

ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES

FOR

GREATWISE DEVELOPMENTS 740 SPRINGLAND DRIVE

CITY OF OTTAWA

PROJECT NO.: 13-673

SEPTEMBER 2017 – REV 1
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**ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES
FOR
740 SPRINGLAND DRIVE
GREATWISE DEVELOPMENTS**

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1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained by Greatwise Developments to prepare an Assessment of Adequacy of Public Services report in support of the application for a Zoning By-Law Amendment (ZBLA) at 740 Springland Drive.

The subject property is located within the City of Ottawa urban boundary, in the River ward. As illustrated in **Figure 1**, the subject property is located north east and south west of the intersection of Springland Drive and Norberry Crescent. Comprised of a single parcel of land, the subject property measures approximately **5.68 ha** and is zoned Residential Fifth Density Zone (R5).



Figure 1: Site Location

The contemplated ZBLA would allow for the development of one 4-storey and two 4.5-storey residential buildings fronting onto Norberry Crescent. The contemplated development would include an addition of approximately 225 residential units with modifications to the existing above ground parking. A copy of the conceptual site plan is included in ***Drawings/Figures***.

No change in floor area is contemplated to the existing buildings. The site plan contemplates revising existing drive aisles and curbed islands to allow for pedestrian access.

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

1.1 Existing Conditions

The existing site includes four residential buildings and a recreational building with associated asphalt parking lots and drive aisles. Existing catchbasins are located within the subject site; no stormwater management controls have been observed on site.

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:

Norberry Crescent

- 203 mm diameter PVC watermain
- 225 mm diameter sanitary tributary to the Rideau River Collector sewer
- 525-600 mm diameter concrete storm sewer tributary to Sawmill Creek north east of the subject site

Springland Drive

- 305 mm diameter cast iron watermain north of the subject site
- 525 mm diameter sanitary tributary to the Rideau River Collector sewer north of the subject site
- 1200 mm diameter concrete storm sewer tributary to Sawmill Creek north of the subject site

1.2 Required Permits / Approvals

The contemplated 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 contemplated development is a single parcel; as a result, the stormwater management system is exempt from sections 53(1) and (3) of the Ontario Water Resources Act under Ontario Regulation 525/98.

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)
- **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 2C pressure zone. Based on water distribution mapping provided by the City of Ottawa included in **Drawings/Figures**, a local 200 mm diameter watermain exists within the Norberry Crescent right-of-way and a 300 mm diameter watermain exists within the Springland Drive right-of-way. In addition the Billings Bridge Pump Station is located approximately 1.4m north of the subject site, as shown by the Pressure Zone map in **Appendix B**.

3.2 Water Supply Servicing Design

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 Average Apartment	1.8 P/unit
Residential Average Daily Demand	350 L/d/P
Residential Maximum Daily Demand	3 x Average Daily *
Residential Maximum Hourly	4.5 x Average Daily *
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	

It is contemplated that Building A will be serviced via the 200mm diameter watermain within the Norberry Crescent right-of-way near Connection 2 and Building B and Building C will be serviced via the 200mm diameter watermain within the Norberry Crescent right-of-way near Connection 1, as shown by the boundary condition request included in **Appendix B**.

Table 2 and **Table 3** summarize the anticipated water supply demand and boundary conditions for the contemplated development based on the **Water Supply Guidelines**.

Table 2
Water Demand
Contemplated Conditions

Design Parameter	Building A Anticipated Demand ¹ (L/min)	Building B Anticipated Demand ¹ (L/min)	Building C Anticipated Demand ¹ (L/min)	Overall Anticipated Demand ¹ (L/min)
Average Daily Demand	35.5	31.6	31.6	98.4
Max Day + Fire Flow	106.5 + 15,000 = 15,106.5	94.8 + 10,000 = 10,094.8	94.8 + 12,000 = 12,094.8	295.3 + 15,000 = 15,295.3
Peak Hour	159.7	142.2	142.2	443.0
1) Water demand calculation per <i>Water Supply Guidelines</i> . See <i>Appendix B</i> for detailed calculations.				

Table 3
Boundary Conditions
Contemplated Conditions

Design Parameter	Connection 1 ¹ Building B and Building C (m H ₂ O / kPa)	Connection 2 ¹ Building A (m H ₂ O / kPa)
Average Daily Demand	57.6 / 565.1	56.9 / 558.2
Max Day + Fire Flow	18,300 L/min at 140 kPa	17,880 L/min at 140 kPa
Peak Hour	47.5 / 466.0	46.8 / 459.1
1) Boundary conditions supplied by the City of Ottawa for the demands indicated in the correspondence; assumed ground elevation 77m at connection 1 and 77.7m at connection 2. See <i>Appendix B</i> .		

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. The following assumptions were assumed for the contemplated buildings:

- Type of construction - Ordinary Construction
- Occupancy type – Limited Combustibility
- Sprinkler Protection – Sprinklered

The above assumptions result in an estimated maximum fire flow of approximately **15,000 L/min**, **10,000 L/min** and **12,000 L/min** for Buildings A, B and C, respectively. Actual building materials selected will affect the estimated 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.

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**.

The City provided both the anticipated minimum and maximum water pressures, as well as the estimated water pressure during fire flow demand for the demands as indicated by the correspondence in **Appendix B**.

Initial boundary conditions obtained indicate residual pressures exceed the required pressure range as specified in **Table 1** and the **Water Supply Guidelines**; it is therefore recommended that a pressure check be conducted at the completion of construction to confirm if pressure controls are required.

3.3 Water Supply Conclusion

Anticipated water demand under proposed conditions was submitted to the City of Ottawa for establishing boundary conditions.

Initial boundary conditions obtained indicate residual pressures exceed the required pressure range as specified in **Table 1** and the **Water Supply Guidelines**; it is therefore recommended that a pressure check be conducted at the completion of construction to confirm if pressure controls are required.

The contemplated 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 Rideau River Collector Sewer catchment area, as shown by the City sewer mapping included in **Drawings/Figures**. A 225 mm diameter sanitary sewer exists within the Norberry Crescent right-of-way and a 525 mm diameter sanitary sewer exists within the Springland Drive right-of-way are available to service the contemplated development.

The existing site consists of residential lands that contribute wastewater to the local Springland Drive sewer system. The Springland Drive sanitary sewer is tributary to the Rideau River Collector sewer located approximately 80m downstream of the site.

4.2 Wastewater Design

It is anticipated that the contemplated development will be serviced through connections to the 225 mm sanitary sewer within Norberry Crescent.

Table 4 summarizes the **City Standards** employed in the design of the contemplated wastewater sewer system.

Table 4
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
Infiltration and Inflow Allowance	0.28L/s/ha
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{\frac{2}{3}} S^{\frac{1}{2}}$
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 5 demonstrates the anticipated peak flow from the contemplated development. See **Appendix C** for associated calculations.

Table 5
Summary of Estimated Peak Wastewater Flow

	Building A	Building B	Building C	Overall
Design Parameter	Total Flow (L/s)	Total Flow (L/s)	Total Flow (L/s)	Total Flow (L/s)
Estimated Average Dry Weather Flow	0.59	0.53	0.53	1.64
Estimated Peak Dry Weather Flow	2.37	2.11	2.11	6.56
Estimated Peak Wet Weather Flow	3.96	3.70	3.70	8.15
Please note that peak wet weather flow for Building A, Building B, Building C, and Overall, include the infiltration flow rate for the entire site.				

