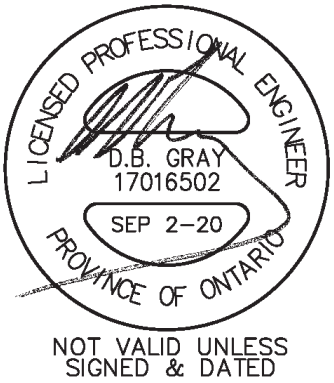
SERVICING BRIEF &
STORMWATER MANAGEMENT REPORT

455-483 Sherbourne Road
(Building A – 483 Sherbourne Road)
Ottawa, Ontario

Report No. 20045A

September 2, 2020



D.B. Gray Engineering Inc.

Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains

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SERVICING BRIEF &
STORMWATER MANAGEMENT REPORT

455-483 Sherbourne Road
(Building A – 483 Sherbourne Road)
Ottawa, Ontario

Two existing apartment buildings are proposed to be demolished and three new apartment buildings are proposed to be constructed at 455-483 Sherbourne Road in Ottawa. This Servicing Brief & Stormwater Management Report has been prepared for one of the proposed apartment buildings (Building A).

Specifically, this report describes the services and addresses the stormwater management requirements of a property, 1,195 sq.m. in area, located at 483 Sherbourne Road (at the corner of Keenan and Redwood Avenues) in Ottawa. The property currently has a 6-unit apartment building that will be demolished. A three-storey (plus a basement) 24-unit apartment building (Building A) is proposed.

This report forms part of the stormwater management design for the proposed development. Refer to drawing C-1 to C-8 also prepared by D. B. Gray Engineering Inc.

WATER SUPPLY FOR FIREFIGHTING:

There are four municipal fire hydrants in the municipal road right-of-way in the vicinity of the proposed building. The closest hydrant is located at the corner of Sherbourne Road and Keenan Avenue about 25 m unobstructed distance to the front entrance. Another is located near the corner of Keenan and Redwood Avenue about 35 m unobstructed distance to the rear entrance. A third is located in front of 599 Redwood Avenue about 115 m unobstructed distance to the rear entrance. A fourth is located in front of 2037 Honeywell Avenue about 122 m unobstructed distance to the front entrance.

A fire flow of 233.3 L/s (14,000 L/min) is required, as calculated as per the Fire Underwriter Survey "Water Supply For Fire Protection".

The boundary conditions (based on the city's computer model of the municipal water distribution system) received from the City stated that maximum available fire flow at this location is 247 L/s (14,820 L/min) at 138 kPa (20 psi). Since the available flow is above required fire flow of 233.3 L/s there is an adequate water supply for firefighting from the existing municipal water distribution system.

As per City of Ottawa Technical Bulletin ISTB-2018-02, the aggregate fire flow of all contributing fire hydrants within 150 m of the building can used to supply the required fire flow. It is believed all existing municipal hydrants in the vicinity are Class AA. (The bonnets

of all the hydrants are colour coded light blue (Class AA) except the closest hydrant which is not currently colour coded. However, from Google Street View it can be seen that it was colour coded as Class AA in 2012 and earlier.) The two closest hydrants are within 75 m and can contribute 5,700 L/min (95 L/s) each; and the other two hydrants being between 75 and 150 m can contribute 3,800 L/min (63.3 L/s) each (as per Table 1 of ISTB-2018-02). Therefore, the aggregate flow from all four hydrants is 19,000 L/min (316.7 L/s), which is greater than the required fire flow.

WATER SERVICE:

There are existing 200 mm municipal watermains in Sherbourne Road and Keenan Avenue and 150 mm municipal watermain in Redwood Avenue.

The 24 apartment units are comprised of 17 one-bedroom and 7 two-bedroom units. Based on the City of Ottawa Water Distribution Design Guidelines for residential properties (one-bedroom apartment units / 1.4 person per unit; and two-bedroom apartment units / 2.1 persons per unit – 350 L/person/day) and Ministry of the Environment Design Guidelines for peaking factors the daily average flow is 0.2 L/s with a maximum daily and maximum hourly demand of 1.4 and 2.2 L/s respectively.

To determine water pressure under these demands, boundary conditions, based on the City of Ottawa computer simulation of the water distribution system, at the subject location, are required. In summary, received the boundary conditions for the subject area based on the following:

Average Daily Demand: 0.2 L/s.
Maximum Daily Demand: 1.4 L/s.
Maximum Hourly Demand: 2.2 L/s

Based on the boundary conditions received from the City, the minimum HGL (hydraulic grade line) is 108.5 m and the maximum is 115.2 m. With these HGLs the water pressure at the water meter is calculated to vary from 436 kPa to 502 kPa (63 to 73 psi). This is an acceptable range of water pressures for the proposed development.

Based on the AWWA water flow demand curve, and a water pressure at the meter of 469 kPa (68 psi), the peak demand for the building is expected to be 3.0 L/s (183 L/min / 48 USgpm). The AWWA method calculates the instantaneous demand and is used to size the water service. This peak demand will produce an acceptable velocity of 1.6 m/s in the proposed 50 mm water service connection (up to 2.4 m/s is acceptable). The water service will connect to the 200 mm municipal watermain in Sherbourne Road.

SANITARY SERVICE:

There is an existing 900 mm municipal sanitary sewer in Sherbourne Road and a 300 mm municipal sanitary sewer in Redwood Avenue.

Based on the City of Ottawa Sewer Design Guidelines for a residential property (17 one-bedroom apartment units / 1.4 person per unit; and 7 two-bedroom apartment units / 2.1 persons per unit; 280 l/person/day – 3.2 peaking factor); and based on a 0.33 l/s/ha infiltration flow; the post development flow is calculated to be 0.44 L/s. This flow will be adequately handled by the proposed sanitary sewer service connections (150mm at 1% slope - 15.9 L/s capacity) since, at the design flow, it will only be about 3% full.

The proposed 150mm sanitary service connections will connect to the 900mm municipal sanitary sewer in Sherbourne Road which, with a 0.36% slope, has a capacity of 1133 L/s. The existing development of 6-unit apartment building generates 0.15 L/s. Therefore, the 0.29 L/s increase in sanitary flows contributing to the existing 900mm sanitary sewer is expected to have an acceptable impact.

STORMWATER MANAGEMENT:

Water Quality:

With respect to the subject project the Rideau Valley Conservation Authority (RVCA) has stated: *"The downstream outlet is less than 500 metres. There is no downstream stormwater facility. Therefore the appropriate water quality target is enhanced (80% TSS removal). If the configuration of the parking at the rear is changing or the storm pipes (if applicable) are being altered, then water quality needs to be accounted for in those areas as well." "The trigger for onsite water quality parking would be 6 parking spaces or more." "Based on the grading Plan, only a small amount of the existing parking is being re-graded. Therefore in this instance we would be looking for some of improvement over the existing condition. Given the amount of grassed area, would there be an opportunity to have some of the flows go through a vegetated swale in order to provide some treatment?" "For this one, we would want to see some sort of improvement with water quality given the large amount of parking spaces. In other instances where grading has been an issue, permeable pavers, control of ponding, swales and sometimes even storage tanks for settling have been considered. We would rely on the Engineer to provide a solution to the issue if not proposing traditional onsite water quality treatment." "It is only due to the number of new parking spaces being proposed that we could consider an improvement over full water quality targets."*

Less than six parking spaces are proposed so onsite water quality is not triggered, however, the RVCA *"would want to see some sort of improvement with water quality"*. The underlying soil (silty clay) is not appropriate for any infiltration measures; however, only about 11% of the site has asphalt or concrete (the rest being the roof or grassed / landscaped); and proposed quantity control measures (see following section) will provide storage for settling. The storm sewers have been oversized to provide about 11 cu.m. of storage; and the sumps of three catch basin / manholes will provide an area for sediment to settle.

An erosion and sediment control plan has been developed to be implemented during construction, (see drawing C-5 and notes 2.1 to 2.6 on drawing C-6). In summary: to filter out construction; sediment capture filter sock inserts will be installed in all existing catch

basins adjacent to the site and all new catch basins as they are installed; and any material deposited on a public road will be removed.

