david schaeffer engineering ltd

120 Iber Road, Suite 103
Ottawa, Ontario K2S 1E9
Tel. (613) 836-0856
Fax (613) 836-7183
www.DSEL.ca

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

FOR

TC UNITED DEVELOPMENT CORPORATION
36 ROBINSON AVENUE

CITY OF OTTAWA

PROJECT NO.: 18-1078

JANUARY 2020 – REV. 4

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT FOR TC UNITED DEVELOPMENT CORPORATION 36 ROBINSON AVENUE

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1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained by TC United Development Corporation to prepare a Functional Servicing and Stormwater Management Report in support of the application for Site Plan Control (SPC) at 36 Robinson Avenue.

The subject property is located within the City of Ottawa urban boundary, in the Rideau-Vanier Ward. As illustrated in ***Figure 1***, below, the subject property is located on Robinson Avenue, west of the Rideau River and north-east of Hurdman Road. The subject property measures approximately ***0.19 ha*** and is zoned Residential Fifth Density Zone, (R5K[2219]H(27)-h). The subject property also lies within the Mature Neighborhoods Overlay.

Figure 1: Site Location

There are two existing single-storey commercial use buildings and two existing 2-storey detached homes on the subject property that are proposed to be demolished. The development proposes a 9-storey building consisting of **192 apartment units**.

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

1.1 Existing Conditions

The existing buildings on the site are serviced through connections to the existing watermain and combined sewer within Robinson Avenue.

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

Robinson Avenue:

- 200 mm diameter watermain;
- 600 mm diameter combined sewer;
- 1500 mm diameter combined sewer; and
- 225 mm diameter combined sewer.

1.2 Required Permits / Approvals

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

As the development proposes to discharge stormwater to a combined sewer, the project does not qualify for an exemption as per O.Reg. 525/98 and an Environmental Compliance Approval (ECA) will be required.

1.3 Pre-consultation

Pre-consultation correspondence from the City of Ottawa, 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, October 2012.
  (City Standards)

  - **Technical Bulletin ISTB-2018-01**
    City of Ottawa, March 21, 2018.
    (*ISTB-2018-01*)

  - **Technical Bulletin ISTB-2018-04**
    City of Ottawa, June 27, 2018.
    (*ISTB-2018-04*)

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

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

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

  - **Technical Bulletin ISDTB-2018-02**
    City of Ottawa, March 21, 2018.
    (ISDTB-2018-02)

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

- **Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems**
  National Fire Protection Association
  2016 Edition.
  (NFPA 25)

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

- **Hydrogeological Assessment**
  Report No 2, dated December, 2019, prepared by GHD
  (Hydrogeological Report)

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 200 mm diameter watermain exists within Robinson Avenue right-of-way. There are two existing detached homes and two existing commercial buildings on the subject property.

Table 1, below, estimates the water demand of the existing buildings on the subject property based on the ***Water Supply Guidelines*** shown in ***Table 2.***

Table 1
Water Demand and Boundary Conditions
Existing Conditions

Design Parameter	Anticipated Demand[1] (L/min)
Average Daily Demand	1.6
Max Day + Fire Flow	13.2
Peak Hour	20.0
1) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations.	

3.2 Water Supply Servicing Design

In accordance with City of Ottawa technical bulletin ***ISDTB-2014-02***, redundant service connections are required due to an anticipated design flow greater than ***50 m³/day***. The subject property is proposed to be serviced through two 150 mm water services looped internally to provide a redundant service connection. Refer to the ***SSP-1,*** accompanying this report, for proposed water servicing.

Table 2, below, summarizes the ***Water Supply Guidelines*** employed in the preparation of the preliminary water demand estimate.

Table 2
Water Supply Design Criteria

Design Parameter	Value
Residential Bachelor Apartment	1.4 P/unit
Residential 1 Bedroom Apartment	1.4 P/unit
Residential 2 Bedroom Apartment	2.1 P/unit
Residential Average Daily Demand	280 L/d/P*
Residential Maximum Daily Demand	3.6 x Average Daily **
Residential Maximum Hourly	5.4 x Average Daily **
Commercial Space	2500 L/(1000m^2/d)
Minimum Watermain Size	150 mm diameter
Minimum Depth of Cover	2.4 m from top of watermain to finished grade
During normal operating conditions desired operating pressure is within	350 kPa and 480kPa
During normal operating conditions pressure must not drop below	275 kPa
During normal operating conditions pressure must not exceed	552 kPa
During fire flow operating pressure must not drop below	140 kPa

*** Table updated to reflect ISD-2010-2*
**** Residential Max. Daily and Max. Hourly peaking factors per MOE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500 persons. Above 500 persons, refer to Table 4.2 from City Guidelines.*

Table 3, below, summarizes the anticipated water supply demand and boundary conditions for the proposed development based on the ***Water Supply Guidelines***.

Table 3
Water Demand and Boundary Conditions
Proposed Conditions

Design Parameter	Anticipated Demand[1] (L/min)	Boundary Condition[2] (m H_2O / kPa)
Average Daily Demand	54.4	55.1 / 540.5
Max Day + Fire Flow	196.0+ 6,650 = 6,846.0	11,400 L/min @ 20 psi / 140 kPa
Peak Hour	294.0	45.6 / 447.3

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 for fire flow is 59.6m. See ***Appendix B.***

For the purpose of estimating fire flow, the short method within the National Fire Protection Association (NFPA) standards was utilized. As indicated by Section 11.2.2

from the ***NFPA Standards***, fire flow requirements are to be determined by combining the required flow rate for the sprinkler system, along with the anticipated hose stream. As indicated by Table 11.2.2.1 and Table 11.2.3.1.2 extracted from the ***NFPA Standards***, the anticipated fire flow requirements for the sprinkler system is ***5,700 L/min*** (1500 gpm) and the anticipated internal and external total combined inside and outside hose stream demand is ***950 L/min*** (250 gpm).

As a result, the total fire flow is anticipated to be ***6,650 L/min*** (1,750 gpm), refer to calculation method found in the correspondence included in ***Appendix B***. Based on the boundary conditions provided by the City of Ottawa, sufficient supply is available for fire flow. A certified fire protection system specialist will need to be employed to design the building's fire suppression system and confirm the actual fire flow demand.

The minimum and maximum pressures fall within the required range identified in ***Table 2***. Based on the boundary conditions provided by the City, the maximum fire flow available is ***11,400 L/min***, which exceeds the maximum fire flow required as per ***NFPA*** calculations.

3.3 Water Supply Conclusion

The development is proposed to be serviced through two connections to the existing 200 mm diameter watermain within Robinson Avenue.

The anticipated water demand under proposed conditions was submitted to the City of Ottawa for establishing boundary conditions. As demonstrated by ***Table 3***, based on the City's model, the municipal system is capable of delivering water within the ***Water Supply Guidelines*** pressure range.

A certified fire protection system specialist will need to be retained to design the building's fire suppression system and confirm the maximum fire flow demand. However, the current maximum fire flow that can be supplied to the building exceeds the maximum fire flow required as per ***NFPA*** calculations.

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

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The subject site lies within the Rideau River Collector Twin Sewer catchment area, as shown by the ***Sanitary & Storm Collection System Maps,*** included in ***Appendix C***. There is an existing 600 mm diameter combined sewer, a 225 mm diameter combined sewer and a 1500 mm diameter sanitary sewer within Robinson Avenue, which is adjacent to the subject property.

Table 4, below, summarizes the estimated wastewater flows for the existing building.

Table 4
Summary of Estimated Existing Peak Wastewater Flow

Design Parameter	Existing Flow (L/s)
Estimated Average Dry Weather Flow	0.04
Estimated Peak Dry Weather Flow	0.14
Estimated Peak Wet Weather Flow	0.27

4.2 Wastewater Design

The proposed design will discharge wastewater to the 600 mm diameter combined sewer within Robinson Avenue.

Table 5, below, summarizes the ***City Standards*** employed in the design of the proposed wastewater sewer system.

Table 5
Wastewater Design Criteria

Design Parameter	Value
Residential Bachelor Apartment	1.4 P/unit
Residential 1 Bedroom Apartment	1.4 P/unit
Residential 2 Bedroom Apartment	2.1 P/unit
Average Daily Demand	280 L/d/per
Peaking Factor	Harmon's Peaking Factor. Max 3.8, Min 2.0 Harmon's Corrector Factor 0.8
Infiltration and Inflow Allowance	0.05 L/s/ha (Dry Weather Flow) 0.28 L/s/ha (Wet Weather Flow) 0.33 L/s/ha (Total)
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sewer Size	250 mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6 m/s
Maximum Full Flowing Velocity	3.0 m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012.	

Table 6, below, demonstrates the anticipated peak flow from the proposed development. See ***Appendix C*** for associated calculations.

Table 6
Summary of Estimated Proposed Peak Wastewater Flow

Design Parameter	Proposed Flow (L/s)
Estimated Average Dry Weather Flow	0.92
Estimated Peak Dry Weather Flow	3.20
Estimated Peak Wet Weather Flow	3.33

Based on the architectural site plan, provided in ***Drawings/Figures,*** peak wet weather flow of ***3.33 L/s*** is estimated, a ***3.06 L/s*** increase from the existing condition. Detailed calculations are included in ***Appendix C***. The increase in wastewater discharge will be compensated for by a reduction in stormwater flow, as per City of Ottawa criteria, and is detailed in ***Section 5.0 & Section 6.0*** of this report.

