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FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

FOR

RICHCRAFT GROUP OF COMPANIES
590 RIDEAU STREET

CITY OF OTTAWA

PROJECT NO.: 16-849

APRIL 2016 – REV 1

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
590 RIDEAU STREET
RICHCRAFT GROUP OF COMPANIES

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FOR

590 RIDEAU STREET
RICHCRAFT GROUP OF COMPANIES

APRIL 2016 – REV 1

CITY OF OTTAWA
PROJECT NO.: 16-849

1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained to prepare a Functional Servicing and Stormwater Management report in support of the application for Site Plan Control (SPC) at 590 Rideau Street.

The subject property is located within the City of Ottawa urban boundary, in the Rideau-Vanier ward. As illustrated in ***Figure 1***, the subject property is bounded by Rideau Street to the north; Besserer Street to the south and Cobourg Street to the west. The subject property measures approximately ***0.137ha***.

Figure 1: Site Location

Richcraft are proposing a 7-storey residential/commercial building fronting onto Rideau Street. The proposed development would include approximately 347m^2 of ground level retail on the 1st level and 2-storeys of underground parking fronting onto Rideau Street. The residential component is comprised of 68 units. A copy of the proposed site plan is included in ***Drawings/Figures***.

The objective of this report is to support the application for SPC by providing sufficient detail to demonstrate that the proposed development is supported by existing municipal servicing infrastructure and that the site design conforms to current City of Ottawa design standards.

1.1 Existing Conditions

The existing site currently consists of a public park space. Historical photos indicate that prior to 2012 the subject site consisted of single family homes with retail or commercial use and an asphalt parking area.

A detailed survey of the property was prepared by Annis, O'Sullivan, Vollebekk Ltd, March 31, 2016. The elevations range between ***72.16m*** and ***71.19m*** generally sloping from the north-east to south-west 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:

Rideau Street

- 305mm diameter PVC watermain
- 300mm diameter sanitary sewer
- 375mm diameter sanitary sewer

Charlotte Street

- 150mm diameter watermain
- 300mm diameter storm sewer
- 250mm diameter sanitary sewer

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.

1.3 Pre-consultation

Pre-Consultation was conducted with interested parties at the City of Ottawa via e-mail in March 2016.

Requirements for Stormwater management were reviewed with the City of Ottawa, and included allowable release rate based on a maximum Rational Method Coefficient of 0.50, employing IDF parameters for a 5-year storm with a calculated time of concentration equal to or greater than 10 minutes. Furthermore storms up to and including the City of Ottawa 100-year design event are to be attenuated on site.

As per pre-consultation with the City of Ottawa, the Rational Method Coefficient will be determined based on the historic use of the site. As discussed, the historic use was made up building and asphalt parking lot, essentially 100% impervious surface.

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)

- **Water Supply for Public Fire Protection**
  Fire Underwriters Survey, 1999.
  (FUS)

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 300mm diameter watermain exist within the Rideau Street right-of-way. In addition, a 150mm diameter exist within Charlotte Street. An excerpt from the City of Ottawa Pressure Zone map has been included in ***Appendix B***.

3.2 Water Supply Servicing Design

Water servicing will be achieved by a single 250mm diameter water service connection from the 300mm diameter watermain within Rideau Street. A 250mm diameter water service has been constructed and stubbed close to the property during the watermain reconstruction within Rideau Street between 2013 and 2015.

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

Table 1
Water Supply Design Criteria

Design Parameter	Value
Residential Bachelor/1 Bedroom Apartment	1.4 P/unit
Residential 2 Bedroom Apartment	2.1 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 Office	75 L/9.3m^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 anticipated water supply demand and boundary conditions for the proposed development based on the ***Water Supply Guidelines***.

Table 2
Water Demand and Boundary Conditions
Proposed Conditions

Design Parameter	Anticipated Demand[1] (L/min)	Boundary Condition (m H_2O / kPa)	
Average Daily Demand	27.6	46.5	456.2
Max Day + Fire Flow	133.1 + 5,000 = 5,133.1	40,500 L/min @ 140 kPa	
Peak Hour	201.3	34.0	333.5

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 59m. See ***Appendix B.***

The City provided both the anticipated minimum and maximum water pressures, as well as the maximum flow at 140 kPa (20 PSI) indicated by the correspondence in ***Appendix B***.

Initial boundary conditions obtained indicate residual pressures within what is recommended in ***Table 1.*** It is recommended that a pressure check be conducted at during construction to determine if pressure controls are required.

Fire flow requirements are to be determined in accordance with Local Guidelines (***FUS***), City of Ottawa ***Water Supply Guidelines***, and the Ontario Building Code.

Using the ***FUS*** method a conservative estimation of fire flow had been established. Based on information received from ***Graziani & Corazza Architects****,* the following assumptions were assumed:

- Type of construction – Fire Resistive Construction
- Occupancy type – Limited Combustibility
- Sprinkler Protection – Supervised Sprinkler System

The above assumptions result in an estimated fire flow of approximately ***5,000 L/min****;* actual building materials selected will affect the estimated flow, see ***Appendix B*** for detailed FUS calculations. Approximately ***40,500 L/min*** flow is available within the municipal system at minimum pressure, sufficient to service the proposed development.

3.3 Water Supply Conclusion

Anticipated water demand under proposed conditions was submitted to the City of Ottawa for establishing boundary conditions. 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. Sufficient flow is available at minimum pressure

within the municipal system to provide fire protection for the site. 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 is tributary to the Interceptor Sewer. An existing 200mm diameter sanitary sewers has been installed, stubbed at the property line, discharging to the 300mm sanitary sewer located within Rideau Street.

The site currently consists of open space and construction staging area, historical uses for the site included asphalt parking lot and single family residence.

4.2 Wastewater Design

The proposed development will use the existing 200mm sanitary sewer stub.

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 1 Bedroom Apartment	1.4 P/unit
Residential 2 Bedroom Apartment	2.1 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
Commercial Office Space	75 L/9.3m^2/d
Infiltration and Inflow Allowance	0.28L/s/ha
Industrial Peaking Factor	7.0 per City of Ottawa Sewer Design Guidelines Appendix 4B
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sewer Size	200mm 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 anticipated peak flow from the proposed development. 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	0.49
Estimated Peak Dry Weather Flow	1.86
Estimated Peak Wet Weather Flow	1.90

The estimated sanitary flow based on the proposed plan provided in ***Drawings/Figures*** anticipates a peak wet weather flow of ***1.90 L/s***.

An analysis of the sanitary sewer fronting the subject site within Rideau Street was completed in March 2012 by Delcan for the City of Ottawa. As per the ***Delcan Design Brief***, the subject site is included as part of ***SAN 3*** drainage area to the sanitary sewer, see ***Appendix C*** for drainage map. Based on the sanitary analysis prepared by Declan, the most restrictive section of sanitary sewer is located directly upstream of the existing 750mm diameter sanitary sewer east of Chapel Street. The most restrictive section has ***50.1 L/s*** of residual capacity, see ***Appendix C*** for excerpt from ***Delcan Design Brief***. The analysis was only completed up to the eventual discharge to the existing 750mm diameter sanitary sewer within Chapel Street.

Based on the sanitary analysis included in the ***Declan Design Brief***, the controlling section of the local sewer system is located within Rideau Street, east of Chapel Street, with an available residual capacity of ***50.1L/s***.

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 Rideau River Collector sewer; based on the sanitary analysis sufficient capacity is available to accommodate the anticipated ***1.90 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 Ottawa River. 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).

