



**Kollaard Associates**

Engineers

210 Prescott Street, Unit 1

P.O. Box 189

Kemptville, Ontario K0G 1J0

Civil • Geotechnical •  
Structural • Environmental •  
Hydrogeology

(613) 860-0923

FAX: (613) 258-0475

---

**Serviceability Brief**

Proposed Institutional Development  
82 Colonnade Road  
Ottawa, Ontario

Prepared For:  
Redeemer Christian High School  
82 Colonnade Road  
Ottawa, Ontario  
K2E 7L2

PROJECT #: 250483

DISTRIBUTION

City of Ottawa

Redeemer Christian High School

Kollaard Associates Inc.

Rev 0 – Issued for Site Plan Approval

March 19, 2026



**Professional Engineers**  
Ontario

Authorized by the Association of Professional Engineers  
Of Ontario to offer professional engineering services



**TABLE OF CONTENTS**

1 INTRODUCTION..... 3

2 Building Occupancy..... 3

3 SANITARY DESIGN ..... 4

    3.1 Design Flows ..... 4

    3.2 Sanitary Service Lateral..... 5

    3.3 Sufficiency of Existing Municipal Sanitary Sewer ..... 5

4 WATER SERVICE AND WATER DEMAND ..... 5

    4.1 Domestic Water Demand ..... 6

    4.2 Fire Flow Requirement ..... 6

        4.2.1 Calculation Procedure ..... 6

        4.2.2 Building Considerations ..... 6

        4.2.3 Fire flow Requirements ..... 7

    4.3 Preliminary Sprinkler Flow Allowance ..... 7

    4.4 Water Demand Summary ..... 8

    4.5 Boundary Conditions ..... 8

    4.6 Water Service Requirements and Pressure Loss Calculations..... 8

    4.7 Existing Fire Hydrants ..... 10

5 STORMWATER MANAGEMENT DESIGN ..... 11

6 CONCLUSIONS..... 11

**APPENDIX**

- Appendix A – Correspondence With Principal Regarding Occupancy
- Appendix B – Fire Flow Requirements Calculation
- Appendix C – Correspondence with the City of Ottawa



## 1 INTRODUCTION

This brief has been prepared in support of a site plan control application to the City of Ottawa to construct a two storey school addition to the north side of the gym and a one storey school addition to the north side of the school building on the property at 82 Colonnade Road, City of Ottawa. The property is located on the south side of Colonnade Road immediately south of the intersection of Citiplace Drive and Colonnade Road.

The existing site is currently occupied by a two storey building with an attached single storey gym. The building is of concrete and masonry construction. The existing school building is serviced with asphaltic surfaced roadways and parking areas. The existing building is provided with water and sanitary services from Colonnade Road. The existing water service is located about 10 metres east of the west property line and enters the school at the south end of the west side of the building. The existing sanitary service is located about 65 m east of the west property line and enters the school building on the north side of the existing gym. Runoff collected on site by the existing stormwater management works is directed by a storm sewer which is located parallel to the existing sanitary sewer and passes beneath the existing gym.

The proposed development will include a two storey school addition to the north side of the gym having a plan area of 695 m<sup>2</sup> and a one storey school addition to the north side of the school building having a plan area of 127 m<sup>2</sup>. The development will include internal renovations to the existing building. The school building includes change rooms with showers and has a cafeteria.

The proposed additions to the building will be serviced by the existing sanitary and water services. The portion of the existing storm sewer which passes under the gym will be abandoned and the storm sewer will be relocated around the east side of the proposed addition. The relocated storm sewer will reconnect to the existing storm sewer within the limits of the site.

This brief presents a description of the proposed servicing and an analysis of the adequacy of the existing sanitary sewers and water main to accommodate the sewer and water demands associated with the proposed development. This brief also presents a summary of the stormwater management requirements for the site.

## 2 Building Occupancy

Based on communication received from the principal (attached in Appendix A), the anticipated occupancy of the school upon completion of the additions and renovations is 300 students with a maximum of 320 students.

The maximum occupancy of the school was also considered based on the Ontario Building Code occupancy loads allowed under Section 3.1.17 for classrooms, labs, school shops and vocational rooms and offices. The following Table 2.1 provides a summary of the calculations:



Table 2.1 - Summary of Occupancy Calculations

Type of Use	Area Per Person (m <sup>2</sup> /person)	Total Area (m <sup>2</sup> )	Number of Persons*
Classrooms	1.85	1030	557
Laboratories	4.6	265	58
Shops and Vocational Rooms	9.3	410	45
Total Students			660
Offices (Staff)	9.3	320	35
Total			695

\* rounded up to the nearest whole number

### 3 SANITARY DESIGN

Sewage discharges will be domestic in type and in compliance with the City of Ottawa Sewer Use By-law. The sanitary sewage flow for the building including the additions was calculated based on the City of Ottawa Sewer Design Guidelines (as modified by the Technical Bulletins) and Ontario Building Code (OBC Table 8.2.1.3A).