4.3 Wastewater Servicing Conclusions

The site is tributary to the Rideau River Collector Twin Sewer. It is proposed to discharge the subject property's wastewater via a connection to the existing 600 mm combined sewer within Robinson Avenue.

The sanitary flow analysis for the proposed development results in an estimated increase from existing conditions of ***3.06 L/s*** to the Robinson Avenue combined sewer. This increase in wastewater discharge will be compensated for by a reduction in stormwater flow, as per City of Ottawa Criteria.

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

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Services

Stormwater runoff from the subject property is tributary to the City of Ottawa sewer system and is located within the Lower Rideau River sub-watershed. As such, approvals for proposed 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).

There currently exists a ***0.21 ha*** drainage area that directs flow from the adjacent properties through the subject property, directed towards the existing catch basins within Robinson Avenue and conveyed through the combined sewer within Robinson Avenue towards the 1500 mm diameter sanitary Trunk Sewer. Major flow from Robinson Road is directed overland between properties 57 and 59 Robinson Avenue, discharging directly to the Rideau river.

It is anticipated that no stormwater management controls for flow attenuation exist on-site. The estimated pre-development peak flows for the 2, 5, and 100-year events are summarized in ***Table 7,*** below:

Table 7
Summary of Existing Peak Storm Flow Rates

City of Ottawa Design Storm	Estimated Peak Flow Rate (L/s)
2-year	16.0
5-year	21.7
100-year	46.5

5.2 Post-development Stormwater Management Targets

Stormwater management quantity control requirements for the proposed development were reviewed with the City of Ottawa, correspondence is included in ***Appendix A*** and summarized below:

- Meet a combined allowable release rate based on existing sanitary flow in addition to storm flow equal to a calculated Rational Method Coefficient determined as per existing conditions but no more than 0.4, employing the City of Ottawa IDF

parameters for a 2-year storm with a calculated time of concentration no less than 10 minutes;

- The stormwater release rate is equal to the allowable combined flow subtract the proposed sanitary flow;
- Attenuate storms up to and including the City of Ottawa 100-year design event on site;
- Major and minor system flow from external drainage areas that are directed through the subject property will need to be directed towards the major overland flow route along Robinson Avenue; and
- Quality controls are not anticipated to be required for the development since stormwater is tributary to a combined sewer. Correspondence with the RVCA is included in ***Appendix A***.

Based on the above criteria, the allowable combined flow rate equals ***16.27 L/s*** and the allowable stormwater release rate is equal to ***13.07 L/s.*** (16.27 – 3.20= 13.07 L/s).

5.3 Proposed Stormwater Management System

It is proposed that the stormwater for the development be serviced through a connection to the 600 mm diameter combined sewer within Robinson Avenue.

To achieve the allowable post-development stormwater runoff release rate identified in ***Section 5.2*** above, the proposed development will employ flow attenuation using onsite storage through the use of an internal cistern.

Table 8, below***,*** estimates post-development flow rates and storage requirements.

Table 8
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	3.16	0.00	6.77	0.00
Foundation Drainage	1.04	0.00	1.04	0.00
Attenuated Areas	2.73	33.46	5.26	64.46
Total	**6.93**	**33.46**	**13.07**	**64.46**

It is estimated that a total of ***64.46 m^3*** of storage is required within the cistern in order to attenuate flow to ***13.07 L/s***. Based on the ***Hydrogeological Report,*** an estimated release

rate of ***1.04 L/s*** was allocated to foundation drainage per geotechnical foundation drainage estimate of *90 m³/day*. Storage calculations are contained within ***Appendix D***.

The external flow entering the site from the external drainage areas will be captured by cut off swales and directed towards Robinson Avenue. Minor flow will be captured through the existing and proposed catch basins along Robinson Avenue and discharged to the existing combined sewers. The major flow will be captured in the Robinson Road overland flow route, which discharges directly to the Ottawa River. Refer to drawing ***GP-1,*** accompanying this report, for cut off swale locations.

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***. The post-development stormwater allowable release rate to the combined sewer within Robinson Avenue was calculated to be ***13.07 L/s***. It is estimated that ***64.46 m³*** of storage will be required to meet this release rate.

Quantity controls will be provided through the use of an internal cistern.

External drainage that is directed to the subject property will be conveyed toward the major and minor overland flow routes along Robinson Avenue, discharging directly to the Ottawa River. Minor flow will be captured through the existing catch basins along Robinson Avenue and discharged to the existing combined sewers.

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

6.0 COMBINED SEWER SYSTEM FLOW

Based on criteria outlined in ***Section 5.2***, the combined stormwater and sanitary flow is not to exceed ***16.3 L/s***.

Table 9, below, summarizes the pre-development and post-development flow rates to the combined sewershed.

Table 9
Summary of Release Rates to the Combined Sewer

Flow Type	5-Year		100-year	
	Pre-Development (L/s)	Post-Development (L/s)	Pre-Development (L/s)	Post-Development (L/s)
Sanitary*	0.14	3.20	0.14	3.20
Storm**	21.71	6.71	46.50	13.07
Combined Flow	**21.85**	**9.98**	**46.64**	**16.27**

*Infiltration flows have been taken into account in stormwater calculations. Sanitary flow is equal to the peak dry weather flow.
**No foundation drainage in pre-development.

As shown by ***Table 9,*** the post-development combined flow meets the target objective described in section 5.2. In addition, the development proposes to decrease the discharge to the existing combined sewer by approximately 65% in the 100-year storm event.

7.0 UTILITIES

Utility servicing will be coordinated with the individual utility companies prior to site development.

8.0 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 SILTSACKs 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; and
- 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; and
- Clean and change filter cloth at catch basins.

9.0 CONCLUSION AND RECOMMENDATIONS

David Schaeffer Engineering Ltd. (DSEL) has been retained by TC United Development Corporation to prepare a Functional Servicing and Stormwater Management Report in support of the application for a Site Plan Control (SPC) at 36 Robinson Avenue. The preceding report outlines the following:

- Based on boundary conditions provided by the City, the existing municipal water infrastructure is capable of providing the proposed development with water within the City's required pressure range;
- The ***OBC*** determined required fire flow based on the ***NFPA Standards*** estimates ***6,650 L/min*** is required for the proposed development;
- The proposed development is anticipated to have a peak wet weather wastewater flow of ***3.33 L/s***, which is a ***3.06 L/s*** increase from the current building conditions. The stormwater release rate will be attenuated in order to accommodate this increase in sanitary flow;
- Based on the ***City Standards***, the proposed development will attenuate flow to a release rate of ***13.07L/s*** and will not have an impact on peak flows to the combined sewer within Robinson Avenue; and
- It is proposed to attenuate flow through the use of an internal cistern. It is anticipated that ***64.46 m^3*** of onsite storage will be required to attenuate flow to the established release rate above.

Prepared by,

David Schaeffer Engineering Ltd.

Per: Brandon N. Chow

Reviewed by,

David Schaeffer Engineering Ltd.

Per: Robert D. Freel, P.Eng

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APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

18-1078 05/03/2019

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.	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.	N/A
☐	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.	N/A
☐	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	N/A
☐	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.	N/A
☐	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	N/A
☐	Description of the stormwater management concept with facility locations and descriptions with references and supporting information	N/A
☐	Set-back from private sewage disposal systems.	N/A
☐	Watercourse and hazard lands setbacks.	N/A
☐	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	N/A
☐	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	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).	N/A
☐	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	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.	N/A
☐	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.	N/A
☐	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.	N/A
☐	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
☐	Identification of fill constraints related to floodplain and geotechnical investigation.	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.	N/A
☐	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 6.0
☐	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

MINUTES
Pre-Application Consultation Meeting
Date: December 12, 2018
Time: 10:00 am
Location: 110 Laurier, Room 4103E

Attendees

City of Ottawa
Andrew McCreight, File Lead
Christopher Moise, Urban Designer / Architect
John Wu, Infrastructure Engineer
Kiana Simmons, Planning Student

Community Representation
Trina Cooper and David Eldon, Action Sandy Hill

Applicant Team
Daniel Boulanger - TCU
Jamie Posen, Fotenn
Brian Casagrande, Fotenn
Steve Merrick, DSEL
Karen Griffith, Hobin Architecture
Bill Ritcey, Hobin Architecture

Introductions

Explanation of the pre-application consultation project and confirmation of the Non-Disclosure Agreements (copies available upon request).

Overview of Proposal (applicant team)

Background

- The Lees TOD Study resulted in an appeal to the OMB on this property, which resulted in zoning for an 8-storey building. New owners intend to build within the zoning, however, at 9-storeys but within the height limit (27 metres) permitted by zoning.
- Fotenn was asked to come up with a "community" plan and identify opportunities for this area. City Staff were not able to review the plan before the meeting, and are awaiting the planning rationale associated with all Robinson Avenue submissions.
- Current design is based on a yield study and the intent is to further design the building after this meeting in response to feedback. We need to further explore landscaping issues, architectural details, and couldn't provide step-back after the 6th
- The application submission, with the planning rationale and community plan is intended as the starting point for discussion of the proposals.

Overview

- Proposing a 9-storey apartment building with 197 dwelling units, considering 2 levels of underground parking (but slightly short of required amount of parking) and a potential rooftop terrace
- Mix of bachelor, one bedroom and two bedroom units
- Provide stepbacks after the 7th storey.

