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FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

FOR

DOMICILE DEVELOPMENTS 398-406 ROOSEVELT AVENUE

CITY OF OTTAWA

PROJECT NO.: 17-986

DECEMBER 2017 – REV 1

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
FOR
398-406 ROOSEVELT AVENUE

DOMICILE DEVELOPMENTS

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FOR
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1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained by Domicile Developments to prepare a Functional Servicing and Stormwater Management report in support of the application for a Zoning By-law Amendment (ZBLA) and Site Plan Control (SPC) at 398-406 Roosevelt Avenue.

The subject property is located within the City of Ottawa urban boundary, in the Kitchissippi ward. As illustrated in ***Figure 1***, the subject property is located north of the intersection of Richmond Road and Roosevelt Avenue. Comprised of three parcels to be combined into one parcel, the subject property measures approximately ***0.14 ha*** and is zoned Residential Third Density (R3S).

Figure 1: Site Location

The proposed ZBLA and SPC would allow for the development of a 6-storey residential /commercial building fronting onto Roosevelt Avenue. The proposed development would include approximately ***552 m²*** of ground level retail and underground parking, with access from Roosevelt Avenue. The residential component is comprised of approximately 35 units. A copy of the site plan prepared by Alcaide Webster, dated December 11, 2017, is included in ***Drawings/Figures***.

The objective of this report is to provide sufficient detail to demonstrate that the proposed re-zoning and proposed development is supported by existing municipal services.

1.1 Existing Conditions

The existing site includes three single family homes consisting of asphalt driveways and vegetated areas. The elevations range between 67.36m and 66.87m with a minimal grade change of approximate 0.49m from the Northeast to the Southwest corner of the property.

Sewer and watermain mapping collected from the City of Ottawa indicate that the following services exist across the property frontages within the adjacent municipal right-of-ways:

Roosevelt Avenue

- 150 mm diameter unlined cast iron watermain
- 300 mm diameter concrete sanitary sewer tributary to the West Nepean Trunk Collector
- 300 mm diameter concrete storm sewer tributary to the Ottawa River

1.2 Required Permits / Approvals

The proposed development is subject to the site plan control approval process. The City of Ottawa must approve the engineering design drawings and reports prior to the issuance of site plan control.

The development is proposed to consist of a single parcel of land that is not industrial and would outlet to a storm sewer. As a result, the stormwater management system is anticipated to be exempt from sections 53(1) and (3) of the Ontario Water Resources Act under Ontario Regulation 525/98. Correspondence with the Ministry of the Environment and Climate Change (MOECC) has been included in ***Appendix A***.

1.3 Pre-consultation

Pre-consultation correspondence, along with the servicing guidelines checklist, is located in ***Appendix A***.

2.0 GUIDELINES, PREVIOUS STUDIES, AND REPORTS

2.1 Existing Studies, Guidelines, and Reports

The following studies were utilized in the preparation of this report.

- **Ottawa Sewer Design Guidelines**,
  City of Ottawa, *SDG002,* October 2012.
  (City Standards)

- **Ottawa Design Guidelines – Water Distribution**
  City of Ottawa, July 2010.
  (Water Supply Guidelines)

  - **Technical Bulletin ISD-2010-2**
    City of Ottawa, December 15, 2010.
    (*ISD-2010-2*)

  - **Technical Bulletin ISDTB-2014-02**
    City of Ottawa, May 27, 2014.
    (*ISDTB-2014-02*)

- **Design Guidelines for Sewage Works,**
  Ministry of the Environment, 2008.
  (MOE* Design Guidelines*)

- **Stormwater Planning and Design Manual,**
  Ministry of the Environment, March 2003.
  (SWMP Design Manual)

- **Ontario Building Code Compendium**
  Ministry of Municipal Affairs and Housing Building Development Branch, January 1, 2010 Update.
  (OBC)

- **NFPA 13 – Standard for the Installation of Sprinkler Systems**
  National Fire Protection Association, 2016.
  (NFPA Standards)

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject property lies within the City of Ottawa 1W pressure zone. A local 150mm diameter watermain exists within the Roosevelt Avenue right-of-way, as shown by the Water Distribution System map included in ***Appendix B***.

3.2 Water Supply Servicing Design

It is proposed that the development be serviced via a 150mm diameter water service to the existing 150mm watermain located within the Roosevelt Avenue right-of-way.

Table 1 summarizes the ***Water Supply Guidelines*** employed in the preparation of the water demand estimate.

Table 1
Water Supply Design Criteria

Design Parameter	Value
Residential Average Apartment	1.8 P/unit
Residential Average Daily Demand	350 L/d/P
Residential Maximum Daily Demand	4.9 x Average Daily *
Residential Maximum Hourly	7.4 x Average Daily *
Commercial Retail	2.5 L/m^2/d
Commercial Maximum Daily Demand	1.5 x avg. day
Commercial Maximum Hour Demand	1.8 x max. day
Minimum Watermain Size	150mm diameter
Minimum Depth of Cover	2.4m from top of watermain to finished grade
During normal operating conditions desired operating pressure is within	350kPa and 480kPa
During normal operating conditions pressure must not drop below	275kPa
During normal operating conditions pressure must not exceed	552kPa
During fire flow operating pressure must not drop below	140kPa

Daily average based on Appendix 4-A from **Water Supply Guidelines*
*** Residential Max. Daily and Max. Hourly peaking factors per MOE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500 persons.*
-Table updated to reflect ISD-2010-2

Table 2 summarizes the estimated water supply demand and boundary conditions for the proposed development based on the development statistics provided by Alcaide Webster.

Table 2
Water Demand and Boundary Conditions

Design Parameter	Proposed Demand[1] (L/min)	Boundary Condition[2] (m H_2O / kPa)
Average Daily Demand	16.3	48.3 / 473.6
Max Day + Fire Flow	76.5 + 4,150 = 4,196.5	4,980 L/min @ 140 kPa
Peak Hour	115.9	41.6 / 407.9

1) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations.
2) Boundary conditions supplied by the City of Ottawa for the demands indicated in the correspondence; assumed ground elevation 67.12m. See ***Appendix B.***

The City of Ottawa was contacted to obtain boundary conditions associated with the estimated water demand as indicated in the boundary request correspondence included in ***Appendix B***. Based on the updated Site Plan, the anticipated water demand for the site increased by approximately 7%; it is not anticipated to significantly impact the boundary conditions provided by the City.

The City provided the available fire flow at 140 kPa along with the anticipated minimum and maximum water pressures for the demands as indicated by the correspondence include in ***Appendix B***. The minimum and maximum pressures fall within the recommended range identified in ***Table 1***. Based on the City of Ottawa boundary conditions, the existing municipal infrastructure is capable of providing ***4,980 L/min*** at 140 kPa during fire flow demands.

For the purpose of estimating fire flow, National Fire Protection Association (NFPA) standards were utilized. As indicated by Section 11.2.2 from the ***NFPA Standards***, fire flow requirements are to be determined by combining the required flow rate for the sprinkler system along with the anticipated hose stream. As indicated by Table 11.2.2.1 and Table 11.2.3.1.2 extracted from the ***NFPA Standards*** included in ***Appendix B***, the anticipated fire flow requirements for the sprinkler system is ***3,200 L/min*** (850 gpm) and the anticipated internal and external total combined inside and outside hose stream demand is ***950 L/min*** (250 gpm).

As a result, the total fire flow is anticipated to be ***4,150 L/min*** (1,100 gpm). Based on the boundary conditions provided by the City of Ottawa, sufficient supply is available for fire flow. A certified fire protection system specialist would need to be employed to design the building fire suppression system and confirm the actual fire flow demand.

3.3 Water Supply Conclusion

The estimated water demand under proposed conditions was submitted to the City of Ottawa for establishing boundary conditions. Sufficient fire flow in accordance with ***NFPA Standards*** is available. As demonstrated by ***Table 2***, based on the City's model, the municipal system is capable of delivering water within the ***Water Supply Guidelines*** pressure range.

The proposed water supply design conforms to all relevant City Guidelines and Policies.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The subject site lies within the West Nepean Collector Sewer catchment area, as shown by the City sewer mapping included in ***Appendix C***. An existing 300 mm diameter sanitary sewer within the Roosevelt Avenue right-of-way is available to service the proposed development.

4.2 Wastewater Design

It is proposed that the development be serviced via a 135mm sanitary service to the existing 300mm diameter sanitary sewer located within the Roosevelt Avenue right-of-way.