OBC Table 8.2.1.3A indicates that the total daily sanitary sewage from for a school is calculated based on the following:

90 L/day per student with shows and cafeteria

50 L/day for non-teaching staff

#### 3.1 Design Flows

##### Institutional

	<i>Pop</i>	<i>Volume</i>	<i>L/day</i>	<i>L/sec</i>
<i>Students</i>	660:	90	59,400	0.688
<i>Staff</i>	35:	50	1,750	0.020
<i>Total</i>			61,150	0.708

Peaking Factor = 1.5

$$Q_{\text{Peak Domestic}} = 0.708 \text{ L/sec} \times 1.5 = 1.06 \text{ L/sec}$$

##### Infiltration

$$Q_{\text{Infiltration}} = 0.33 \text{ L/ha/sec} \times 1.21 \text{ ha} = 0.40 \text{ L/sec}$$



Total Peak Sanitary Flow =  $1.06 + 0.40 = 1.46\text{L/sec}$

### 3.2 Sanitary Service Lateral

The existing sanitary service lateral for the building consists of a 200 mm diameter sewer sloped at 0.68% and connected to the existing 250 mm diameter Vitrified clay pipe municipal sanitary sewer along Colonnade Road.

The maximum peak sanitary flow for the building is 1.46 L/sec. The Ontario Building Code specifies minimum pipe size and maximum hydraulic loading for sanitary sewer pipe. OBC 7.4.10.8 (2) states "Horizontal sanitary drainage pipe shall be designed to carry no more than 65% of its full capacity." The capacity of the 200 mm diameter PVC sanitary sewer lateral at a slope of 0.68% is 27.1 L/sec. Since  $0.65 \times 27.1 = 17.6\text{ L/s}$  is much greater than 1.46 L/sec the existing 200 mm diameter sanitary sewer service lateral will be sufficient to accommodate the proposed addition.

### 3.3 Sufficiency of Existing Municipal Sanitary Sewer

The existing sanitary service lateral for the building consists of a 200 mm diameter sewer connected to the existing 250 mm diameter Vitrified clay pipe municipal sanitary sewer along Colonnade Road. The section of sanitary sewer along Colonnade Road that receives the flow from the site begins at sanitary maintenance hole MHSA17906 approximately 10 metres west of the sanitary servicing connection. The 250 mm diameter sewer has a slope of 0.55% and a capacity of 44.1 L/s. There is no other sanitary contribution to this section of sanitary sewer. The 250 mm diameter sewer discharges to a 375 mm diameter sewer at MHSA17905 approximately 47 metres east or downstream of the 200 mm sanitary service connection. The 375 mm diameter sewer in turn discharges to a 2250 mm trunk sewer 33 metres downstream of MHSA17905.

The slope of the 375 mm diameter sewer varies from 0.12% (upstream sewer) to 0.3% which represents an increase in capacity of approximately 35 L/sec. Since the peak flow from the site is 1.46 L/s which is significantly less than the capacity of the 250 mm diameter pipe and the increase in capacity of the 375 mm diameter pipe, there is sufficient capacity within the municipal sewer system for the sanitary flow from the site.

## 4 WATER SERVICE AND WATER DEMAND

The existing water lateral consists of a 150 mm diameter ductile iron water main which enters the west side of the building approximately 7 metres from the south side of the building. The proposed addition will be serviced from the existing connection.



## 4.1 Domestic Water Demand

The demand type for the existing building and proposed additional is considered to be institutional – school for the purposes of the City of Ottawa Water Distribution design guidelines. From Table 4.2 the consumption rate is 70 L/student/day. Based on the number of students and location of the proposed development, it is considered that the proposed development is within a subdivision having more than 501 persons so Table 4.2 is considered to be applicable.

The average or basic daily flow was calculated as follows:

$$(650 \text{ students} + 35 \text{ Staff}) \times 70 \text{ Litres/capita/day} = 48.65 \text{ m}^3/\text{day} = 0.563 \text{ L/sec}$$

Maximum Daily Demand

$$0.563 \text{ L/sec} \times 1.5 = 0.845 \text{ L/sec}$$

Peak Hourly Demand

$$0.84 \text{ L/sec} \times 1.8 = 1.52 \text{ L/s}$$

Since the average or basic daily water demand is less than 50 m<sup>3</sup>/day only one service connection is permitted. As such the fixtures within the proposed additions must be connected internally and must receive water from the existing service connection.

## 4.2 Fire Flow Requirement

### 4.2.1 Calculation Procedure

The fire flow requirement was calculated for the proposed buildings to ensure that there is adequate flow available to put out a fire within the proposed building should it occur. The fire flow calculation determines the minimum water flow or volume required to be available for firefighting purposes to be used by firefighters. In accordance to City of Ottawa Technical Bulletin ISTB-2021-03, the fire flow requirement calculation for private property is to first consider the Ontario Building Code (OBC). If the fire protection requirement from the OBC yields a fire flow greater than 9,000 L/min then the Fire Underwriters Survey (FUS) shall be used to determine the Fire Flow Demand.