The estimated sanitary flow based on the concept plan provided in **Drawings/Figures** anticipates a peak wet weather flow of **8.15 L/s**.

A sanitary analysis was conducted for the local municipal sanitary sewers located within Norberry Crescent, in order to assess the available capacity. The analysis was conducted from the 525 mm sanitary sewer within Springland Drive at the northern intersection of Springland Drive and Norberry Crescent to the upstream extents of the drainage area, located near the southern intersection of Springland Drive and Norberry Crescent; refer to the sanitary drainage plan, **SAN-1**, included 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 sections of the local sewer system are located from manhole 34471 to manhole 34064 within the northern section of Norberry Crescent, with an available residual capacity of **16.1 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 contemplated 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 **8.15 L/s** peak wet weather flow from the contemplated development.

The contemplated 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 Sawmill Creek sub-watershed. As such, approvals for contemplated developments 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 in **Appendix A**.

The estimated pre-development peak flows for the 2, 5, and 100-year are summarized in **Table 6**:

Table 6
Summary of Existing Peak Storm Flow Rates

City of Ottawa Design Storm	Estimated Peak Flow Rate (L/s)
2-year	605.9
5-year	822.0
100-year	1760.8

5.2 Post-development Stormwater Management Target

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

- 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.
- All storms up to and including the City of Ottawa 100-year design event are to be attenuated on site.
- Quality controls to an enhanced level of treatment are required for any proposed surface parking due to the distance to the outlet. Quality controls are not required for roof areas, as runoff from roof areas is considered to be clean. Correspondence with the RVCA is included in **Appendix A**.

Based on the above the allowable release rate for the entire parcel of land at 740 Springland Drive development is **822.0 L/s**.

5.3 Contemplated Stormwater Management System

It is contemplated that the stormwater outlet for the development will be to the existing internal stormwater network that currently services the Norberry residences, outletting to the existing storm sewer within Norberry Crescent.

To meet the stormwater objectives the proposed development may contain a combination of roof top flow attenuation along with surface and subsurface storage.

Table 7 summarizes anticipated post-development flow rates. Based on the contemplated development, the following storage requirement estimate assumes that approximately 10% of the development area will be directed to the outlet without flow attenuation. These areas will be compensated for in areas with flow attenuation controls.

Table 7
Stormwater Flow Rate Summary

Control Area	5-Year Release Rate (L/s)	5-Year Storage (m ³)	100-Year Release Rate (L/s)	100-Year Storage (m ³)
Unattenuated Areas	32.9	0.0	70.4	0.0
Attenuated Areas	373.5	571.5	751.5	1149.8
Total	406.4	571.5	822.0	1149.8

It is anticipated that approximately **1149.8 m³** of storage will be required on site to attenuate flow to the established release rate of **822.0 L/s**; storage calculations are included in **Appendix D**.

Quality controls to an enhanced level of treatment are required for any proposed surface parking due to the distance to the outlet. Quality controls are not required for roof areas, as runoff from roof areas is considered to be clean. Correspondence with the RVCA is included in **Appendix A**.

Actual storage volumes will need to be confirmed at the detailed design stage based on a number of factors including grading constraints and the site area to be modified. Calculations and storage volume will be re-evaluated and adjusted as required at detailed design stage.

5.4 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**. Based on consultation with the City of Ottawa, the post-development allowable release rate was calculated as **822.0 L/s**. It is estimated that **1149.8 m³** will be required to meet this release rate.

Quality controls to an enhanced level of treatment are required for any proposed surface parking due to the distance to the outlet. Quality controls are not required for roof areas,

as runoff from roof areas is considered to be clean. 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

Hydro Ottawa has been contacted to discuss servicing the contemplated development. Based on the coordination, the development is anticipated to be serviced via the existing electrical distribution system on-site. Further coordination with Hydro Ottawa will be required to determine the extents of upgrades that may be necessary to service the contemplated development.

7.0 CONCLUSION AND RECOMMENDATIONS

David Schaeffer Engineering Ltd. (DSEL) has been retained by Greatwise Developments to prepare an Assessment of Adequacy of Public Services report in support of the application for a Zoning By-Law Amendment (ZBLA) at 740 Springland Drive. The preceding report outlines the following:

- The FUS method for estimating fire flow indicated a maximum of **15,000 L/min** is required for the contemplated development;
- Based on boundary conditions provided by the City, the existing municipal water infrastructure is capable of providing sufficient flow during fire flow demands and residual pressures during average day demands exceed the required pressure range as specified by the **Water Supply Guidelines**; therefore a pressure check is recommended to be conducted at the completion of construction to confirm if pressure controls are required;
- The contemplated development is anticipated to have a peak wet weather flow of **8.15 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 of Ottawa, the contemplated development will be required to attenuate post development flows to an equivalent release rate of **822.0 L/s** for all storms up to and including the 100-year storm event;
- It is contemplated that stormwater objectives may be met through storm water retention via roof top, surface and subsurface storage, it is anticipated that **1149.8 m³** of onsite storage will be required to attenuate flow to the established release rate above;
- Quality controls to an enhanced level of treatment are required for any proposed surface parking due to the distance to the outlet. Quality controls are not required for roof areas, as runoff from roof areas is considered to be clean.

Prepared by,
David Schaeffer Engineering Ltd.



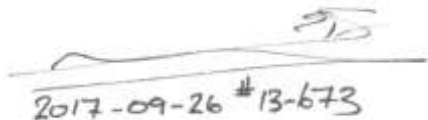
Per: Alison J. Gosling, EIT

Reviewed by,
David Schaeffer Engineering Ltd.



Per: Robert D. Freel, P. Eng.

Reviewed by,
David Schaeffer Engineering Ltd.



Per: Adam D. Fobert, P.Eng

APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

13-673

14/09/2017

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 defensible 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.	N/A
☐	Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
☐	Proposed phasing of the development, if applicable.	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	N/A
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

☒	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 feeder mains, 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

☐	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

☒	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 7.0
☐	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 Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	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	

Meeting Notes
City of Ottawa Pre-Consultation 3 – Norberry Crescent
June 7, 2016
DRAFT

Attendees

Melissa Jort-Conway, City of Ottawa
Wally Dubyk, City of Ottawa
Syd Robertson, City of Ottawa
Natan Ary, Greatwise
Rod Lahey, RLA
James Gerwin, RLA
Jeff Polowin, Hill + Knowlton Strategies
Arman Matti, Castle Glenn
Arman Lloyd Phillips, LPA
Jill Stewart, LPA

A third pre-application consultation meeting was held at the City of Ottawa June 7, 2016 in connection with the revised plans for Norberry Crescent. The revised plans were based on previous comments provided by City staff and the Urban Design Review Panel.

The following is a summary of the meeting:

Rod Lahey provided an overview of the revised concept plan which consists of three, five-storey apartments buildings, with the fifth story setback. The total new unit count is 198. The plan has eliminated subsurface parking and proposes surface parking lots located in the rear of the new buildings. The existing parking structure is to be demolished and one new entrance is proposed along the western edge of the site. The elimination of underground parking will allow for a more feasible project as the proposal targets the rental market.

