of storage is calculated by multiplying the flow contributing to storage by the five-minute time interval. The accumulated storage is summed for each five-minute time interval to determine the peak storage required.

5.0 CALCULATIONS

The total disturbed area is 8395m^2. The following tables summarize the pre- and post-development surface types and calculation of the overall weighted runoff coefficient.

TABLE 1 WEIGHTED RUNOFF COEFFICIENT (Pre-Development)						
Description	**Soft Surface**	**Hard Surface**	**Roof**	**Interlock Pavers**	**Total**	**Weighted Runoff Coefficient**
Area (m^2)	6510	1885	0	0	8395	0.36
Runoff Coefficient	0.20	0.90	0.95	0.70	--	--

Runoff coefficient "c" = (0.20*6510 + 0.90*1885)/8395 = 0.36

The existing site drains mainly uncontrolled to adjacent properties. Using the 5-year intensity with a time of concentration of 20 minutes, the existing areas to be disturbed drain at a discharge rate of:

$Q_{exist.}$ = 0.36 x 68.45mm/hr x 8395m^2 / 3600
$Q_{exist.}$ = 57.46 l/s

TABLE 2 WEIGHTED RUNOFF COEFFICIENT (Post-Development)						
Description	**Soft Surface**	**Hard Surface**	**Roof**	**Interlock Pavers**	**Total**	**Weighted Runoff Coefficient**
Area (m^2)	1592	5115	1598	90	8395	0.77
Runoff Coefficient	0.20	0.90	0.95	0.70	--	--

Runoff coefficient "c" = (0.20*1592 + 0.90*5115 + 0.95*1598 + 0.70*90)/8395 = 0.77

The proposed site configuration directs stormwater to two separate constructed ponding areas on the northwest side of the property. An area in the south portion of the site drains uncontrolled to adjacent properties. The following table summarizes the surfaces that drain uncontrolled and that are directed to the ponding areas. Drawing SP-01 (Appendix A) shows the drainage pattern and ponding areas.

TABLE 3 WEIGHTED RUNOFF COEFFICIENT (Post-Development)						
Description	**Soft Surface**	**Hard Surface**	**Roof**	**Interlock Pavers**	**Total**	**Weighted Runoff Coefficient**
Drains Uncontrolled Area (m^2)	385	2545	0	0	2930	0.81
Drains to Pond Area (m^2)	1207	2570	1598	90	5465	0.76
Runoff Coefficient	0.20	0.90	0.95	0.70	--	--

Drains Uncontrolled:
Runoff coefficient "c" = (0.20*385 + 0.90*2545)/2930 = 0.81

Drains to Pond Areas:
Runoff coefficient "c" = (0.20*1207 + 0.90*2570 + 0.95*1598 + 0.70*90)/5465 = 0.76

Using the 5-year intensity with a time of concentration of 20 minutes, the disturbed areas that drain uncontrolled to adjacent properties drain at a discharge rate of:

$Q_{uncontrolled}$ = 0.81 x 68.45mm/hr x 2930m^2 / 3600
$Q_{uncontrolled}$ = 45.13 l/s

Within the two ponding areas, the discharge in a five-year storm is taken as the difference between the pre-construction discharge and the uncontrolled drainage:

$Q_{controlled}$ = 57.46 l/s – 45.13 l/s = 12.33 l/s

Using the allowable controlled discharge from the ponds, the resulting storage volume was computed, and Appendix C provides the storage volume calculation for the disturbed areas. The volume of storage required in the 5-year storm is summarized in Table 4.

Table 4 DISCHARGE AND STORAGE SUMMARY

DESCRIPTION	AREA (m^2)	WEIGHTED RUNOFF COEFFICIENT	ALLOWABLE DISCHARGE (L/s)	5-YEAR EVENT STORAGE REQUIRED (m^3)
Drains to Ponds	5465	0.76	12.33	94.65

The design of the ponds will accommodate a total storage volume of 94.65 m^3 based on a discharge of 12.33 l/s. Once this volume is reached, the ponds will release via the overflow channel in the rock check flow dam to Terry Fox Drive and stormwater will drain to the existing ditch system adjacent to the road. Refer to Appendix D for a sketch showing the ponding areas. The volume of ponding achieved will be (27.9 + 68.9 = 96.8m^3), which exceeds the required volume of 94.65 m^3.

To restrict the flow from the ponds, a permanent rock flow check dam will be installed at the outlet of the ponds according to OPSD 219.210. The flow check will restrict the amount of water that exits the ponds, which in turn builds up the volume detained in the 5-year storm event. This is achieved by setting the elevation of the spillway to the overflow elevation. See Appendix E for the detail of the permanent rock flow check dams and overflow elevations.