It is noted that the OBC calculation provided a fire flow demand of 6,300 L/min however, calculations using the FUS method were also completed for comparison and verification.

### 4.2.2 Building Considerations

Building Considerations

- Occupancy: Group A, Division 2, Sprinklered.
- Number of Number of Storeys:
  - School Building – 2



- Gym – 1 tall storey
- Footprint:
  - School First Floor = 2302 m<sup>2</sup>
  - School Second Floor = 2175 m<sup>2</sup>
  - Gym = 750 m<sup>2</sup>
- Construction:
  - School - Masonry Wall and Concrete Floors
  - Gym – Masonry Walls, Wood floor over Concrete Floor
- Construction Type – Non-combustible construction
- Location of Services: Colonnade Road North

### 4.2.3 Fire flow Requirements

As previously indicated, fire flow demand calculations were completed using both the OBC and the FUS methods even though the OBC method yielded a fire flow requirement below 9,000 L/min.

The fire flow calculations for both methods are included in Appendix B. The results of the calculations are summarized in the following Table 4.1:

Table 4.1 Summary of Fire Flow Demand Requirements

Calculation Method	Fire Flow Demand (L/sec)
FUS	100
OBC	105

### 4.3 Preliminary Sprinkler Flow Allowance

The sprinkler flow allowance is ultimately determined by the Mechanical Engineer during design for building permit purposes. However, at this time no mechanical engineer has been retained. For the purposes of verifying the adequacy of the available water supply and the required building service size, the sprinkler flow allowance has been determined in keeping with NFPS 13 Chapter 19.2.3.

From Annex A of NFPA 13, the school building occupancy classification is Light hazard. From table 19.2.3.1.1 the minimum sprinkler water supply is 0.1 gpm /ft<sup>2</sup> using a minimum area of 1500 ft<sup>2</sup> or 4.1mm/min using a minimum area of 140 m<sup>2</sup>. As previously indicated, the building footprint ranges from 2175 m<sup>2</sup> for the second floor to 3062 m<sup>2</sup> and the ground floor and gym combined.

Assuming that the sprinkler system will be designed to limit the sprinkler discharge to the area affected by a fire, the water demand area will be limited to one class room, office area, lab or shop. For the purposes of estimating the sprinkler flow allowance, it was assumed that the sprinkler discharge would be limited to the largest single room. The largest single space excluding the gym area is the tech room with a foot print of 246 m<sup>2</sup>. The gym has a foot print of 760 m<sup>2</sup>. It is assumed that the gym would be divided into a minimum of 2 zones to reduce the water damage due to the sprinklers.



The sprinkler demand for the tech room is calculated as  $4.1\text{mm}/\text{min} \times 246 \text{ m}^2 = 1009 \text{ L}/\text{min}$  or  $16.8 \text{ L}/\text{s}$ .

The sprinkler demand for the gym is calculated as  $4.1\text{mm}/\text{min} \times 760/2 \text{ m}^2 = 1558 \text{ L}/\text{min}$  or  $26.0 \text{ L}/\text{s}$ .

#### 4.4 Water Demand Summary

Average daily demand	= 0.56 L/s
Maximum daily demand	= 0.85 L/s
Maximum hourly demand	= 1.52 L/s
Fire Flow demand	= 105 L/s
Maximum Daily Plus Fire Flow	= 105.85 L/s

#### 4.5 Boundary Conditions

The following are the boundary conditions, HGL, for hydraulic analysis that were provided by the city of Ottawa in response to the above indicated peak hourly demand and fire flow demand.

Minimum HGL = 125.3m

Maximum HGL = 131.7 m

Max Day + Fire Flow 124.6 m

Correspondence with the City of Ottawa is included in Appendix C

#### 4.6 Water Service Requirements and Pressure Loss Calculations

The maximum and minimum pressures were determined for both the mechanical room (water entry point) and the 2cd floor using three water demand scenarios. The pressure losses were calculated using the 152mm diameter service.

During the first scenario only the domestic water demand was considered. The maximum pressure was determined using the maximum HGL and the average daily water demand of 0.56 m/s.

During the second scenario only the domestic water demand was considered. The minimum pressure was determined using the minimum HGL and the maximum hourly water demand of 1.52 L/s.

During the third scenario, the fire flow demand was added to the residential water demand. The minimum pressure was determined using the HGL during fire flow conditions and the the combined max day plus Fire flow of 105.86 L/s.