The proposal requires site plan control approval and a minor rezoning application to reduce the parking rate to 0.7 spaces per unit (including visitor parking), whereas the zoning by-law is 1.2 spaces per unit. Currently there are 20 visitor parking spaces.

Overall, City staffer were supportive of the revised plans and direction of the proposal.

Planning Comments, Melissa Jort-Conway:

- The proposal complies with the existing maximum height limit set out in the zoning;
- Planning staff requested that they would like a breakdown of all existing and proposed visitor and residential parking spaces;
- A detailed parking study will be required to address the parking rate reduction;
- The study should arrive at a parking rate that is less, but supports the site, and alleviates on-street parking pressure;

- The reduction of parking rate can be justified through existing parking demands, and the types of tenants e.g. students, who demonstrate a higher use of alternate modes of transit.
- Justify the reduction of parking in the planning rationale;
- A sensitive integration with the existing single-family dwellings is required;
- The preservation of the existing trees, streetscape and enhancement of a new internal streetscape is required.

Urban Design Comments, Christopher Moise (absent):

- Introduce an architectural feature that makes reference to the low-rise residential buildings across the street from the site, for example: an awning;
- The design should enhance the public realm and provide a high quality pedestrian environment with internal courtyards, quality landscaping, amenity spaces, pedestrian paths and better street connections;
- Better connectivity from the two new buildings to the internal site is required;
- Remove the ramp/driveway to the parking structure that is mistakenly shown on the renderings;
- Are there any other amenity spaces being proposed? The design should enhance the existing environment and help improve the quality of life for residents and the surrounding area;
- Detailed street level urban design plans should be prepared;
- The design should fulfill the urban design guidelines for infill development.

Transportation Comments, Wally Dubyk:

- A Transportation Impact Study is required;
- The modal share of the site should be determined to accurately evaluate parking demands;
- The U-turns on the periphery of the site will need to be one-way;
- The sidewalk is to be 2.0 metres in width and be continuous along property frontage and linked through the proposed accesses;
- The minimum width for the fire truck route is 6.0 metres and is to be depicted on the drawings;
- There could be concerns with compliance of the private approach by-law and more specifically with the maximum private approaches permitted and separation distances;
- Include MMLOS info;
- The comments from the previous pre-con still apply;
- Try to implement TDM, Transportation Demand Management.

Engineering Comments, Syd Robertson:

- A Servicing Study is required. This study should include fire protection and water boundary conditions;
- A Stormwater Management Report is required. Currently, SWM is part of an approved sub-water shed plan;
- The SWM plan will need to provide site specific engineering solutions as the outfall requires stringent criteria.
- There may be constraints with water resources.

Tree Preservation and Protection Comments:

- The existing mature trees should be protected and any trees that require removal, e.g. ash, need to be identified;
- A Tree Conservation Report is required.

Application Process Comments:

- Submit rezoning and site plan control concurrently;
- Natan to confirm if there is an existing site plan agreement for the site;
- Applications should address site phasing;
- The development is a Planned Unit Development and one lot for zoning purposes;
- Severance applications will be required on new buildings for the purpose of mortgages;
- Severance Applications will need to be submitted to the Committee of Adjustment;
- Great Wise does not intend to sell the new buildings to private developers.

Next Steps:

- A public meeting time/date is to be confirmed;
- City to provide a full set of comments from all departments;
- Revise plan as per meeting comments and commence required studies.

These notes were prepared by Jill Stewart. Jill@lloydphillips.com / 613-236-5373 ext.3

City of Comments – Norberry Crescent
October 21, 2013

Planning and Urban Design

Staff have concerns with the concept of building three 4-storey apartment buildings along Norberry Crescent as presented and would not be able to support this concept including having some parking proposed in the front yards of the existing residential buildings (off the existing circular driveways). Staff feel if intensification is to be accommodated on this site, it would need to be more rationally considered in the context of overall site organization and functionality and with regard to the preservation and protection of the existing streetscapes. A sensitive integration with the existing character of the street and neighbourhood being predominately single family dwellings is required.

The site is located on a collector (Springland Drive) and a local street (Norberry). As such, the development of the site will need to meet all relevant OP policies, including Section 3.6. In addition, the design of the project should demonstrate how the Council-approved urban design guidelines for infill development would be fulfilled.

Note - It is also important that you meet with Councillor Maria McRae prior to meeting again with staff.

Transportation – see attachment

Engineering – see attachment

Forestry

- Proper tree protection fencing measures and details will need to be put in place if new development is to be proposed (refer to the City of Ottawa website for the tree conservation guidelines under #10: <http://ottawa.ca/en/residents/water-and-environment/trees-and-community-forests/tree-conservation-report-guidelines>;
- No trees are permitted to be cut unless a permit has been issued.

Parks

- If it can be proved that Cash-in-Lieu of Parkland (CIL) was paid for the existing building, then CIL would only be due on the proposed new addition(s).

Pre-consultation follow up for 740 Springland Drive, Norberry Residence

Site: Residential Development

Capacity issues for sewers

Please find the Servicing Study Guidelines” in the attachment and prepare the study accordingly. For capacity issue, please see section 3.2.1 page 3-3 and follow this section to address the capacity issue on your “Servicing Study”. A completed **checklist with corresponding references from the study is mandatory** for the completeness of the serviceability study. Please add a completed checklist with the report.



Servicing Guidelines Final Dec.

Required information for Water boundary conditions, Water boundary conditions are required to prepare a serviceability study

1. Location of Service
2. Street Number
3. Type of development and units
4. The amount of fire flow required for the proposed development
5. Average daily demand:-l/s
6. Maximum daily demand:-l/s
7. Maximum hourly daily demand :-l/s

SWM Criteria for the area of the site being redeveloped: SWM criteria are required to prepare serviceability study (Quantity control criteria)

- Allowable release rate will be 5 year pre-development rate.
- C Coefficient of runoff will need to be determined as per existing conditions but in no case more than 0.5
- TC =20 minutes or can be calculated ,
- TC should not be less than 10 minute, since the IDF curves become unrealistic less than 10min.
- Any storm events greater than 5 year, up to 100 year, and including 100 year storm events need to be stored on site.

If a receiving creek/stream has specific SWM criteria that will supersede above SWM criteria.

Stormwater management criteria (Quality Control Issues)

It is consultant's responsibility to check with the Rideau Valley Conservation Authority (RVCA) for quality control issues. Please contact Jocelyn Chandler at the RVCA for further information.

Jocelyn Chandler M.Pl. MCIP, RPP.
Planner, RVCA
613.692.3571 x1137
jocelyn.chandler@rvca.ca

Studies required for Site Plan application

- Serviceability Study
- Erosion and sediment Control Plan, it can be combined with grading plan
- Stormwater Management Report
- Geotechnical Study

- Traffic Impact Study,
- Noise Study
- Phase 1 Study
- Phase 2 Study depends upon the Phase 1 Study

MOE Requirement

Single ownership not required

Transportation Pre-Consultation Comments

March 22, 2013

740 Springland Drive Norberry Residence

Springland Drive is designated as a Collector road.

A 5.0 metres x 5.0 metres sight triangle is required at the intersection of Springland Drive and Norberry Crescent North is to be shown on all drawings.

A 5.0 metres x 5.0 metres sight triangle is required at the intersection of Springland Drive and Norberry Crescent West is to be shown on all drawings.