Water Quantity:

The stormwater management criteria for quantity control are to control the post development peak flows for the 5-year and 100-year storm events to peak flows during the 5-year storm event using a pre-development runoff coefficient or runoff coefficient of 0.50, whichever is less; and a time of concentration of 20 minutes or calculated (but not less than 10 minutes). It is calculated that the pre-development conditions reflect a 5-year runoff coefficient of 0.49. Therefore, based on runoff coefficient of 0.49, a 20 minute time of concentration; and using the Rational Method; the maximum allowable release rate is 11.35 L/s for all storm events. The runoff coefficients for the 100 year event are increased by 25% to maximum 1.00.

Stormwater will be stored within the development on the roof of the proposed building and underground in the proposed an oversized site storm sewer system.

Drainage Area I
(Uncontrolled Flow Off Site – 90 sq.m.):
The runoff from entrance to the property will be allowed to flow uncontrolled off the site. The flow from is calculated at 10 minutes concentration.

	100-year	5-year
Maximum flow rate:	4.24 L/s	2.22 L/s

Drainage Area II (Roof – 507 sq.m.):
The two roof drains will be flow control types which will restrict the flow and cause the storm water to pond on the roof. The flow control type roof drain shall be installed with a parabolic shaped slotted weir (1 slot per weir drain at 0.0124 l/s per mm per slot - 5 USgpm per inch per slot): Watts roof drain with a Watts Accutrol Weir RD-100-A1 or equal. The roof drain will be installed at the low point of the roof which will be 150mm lower than the perimeter of the roof. Four scuppers, each 370 mm wide and installed 150 mm above the roof drains (refer to architectural for exact locations and details). The roof shall be designed to carry the load of water having a 50 mm depth at scupper and 200 mm depth at roof drain (refer to structural). (The storm sewer serving the roof drains will connect to the upstream of the ICD, therefore, the release rate from the roof drains are added to Drainage Area III.)

	100-year	5-year
The maximum release rate:	3.39 L/s	2.59 L/s
The maximum ponding depth:	137 mm	104 mm
The maximum stored volume:	17.32 cu.m.	7.71 cu.m.

Drainage Area III (598 sq.m.):
An inlet control device (ICD) located at the outlet pipe of catch basin / manhole CB/MH-3A will control the release of stormwater from Drainage Area III and the property. The ICD will restrict the flow and force the stormwater to back up onto upstream sewer pipes and manholes. To calculate the required storage volume an average release rate is assumed to be equal to 50% of the maximum release rate. The ICD shall be a plug style with a round orifice design (with the orifice located at the bottom of the plug) manufactured by Pedro

Plastics (or approved equal) and shall be sized by the manufacturer for a discharge rate of 8.41 L/s at 0.50 m head. It is calculated that an orifice area of 4,418 sq.mm. (75 mm diameter) and a discharge coefficient of 0.61 will restrict the outflow rate to 8.41 L/s at a head of 0.50 m. Based on this orifice the maximum outflow rate for the 1:5 year storm event is calculated to be 5.96 L/s at 0.25 m.

	100-year	5-year
Maximum release rate:	8.41 L/s	5.96 L/s
Maximum stored volume:	11.07 cu.m.	5.66 cu.m.

The Entire Site:

	100-year	5-year
Maximum permitted release rate:	11.35 L/s	11.35 L/s
Maximum release rate:	12.65 L/s	8.18 L/s
Maximum stored volume:	28.39 cu.m.	13.36 cu.m.

While the maximum post-development release rate for the 100-year storm event is calculated to be 11% greater than the maximum allowable, it is 43% less than the pre-development flow rate. To achieve the maximum allowable would require the use of a vortex style ICD; however, since the storm sewer system is very shallow (less than 0.9 m cover at the manhole with the ICD) a vortex style ICD is not advisable as they would be prone to blockages during freezing conditions. For the 5-year event the maximum post-development release is calculated to be 28% less than the maximum allowable.

There is an existing 1500 mm municipal storm sewer in Sherbourne Road and a 300 mm municipal storm sewer in Redwood Avenue. The proposed site storm sewer system is proposed to connect to the Redwood Avenue storm sewer. The foundation drains are proposed to drain to a sump and pumped to the proposed site storm sewer system.

The unrestricted flowrate resulting from one in five-year storm event will produce a peak flow of 15.94 L/s which will be adequately handled by the proposed storm sewer system with the last pipe segment (300mm at 0.34% - 58.8 L/s capacity) being only at 38% of its capacity (with the restricted flows through the ICD the last pipe will only be at 10% of its capacity). The flows contributing to the municipal storm sewer system is expected to have a positive impact given the post-development flows from the site are being reduced by 28% during the 5-year event.

CONCLUSIONS:

1. There is an adequate water supply for firefighting from the existing municipal water distribution system.

2. The aggregate flow from the four existing municipal fire hydrants within 150 m of the buildings is greater than the required fire flow.

3. The water pressure in the municipal watermain is adequate for the proposed development.

4. The expected sanitary sewage flow rate will be adequately handled by the proposed sanitary sewer service connection.

5. The sanitary flow contributing to the existing municipal combined sewer is expected to have an acceptable impact.

6. The RVCA has indicated that they *"would want to see some sort of improvement with water quality"*. The underlying soil (silty clay) is not appropriate for any infiltration measures; however, only about 11% of the site is asphalted or concrete; and proposed quantity control measures will provide storage for settling.

7. An erosion and sediment control plan has been developed to be implemented during construction.

8. The stormwater management criteria for quantity control are to control the post development peak flows for the 5-year and 100-year storm events to peak flows during the 5-year storm event using a pre-development runoff coefficient and a time of concentration of 20 minutes. The maximum allowable release rate is 11.35 L/s for all storm events. Stormwater will be stored within the development on the roof of the proposed building and underground in the proposed an oversized storm sewer system.

9. While the maximum post-development release rate for the 100-year storm event is calculated to be 11% greater than the maximum allowable, it is 43% less than the pre-development flow rate. To achieve the maximum allowable would require the use of a vortex style ICD; however, since the storm sewer system is very shallow (less than 0.9 m cover at the manhole with ICD) a vortex style ICD is not advisable as they would be prone to blockages during freezing conditions. For the 5-year event the maximum post-development release is calculated to be 28% less than the maximum allowable.

10. The unrestricted flowrate resulting from one in five-year storm event will produce a peak flow which will be adequately handled by the proposed site storm sewer system.

11. The flows contributing to the municipal storm sewer system is expected to have a positive impact given the post-development flows from the site are being reduced by 28% during the 5-year event.

D.B. GRAY ENGINEERING INC.

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23-Jul-20
REVISED 12-Aug-20

455-483 Sherbourne Road
Proposed Building A
Ottawa, Ontario

Fire Flow Requirements

Fire flow requirement as calculated as per Fire Undewriter Survey "Water Supply For Fire Protection".

F = 220 C $A^{0.5}$ = the required fire flow in litres per minute

C = coefficient related to the type of construction
= 1.5 Wood Frame Construction

A = total floor area (all storeys excluding basements at least 50% below grade)

3rd Floor	489	sq.m.
2nd Floor	489	sq.m.
Ground Floor	489	sq.m.
Basement (> 50% Below grade)	0	sq.m.
TOTAL FIRE AREA:	1467	sq.m.

F = 12,639 L/min
= 13,000 L/min (rounded off to the nearest 1,000 L/min)

-15% Charge for Limited-combustible Occupancy

= 11,050 L/min

0% Reduction: No Sprinkler System

= - L/min

Increase for Separation Exposed Buildings

			Adjacent Building			Length-Height
			Constuction	Length m	Storeys	Factor
5%	North	30.1 to 45m	W-F			0
0%	East	>45	W-F			0
5%	South	30.1 to 45m	W-F			0
17%	West	3.1 to 10m	W-F	9	3	27
27%	Total Increase for Exposure (maximum 75%)					

= 2,984 L/min Increase

= 14,034 L/min
F = 14,000 L/min (rounded off to the nearest 1,000 L/min)
= 233.3 l/s

			Static Pressure at Fire Hydrant			
Elevation at Fire Hydrant (corner of Sherbourne & Keenan)	65.21	m ASL				
200 l/s FIRE FLOW:	88.7	m ASL	33	psi	230	kPa
247 l/s FIRE FLOW:	79.3 (estimated)	m ASL	20.0	psi	138	kPa

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23-Jul-20

REVISED 12-Aug-20

455-483 Sherbourne Road
Proposed Building A
24-Unit 4-Level Apartment Builidng
Ottawa, Ontario

Water Demand

	Number of Units	Persons Per Unit	Population
UNIT TYPE:			
Single Family:	0	3.4	0
Semi- detached:	0	2.7	0
Duplex:	0	2.3	0
Townhouse:	0	2.7	0
APARTMENTS:			
1 Bedroom:	17	1.4	24
2 Bedroom:	7	2.1	15
3 Bedroom:	0	3.1	0
Average Aptarment:	0	1.8	0
TOTAL:	24		39

DAILY AVERAGE

350 litres / person / day

9.4 l/min | 0.2 l/s | 2 USgpm

MAXIMUM DAILY DEMAND 9.2 (Peaking Factor for a population of 39: Table 3-3 MOE Design Guidelines for Drinking-Water Systems)

85.8 l/min | 1.4 l/s | 23 USgpm

MAXIMUM HOURLY DEMAND 13.8 (Peaking Factor for a population of 39: Table 3-3 MOE Design Guidelines for Drinking-Water Systems)

129.2 l/min | 2.2 l/s | 34 USgpm

Elevation of Water Meter: 64.02 m ASL

Basement Floor Elevation: 63.12 m ASL

			Static Pressure at Water Meter	
MINIMUM HGL:	108.5 m ASL	63 psi	436 kPa	
MAXIMUM HGL:	115.2 m ASL	73 psi	502 kPa	

D.B. Gray Engineering Inc.