A portion of the subject site's runoff is directed to existing catch basins and assumed to discharge to surrounding municipal sewers. The remainder of the site is directed off-site via overland flow to adjacent properties and the municipal right-of-ways.

Two existing 250mm diameter storm sewers have been extended to the limit of the site during the reconstruction and separation of the Rideau Street combined sewer system.

It is appears that the existing site has no stormwater management controls. Pre-development runoff rates were generated assuming the original asphalt prior to the landowner converting the lands to park space.

The estimated pre-development peak flows for the 2, 5, and 100-year are summarized in ***Table 5***:

Table 5
Summary of Existing Peak Storm Flow Rates

City of Ottawa Design Storm	Estimated Peak Flow Rate (L/s)
2-year	11.7
5-year	15.9
100-year	34.0

5.2 Post-development Stormwater Management Target

Stormwater management requirements for the proposed development were reviewed with the City of Ottawa, see correspondence in ***Appendix A***, where the proposed development is required to:

- Control to 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 calculated time of concentration no less than 10 minutes;

- Attenuate all storms up to and including the City of Ottawa 100-year design event are to be attenuated on site;
- The proposed development does not contemplate surface parking, therefore, quality controls are not required, see correspondence with RVCA in ***Appendix A***

Based on the above the allowable release rate for the proposed development is ***19.8 L/s***.

5.3 Proposed Stormwater Management System

It is proposed to re-use the existing 250mm diameter storm sewer, stubbed at the edge of the site. The existing storm sewers discharge to the existing 375mm diameter storm sewer within Rideau Street. The storm sewer to be used will be selected by the mechanical engineer, based on the internal mechanical layout.

In order to achieve the allowable post-development stormwater runoff release rate identified in ***Section 5.2*** above, the proposed development will employ flow attenuation using cistern storage. It is proposed to pump stormwater to the allowable release rate form the stormwater storage to the existing 250mm diameter storm sewer stubbed at the property.

Table 6 presents the estimated release rates, storage requirements and available storage for the proposed development.

Table 6
Stormwater Flow Rate Summary

Control Area	5-Year Release Rate	5-Year Storage	100-Year Release Rate	100-Year Storage
	(L/s)	(m^3)	(L/s)	(m^3)
Unattenuated Areas	4.2	0.0	8.9	0.0
Attenuated Areas	5.7	18.5	10.9	35.6
Total	**9.9**	**18.5**	**19.8**	**35.6**

As indicated in ***Table 6*** it is anticipated that ***35.6 m^3*** of onsite storage will be required to attenuate stormwater runoff to the allowable release rate of ***19.8 L/s***. The proposed drainage boundaries and overland flow routes are illustrated by ***SWM-1*** included with this report.

As discussed in ***Section 5.2***, the proposed development does not proposed surface parking, therefore, stormwater quality controls are not required, as per correspondence with the RVCA in ***Appendix A***.

5.4 Stormwater Servicing Conclusions

Post development stormwater runoff will be attenuated onsite for storm events up to and including the 1:100 year in accordance with ***City Standards***. ***35.6 m^3*** of onsite storage will be required to attenuate stormwater runoff to the site's allowable release rate.

No on-site quality controls are required as the proposed site plan does not consider any surface parking spaces.

The design of the proposed storm sewer system conforms to all relevant ***City Standards***.

6.0 UTILITIES

Gas, Bell and Hydro services currently exist within the Rideau Street and Besserer Street right-of-ways. 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. The extent of erosion losses is exaggerated during construction where vegetation has been removed and the top layer of soil becomes 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 filter fabric 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

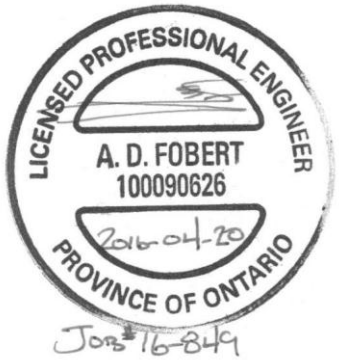
David Schaeffer Engineering Ltd. (DSEL) has been retained to prepare an Assessment of Adequacy of Public Services report in support of the application for a Zoning By-law Amendment (ZBLA) and Site Plan Control (SPC) at 590 Rideau Street. The preceding report outlines the following:

- 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;
- A pressure check be conducted at the completion of construction to determine if pressure controls are required;
- The FUS method for estimating fire flow indicated approximately ***5,000 L/min*** is required for the proposed development;
- The proposed development is anticipated to have a peak wet weather flow of ***1.90 L/s***; Based on the sanitary analysis conducted the existing municipal sewer infrastructure has sufficient capacity to support the development;
- Based on pre-consultation with the City of Ottawa, stormwater quantity controls are required to attenuate peak flow to ***19.8 L/s;***
- It is proposed that stormwater objectives will be met through storm water retention via subsurface storage, it is anticipated that ***35.6 m^3*** of onsite storage will be required to attenuate flow to the established release rate above;
- The development does not contemplate any surface parking, therefore, quality controls are not required.

Prepared by,
David Schaeffer Engineering Ltd.

Per: Steve L. Merrick, EIT.

Reviewed by,
David Schaeffer Engineering Ltd.



Per: Adam D. Fobert, P.Eng

APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

15-849 20/04/2016

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

Steve Merrick

From: White, Joshua <Joshua.White@ottawa.ca>
Sent: March-01-16 1:43 PM
To: 'Steve Merrick'
Subject: RE: 590 Rideau - Engineering Pre-consultation

Hi Steve,

I can confirm that the below is correct and meets the Cities requirements for the site.

Joshua White, P.Eng.
Project Manager, Infrastructure Approvals
Development Review, Urban Services, City of Ottawa
Please consider the environment before printing this e-mail.

PLANNING AND GROWTH MANAGEMENT
URBANISME ET GESTION DE LA CROISSANCE

City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 15843
Email: joshua.white@ottawa.ca
ottawa.ca/planning / ottawa.ca/urbanisme

From: Steve Merrick [mailto:smerrick@dsel.ca]
Sent: Tuesday, March 01, 2016 1:26 PM
To: White, Joshua
Subject: 590 Rideau - Engineering Pre-consultation

Hi Josh,

I believe that you have already been through the pre-consultation process on the above noted project, we just wanted to confirm some of the requirements for the site. I understand that even though the current site is a city park and landscaped that the allowable release rate will be based on the previous land use (100% impervious) and therefore runoff coefficient of 0.50 is acceptable.

We hope you can confirm the criteria for determining the allowable release rate (0.50 RC, calculated Tc, 5-year storm) and confirm if the City has a preferred sanitary outlet (Rideau or Charlotte).

We will be sending over a boundary condition request in the near future.

Steve Merrick, EIT.
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext. 561
cell: (613) 222-7816
email: smerrick@DSEL.ca

Steve Merrick

From: Jocelyn Chandler <jocelyn.chandler@rvca.ca>
Sent: April-20-16 9:58 AM
To: Steve Merrick
Subject: RVCA RE: 590 Rideau St - Quality Control Requirements

Hello Steve,
Based on the information you have provided, the development appears to have limited hard surfaces for parking or drive aisles. For the purpose of surface water quality protection, roof top runoff is deemed clean. The RVCA will not be advising that additional quality controls are required on-site provided the site plan reflects the above described condition. Jocelyn.