Table 3 summarizes the ***City Standards*** employed in the design of the proposed wastewater sewer system.

Table 3
Wastewater Design Criteria

Design Parameter	Value
Residential Average Apartment	1.8 P/unit
Average Daily Demand	350 L/d/per
Peaking Factor	Harmon's Peaking Factor. Max 4.0, Min 2.0
Commercial Floor Space	5 L/m^2/d
Infiltration and Inflow Allowance	0.28L/s/ha
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sewer Size	135mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6m/s
Maximum Full Flowing Velocity	3.0m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012.	

Table 4 demonstrates the estimated peak flow from the proposed development based on the development statistics provided by Alcaide Webster. See ***Appendix C*** for associated calculations.

Table 4
Summary of Estimated Peak Wastewater Flow

Design Parameter	Total Flow (L/s)
Estimated Average Dry Weather Flow	0.32
Estimated Peak Dry Weather Flow	1.12
Estimated Peak Wet Weather Flow	1.15

The sanitary flow based on the site plan dated December 11th, 2017, prepared by Alcaide Webster included in ***Drawings/Figures*** results in a peak wet weather flow of ***1.15 L/s***.

A sanitary analysis was conducted for the local municipal sanitary sewers located across the frontage of the subject property in order to assess the available capacity. The catchment area serviced by the Roosevelt Avenue sanitary sewer was identified and evaluated by reviewing existing development and zoning within the area. The analysis was conducted from the site to the upstream extents of the drainage area located near the intersection of Danforth Avenue and Roosevelt Avenue, as shown by the sanitary drainage plan ***SAN-1*** in ***Drawings/Figures***.

City of Ottawa Sewer Design Guidelines (2004) Figure 4.3 'Peak Flow Design Parameters' were employed to generate a conservative estimate of the existing wastewater flow conditions within the sewer.

Based on the sanitary analysis, the controlling section of the local sewer system is located at section D-C with an available residual capacity of ***58.6 L/s***; detailed calculations are included in ***Appendix C***.

The analysis above indicates that sufficient capacity is available in the local sewers to accommodate the proposed development.

4.3 Wastewater Servicing Conclusions

The site is tributary to the West Nepean Trunk Collector sewer; based on the sanitary analysis sufficient capacity is available to accommodate the estimated ***1.15 L/s*** peak wet weather flow from the proposed development.

The proposed wastewater design conforms to all relevant ***City Standards***.

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Services

Stormwater runoff from the subject property is tributary to the City of Ottawa sewer system located within the Ottawa Central sub-watershed. As such, approvals for proposed development within this area are under the approval authority of the City of Ottawa.

Flows that influence the watershed in which the subject property is located are further reviewed by the principal authority. The subject property is located within the Ottawa River watershed, and is therefore subject to review by the Rideau Valley Conservation Authority (RVCA). Consultation with the RVCA is located in ***Appendix A***.

It was assumed that the existing development contained no stormwater management controls for flow attenuation. The estimated pre-development peak flows for the 2, 5, and 100-year are summarized in ***Table 7***:

Table 5
Summary of Existing Peak Storm Flow Rates

City of Ottawa Design Storm	Estimated Peak Flow Rate (L/s)
2-year	17.8
5-year	24.2
100-year	52.0

5.2 Post-development Stormwater Management Target

Stormwater management requirements for the proposed development were reviewed with the City of Ottawa, where the proposed development is required to:

- Meet an allowable release rate based on a Rational Method Coefficient of 0.50, employing the City of Ottawa IDF parameters for a 5-year storm with a time of concentration equal to or greater than 10 minutes.
- Attenuate all storms up to and including the City of Ottawa 100-year design event on site.
- Quality controls are required to an enhanced level of treatment for the proposed development; correspondence with the RVCA is included in ***Appendix A***.

Based on the above the allowable release rate for the proposed development is ***19.7 L/s***.

5.3 Proposed Stormwater Management System

It is proposed that the stormwater outlet from the development will be to the existing 300mm diameter storm sewer within Roosevelt Avenue via a 250mm diameter storm service.

To meet the stormwater objectives the proposed development will contain flow attenuation via an ICD located within an internal cistern.

Stormwater runoff collected from roof area is proposed to be directed to the internal stormwater cistern. Cistern flow will be controlled using the internal mechanical system and will outlet to the municipal storm sewer within Roosevelt Avenue, as shown by ***SSGP-1***.

Runoff from the parking area will be directed to area drains above the parking garage and are proposed to be directed to a ***30.0 m³*** cistern. Stormwater from the cistern will be attenuated by a ***94mm*** ICD. Detailed calculations are located in ***Appendix D***.

Table 6 summarizes post-development flow rates based on the proposed Site Plan.

Table 6
Stormwater Flow Rate Summary

Control Area	5-Year Release Rate	5-Year Storage	100-Year Release Rate	100-Year Storage Required	100-Year Storage Available
	(L/s)	(m^3)	(L/s)	(m^3)	(m^3)
Unattenuated Areas	0.8	0.0	1.7	0.0	0.0
Attenuated Areas	11.3	13.4	17.8	29.7	30.0
Total	**12.1**	**13.4**	**19.5**	**29.7**	**30.0**

It is estimated that ***29.7 m³*** of storage will be required on site to attenuate flow to the established release rate of ***19.7 L/s***; storage calculations are contained within ***Appendix D***.

5.4 Stormwater Quality Control

In an effort to meet stormwater quality controls as specified by the RVCA, a best management practices approach is proposed. To reduce total suspended solids (TSS), stormwater runoff from parking area is proposed to be captured by area drains and directed to an internal cistern system allowing for detention time, thus promoting the removal of suspended solids.

Stormwater from roof areas is considered to be clean and will be directed towards the internal cistern before discharging to the municipal system.

5.5 Stormwater Servicing Conclusions

Post development stormwater runoff will be required to be restricted to the allowable target release rate for storm events up to and including the 100-year storm in accordance with City of Ottawa ***City Standards***. The post-development allowable release rate is ***19.7 L/s;*** it is calculated that ***29.7 m³*** is required to meet this release rate.

Quality controls are required to an enhanced level of treatment for the proposed development; correspondence with the RVCA is included in ***Appendix A***.

The proposed stormwater design conforms to all relevant ***City Standards*** and Policies for approval

6.0 UTILITIES

Gas and Hydro services currently exist within the Roosevelt Avenue right-of-way. Utility servicing will be coordinated with the individual utility companies prior to site development.

7.0 EROSION AND SEDIMENT CONTROL

Soil erosion occurs naturally and is a function of soil type, climate and topography. During construction the extent of erosion losses is exaggerated due to the removal of vegetation and the top layer of soil becoming agitated.

Prior to topsoil stripping, earthworks or underground construction, erosion and sediment controls will be implemented and will be maintained throughout construction.

Silt fence will be installed around the perimeter of the site and will be cleaned and maintained throughout construction. Silt fence will remain in place until the working areas have been stabilized and re-vegetated.

Catch basins will have SILTSACKs or an approved equivalent installed under the grate during construction to protect from silt entering the storm sewer system.

A mud mat will be installed at the construction access in order to prevent mud tracking onto adjacent roads.

Erosion and sediment controls must be in place during construction. The following recommendations to the contractor will be included in contract documents.

- Limit extent of exposed soils at any given time.
- Re-vegetate exposed areas as soon as possible.
- Minimize the area to be cleared and grubbed.
- Protect exposed slopes with plastic or synthetic mulches.
- Install silt fence to prevent sediment from entering existing ditches.
- No refueling or cleaning of equipment near existing watercourses.
- Provide sediment traps and basins during dewatering.
- Install filter cloth between catch basins and frames.
- Plan construction at proper time to avoid flooding.

Establish material stockpiles away from watercourses, so that barriers and filters may be installed.

The contractor will, at every rainfall, complete inspections and guarantee proper performance. The inspection is to include:

- Verification that water is not flowing under silt barriers.
- Clean and change filter cloth at catch basins.