Douglas Gray <d.gray@dbgrayengineering.com>

RE: 455-483 Sherbourne Rd

1 message

Valic, Jessica <jessica.valic@ottawa.ca> Tue, Aug 11, 2020 at 3:46 PM
To: Douglas Gray <d.gray@dbgrayengineering.com>
Cc: Caoimhin Kennedy <c.kennedy@dbgrayengineering.com>

Good afternoon Doug,

Please find attached the water boundary conditions as requested. Note that the conditions provided are based on the worst-case scenario.

The following are boundary conditions, HGL, for hydraulic analysis for 455-483 Sherbourne (zone 1W) assumed to be connected to the 203mm on Sherbourne Road (see attached PDF for location).

Minimum HGL = 108.5m

Maximum HGL = 115.2m

Max Day + FF (200 L/s) = 88.7m

Available Fire Flow @ Residual 20psi = 247 L/s

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.

Please do not hesitate to contact me with any questions/concerns.

Regards,

Jessica Valic, E.I.T.

Project Manager

Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique

Development Review - West

City of Ottawa | Ville d'Ottawa

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613.580.2424 ext./poste 15672

jessica.valic@ottawa.ca

****Please note that due to the current situation, I am working remotely. Email is currently the best way to contact me****

From: Douglas Gray <d.gray@dbgrayengineering.com>
Sent: July 23, 2020 3:23 PM
To: Valic, Jessica <jessica.valic@ottawa.ca>
Cc: Caoimhin Kennedy <c.kennedy@dbgrayengineering.com>
Subject: 455-483 Sherbourne Rd

Hi Jessica

We are working on a project that proposes three new apartment buildings.

Please provide the boundary conditions at 455-483 Sherbourne Rd. We have calculated the following expected demands:

Building A:

Average daily demand: 0.2 L/s.

Maximum daily demand: 1.4 L/s.

Maximum hourly daily demand: 2.2 L/s

Fire Flow demand: 266.7 L/s

Fire Flow + Max Day: 268.1 L/s

Building B:

Average daily demand: 0.1 L/s.

Maximum daily demand: 0.7 L/s.

Maximum hourly daily demand: 1.1 L/s

Fire Flow demand: 200.0 L/s

Fire Flow + Max Day: 200.7 L/s

Building C:

Average daily demand: 0.2 L/s.

Maximum daily demand: 1.4 L/s.

Maximum hourly daily demand: 2.2 L/s

Fire Flow demand: 300.0 L/s

Fire Flow + Max Day: 301.4 L/s

Calculations are attached. All of the proposed service connections are to the 200 mm watermain in Sherbourne Rd.

Thanks, Doug

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455-483 Sherbourne July 2020.pdf
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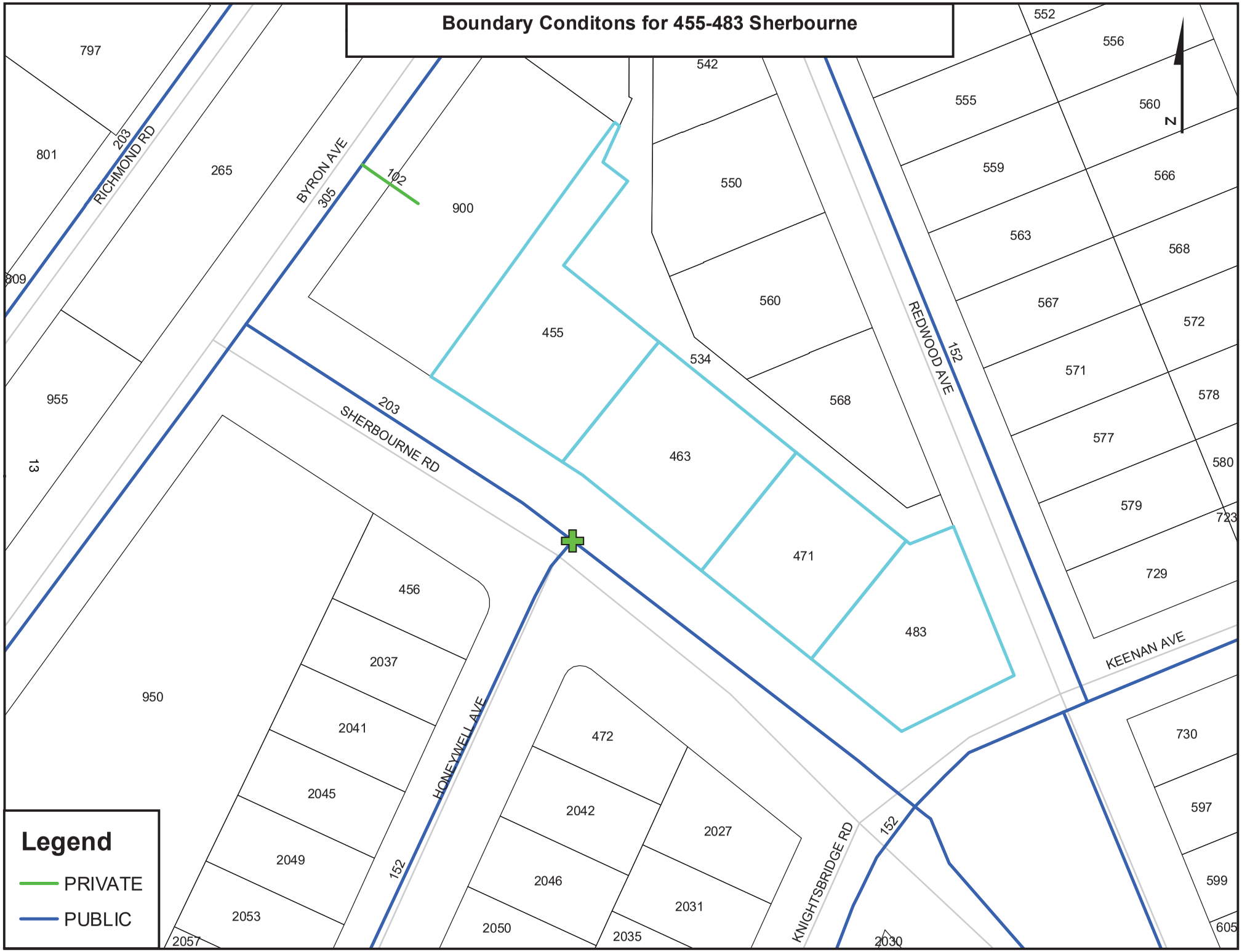
Boundary Conditons for 455-483 Sherbourne
797
801
809
203
RICHMOND RD
265
BYRON AVE
305
102
900
542
550
560
552
556
555
560
559
566
563
568
567
572
571
578
577
580
579
723
729
455
534
568
463
471
483
955
13
203
SHERBOURNE RD
REDWOOD AVE
152
KEENAN AVE
950
456
2037
2041
2045
2049
2053
2057
HONEYWELL AVE
152
472
2042
2046
2050
2027
2031
2035
KNIGHTSBRIDGE RD
152
2030
730
597
599
605
N
Legend
PRIVATE
PUBLIC

13-Jul-20

REVISED 28-Aug-20

455-483 Sherbourne Road (Building A)

Ottawa, Ontario

Peak Water Demand

WATER FIXTURE VALUE
(AWWA Manual M22 - Sizing Water Service Lines and Meters)