Jocelyn Chandler M.Pl. MCIP, RPP
Planner, RVCA
t) 613-692-3571 x1137
f) 613-692-0831
jocelyn.chandler@rvca.ca
www.rvca.ca
mail: Box 599 3889 Rideau Valley Dr., Manotick, ON K4M 1A5
courier: 3889 Rideau Valley Dr., Nepean, ON K2C 3H1

From: Steve Merrick [mailto:smerrick@dsel.ca]
Sent: Tuesday, April 19, 2016 3:22 PM
To: Jocelyn Chandler <jocelyn.chandler@rvca.ca>
Subject: 590 Rideau St - Quality Control Requirements

Hi Jocelyn,

We have been retained to provide our services for a development located at 590 Rideau Street. The proposed development will include a 7 storey residential building with associated underground parking, see attached site plan. The building footprint takes up the majority of the site, flow attenuation is provided by an internal cistern. The storm is directed to a newly separated storm sewer within Rideau and based on best available information, travels approx. 2.5km prior to discharging to the Ottawa River, see sketch below.

We would like to confirm the quality control requirement for the above noted site.

Thanks,

Steve Merrick, EIT.
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

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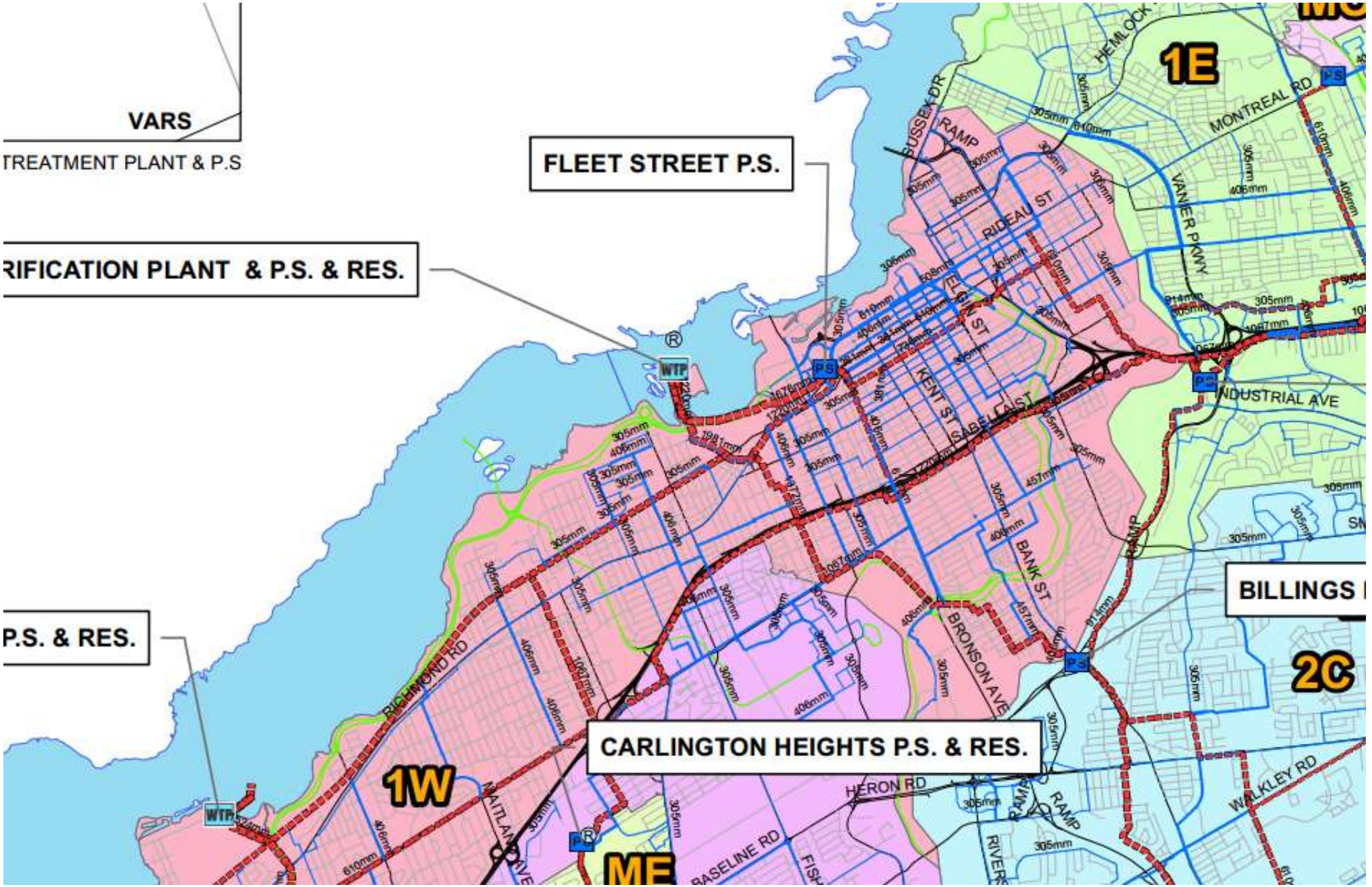
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext. 561
cell: (613) 222-7816
email: smerrick@DSEL.ca

APPENDIX B

Water Supply


VARS
TREATMENT PLANT & P.S
FLEET STREET P.S.
RIFICATION PLANT & P.S. & RES.
P.S. & RES.
CARLINGTON HEIGHTS P.S. & RES.
BILLINGS
1E
2C
1W
ME
WTP
PS
RAMP
HEMLOCK
MONTREAL RD
VANIER PKWY
RIDEAU ST
ELGIN ST
KENT ST
SABELLA ST
INDUSTRIAL AVE
BANK ST
BRONSON AVE
RICHMOND RD
HERON RD
BASELINE RD
WALKLEY RD

Steve Merrick

From: White, Joshua <Joshua.White@ottawa.ca>
Sent: March-15-16 2:22 PM
To: 'Steve Merrick'
Subject: FW: 590 Rideau St - Water Boundary Condition
Attachments: 590 Rideau MArch 2016.pdf

Hi Steve,

Please find below the boundary conditions for 590 Rideau St.

Josh

******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 590 Rideau (zone 1W) assumed to be connected to the 305mm on Rideau (see attached PDF for location).

Minimum HGL = 105.5m

Maximum HGL = 118.0m

Available Flow = 675 L/s assuming a residual of 20 psi and a ground elevation of 71.5m

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.

From: Steve Merrick [mailto:smerrick@dsel.ca]
Sent: Tuesday, March 01, 2016 5:07 PM
To: White, Joshua
Subject: 590 Rideau St - Water Boundary Condition