A 3.0 metres x 3.0 metres sight triangle is required at the Norberry Crescent southeast bend is to be shown on all drawings.

The concrete sidewalk is to meet City standards and be 2.0 metres in width and be continuous along property frontage and depressed through the proposed access (please refer to the City's sidewalk and curb standard drawing SC7.1).

Please note that Section 4.3 of the Official Plan requires that the proposed development include safe, direct and attractive pedestrian access from the public sidewalks to the major building entrance. The plans must also include pedestrian connections to the optional additional developments should they proceed.

Accesses must be 6.7 metres in width at the property line for two-way traffic. Curb returns must be provided at the access with a minimum radius of 3.0 metres.

The minimum width for the fire truck route is 6.0 metres and is to be depicted on the drawings.

The By-Law No. 2003-447, Section 25 (a)(iv)(v) states that the maximum private approaches permitted shall be as follows; 46 metres to 150 metres of frontage, one two-way private approach and two one-way private approach or two two-way private approaches, and for each additional 90 metres of frontage in excess of 150 metres, one two-way private approach or two one-way private approaches.

Since Springland crescent is identified as a collector the minimum clear throat length required is 8.0 metres TAC Manual, Part 2, Table 3.2.9.3 and method of measurement as per Figure 3.2.5.2.

Please ensure that the TIS report addresses the total traffic volumes that would ingress and egress the proposed development site during the peak periods.

Bicycle parking spaces are required as per Section 111 of the Ottawa Comprehensive Zoning By-law. Bicycle parking spaces should be located in safe, secure places near main entrances and preferably protected from the weather.

Wally Dubyk

Alison Gosling

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: Tuesday, September 26, 2017 8:58 AM
To: Alison Gosling
Subject: RE: 740 Springland Drive

Good Morning Alison,

As per our conversation this morning, the RVCA acknowledges that there will be an overall reduction in the parking spaces on site based on the new proposal. However, the proposal still adds the construction of new parking spaces. Therefore in the areas where large amounts of parking areas are being added (ie: new parking lot of 42 spaces) the appropriate water quality target would be 80% TSS removal. In areas where limited numbers of parking spaces are being added and where it would not be feasible to achieve a specific onsite water quality target due to the existing infrastructure (ie: where 4 parking spaces are being added to the drive around loops), efforts should be made to improve the water quality including Best Management Practices.

From: Alison Gosling [mailto:AGosling@dsel.ca]
Sent: Friday, September 15, 2017 10:03 AM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Subject: RE: 740 Springland Drive

Good morning Jamie,

To follow up on my voicemail, there will be relocation of parking spaces due to the development.

As indicated by the existing site plan and the concept site plan attached, the development will result in a decrease in overall surface parking and an increase in underground/covered parking.

Feel free to call to discuss.

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

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From: Jamie Batchelor [<mailto:jamie.batchelor@rvca.ca>]
Sent: Friday, September 15, 2017 9:20 AM
To: Alison Gosling <AGosling@dsel.ca>
Subject: RE: 740 Springland Drive

Hi Alison,

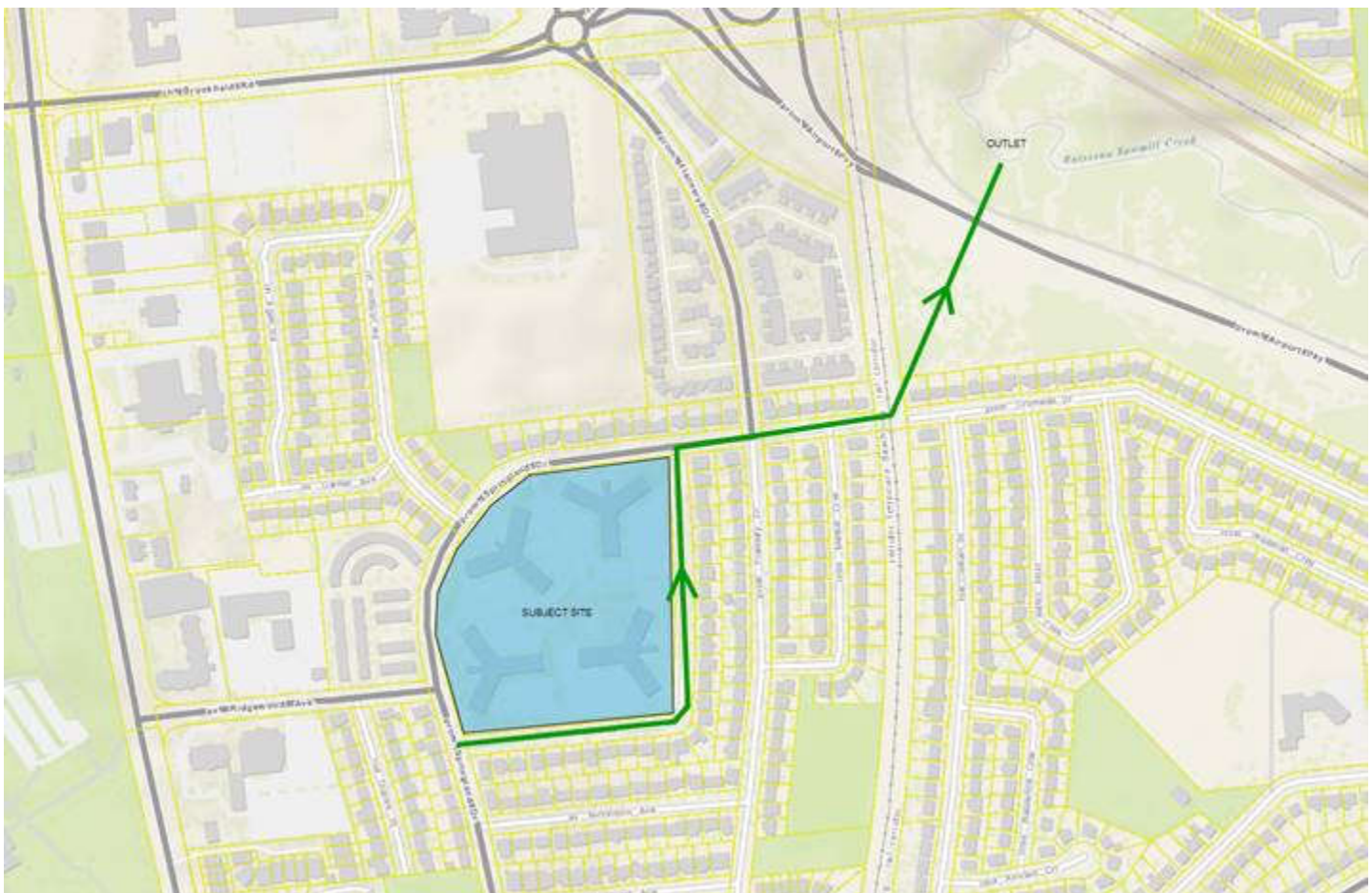
I was just comparing the concept plan versus the air photos of the existing building and based on the air photos it looks additional parking is being proposed to make up for the areas that would be replaced with the newly proposed buildings. Can you confirm this? I have highlighted the areas I noticed attached.

From: Alison Gosling [<mailto:AGosling@dsel.ca>]
Sent: Thursday, September 14, 2017 4:59 PM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Subject: 740 Springland Drive

Good afternoon Jamie,

We wanted to touch base with you regarding a development at 740 Springland Drive. The development involves the construction of three residential buildings located within the existing parking lot, as shown by the attached concept plan. The existing residential buildings are to be retained.