	No.	F.V.	Total
Bathtub		8	0
Toilet - tank	24	6	144
Tiolet - flush valve		24	0
Lavs.	24	1.5	36
Bidet		2	0
Urinal - wall flush valve		10	0
Shower	24	2.5	60
K. Sink	24	1.8	43.2
Dishwasher	24	1.3	31.2
Clothes Washer	24	6	144
Commercial Sink		4	0
J. Sink		4	0
Commercial Dishwasher		4	0
Commercial Washer		4	0
Hose 1/2 in		5	0
Hose 3/4 in		12	0
			458.4

Peak Demand (fig 4-2 or 4-3 AWWA M22)			45	USgpm		
Pressure @ Meter	469	kPa	68	psi		
Pressure Factor (table 4-1 AWWA M22)			1.07			
Peak Demand			48	USgpm		
Irrigation - hose 1/2 in	0		0	USgpm (includes pressure factor)		
TOTAL PEAK DEMAND	183	l/min	48	USgpm	3.0	l/s
		Nominal Size	2.0	in	50	mm
			5.1	ft/s	1.6	m/s

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SANITARY SEWER DESIGN FORM

Average Daily Flows
Residential: 280 l / capita / day
Commercial: 28000 l / ha / day
Instituational: 28000 l / ha / day
Light Industrial: 35000 l / ha / day
Heavy Industrial: 55000 l / ha / day

Infiltration Allowance: 0.33 l / s / ha

Peaking Factor:
Residential (Harmon Equation): $1 + \frac{14}{4 + P^{0.5}}$
P = Population / 1000
Harmon Correction Factor: 0.8
Commercial & Institutional: 1.5 If contrinbution > 20%
Commercial & Institutional: 1 If contrinbution < 20%
Industrial: As per Ottawa Guidelines Appendix 4-B

Project: 455-483 Sherbourne Rd
Designed By: D.B.G.
02-Sep-20
Page: 1 of 1

Location		Section								Cumulative Residential		Section Non-Residential			Cumulative					Sewer Data n = 0.013								Comments
		Single Family	Semi/Town house	Duplex / Triplex	Apartment (average)	Apartment (1 Bed.)	Apartment (2 Bed.)	Apartment (3 Bed.)	Residential Area	Pop.	Peaking Factor	Area	Flow	Peaking Factor	Flow	Area	Sewage Flow	Infiltration Flow	Total Flow	Type of Pipe	Dia. Actual	Dia. Nom.	Slope	Length	Capacity	Velocity	Ratio	
		ppu = 3.4	ppu = 2.7	ppu = 2.3	ppu = 1.8	ppu = 1.4	ppu = 2.1	ppu = 3.1																				
FROM	TO	No. of Units	No. of Units	No. of Units	No. of Units	No. of Units	No. of Units	No. of Units	ha			ha	l/ha/day		l/s	ha	l/s	l/s	l/s		(mm)	(mm)	(%)	(m)	(l/s)	(m/s)	Q/Qfull	
		EXISTING 6-UNIT APARTMENT BUILDING.																										
EXIST BLDG A	Exist 900				6				0.120	10.8	3.2					0.120	0.11	0.04	0.15									
		PROPOSED 24-UNIT APARTMENT BUILDING (BUILDING A)																										
PROP. BLDG A	Exist 900					17	7		0.120	38.5	3.2					0.120	0.40	0.04	0.44	PVC	152.4	150	1.00	22.7	15.9	0.87	0.03	
																Increase in Flow			0.29									
																				EXISTING 900 SANITARY SEWER IN SHERBOURNE RD								
																					914.4	900	0.36		1133	1.73		

STORMWATER MANAGEMENT CALCULATIONS

The orifice calculations are based on the following formula:

$$Q = C_d \times A_o \sqrt{2gh} \times 1000$$

where:

- Q = flowrate in litres per second
- C_d = coefficient of discharge
- A_o = orifice area in sq.m.
- g = 9.81 m/s2
- h = head above orifice in meters

Flow control roof drain calculations are based on the following formula:

$$Q = N \times S \times d \times F$$

where:

- Q = flowrate in litres per second
- N = number of roof drains
- S = slots per weir
- d = pond depth at roof drain in mm
- F = flowrate through each slot
  0.0124 litres per second per mm pond depth (5 USgpm per inch)

Storage calculations on the roof area are based on the following formula for volume of a cone:

$$V = (A \times d)/3$$

where:

- V = volume in cu.m.
- A = ponding area in sq.m.
- d = ponding depth in meters

Calculations for sub-surface storage (manholes and sewer pipes) are based on the following formula for volume of a cylinder:

$$V = L \times Pi \times (d/2)2$$

where:

- V = volume in cu.m.
- L = depth of water in manhole or length of pipe in meters
- d = diameter of manhole or pipe in meters

Summary Tables

ONE HUNDRED-YEAR EVENT					
Drainage Area	Pre-Development Release Rate (L/s)	Maximum Allowable Release Rate (L/s)	Maximum Release Rate (L/s)	Maximum Volume Required (cu.m)	Maximum Volume Stored (cu.m)
AREA IA (Uncontrolled Flow Off Site)	-	-	4.24	-	-
AREA IIA (Roof) * Drains to Area IIIA	-	-	3.39	17.32	17.32
AREA IIIA	-	-	8.41	11.07	11.07
TOTAL (Area IA+ IIIA)	22.19	11.35	12.65	28.39	28.39

FIVE-YEAR EVENT					
Drainage Area	Pre-Development Release Rate (L/s)	Maximum Allowable Release Rate (L/s)	Maximum Release Rate (L/s)	Maximum Volume Required (cu.m)	Maximum Volume Stored (cu.m)
AREA IA (Uncontrolled Flow Off Site)	-	-	2.22	-	-
AREA IIA (Roof) * Drains to Area IIIA	-	-	2.59	7.71	7.71
AREA IIIA	-	-	5.96	5.66	5.66
TOTAL (Area IA+ IIIA)	11.35	11.35	8.18	13.36	13.36

455-483 Sherbourne Road
Building 'A'
Ottawa, Ontario

STORMWATER MANAGEMENT CALCULATIONS
Rational Method

PRE-DEVELOPMENT CONDITIONS

100-Year Release Rate

			C
Roof Area:	286	sq.m	1.00
Asphalt/Concrete Area:	203	sq.m	1.00
Gravel Area:	0	sq.m	0.875
Landscaped Area:	706	sq.m	0.25
Total Catchment Area:	1195	sq.m	0.56

Area (A):	1195	sq.m
Time of Concentration:	20	min
Rainfall Intensity (i):	120	mm/hr (100-year event)
Runoff Coeficient (C):	0.56	
100-Year Pre-Development Release Rate (2.78AiC):	22.19	L/s

5-Year Flow Rate and Maximum Allowable Release Rate

			C
Roof Area:	286	sq.m	0.90
Asphalt/Concrete Area:	203	sq.m	0.90
Gravel Area:	0	sq.m	0.70
Landscaped Area:	706	sq.m	0.20
Total Catchment Area:	1195	sq.m	0.49

Area (A):	1195	sq.m
Time of Concentration:	20	min
Rainfall Intensity (i):	70	mm/hr (5 year event)
Runoff Coeficient (C):	0.49	
Maximum Allowable Release Rate (2.78AiC):	11.35	L/s

ONE HUNDRED-YEAR EVENT

DRAINAGE AREA IA (Uncontrolled Flow Off Site)

(ONE HUNDRED-YEAR EVENT)

			C
Roof Area:	0	sq.m	1.00
Asphalt/Concrete Area:	84	sq.m	1.00
Gravel Area:	0	sq.m	0.875
Landscaped Area:	6	sq.m	0.25
Total Catchment Area:	90	sq.m	0.95

Area (A):	90	sq.m
Time of Concentration:	10	min
Rainfall Intensity (i):	179	mm/hr
Runoff Coeficient (C):	0.95	
Release Rate (2.78AiC):	4.24	L/s

DRAINAGE AREA IIA (Roof)

(ONE HUNDRED-YEAR EVENT)

			C
Roof Area:	507	sq.m	1.00
Asphalt/Concrete Area:	0	sq.m	1.00
Gravel Area:	0	sq.m	0.875
Landscaped Area:	0	sq.m	0.25
Total Catchment Area:	507	sq.m	1.00