Hi Josh

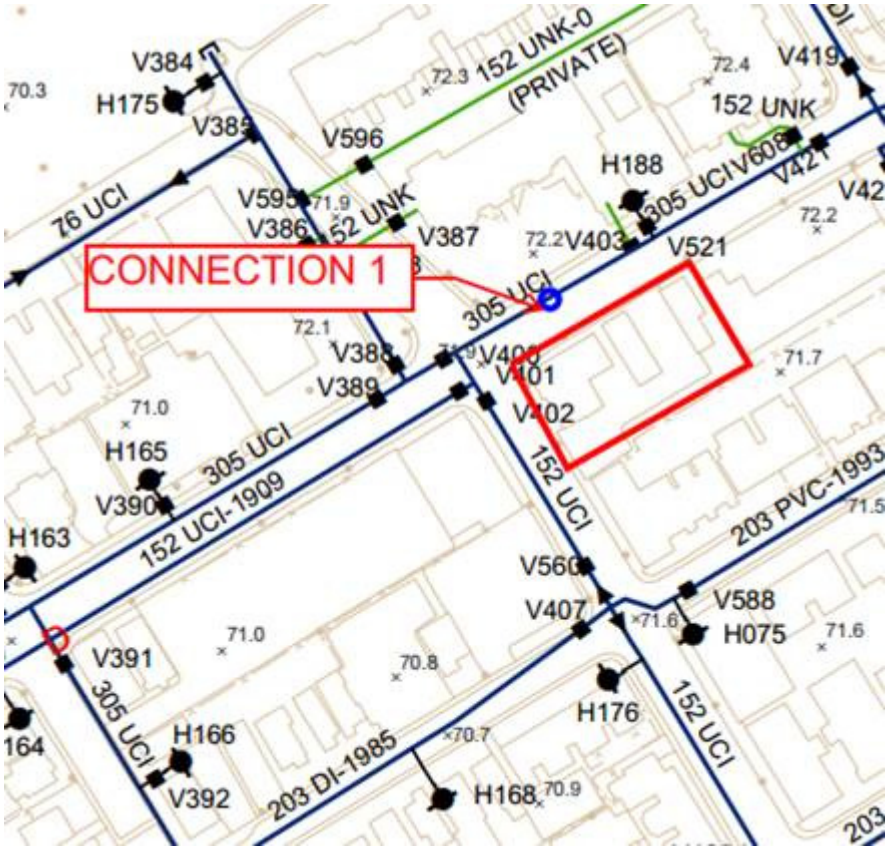
We would like to request boundary conditions for the contemplated development of 590 Rideau Street. The proposed development will consist of a 7 storey building totaling 68 residential units. It is proposed to provide a 150mm service connection to the existing 305mm watermain within Rideau Street, see attached sketch.

We hope that you can provide the maximum flow from the existing connection point at a minimum pressure of 140 kPa (20 PSI) as we do not have sufficient building information to provide an estimate of fire flow based on the FUS at this

time. Once information is available we will calculate fire flow as per the FUS and compare to the provided maximum flow rate.

The anticipated water demands are summarized below:

	L/min	L/s
Avg. Daily	27.6	0.46
Max Day	133.1	2.22
Peak Hour	201.3	3.35



Steve Merrick, EIT.
Project Coordinator / Junior Designer

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cell: (613) 222-7816
email: smerrick@DSEL.ca

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	10	14
1 Bedroom	1.4	37	52
2 Bedroom	2.1	21	45
3 Bedroom	3.1		0
Average	1.8		0

	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	111	38.9	27.0	190.4	132.2	287.5	199.6

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 $L/m^2/d$	347	0.87	0.6	1.3	0.9	2.3	1.6
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			0.9	0.6	1.3	0.9	2.3	1.6
Total Demand			**39.7**	**27.6**	**191.7**	**133.1**	**289.8**	**201.3**

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

$F = 220C\sqrt{A}$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Fire-Resistive Construction

C	0.6		*Type of Construction Coefficient per FUS Part II, Section 1*
A	1233.3	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	4635.6	L/min	
	5000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible	-15%	
Fire Flow	**4250.0**	**L/min**

3. Reduction for Sprinkler Protection

Sprinklered	-50%	
Reduction	**-2125**	**L/min**

4. Increase for Separation Distance

N	20.1m-30m	10%	
S	3.1m-10m	20%	
E	0m-3m	25%	
W	20.1m-30m	10%	
	% Increase	**65%**	*value not to exceed 75% per FUS Part II, Section 4*
	Increase	**2762.5**	**L/min**

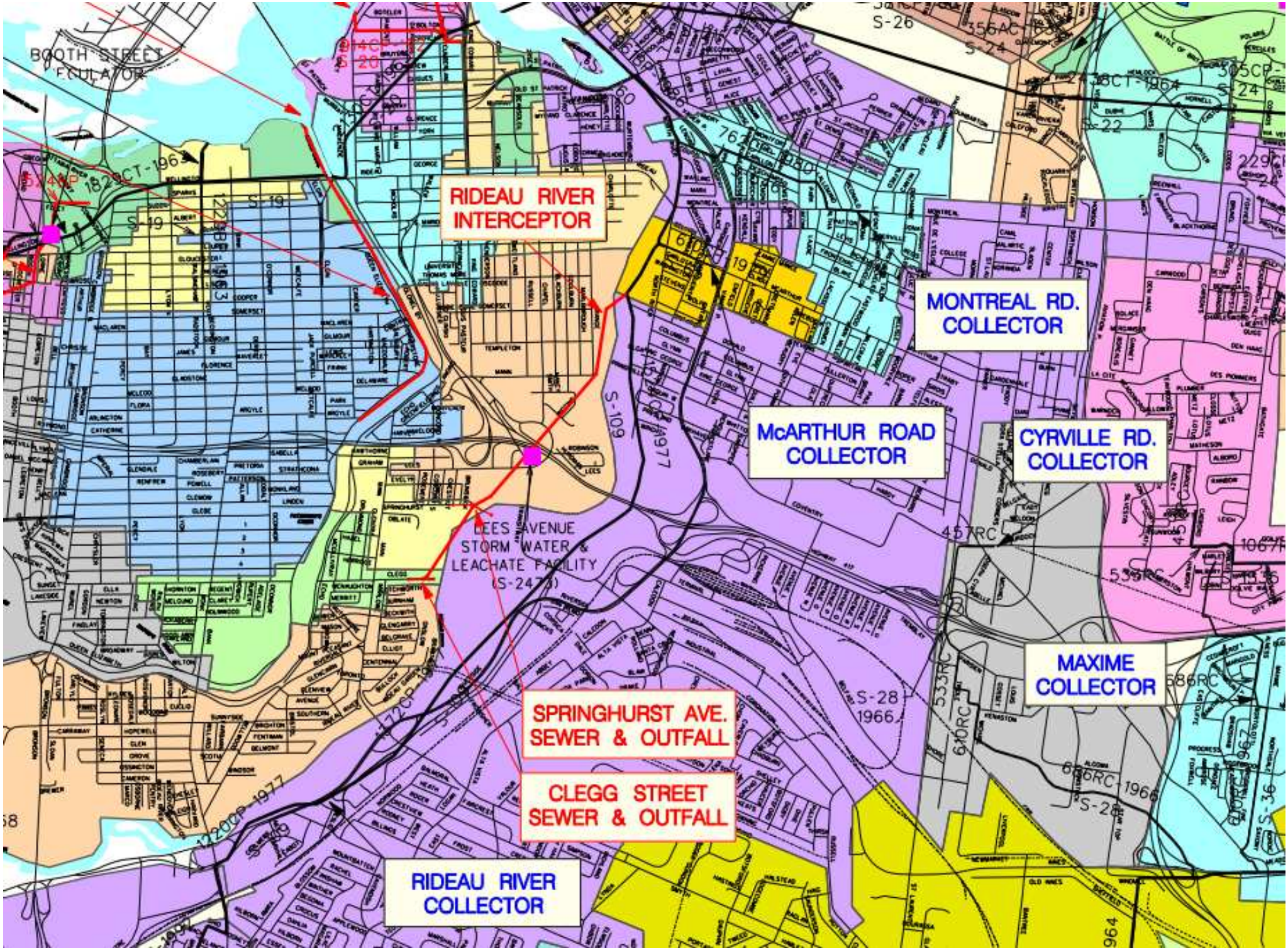
Total Fire Flow

Fire Flow	4887.5	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	5000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by Graziani & Corazza Architects
-Calculations based on Fire Underwriters Survey - Part II