Based on the information available, the existing storm sewers servicing the site travels 1.0 km to an outlet into Sawmill Creek, as shown by the figure below. Since there are no proposed changes to the existing stormwater management system and the runoff from the site will be from a roof top source which was previously parking area, can you confirm if any quality controls will be required?



Please feel free to contact me to discuss.

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

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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	81	146

	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	146	51.1	35.5	153.3	106.5	230.0	159.7

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate	Units	Avg. Daily		Max Day		Peak Hour	
			m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Commercial floor space	2.5 L/m ² /d		0.00	0.0	0.0	0.0	0.0	0.0
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			0.0	0.0	0.0	0.0	0.0	0.0
Total Demand			51.1	35.5	153.3	106.5	230.0	159.7

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	72	130

	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	130	45.5	31.6	136.5	94.8	204.8	142.2

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate	Units	Avg. Daily		Max Day		Peak Hour	
			m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Commercial floor space	2.5 L/m ² /d		0.00	0.0	0.0	0.0	0.0	0.0
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			0.0	0.0	0.0	0.0	0.0	0.0
Total Demand			45.5	31.6	136.5	94.8	204.8	142.2

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	72	130

	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	130	45.5	31.6	136.5	94.8	204.8	142.2

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate	Units	Avg. Daily		Max Day		Peak Hour	
			m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Commercial floor space	2.5 L/m ² /d		0.00	0.0	0.0	0.0	0.0	0.0
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			0.0	0.0	0.0	0.0	0.0	0.0
Total Demand			45.5	31.6	136.5	94.8	204.8	142.2

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	225	405

	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	405	141.8	98.4	425.3	295.3	637.9	443.0

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate	Units	Avg. Daily		Max Day		Peak Hour	
			m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Commercial floor space	2.5 L/m ² /d		0.00	0.0	0.0	0.0	0.0	0.0
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			0.0	0.0	0.0	0.0	0.0	0.0
Total Demand			141.8	98.4	425.3	295.3	637.9	443.0

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999



Fire Flow Required

1. Base Requirement

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

Type of Construction: Ordinary Construction

C 1 Type of Construction Coefficient per FUS Part II, Section 1
A 7200.0 m² Total floor area based on FUS Part II section 1

Fire Flow	18667.6 L/min
	19000.0 L/min rounded to the nearest 1,000 L/min

Adjustments

2. Reduction for Occupancy Type

Limited Combustible -15%

Fire Flow	16150.0 L/min
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3. Reduction for Sprinkler Protection

Sprinklered -50%

Reduction	-8075 L/min
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4. Increase for Separation Distance

N 10.1m-20m 15%
S 30.1m-45m 5%
E 30.1m-45m 5%
W 10.1m-20m 15%

% Increase	40%	value not to exceed 75% per FUS Part II, Section 4
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Increase	6460.0 L/min
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Total Fire Flow

Fire Flow	14535.0 L/min	fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4
	15000.0 L/min	rounded to the nearest 1,000 L/min

Notes:

- Type of construction, Occupancy Type and Sprinkler Protection information provided by _____.
- Calculations based on Fire Underwriters Survey - Part II

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

**Fire Flow Required****1. Base Requirement**

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

Type of Construction: Ordinary Construction

C 1 Type of Construction Coefficient per FUS Part II, Section 1
A 4500.0 m² Total floor area based on FUS Part II section 1

Fire Flow	14758.0 L/min
	15000.0 L/min rounded to the nearest 1,000 L/min

Adjustments**2. Reduction for Occupancy Type**

Limited Combustible -15%

Fire Flow	12750.0 L/min
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3. Reduction for Sprinkler Protection

Sprinklered -50%

Reduction	-6375 L/min
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4. Increase for Separation Distance

N 30.1m-45m 5%

S 20.1m-30m 10%

E >45m 0%

W 20.1m-30m 10%

% Increase	25%	value not to exceed 75% per FUS Part II, Section 4
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Increase	3187.5 L/min
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Total Fire Flow

Fire Flow	9562.5 L/min	fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4
	10000.0 L/min	rounded to the nearest 1,000 L/min

Notes:

-Type of construction, Occupancy Type and Sprinkler Protection information provided by _____.

-Calculations based on Fire Underwriters Survey - Part II

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999



Fire Flow Required

1. Base Requirement

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

Type of Construction: Ordinary Construction

C 1 Type of Construction Coefficient per FUS Part II, Section 1
A 6000.0 m² Total floor area based on FUS Part II section 1

Fire Flow	17041.1 L/min
	17000.0 L/min rounded to the nearest 1,000 L/min

Adjustments

2. Reduction for Occupancy Type

Limited Combustible -15%

Fire Flow	14450.0 L/min
-----------	---------------

3. Reduction for Sprinkler Protection

Sprinklered -50%

Reduction	-7225 L/min
-----------	-------------

4. Increase for Separation Distance

N 20.1m-30m 10%
S 30.1m-45m 5%
E 10.1m-20m 15%
W >45m 0%

% Increase	30%	value not to exceed 75% per FUS Part II, Section 4
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Increase	4335.0 L/min
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Total Fire Flow

Fire Flow	11560.0 L/min	fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4
	12000.0 L/min	rounded to the nearest 1,000 L/min

Notes:

- Type of construction, Occupancy Type and Sprinkler Protection information provided by _____.
- Calculations based on Fire Underwriters Survey - Part II

Connection 1 - Noberry Crescent (South of Site)

Boundary Conditions Unit Conversion

	Height (m)	Elevation (m)	m H ₂ O	PSI	kPa		L/s	L/min
Avg. DD	134.6	77	57.6	82.0	565.1	Fire Flow @ 140kPa	305	18300
Fire Flow			0.0	0.0	0.0			
Peak Hour	124.5	77	47.5	67.6	466.0			

Connection 2 - Noberry Crescent (East of Site)

Boundary Conditions Unit Conversion

	Height (m)	Elevation (m)	m H ₂ O	PSI	kPa		L/s	L/min
Avg. DD	134.6	77.7	56.9	81.0	558.2	Fire Flow @ 140kPa	298	17880
Fire Flow			0.0	0.0	0.0			
Peak Hour	124.5	77.7	46.8	66.6	459.1			

Alison Gosling

From: Oram, Cody <Cody.Oram@ottawa.ca>
Sent: Thursday, September 21, 2017 1:39 PM
To: Alison Gosling
Cc: Shillington, Jeffrey
Subject: RE: Norberry Residences - Boundary condition request
Attachments: 740 Springland Sept 2017.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Hi Alison,

The following are boundary conditions, HGL, for hydraulic analysis at 740 Springland (zone 2C) assumed to be connected to two locations to the 203 mm on Norberry Cres (see attached PDF for locations).

Minimum HGL = 124.5 m (same at both locations)

Maximum HGL = 134.6 m (same at both locations)

The maximum pressure is estimated to be close to 80 psi. A pressure check at completion of construction is recommended to determine if pressure control is required.

Available fire flow (Connection 1) = 305 L/s assuming a residual of 20 psi and a ground elevation of 77.0 m

Available fire flow (Connection 2) = 298 L/s assuming a residual of 20 psi and a ground elevation of 77.7 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.