The pressure loss to the mechanical room and to the sixth floor of the proposed building was calculated using Bernoulli's Equation in Combination with the Darcy – Weisbach Equation and the Colebrook Equation. The equations are shown below.

$$H_P + Z_1 - Z_2 + \frac{P_1 - P_2}{\rho g} + \frac{V_1^2 - V_2^2}{2g} = h_f + h_m \quad \text{where:}$$

$$h_m = K_m \frac{V^2}{2g} \quad Re = \frac{VD}{\nu} \quad Q = VA \quad A = \frac{\pi}{4} D^2$$

$$\text{Darcy - Weisbach Equation: } h_f = f \frac{L}{D} \frac{V^2}{2g} \quad \text{where:}$$

$$\text{If laminar flow } (Re < 4000 \text{ and any } \frac{e}{D}), \quad f = \frac{64}{Re}$$

$$\text{If turbulent flow } (4000 \leq Re \leq 10^8 \text{ and } 0 \leq \frac{e}{D} < 0.05), \text{ then}$$

$$\text{Colebrook Equation: } \frac{1}{\sqrt{f}} = -2.0 \log \left( \frac{e/D}{3.7} + \frac{2.51}{Re \sqrt{f}} \right)$$

Scenario	Pipe Sections	Along	End	Grade Elevation		Hydraulic Grade line		Pressure	
				Start m	End m	Start m	End m	P <sub>start</sub> kPa	P <sub>end</sub> kPa
<b>Floor 1</b>									
Minimum Domestic Only	Colonnade (min HGL)	Service	Mechanical Room	84.6	85.5	125.3	125.3	399	390
Maximum Domestic Only	Colonnade (max HGL)	Service	Mechanical Room	84.6	85.5	131.7	131.7	462	453
Minimum Including FF	Colonnade (min HGL)	Service	Mechanical Room	84.6	85.5	124.6	107.5	392	216
<b>Floor 2</b>									
Minimum Domestic Only	Colonnade (min HGL)	Service	2cd storey	84.6	89.4	125.3	125.3	399	352
Maximum Domestic Only	Colonnade (max HGL)	Service	2cd storey	84.6	89.4	131.7	131.7	462	415
Minimum Including FF	Colonnade (max HGL)	Service	2cd storey	84.6	89.4	124.6	107.5	392	178

In general conformance with the MOE Guidelines, and City of Ottawa Technical Bulletin ISD-2010-2, the desired range in pressure should be approximately 350KPa (50psi) to 480KPa (70psi) during normal operating conditions. Additionally the distribution system shall be sized so that under maximum hourly demand conditions the pressures are not less than 276 kPa (40 psi.). The minimum residual pressure during fire flow conditions is 138 kPa (20 psi) As per the Ontario Building Code, the maximum pressure should not exceed 552KPa (80psi).

Based on the results of the analysis as presented in the above tables, when using the existing 152 mm diameter service, the above minimum and maximum HGL provide a water pressure of between 352 KPa and 453 KPa at the proposed addition to the building.

The minimum residual pressure, calculated on the second flow, when there is fire flow demand would be 216 kPa or well above the minimum of 138 kPa.

The City Boundary Conditions are provided based on computer modeling of the water network. During construction, a pressure check is to be completed to determine that the pressure in the system at the building does not exceed 552 KPa. If the pressure does exceed 552 Kpa a pressure reducing valve would have to be installed downstream of the isolation valve and water meter in the building.



Based on the above calculations the existing 150 mm water service is sufficient to meet the added demand due to the proposed addition.

#### 4.7 Existing Fire Hydrants

City of Ottawa Technical Bulletin ISTB-2018-02 Appendix I Table 1 provides guidance with respect to the contribution of nearby fire hydrants to the required fire flow. From this table, a Class AA hydrant can contribute a maximum flow of 5,700 L/min when located less than 75 metres from the building and 3,800 L/min when located between 75 and 150 metres from the building.

Three Class AA fire hydrants have been located in the immediate vicinity of the development and are considered for fire flow requirements. The three hydrants are located on the 305mm DI watermain beneath Colonnade. The first two hydrants are located on the subject property, and the third is located south side of Colonnade Road approximately 20 m west of the site.

An additional private hydrant is located on the subject property near the southwest corner of the existing building. This hydrant was not considered with respect to the available flow and sufficiency of the existing hydrants.

Building	Fire Flow Demand (L/min)	Fire Hydrant(s) within 75m x Hydrant Contribution	Combined Available Fire Flow (L/min)
2 Storey Sprinklered School	6,300 L/min	3 x 5,700 L/min	17,100 L/min

Notwithstanding the above:

The flows provided for in City of Ottawa Technical Bulletin ISTB-2018-02 Appendix I Table 1 are the fire hydrant capacities based on hydrant class and distances to proposed buildings. Those flows are not available flows but the maximum flows that can be obtained from a hydrant.