8.0 CONCLUSION AND RECOMMENDATIONS

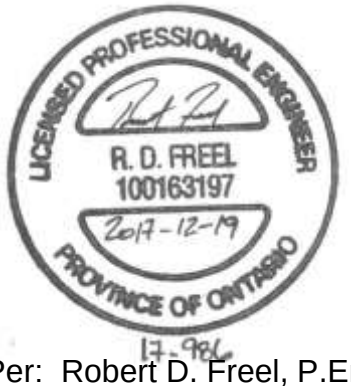
David Schaeffer Engineering Ltd. (DSEL) has been retained by Domicile Developments to prepare a Functional Servicing and Stormwater Management report in support of the application for a Zoning By-law Amendment (ZBLA) and Site Plan Control (SPC) at 398-406 Roosevelt Avenue. The preceding report outlines the following:

- Based on boundary conditions provided by the City the existing municipal water infrastructure is capable of providing the proposed development with water within the City's required pressure range;
- Fire flow requirements were estimated in accordance with ***NFPA Standards*** and the boundary conditions provided by the City of Ottawa, sufficient flow is available to service the development;
- The proposed development is estimated to have a peak wet weather flow of ***1.15 L/s***; Based on the sanitary analysis conducted the existing municipal sewer infrastructure has sufficient capacity to support the development;
- Based on consultation with the City, the proposed development will be required to attenuate post development flows to an equivalent release rate of ***19.7 L/s*** for all storms up to and including the 100-year storm event;
- It is proposed that stormwater objective be met through storm water retention via cistern storage, it is calculated that ***29.7 m^3*** of onsite storage will be required to attenuate flow to the established release rate above;
- Quality controls are required to an enhanced level of treatment for the proposed development; correspondence with the RVCA is included in ***Appendix A***.

Prepared by,
David Schaeffer Engineering Ltd.

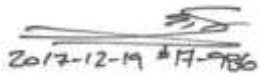
Per: Alison J. Gosling, EIT.

Reviewed by,
David Schaeffer Engineering Ltd.



Per: Robert D. Freel, P.Eng.

Reviewed by,
David Schaeffer Engineering Ltd.



Per: Adam D. Fobert, P.Eng.

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APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

17-986 18/12/2017

4.1 General Content		
☐	Executive Summary (for larger reports only).	N/A
☒	Date and revision number of the report.	Report Cover Sheet
☒	Location map and plan showing municipal address, boundary, and layout of proposed development.	Drawings/Figures
☒	Plan showing the site and location of all existing services.	Figure 1
☒	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Section 1.0
☒	Summary of Pre-consultation Meetings with City and other approval agencies.	Section 1.3
☒	Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	Section 2.1
☒	Statement of objectives and servicing criteria.	Section 1.0
☒	Identification of existing and proposed infrastructure available in the immediate area.	Sections 3.1, 4.1, 5.1
☐	Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	N/A
☒	Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	GP-1
☐	Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
☐	Proposed phasing of the development, if applicable.	N/A
☒	Reference to geotechnical studies and recommendations concerning servicing.	Section 1.4
☒	All preliminary and formal site plan submissions should have the following information: -Metric scale -North arrow (including construction North) -Key plan -Name and contact information of applicant and property owner -Property limits including bearings and dimensions -Existing and proposed structures and parking areas -Easements, road widening and rights-of-way -Adjacent street names	SSP-1

4.2 Development Servicing Report: Water		
☐	Confirm consistency with Master Servicing Study, if available	N/A
☒	Availability of public infrastructure to service proposed development	Section 3.1
☒	Identification of system constraints	Section 3.1
☒	Identify boundary conditions	Section 3.1, 3.2
☒	Confirmation of adequate domestic supply and pressure	Section 3.3

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☒	Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Section 3.2
☐	Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	N/A
☐	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
☐	Address reliability requirements such as appropriate location of shut-off valves	N/A
☐	Check on the necessity of a pressure zone boundary modification	N/A
☒	Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range	Section 3.2, 3.3
☐	Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	N/A
☐	Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A
☒	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Section 3.2
☐	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N/A

4.3 Development Servicing Report: Wastewater

☒	Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Section 4.2
☐	Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A
☐	Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	N/A
☒	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 4.1
☒	Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Section 4.2
☒	Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Section 4.2, Appendix C
☒	Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 4.2
☐	Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☐	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
☐	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
☐	Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
☐	Special considerations such as contamination, corrosive environment etc.	N/A

4.4 Development Servicing Report: Stormwater Checklist

☒	Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 5.1
☒	Analysis of available capacity in existing public infrastructure.	Section 5.1, Appendix D
☒	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Drawings/Figures
☒	Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Section 5.2
☒	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 5.2
☒	Description of the stormwater management concept with facility locations and descriptions with references and supporting information	Section 5.3
☐	Set-back from private sewage disposal systems.	N/A
☐	Watercourse and hazard lands setbacks.	N/A
☒	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Appendix A
☐	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A
☒	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	Section 5.3
☐	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A
☒	Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Section 5.1, 5.3
☐	Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
☐	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	N/A
☐	If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A
☐	Identification of potential impacts to receiving watercourses	N/A
☐	Identification of municipal drains and related approval requirements.	N/A

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☒	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 5.3
☐	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	N/A
☐	Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A
☒	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 6.0
☐	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
☐	Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Approval and Permit Requirements: Checklist

☒	Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement ct. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	Section 1.2
☐	Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A
☐	Changes to Municipal Drains.	N/A
☐	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

4.6 Conclusion Checklist

☒	Clearly stated conclusions and recommendations	Section 8.0
☐	Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	
☐	All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

Alison Gosling

From: Primeau, Charlie (MOECC) <Charlie.Primeau@ontario.ca>
Sent: Tuesday, December 19, 2017 1:28 PM
To: Alison Gosling
Subject: RE: 398-406 Roosevelt Road - Job:896B

Hi Alison,

Thank you for your call and the additional clarification for the above noted proposed development.

As you indicated during our telephone call that the City has determined that the proposed development at 398-406 Roosevelt Road qualifies for the ECA exemption under Reg. 525/98 of OWRA. As such no pre-submission consultation is required. Please proceed with your project.

Charlie Primeau
Water Inspector / Inspecteur de l'eau, Badge #1420
Safe Drinking Water Branch / Direction du contrôle de la qualité de l'eau potable
Ministry of the Environment and Climate Change/
Ministère de l'Environnement et de l'Action en matière de changement climatique
2430 Don Reid Drive
Ottawa ON K1H 1E1
Tel: 613 521-3450 ext 251 or/ou 1 800 860-2195
Fax 613 521-5437
E-mail: charlie.primeau@ontario.ca
Website/Site Web: www.ene.gov.on.ca

From: Primeau, Charlie (MOECC)
Sent: December-18-17 3:18 PM
To: MOECCOttawaSewage (MOECC); Alison Gosling
Cc: Primeau, Charlie (MOECC)
Subject: RE: 398-406 Roosevelt Road - Job:896B

Good afternoon Alison,

I have received your Pre-Submission Consultation request form. Prior to scheduling a pre-submission consultation I will need the City's application file # (to expedite my consultation, I review info based on documents City has posted on their site). I will also require the city review engineer to confirm under which process this ECA application will proceed: ToR standard works, ToR expanded works or direct submission. And what time of SWM facility to be used to attain Enhanced treatment.

Once I have receive the requested additional information I will contact you.

Charlie Primeau
Water Inspector / Inspecteur de l'eau, Badge #1420
Safe Drinking Water Branch / Direction du contrôle de la qualité de l'eau potable
Ministry of the Environment and Climate Change/
Ministère de l'Environnement et de l'Action en matière de changement climatique

2430 Don Reid Drive
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Tel: 613 521-3450 ext 251 or/ou 1 800 860-2195
Fax 613 521-5437
E-mail: charlie.primeau@ontario.ca
Website/Site Web: www.ene.gov.on.ca

From: MOECCOttawaSewage (MOECC)
Sent: December-18-17 3:09 PM
To: Alison Gosling
Cc: Primeau, Charlie (MOECC)
Subject: RE: 398-406 Roosevelt Road - Job:896B

Good afternoon,

The MOECC Ottawa District Office has received your pre-submission consultation request. The Water Inspector assigned to your file is Charlie Primeau and will be contacting you.

Thank you,

Jéhanne Hurlbut
District Administrative Assistant (Bilingual)
Ontario Ministry of the Environment and Climate Change
Ottawa District Office
103-2430 Don Reid Drive
Ottawa, ON K1H 1E1
Ph: (613) 521-3450 X 221

From: Alison Gosling [mailto:AGosling@dsel.ca]
Sent: Friday, December 15, 2017 4:22 PM
To: MOECCOttawaSewage (MOECC) <MOECCOttawaSewage@ontario.ca>
Subject: 398-406 Roosevelt Road - Job:896B

Good afternoon,

We just wanted to touch base with you regarding a proposed development we are working on located at 398-406 Roosevelt Road.

Currently comprised of three parcels of land to be combined into one parcel, the existing 0.14ha site currently consists of three single family homes and is zoned Residential Third Density. The development proposes to construct a 6-storey residential/commercial building. It appears that the existing site is tributary to the Ottawa Central sub-watershed.