APPENDIX C

Wastewater Collection


RIDEAU RIVER INTERCEPTOR
MONTREAL RD. COLLECTOR
McARTHUR ROAD COLLECTOR
CYRVILLE RD. COLLECTOR
MAXIME COLLECTOR
LEES AVENUE STORM WATER & LEACHATE FACILITY (S-247)
SPRINGHURST AVE. SEWER & OUTFALL
CLEGG STREET SEWER & OUTFALL
RIDEAU RIVER COLLECTOR
BOOTH STREET REGULATOR

RIDEAU STREET RENEWAL

Figure 6: Sanitary Catchments

SANITARY SEWER DESIGN SHEET

TABLE 5

RIDEAU STREET - KING EDWARD AVENUE to WURTEMBURG STREET & CHARLOTTE STREET - RIDEAU STREET to BESSERER STREET

Formulas

Q(d)=Q(p)+Q(c)+Q(I) (L/s)

Q(d) = Peak Design Flow (L/s)
Q(p) = Peak Population Flow (L/s)
Q(c) = Commercial and Institutional Flow (L/s)
Q(I) = Peak Extraneous Flow (L/s)

Q(p)=PQM/86.4 (L/s)

P = Population
Q= Average Daily Flow per Capita (Lpcd)
M = Peak Factor

Q(I)=IA (L/s)

A = Area (ha)
I = Unit of Peak Extraneous flow (L/s/ha)

M=[1+(14/4+(P/1000)^0.5))]*K (Harmon formula)
K = Correction Factor

Design Flow Rates (based on monitoring data)		
Residential	**300**	Lpcd
Commercial (COMM)	**17,000**	L/ha/day
Institutional (INST)	**10,000**	L/ha/day
Industrial (INDUS)	**10,000**	L/ha/day
Extraneous (as per City design guidelines)		
Infiltration	**0.28**	L/s/ha
Foundation	**3.00**	L/s/ha

Peaking Factors		
"K" correction factor (Residential)	**0.40**	(based on monitoring data)
Commercial/Institutional	**1.5**	
Residential Densities		
Type	**Person/Unit**	
Single Family (SF)	3.4	
Multi Unit Townhomes (MLT)	2.7	
Apartment (APT)	1.8	

Mannings n = **0.013**
Minimum Velocity (full) = **0.60** m/sec

STREET	FROM STREET (MH)	TO STREET (MH)	AREA ID	RESIDENTIAL FLOW								INDUSTRIAL/COMMERCIAL/INSTITUTIONAL (ICI) AREA FLOW									EXTRANEOUS FLOWS					PEAK DESIGN FLOW Q(d) L/s	SEWER DATA								REMARKS
				UNIT COUNTS			POP (persons)	ACCUM POP (persons)	AVERAGE FLOW L/s	PEAK FACTOR M	PEAK FLOW L/s	COMM AREA ha	INDUS AREA ha	INST AREA ha	ACCUMULATED			AVERAGE FLOW L/s	PEAK FACTOR	PEAK FLOW L/s	AREA ha	ACCUM AREA ha	INFILT. L/s	FOUND. L/s	PEAK FLOW L/s		TYPE OF PIPE	PIPE DIAMETER (mm)		SLOPE (%)	CAPACITY		VELOCITY		
				SF	APT	MLT									COMM AREA ha	INDUS AREA ha	INST AREA ha											(nom.)	(act.)		Q (full) L/s	Q(d) /Q(f) (%)	V (full) m/sec	actual m/sec	
RIDEAU	WURTEMBURG (SA14)	CHARLOTTE (SA13)	SAN 01	0	115	0	207	207	0.7	1.6	1.2	0.31	0.00	0.00	0.31	0.00	0.00	0.1	1.50	0.1	1.07	1.07	0.3	3.2	3.5	**4.8**	PVC	300	305	0.70	**84.4**	5.63	**1.16**	0.53	
CHARLOTTE	CHARLOTTE S. (SA33)	RIDEAU (SA13)	SAN 02	0	10	0	18	18	0.1	1.6	0.1	0.15	0.00	0.00	0.15	0.00	0.00	0.0	1.50	0.0	0.30	0.30	0.1	0.9	1.0	**1.1**	PVC	250	254	1.00	**62.0**	1.82	**1.22**	0.45	NEW SEWER SOUTH (Min Diameter)
RIDEAU	CHARLOTTE (SA13)	RIDEAU (SA12)	SAN 03	0	216	0	389	614	2.1	1.6	3.3	0.44	0.00	0.00	0.90	0.00	0.00	0.2	1.50	0.3	1.14	2.51	0.7	7.5	8.2	**11.8**	PVC	300	305	1.60	**127.6**	9.28	**1.75**	0.93	
RIDEAU	RIDEAU (SA12)	COBOURG (SA10)						614	2.1	1.6	3.3				0.90	0.00	0.00	0.2	1.50	0.3		2.51	0.7	7.5	8.2	**11.8**	PVC	300	305	1.80	**135.3**	8.75	**1.85**	0.98	
	COBOURG South	RIDEAU (SA10)	SAN 04	0	0	1	3	3	0.0	1.6	0.0	0.03	0.00	0.00	0.03	0.00	0.00	0.0	1.50	0.0	0.15	0.15	0.0	0.5	0.5	**0.5**	PVC	250	254	2.56	**99.3**	0.52	**1.96**	0.63	CAPTURE EXISTING SEWER SOUTH
RIDEAU	COBOURG (SA10)	RIDEAU (SA9)	SAN 05	0	6	8	32	649	2.3	1.6	3.5	0.39	0.00	0.00	1.32	0.00	0.00	0.3	1.50	0.4	0.77	3.43	1.0	10.3	11.3	**15.2**	PVC	300	305	0.44	**70.1**	21.64	**0.92**	0.61	
RIDEAU	RIDEAU (SA9)	AUGUSTA (SA8)						649	2.3	1.6	3.5				1.32	0.00	0.00	0.3	1.50	0.4		3.43	1.0	10.3	11.3	**15.2**	PVC	300	305	0.44	**69.0**	21.99	**0.92**	0.61	
	AUGUSTA S. (SA38806)	RIDEAU (SA8)	SAN 06	1	0	2	9	9	0.0	1.6	0.1	0.07	0.00	0.00	0.07	0.00	0.00	0.0	1.50	0.0	0.24	0.24	0.1	0.7	0.8	**0.9**	PVC	250	254	2.10	**89.9**	0.95	**1.77**	0.57	CAPTURE EXISTING SEWER SOUTH
RIDEAU	AUGUSTA (SA8)	RIDEAU (SA7)	SAN 07	0	0	0	0	658	2.3	1.6	3.6	0.77	0.00	0.37	2.16	0.00	0.37	0.5	1.50	0.7	1.48	5.15	1.4	15.5	16.9	**21.2**	PVC	300	305	0.50	**71.3**	29.67	**0.98**	0.70	
RIDEAU	RIDEAU (SA7)	CHAPEL (SA6a)						658	2.3	1.6	3.6				2.16	0.00	0.37	0.5	1.50	0.7		5.15	1.4	15.5	16.9	**21.2**	PVC	300	305	0.50	**71.3**	29.67	**0.98**	0.70	
CHAPEL	CHAPEL South	RIDEAU (SA6a)	Chapel S	185	1361	587	4,664	4,664	16.2	1.3	21.2	1.05	0.00	1.06	1.05	0.00	1.06	0.3	1.50	0.5	33.59	33.59	9.4	100.8	110.2	**131.9**	CONC	750	762	1.96	**1626.0**	8.11	**3.57**	1.85	RELINE EXISTI
	RIDEAU (SA6a)	CHAPEL North (Exist)						5,322	18.5	1.3	23.8				3.21	0.00	1.43	0.8	1.50	1.2		38.74	10.8	116.2	127.1	**152.1**	CONC	750	762	3.00	**2011.6**	7.56	**4.41**	2.29	Existing Outlet S
RIDEAU	CHAPEL (SA6)	RIDEAU (SA5)	SAN 08	0	370	0	666	666	2.3	1.6	3.6	0.71	0.00	0.00	0.71	0.00	0.00	0.1	1.50	0.2	1.49	1.49	0.4	4.5	4.9	**8.7**	PVC	300	305	1.50	**123.6**	7.05	**1.69**	0.85	
RIDEAU	RIDEAU (SA5)	FRIEL (SA4)						666	2.3	1.6	3.6				0.71	0.00	0.00	0.1	1.50	0.2		1.49	0.4	4.5	4.9	**8.7**	PVC	300	305	3.00	**174.7**	4.99	**2.39**	1.10	
	FRIEL South	RIDEAU (SA4)	SAN 09	0	0	0	0	0				0.00	0.00	0.00	0.00	0.00	0.00				0.16	0.16												
	FRIEL South	" "	SAN 10	0	0	14	38	38				0.00	0.00	0.00	0.00	0.00	0.00				0.23	0.39												
	FRIEL South	" "	SAN 11	4	14	31	123	161				0.00	0.00	0.00	0.00	0.00	0.00				0.87	1.26												
	FRIEL South	" "	SAN 12	1	0	5	17	178				0.04	0.00	0.00	0.04	0.00	0.00				0.40	1.66												
	FRIEL South	" "	SAN 13	2	6	35	112	290				0.00	0.00	0.00	0.04	0.00	0.00				0.95	2.61												
	FRIEL South	" "	SAN 14	0	109	17	242	532				0.00	0.00	0.00	0.04	0.00	0.00				0.98	3.59												
	FRIEL South	" "	SAN 15	0	0	2	5	537				0.00	0.00	0.00	0.04	0.00	0.00				0.25	3.84												
	FRIEL South	" "	SAN 16	0	226	3	415	952				0.00	0.00	0.00	0.04	0.00	0.00				0.95	4.79												
	FRIEL South (SA31)	RIDEAU (SA4)	SAN 17	0	0	0	0	952	3.3	1.5	5.0	0.03	0.00	0.00	0.07	0.00	0.00	0.0	1.50	0.0	0.18	4.97	1.4	14.9	16.3	**21.4**	PVC	300	305	3.20	**180.5**	11.84	**2.47**	1.41	CAPTURE EXISTING SEWER SOUTH
RIDEAU	FRIEL (SA4)	RIDEAU (SA3)	SAN 18	0	10	0	18	1636	5.7	1.5	8.3	0.97	0.00	0.32	1.75	0.00	0.32	0.4	1.50	0.6	1.87	8.33	2.3	25.0	27.3	**36.2**	PVC	300	305	3.00	**174.7**	20.71	**2.39**	1.58	
RIDEAU	RIDEAU (SA3)	NELSON (SA2)						1636	5.7	1.5	8.3				1.75	0.00	0.32	0.4	1.50	0.6		8.33	2.3	25.0	27.3	**36.2**	PVC	300	305	1.30	**115.0**	31.47	**1.58**	1.15	
	NELSON South	RIDEAU (SA2)	SAN 19	4	46	27	169	169				0.00	0.00	0.00	0.00	0.00	0.00				0.73	0.73												
	NELSON South (SA30)	RIDEAU (SA2)	SAN 20	0	0	9	24	193	0.7	1.6	1.1	0.00	0.00	0.00	0.00	0.00	0.00	0.0	1.50	0.0	0.19	0.92	0.3	2.8	3.0	**4.1**	PVC	300	305	5.80	**243.0**	1.68	**3.33**	1.23	CAPTURE EXISTING SEWER SOUTH
RIDEAU	NELSON (SA2)	RIDEAU (SA1)	SAN 21	0	0	0	0	1829	6.4	1.4	9.2	0.83	0.00	0.00	2.58	0.00	0.32	0.5	1.50	0.8	1.14	10.39	2.9	31.2	34.1	**44.1**	PVC	300	305	0.65	**81.3**	54.20	**1.11**	0.97	
RIDEAU	RIDEAU (SA1)	K. EDWARD (Ex. SA1a)						1829	6.4	1.4	9.2				2.58	0.00	0.32	0.5	1.50	0.8		10.39	2.9	31.2	34.1	**44.1**	PVC	300	305	0.65	**81.3**	54.20	**1.11**	0.97	
	K. EDWARD (Ex. SA1a)	K. EDWARD (Ex. SA1)						1829	6.4	1.4	9.2				2.58	0.00	0.32	0.5	1.50	0.8		10.39	2.9	31.2	34.1	**44.1**	PVC	300	305	0.44	**66.9**	65.87	**0.92**	0.85	Existing Outlet Sewer