Preliminary Comments from Community Association Representative

Trina Cooper and David Eldon, Action Sandy Hill

- Letter received from City Solicitor (following the OMB decisions) that said the zoning permitted 8 stories, and we question why the proposal was 9 stories
    - Response (Andrew) – The Zoning by-law permits a maximum building height of up to 27 metres on this site. Past case law and Legal interpretations has proven that if the proposed building complies with zoning, in this case the height (27m), an amendment to the Official Plan would not be required, even though the Secondary Plan clearly shows the site as an 8-storey maximum.

- Lack of commercial amenities in community, concerned about polarization of demographic from established community to new mix with students.
- Why are here? Cannot make full comments until they are able to see the community vision for Robinson and understand the radical intensification that could occur. Need to have a wholesome discussion with the community for feedback before proceeding with applications.
    - Applicant response: Follow up meeting will be scheduled for open dialogue with the community and Councillor early in the process.
- Supports involving the community in the community vision
- Would like to see a better mix of unit size and types. The "Missing Middle" is affecting Sandy Hill.
- Enjoys the brick and aesthetics of building

Preliminary Comments from City

Engineering – John Wu

- John and Steve exchanged information relevant to the submission requirements, including fire flow, storm water control, ground water / waterproofing, MOE approval, and run-off criteria. Any clarification needed on engineering submissions shall be directed to John.

Planning - Andrew

- 6-storey limit on the west side of Robinson Ave, while eastern portion remains as stable low rise. The site lays in the middle of these designations.
- Further discussion needed to determine how to best respond to the site context and how to marry the stable low-rise area (east) and higher density (west) on this very zoning permissive property. It will be important to analyze the existing and planned function for the area and how the proposed building design fits from a design and compatibility perspective.
- Christopher will elaborate on Urban Design, but the conversation of built form and relationships between properties will be very important with this application. The building envelope permitted on this property does not represent compatibility and needs to look at how to sculpt various sides to further the design.
- Transportation submission from the other Robinson proposals are nearly complete for circulation, and once accepted, the report can be used as a base to then insert the information relative to 36 Robinson. Please proceed with Step 1 of the TIA process to confirm submission requirements with this application. https://ottawa.ca/en/transportation-impact-assessment-guidelines

Urban Design – Christopher Moise

- Selection of brick colour and design of rooftop patio premature if massing is still up for discussion.
- Consider that this site may be overdeveloped when other sites (Robinson proposals) may be under developed; 3-storey proposals on lots where 6-storeys is permitted.
- The building envelope does not have to mirror the property line jog at the rear.
- The 8 storey wall is not respectful of the stable residential
- West façade has an opportunity for mass while the east should be softened
- Consider a horizontal line across the street; building should recognize adjacency to low and midrise buildings. The jump from 2-9 storeys is stark.
- Stepback would be more valuable at the 2nd or 3rd storey, with further treatment at the top with the upper storeys.

Genavieve Melatti

From: Steve Merrick
Sent: Wednesday, February 13, 2019 10:46 AM
To: Genavieve Melatti
Subject: FW: 36 Robinson - Stormwater Criteria

Steve Merrick, P.Eng.
Project Manager / Intermediate 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

-----Original Message-----
From: Wu, John [mailto:John.Wu@ottawa.ca]
Sent: Wednesday, February 13, 2019 10:44 AM
To: Steve Merrick <SMerrick@dsel.ca>
Subject: RE: 36 Robinson - Stormwater Criteria

Yes, use that
_____._____
From: Steve Merrick [SMerrick@dsel.ca]
Sent: February-13-19 9:54 AM
To: Wu, John
Cc: Genavieve Melatti
Subject: 36 Robinson - Stormwater Criteria

Hi John,

I want to confirm that the time of concentration for the above noted site will be calculated no less than 10 minutes. A calculated TC is consistent with other recent applications on Robinson Avenue for example at 130-138 Ronbinson Ave attached.

Thanks in advance,

Steve Merrick, P.Eng.
Project Manager / Intermediate 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<mailto:afobert@DSEL.ca>

Genavieve Melatti

From: Karen Griffith <kgriffith@hobinarc.com>
Sent: Thursday, December 20, 2018 4:50 PM
To: Genavieve Melatti
Cc: Steve Merrick; Bill Ritcey
Subject: Re: 36 Robinson FUS Calculations

Hello Genavieve,

There will be an automatic sprinkler system as required by Code. This will be a Class 3 non-combustible building.

Here are the unit stats.

Unit distribution

		bachelor	1 bedroom	2 bedroom	total	
LEVEL 1	RES		7	11	1	19
LEVEL 2	RES		8	13	2	23
LEVEL 3	RES		8	13	2	23
LEVEL 4	RES		8	13	2	23
LEVEL 5	RES		8	13	2	23
LEVEL 6	RES		8	13	2	23
LEVEL 7	RES		8	13	2	23
LEVEL 8	RES		8	12	1	21
LEVEL 9	RES		8	12	1	21
total			71	113	15	199

The area's per floor are:
1st garage access 101.5m. sq. - unit areas 1199.5m. sq. total 1301m
2nd to 7th 1301m. sq.
8th to 9th 1130m. sq.

Not sure what you mean by each building?

Regards,

On 12/19/2018 10:07 AM, Genavieve Melatti wrote:

> Good morning Karen,
>
> I was wondering if you would be able to provide some information for us that is required in order to complete the FUS calculations for this project so that we can submit a request to the City for boundary conditions.
>
> - Would you be able to please confirm the sprinkler systems for the building?
> - We are right now assuming that there are 9 storeys at 1130m^2 per floor. We are assuming that all floors are residential with 197 dwelling units. Would you be able to confirm that these assumption and also provide the dwelling breakdown for how many bachelor, single and double bedroom units are anticipated?
> - I have included the ISO Guide in which sections 1, 2 and 3 on pages 3 to 10 provides definitions to clarify as well as the section from the City's technical bulletin. Note that ISO refers only to fire-resistive for fire ratings not less than 1-hour. Would you be able to provide the ISO class for each building.

A. *Determine the type of construction.*

- Coefficient *C* in the FUS method is equivalent to coefficient *F* in the ISO method:

Correspondence between FUS and ISO construction coefficients

FUS type of construction	ISO class of construction	Coefficient *C*
Fire-resistive construction	Class 6 (fire resistive)	0.6
	Class 5 (modified fire resistive)	0.6
Non-combustible construction	Class 4 (masonry non-combustible)	0.8
	Class 3 (non-combustible)	0.8
Ordinary construction	Class 2 (joisted masonry)	1.0
Wood frame construction	Class 1 (frame)	1.5

However, the FUS definition of fire-resistive construction is more restrictive than those of ISO construction classes 5 and 6 (modified fire resistive and fire resistive). FUS requires structural members and floors in buildings of fire-resistive construction to have a fire-resistance rating of 3 hours or longer.

- With the exception of fire-resistive construction that is defined differently by FUS and ISO, practitioners can refer to the definitions of the ISO construction classes (and the supporting definitions of the types of materials and assemblies that make up the ISO construction classes) found in the current ISO guide [4] (see Annex i) to help select coefficient *C*.
- To identify the most appropriate type of construction for buildings of mixed construction, the rules included in the current ISO guide [4] can be followed (see Annex i). For a building to be assigned a given classification, the rules require ⅔ (67%) or more of the total wall area and ⅔ (67%) or more of the total floor and roof area of the building to be constructed according to the given construction class or a higher class.
- New residential developments (less than 4 storeys) are predominantly of wood frame construction ($C = 1.5$) or ordinary construction ($C = 1.0$) if exterior walls are of brick or masonry. Residential buildings with exterior walls of brick or masonry veneer and those with less than ⅔ (67%) of their exterior walls made of brick or masonry are considered wood frame construction ($C = 1.5$).

> If you have any questions at all please feel free to contact me.

Thank you,

Genavieve Melatti
Project Coordinator/ Junior Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext. 569
email: gmelatti@DSEL.ca

--

Karen Griffith

Hobin Architecture Incorporated
63 Pamilla Street
Ottawa, Ontario
Canada K1S 3K7

t 613-238-7200 x106
f 613-235-2005
e kgriffith@hobinarc.com

hobinarc.com

Brandon Chow

To: kgriffith@hobinarc.com
Subject: RE: 36 Robinson Site Plan

From: Karen Griffith <kgriffith@hobinarc.com>
Sent: July 29, 2019 12:58 PM
To: Brandon Chow <BChow@dsel.ca>
Subject: Re: 36 Robinson Site Plan

Hi Brandon,

I just saw this from Hydro. Not sure if it affects anything....
Here is unit info.

58- Bach
121- 1Bed
13- 2 Bed
Total 192 units

Regards,

On 7/29/2019 12:04 PM, Brandon Chow wrote:

> Hi Karen,
>
> Can you confirm the unit counts for the proposed bldg?
> (bachelor/1 bedroom/2 bedroom/3 bedroom)
>
> Thanks,
>
> Brandon Chow
> Project Coordinator / Intermediate Designer
>
> **DSEL**
> **david schaeffer engineering ltd.**
>
> 120 Iber Road, Unit 103
> Stittsville, ON K2S 1E9
>
> **phone:** (613) 836-0856 ext.532
> **fax**: (613) 836-7183
> **email**: bchow@DSEL.ca
>
>

Genavieve Melatti

From: Genavieve Melatti
Sent: Friday, December 14, 2018 11:02 AM
To: 'Emily.Diamond@ontario.ca'
Cc: Steve Merrick
Subject: 36 Robinson Avenue - ECA Application Requirement

Good morning Emily,

I would like to confirm that an ECA will be required for the contemplated development at 36 Robinson Avenue.