As the proposed sewage works and stormwater management facility will be servicing a single parcel of land as the parcels are to be combined into one parcel, which will be owned and operated by a single entity, does not discharge to a combined sewer system, and is not proposed to be used for industrial purposes, it is assumed this falls within the exemption requirements for an Environmental Compliance Approval as per O.Reg 525/98, Section 3 (a) & Ontario Water Resources Act Section 53. 6 (c).

I hope you could comment on my assumption that this property would be exempt from requiring an ECA. Please feel free to call to discuss this further.

Thank you,

Alison Gosling, E.I.T.
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103

Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.542
fax: (613) 836-7183
email: agosling@dsel.ca

Alison Gosling

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: Monday, December 18, 2017 9:13 AM
To: Alison Gosling
Cc: Eric Lalande
Subject: RE: 406 Roosevelt Road - Job:986B

Follow Up Flag: Follow up
Flag Status: Flagged

Good Morning Alison,

Based on the plans provided, it is our understanding that there are 9 parking spaces and drive aisles at grade. Therefore, given the parking spaces proposed and the distance of the outlet being approximately 600m to the Ottawa River, the RVCA would require water quality measures to achieve enhanced (80% TSS removal) in the stormwater management plan to mitigate the impacts on surface water quality and aquatic habitat of the receiver.

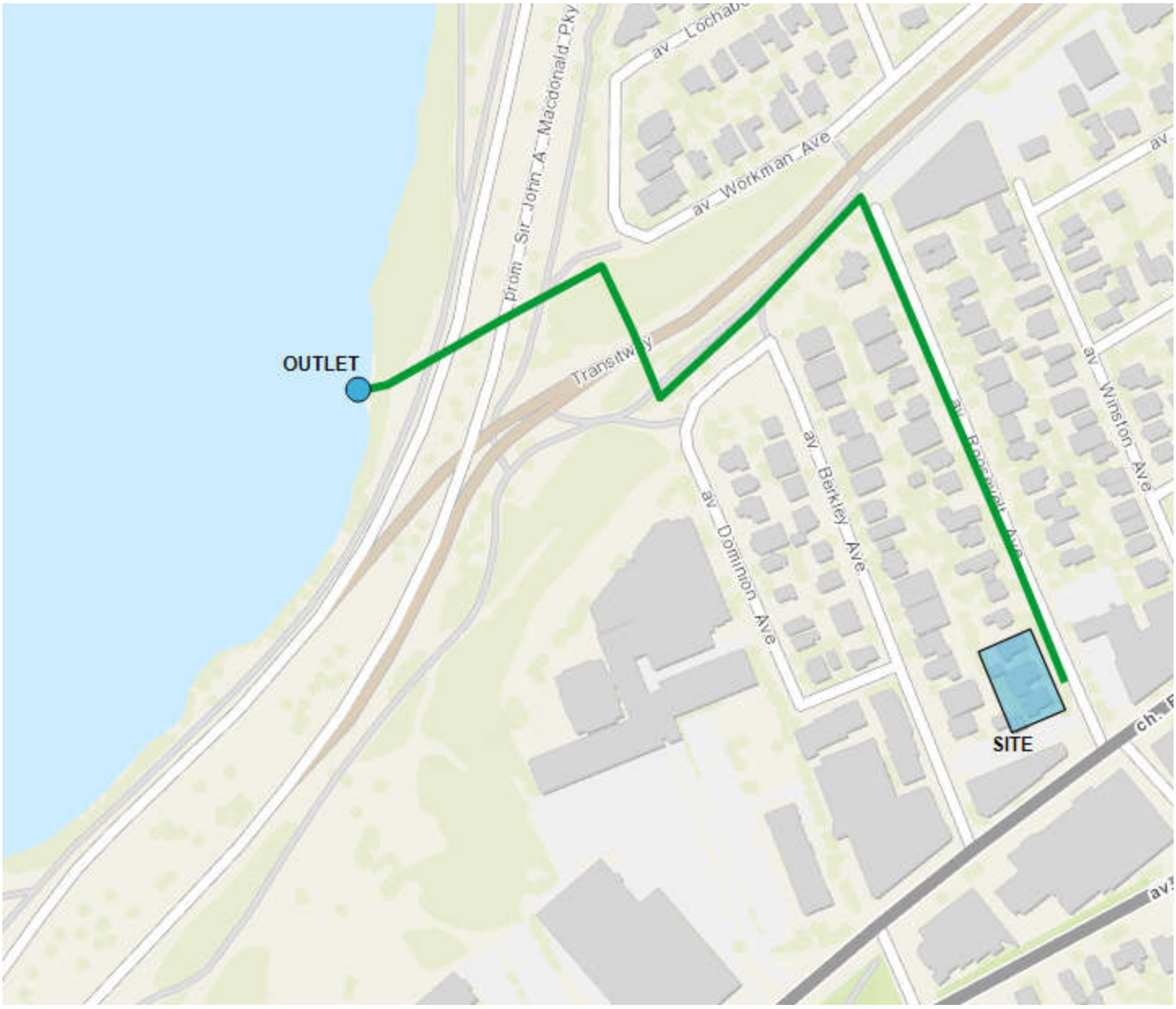
From: Alison Gosling [mailto:AGosling@dsel.ca]
Sent: Friday, December 15, 2017 3:57 PM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Eric Lalande <eric.lalande@rvca.ca>
Subject: 406 Roosevelt Road - Job:986B

Hi Jamie,

We wanted to touch base with you regarding a development at 398-406 Roosevelt Road. The development involves the construction of a 6-storey residential/commercial building, as shown by the attached site plan.

The development will connect to the existing 300mm diameter storm sewer within Roosevelt Road and will discharge primarily rooftop stormwater.

The stormwater collected from the site travels approximately 600 m to the Ottawa River. Can you provide a comment regarding quality controls that maybe required for the site?



Thank you,

Alison Gosling, E.I.T.
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.542
fax: (613) 836-7183
email: agosling@dsel.ca

APPENDIX B

Water Supply

Water Demand Design Flows per Unit Count
City of Ottawa - Water Distribution Guidelines, July 2010

Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4		0
Semi-detached	2.7		0
Townhouse	2.7		0
Apartment			0
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8	35	63

	Pop	Avg. Daily		Max Day		Peak Hour	
		m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Total Domestic Demand	63	22.1	15.3	108.0	75.0	163.2	113.3

Institutional / Commercial / Industrial Demand

				Avg. Daily		Max Day		Peak Hour	
Property Type	**Unit Rate**		**Units**	m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Commercial floor space	2.5	$L/m^2/d$	552	1.38	1.0	2.1	1.4	3.7	2.6
Office	75	$L/9.3m^2/d$		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Light	35,000	L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000	L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
			Total I/CI Demand	1.4	1.0	2.1	1.4	3.7	2.6
			Total Demand	**23.4**	**16.3**	**110.1**	**76.5**	**166.9**	**115.9**

Boundary Conditions Unit Conversion

	Height (m)	Elevation (m)	m H_2O	PSI	kPa		L/s	L/min
Avg. DD	115.4	67.12	48.3	68.7	473.6	Fire Flow @ 140kPa	83	4980
Fire Flow			0.0	0.0	0.0			
Peak Hour	108.7	67.12	41.6	59.2	407.9			

Alison Gosling

From: Wu, John <John.Wu@ottawa.ca>
Sent: Friday, December 8, 2017 10:35 AM
To: Alison Gosling
Subject: RE: 398-406 Roosevelt Street - Boundary condition request
Attachments: 398-406 Roosevelt December 2017.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi, Alison:

This is the result, please resubmit your fire flow calculation after you guys did it.

******The following information may be passed on to the consultant, but do NOT forward this e-mail directly.******

The following are boundary conditions, HGL, for hydraulic analysis at 398-406 Roosevelt (zone 1W) assumed to be connected to the 152 mm on Roosevelt (see attached PDF for location).

Minimum HGL = 108.7 m

Maximum HGL = 115.4 m

Available Flow = 83 L/s assuming a residual of 20 psi and a ground elevation of 67.2 m

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

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

John

From: Alison Gosling [mailto:AGosling@dsel.ca]
Sent: Wednesday, December 06, 2017 1:44 PM
To: Wu, John <John.Wu@ottawa.ca>
Subject: RE: 398-406 Roosevelt Street - Boundary condition request

Hi John,

Please see attached for a diagram indicating the approximate connection location.