The available fire flow at the watermain at 138 kPa was not provided by the City of Ottawa. However, the boundary conditions provided indicate that the water pressure in the main will be 392 kPa during fire flow conditions. As such there are sufficient hydrants within close proximity of the site to meet the fire flow required at the site.



---

## 5 STORMWATER MANAGEMENT DESIGN

The stormwater management design for the site has been completed under a separate report Stormwater Management Report, Proposed Institutional Development, 82 Colonnade Road, Ottawa, Ontario prepared by Kollaard Associates Inc, File No. 250483 dated March 19, 2026.

The stormwater management for the site consists of controlling the post-development release rate from the stormwater originating on the areas of the site affected by the proposed development such that the total post-development runoff rate from the site during a 100 year design storm is less than the runoff rate from a 5 year storm during pre-development site conditions. Stormwater will be temporarily stored on site and will be released at a controlled rate during and following a rainstorm event to the existing storm sewer along Colonnade Road.

The parking for the existing building is located on the south side of the building and in part occupies a portion of the land within a Hydro Corridor south of the site. Access to this parking area is provided along the west side of the school. Runoff from the south half of the parking area access road and the south parking area is collected by catch basins which discharge to a 525 mm diameter storm sewer. This 525 mm diameter storm sewer passes under the existing gym and discharges to the storm sewer along Colonnade Road. Runoff from the landscaped surfaces east of the existing building was either directed by sheet flow to Colonnade road or to a stormwater storage swale which outlet to the 525 mm diameter storm sewer. Runoff from the roof of the existing school building and gym is also directed to this storm sewer. Runoff originating on the front access route and drop off zone north of the existing school is collected by means of a catch basin and is directed to the 525 mm diameter storm sewer.

The existing 525 storm sewer will be relocated around the outside of the proposed addition. The proposed stormwater management works will outlet into the 525 mm sewer avoiding any additional storm connection on Colonnade Road.

The stormwater storage requirements will be met for all design storm events up to and including the 100-year design storm. The storage will be provided in a combination of roof storage, surface storage and storage within a storage swale along the eastern portion of south side of the site. The storage swale will also be used to provide quality control to an enhanced level of treatment.

## 6 CONCLUSIONS

This report addresses the adequacy of the existing municipal sanitary sewer system and watermain to service the proposed school building addition development at 82 Colonnade Road. The report also provides a summary of the stormwater management design presented under separate cover. Based on the analysis and summary provided in this report, the conclusions are as follows:



Stormwater management for the site has been designed to ensure that post-development runoff rate from the site during a 100 year storm event does not exceed the pre-development runoff rate during a 5-year storm. Stormwater storage will be provided on site and released at a controlled rate. Discharge will be directed to the existing 525 mm diameter Storm sewer on site which in turn outlets to the existing storm sewers along Colonnade Road.

The proposed additions to the building will be serviced by the existing services. There are no new proposed service connections. The existing services consist of a 200 mm diameter sanitary service and a 150 mm diameter water service. The peak sewage flow rate from the proposed development will be 1.46 L/sec. The existing municipal sanitary sewer has adequate capacity to accommodate the increase in peak flow due to the proposed addition.

The existing water service consists of a 150 mm diameter DI water service which is connected to the existing 305 mm diameter water main along Colonnade Road. There is sufficient capacity and pressure within the municipal water system adjacent the site to meet the domestic and fire flow requirements.

We trust that this report provides sufficient information for your present purposes. If you have any questions concerning this report please do not hesitate to contact our office.

Sincerely,  
Kollaard Associates Inc.



---

Steve deWit, P.Eng.



## Appendix A – Correspondence With Principal

**Subject:** Re: Redeemer: 82 Colonnade: fire flow, occupancy

**From:** "J. David Naftel" <principal@rchs.on.ca>

**Date:** 2026-01-15, 1:16 p.m.

**To:** VWA Mail <mail@vwarchitects.ca>

**CC:** Steven deWit <steve@kollaard.ca>, Amy Brunsveld-Dewar <amy@kollaard.ca>, Tim Priddle <tim@wood-source.com>, Joe Naufal <joe@vwarchitects.ca>

Hi Steve,

I would say an expected occupancy of the whole expanded building would be approximately 300 students. Maybe as high as 320ish but our target is 300.



Virus-free. [www.avast.com](http://www.avast.com)

On Thu, Jan 15, 2026 at 1:07 PM VWA Mail <mail@vwarchitects.ca> wrote:

Hi Steve:

Re most of your questions: Under the Building Code, we would classify the building under 3.2.2.24 Group A, Division 2, up to 6 Storeys, Any Area, Sprinklered.

As a result, there are no fire walls currently or proposed (there may be rated doors however), the building is currently sprinklered with a "Siamese" at the west end of the building.

The occupancy is a question – I believe the principal's (David Naftel) projection is that 300 students (plus staff) would be accommodated in the building upon expansion completion. Dave: can you confirm?

Ralph

Vandenberg & Wildeboer Architects Inc.

