D.B. Gray Engineering Inc.

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

700 Long Point Circle
Ottawa, Ontario K1T 4E9

613-425-8044
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SITE SERVICING STUDY & STORMWATER MANAGEMENT REPORT

216 MCARTHUR AVENUE
OTTAWA, ONTARIO

REPORT NO. 20123

FEBRUARY 2, 2023

CONTENTS

LIST OF APPENDICES

1.0 INTRODUCTION

This report describes the servicing and stormwater management requirements for a proposed 3-storey mixed use building comprised of 12 residential apartment units and partial ground floor commercial located at 216 McArthur Avenue in Ottawa, Ontario. The property is currently occupied by an existing triplex residential building to be demolished.

This report forms part of the servicing and stormwater management design for the proposed development. Also refer to drawings C-1 to C-3, prepared by D.B. Gray Engineering Inc.

2.0 WATER SERVICING

2.1 WATER SUPPLY FOR FIREFIGHTING

There is an existing municipal Class AA fire hydrant located between 203 McArthur Avenue and 217 McArthur Avenue. It is 27 m unobstructed distance to the NW corner of the proposed building, which is less than the maximum 90 m permitted by the Ontario Building Code; therefore, a private fire hydrant is not required.

As per City of Ottawa Technical Bulletin ISTB-2021-03, when calculating the required fire flow where pipe sizing is not affected, the Ontario Building Code Method is to be used. Using the Ontario Building Code Method the required fire flow was calculated to be 2,700 L/min (45 L/s) at a minimum required pressure of 140 kPa (20 psi).

The boundary conditions in the 400 mm McArthur Avenue watermain provided by the City of Ottawa for the 45 L/s fire flow at the subject property indicate a hydraulic grade line (HGL) of 113.1 m. This HGL calculates to 494 kPa (72 psi). Since the pressure is above the required minimum pressure of 140 kPa (20 psi), 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 flow of all contributing fire hydrants within 150 m of the building shall not be less than the required fire flow. The existing municipal Class AA fire hydrant discussed above can contribute 5,700 L/min (95 L/s), which is greater than the required fire flow of 2,700 L/min (45 L/s).

2.2 DOMESTIC WATER SUPPLY

As per the City of Ottawa Water Design Guidelines, City of Ottawa Technical Bulletin ISTB-2021-03 and the Ministry of the Environment Water Design Guidelines, and based on the 12 1-bedroom apartment units and partial ground floor commercial representing 40% of the property, the average daily demand was calculated to be 0.1 L/s, the maximum daily demand was calculated to be 0.5 L/s and the maximum hourly demand was calculated to be 0.8 L/s.

The boundary conditions in the 400 mm McArthur Avenue watermain provided by the City of Ottawa at the subject property indicate a minimum HGL of 109.7 m and a maximum HGL of 118.5 m. With these boundary conditions, the pressure at the water meter is calculated to vary between 479 kPa (70 psi) and 566 kPa (82 psi). This is an acceptable range for the proposed development. Since the water pressure

may be above 80 psi at times, it is recommended a pressure test be conducted at the completion of construction to determine if a pressure reducing valve is required. If required, the pressure reducing valve is to be installed immediately after the water meter.

Using the American Water Works Association Manual of Water Supply Practices M22 for fixture values, and based on an average water pressure at the water meter of 522.5 kPa (76 psi), the peak demand was calculated to be 2.5 L/s. A 38 mm water service connecting to the 400 mm McArthur Avenue municipal watermain is proposed to service the development. The peak demand will produce an acceptable velocity of 2.2 m/s (7.3 ft/s) in the proposed 38 mm water service. Refer to calculations in Appendix A.

3.0 SANITARY SERVICING

As per the City of Ottawa Sewer Design Guidelines and City of Ottawa Technical Bulletin ISTB-2018-01, and based on the 12 1-bedroom apartment units and partial ground floor commercial representing 40% of the property, the post development sanitary flow rate was calculated to be 0.21 L/s. A 150 mm sanitary service at 2% slope (22.47 L/s capacity) is proposed to service the development. At the design flow rate the sanitary service will only be at 1% of its capacity. The proposed 150 mm sanitary service will connect to the existing 375 mm municipal sanitary sewer in McArthur Avenue, which at 0.27% slope has a capacity of 95.04 L/s. The pre development sanitary flow rate for the existing residential triplex was calculated to be 0.08 L/s. The 0.13 L/s increase in flow is expected to have an acceptable impact on the 375 mm McArthur Avenue sanitary sewer.

4.0 STORMWATER MANAGEMENT

4.1 QUALITY CONTROL

The Rideau Valley Conservation Authority (RVCA) has stated: *"… given that this is a redevelopment proposal on a lot that is serviced with a municipal storm sewer, the RVCA does not have specific requirements for storm water management, other than to note that you should meet whatever runoff coefficient and other criteria that the City of Ottawa may specify for the receiving storm sewer. RVCA would also encourage you utilized storm water best management practices to improve water quality and minimize runoff by promoting infiltration."* No permanent stormwater quality control measures are proposed.