No. of Roof Drains: 2

Slots per Wier: 1 0.0124 L/s/mm/slot (5 USGPM/in/slot)

Depth at Roof Drain: 137 mm

Maximum Release Rate: 3.39 L/s Pond Area: 380 sq.m

Achieved Volume: 17.32 cu.m

Maximum Volume Required: 17.32 cu.m

Time (min)	i (mm/hr)	2.78AiC (L/s)	Release Rate (L/s)	Stored Rate (L/s)	Stored Volume (cu.m)
5	243	34.21	3.39	30.82	9.25
10	179	25.17	3.39	21.78	13.07
15	143	20.14	3.39	16.75	15.08
20	120	16.91	3.39	13.52	16.22
25	104	14.64	3.39	11.25	16.87
30	92	12.95	3.39	9.56	17.21
35	83	11.64	3.39	8.25	17.32
40	75	10.59	3.39	7.20	17.28
45	69	9.73	3.39	6.34	17.13
50	64	9.01	3.39	5.62	16.87
55	60	8.40	3.39	5.01	16.55
60	56	7.88	3.39	4.49	16.16
65	53	7.42	3.39	4.03	15.72
70	50	7.02	3.39	3.63	15.24
75	47	6.66	3.39	3.27	14.72
80	45	6.34	3.39	2.95	14.17
85	43	6.05	3.39	2.66	13.59
90	41	5.79	3.39	2.40	12.99
95	39	5.56	3.39	2.17	12.36
100	38	5.34	3.39	1.95	11.72
105	36	5.14	3.39	1.75	11.05
110	35	4.96	3.39	1.57	10.38
115	34	4.79	3.39	1.40	9.68
120	33	4.64	3.39	1.25	8.98
125	32	4.49	3.39	1.10	8.26
130	31	4.35	3.39	0.97	7.53
135	30	4.23	3.39	0.84	6.79
140	29	4.11	3.39	0.72	6.04
145	28	4.00	3.39	0.61	5.28
150	28	3.89	3.39	0.50	4.52
180	24	3.37	3.37	0.00	0.00
210	21	2.98	2.98	0.00	0.00
240	19	2.68	2.68	0.00	0.00
270	17	2.44	2.44	0.00	0.00
300	16	2.24	2.24	0.00	0.00

DRAINAGE AREA IIIA

(ONE HUNDRED-YEAR EVENT)

			C
Roof Area:	0	sq.m	1.00
Asphalt/Concrete Area:	133	sq.m	1.00
Gravel Area:	0	sq.m	0.875
Landscaped Area:	465	sq.m	0.25
Total Catchment Area:	598	sq.m	0.42

Water Elevation:	63.19	m
Invert of Outlet Pipe - CB/MH-3A:	62.66	m
Centroid of ICD Orifice: (ICD in Outlet Pipe of CB/MH-3A)	62.70	m
Head:	0.50	m
Orifice Diameter:	75	mm
Orifice Area:	4418	sq.mm
Coefficient of Discharge:	0.61	
Maximum Release Rate:	8.41	L/s

CB/MH Storage

	Invert	Size	Volume	
CB/MH-1A	62.80	1200	0.46	cu.m
CB/MH-2A	62.70	1200	0.58	cu.m
CB/MH-3A	62.66	1200	0.62	cu.m

Pipe Storage

From	Invert	To	Invert	Length	Dia.	Volume	
CB/MH-1A	62.80	CB/MH-2A	62.70	28.4	300	2.07	cu.m
CB/MH-2A	62.70	CB/MH-3A	62.66	27.9	600	7.34	cu.m

Achieved Volume:	11.07	cu.m
Maximum Volume Required:	11.07	cu.m

Time (min)	i (mm/hr)	2.78AiC (L/s)	Flow from Roof (L/s)	Total Inflow (L/s)	50% Release Rate (L/s)	Stored Rate (L/s)	Stored Volume (cu.m)
5	243	16.82	3.39	20.21	4.20	16.00	4.80
10	179	12.37	3.39	15.76	4.20	11.56	6.93
15	143	9.90	3.39	13.29	4.20	9.09	8.18
20	120	8.31	3.39	11.70	4.20	7.50	9.00
25	104	7.20	3.39	10.59	4.20	6.38	9.57
30	92	6.37	3.39	9.76	4.20	5.55	9.99
35	83	5.72	3.39	9.11	4.20	4.91	10.31
40	75	5.21	3.39	8.60	4.20	4.39	10.54
45	69	4.78	3.39	8.17	4.20	3.97	10.72
50	64	4.43	3.39	7.82	4.20	3.62	10.85
55	60	4.13	3.39	7.52	4.20	3.32	10.94
60	56	3.87	3.39	7.26	4.20	3.06	11.01
65	53	3.65	3.39	7.04	4.20	2.83	11.05
70	50	3.45	3.39	6.84	4.20	2.64	11.07
75	47	3.27	3.39	6.66	4.20	2.46	11.07
80	45	3.12	3.39	6.51	4.20	2.30	11.05
85	43	2.98	3.39	6.37	4.20	2.16	11.02
90	41	2.85	3.39	6.24	4.20	2.03	10.98
95	39	2.73	3.39	6.12	4.20	1.92	10.93
100	38	2.63	3.39	6.02	4.20	1.81	10.87
105	36	2.53	3.39	5.92	4.20	1.71	10.80
110	35	2.44	3.39	5.83	4.20	1.62	10.72
115	34	2.36	3.39	5.75	4.20	1.54	10.64
120	33	2.28	3.39	5.67	4.20	1.46	10.54
125	32	2.21	3.39	5.60	4.20	1.39	10.45
130	31	2.14	3.39	5.53	4.20	1.33	10.34
135	30	2.08	3.39	5.47	4.20	1.26	10.24
140	29	2.02	3.39	5.41	4.20	1.21	10.12
145	28	1.96	3.39	5.35	4.20	1.15	10.01
150	28	1.91	3.39	5.30	4.20	1.10	9.89
180	24	1.66	3.37	5.03	4.20	0.82	8.86
210	21	1.47	2.98	4.45	4.20	0.24	3.04
240	19	1.32	2.68	4.00	4.00	0.00	0.00
270	17	1.20	2.44	3.64	3.64	0.00	0.00
300	16	1.10	2.24	3.34	3.34	0.00	0.00

FIVE-YEAR EVENT

DRAINAGE AREA IA (Uncontrolled Flow Off Site)

(FIVE-YEAR EVENT)

			C
Roof Area:	0	sq.m	0.90
Asphalt/Concrete Area:	84	sq.m	0.90
Gravel Area:	0	sq.m	0.70
Landscaped Area:	6	sq.m	0.20
Total Catchment Area:	90	sq.m	0.85

Area (A):	90	sq.m
Time of Concentration:	10	min
Rainfall Intensity (i):	104	mm/hr
Runoff Coeficient (C):	0.85	
Release Rate (2.78AiC):	2.22	L/s

DRAINAGE AREA IIA (Roof)

(FIVE-YEAR EVENT)

			C
Roof Area:	507	sq.m	0.90
Asphalt/Concrete Area:	0	sq.m	0.90
Gravel Area:	0	sq.m	0.70
Landscaped Area:	0	sq.m	0.20
Total Catchment Area:	507	sq.m	0.90

No. of Roof Drains: 2

Slots per Wier: 1 0.0124 L/s/mm/slot (5 USGPM/in/slot)

Depth at Roof Drain: 104 mm

Maximum Release Rate: 2.59 L/s Pond Area: 222 sq.m

Achieved Volume: 7.71 cu.m

Maximum Volume Required: 7.71 cu.m

Time (min)	i (mm/hr)	2.78AiC (L/s)	Release Rate (L/s)	Stored Rate (L/s)	Stored Volume (cu.m)
5	141	17.91	2.59	15.32	4.60
10	104	13.22	2.59	10.63	6.38
15	84	10.60	2.59	8.01	7.21
20	70	8.91	2.59	6.32	7.59
25	61	7.72	2.59	5.14	7.71
30	54	6.84	2.59	4.25	7.66
35	49	6.15	2.59	3.57	7.49
40	44	5.60	2.59	3.02	7.24
45	41	5.15	2.59	2.57	6.93
50	38	4.78	2.59	2.19	6.57
55	35	4.46	2.59	1.87	6.16
60	33	4.18	2.59	1.59	5.73
65	31	3.94	2.59	1.35	5.27
70	29	3.73	2.59	1.14	4.78
75	28	3.54	2.59	0.95	4.28
80	27	3.37	2.59	0.78	3.75
85	25	3.22	2.59	0.63	3.22
90	24	3.08	2.59	0.49	2.66
95	23	2.96	2.59	0.37	2.10
100	22	2.84	2.59	0.25	1.53
105	22	2.74	2.59	0.15	0.95
110	21	2.64	2.59	0.05	0.36
115	20	2.55	2.55	0.00	0.00
120	19	2.47	2.47	0.00	0.00
125	19	2.39	2.39	0.00	0.00
130	18	2.32	2.32	0.00	0.00
135	18	2.25	2.25	0.00	0.00
140	17	2.19	2.19	0.00	0.00
145	17	2.13	2.13	0.00	0.00
150	16	2.08	2.08	0.00	0.00
180	14	1.80	1.80	0.00	0.00
210	13	1.59	1.59	0.00	0.00
240	11	1.43	1.43	0.00	0.00
270	10	1.30	1.30	0.00	0.00
300	9	1.20	1.20	0.00	0.00