The proposed development would be discharging into the combined sewer within Robinson Avenue. The design will be controlling to the 2-year storm event with a time of concentration of 20 minutes and a runoff coefficient of 0.4 or existing.

There is no exemption for this project as per O.Reg. 525/98 as the development would be discharging to a combined sewer.

Please let me know if there is any additional information that you require.

Thank you,

Genavieve Melatti
Project Coordinator/ Junior Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext. 569
email: gmelatti@DSEL.ca

Genavieve Melatti

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: Tuesday, March 5, 2019 11:11 AM
To: Genavieve Melatti
Subject: RE: 36 Robinson Avenue

Hi Genavieve,

I apologize for not getting back to you earlier. I can confirm that onsite water quality controls are not required as stormwater from this site is being directed to the combined sewer.

Jamie Batchelor, MCIP,RPP
Planner, ext. 1191
jamie.batchelor@rvca.ca

Rideau Valley Conservation Authority
3889 Rideau Valley Drive
PO Box 599, Manotick ON K4M 1A5
T 613-692-3571 | 1-800-267-3504 F 613-692-0831 | www.rvca.ca

From: Genavieve Melatti <GMelatti@dsel.ca>
Sent: Tuesday, March 05, 2019 10:55 AM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Subject: RE: 36 Robinson Avenue

Good morning Jamie,

I just wanted to follow up on this.

I was wondering if we might be able to get confirmation between today and tomorrow as we are looking to submit on Thursday.

Let me know if you need any additional information.

Thank you,

Genavieve Melatti
Project Coordinator/ Junior Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext. 569
email: gmelatti@DSEL.ca

From: Genavieve Melatti
Sent: Friday, December 21, 2018 10:33 AM
To: 'jamie.batchelor@rvca.ca' <jamie.batchelor@rvca.ca>
Subject: 36 Robinson Avenue

Good afternoon Jamie,

I wanted to touch base with you regarding a development at 36 Robinson Avenue shown in the map below.

The development proposes to construct a 9-storey residential building with underground parking. Stormwater from site will be discharged the existing 600mm diameter combined sewer within Robinson Avenue.

I wanted to confirm that quality controls would not be required as it will be discharging into a combined sewer.

Please let me know if there is any further information that you might need from me.

Genavieve Melatti
Project Coordinator/ Junior Designer

DSEL
david schaeffer engineering ltd.

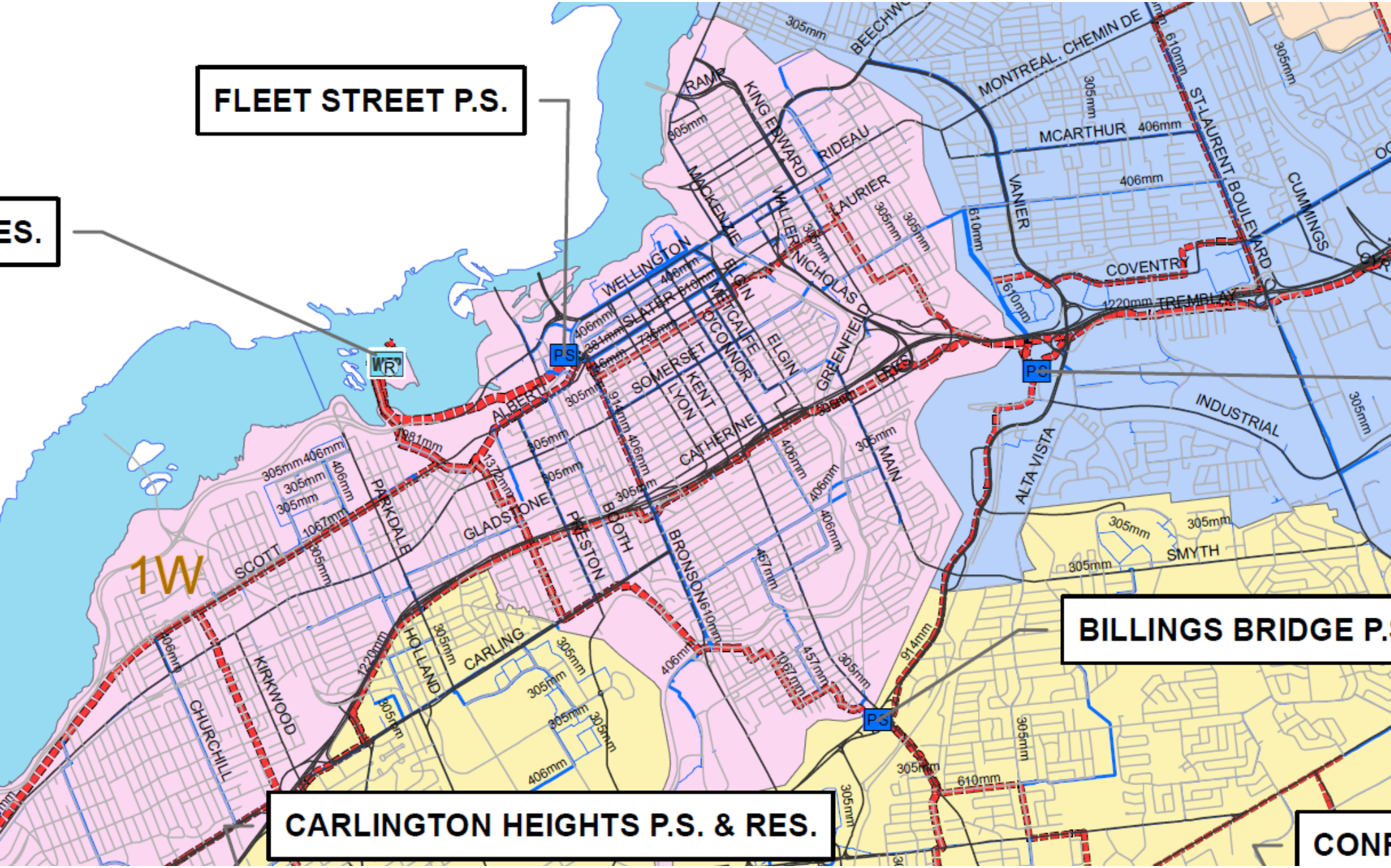
120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext. 569
email: gmelatti@DSEL.ca

APPENDIX B

Water Supply

Pressure Zone Map



Genavieve Melatti

From: Wu, John <John.Wu@ottawa.ca>
Sent: Tuesday, January 29, 2019 10:14 AM
To: Genavieve Melatti
Subject: RE: 36 Robinson Avenue - Boundary Condition Request
Attachments: 36 Robinson Jan 2019.pdf

Hi, Melatti:

Here is the result:

******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 36 Robinson (zone 1W) assumed to be connected to the 203mm on Robinson (see attached PDF for location).

Minimum HGL = 105.2m

Maximum HGL = 114.7m

Available Flow @ 20psi = 190 L/s assuming a ground elevation of 59.6m

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.

Thanks.

John

From: Genavieve Melatti <GMelatti@dsel.ca>
Sent: Tuesday, January 22, 2019 11:06 AM
To: Wu, John <John.Wu@ottawa.ca>
Cc: Steve Merrick <SMerrick@dsel.ca>
Subject: RE: 36 Robinson Avenue - Boundary Condition Request

Hey John,

I just wanted to follow up on the boundary conditions request below.

Please let me know if you have any questions.

Thank you,

Genavieve Melatti
Project Coordinator/ Junior Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext. 569
email: gmelatti@DSEL.ca

From: Genavieve Melatti
Sent: Friday, December 21, 2018 11:07 AM
To: 'John.Wu@ottawa.ca' <John.Wu@ottawa.ca>
Cc: Steve Merrick <SMerrick@dsel.ca>
Subject: RE: 36 Robinson Avenue - Boundary Condition Request

Hey John,

Just to follow up on my previous boundary request email, I wanted to also sent the fire flow demand using the NFPA method.

As indicated by Section 11.2.2 from the NFPA, fire flow requirements are to be determined by combining the required flow rate for the sprinkler system along with the anticipated hose stream. As indicated by Table 11.2.2.1 and Table 11.2.3.1.2 extracted from the NFPA, the anticipated fire flow requirements for the sprinkler system is 5,700 L/min. As to keep a conservative estimate for the required flow, the higher flow rate was selected from Table 11.2.2.1. The anticipated hose stream demand is 950 L/min per Table 11.2.3.1.2. As a result, the total fire flow is anticipated to be 6,650 L/min .

Table 11.2.2.1 Water Supply Requirements for Pipe Schedule Sprinkler Systems

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

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

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

Please let me know if you have any questions.