Drainage from the rooftop of the building addition will be achieved via roof drains that outlet to landscaped areas immediately adjacent to SWM detention area #2. There is no rooftop control proposed for the building addition. SWM detention area #1 will reach a depth of water of 0.20m, and SWM detention area #2 will reach a depth of water of 0.30m, as shown in Appendix C. These depths will be achieved by landscaped grading on the sides of the detention area with a 5:1 slope in Area #1 and a 3:1 slope in Area #2, and small berms adjacent to the ponds on the Terry Fox Drive side to prevent flow from the street onto the property.

The side slopes of the detention areas shall be sodded, not seeded, which will prevent topsoil from washing into the ponds. Straw bale flow checks per OPSD 219.180 will also be installed at the outlets to provide some filtration of the stormwater flows until the landscaping has been established.

After reaching the required depths during a five-year storm event, the overflow channel elevation will be set so that water overflows to Terry Fox Drive through a channel set at less than 1.0% slope and protected by rip-rap material per OPSD 810.01 to provide erosion control. The flow ultimately enters a ditch inlet catchbasin within the Terry Fox Drive road allowance.

6.0 CONCLUSION

The design of the stormwater management system serves to control the 5-year peak post-development flows to the 5-year pre-development flows for the disturbed areas. Where possible, flow is directed to two ponding areas where the five-year storm event is detained; in frequent storm events, stormwater will percolate through the rock check flow dams. In a greater-than five-year storm, the overflow is directed to the ditch system on Terry Fox Drive.

We trust this stormwater management report and detention facility design complies with the City requirements and we look forward to receiving your approval.

R.V. ANDERSON ASSOCIATES LIMITED

Prepared by:

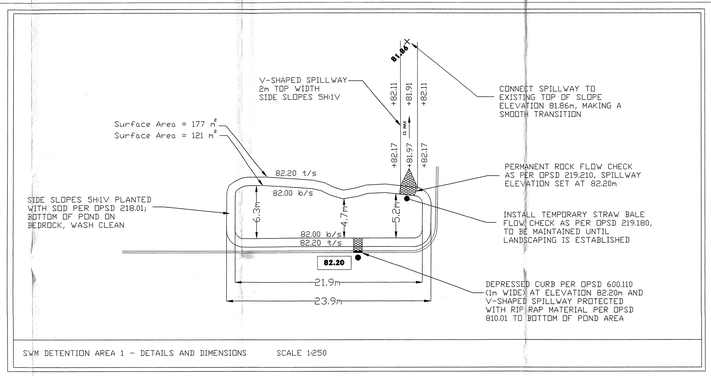
Jo-anne Moore

Jo-anne Moore, E.I.T.

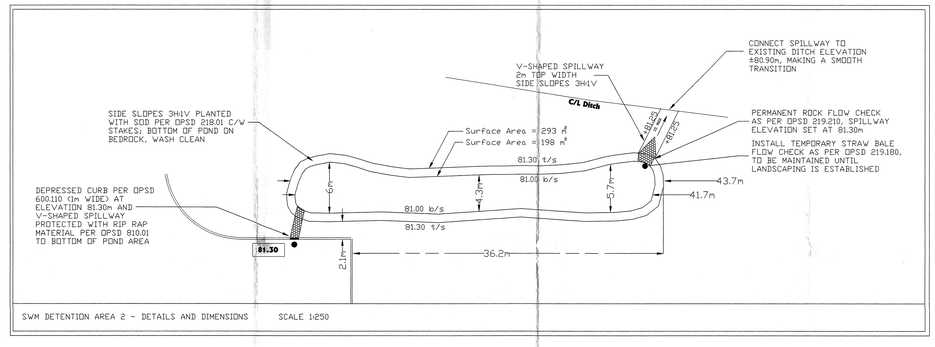
Reviewed by:

Gary Holowach

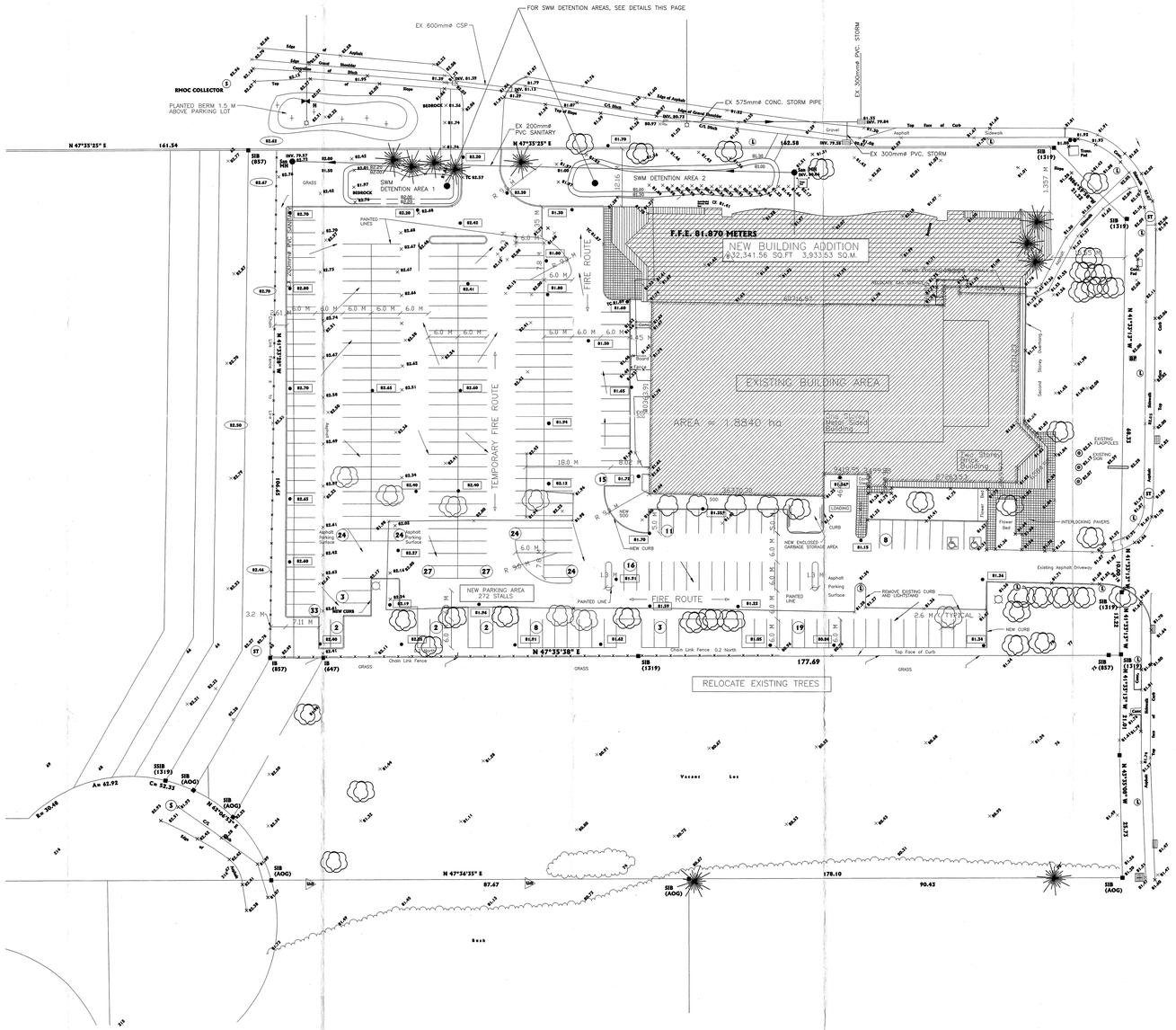
Gary Holowach, P. Eng.



SWM DETENTION AREA 1 – DETAILS AND DIMENSIONS SCALE 1:50



SWM DETENTION AREA 2 – DETAILS AND DIMENSIONS SCALE 1:50



SITE PLAN
SCALE: 1 : 400

Notes & Legend

Ⓛ	=	LIGHT STANDARD
●	=	BOLLARD
	=	DECIDUOUS TREE
	=	CONIFEROUS TREE
MH	=	MAINTENANCE HOLE (STORM SEWER)
Ⓢ	=	MAINTENANCE HOLE (SANITARY)
H	=	HYDRANT VALVE
UM	=	UNDERGROUND SERVICE MARKER
	=	CATCH BASIN
	=	FIRE HYDRANT
	=	FLAG POLE
	=	GAS METER
82.50	=	LOCATION OF ELEVATIONS
	=	PROPERTY LINE
C/L	=	CENTRELINE
	=	BELL PEDESTAL
	=	PROPOSED VEGITATION
	=	HANDICAP PARKING SPACE
		EXISTING STORM SEWER
		EXISTING SANITARY SEWER
		EXISTING WATERMAIN
× 82.45		EXISTING ELEVATIONS TAKEN BY RVA

BOUNDARY INFORMATION COMPILED FROM PLANS:
– 5R–12678, 4R–12735, 4R–7856

ALL SITE INFORMATION TAKEN FROM
SITE & TOPOGRAPHICAL PLAN OF
PART OF LOT 9
CONCESSION 3
(Formerly The Township of March)
NOW IN THE CITY OF KANATA
REGIONAL MUNICIPALITY OF OTTAWA–CARLETON
AS PREPARED BY ANNIS O'SULLIVAN VOLLEBEKK LTD.