Thank you,

Alison Gosling, E.I.T.
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.542
fax: (613) 836-7183
email: agosling@dsel.ca

From: Wu, John [mailto:John.Wu@ottawa.ca]
Sent: Wednesday, December 6, 2017 1:29 PM
To: Alison Gosling <AGosling@dsel.ca>
Subject: RE: 398-406 Roosevelt Street - Boundary condition request

We need sketch how it is serviced?

From: Alison Gosling [mailto:AGosling@dsel.ca]
Sent: Wednesday, December 06, 2017 1:19 PM
To: Wu, John <John.Wu@ottawa.ca>
Subject: 398-406 Roosevelt Street - Boundary condition request

Good afternoon John,

We would like to request water boundary conditions for Roosevelt Street using the following proposed development demands:

1. Location of Service / Street Number: 398-406 Roosevelt Street

2. Type of development and the amount of fire flow required for the proposed development:

- The proposed development is mixed use residential/commercial. The full build-out proposes 32 residential units and 552 m^2 of commercial space.
- It is anticipated that the development will have a connection to be serviced from the existing 152 mm diameter watermain within Roosevelt Street, as shown by the attached map.
- Fire demand based on FUS will be used to calculate fire demand, sufficient information is unavailable at this time to complete a calculation we would request that the available fire flow at 140 kPa be provided for later comparison and for water data card purposes.

3.

	L/min	L/s
Avg. Daily	15.1	0.25

Max Day	70.5	1.18
Peak Hour	106.9	1.78

It you have any questions please feel free to contact me.

Thank you,

Alison Gosling, E.I.T.
Project Coordinator / Junior Designer

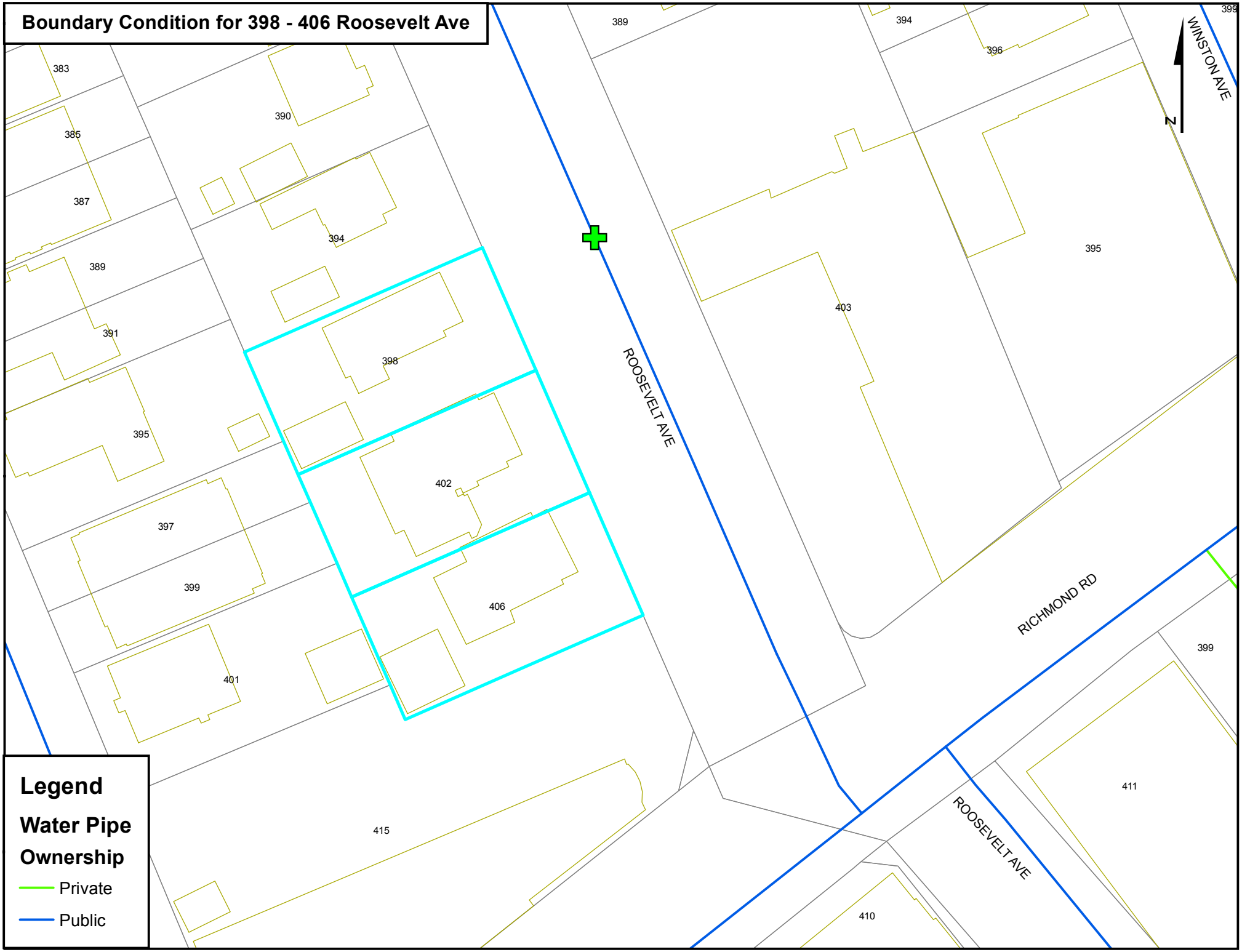
DSEL

david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.542
fax: (613) 836-7183
email: agosling@dsel.ca

'


Boundary Condition for 398 - 406 Roosevelt Ave
383
385
387
389
391
395
397
399
401
415
390
394
398
402
406
389
394
396
399
403
395
ROOSEVELT AVE
WINSTON AVE
N
RICHMOND RD
399
411
ROOSEVELT AVE
410
Legend
Water Pipe
Ownership
Private
Public

National Fire Protection Association (NFPA) 13 – Standard for the Installation of Sprinkler Systems

Table 11.2.2.1, Table 11.2.3.1.2

National Fire Protection Association 13 - Standard for the Installation of Sprinkler Systems Report, Table 11.2.2.1

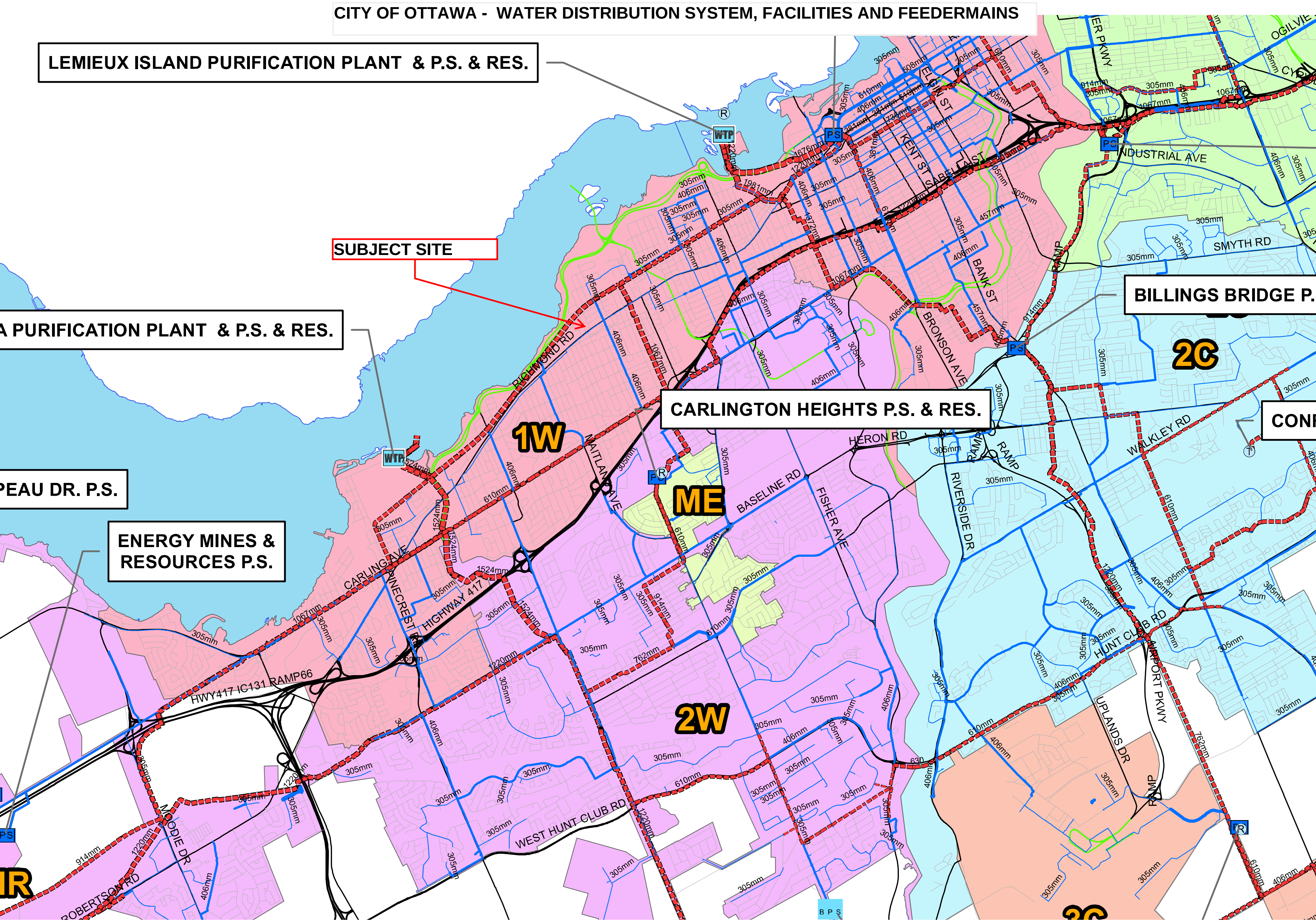
Table 11.2.2.1 Water Supply Requirements for Pipe Schedule Sprinkler Systems