Thank you,

Genavieve Melatti
Project Coordinator/ Junior Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext. 569
email: gmelatti@DSEL.ca

From: Genavieve Melatti
Sent: Friday, December 21, 2018 10:05 AM
To: 'John.Wu@ottawa.ca' <John.Wu@ottawa.ca>
Cc: Steve Merrick <SMerrick@dsel.ca>
Subject: 36 Robinson Avenue - Boundary Condition Request

Good morning John,

Would we be able to request boundary conditions for the proposed development at 36 Robinson Avenue:

1. Location of Service / Street Number: 36 Robinson Avenue

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

- The proposed development is residential, consisting of a 9-storey apartment building; the building has a footprint of 1301 m^2 and a total floor area of 11,367m^2. The building would consist of 71 bachelor, 113 single bedroom and 15 2-bedroom apartments.
- We are proposing to connect to the existing 203 mm diameter within Robinson Avenue shown below.
- The maximum fire flow demand for the proposed development is 19,000 L/min. The calculations and parameters used in these calculations are in the attached FUS calculation sheet.
- We are looking for the boundary conditions at the proposed connection point shown below.

3.

	L/min	L/s
Avg. Daily	56.6	0.94
Max Day	203.7	3.40
Peak Hour	305.6	5.09

In accordance with City of Ottawa technical bulletin **ISDTB-2014-02**, redundant service connections will be required due to an anticipated average daily demand greater than 50 m^3/day.

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

Genavieve Melatti
Project Coordinator/ Junior Designer

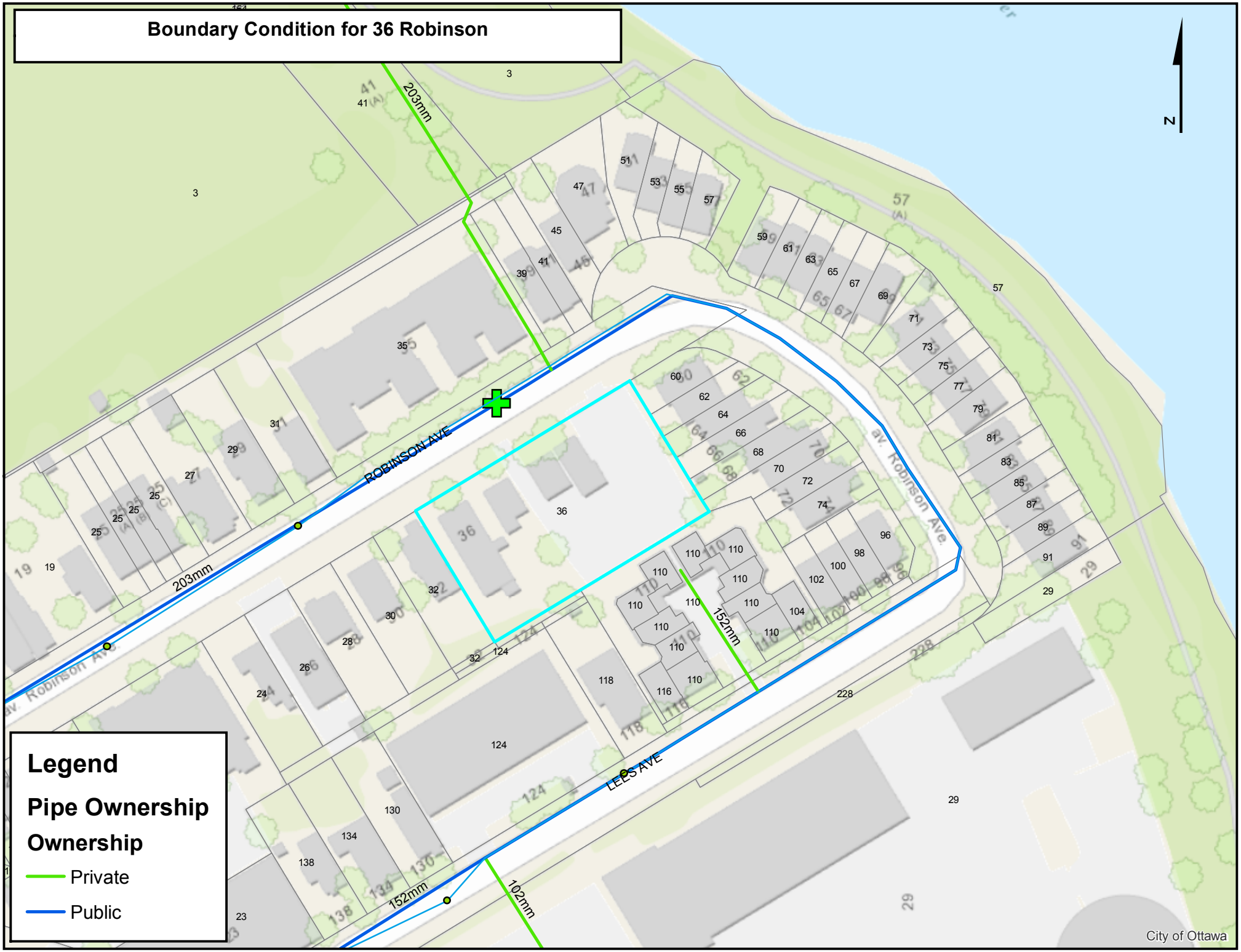
DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext. 569
email: gmelatti@DSEL.ca

'

'


Boundary Condition for 36 Robinson
N
203mm
ROBINSON AVE
203mm
av. Robinson Ave.
av. Robinson Ave.
152mm
LEES AVE
152mm
102mm
Legend
Pipe Ownership
Ownership
Private
Public
City of Ottawa

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	2	7
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	-	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	7	2.0	1.4	18.6	12.9	28.0	19.5

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 $L/m^2/d$	114	0.29	0.2	0.4	0.3	0.8	0.5
Office	75 $L/9.3m^2/d$	-	0.00	0.0	0.0	0.0	0.0	0.0
Restaurant*	125 L/seat/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			0.3	0.2	0.4	0.3	0.8	0.5
Total Demand			**2.2**	**1.6**	**19.0**	**13.2**	**28.8**	**20.0**

* Estimated number of seats at 1seat per $9.3m^2$

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	58	82
1 Bedroom	1.4	121	170
2 Bedroom	2.1	13	28
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	280	78.4	54.4	282.2	196.0	423.4	294.0

Institutional / Commercial / Industrial Demand

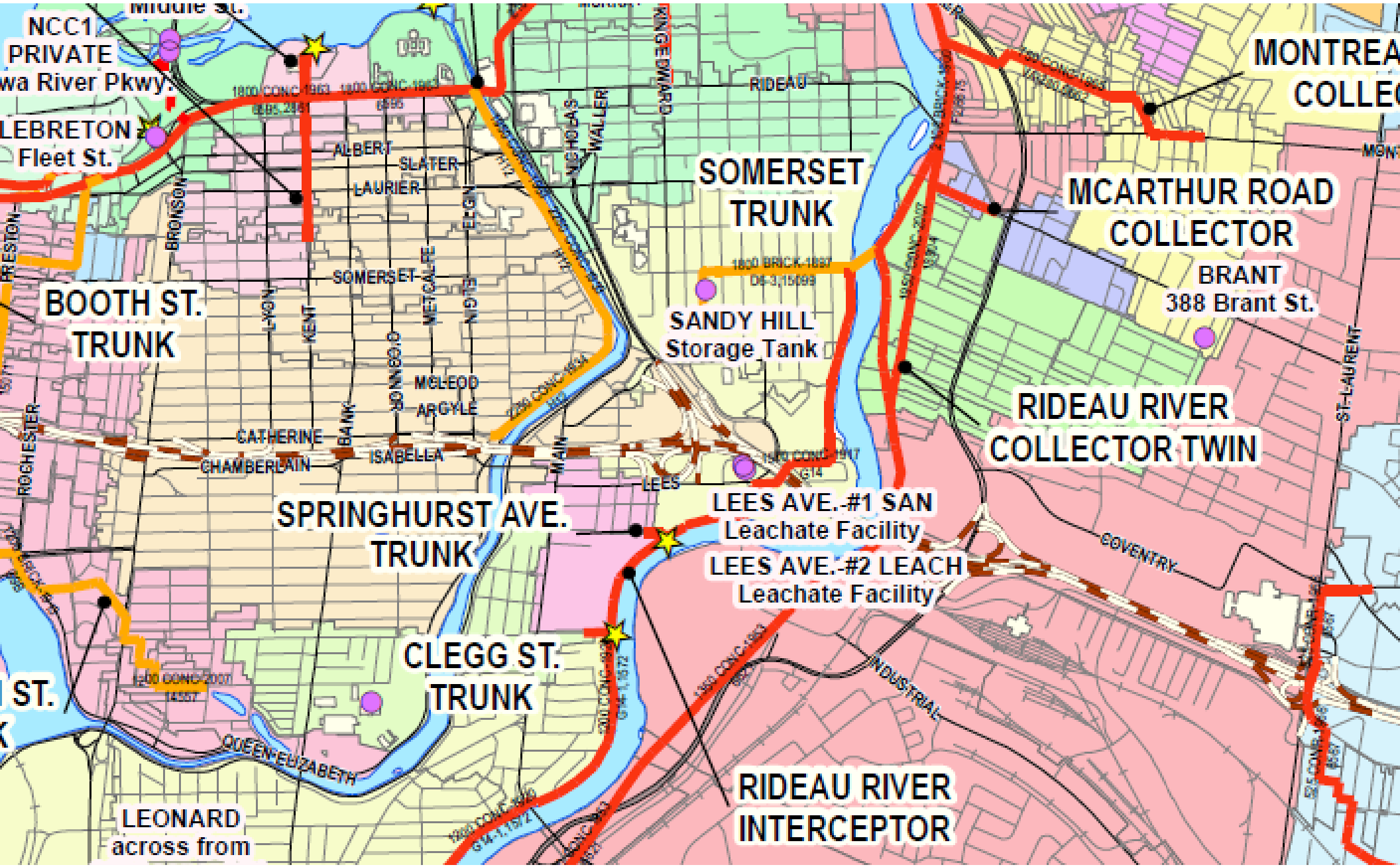
Property Type	Unit Rate	Units	Avg. Daily m^3/d	Avg. Daily L/min	Max Day m^3/d	Max Day L/min	Peak Hour m^3/d	Peak Hour L/min
Commercial floor space	2.5 $L/m^2/d$	-	0.00	0.0	0.0	0.0	0.0	0.0
Office	75 $L/9.3m^2/d$	-	0.00	0.0	0.0	0.0	0.0	0.0
Restaurant*	125 L/seat/d	-	0.00	0.0	0.0	0.0	0.0	0.0
Industrial - 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			**78.4**	**54.4**	**282.2**	**196.0**	**423.4**	**294.0**