DRAINAGE AREA IIIA

(FIVE-YEAR EVENT)

			C
Roof Area:	0	sq.m	0.90
Asphalt/Concrete Area:	133	sq.m	0.90
Gravel Area:	0	sq.m	0.70
Landscaped Area:	465	sq.m	0.20
Total Catchment Area:	598	sq.m	0.36

Water Elevation:	62.95	m
Invert of Outlet Pipe - CB/MH-3A:	62.66	m
Centroid of ICD Orifice: (ICD in Outlet Pipe of CB/MH-3A)	62.70	m
Head:	0.25	m
Orifice Diameter:	75	mm
Orifice Area:	4418	sq.mm
Coefficient of Discharge:	0.61	
Maximum Release Rate:	5.96	L/s

CB/MH Storage

	Invert	Size	Volume	
CB/MH-1A	62.80	1200	0.17	cu.m
CB/MH-2A	62.70	1200	0.29	cu.m
CB/MH-3A	62.66	1200	0.33	cu.m

Pipe Storage

From	Invert	To	Invert	Length	Dia.	Volume	
CB/MH-1A	62.80	CB/MH-2A	62.70	28.4	300	1.41	cu.m
CB/MH-2A	62.70	CB/MH-3A	62.66	27.9	600	3.45	cu.m
					Achieved Volume:	5.66	cu.m
					Maximum Volume Required:	5.66	cu.m

Time (min)	i (mm/hr)	2.78AiC (L/s)	Flow from Roof (L/s)	Total Inflow (L/s)	50% Release Rate (L/s)	Stored Rate (L/s)	Stored Volume (cu.m)
5	141	8.35	2.59	10.94	2.98	7.96	2.39
10	104	6.16	2.59	8.75	2.98	5.77	3.46
15	84	4.94	2.59	7.53	2.98	4.55	4.09
20	70	4.15	2.59	6.74	2.98	3.76	4.51
25	61	3.60	2.59	6.19	2.98	3.21	4.81
30	54	3.19	2.59	5.78	2.98	2.80	5.03
35	49	2.87	2.59	5.46	2.98	2.48	5.20
40	44	2.61	2.59	5.20	2.98	2.22	5.33
45	41	2.40	2.59	4.99	2.98	2.01	5.43
50	38	2.23	2.59	4.81	2.98	1.83	5.50
55	35	2.08	2.59	4.66	2.98	1.68	5.56
60	33	1.95	2.59	4.54	2.98	1.56	5.60
65	31	1.84	2.59	4.42	2.98	1.44	5.63
70	29	1.74	2.59	4.32	2.98	1.34	5.65
75	28	1.65	2.59	4.24	2.98	1.26	5.66
80	27	1.57	2.59	4.16	2.98	1.18	5.66
85	25	1.50	2.59	4.09	2.98	1.11	5.65
90	24	1.44	2.59	4.02	2.98	1.04	5.64
95	23	1.38	2.59	3.97	2.98	0.99	5.62
100	22	1.32	2.59	3.91	2.98	0.93	5.60
105	22	1.28	2.59	3.86	2.98	0.88	5.57
110	21	1.23	2.59	3.82	2.98	0.84	5.54
115	20	1.19	2.55	3.74	2.98	0.76	5.26
120	19	1.15	2.47	3.62	2.98	0.64	4.62
125	19	1.12	2.39	3.51	2.98	0.53	3.96
130	18	1.08	2.32	3.40	2.98	0.42	3.30
135	18	1.05	2.25	3.30	2.98	0.32	2.63
140	17	1.02	2.19	3.21	2.98	0.23	1.95
145	17	0.99	2.13	3.12	2.98	0.15	1.26
150	16	0.97	2.08	3.04	2.98	0.06	0.57
180	14	0.84	1.80	2.64	2.64	0.00	0.00
210	13	0.74	1.59	2.34	2.34	0.00	0.00
240	11	0.67	1.43	2.10	2.10	0.00	0.00
270	10	0.61	1.30	1.91	1.91	0.00	0.00
300	9	0.56	1.20	1.76	1.76	0.00	0.00

Building A - 455-483 Sherbourne Road

Ottawa, Ontario

STORM SEWER COMPUTATION FORM

Rational Method

FIVE YEAR EVENT

Q = 2.78 A i C

August 28, 2020

n = 0.013

Location			Areas (ha)				Individual	Accum.	Time of	Rainfall Intensity	Peak Flow	Pipe Data									Notes
			Hard	Gravel	Landscape	Roof			Conc.	i	Q		Actual Diameter	Nominal Diameter	Slope	Length	Capacity	Velocity	Time of Flow	Ratio	
Street	From	To	C = 0.9	C = 0.7	C = 0.2	C = 0.9	2.78AC	2.78AC	(min)	(mm/hr)	(L/s)	Material	(mm)	(mm)	(%)	(m)	(L/s)	(m/s)	(min)	Q/Qfull	
	ROOF	CB/MH-1A				0.0507	0.1269	0.1269	10.00	104	13.22	PVC	203.2	200	1.00	3.8	34.2	1.06	0.06	0.39	
	CB/MH-1A	CB/MH-2A	0.0028		0.0458		0.0325	0.1593	10.06	104	16.55	PVC	304.8	300	0.34	28.4	58.8	0.81	0.59	0.28	
	CB/MH-2A	CB/MH 3A	0.0010		0.0320		0.0203	0.1796	10.65	101	18.12	Concrete	609.6	600	0.14	27.9	242.2	0.83	0.56	0.07	
	CB/MH 3A	CB/MH-4A	0.0141		0.0243		0.0488	0.2284	11.21	98	22.43	PVC	304.8	300	0.34	5.1	58.8	0.81	0.11	0.38	
											5.96	PVC	304.8	300	0.34	5.1	58.8	0.81	0.11	0.10	ICD FLOW THRU ICD

D.B. Gray Engineering Inc.

Douglas Gray <d.gray@dbgrayengineering.com>

RE: FW: 550-560 Redwood Ave & 463-471 Sherbourne Road - Pre-consultation follow-up

1 message

Valic, Jessica <jessica.valic@ottawa.ca> Fri, May 1, 2020 at 1:11 PM
To: Douglas Gray <d.gray@dbgrayengineering.com>

Good afternoon Doug,

SWM criteria for the Sherbourne properties is:

- Coefficient (C) of runoff will need to be determined **as per existing conditions** but in no case more than 0.5
- TC = 20 minutes or can be calculated (not less than 10min)
- Storm events greater than 5 year, up to 100 year, and including 100 year storm event must be detained on site.

Concerning the trunk connections, pumping will be required as will backwater valves. As these are trunk mains, minimizing the number of connections to the mains is encouraged. I recognize these may not be possible based on the design, but please consider the following approaches:

- Limit to one storm connection per property
- Connect new laterals in same location as existing to minimize additional cuts in sewers
- Reuse existing laterals if in good condition and size is appropriate

There is also a road cut moratorium on Sherbourne Ave until July 2022 so minimizing the number of road cuts for these developments is encouraged.

Please do not hesitate to contact me with any questions/concerns.

Regards,

Jessica Valic, E.I.T.

Engineering Intern

Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique

Development Review - Central

City of Ottawa | Ville d'Ottawa

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

613.580.2424 ext./poste 15672

jessica.valic@ottawa.ca

From: Douglas Gray <d.gray@dbgrayengineering.com>
Sent: April 29, 2020 4:12 PM
To: Valic, Jessica <jessica.valic@ottawa.ca>
Cc: Ryan Faith <r.faith@dbgrayengineering.com>
Subject: Fwd: FW: 550-560 Redwood Ave & 463-471 Sherbourne Road - Pre-consultation follow-up

Hi Jessica

We are working on a project at 463-471 Sherbourne Rd.