Occupancy Classification	Minimum Residual Pressure Required		Acceptable Flow at Base of Riser (Including Hose Stream Allowance)		Duration (minutes)
	psi	bar	gpm	L/min	
Light hazard	15	1	500–750	1900-2850	30–60
Ordinary hazard	20	1.4	850–1500	3200-5700	60–90

National Fire Protection Association 13 - Standard for the Installation of Sprinkler Systems Report, Table 11.2.3.1.2

Table 11.2.3.1.2 Hose Stream Allowance and Water Supply Duration Requirements for Hydraulically Calculated Systems

Occupancy	Inside Hose		Total Combined Inside and Outside Hose		Duration (minutes)
	gpm	L/min	gpm	L/min	
Light hazard	0, 50, or 100	0, 190, or 380	100	380	30
Ordinary hazard	0, 50, or 100	0, 190, or 380	250	950	60–90
Extra hazard	0, 50, or 100	0, 190, or 380	500	1900	90–120


CITY OF OTTAWA - WATER DISTRIBUTION SYSTEM, FACILITIES AND FEEDERMAINS
LEMIEUX ISLAND PURIFICATION PLANT & P.S. & RES.
SUBJECT SITE
A PURIFICATION PLANT & P.S. & RES.
PEAU DR. P.S.
ENERGY MINES & RESOURCES P.S.
CARLINGTON HEIGHTS P.S. & RES.
BILLINGS BRIDGE P.
CONI
1W
2W
2C
ME
INDUSTRIAL AVE
SMYTH RD
WALKLEY RD
HERON RD
BASELINE RD
FISHER AVE
RIVERSIDE DR
HUNT CLUB RD
AIRPORT PKWY
UPLANDS DR
WEST HUNT CLUB RD
MOODIE DR
ROBERTSON RD
HWY417 IC131 RAMP66
HIGHWAY 417
CARLING AVE
PINECREST RD
RICHMOND RD
MAITLAND AVE
BRONSON AVE
BANK ST
KENT ST
ELGIN ST

APPENDIX C

Wastewater Collection

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2004

Site Area 0.136 **ha**

Extraneous Flow Allowances

Infiltration / Inflow	**0.04**	**L/s**

Domestic Contributions

Unit Type	Unit Rate	Units	Pop
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
Stacked Townhouse	2.3		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8	35	63

Total Pop	**63**	
Average Domestic Flow	**0.26**	**L/s**
Peaking Factor	**4.00**	
Peak Domestic Flow	**1.02**	**L/s**

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate		No. of Units	Avg Wastewater (L/s)
Commercial floor space*	5	$L/m^2/d$	552	0.06
Hospitals	900	L/bed/d		0.00
School	70	L/student/d		0.00
Ex. Industrial - Light**	35,000	L/gross ha/d		0.00
Industrial - Light**	35,000	L/gross ha/d		0.00
Industrial - Heavy**	55,000	L/gross ha/d		0.00

Average I/C/I Flow	**0.06**
Peak Institutional / Commercial Flow	0.10
Peak Industrial Flow**	0.00
Peak I/C/I Flow	**0.10**

** assuming a 12 hour commercial operation*
*** peak industrial flow per City of Ottawa Sewer Design Guidelines Appendix 4B*

Total Estimated Average Dry Weather Flow Rate	**0.32**	**L/s**
Total Estimated Peak Dry Weather Flow Rate	**1.12**	**L/s**
Total Estimated Peak Wet Weather Flow Rate	**1.15**	**L/s**

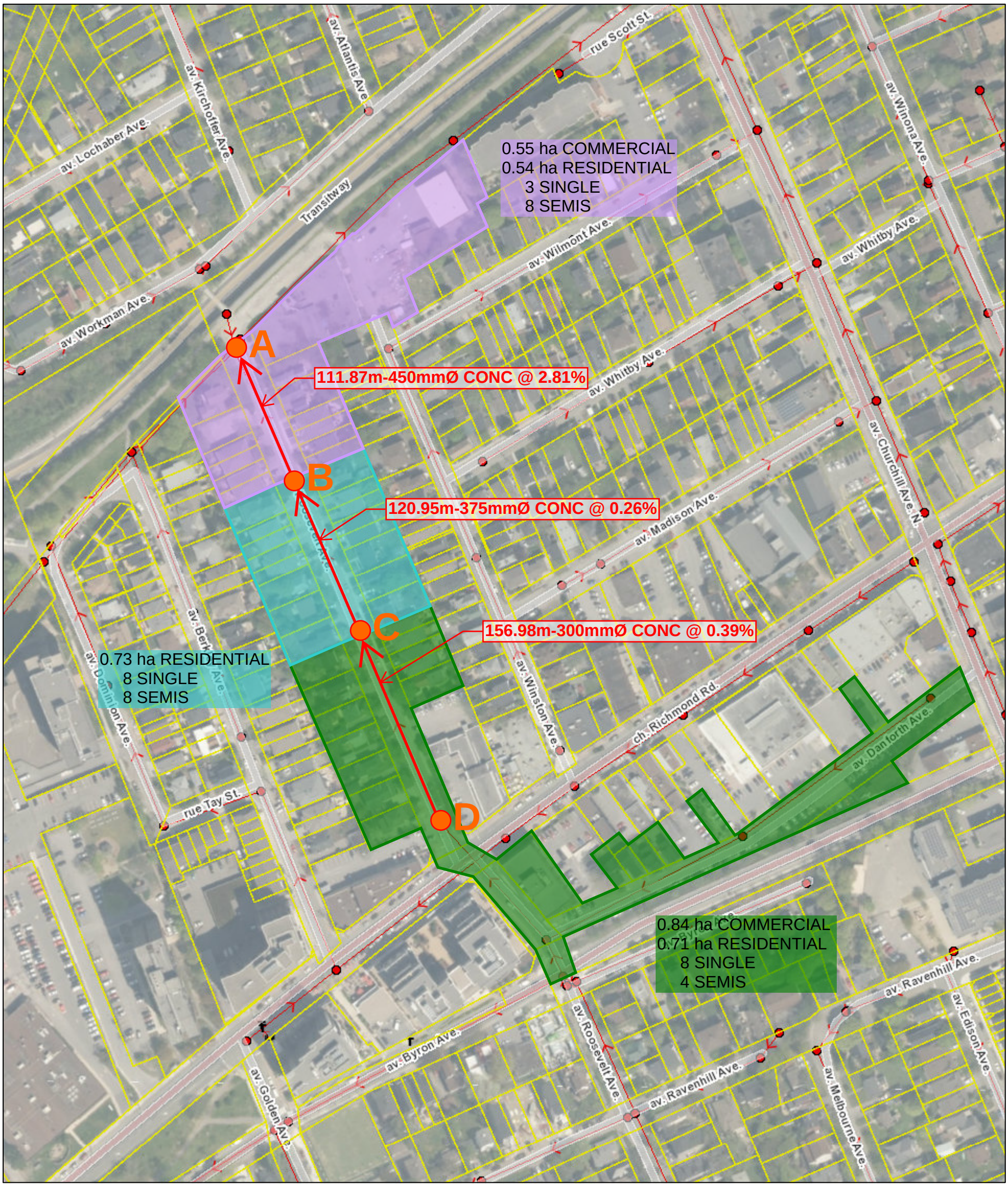
SANITARY SEWER CALCULATION SHEET

CLIENT: **Domicile**
LOCATION: **Roosevelt**
FILE REF: **17-986**
DATE: **18-Dec-17**