* Estimated number of seats at 1 seat per $9.3m^2$

APPENDIX C

Wastewater Collection

Sanitary & Storm Collection System Map



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

Site Area 0.188 **ha**

Extraneous Flow Allowances

Infiltration / Inflow (Dry)	**0.01 L/s**
Infiltration / Inflow (Wet)	**0.05 L/s**
Infiltration / Inflow (Total)	**0.06 L/s**

Extraneous Flow Allowances

Infiltration / Inflow	**0.06 L/s**

Domestic Contributions

Unit Type	**Unit Rate**	**Units**	**Pop**
Single Family	3.4	2	7
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
			0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8		0

Total Pop	**7**
Average Domestic Flow	**0.02 L/s**
Peaking Factor	**3.74**
Peak Domestic Flow	**0.08 L/s**

Institutional / Commercial / Industrial Contributions

Property Type	**Unit Rate**		**No. of Units**	**Avg Wastewater (L/s)**
Commercial floor space*	28,000	L/ha/d	0.0114	0.00
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	**0.00**
Peak Institutional / Commercial Flow	0.01
Peak I/C/I Flow	**0.01**

Total Estimated Average Dry Weather Flow Rate	**0.04 L/s**
Total Estimated Peak Dry Weather Flow Rate	**0.14 L/s**
Total Estimated Peak Wet Weather Flow Rate	**0.27 L/s**

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

Site Area 0.188 **ha**

Extraneous Flow Allowances

Infiltration / Inflow (Dry)	**0.01 L/s**
Infiltration / Inflow (Wet)	**0.05 L/s**
Infiltration / Inflow (Total)	**0.06 L/s**

Extraneous Flow Allowances

Infiltration / Inflow **0.06 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
			0
Apartment			
Bachelor	1.4	58	82
1 Bedroom	1.4	121	170
2 Bedroom	2.1	13	28
3 Bedroom	3.1		0
Average	1.8		0

Total Pop **280**

Average Domestic Flow **0.91 L/s**

Peaking Factor **3.47**

Peak Domestic Flow **3.15 L/s**

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate	No. of Units	Avg Wastewater (L/s)
Dining room	125 L/seat/d		0.00
Commercial floor space	28,000.0 L/ha/d		0.00
Water Closets**	150 L/hr		0.00
Laundry Facility	1,200 L/unit/d		0.00

Average I/C/I Flow **0.00**

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

Total Estimated Average Dry Weather Flow Rate	**0.92 L/s**
Total Estimated Peak Dry Weather Flow Rate	**3.20 L/s**
Total Estimated Peak Wet Weather Flow Rate	**3.33 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	0.188	ha
C	0.40	Rational Method runoff coefficient
L	90.5	m
Up Elev	68	m
Dn Elev	66.5	m
Slope	1.7	%
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	16.0	21.71	46.5	L/s

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

Existing Drainage Charateristics EX1

Area	0.090	ha
C	0.45	Rational Method runoff coefficient
L	73	m
Up Elev	61.5	m
Dn Elev	59.75	m
Slope	2.4	%
Tc	13.5	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	65.5	88.6	151.6	mm/hr
Q	7.4	10.0	21.3	L/s

Existing Drainage Charateristics EX2

Area	0.115	ha
C	0.45	Rational Method runoff coefficient
L	20	m
Up Elev	59.5	m
Dn Elev	59	m
Slope	2.5	%
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	11.0	15.0	32.1	L/s

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

Target Flow Rate

Area	0.188	ha	
C	0.40	Rational Method runoff coefficient	
t_c	10.0	min	
	2-year		
i	76.8	mm/hr	
Q	16.0	L/s	
Ex. Sanitary Flow	0.27	L/s	*Based on 2 single family homes & 0.0114 ha of commercial building dry weather release. See Appendix C for calc
Total Combined Allowable Release	**16.27**	**L/s**	**<---- 2-Year Release (16.0 L/s) + Ex. Sanitary Flow (0.27 L/s)**
Foundation Drainage	1.04	L/s	*Based on Geotechnical foundation drainage estimation of 90m^3/day
Proposed Sanitary	3.20	L/s	*Based on an 192 proposed units, dry weather release rate. See Appendix C for Calculations
Total Allowable Stormwater Release	**13.07**	**L/s**	**<---- Total Combined Release (16.27 L/s) - Proposed Sanitary Flow (3.20 L/s)**

Estimated Post Development Peak Flow from Unattenuated Areas (U1 & U2)

Total Area	0.039	ha	
C	0.28	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	3.2	3.2	0.0	0.0	178.6	6.8	6.8	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	0.149	ha	
C	0.88	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	37.9	2.7	35.2	21.1	178.6	73.9	5.3	68.6	41.2
15	83.6	30.4	2.7	27.7	25.0	142.9	59.1	5.3	53.9	48.5
20	70.3	25.6	2.7	22.9	27.5	120.0	49.6	5.3	44.4	53.3
25	60.9	22.2	2.7	19.5	29.2	103.8	43.0	5.3	37.7	56.6
30	53.9	19.6	2.7	16.9	30.5	91.9	38.0	5.3	32.8	59.0
35	48.5	17.7	2.7	15.0	31.4	82.6	34.2	5.3	28.9	60.7
40	44.2	16.1	2.7	13.4	32.1	75.1	31.1	5.3	25.8	62.0
45	40.6	14.8	2.7	12.1	32.6	69.1	28.6	5.3	23.3	63.0
50	37.7	13.7	2.7	11.0	33.0	64.0	26.5	5.3	21.2	63.6
55	35.1	12.8	2.7	10.1	33.2	59.6	24.7	5.3	19.4	64.1
60	32.9	12.0	2.7	9.3	33.4	55.9	23.1	5.3	17.9	64.3
65	31.0	11.3	2.7	8.6	33.5	52.6	21.8	5.3	16.5	64.5
70	29.4	10.7	2.7	8.0	33.5	49.8	20.6	5.3	15.3	64.5
75	27.9	10.2	2.7	7.4	33.4	47.3	19.6	5.3	14.3	64.3
80	26.6	9.7	2.7	6.9	33.3	45.0	18.6	5.3	13.4	64.1
85	25.4	9.2	2.7	6.5	33.2	43.0	17.8	5.3	12.5	63.8
90	24.3	8.8	2.7	6.1	33.0	41.1	17.0	5.3	11.8	63.5
95	23.3	8.5	2.7	5.8	32.8	39.4	16.3	5.3	11.1	63.0
100	22.4	8.2	2.7	5.4	32.5	37.9	15.7	5.3	10.4	62.6
105	21.6	7.9	2.7	5.1	32.3	36.5	15.1	5.3	9.8	62.0
110	20.8	7.6	2.7	4.8	32.0	35.2	14.6	5.3	9.3	61.4

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)