MOST RESTRICTIVE SECTION 50.1 L/S CAPACITY

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2012

Site Area 0.137 **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	10	14
1 Bedroom	1.4	37	52
2 Bedroom	2.1	21	45
3 Bedroom	3.1		0
Average	1.8		0

Total Pop **111**

Average Domestic Flow **0.45 L/s**

Peaking Factor **4.00**

Peak Domestic Flow **1.80 L/s**

Institutional / Commercial / Industrial Contributions

Property Type	**Unit Rate**		**No. of Units**	**Avg Wastewater (L/s)**
Commercial floor space*	5	$L/m^2/d$	347	0.04
Hospitals	900	L/bed/d		0.00
School	70	L/student/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 **0.04**

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

** 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	**0.49 L/s**
Total Estimated Peak Dry Weather Flow Rate	**1.86 L/s**
Total Estimated Peak Wet Weather Flow Rate	**1.90 L/s**

APPENDIX D

Stormwater Management

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

Existing Drainage Charateristics From Internal Site

Area	0.1370	ha
C	0.40	Rational Method runoff coefficient
L	30	m
Up Elev	72.15	m
Dn Elev	71.48	m
Slope	2.2	%
Tc	10	min

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	76.8	104.2	178.6	mm/hr
Q	11.7	15.9	34.0	L/s

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

Target Flow Rate

Area	0.137	ha
C	0.50	Rational Method runoff coefficient
t_c	10.0	min

	5-year	
i	104.2	mm/hr
Q	19.8	L/s

Estimated Post Development Peak Flow from Unattenuated Areas

Total Area	0.02	ha
C	0.80	Rational Method runoff coefficient

	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	4.2	4.2	0.0	0.0	178.6	8.9	8.9	0.0	0.0

Estimated Post Development Peak Flow from Attenuated Areas

BLDG Area	0.093	
C	0.9	
A1 Area	0.027	
C	0.85	
Total Area	0.12	ha
C	0.89	Rational Method runoff coefficient