Cody Oram, P.Eng. Senior Engineer

Development Review, South Services

Planning, Infrastructure and Economic Development Department | Services de planification, d'infrastructure et de développement économique

City of Ottawa | Ville d'Ottawa

110 Laurier Avenue West, Ottawa, ON | 110, avenue, Laurier Ouest, Ottawa (Ontario) K1P 1J1

613.580.2424 ext./poste **13422**, fax/télé: 613-580-2576, cody.oram@ottawa.ca

From: Alison Gosling [mailto:AGosling@dsel.ca]
Sent: Tuesday, September 19, 2017 10:38 AM
To: Oram, Cody <Cody.Oram@ottawa.ca>
Subject: RE: Norberry Residences - Boundary condition request

Good morning Cody,

Upon further review, the flow rates for each connection point should be as follows:

	Connection 1 Building B & C		Connection 2 Building A	
	L/min	L/s	L/min	L/s
Avg. Daily	63.2	1.05	35.5	0.59
Max Day	227.5	3.79	173.9	2.90
Peak Hour	341.3	5.69	262.6	4.38

Please let us know if you have any questions.

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

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From: Alison Gosling
Sent: Wednesday, September 13, 2017 10:17 AM
To: 'Oram, Cody' <Cody.Oram@ottawa.ca>
Subject: RE: Norberry Residences - Boundary condition request

Good morning Cody,

Please refer to attached concept plan for clarity. Building A will discharge to Connection 2 and Building B and C will discharge to Connection 1. Dual connections will be installed where flow rates exceed 50 m3/day.

We have broken down the flow rates for each connection point.

Connection 1	Connection 2
--------------	--------------

	Building B & C		Building A	
	L/min	L/s	L/min	L/s
Avg. Daily	35.5	0.59	63.2	1.05
Max Day	173.9	2.90	227.5	3.79
Peak Hour	262.6	4.38	341.3	5.69

Please let us know if you require any additional information.

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

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From: Oram, Cody [<mailto:Cody.Oram@ottawa.ca>]
Sent: Wednesday, September 13, 2017 8:58 AM
To: Alison Gosling <AGosling@dsel.ca>
Subject: RE: Norberry Residences - Boundary condition request

Hi Alison,

Could you please clarify if the proposed residences are to be serviced by a loop (between Connection 1 and 2 shown on the figure below), split between both connections, or using one or the other?

Thanks,
Cody

From: Alison Gosling [<mailto:AGosling@dsel.ca>]
Sent: Wednesday, September 06, 2017 4:58 PM
To: Oram, Cody <Cody.Oram@ottawa.ca>
Subject: Norberry Residences - Boundary condition request

Good afternoon Cody,

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

1. Location of Service / Street Number: 740 Springland Drive
2. Type of development and the amount of fire flow required for the proposed development:

- The proposed development includes the addition of three residential buildings, approximately 225 units, located within the existing parking lot. The existing building are to be retained.
- It is anticipated that the development will have connections to be serviced from the existing 203 mm diameter watermain within Norberry Crescent, 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.

	Proposed	
	L/min	L/s
Avg. Daily	98.4	1.64
Max Day	295.3	4.92
Peak Hour	443.0	7.38

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



Thank you,

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

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

phone: (613) 836-0856 ext.542

fax: (613) 836-7183

email: agosling@DSEL.ca

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[illegible]

APPENDIX C

Wastewater Collection

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



Site Area 5.68 ha

Extraneous Flow Allowances

Infiltration / Inflow 1.59 L/s

Domestic Contributions

Type of Housing	Unit Rate	Units	Pop
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
Stacked Townhouse (Duplex)	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	81	146

Total Pop 146

Average Domestic Flow 0.59 L/s

Peaking Factor 4.00

Peak Domestic Flow 2.37 L/s

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate	No. of Units	Avg Wastewater (L/s)
Commercial floor space	2.5 L/m ² /d		0.00
Office	75 L/9.3m ² /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 0.00

Peak Institutional / Commercial Flow 0.00

Peak Industrial Flow** 0.00

Peak I/C/I Flow 0.00

Total Estimated Average Dry Weather Flow Rate	0.59 L/s
Total Estimated Peak Dry Weather Flow Rate	2.37 L/s
Total Estimated Peak Wet Weather Flow Rate	3.96 L/s

* Based on a daily demand of 200L/day per person as identified by Appendix 4-A of the Sewer design guidelines

** Water closets demand of 150 L/hour from Appendix 4-A of the Sewer design guidelines, assuming a 12 hour operation

*** Assuming 1 seat is approximately equal to 9.3 m²

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



Site Area 5.68 ha

Extraneous Flow Allowances

Infiltration / Inflow 1.59 L/s

Domestic Contributions

Type of Housing	Unit Rate	Units	Pop
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
Stacked Townhouse (Duplex)	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	72	130

Total Pop 130

Average Domestic Flow 0.53 L/s

Peaking Factor 4.00

Peak Domestic Flow 2.11 L/s

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate	No. of Units	Avg Wastewater (L/s)
Commercial floor space	2.5 L/m ² /d		0.00
Office	75 L/9.3m ² /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 0.00

Peak Institutional / Commercial Flow 0.00

Peak Industrial Flow** 0.00

Peak I/C/I Flow 0.00

Total Estimated Average Dry Weather Flow Rate	0.53 L/s
Total Estimated Peak Dry Weather Flow Rate	2.11 L/s
Total Estimated Peak Wet Weather Flow Rate	3.70 L/s

* Based on a daily demand of 200L/day per person as identified by Appendix 4-A of the Sewer design guidelines

** Water closets demand of 150 L/hour from Appendix 4-A of the Sewer design guidelines, assuming a 12 hour operation

*** Assuming 1 seat is approximately equal to 9.3 m²

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



Site Area 5.68 ha

Extraneous Flow Allowances

Infiltration / Inflow 1.59 L/s

Domestic Contributions

Type of Housing	Unit Rate	Units	Pop
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
Stacked Townhouse (Duplex)	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	72	130

Total Pop 130

Average Domestic Flow 0.53 L/s

Peaking Factor 4.00

Peak Domestic Flow 2.11 L/s

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate	No. of Units	Avg Wastewater (L/s)
Commercial floor space	2.5 L/m ² /d		0.00
Office	75 L/9.3m ² /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 0.00

Peak Institutional / Commercial Flow 0.00

Peak Industrial Flow** 0.00

Peak I/C/I Flow 0.00

Total Estimated Average Dry Weather Flow Rate	0.53 L/s
Total Estimated Peak Dry Weather Flow Rate	2.11 L/s
Total Estimated Peak Wet Weather Flow Rate	3.70 L/s

* Based on a daily demand of 200L/day per person as identified by Appendix 4-A of the Sewer design guidelines

** Water closets demand of 150 L/hour from Appendix 4-A of the Sewer design guidelines, assuming a 12 hour operation

*** Assuming 1 seat is approximately equal to 9.3 m²

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



Site Area 5.68 ha

Extraneous Flow Allowances

Infiltration / Inflow 1.59 L/s

Domestic Contributions

Type of Housing	Unit Rate	Units	Pop
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
Stacked Townhouse (Duplex)	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	225	405