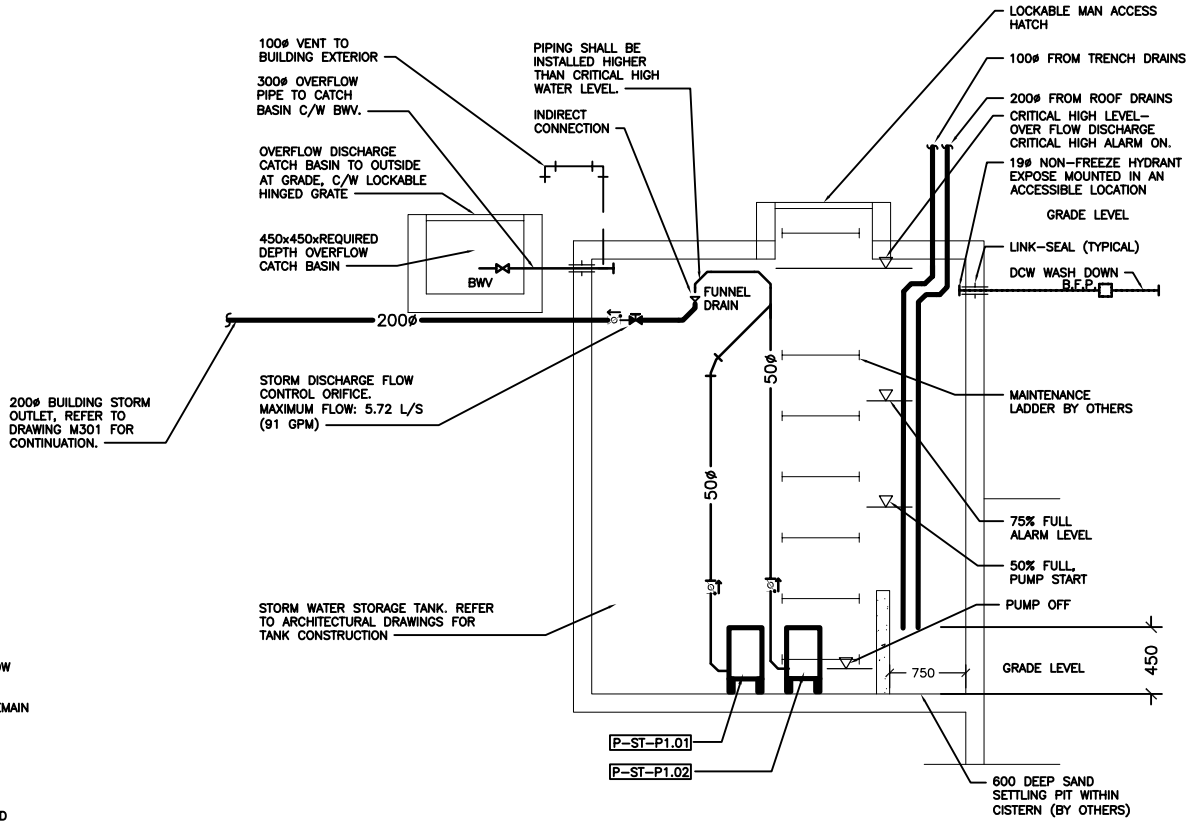
5-year $Q_{attenuated}$	**2.73 L/s**	**100-year $Q_{attenuated}$**	**5.26 L/s**
5-year Max. Storage Required	**33.5 m^3**	**100-year Max. Storage Required**	**64.5 m^3**

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	3.16	0.00	6.77	0.00
Foundation Drainage	1.04	0.00	1.04	0.00
Attenuated Areas	2.73	33.46	5.26	64.46
Total	**6.93**	**33.46**	**13.07**	**64.46**

									Ditch Data												
Up	**Down**	**Area**	**C**	**Indiv AxC**	**Acc AxC**	**T_C**	**I**	**Q**	**depth**	**Side Slope**	**Bot. Width**	**Mannings**	**Slope**	**Length**	**A_{flow}**	**Wet. Per.**	**R**	**Velocity**	**Qcap**	**Time Flow**	**Q / Q full**
		(ha)	**(-)**			**(min)**	**(mm/hr)**	**(L/s)**	**(mm)**	**(X:1)**	**(m)**	**n**	**(%)**	**(m)**	**(m^2)**	**(m)**	**(m)**	**(m/s)**	**(L/s)**	**(min)**	**(-)**
U1		0.011	0.30	0.00	0.00																
EX1		0.091	0.45	0.05	0.06	13.5	151.6	23.3	150	3	0	0.03	2.00	25	0.068	0.949	0.07	0.81	54.6	0.5	0.43
@ Intake*				0.00	0.06	14.0	148.4	22.8	150	3	0	0.03	1.50	10	0.068	0.949	0.07	0.35	23.7	0.5	0.96
EX2		0.115	0.45	0.05	0.05	10.0	178.6	25.7	150	3	0	0.03	0.50	53	0.068	0.949	0.07	0.40	27.3	2.2	0.94
U2		0.015	0.25	0.00	0.06	12.2	160.8	24.8	150	3	0	0.03	0.60	33	0.068	0.949	0.07	0.44	29.9	1.2	0.83

* 50% Swale Capacity to account for Parking Garage Intake



NOTES:

1. PROVIDE AND INSTALL PUMP CONTROL PANEL, FLOW LEVEL SWITCH AND SET ALARM LEVELS AS INDICATED.

2. SET OFF SWITCH TO ALLOW PUMP SUCTION TO REMAIN UNDER WATER AT ALL TIMES OR PUMP MAY BECOME AIR-LOCKED.

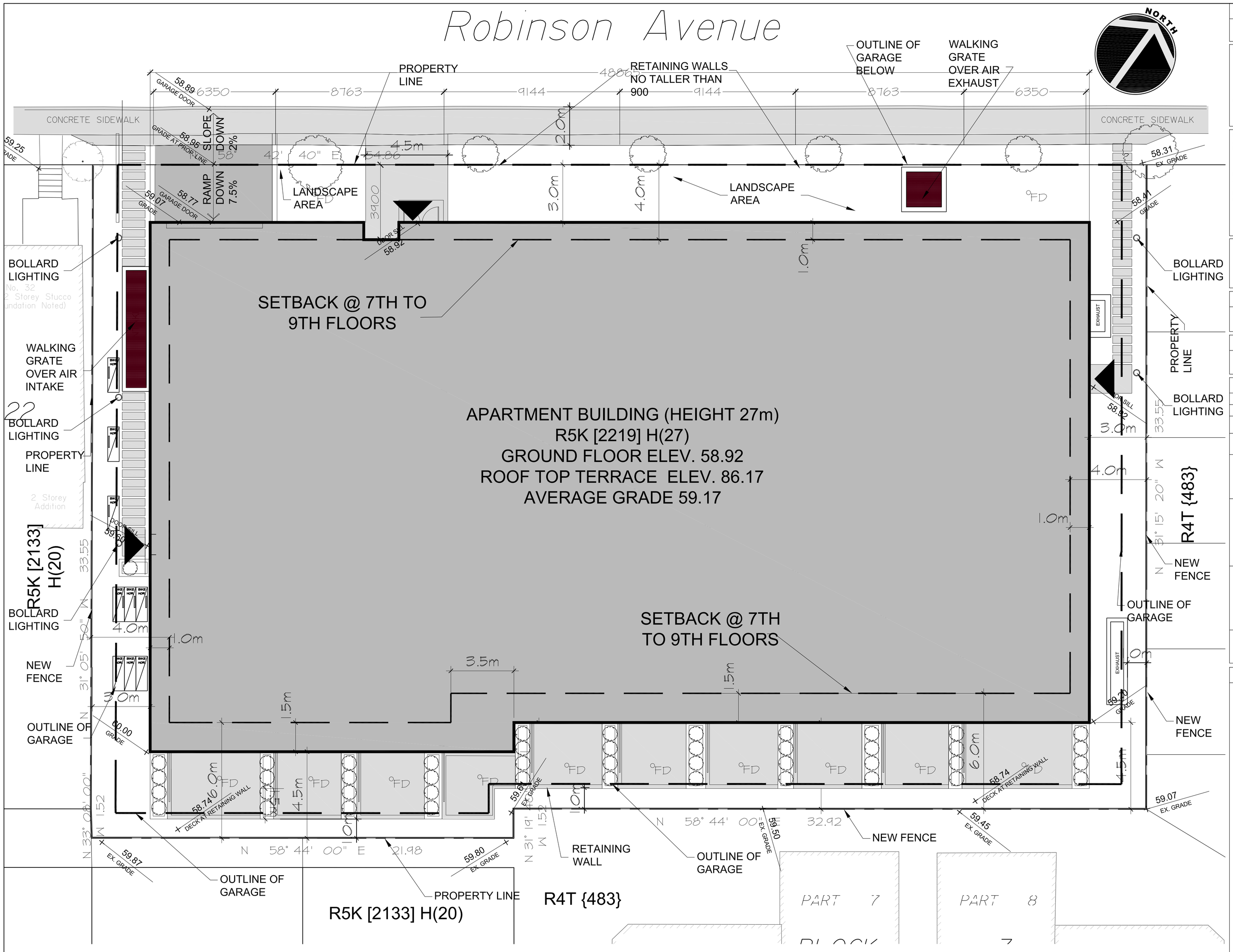
3. SET ON SWITCH TO ALLOW PUMP TO OPERATE A MINIMUM OF 2 MINUTES PER CYCLE.

4. PUMP MAXIMUM DISCHARGE RATE TO STORM MAIN SHALL BE RESTRICTED BY FLOW CONTROL DEVICE AND NOT EXCEED LIMIT DEFINED BY CIVIL ENGINEERING.

5. BUILDING BAS SHALL MONITOR PUMP OPERATION AND ALL ALARM LEVELS. REFER TO SEQUENCE OF OPERATION OF BAS SYSTEM FOR DETAIL.