DESIGN PARAMETERS

Avg. Daily Flow Res.	350	L/p/d	Peak Fact Res. Per Harmons: Min = 2.0, Max =4.0		Infiltration / Inflow	0.28	L/s/ha
Avg. Daily Flow Comm	50,000	L/ha/d	Peak Fact. Comm.	1.5	Min. Pipe Velocity	0.60	m/s full flowing
Avg. Daily Flow Instit.	50,000	L/ha/d	Peak Fact. Instit.	1.5	Max. Pipe Velocity	3.00	m/s full flowing
Avg. Daily Flow Indust	35,000	L/ha/d	Peak Fact. Indust. per MOE graph		Mannings N	0.013	

Location			Residential Area and Population									Commercial		Institutional		Industrial			Infiltration				Pipe Data							
Area ID	Up	Down	Area	Number of Units				Pop.	Cumulative		Peak.	Q_{res}	Area	Accu.	Area	Accu.	Area	Accu.	Q_{C+I+I}	Total	Accu.	Infiltration	Total	DIA	Slope	Length	$A_{hydraulic}$	R	Velocity	Q_{cap}	Q / Q full
				by type					Area	Pop.	Fact.			Area		Area		Area			Area	Flow	Flow							
			(ha)	Singles	Semi's	Town's	Apt's		(ha)		(-)	(L/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(mm)	(%)	(m)	(m^2)	(m)	(m/s)	(L/s)	(-)
ROOSEVELT	D	C	0.710	8	4			38.0	0.710	38.0	4.00	0.62	0.84	0.84		0.00		0.00	0.73	1.550	1.550	0.43	1.78	300	0.39	157.0	0.071	0.075	0.85	60.4	0.03
	C	B	0.730	8	8			49.0	0.730	87.0	4.00	1.41		0.84		0.00		0.00	0.73	0.730	2.280	0.64	2.78	375	0.26	121.0	0.110	0.094	0.81	89.4	0.03
	B	A	0.540	3	8			32.0	0.540	119.0	4.00	1.93	0.55	1.39		0.00		0.00	1.21	1.090	3.370	0.94	4.08	450	2.81	111.9	0.159	0.113	3.01	477.9	0.01



December 18, 2017

1:3,000

0 0.0325 0.065 0.13 mi

0 0.05 0.1 0.2 km

- Property Parcels

Road Names

Road Centrelines

- Provincial Highway
- City Freeway
- Arterial
- Major Collector
- Collector
- Federally Owned
- Local
- Transit
- Open to Traffic
- Commence Work

Sewer Fittings / Raccords

- Cap / bouchon
- Tee / raccord en T
- Sanitary Manholes / Regards d'égout domestique

Sanitary Pipes / Conduites d'égout domestique

- Private / Branchement privé
- Public / Branchement public

Sanitary Pump Stations and Treatment Plants / Installations d'infrastructure

- Sanitary Pump Station / Station de pompage des eaux usées
- Wastewater Treatment Plant / Usine d'épuration des eaux usées
- Combined Manholes / Regards d'égout unitaire

Combined Pipes / Conduites d'égout unitaire

- Private / Branchement privé
- Public / Branchement public

City of Ottawa

CITY OF OTTAWA - SANITARY AND STORM COLLECTION SYSTEM

APPENDIX D

Stormwater Management

Estimated Peak Stormwater Flow Rate
City of Ottawa Sewer Design Guidelines, 2012

Existing Drainage Charateristics From Internal Site

Area	0.136	ha
C	0.51	Rational Method runoff coefficient
L	25.8	m
Up Elev	67.33	m
Dn Elev	66.54	m
Slope	3.1	%
Tc	6.7	min

	Imp.	Perv.	Total
Area	0.060	0.076	0.136
C	0.9	0.2	0.51

1) Time of Concentration per Federal Aviation Administration

$$t_c = \frac{1.8(1.1-C)L^{0.5}}{S^{0.333}}$$

tc, in minutes
C, rational method coefficient, (-)
L, length in ft
S, average watershed slope in %

Estimated Peak Flow

	2-year	5-year	100-year	
i	92.2	125.4	215.3	mm/hr
Q	17.8	24.2	52.0	L/s

Stormwater - Proposed Development
City of Ottawa Sewer Design Guidelines, 2012

Target Flow Rate

Area	0.136	ha
C	0.50	Rational Method runoff coefficient
t_c	10.0	min

5-year

i	104.2	mm/hr
Q	19.7	L/s

Estimated Post Development Peak Flow from Unattenuated Areas

Area ID **U1**
Total Area 0.009 ha
C 0.31 Rational Method runoff coefficient

	Imp.	Perv.	Total
Area	0.001	0.007	0.009
C	0.9	0.2	0.31

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual}* (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
10.0	104.2	0.8	0.8	0.0	0.0	178.6	1.7	1.7	0.0	0.0

Note:
C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

Estimated Post Development Peak Flow from Attenuated Areas

Area ID **A1**
Available Sub-surface Storage
Maintenance Structures

	Imp.	Perv.	Total
Area	0.125	0.003	0.128
C	0.9	0.2	0.89

Total Subsurface Storage (m^3) 30.0

Stage Attenuated Areas Storage Summary

		Surface Storage			Surface and Subsurface Storage			
	Stage (m)	Ponding (m^2)	h_o (m)	delta d (m)	V* (m^3)	V_{acc}** (m^3)	$Q_{release}$† (L/s)	$V_{drawdown}$ (hr)
Orifice INV	64.45		0.00			0.0	0.0	0.00
U/G Storage SL	64.91		0.46	0.46	15.0	15.0	12.7	0.33
U/G Storage OBV	65.36		0.91	0.46	15.0	30.0	17.9	0.46

* V=Incremental storage volume
**V_{acc}=Total surface and sub-surface
† $Q_{release}$ = Release rate calculated from orifice equation

Orifice Location **BLDG** **Dia** 94
Total Area 0.128 ha
C 0.89 Rational Method runoff coefficient *Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations*