Scale 1 : 400
16 12 8 4 0 8 16 Metres

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

GRADING LEGEND

EXISTING ELEVATIONS	82.50
EXISTING ELEVATIONS TO BE MAINTAINED	82.40
FINISHED ASPHALT GRADE	● 82.40
PAVEMENT STRUCTURE DETAIL	40 MM HL3
PAVEMENT STRUCTURE DETAIL	40 MM HL8
CURB DETAIL	150 GRAN 'A'
CURB DETAIL	300 GRAN 'B'

	EXISTING TREES TO BE REMOVED
	EXISTING TREES TO BE REMAIN

TUNDRA

SITE DATA

SITE AREA = 20,162.35 SQ. M
PERMITTED LOT COVERAGE = 45 %
PROPOSED LOT COVERAGE = 22.42 %

EXISTING BUILDING AREA
GROUND FLOOR AREA = 3,014.83 SQ.M 32,452.42 SQ.FT.
SECOND FLOOR AREA = 918.70 SQ.M 9,889.14 SQ.FT.
TOTAL BLDG. AREA = 3,933.53 SQ.M 42,341.56 SQ.FT.

PROPOSED ADDITION
GROUND FLOOR AREA = 1,505.66 SQ.M. 16,207.31 SQ. FT
SECOND FLOOR AREA = 1,589.47 SQ.M. 17,109.47 SQ.FT.
TOTAL = 3,095.13 SQ.M. 33,316.78 SQ.FT.

TOTAL BUILDING AREA = 7,028.66 SQ.M 75,658.34 SQ.FT.

REQUIRED PARKING = 1 / 30 SQ. M = 234 PARKING SPACES

PROPOSED PARKING = 272 PARK. SPACES

R.V. Anderson Associates Limited
consulting engineers, architects, technology managers
1750 Courtwood Crescent, Suite 220, Ottawa, Ontario Phone: 226–1844 Fax: 226–8630
ottawa@rvanderson.com

NOTE: THE ARCHITECT'S PLAN HAS BEEN AMENDED BY RVA TO INCLUDE PROPOSED STORMWATER DETENTION AREAS AND GRADING ADJUSTMENTS TO SUIT THE REQUIREMENTS OF THEIR INSTALLATION.

No.	DESCRIPTION	DATE	CHD
RVA1	AMENDED TO INCLUDE POND DESIGN	16OCT01	GSH

REVISIONS

CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND REPORT ANY OMMISSIONS OR DISCREPANCIES TO THE ARCHITECT BEFORE PROCEEDING WITH THE WORK.

DO NOT SCALE THE DRAWINGS

PROJECT NORTH

THIS DRAWING SHALL NOT BE USED FOR CONSTRUCTION PURPOSES UNTIL SIGNED BY THE ARCHITECT.

