

# TECHNICAL MEMORANDUM

---

**DATE:** JANUARY 2018 (REVISED SEPTEMBER 2018)  
**TO:** MURRAY CHOWN  
**FROM:** CARA RUDDLE  
**RE:** BYRON / RAVENHILL AVENUE REZONING

---

Novatech has been retained to review the adequacy of existing services for the re-zoning of the properties at 556-576 Byron Avenue, 430-440 Roosevelt Avenue and 411-431 Ravenhill Avenue within the City of Ottawa. Refer to **Figure 1** – Key plan for the site location. The subject site consists of 9 existing lots with a total area of approximately 0.548 ha. Currently, eight of the nine lots are developed with residential dwellings and a commercial development (Westboro Dental Center). Refer to **Figure 2** – Existing Conditions. The rezoning would allow for the severance of 9 existing lots to create 18 lots for the construction of 18 low-rise residential apartment buildings. Each building would be limited to 3 storeys and a maximum of 4 units with an approximate footprint of 1500sqft. Refer to **Figure 3** – Potential Development Plan.

This technical memorandum is being submitted in support of a rezoning application. The memo will review the water, sanitary and storm servicing requirements for the potential development of 18 low-rise apartment buildings and will provide an analysis on the existing infrastructure surrounding the site to ensure there is adequate capacity.

## **Water Servicing**

There is an existing public 150mm diameter watermain within the Byron, Roosevelt and Ravenhill Avenue right-of-way's. The existing 150mm diameter watermain currently services the existing residential and commercial developments on the subject site. It is proposed to service the potential 18 low-rise apartment buildings directly from the existing watermain along Byron and Ravenhill Avenue. Refer to **Figure 4** – Existing Services Figure. The water demands for the potential development were calculated and provided to the City to obtain boundary conditions to confirm serviceability. The domestic water demand calculations are based on a theoretical population for the potential development based on criteria provided in the City of Ottawa Water Design Guidelines. The required fire flow was calculated using the Fire Underwriter's Survey method and is based on a 3-storey above ground wood frame construction. The water demand calculations, boundary conditions and hydraulic analysis calculation for the existing public infrastructure are provided in **Appendix A** for reference. The results of the hydraulic analysis are summarized below in **Table 1**.

Table1: Water Analysis Results Summary

Condition	Street	Demand (L/s)	Min/Max Allowable Operating Pressures (psi)	Limits of Design Operating Pressures (psi)
High Pressure	Ravenhill / Byron	0.62	80psi (Max)	67.3
Maximum Daily Demand and Fire Flow	Ravenhill	152.67	20psi (Min)	24.5
	Byron	152.67		23.3
Peak Hour	Ravenhill / Byron	4.01	40psi (Min)	58.0

The results of the water analysis show there is adequate flow and pressure in the existing 150mm watermain in Byron Avenue and Ravenhill Avenue to meet the required domestic demands and pressures for fire flow.

**Sanitary Servicing**

There is an existing 225mm and 300mm diameter sanitary sewer in Ravenhill Avenue and a 450mm diameter sanitary sewer in Byron Avenue. The total sanitary flows from the existing development is calculated to be 2.81 L/s. It is proposed to service the potential 18 low-rise apartment buildings directly from the existing sewers in Ravenhill and Byron Avenue. Refer to **Figure 4 – Existing Services Figure**. The sanitary flows generated by the potential development are calculated to be 2.48 L/s (calculations below). There is a total decrease in sanitary flow of 0.33 L/s in the proposed condition. This is due to the City of Ottawa requirement for fully separated systems in all new developments.

Existing Development Flows

Number of Existing Single-Family Units = 8units  
 Population = 8 units x 3.4 people/unit = 28 people  
 Residential Peaking Factor = 3.6 (Harmon Formula)  
 Domestic Sanitary Flow = (280L/person/day x 28 people) / 86400 sec/day x 3.6 = 0.33 L/s

Institutional Area = 0.06ha  
 Institutional Peaking Factor = 1.5  
 Domestic Sanitary Flow = (50000L/ha/day x 0.06ha) / 86400 sec/day x 1.5 = 0.05 L/s

Foundation drain allowance for unseparated systems = 3 L/s/ha  
 Site Drainage Area = 0.81 ha  
 Foundation Drainage = 3 L/s/ha x 0.81 ha = 2.43 L/s

Total Existing Sanitary Flow = 0.33 + 0.05 + 2.43 = **2.81 L/s**

Potential Development Flows

Number of 2 Bedroom Units = 18 buildings x 4 units/building = 72 units  
 Population = 72 units x 2.1 people/unit = 152 people  
 Residential Peaking Factor = 3.6 (Harmon Formula)  
 Domestic Sanitary Flow = (350L/person/day x 152 people) / 86400 sec/day x 3.6 = 2.21 L/s

Extraneous flow allowance = 0.33 L/s/ha  
Site Drainage Area = 0.81ha  
Extraneous Flow = 0.33 L/s/ha x 0.81ha = 0.27 L/s

Total Potential Development Sanitary Flow = 2.21 + 0.27 = **2.48 L/s**

A downstream analysis of the 525mm diameter sanitary trunk sewer to the west of the Byron and Golden Avenue intersection was completed to confirm the capacity in the existing sanitary system. The sanitary sewer design sheets for the existing and proposed conditions and drainage area figures are provided in **Appendix B** for reference.

A review of the downstream analysis, in the existing condition, shows that the one section of the 300mm diameter sanitary sewer in Ravenhill Avenue is at capacity (96.3% full). The remainder of the sanitary sewer system has excess capacity. The total peak design flows are not likely indicative of the actual flows since the flows generated in the spreadsheets assume that the entire drainage area is serviced by a non-separated system. As per the City of Ottawa Sewer Design Guidelines the sanitary analysis incorporates a 3.0 L/s/ha foundation drain allowance for existing developments where there is potential for partially separated systems.

In the proposed condition, the total peak design flow to the 300mm diameter sewer in Ravenhill Avenue is reduced by 0.33 L/s since the potential development will require a separated foundation drain system. Therefore, since the potential development decreases the flows from the existing condition, there are no concerns that the potential development flows will have any adverse effects on the existing infrastructure.

### **Storm Servicing & Stormwater Management**

There is an existing 675mm diameter storm sewer along the north side of the Byron Avenue and an existing 900mm diameter storm sewer along Ravenhill Avenue to the west of the potential development. There is no existing storm sewer in Ravenhill Avenue fronting the potential development. Refer to **Figure 4** – Existing Services Figure. The potential development foundation drainage is required to have full separation from the sanitary system. This will require all new development in the Ravenhill area to utilize sump pumps to the surface for foundation drainage.

Through the site plan approval process stormwater management will be required on a site by site basis. Quality control requirements should be confirmed with the Conservation Authority during detailed design. Quantity control will be required to meet pre-development conditions for the site.

**Conclusion**

Based on the foregoing, the existing sanitary sewer and watermain infrastructure have capacity to service the potential development. Stormwater management, including quantity and quality control of stormwater will be required on a site by site basis.

**NOVATECH**

Prepared by:

Reviewed by:



Matthew Hrehoriak, P.Eng  
Project Engineer



Cara Ruddle, P.Eng.  
Senior Project Manager

**List of Appendices:**

- Appendix A: Water Calculations
- Appendix B: Sanitary Calculations