	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	104.2	30.9	5.7	25.2	15.1	178.6	59.5	10.9	48.6	29.2
15	83.6	24.8	5.7	19.1	17.2	142.9	47.6	10.9	36.7	33.1
20	70.3	20.8	5.7	15.1	18.2	120.0	40.0	10.9	29.1	34.9
25	60.9	18.0	5.7	12.4	18.5	103.8	34.6	10.9	23.7	35.6
30	53.9	16.0	5.7	10.3	18.5	91.9	30.6	10.9	19.7	35.5
35	48.5	14.4	5.7	8.7	18.2	82.6	27.5	10.9	16.6	34.9
40	44.2	13.1	5.7	7.4	17.7	75.1	25.0	10.9	14.2	34.0
45	40.6	12.0	5.7	6.3	17.1	69.1	23.0	10.9	12.1	32.7
50	37.7	11.2	5.7	5.5	16.4	64.0	21.3	10.9	10.4	31.3
55	35.1	10.4	5.7	4.7	15.5	59.6	19.9	10.9	9.0	29.6
60	32.9	9.8	5.7	4.1	14.6	55.9	18.6	10.9	7.7	27.8
65	31.0	9.2	5.7	3.5	13.6	52.6	17.5	10.9	6.7	25.9
70	29.4	8.7	5.7	3.0	12.5	49.8	16.6	10.9	5.7	23.9
75	27.9	8.3	5.7	2.5	11.5	47.3	15.8	10.9	4.9	21.8
80	26.6	7.9	5.7	2.2	10.3	45.0	15.0	10.9	4.1	19.7
85	25.4	7.5	5.7	1.8	9.2	43.0	14.3	10.9	3.4	17.4
90	24.3	7.2	5.7	1.5	8.0	41.1	13.7	10.9	2.8	15.2
95	23.3	6.9	5.7	1.2	6.7	39.4	13.1	10.9	2.2	12.8
100	22.4	6.6	5.7	0.9	5.5	37.9	12.6	10.9	1.7	10.4
105	21.6	6.4	5.7	0.7	4.2	36.5	12.2	10.9	1.3	8.0
110	20.8	6.2	5.7	0.4	2.9	35.2	11.7	10.9	0.8	5.5

5-year $Q_{attenuated}$ 5.73 L/s **100-year $Q_{attenuated}$ 10.90 L/s**
5-year Max. Storage Required 18.5 m^3 **100-year Max. Storage Required 35.6 m^3**

Summary of Release Rates and Storage Volumes

Control Area	5-Year Release Rate (L/s)	5-Year Storage Storage (m^3)	100-Year Release Rate Release Rate (L/s)	100-Year Storage Storage (m^3)
Unattenuated Areas	4.2	0.0	8.9	0.0
Attenutated Areas	5.7	18.5	10.9	35.6
Total	**9.9**	**18.5**	**19.8**	**35.6**

DRAWINGS / FIGURES

SURVEYOR'S REAL PROPERTY REPORT

PART 1 Plan of
LOTS 49 & 50 AND WEST HALF OF LOT 51 (South Rideau Street) REGISTERED PLAN 6 CITY OF OTTAWA

Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

Scale 1 : 200

8.0 6.0 4.0 2.0 0 4 8 Metres

Metric

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

Surveyor's Certificate

I CERTIFY THAT :

1. This survey and plan are correct and in accordance with the Surveys Act and the Surveyors Act and the regulations made under them.
2. The survey was completed on the 11th day of April, 2016.

April 12/2016 — Edward M. Lancaster

Date — Edward M. Lancaster, Ontario Land Surveyor

PART 2

THIS PLAN MUST BE READ IN CONJUNCTION WITH SURVEY REPORT DATED: April 12, 2016

ANNIS, O'SULLIVAN, VOLLEBEKK LTD. grants to Richcraft (Rideau) Ltd. ("The Client"), their solicitors, mortgagees, and other related parties, permission to use original, signed, sealed copies of the Surveyor's Real Property Report in transactions involving The Client.

Notes & Legend

—□—	Denotes	Survey Monument Planted
—■—	"	Survey Monument Found
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
CC	"	Cut Cross
(WIT)	"	Witness
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
Meas.	"	Measured
(P1)	"	Plan 4R-26482
(P2)	"	(AOG) Notes for Plan 4R-26482
○ MH–ST	"	Maintenance Hole (Storm Sewer)
○ MH–T	"	Maintenance Hole (Traffic)
○ MH–H	"	Maintenance Hole (Hydro)
○ MH	"	Maintenance Hole (Unidentified)
—OHW—	"	Overhead Wires
○ UP	"	Utility Pole
○ AN	"	Anchor
○ LS	"	Light Standard
□ CBI	"	Catch Basin Inlet
○FH	"	Fire Hydrant
T/G	"	Top of Grate
□ HH	"	Handhole
▫ TB–B	"	Bell Terminal Box
	"	Deciduous Tree
	"	Coniferous Tree
△ S	"	Sign
BF	"	Board Fence
CRW	"	Concrete Retaining Wall
SRW	"	Stone Retaining Wall
○ M–W	"	Monitoring Well
Ø	"	Diameter
+65.00	"	Location of Elevations
C/L	"	Centreline
———	"	Property Line

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
19656640
THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR In accordance with Regulation 1026, Section 29 (3).

Bearings are grid bearings, derived from the Southeasterly Limit of Rideau Street on Registered Plan 6, shown to be N58°45'00"E and are referred to the Central Meridian of MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

ELEVATION NOTES

1. Elevations shown are geodetic and are referred to the CGVD28 geodetic datum.
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that it's relative elevation and description agrees with the information shown on this drawing.

UTILITY NOTES

1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
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Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com
Ontario Land Surveyors

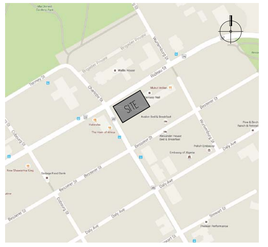
Job No. 17054-16 Richcraft Lts49,50&PtLt51 RP6 T F — AE

Y:\2016\17054-16\FINAL\17054-16 Richcraft Lts49,50&PtLt51 RP6 T F.dwg

GENERAL NOTES

1. For landscaping, refer to landscape drawings.
2. For proposed grading, refer to landscape drawings.
3. All perimeter existing information indicated taken from survey.
4. All work to be done in conformance with the 2012 Ontario Building Code. [O.B.C., as amended]
5. Land to be conveyed to the city free and clear of all encumbrances at a nominal cost for lane widening purposes at no expense to the city.

KEYPLAN



LIST OF DRAWINGS

A101	CONTEXT PLAN & STATISTICS	1:600
A102	SITE PLAN	1:150
A201	UNDERGROUND PLANS	1:150
A301	GROUND FLOOR PLAN	1:100
A302	2ND – 7TH FLOORS PLANS	1:150
A401	ELEVATIONS	1:150

SURVEY INFORMATION

PLAN OF SURVEY OF
LOTS 49, 50 AND THE WEST HALF OF
LOT 51 (South Rideau Street)
REGISTERED PLAN 6
CITY OF OTTAWA

AMNIS, O'SULLIVAN, VOLLEBEKK LTD.
ONTARIO LAND SURVEYOR
SUITE 500
14 CONCOURSE GATE
NEPEAN, ONTARIO
K2E 7S6
TEL (613) 727-0850
FAX (613) 727-1079