An Erosion & Sediment Control Plan has been developed to be implemented during construction. Refer to drawing C-2 and notes 2.1 to 2.5 on drawing C-3. In summary: Sediment capture filter sock inserts will be installed in all existing catch-basins adjacent to the site; and any material deposited on the public road is to be removed.

4.2 QUANTITY CONTROL

The stormwater quantity control criterion was to control the post development peak flows with the use of flow control roof drains. It was calculated that the pre development conditions reflect a 5-year runoff coefficient of 0.85 and a time of concentration of 2 minutes. Using the Rational Method and a time of concentration of 10 minutes, the pre-development flow rates were calculated to be 16.59 L/s during the

100-year event and 8.70 L/s during the 5-year event. The Modified Rational Method was used to calculate the post development peak flow rates and corresponding storage volumes.

Drainage Area I (Uncontrolled Flow Off Site – 110 sq.m):
Other than roof storage, stormwater from the property will drain uncontrolled off the site. The flow rates are calculated at a time of concentration of 10 minutes.

	100-Year Event	5-Year Event
Maximum Flow Rate	3.23 L/s	1.65 L/s

Drainage Area II (Roof – 200 sq.m):
The 2 roof drains will be flow control type roof drains which will restrict the flow of stormwater and cause it to pond on the roof. Each roof drain will be installed with 1 parabolic slotted weir and will release 0.0124 L/s/mm (5 USgpm/in). The opening at the top of the flow control weir will be a minimum 50 mm in diameter. Roof drains will be Watts with an Accutrol Weir RD-100-A1 or approved equal. A minimum of 4 scuppers, each a minimum 180 mm wide will be installed 150 mm above the roof drains. Refer to architectural for exact locations and details. The roof will be designed to carry the load of water having a 50 mm depth at the scuppers or 200 mm depth at the roof drains: Refer to structural.

	100-Year Event	5-Year Event
Maximum Release Rate	2.79 L/s	1.95 L/s
Maximum Ponding Depth	112 mm	79 mm
Maximum Volume Stored	6.38 cu.m	2.81 cu.m

Entire Site:

	100-Year Event	5-Year Event
Pre Development Flow Rate	16.59 L/s	8.70 L/s
Maximum Release Rate	6.02 L/s	3.60 L/s
Maximum Volume Stored	6.38 cu.m	2.81 cu.m

The maximum post development release rates were calculated to be 6.02 L/s during the 100-year event and 3.60 L/s during the 5-year event. Therefore, the maximum post development release rate is calculated to be 64% less than the pre-development flow rate during the 100-year event and 59% less during the 5-year event.

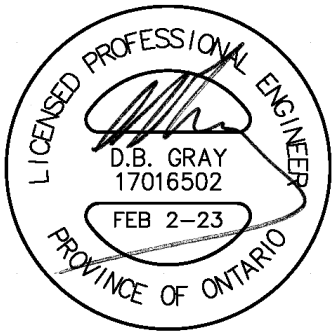
4.3 STORM SERVICING

The unrestricted flow rate during the 5-year event was calculated to be 6.33 L/s. A 150 mm storm service at 1% slope (15.89 L/s capacity) is proposed to service the development. At the design flow rate the storm service will only be at 40% of its capacity. The proposed 150 mm storm service will connect to the existing 300 mm municipal storm sewer in McArthur Avenue, which, at 1.80% slope, has a capacity of

135.35 L/s. The reduction in flows is expected to have a positive impact on the 300 mm McArthur Avenue storm sewer.

5.0 CONCLUSIONS

1. A private fire hydrant is not required.
2. There is an adequate water supply for firefighting from the existing municipal water distribution system.
3. There is an acceptable range of water pressures in the existing water distribution system.
4. Since the water pressure may be above 80 psi at times, it is recommended a pressure test be conducted at the completion of construction to determine if a pressure reducing valve is required.
5. The post development sanitary flow rate will be adequately handled by the proposed sanitary service.
6. The post development increase in sanitary flow is expected to have an acceptable impact on the existing municipal sanitary sewer.
7. The RVCA does not require permanent stormwater quality control measures. As such, no permanent measures are proposed.
8. An Erosion & Sediment Control Plan has been developed to be implemented during construction.
9. The maximum post development release rate is calculated to be 62% less than the pre-development flow rate during the 100-year event and 54% less during the 5-year event.
10. The unrestricted flow rate during the 5-year event will be adequately handled by the proposed storm service.
11. The post development reduction in stormwater flow is expected to have a positive impact on the existing municipal storm sewer.