DATE 16OCT01
DRAWN JMM
DATE 16OCT01
CHECKED GSH
DATE PRINTED 16OCT01

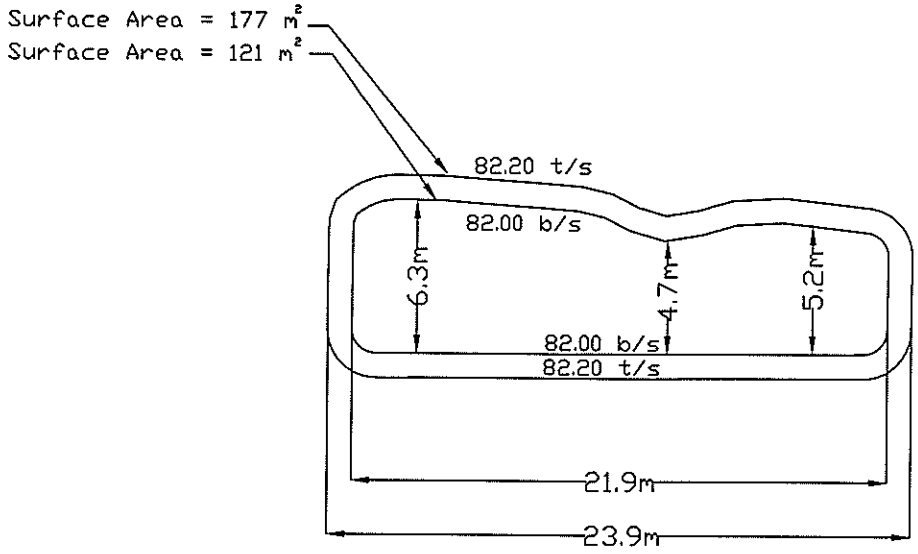
REGISTERED PROFESSIONAL ENGINEER G. S. HOLOWACH PROVINCE OF ONTARIO

VINCENT P. COLIZZA ARCHITECT INCORPORATED

TUNDRA SEMICONDUCTOR

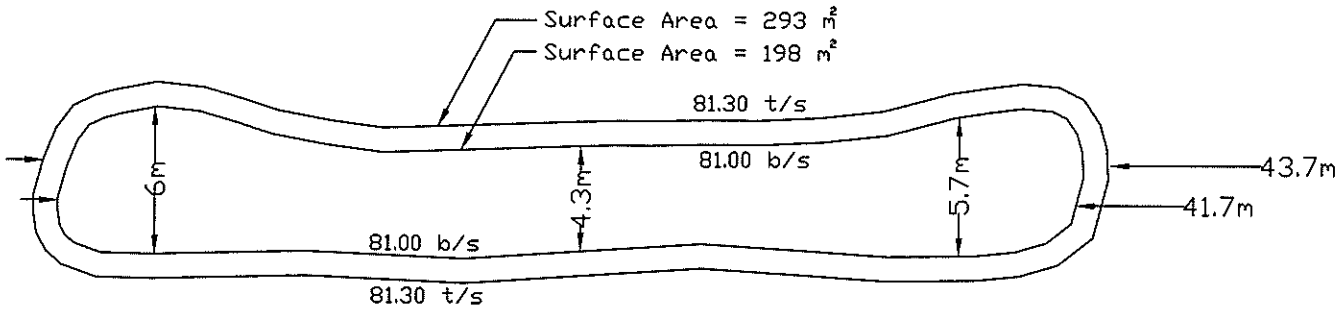
DWG. TITLE
SITE SURVEY
GRADING & DRAINAGE PLAN

SCALE 1:400 ~~1:400~~ AS NOTED
DWG. NO. SP–01
PROJ. NO. 1200



SWM Detention Area #1

Volume = (0.20*121) + (0.20*(177-121)/3) = 27.9 m³



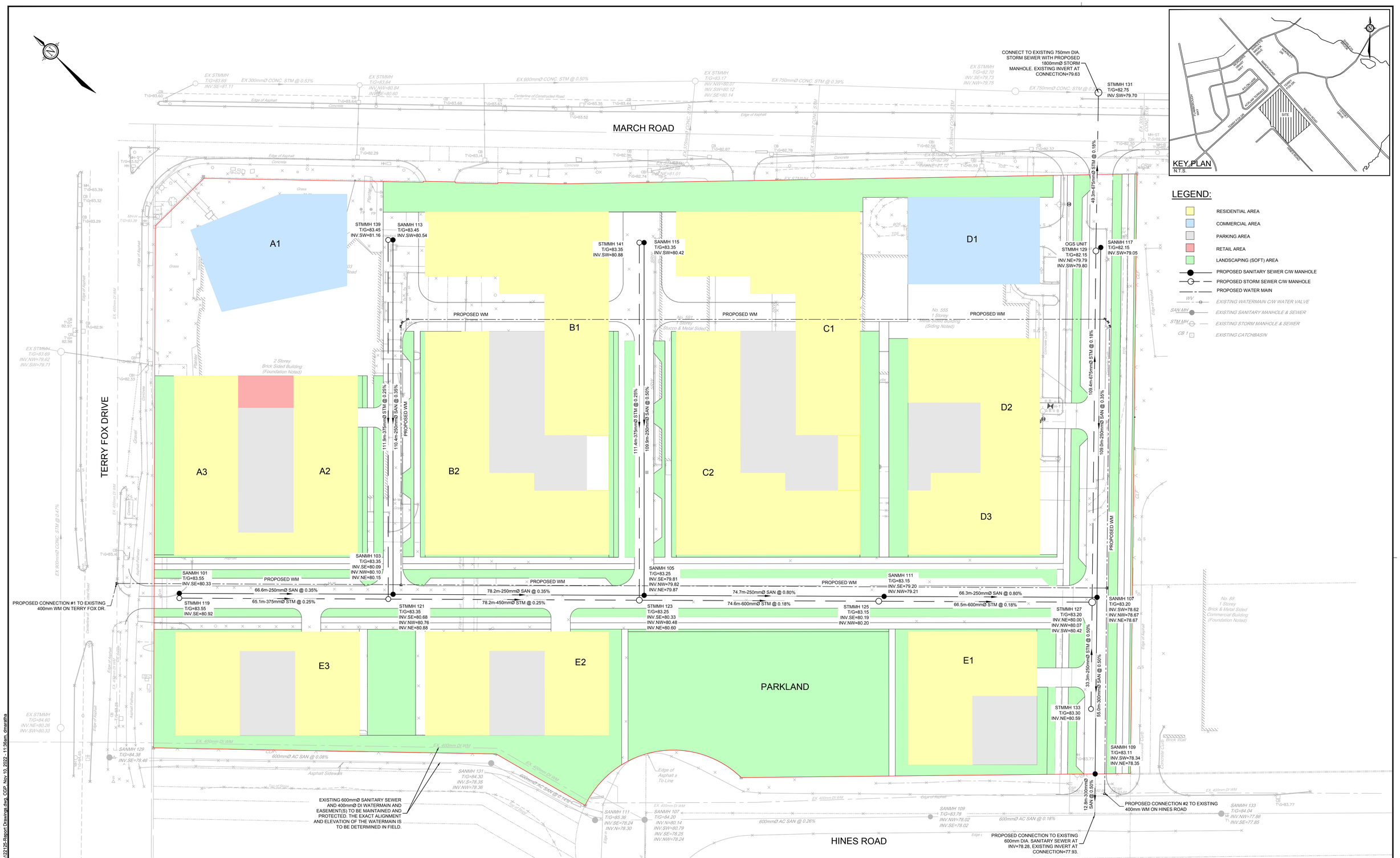
SWM Detention Area #2

Volume = (0.30*198) + (0.20*(293-198)/3) = 68.9 m³

PONDING AREAS N.T.S.

APPENDIX F

Conceptual Drawings



LEGEND:

- RESIDENTIAL AREA
- COMMERCIAL AREA
- PARKING AREA
- RETAIL AREA
- LANDSCAPING (SOFT) AREA
- PROPOSED SANITARY SEWER C/W MANHOLE
- PROPOSED STORM SEWER C/W MANHOLE
- PROPOSED WATER MAIN
- WV — EXISTING WATERMAIN C/W WATER VALVE
- SAN MH — EXISTING SANITARY MANHOLE & SEWER
- STM MH — EXISTING STORM MANHOLE & SEWER
- CB — EXISTING CATCHBASIN

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:
March + Main Developments Inc. and
591-595 March Road Development Inc.
Daniel Byrne
109 Atlantic Avenue, Unit 302B
Toronto, ON
M6K 1X4
(416) 530-2438

No.	REVISION	DATE	BY
1.	ISSUED FOR CITY APPROVAL	NOV 11/22	FST

SCALE 1:500 (1:500 0 5 10 15 20)

DESIGN FST/DMM
CHECKED FST
DRAWN DMM
CHECKED FST
APPROVED FST

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER F.S. THAUVETTE 100041399 NOV 11, 2022 PROVINCE OF ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
CITY OF OTTAWA
555, 591, 595 & 603 MARCH ROAD

DRAWING NAME
CONCEPTUAL SERVICING PLAN

PROJECT No. 122125
REV REV # 1
DRAWING No. C-1

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PLEASE DO NOT SCALE - If in doubt ASK!