Total Pop 405

Average Domestic Flow 1.64 L/s

Peaking Factor 4.00

Peak Domestic Flow 6.56 L/s

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate	No. of Units	Avg Wastewater (L/s)
Commercial floor space	2.5 L/m ² /d		0.00
Office	75 L/9.3m ² /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 0.00

Peak Institutional / Commercial Flow 0.00

Peak Industrial Flow** 0.00

Peak I/C/I Flow 0.00

Total Estimated Average Dry Weather Flow Rate	1.64 L/s
Total Estimated Peak Dry Weather Flow Rate	6.56 L/s
Total Estimated Peak Wet Weather Flow Rate	8.15 L/s

* Based on a daily demand of 200L/day per person as identified by Appendix 4-A of the Sewer design guidelines

** Water closets demand of 150 L/hour from Appendix 4-A of the Sewer design guidelines, assuming a 12 hour operation

*** Assuming 1 seat is approximately equal to 9.3 m²

SANITARY SEWER CALCULATION SHEET - EXISTING CONDITIONS

PROJECT: Greatwise Developments
LOCATION: 740 Springland Drive
FILE REF: 13-673
DATE: 15-Sep-17

DESIGN PARAMETERS
Avg. Daily Flow Res. 300 L/p/d
Avg. Daily Flow Comm. 17,000 L/ha/d
Avg. Daily Flow Indust. 10,000 L/ha/d
Avg. Daily Flow Indust. 10,000 L/ha/d
Peak Fact Res. Per Hamons: Min = 2.0, Max =4.0
Peak Fact. Comm. 1
Peak Fact. Instit. 1
Peak Fact. Indust. per MOE graph

Infiltration / Inflow 0.28 L/s/ha
Min. Pipe Velocity 0.60 m/s full flowing
Max. Pipe Velocity 3.00 m/s full flowing
Mannings N 0.013

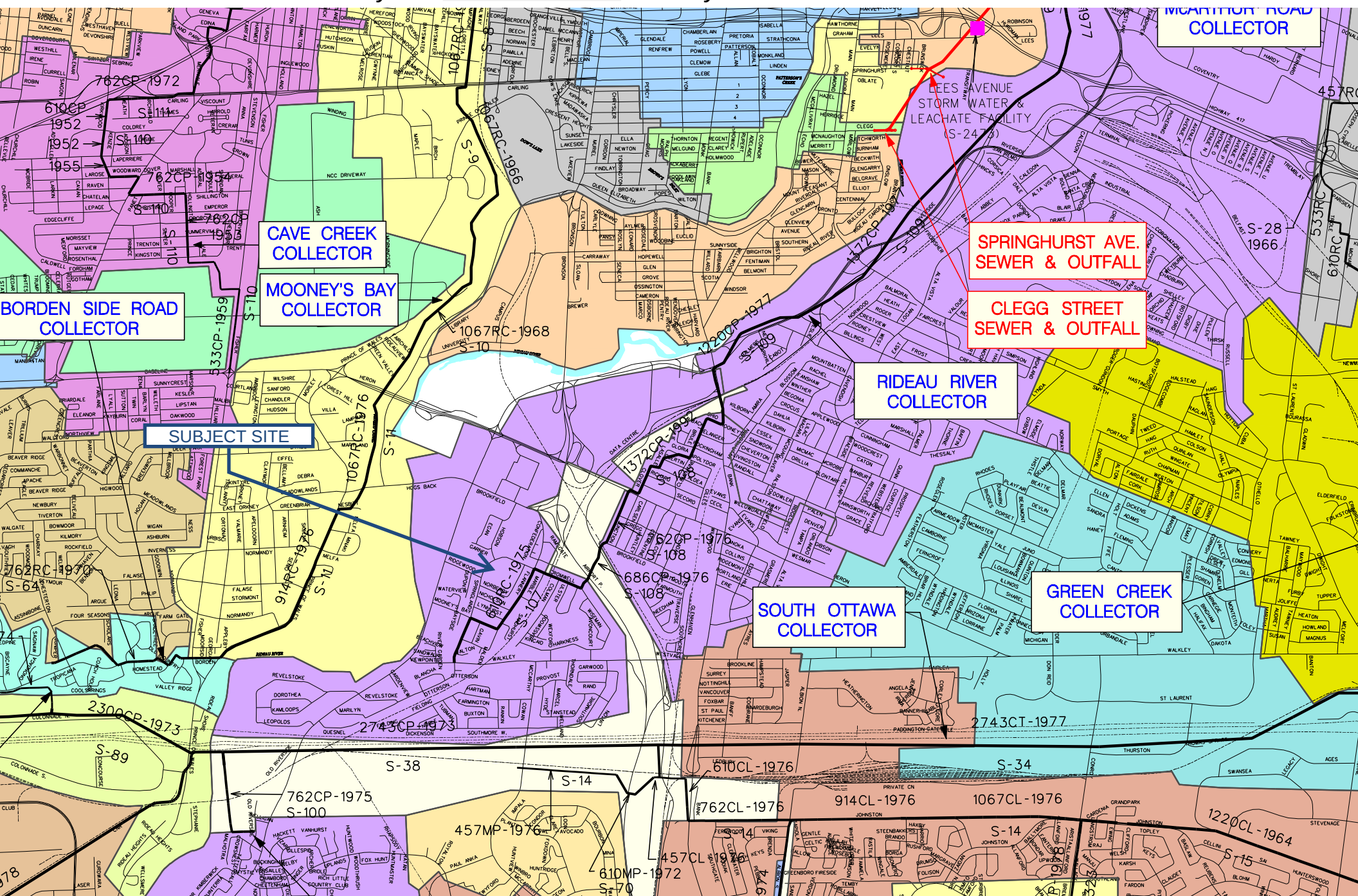


Location			Residential Area and Population										Commercial		Institutional		Industrial		Infiltration				Pipe Data									
Area ID	Up	Down	Area (ha)	Number of Units by type				Pop.	Cumulative		Peak Fact. (-)	Q _{res} (L/s)	Area (ha)	Accu. Area (ha)	Area (ha)	Accu. Area (ha)	Area (ha)	Accu. Area (ha)	Q _{C+H} (L/s)	Total Area (ha)	Accu. Area (ha)	Infiltration Flow (L/s)	Total Flow (L/s)	DIA (mm)	Slope (%)	Length (m)	A _{hydraulic} (m ²)	R (m)	Velocity (m/s)	Q _{cap} (L/s)	Q / Q full (-)	Qresidual (L/s)
				Singles	Semi's	Town's	Apt's		Area (ha)	Pop.																						
SPRINGLAND DRIVE AND NORBERRY CRESCENT	A		2.23	24				82.0	2.230	82.0	4.00	1.14		0.00		0.00		0.00	0.0	2.230	2.230	0.624	1.76	225	0.370	75.0	0.040	0.056	0.69	27.3	0.06	25.5
			0.00					0.0	2.230	82.0	4.00	1.14		0.00		0.00		0.00	0.0	0.000	2.230	0.624	1.76	225	0.610	72.5	0.040	0.056	0.88	35.1	0.05	33.3
			0.00					0.0	2.230	82.0	4.00	1.14		0.00		0.00		0.00	0.0	0.000	2.230	0.624	1.76	225	0.320	70.0	0.040	0.056	0.64	25.4	0.07	23.6
		B	0.00					0.0	2.230	82.0	4.00	1.14		0.00		0.00		0.00	0.0	0.000	2.230	0.624	1.76	225	0.320	3.0	0.040	0.056	0.64	25.4	0.07	23.6
NORBERRY CRESCENT	B		2.63	15			250	501.0	4.860	583.0	3.94	7.97		0.00		0.00		0.00	0.0	2.630	4.860	1.361	9.33	225	0.320	72.5	0.040	0.056	0.64	25.4	0.37	16.1
			0.00					0.0	4.860	583.0	3.94	7.97		0.00		0.00		0.00	0.0	0.000	4.860	1.361	9.33	225	0.320	65.0	0.040	0.056	0.64	25.4	0.37	16.1
			0.00					0.0	4.860	583.0	3.94	7.97		0.00		0.00		0.00	0.0	0.000	4.860	1.361	9.33	225	0.320	72.5	0.040	0.056	0.64	25.4	0.37	16.1
		C	0.00					0.0	4.860	583.0	3.94	7.97		0.00		0.00		0.00	0.0	0.000	4.860	1.361	9.33	225	0.320	67.5	0.040	0.056	0.64	25.4	0.37	16.1