5 CISTERN TANK CONNECTION DETAIL

DRAWINGS / FIGURES



1 SITE PLAN
SP-1 1:100

SITE DATA

SITE STATISTICS

GROSS FLOOR AREA 11,367m²

LOT COVERAGE TOTAL LOT AREA:	1,875m²	
TOTAL GROSS BUILDING AREA: TOTAL LOT COVERAGE	1,294m² 69%	REQUIRED VARIANCES • PARKING REDUCTION FROM 108 TO 71
TOTAL HARD LANDSCAPING AREA: TOTAL LOT COVERAGE DRIVEWAY NOT INCLUDED	351m² 18.72%	
TOTAL SOFT LANDSCAPING AREA: TOTAL LOT COVERAGE	243m² 13%	

PARKING (PARKING PROVISIONS 2008-250 SECTION 100-114)

USE	REQUIRED	PROVIDED
MID-RISE APT. UNITS 192	(192-12)x.5=90 Parking Space / Dwelling Unit	Parking 53
Visitor Parking	(192-12)x.1=18 Visitor Parking	Visitor Parking 18
PARKING SPACES	Spaces/Dwelling Total Required= 108	Total Provided = 71
BICYCLE PARKING	REQUIRED 0.5 x 192 UNITS = 96 SPACES	PROVIDED 102 SPACES PROVIDED 48 HORIZ. @ 45 VERT. SPACES 9 OUTDOOR SPACES 50 WITH STACKING IF HORIZ. ARE STACKED

SOLID WASTE STORAGE & DISPOSAL

APARTMENT REQUIRED:		APARTMENT PROVIDED:	
GARBAGE STORAGE COMPACTED	- 5x4 yd.	GARBAGE STORAGE COMPACTED	- 5x4 yd.
FIBRE (PAPER) STORAGE	- 3x4 yd.	FIBRE (PAPER) STORAGE	- 3x4 yd.
G.M.P. STORAGE	- 1x3 yd.	G.M.P. STORAGE	- 1x3 yd.
GREEN WASTE STORAGE	- 4x240 L	GREEN WASTE STORAGE	- 4x240 L

SURVEY INFORMATION

PLAN OF SURVEY OF PART OF LANE (ADJACENT TO LOTS 15, 16, 18, 19, 21 AND 22) REGISTERED PLAN 190 CITY OF OTTAWA

GRAPHIC SCALE 1 : 100

1m 2m 3m 4m 5m 10m

SITE STATISTICS

PLANNED UNIT DEVELOPMENT ZONING MECHANISM

ZONING: R5K [2218] H(27)

DWELLING TYPE: MID RISE APARTMENT (191 UNITS)	REQUIRED	PROPOSED
MIN. WIDTH OF PRIVATE DRIVEWAY	6.0m	6.0m
MIN. WIDTH OF DRIVE AISLE WIDTH	6.0m	6.0m
	STOREY SETBACK REQUIRED	STOREY SETBACK PROVIDED
SETBACKS (AS PER ZONING MAP)	to 6 7 to 9	to 6 7 to 9
FRONT YARD - NORTH	3.0m 4.0m	3.0m 4.0m
INTERIOR SIDE YARD - EAST	3.0m 4.0m	3.0m 4.0m
INTERIOR SIDE YARD - WEST	3.0m 4.0m	3.0m 4.0m
REAR YARD - SOUTH	4.5m 6.0m	4.5m 6.0m
MIN. LOT WIDTH	15.0m	54.83m
MIN. LOT AREA	450m²	1,875m²
MAX. BUILDING HEIGHT	27m	27m
MAX. FLOOR SPACE INDEX	2.0	1.48m
MIN. PERCENTAGE OF LANDSCAPED AREAS	30%	31.68%
ABUTTING A STREET (m)	NO MIN.	NO MIN.
OTHER CASES (m)	NO MIN.	NO MIN.
MIN. TOTAL AMENITY AREA (m²) APARTMENT OF 9 STOREYS AND 191 UNITS	6m² PER DWELLING 1,146m²	2,112m²
	50% OF THE REQUIRED TOTAL AMENITY COMMUNAL	
MIN. COMMUNAL AMENITY AREA (m²)		1,118m²
PERMITTED PROJECTIONS PROVISIONS IN THE CASE OF ANY YARDS	1.5m BUT NO CLOSER THAN 1m TO LOT LINE	1.5m BUT NO CLOSER THAN 1m TO LOT LINE
DRIVEWAY SLOPE FIRST 6 METRES DUE TO SLOPE GREATER AND 6% DRIVAWAY WILL NEED TO BE HEATED.	MAX 6%	7.5%

CONSULTANTS

ARCHITECT
HOBIN ARCHITECTURE INC.
63 PAMILLA STREET,
OTTAWA, ON K1S 3K7

CONTACT:
BILL RITCEY
TEL. 613-236-7200
FAX. 613-265-2005

CIVIL ENGINEER
DSEL
120 IBER RD, STITTSVILLE,
ON K2S 1E9

CONTACT:
STEVE MERRICK
TEL. 613-836-0856

TRAFFIC PLANNING
CGH TRANSPORTATION
OTTAWA, ON

CONTACT:
ANDREW HARTE
TEL. 613-647-3747
EMAIL:
ANDREWHARTE@CGHTRANSPORTATION.COM

URBAN PLANNING
FOTENN
223 MCLEOD ST
OTTAWA, ON K2P 0Z8

CONTACT:
JAMIE POSEN
TEL. 613-730-5709
FAX. 613-730-1136

GEOTECHNICAL
GHD.
174 COLONNADE ROAD #400,
OTTAWA, ON K2E 7J4

CONTACT:
BAHAREH VAZHBAKHT
TEL. 613-727-0510
FAX. 613-XXX-XXXX

SURVEYOR
ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 CONCOURSE GATE, SUITE 500
OTTAWA, ON K2E 7S6

CONTACT:
V. ANDREW SHELP
TEL. 613-727-0850
FAX. 613-727-1079

LANDSCAPE ARCHITECT
JAMES B. LENNOX & ASSOCIATES INC.
1419 CARLING AVENUE
OTTAWA, ON K1Z 7L6

CONTACT:
JAMES LENNOX
TEL. 613-722-5168
FAX. 1-866-343-3442

SOUND & WIND
GRADIENT WIND ENGINEERING INC.
127 WALGREEN RD, CARP, ON K0A 1L0

CONTACT:
Joshua Foster
613-836-0434

no.	date	revision
12	19/11/25	REV. FOR SITE PLAN CONTROL
11	19/11/22	ISSUED FOR REVIEW
10	19/11/15	REV. FOR SITE PLAN CONTROL
9	19/10/23	REV. FOR SITE PLAN CONTROL
8	19/08/12	REV. FOR SITE PLAN CONTROL
7	19/07/30	REV. FOR SITE PLAN CONTROL
6	19/03/07	ISSUED FOR SITE PLAN CONTROL
5	19/03/05	ISSUED FOR CONSULTANT REVIEW
4	19/02/28	ISSUED FOR CONSULTANT REVIEW
3	19/02/26	ISSUED FOR CONSULTANT REVIEW
2	19/02/25	ISSUED FOR CONSULTANT REVIEW
1	19/01/30	ISSUED FOR CONSULTANT REVIEW

Hobin Architecture Incorporated
63 Pamilla Street
Ottawa, Ontario
Canada K1S 3K7
T: 613-238-7200
F: 613-235-2005
E: mail@hobinarc.com
hobinarc.com
HOBIN ARCHITECTURE

project title
ROBINSON VILLAGE
APARTMENT BUILDING
39 ROBINSON AVENUE
OTTAWA, ONTARIO

drawing title
SITE PLAN

drawn	date	scale
KG	JAN. 10/2019	1:100

project 1834

drawing no. SP-1

revision no.

ONTARIO ASSOCIATION OF ARCHITECTS
DARRYL J. HOBIN
LICENCE 3049

D07-12-19-0044

17908

SURVEYOR'S REAL PROPERTY REPORT

PART 1 Plan of

LOTS 7, 10, 13, 16 AND 19 AND PART OF LANE

As Closed By By-Law 2009-180
Instrument OC1061652
(ADJACENT TO LOTS 16 AND 19)
REGISTERED PLAN 190
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, the Surveyors Act and the Land Titles Act and the regulations made under them.
2. The survey was completed on the 7th day of January, 2019.

Jan 9/19
Date

V. Andrew Shelp
Ontario Land Surveyor

PART 2
THIS PLAN MUST BE READ IN CONJUNCTION WITH SURVEY REPORT DATED: January 9, 2019

ANNIS, O'SULLIVAN, VOLLEBEKK LTD. grants to TC United ("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
IB	"	Iron Bar
IBØ	"	Round Iron Bar
(WIT)	"	Witness
Meas.	"	Measured
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
(P1)	"	Registered Plan 190
(P2)	"	Plan 4R-23618
(P3)	"	(990) Plan January 14, 2015
(P4)	"	(AOG) Plan April 23, 1984
(P5)	"	Plan 4R-13539
	"	Deciduous Tree
	"	Coniferous Tree
FH	"	Fire Hydrant
WV	"	Water Valve
SP	"	Water Stand Post
MH–ST	"	Maintenance Hole (Storm Sewer)
MH-S	"	Maintenance Hole (Sanitary)
MH	"	Maintenance Hole (Unidentified)
CB	"	Catch Basin
W	"	Underground Water
OHW	"	Overhead Wires
PO–W	"	Wood Pole
CLF	"	Chain Link Fence
BF	"	Board Fence
FP	"	Flag Pole
Ø	"	Diameter
+ 65.00	"	Location of Elevations
+ 65.00*	"	Top of Concrete Curb / CRW Elevation
C/L	"	Centreline
CRW	"	Concrete Retaining Wall
M-W	"	Monitoring Well

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2078286

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR In accordance with Regulation 1026, Section 29 (3).

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.

Bearings are grid, derived from GPS Observations and are referred to the Central Meridian of MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

For bearing comparisons, a rotation of 0°2'10 clockwise was applied to bearings on plan P2

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com
Ontario Land Surveyors

Job No. 18072-18 Pt Lts 7, 10, 13, 16 & 19 PL 190 T F | FS

Y:\2018\18072-18\PJ\MU\18072-18 PLTS 7, 10, 13, 16 & 19 PL 190 T F.dwg