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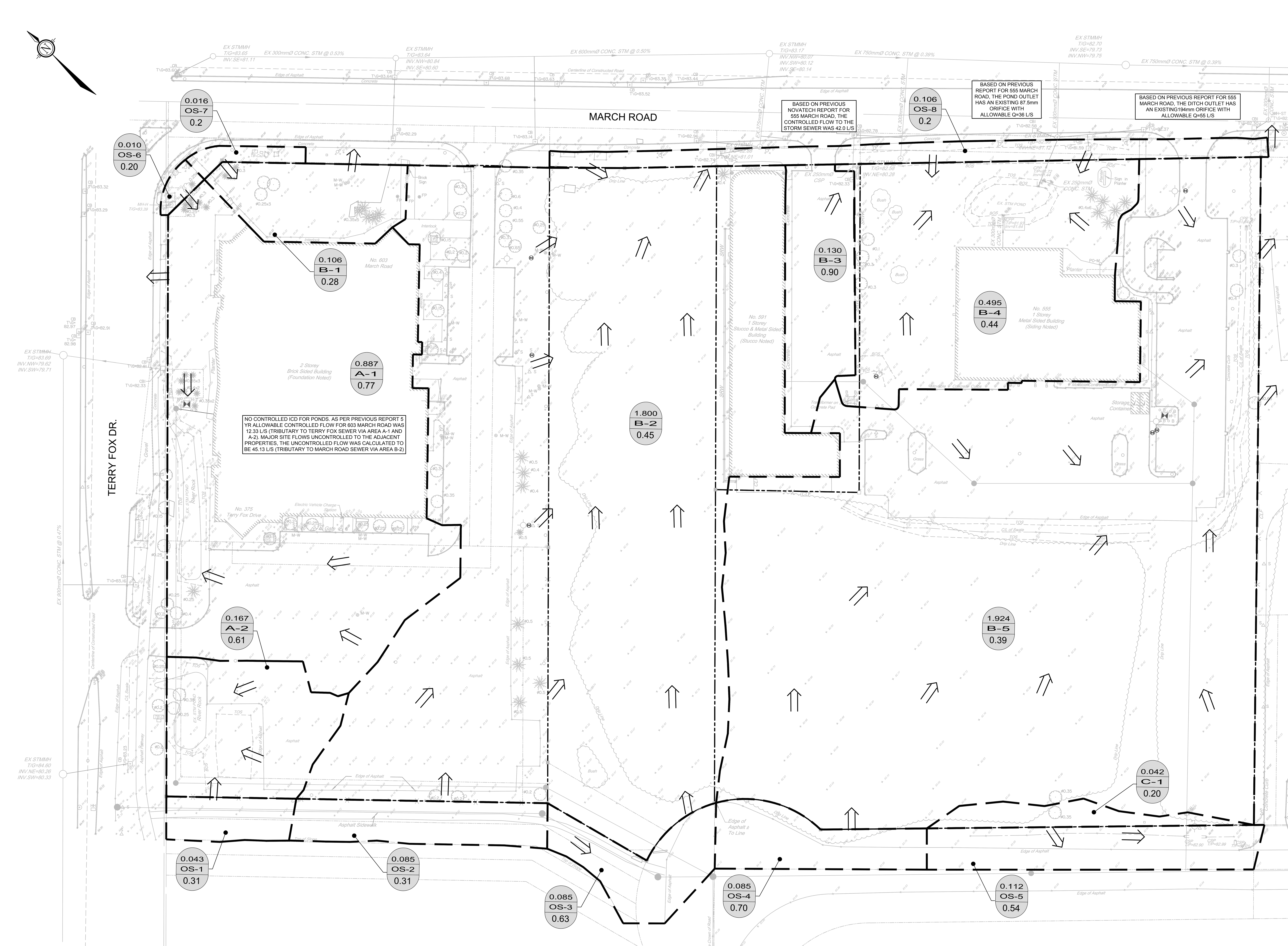
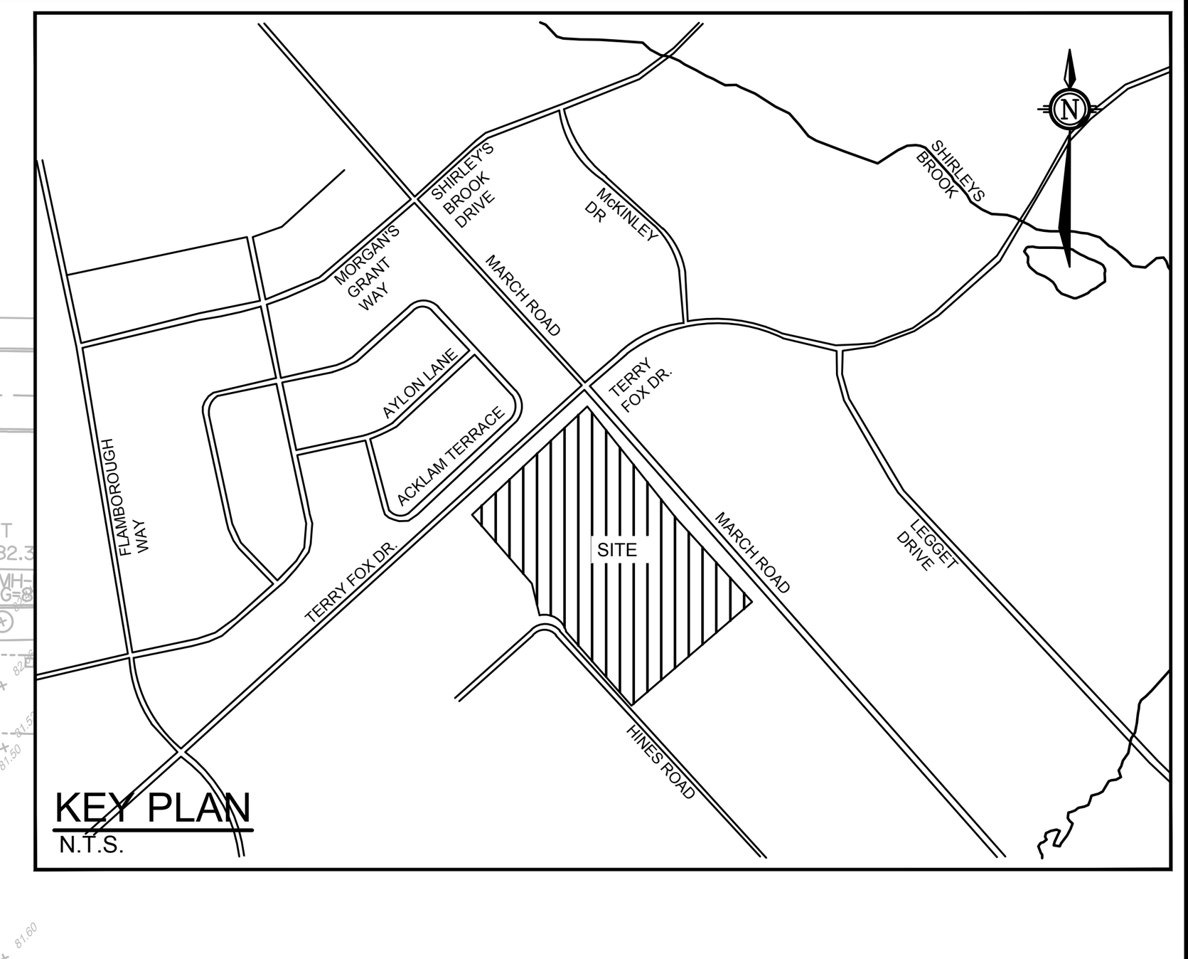
LOCATION
CITY OF OTTAWA
555, 591, 595 & 603 MARCH ROAD