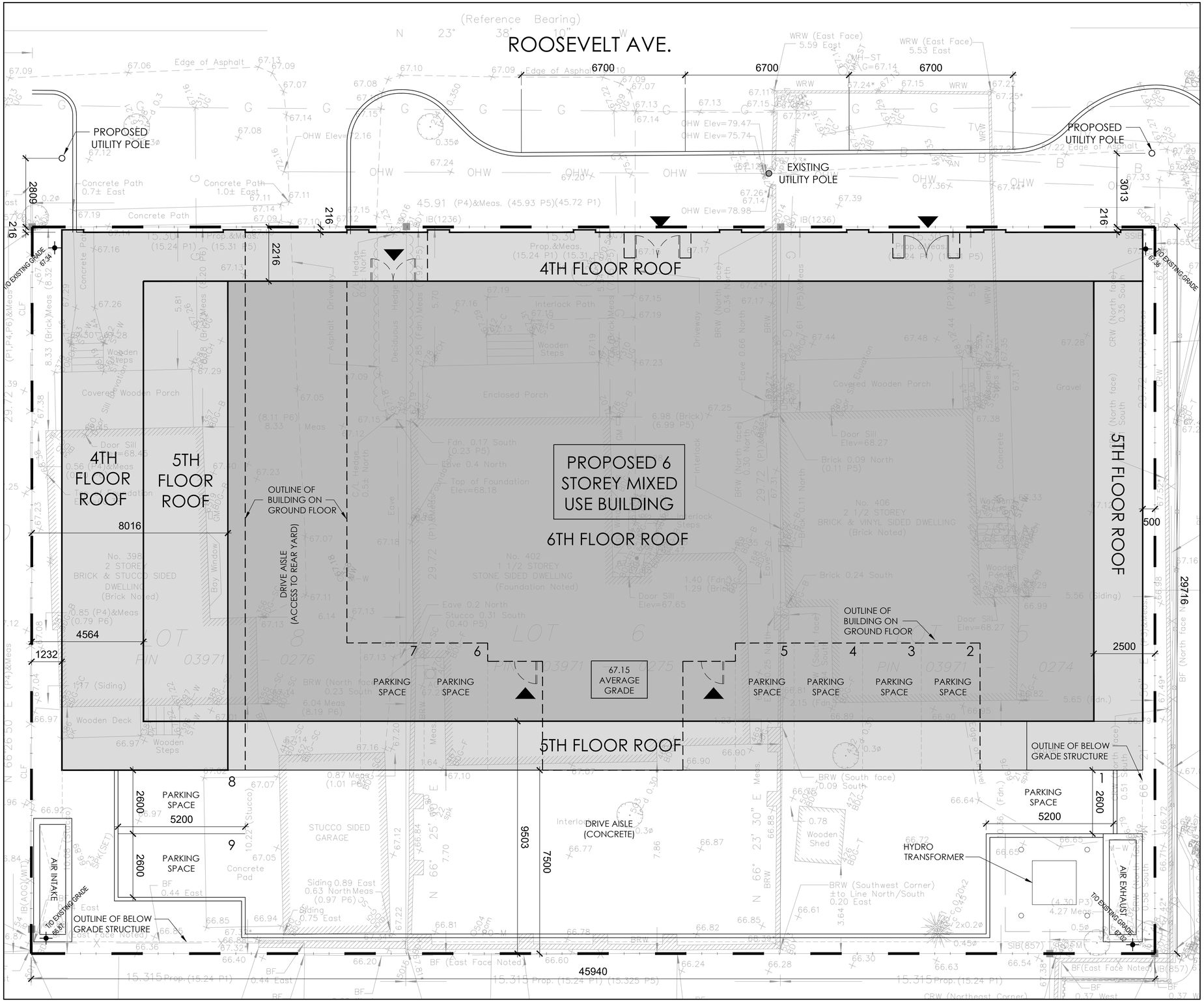
	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual}‡ (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual}‡ (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
5	141.2	44.3	11.3	33.0	9.9	242.7	86.0	17.8	68.2	20.5
10	104.2	32.7	11.3	21.4	12.8	178.6	63.3	17.8	45.5	27.3
15	83.6	26.2	11.3	14.9	13.4	142.9	50.7	17.8	32.8	29.6
20	70.3	22.0	11.3	10.7	12.9	120.0	42.5	17.8	24.7	29.7
25	60.9	19.1	11.3	7.8	11.7	103.8	36.8	17.8	19.0	28.5
30	53.9	16.9	11.3	5.6	10.1	91.9	32.6	17.8	14.8	26.6
35	48.5	15.2	11.3	3.9	8.2	82.6	29.3	17.8	11.5	24.1
40	44.2	13.9	11.3	2.5	6.1	75.1	26.6	17.8	8.8	21.2
45	40.6	12.7	11.3	1.4	3.8	69.1	24.5	17.8	6.7	18.0
50	37.7	11.8	11.3	0.5	1.5	64.0	22.7	17.8	4.9	14.6
55	35.1	11.0	11.0	0.0	0.0	59.6	21.1	17.8	3.3	11.0
60	32.9	10.3	10.3	0.0	0.0	55.9	19.8	17.8	2.0	7.2
65	31.0	9.7	9.7	0.0	0.0	52.6	18.7	17.8	0.9	3.3
70	29.4	9.2	9.2	0.0	0.0	49.8	17.6	17.8	0.0	0.0
75	27.9	8.8	8.8	0.0	0.0	47.3	16.8	17.8	0.0	0.0
80	26.6	8.3	8.3	0.0	0.0	45.0	15.9	17.8	0.0	0.0
85	25.4	8.0	8.0	0.0	0.0	43.0	15.2	17.8	0.0	0.0
90	24.3	7.6	7.6	0.0	0.0	41.1	14.6	17.8	0.0	0.0
95	23.3	7.3	7.3	0.0	0.0	39.4	14.0	17.8	0.0	0.0
100	22.4	7.0	7.0	0.0	0.0	37.9	13.4	17.8	0.0	0.0
105	21.6	6.8	6.8	0.0	0.0	36.5	12.9	17.8	0.0	0.0

5-year $Q_{attenuated}$	**11.33**	**L/s**	**100-year $Q_{attenuated}$**	**17.81**	**L/s**
5-year Max. Storage Required	**13.4**	**m^3**	**100-year Max. Storage Required**	**29.7**	**m^3**
Est. 5-year Storage Elevation	**64.86**	**m**	**Est. 100-year Storage Elevation**	**65.35**	**m**

Summary of Release Rates and Storage Volumes

Control Area	5-Year Release Rate (L/s)	5-Year Required Storage (m^3)	100-Year Release Rate (L/s)	100-Year Required Storage (m^3)	100-Year Available Storage (m^3)
Unattenuated Areas	0.8	0.0	1.7	0.0	0.0
Attenutated Areas	11.3	13.4	17.8	29.7	30.0
Total	**12.1**	**13.4**	**19.5**	**29.7**	**30.0**

DRAWINGS / FIGURES



1 SITE PLAN
SCALE 1:75

DEC 11, 2017

NOTES:

RESIDENTIAL UNITS: 35 UNITS

GROUND FLOOR COMMERCIAL:
SUITE #01 - 95.6 m² / 1029 ft²
SUITE #02 - 408.6 m² / 4398 ft²
(INCLUDING UPPER LEVEL)

PARKING :

BASEMENT (RESIDENTIAL) -	23
GROUND SURFACE (COMMERCIAL) -	7
GROUND SURFACE (VISITOR) -	2
TOTAL PARKING -	32

MINIMUM RESIDENTIAL PARKING SPACE:
(0 SPACES REQUIRED FOR FIRST 12 UNITS, 0.5 * REMAINING UNITS): 35 UNITS - 12 = 23 UNITS * 0.5 = 11.5 PARKING SPACES REQUIRED

MIN. VISITOR PARKING:
(0 SPACES REQUIRED FOR FIRST 12 UNITS, 0.1 * REMAINING UNITS): 35 UNITS - 12 = 23 UNITS * 0.1 = 2.3 VISITOR SPACES REQUIRED

BICYCLE PARKING:
RESIDENTIAL: 0.5 PER DWELLING UNIT
35 UNITS *0.5 = 17.5 BICYCLE SPACES

COMMERCIAL: 1 PER 250 m2 GFA:
554 m2 GFA/ 250 SQ M = 2.2 BICYCLE SPACES

AREA OF SITE:

TOTAL SITE AREA: 1365 SQ M

UNIT TYPES - CONDO TOWER:
35 CONDOMINIUM APARTMENTS TOTAL

LEGAL DESCRIPTION:

PART 1 Plan of
LOTS 5, 6 AND 8 REGISTERED PLAN 114
CITY OF OTTAWA

ORIGINAL SURVEY PREPARED BY ANNIS O'SULLIVAN VOLLEBEKK LTD.

SURVEY #:19693-17 Domicile Lt 5 PL 114 T F

BUILDING AREAS

BELOW GRADE	1283 m² / 13807 ft²
ABOVE GRADE COMMERCIAL	
GROUND FLOOR	408.6 m² / 4398 ft²
2nd FLOOR	125 m² / 1345 ft²
TOTAL COMMERCIAL	534 m² / 5743 ft²
ABOVE GRADE RESIDENTIAL	
GROUND FLOOR	194.0 m² / 2088 ft²
2nd FLOOR	575 m² / 6190 ft²
3rd FLOOR	912 m² / 9816 ft²
4th FLOOR	912 m² / 9816 ft²
5th FLOOR	800.6 m² / 8618 ft²
6th FLOOR	637.0 m² / 6858 ft²
TOTAL RESIDENTIAL	4030 m² / 43379 ft²
TOTAL RESIDENTIAL + COMMERCIAL (ABOVE GRADE)	4564 m² / 49122 ft²
ABOVE + BELOW AREA	5847 m² / 62929 ft²

no	date	revision
02	DEC 11 2017	ISSUED FOR SITE PLAN CONTROL
01	NOV 29 2017	ISSUED FOR REVIEW

project north

professional stamp

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ARCHITECTURE, PLANNING
DESIGN/BUILD, PROJECT MANAGEMENT

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ANNIS O'SULLIVAN VOLLEBEKK LTD. - SURVEYOR

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OTTAWA, ON

drawn	checked
MH	VA
date	project no.
DEC 11 2017	17-15

drawing title
SITE PLAN
SITE PLAN CONTROL

revision	drawing no.
02	**SP-1**