STATISTICAL INFORMATION

	REQUIRED	PROVIDED
1. SITE AREA		± 1,525 m2 ± 16,413 ft2 ± 0.38 ha ± 0.15 ac
2. G.F.A.		GROUND ± 377 m2 ± 4,058 ft2 2ND – 3RD ± 1,405 m2 ± 15,126 ft2 4TH ± 668 m2 ± 7,188 ft2 5TH – 6TH ± 1,336 m2 ± 14,377 ft2 7TH ± 520 m2 ± 5,595 ft2 **TOTAL G.F.A. ± 4,306 m2 ± 46,344 ft2**
3. F.S.I.	MAXIMUM F.S.I. = 3	**2.82**
4. BUILDING HEIGHT	MAXIMUM PERMITTED HEIGHT 22 m AND NO GREATER THAN 7 STOREYS	7 STOREYS 28.5 m 24.5 m + 4 m MECH. (FROM GROUND FLOOR TO TOP OF ROOF SLAB)
5. UNIT COUNT		GROUND = 0 u 2ND – 3RD (12 u/flr x 2 flrs) = 24 u 4TH = 12 u 5TH – 6TH (12 u/flr x 2 flrs) = 24 u 7TH = 8 u **TOTAL UNITS 68 u**
6. UNIT BREAKDOWN		STUDIO = 10 u (15%) 1B = 14 u (20%) 1B+D = 23 u (34%) 2B = 19 u (28%) 2B+D = 2 u (3%) **TOTAL UNITS 68 u**
7. AMENITY i.) INDOOR i.) OUTDOOR	**AS PER URBAN EXCEPTION 1697:** A MINIMUM OF 18.5 m2 TOTAL AMENITY AREA MUST BE PROVIDED FOR EACH DWELLING UNIT, OF WHICH HALF MUST BE PROVIDED AS UNCOVERED OUTDOOR AMENITY AREA 9.25 x 68 = **629 m2** 9.25 x 68 = **629 m2** **TOTAL REQUIRED ± 1,258 m2**	INDOOR: GROUND ± 202 m2 OUTDOOR: GROUND ± 182 m2; 2ND–3RD ± 191 m2; 4TH ± 121 m2; 5TH–6TH ± 169 m2; 7TH ± 165 m2; SUBTOTAL ± 828 m2 **TOTAL PROVIDED ± 1,030 m2**
8. PARKING i.) RESIDENTS 0.5 SPACES/UNIT	= 0.5 x 68 u = 34 SPACES **34 SPACES**	P2 = 29 sp P1 = 5 sp **34 SPACES**
ii.) VISITORS NONE FOR FIRST 12 UNITS AND 0.2 SPACES/UNIT FOR NEXT 300 UNITS	= 0.2 x 56 u = 11.2 = 11 SPACES **11 SPACES**	P1 = 11 sp **11 SPACES**
iii.) RETAIL 2.5 SPACES/100 m2	= 2.5/100 x 347 m2 = 8.675 = 9 SPACES **9 SPACES**	P1 = 9 sp **9 SPACES**
	TOTAL REQUIRED 54 SPACES	**TOTAL PROVIDED 54 SPACES**
9. BIKE STORAGE i.) RESIDENTS 0.5 SPACES/UNIT	= 0.5 x 68 u = 34 SPACES **34 SPACES**	GROUND = 34 sp **34 SPACES**
iii.) RETAIL 1 SPACES/250 m2	= 1/250 x 347 m2 = 1.39 = 1 SPACES **1 SPACES**	GROUND = 1 sp **1 SPACES**
	TOTAL REQUIRED 35 SPACES	**TOTAL PROVIDED 35 SPACES**
10. SETBACKS i.) NORTH FRONT YARD	2 m MINIMUM ABOVE 6 STOREYS	2 m BELOW 4 STOREYS 4 m ABOVE 4 STOREYS
i.) EAST INTERIOR SIDE YARD	3 m MINIMUM ABOVE 6 STOREYS WHERE THE MAX. BUILDING HEIGHT IS MORE THAN 16 m	3 m
i.) SOUTH REAR YARD	7.5 m MINIMUM 10.5 m MINIMUM ABOVE 6 STOREYS WHERE THE MAX. BUILDING HEIGHT IS MORE THAN 16 m	7.5 m BELOW 6 STOREYS 10.5 m ABOVE 6 STOREYS
i.) WEST CORNER SIDE YARD	1 m MINIMUM	1 m

01.	XXX.XX.2016	ISSUED FOR SPA E.C.

issued for revisions

GRAZIANI + CORAZZA ARCHITECTS INC.

1320 Showson Drive, Suite 100 Mississauga Ontario L4W 1C3
Phone. 905.795.2601 Fax.905.795.2644 www.gc-architects.com

PROPOSED MIXED USE DEVELOPMENT

590 Rideau

OTTAWA RICHCRAFT Group of Companies ONTARIO

Project Architect:	E. Corazza
Assistant Designer:	L. Wong
Drawn By:	L. Wong
Checked By:	D. Biase
Plot Date:	Apr 01, 2016
Job #	1313.15Z

CONTEXT PLAN & STATISTICS

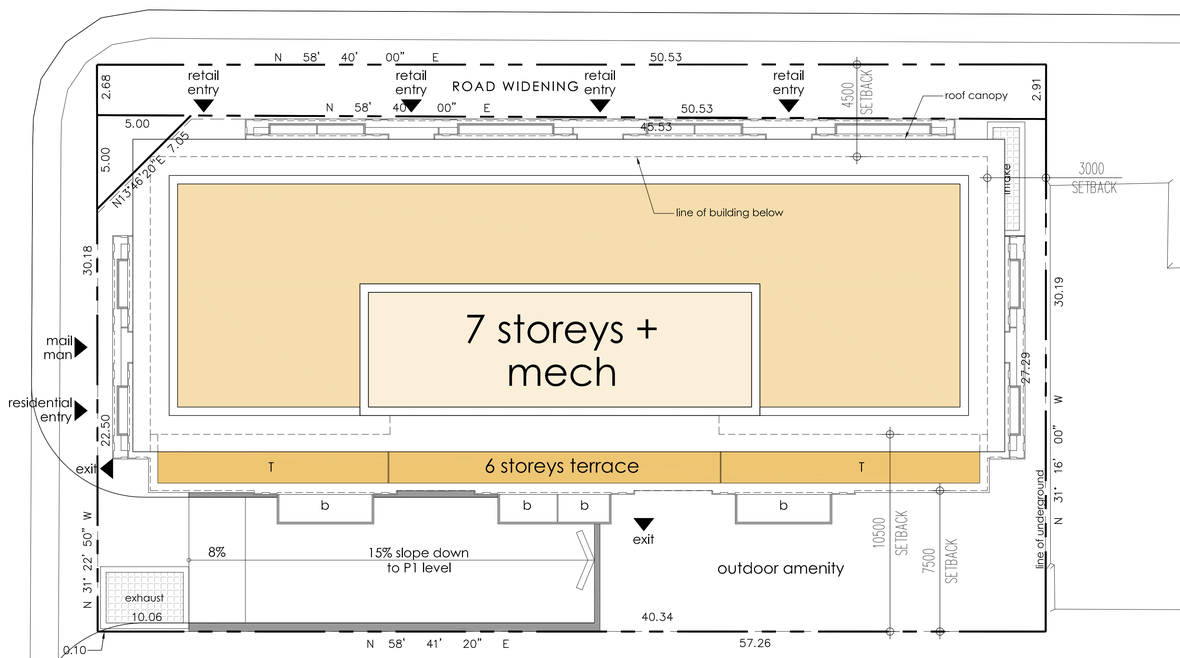
1:600 A101

TITLEBLOCK SIZE: 610 x 950

01. XXX.XX.2016 ISSUED FOR SPA E.C.

RIDEAU STREET

CHARLOTTE STREET



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PROPOSED MIXED USE DEVELOPMENT

590 Rideau

OTTAWA ONTARIO

Project Architect:	E. Corazza
Assistant Designer:	L. Wong
Drawn By:	L. Wong
Checked By:	D. Biase
Plot Date:	Apr 01, 2016
Job #	1313.15Z

SITE PLAN

1:150

A102

TITLEBLOCK SIZE: 610 x 950