DRAWING NAME
CONCEPTUAL GRADING PLAN

PROJECT No. 122125
REV REV # 1
DRAWING No. C-2





LEGEND:

- PROPERTY LINE
- EXISTING SANITARY SEWER C/W MANHOLE
- EXISTING STORM SEWER C/W MANHOLE
- PRE-DEVELOPMENT STORM DRAINAGE AREA
- DRAINAGE AREA / AREA-ID / RUN-OFF COEFFICIENT (0.495 / B-4 / 0.44)

NOTE:
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LOCATION
CITY OF OTTAWA
555, 591, 595 & 603 MARCH ROAD

DRAWING NAME
PRE-DEVELOPMENT STORM DRAINAGE AREA PLAN

PROJECT No. 122125
REV REV # 1
DRAWING No. C-3

PLAN24x36.DWG - 914.4mmx609.6mm

MARCH ROAD

TERRY FOX DRIVE

HINES ROAD

A1
A2
A3
B1
B2
C1
C2
D1
D2
D3
E1
E2
E3
PARKLAND

0.15 DR-1 0.20
0.81 A-1 0.70
0.84 A-2 0.84
1.48 A-3 0.64
0.83 A-4 0.76
0.59 A-5 0.65
0.59 A-6 0.68
0.44 A-7 0.71
0.35 DR-2 0.20

2 Storey Brick Sided Building (Foundation Noted)

No. 591 2 Storey Stucco & Metal Sided

No. 555 1 Storey Metal Sided Building (Siding Noted)

No. 88 1 Storey Brick & Metal Sided Commercial Building (Foundation Noted)

Asphalt Sidewalk

Edge of Asphalt ± To Line

Ditch Line

KEY PLAN
N.T.S.

SITE

LEGEND:

- RESIDENTIAL AREA
- COMMERCIAL AREA
- PARKING AREA
- RETAIL AREA
- LANDSCAPING (SOFT) AREA
- PROPOSED SANITARY SEWER C/W MANHOLE
- PROPOSED STORM SEWER C/W MANHOLE
- PROPOSED STORM DRAINAGE AREA
- 0.35 / DR-2 / 0.20 — DRAINAGE AREA, AREA-ID, RUN-OFF COEFFICIENT

NOTE:
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SCALE
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1:500
0 5 10 15 20

DESIGN FST/DMM
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F.S. THAUVETTE
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NOV 11, 2022
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LOCATION
CITY OF OTTAWA
555, 591, 595 & 603 MARCH ROAD

DRAWING NAME
CONCEPTUAL
POST-DEVELOPMENT STORM
DRAINAGE AREA PLAN

PROJECT No. 122125
REV REV # 1
DRAWING No. C-4

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