Please advise us of the criteria we are to follow with respect to SWM and the trunk sewer (see email below from Steve Gauthier). (The project at 550-560 Redwood Ave is not proceeding at this time.)

Is there any other relevant information that you can provide?

Regards, Doug

D.B. Gray Engineering Inc.

Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains

700 Long Point Circle Tel: 613-425-8044

Ottawa, Ontario K1T 4E9 d.gray@dbgrayengineering.com

---------- Forwarded message ---------
From: **Jordan Tannis** <jt@concorde-properties.ca>
Date: Mon, Apr 13, 2020 at 8:33 AM
Subject: FW: 550-560 Redwood Ave & 463-471 Sherbourne Road - Pre-consultation follow-up
To: Douglas Gray <d.gray@dbgrayengineering.com>, Brandon Lawrence <brandon@sjlarchitect.com>

Let's arrange a call this week. Thank you.

From: Gauthier, Steve <Steve.Gauthier@ottawa.ca>
Sent: Sunday, April 12, 2020 9:55 PM
To: Jordan Tannis <jt@concorde-properties.ca>
Cc: Valic, Jessica <jessica.valic@ottawa.ca>
Subject: 550-560 Redwood Ave & 463-471 Sherbourne Road - Pre-consultation follow-up

Hi Jordan,

Please find attached the submission list.

The salient points discussed at the meeting were:

- Property is designated Mid-rise Park Frame in the Secondary Plan.
- The proponent wants to avoid any reliefs to the zoning by-law and proceed directly with site plan control.
- Common element will be required for the private lane.
- The proposed side entrances to the building need to be relocated to the front. There could be an entrance for one unit fronting onto the street and a side one for the remaining of the building.
- Minimise window alignment with adjacent existing residential buildings.
- Building C: remove the flag portion to the south to minimise obstruction with the existing building to the east.
- Trees will have to be preserved along the two streets.
- Sherbourne is serviced by a trunk sewer. Additional criteria's will be required. Please have your engineering consultant contact Jessica Valic directly.
- The Stormwater criteria is different for the two streets. Please have your engineering consultant contact Jessica Valic directly.

Regards,

Steve Gauthier **RPP**
Planner | Urbaniste

Development Review | Examen des projets d'aménagement

Planning Department | **Service de l'urbanisme**

City of Ottawa | Ville d'Ottawa

613.580.2424 ext./poste 27889

ottawa.ca/planning / ottawa.ca/urbanisme

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D.B. Gray Engineering Inc.

Douglas Gray <d.gray@dbgrayengineering.com>

RE: RVCA Stormwater Management Comments - 455-483 Sherbourne Road

1 message

Jamie Batchelor <jamie.batchelor@rvca.ca> Wed, Aug 26, 2020 at 9:16 AM
To: Ryan Faith <r.faith@dbgrayengineering.com>
Cc: Douglas Gray <d.gray@dbgrayengineering.com>

Good Morning Ryan,

For this one, we would want to see some sort of improvement with water quality given the large amount of parking spaces. In other instances where grading has been an issue, permeable pavers, control of ponding, swales and sometimes even storage tanks for settling have been considered. We would rely on the Engineer to provide a solution to the issue if not proposing traditional onsite water quality treatment.

It is only due to the number of new parking spaces being proposed that we could consider an improvement over full water quality targets.

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: Ryan Faith <r.faith@dbgrayengineering.com>
Sent: Wednesday, August 26, 2020 9:09 AM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Douglas Gray <d.gray@dbgrayengineering.com>
Subject: Re: RVCA Stormwater Management Comments - 455-483 Sherbourne Road

Jamie,

An update on this one too please.

Ryan Faith

D.B. Gray Engineering Inc.

Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains

700 Long Point Circle 613-425-8044
Ottawa, Ontario r.faith@dbgrayengineering.com

On Mon, Aug 17, 2020 at 2:36 PM Ryan Faith <r.faith@dbgrayengineering.com> wrote:

> Hi Jamie,

Just following up on my previous email.

Thanks,

Ryan Faith

D.B. Gray Engineering Inc.

Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains

700 Long Point Circle 613-425-8044
Ottawa, Ontario r.faith@dbgrayengineering.com

On Wed, Aug 12, 2020 at 10:52 AM Ryan Faith <r.faith@dbgrayengineering.com> wrote:

> Hi Jamie,
>
> It would be difficult to drain the parking area without the use of the catch-basins. There would be some very small longitudinal slopes and some very steep cross slopes, which is not ideal - especially in parking stalls. The small longitudinal slopes would pose a constant risk of flooding at those rear entrances to both the proposed building and existing neighbouring building.
>
> Regards,
>
> Ryan Faith
>
> D.B. Gray Engineering Inc.
>
> *Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains*
>
> 700 Long Point Circle 613-425-8044
> Ottawa, Ontario r.faith@dbgrayengineering.com
>
> On Wed, Aug 12, 2020 at 10:29 AM Jamie Batchelor <jamie.batchelor@rvca.ca> wrote:
>
> > Thanks Ryan,
> >
> > Based on the grading Plan, only a small amount of the existing parking is being re-graded. Therefore in this instance we would be looking for some of improvement over the existing condition. Given the amount of grassed area, would there be an opportunity to have some of the flows go through a vegetated swale in order to provide some treatment?
> >
> > Jamie Batchelor, MCIP, RPP
> >
> > Planner, ext. 1191
> >
> > Jamie.batchelor@rvca.ca

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From: Ryan Faith <r.faith@dbgrayengineering.com>
Sent: Wednesday, August 12, 2020 10:22 AM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Douglas Gray <d.gray@dbgrayengineering.com>
Subject: Re: RVCA Stormwater Management Comments - 455-483 Sherbourne Road

Hi Jamie,

Our grading plan is attached. Let me know if you have any questions.

Regards,

Ryan Faith

D.B. Gray Engineering Inc.

Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains

700 Long Point Circle 613-425-8044
Ottawa, Ontario r.faith@dbgrayengineering.com

On Tue, Aug 11, 2020 at 5:32 PM Jamie Batchelor <jamie.batchelor@rvca.ca> wrote:

> Hi Ryan,
>
> I'm wondering if you have a grading plan that will show the extent of grading required. This may help me better understand the scope of the works required and we can factor that into our comments and perhaps discuss further.
>
> Jamie Batchelor, MCIP, RPP
>
> Planner, ext. 1191
>
> Jamie.batchelor@rvca.ca

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From: Ryan Faith <r.faith@dbgrayengineering.com>
Sent: Tuesday, August 11, 2020 4:52 PM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Douglas Gray <d.gray@dbgrayengineering.com>
Subject: Re: RVCA Stormwater Management Comments - 455-483 Sherbourne Road

Hi Jamie,

Thanks for the clarification. I should point out that only 5 parking spaces are proposed behind Building A and 4 parking spaces are proposed behind Building B. I have attached a site plan for your reference.

Regards,

Ryan Faith

D.B. Gray Engineering Inc.

Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains

700 Long Point Circle 613-425-8044
Ottawa, Ontario r.faith@dbgrayengineering.com

On Tue, Aug 11, 2020 at 4:44 PM Jamie Batchelor <jamie.batchelor@rvca.ca> wrote:

> Hi Ryan,
>
> The trigger for onsite water quality parking would be 6 parking spaces or more.
>
> Jamie Batchelor, MCIP, RPP
>
> Planner, ext. 1191
>
> Jamie.batchelor@rvca.ca
>
> Rideau Valley Conservation Authority
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>
>
>
> **From:** Ryan Faith <r.faith@dbgrayengineering.com>
> **Sent:** Tuesday, August 11, 2020 4:43 PM
> **To:** Jamie Batchelor <jamie.batchelor@rvca.ca>
> **Cc:** Douglas Gray <d.gray@dbgrayengineering.com>
> **Subject:** Re: RVCA Stormwater Management Comments - 455-483 Sherbourne Road
>
> Hi Jamie,
>
> I understand the RVCA can see it as an opportunity, however the asphalt represents such a small percentage of the site. The vast majority of the site is considered to be clean for the purpose of protecting aquatic and fish habitat. What area of asphalt or what number of parking stalls triggers the opportunity?