---

**From:** Steven deWit <steve@kollaard.ca>

**Sent:** Thursday, January 15, 2026 12:33 PM

**To:** Joe Naufal <joe@vwarchitects.ca>

**Cc:** Ralph Vandenberg <ralph@vwarchitects.ca>; Amy Brunsveld-Dewar <amy@kollaard.ca>

**Subject:** Re: Redeemer: 82 Colonnade

Good Morning Joe

Thank you for the drawing.

A couple questions I am hoping you have the answers to

What is the total proposed occupancy - Students and Staff with the proposed addition shown in the current site plan?

Are there fire separations with fire doors between the existing school and the gym?

Will there be fire separations with fire doors between the existing building and the proposed addition / proposed addition and the gym?

Is the building sprinklered?

The presence or absence of fire separations between the building units will significantly impact the fire flow calculations.

Thank you

Steve deWit, P.ENG.

+1 613 860-0923



**Kollaard Associates**  
Engineers

**20**  
YEARS

Civil • Geotechnical • Structural • Septic • Environmental • Hydrogeology

210 Prescott Street, Unit 1, P.O. Box 189, Kemptville, Ontario K0G 1J0 Canada

[www.kollaard.ca](http://www.kollaard.ca)

On 2026-01-15 11:35 a.m., Joe Naufal wrote:

Hello,

Please find our updated CAD attached. It has been coordinated with your drawings from October 9.



**Joe Naufal**

TECHNOLOGIST/I.T. MANAGER

**VANDEMBERG & WILDEBOER ARCHITECTS INC.**

160 FLAMBOROUGH WAY, KANATA, ONTARIO, K2K 3H9

**30 YEARS OF DESIGN & INNOVATION:** [www.vwarchitects.ca](http://www.vwarchitects.ca)

--  
J. David Naftel  
Principal  
Redeemer Christian High School



## Appendix B – Fire Flow Requirements Calculation

- OBC
- FUS

**FIRE FLOW REQUIREMENTS**

Client: Redeemer Christian High School  
 Job No.: 250483  
 Location: 82 Colonnade Road North  
 Date: March 19, 2026

**Fire Water Storage and Supply Flow Rate Requirements**

The following equation from the latest version of the Ontario Building Code (2025) was used for calculation of the on-site supply rates required to be supplied by the hydrants.

Formulae: 
$$Q = KVS_{Tot}$$

$$S_{Tot} = 1.0 + [S_{side1} + S_{side2} + S_{side3} + S_{side4} + \dots]$$

OBC Classification of Building Use	Group, Division	Type of Construction		
Assembly - 2 Storey School Masonry and Concrete Construction	A-2	Building is of Noncombustible construction		
Water Supply Coefficient (Table 1, OBC)	K	10		per Table 2 on A-3.2.5.7 of the OBC
Exposure Distance 1	north	>10	m	
Exposure Distance 2	south	>10	m	
Exposure Distance 3	east	>10	m	
Exposure Distance 4	west	>10	m	
Spatial Coefficient 1	Sside	0		
Spatial Coefficient 2	Sside	0		
Spatial Coefficient 3	Sside	0		
Spatial Coefficient 4	Sside	0		
Total Spatial Coefficient	Stot	1		
Average Building Height	H	12	m	
Building Footprint	A	3,062	sq.m	
Total Building Volume	V	24,955	cu.m	
Minimum Supply of Water	Q	249,553	L	
Required Fire Flow	Qf	6300	L/min	
		<b>105</b>	L/s	
		1664	US gpm	

OBC - Table 2 of A-3.2.5.7.  
 REQUIRE MINIMUM WATER SUPPLY FLOW RATE (L/min)

Qf =	2700	If Q ≤ 108 000 L
Qf =	3600	108 000L < Q ≤ 135 000 L
Qf =	4500	135 000L < Q ≤ 162 000 L
Qf =	5400	162 000L < Q ≤ 190 000 L
Qf =	6300	190 000L < Q ≤ 270 000 L
Qf =	9000	Q > 270 000 L



**CALCULATION OF FIRE FLOW REQUIREMENTS - 82 COLONNADE ROAD N**  
**Calculation Based on Fire Underwriters Survey 2020 and Ottawa Technical Bulletin ISTB-2018-02**

Proposed Building:

- Two Storey School - Masonry and Concrete Construction
- One Storey Gym - Masonry Walls
- Unprotected Openings

1) An estimate of the Fire Flow required for a given fire area may be estimated by:

$$F = 220 \times C \times \sqrt{A}$$

where F = required fire flow in litres per minute

A = total floor area in m<sup>2</sup> (including all storeys, but excluding basements at least 50% below grade)

C = coefficient related to the type of construction:

- 1.5 for wood construction (structure essentially combustible)
- 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior)
- 0.8 for noncombustible construction (unprotected metal structural components, masonry or metal walls)
- 0.6 for fire-resistive construction (fully protected frame, floors, roof)