† Minimum pipe slopes were assumed per Section 6.1.2.2 of the City of Ottawa Sewer Design Guidelines



City of Ottawa - Trunk Sanitary Sewers and Collection Areas



APPENDIX D

Stormwater Management

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

Existing Drainage Characteristics From Internal Site

Area	5.68 ha	
C	0.50 Rational Method runoff coefficient	
L	107 m	
Up Elev	109.5 m	
Dn Elev	76.59 m	
Slope	30.8 %	
Tc (Actual)	6.5 min	* Tc must be greater than or equal to 10 minutes
Tc	10.0 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	605.9	822.0	1760.8 L/s

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

Target Flow Rate

Area 5.68 ha

5-year

i 104.2 mm/hr

Q 822.0 L/s

Estimated Post Development Peak Flow from Unattenuated Areas

Total Area 0.57 ha

C 0.20 Rational Method runoff coefficient

t _c (min)	5-year					100-year				
	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	32.9	32.9	0.0	0.0	178.6	70.4	70.4	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

Total Area 5.11 ha

C 0.85 Rational Method runoff coefficient

t _c (min)	5-year					100-year				
	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	1257.6	372.8	884.9	530.9	178.6	2535.5	751.5	1784.0	1070.4
15	83.6	1008.5	373.5	635.0	571.5	142.9	2029.1	751.5	1277.6	1149.8
20	70.3	847.9	374.1	473.8	568.6	120.0	1703.3	751.5	951.8	1142.1
25	60.9	735.0	374.6	360.4	540.6	103.8	1474.6	751.5	723.1	1084.6
30	53.9	650.9	375.0	275.9	496.7	91.9	1304.5	751.5	553.0	995.4
35	48.5	585.6	375.3	210.3	441.6	82.6	1172.6	751.5	421.1	884.3
40	44.2	533.3	375.6	157.7	378.5	75.1	1067.1	751.5	315.5	757.3
45	40.6	490.4	375.9	114.5	309.2	69.1	980.5	751.5	229.0	618.2
50	37.7	454.5	376.1	78.4	235.1	64.0	908.1	751.5	156.6	469.8
55	35.1	423.9	376.3	47.6	157.2	59.6	846.7	751.5	95.1	313.9
60	32.9	397.6	376.5	21.1	76.1	55.9	793.7	751.5	42.2	151.8
65	31.0	374.7	376.7	0.0	0.0	52.6	747.6	751.5	0.0	0.0
70	29.4	354.5	376.8	0.0	0.0	49.8	707.0	751.5	0.0	0.0
75	27.9	336.6	377.0	0.0	0.0	47.3	671.0	751.5	0.0	0.0
80	26.6	320.6	377.1	0.0	0.0	45.0	638.9	751.5	0.0	0.0
85	25.4	306.2	377.3	0.0	0.0	43.0	609.9	751.5	0.0	0.0
90	24.3	293.2	377.4	0.0	0.0	41.1	583.8	751.5	0.0	0.0
95	23.3	281.3	377.5	0.0	0.0	39.4	560.0	751.5	0.0	0.0
100	22.4	270.5	377.6	0.0	0.0	37.9	538.2	751.5	0.0	0.0
105	21.6	260.5	377.8	0.0	0.0	36.5	518.3	751.5	0.0	0.0
110	20.8	251.3	377.9	0.0	0.0	35.2	499.9	751.5	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)

5-year Q _{attenuated}	373.54 L/s	100-year Q _{attenuated}	751.54 L/s
5-year Max. Storage Required	571.5 m ³	100-year Max. Storage Required	1149.8 m ³

Summary of Release Rates and Storage Volumes

Control Area	5-Year Release Rate (L/s)	5-Year Storage (m ³)	100-Year Release Rate (L/s)	100-Year Storage (m ³)
Unattenuated Areas	32.9	0.0	70.4	0.0
Attenuated Areas	373.5	571.5	751.5	1149.8
Total	406.4	571.5	822.0	1149.8

DRAWINGS / FIGURES

EXISTING:	
RESIDENTIAL UNITS:	761
PARKING:	
COVERED:	141
ABOVE GRADE:	86
SURFACE:	523
TOTAL:	750
VISITOR PARKING @ 0.02/UNIT:	18
NET RESIDENTIAL:	731
RESIDENTIAL PARKING RATIO:	0.96

SITE AREA:	BUILDING FOOTPRINT	ASPHALT SURFACE AREA	LANDSCAPED AREA
56 800 M2	14 250 M2 (25.10%)	22 135 M2 (38.97%)	20 410 M2 (35.93%)





PROPOSED SITE PLAN:

NEW RESIDENTIAL AREA: 167,550 SQ.FT.

EXISTING RESIDENTIAL UNITS:	761
NEW RESIDENTIAL UNITS:	225
TOTAL:	986

BUILDING FOOTPRINT:

EXISTING:	14 250 M2
PROPOSED:	3 565 M2
TOTAL:	17 815 M2

PARKING:

COVERED:	156
ABOVE GRADE:	63
SURFACE:	533
TOTAL:	752

VISITOR PARKING @ 0.05/UNIT:	50
NET RESIDENTIAL:	702
RESIDENTIAL PARKING RATIO:	0.71
TOAL SITE PARKING RATIO:	0.76

SITE AREA:	BUILDING FOOTPRINT	ASPHALT SURFACE AREA	LANDSCAPED AREA
56 800 M2	17 815 M2 (31.36%)	17 965 M2 (31.63%)	21 020 M2 (37.00%)



City of Ottawa - 2015 Water Distribution System

The map illustrates the water distribution network in the City of Ottawa. Key features include:

- Streets:** Egan, Garner, Hobson, Norberry, Flannery, Coleman, Baswood, Kincaid, Lynhurst, Riverview, and others.
- Water Infrastructure:** Valves (V), Hydrants (H), Fire Pumps (FP), and various water mains (e.g., 152 CI-1962, 305 CI-1962, 152 UNK-0).
- Subject Site:** A specific area is highlighted with a green box and labeled "SUBJECT SITE" with an arrow pointing to it.
- Other Labels:** 2C, 368-025, and various numerical identifiers for specific infrastructure points.

**SUBJECT
SITE**

City of Ottawa - 2015 Sewer Collection System