Regards,

Ryan Faith

D.B. Gray Engineering Inc.

Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains

700 Long Point Circle 613-425-8044
Ottawa, Ontario r.faith@dbgrayengineering.com

On Tue, Aug 11, 2020 at 4:35 PM Jamie Batchelor <jamie.batchelor@rvca.ca> wrote:

> Hi Ryan,
>
> Thanks for the clarification. However, if the parking spaces are being regraded, then the RVCA would view this as an opportunity to provide water quality controls on the site.
>
> 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:** Ryan Faith <r.faith@dbgrayengineering.com>
> **Sent:** Tuesday, August 11, 2020 4:17 PM
> **To:** Jamie Batchelor <jamie.batchelor@rvca.ca>
> **Cc:** Douglas Gray <d.gray@dbgrayengineering.com>
> **Subject:** Re: RVCA Stormwater Management Comments - 455-483 Sherbourne Road
>
> Hi Jamie,
>
> There is no increase in asphalt areas. The parking spaces at the rear of the buildings are existing and are simply being regraded to improve drainage. The only increases in hard surfaces are the roofs.

Ryan Faith

D.B. Gray Engineering Inc.

Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains

700 Long Point Circle 613-425-8044
Ottawa, Ontario r.faith@dbgrayengineering.com

On Tue, Aug 11, 2020 at 4:03 PM Jamie Batchelor <jamie.batchelor@rvca.ca> wrote:

> Good Afternoon Ryan,
>
> The downstream outlet is less than 500 metres. There is no downstream stormwater facility. Therefore the appropriate water quality target is enhanced (80% TSS removal). If the configuration of the parking at the rear is changing or the storm pipes (if applicable) are being altered, then water quality needs to be accounted for in those areas as well.
>
> Jamie Batchelor, MCIP, RPP
>
> Planner, ext. 1191
>
> Jamie.batchelor@rvca.ca
>
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>
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> PO Box 599, Manotick ON K4M 1A5
> T 613-692-3571 | 1-800-267-3504 F 613-692-0831 | www.rvca.ca
>
>
>
> **From:** Ryan Faith <r.faith@dbgrayengineering.com>
> **Sent:** Monday, August 10, 2020 9:11 AM
> **To:** Jamie Batchelor <jamie.batchelor@rvca.ca>
> **Cc:** Douglas Gray <d.gray@dbgrayengineering.com>
> **Subject:** Re: RVCA Stormwater Management Comments - 455-483 Sherbourne Road
>
> Hi Jamie,
>
> This is a reminder that we are still waiting on your comments for this one.
>
> Regards,
>
> Ryan Faith
>
> D.B. Gray Engineering Inc.
>
> *Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains*
>
> 700 Long Point Circle 613-425-8044
> Ottawa, Ontario r.faith@dbgrayengineering.com

On Fri, Jul 31, 2020 at 11:21 AM Ryan Faith <r.faith@dbgrayengineering.com> wrote:

> Hi Jamie,
>
> We are working on a proposed development consisting of 3 apartment buildings on 4250 sq.m of land at 455-483 Sherbourne Road in Ottawa. The parking at the rear is an existing condition to remain.
>
> Please comment on the stormwater management for the site.
>
> I have attached a site plan for your reference.
>
> Thanks,

Ryan Faith

D.B. Gray Engineering Inc.

Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains

700 Long Point Circle 613-425-8044
Ottawa, Ontario r.faith@dbgrayengineering.com

City of Ottawa Servicing Study Checklist

General Content

Executive Summary (for large reports only): not applicable

Date and revision number of the report: see page 1 of Servicing Brief and Stormwater Management Report

Location map and plan showing municipal address, boundary, and layout of proposed development: see drawings C-1 to C-8

Plan showing the site and location of all existing services: see drawings C-1 to C-8

Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere: not applicable

Summary of Pre-consultation Meetings with City and other approval agencies: not available

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: not applicable

Statement of objectives and servicing criteria: see page 2 of Servicing Brief and Stormwater Management Report

Identification of existing and proposed infrastructure available in the immediate area: see drawings C-1 to C-8

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). see drawings C-1 to C-8

Concept level master grading plan to confirm existing and proposed grades in the development 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: not applicable

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: not applicable

Proposed phasing of the development, if applicable: not applicable

Reference to geotechnical studies and recommendations concerning servicing: see note 1.5 on drawing C-6

All preliminary and formal site plan submissions should have the following information:

- **Metric scale:** included
- **North arrow:** included
    - **(including construction North):** not included

- **Key Plan:** included
- **Name and contact information of applicant and property owner:** not available
- **Property limits**: included
    - **including bearings and dimensions:** not included
- **Existing and proposed structures and parking areas:** included
- **Easements, road widening and rights-of-way:** included
- **Adjacent street names:** included

Development Servicing Report: Water

Confirm consistency with Master Servicing Study, if available: not applicable

Availability of public infrastructure to service proposed development: see page 2 & 3 of Servicing Brief

Identification of system constraints: see page 2 & 3 of Servicing Brief

Confirmation of adequate domestic supply and pressure: see page 2 of Servicing Brief

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 locations throughout the development: see page 2 & 3 of Servicing Brief

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: see page 2 & 3 of Servicing Brief

Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design: not applicable

Address reliability requirements such as appropriate location of shut-off valves: not applicable

Check on the necessity of a pressure zone boundary modification:. not applicable

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: not applicable

Description of the proposed water distribution network, including locations of proposed connections to the existing systems, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions: not applicable

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: not applicable

Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines: see page 2 & 3 of Servicing Brief

Provision of a model schematic showing the boundary conditions locations, streets , parcels, and building locations for reference: not applicable

Development Servicing Report: Wastewater

Summary of proposed design criteria: see page 3 & 4 of Servicing Brief

(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): not applicable

Confirm consistency with Master Servicing Study and /or justification for deviations: not applicable

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 conditions of sewers: not applicable

Descriptions of existing sanitary sewer available for discharge of wastewater from proposed development: see page 3 & 4 of Servicing Brief

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): not applicable

Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix C) format. see page 9 of Servicing Brief

Description of proposed sewer network including sewers, pumping stations, and forcemains: see page 3 &4 of Servicing Brief

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): not applicable

Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development: not applicable

Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity: not applicable

Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding: not applicable

Special considerations such as contamination, corrosive environment etc: not applicable

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): see page 4 & 6 of Servicing Brief and Stormwater Management Report

Analysis of available capacity in existing public infrastructure. not applicable

A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern: see drawing C-4

Water quality 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: see Stormwater Management Report Servicing Brief and Stormwater Management Report

Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements: Servicing Brief and Stormwater Management Report

Descriptions of the references and supporting information.
Set-back from private sewage disposal systems. not applicable

Watercourse and hazard lands setbacks: not applicable

Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed: the pre-application consultation record is not yet been issued

Confirm consistency with sub-waterched and Master Servicing Study, if applicable study exists: not applicable

Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period). see drawings C-1 to C-4 and Servicing Brief and Stormwater Management Report

Identification of watercourses within the proposed development and how watercourses will be protected, or , if necessary, altered by the proposed development with applicable approvals. see drawings C-1 to C-4 and Servicing Brief and Stormwater Management Report

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: see Servicing Brief and Stormwater Management Report

Any proposed diversion of drainage catchment areas from one outlet to another. : not applicable

Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities. : not applicable

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: not applicable

Identification of potential impacts to receiving watercourses: Servicing Brief and Stormwater Management Report

Identification of municipal drains and related approval requirements. : not applicable

Descriptions of how the conveyance and storage capacity will be achieved for the development: see page 4 to 6 of Servicing Brief and Stormwater Management Report

100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading:

Inclusion of hydraulic analysis including hydraulic grade line elevations. : not applicable

Description of approach to erosion and sediment control during construction for the protection of receiving watercourses of drainage corridors: see notes 2.1 to 2.5 on drawing C-2

Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplains elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current: not applicable

Identification of fill constraints related to floodplain and geotechnical investigation. : not applicable

Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

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 approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act: see page 19 of Servicing Brief and Stormwater Management Report

Application for Certificate of Approval (CofA) under the Ontario Water Resources Act:

Changes to Municipal Drains. : not applicable

Other permits (National Capital commission, Parks Canada, public Works and Government Services Canada, Ministry of transportation etc.) : not applicable

Conclusion Checklist

Clearly stated conclusions and recommendations: see page 6 & 7 of Servicing Brief

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: included