No. of Floors =	2	1	(FUS excludes basements that are at least 50% below grade)
Area (first floor) =	2302	760	m <sup>2</sup>
Area (second floor) =	2175		
A =	5237		m <sup>2</sup>
C =	0.8		
F =	12,737	L/min	-----> Rounded to nearest 1000 = <b>13,000</b> L/min

2) The value obtained in 1) may be reduced by as much as 25% for occupancies having a low

- Non-combustible = -25%
- Limited Combustible = -15%
- Combustible = 0%
- Free Burning = 15%
- Rapid Burning = 25%

Reduction due to low occupancy hazard = -15% x 13,000 = **-1,950** L/min **11,050** L/min

3) The value above may be reduced by up to 50% for automatic sprinkler system

Reduction due to automatic sprinkler system = -50% x 11,050 = **-5,525** L/min

4) The value obtained in 2. may be increased for structures exposed within 45 metres by the fire

Separation (metres)	Condition	Max Charge*
0m to 3.0m	1	25%
3.1m to 10.0m	2	20%
10.1m to 20.0m	3	15%
20.1m to 30.0m	4	10%
over 30 m	5	0%

Charge for separation has been modified by Technical Bulletin ISTB-2018-02 based on construction and Length-Height Factor

Length\*Height (L \* H) = Exposed wall length in feet x height of building in stories

No of Stories = 2

Exposures	Distance(m)	Length (m)	m ^ storey	Condition	Charge
side 1 (east)	>30	52	104	5	-----> 0%
side 2 (west)	25.0	31	62	4	-----> 8%
Front (north)	>30	78	156	5	-----> 0%
Back (south)	>30	78	156	5	-----> 0%
					8%

Increase due to separation = 8% x 11,050 = **884** L/min

The fire flow requirement is = **11,050**  
 Reduction due to Sprinkler = **-5,525**  
 Increase due to Separation = **884**  
 -----  
**6,409**

The Total fire flow requirement is = **6,000** L/min  
 or **100.0** L/sec



## Appendix C – Correspondence with the City of Ottawa

- Boundary Conditions
- Excerpts from Pre-consultation Feedback form

**Subject:** RE: Request for Boundary Conditions - Ottawa File No. PC2025-0160  
**From:** "Fawzi, Mohammed" <mohammed.fawzi@ottawa.ca>  
**Date:** 2026-02-05, 10:41 a.m.  
**To:** "steve@kollaard.ca" <steve@kollaard.ca>  
**CC:** "amanda@kollaard.ca" <amanda@kollaard.ca>

Hi Steve,

The following are boundary conditions, HGL, for hydraulic analysis at 82 Colonnade Road N. (zone 2W2C) assumed to be connected to the 305mm on Colonnade Road N. (see attached PDF for location).

Minimum HGL = 125.3 m  
Maximum HGL = 131.7 m  
Max Day + Fire Flow (105.0 L/s) = 124.6 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. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.*

Best Regards,

**Mohammed Fawzi, P.Eng.**

Senior Project Manager (A), Infrastructure Projects  
Development Review – West Branch  
Planning, Development and Building Services Department (PDBS) | Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)  
City of Ottawa | Ville d'Ottawa  
110 Laurier Avenue West | 110 Avenue Laurier Ouest  
Ottawa, ON K1P 1J1  
613.580.2424 ext./poste 70120, [Mohammed.Fawzi@ottawa.ca](mailto:Mohammed.Fawzi@ottawa.ca)

Classified as City of Ottawa - Internal / Ville d'Ottawa - classé interne

---

**From:** Fawzi, Mohammed  
**Sent:** January 26, 2026 6:53 PM  
**To:** [steve@kollaard.ca](mailto:steve@kollaard.ca)  
**Cc:** [amanda@kollaard.ca](mailto:amanda@kollaard.ca)  
**Subject:** RE: Request for Boundary Conditions - Ottawa File No. PC2025-0160

Hi Steve,

This is to confirm your request in the queue. Results will be provided as soon as they are received.

Thanks Steve.

Best Regards,

**Mohammed Fawzi, P.Eng.**

Senior Project Manager (A), Infrastructure Projects

Development Review – West Branch

Planning, Development and Building Services Department (PDBS) | Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)

City of Ottawa | Ville d'Ottawa

110 Laurier Avenue West | 110 Avenue Laurier Ouest

Ottawa, ON K1P 1J1

613.580.2424 ext./poste 70120, [Mohammed.Fawzi@ottawa.ca](mailto:Mohammed.Fawzi@ottawa.ca)

---

**From:** Dieme, Abi <[Abibatou.Dieme@ottawa.ca](mailto:Abibatou.Dieme@ottawa.ca)>  
**Sent:** January 21, 2026 1:27 PM  
**To:** [steve@kollaard.ca](mailto:steve@kollaard.ca)  
**Cc:** [amanda@kollaard.ca](mailto:amanda@kollaard.ca); Fawzi, Mohammed <[mohammed.fawzi@ottawa.ca](mailto:mohammed.fawzi@ottawa.ca)>  
**Subject:** RE: Request for Boundary Conditions - Ottawa File No. PC2025-0160

Hi Steven,

Request received and transferred to the senior project manager (cc'd) as I am moving position.

Regards,  
Abi

Classified as City of Ottawa - Internal / Ville d'Ottawa - classé interne

---

**From:** Steven deWit <[steve@kollaard.ca](mailto:steve@kollaard.ca)>  
**Sent:** Tuesday, January 20, 2026 11:10 AM  
**To:** Dieme, Abi <[Abibatou.Dieme@ottawa.ca](mailto:Abibatou.Dieme@ottawa.ca)>  
**Cc:** [amanda@kollaard.ca](mailto:amanda@kollaard.ca)  
**Subject:** Request for Boundary Conditions - Ottawa File No. PC2025-0160

**CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.**

**ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.**


Good Morning Abi

Please find attached our request for Boundary Conditions for 82 Colonnade R North

Thank you

**Steve deWit, P.ENG.**

+1 613 860-0923

  
Civil • Geotechnical • Structural • Septic • Environmental • Hydrogeology  
210 Prescott Street, Unit 1, P.O. Box 189, Kemptville, Ontario K0G 1J0 Canada  
[www.kollaard.ca](http://www.kollaard.ca)

This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

Le présent courriel a été expédié par le système de courriels de la Ville d'Ottawa. Toute distribution, utilisation ou reproduction du courriel ou des renseignements qui s'y trouvent par une personne autre que son destinataire prévu est interdite. Je vous remercie de votre collaboration.

---

Attachments:

82 Colonnade Road N January 2026.pdf

1.6 MB



10. Reduce parking and hardscaping where possible.

11. Provide safe pedestrian connections from the parking lot to building entrances.

UD requirements:

12. Site Plan

13. Elevations

14. Landscape Plan

Feel free to contact Lisa Stern, Urban Designer, for follow-up questions.

## **Engineering**

### **Water Design**

15. A water boundary condition request should be made for this development. Please provide the following information including supporting calculations:

- i. Location of service
- ii. Type of development
- iii. Amount of fire flow required.
- iv. Average daily demand: \_\_\_ l/s.
- v. Maximum daily demand: \_\_\_ l/s.
- vi. Maximum hourly daily demand: \_\_\_ l/s.

16. The proposed addition must be serviced internally. Unless the water demand exceeds 50m<sup>3</sup>/day, additional connection to the municipal watermain wouldn't be supported.

17. Submission to include watermain system analysis demonstrating adequate pressure as per section 4.2.2 of the Water Distribution Guidelines.

18. Demonstrate adequate hydrant coverage for fire protection. Please review Technical Bulletin ISTB-2018-02, Appendix I table 1 – maximum flow to be considered from a given hydrant.

19. Any proposed emergency route (to be satisfactory to Fire Services).

### **Sanitary Design**

20. The proposed addition should be serviced internally. Additional connection to the municipal sewer is not supported.

21. Demonstrate that there is adequate residual capacity in the private and municipal sanitary sewers to accommodate the proposed addition

22. Please apply the wastewater design flow parameters in Technical Bulletin PIEDTB-2018-01.

### **Storm Design**

- a. The storm design criteria apply to the area being developed
- b. There is access to the 525mm ,675mm and 750mm municipal storm sewers within Colonnade Road
- c. The pre-development runoff shall be the lower of the existing coefficient or a maximum equivalent 'C' of 0.5, whichever is less
- d. Time of concentration: to be calculated, min Tc = 10mins
- e. Design storm for receiving sewer: 5-year design storm
- f. Control the post-development flows to the 5-year pre-development release rate for all storm events up to and including the 100-year event.
- g. Provide enhanced level protection (80%) for suspended solids removal

Feel free to contact Abi Dieme, Project Manager, for follow-up questions.

### **Noise**

Comments:

23. No Comments.

### **Transportation**

Comments:

24. Follow Transportation Impact Assessment Guidelines:

- a. Note that the [TIA Guidelines](#) have been updated, the changes are available on the City's website.
- b. Correct the Screening Form, the proposed access is within the auxiliary lane at the Citiplace Dr intersection.
- c. With the proposed parking lot access at the location shown on the site plan submitted for this pre-application consultation, a reduced-scope Transportation Impact Assessment is required. Please submit the Scoping/Forecasting report to [josiane.gervais@ottawa.ca](mailto:josiane.gervais@ottawa.ca) at your earliest convenience. The applicant is responsible to submit the Scoping Report prior to application and must allow for a 14 day circulation period. The Strategy Report (including Synchro files) must be submitted with the