NOT VALID UNLESS
SIGNED & DATED

APPENDIX A

WATER SERVICING

January 4, 2022

216 McArthur Avenue
3 Storey Mixed Use Building
Ottawa, Ontario

FIRE FLOW CALCULATIONS
OBC Method

Q = Required water supply in litres
= KVS_{Total}

S_{Total} = Total of spatial coefficients from exposure distances
= $1.0 + S_{Side\ 1} + S_{Side\ 2} + S_{Side\ 3} + S_{Side\ 4}$

	Spatial Coefficient	Exposure Distance (m)	
$S_{Side\ 1}$	0	13	(to centerline of road)
$S_{Side\ 2}$	0.5	0	(to east property line)
$S_{Side\ 3}$	0.5	3	(to south property line)
$S_{Side\ 4}$	0.5	2	(to west property line)
S_{Total}	2.5		Need not exceed 2.0

Group C (Residential) Occupancy

K_1 = Water supply coefficient, as per OBC A-3.2.5.7. Table 1
= 10 Building is of noncombustible construction with fire separations and fire resistance ratings in accordance with Subsection 3.2.2.

V_1 = Building volume in cubic meters

	Floor Area (sq.m)	Height (m)	Volume (cu.m)
Penthouse	28	3	84
3rd Floor	244	3	732
2nd Floor	244	3	732
1st Floor	139	3	417
			1,965

Q_1 = 39,300 L

Group E (Commercial) Occupancy

K_2 = Water supply coefficient, as per OBC A-3.2.5.7. Table 1

= 17 Building is of noncombustible construction with fire separations and fire resistance ratings in accordance with Subsection 3.2.2.

V_2 = Building volume in cubic meters

	Floor Area (sq.m)	Height (m)	Volume (cu.m)
1st Floor	93	3	279

Q_2 = 9,486 L

$Q_{Total} = Q_1 + Q_2$

= 48,786 L

= 2,700 L/min as per OBC A-3.2.5.7. Table 2

= 45.0 L/s

---

45 L/s Fire Flow = 113.10 m ASL

Elevation at Fire Hydrant = 62.68 m ASL

Static Pressure at Fire Hydrant = 50.42 m 494 kPa 72 psi

January 4, 2022

216 McArthur Avenue
3 Storey Mixed Use Building
12 Apartment Units / Ground Floor Commercial
Ottawa, Ontario

WATER DEMAND CALCULATIONS

Apartments	Number of Units	Persons per Unit	Population
1 Bedroom	12	1.4	17
2 Bedroom	0	2.1	0
3 Bedroom	0	3.1	0
Total:	12		17

Residential Average Daily Demand:	280	L/capita/day				
	3.3	L/min	0.1	L/s	0.9	USgpm
Residential Maximum Daily Demand:	9.5	(Peaking factor for a population of 17 interpolated from Table 3-3 MOE Design Guidelines for Drinking Water Systems)				
	31.0	L/min	0.5	L/s	8.2	USgpm
Residential Maximum Hourly Demand:	14.3	(Peaking factor for a population of 17 interpolated from Table 3-3 MOE Design Guidelines for Drinking Water Systems)				
	46.7	L/min	0.8	L/s	12.3	USgpm

Commercial Average Daily Demand:	0.01412	ha (40% of 353 sq.m)				
	28000	L/ha/day				
	395.4	L/day				
	8	hour day				
	0.8	L/min	0.01	L/s	0.2	USgpm
Commercial Maximum Daily Demand:	1.5	(Peaking factor as per City of Ottawa Water Design Guidelines)				
	1.2	L/min	0.02	L/s	0.3	USgpm
Commercial Maximum Hourly Demand:	1.8	(Peaking factor as per City of Ottawa Water Design Guidelines)				
	2.2	L/min	0.04	L/s	0.6	USgpm

Total Average Daily Demand:	4.1	L/min	0.1	L/s	1.1	USgpm
Total Maximum Daily Demand:	32.3	L/min	0.5	L/s	8.5	USgpm
Total Maximum Hourly Demand:	48.9	L/min	0.8	L/s	12.9	USgpm

Elevation of Water Meter:	60.80	m ASL				
Basement Floor Elevation:	59.90	m ASL				
Minimum HGL:	109.70	m ASL				
Static Pressure at Fire Hydrant:	48.90	m	479	kPa	70	psi
Maximum HGL:	118.50	m ASL				
Static Pressure at Fire Hydrant:	57.70	m	566	kPa	82	psi

D.B. Gray Engineering Inc.

Douglas Gray <d.gray@dbgrayengineering.com>

RE: Request for Boundary Conditions - 216 McArthur Avenue

1 message

Bakhit, Reza <reza.bakhit@ottawa.ca> Wed, Dec 22, 2021 at 9:07 AM
To: Ryan Faith <r.faith@dbgrayengineering.com>
Cc: Douglas Gray <d.gray@dbgrayengineering.com>

Hi Ryan,

The following are boundary conditions, HGL, for hydraulic analysis at 216 McArthur Avenue (zone 1E) assumed to be connected to the 406 mm watermain on McArthur Ave (see attached PDF for location).

Minimum HGL: 109.7 m

Maximum HGL: 118.5 m

Max Day + FF (45 L/s): 113.1 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.

Regards,

Reza Bakhit, P.Eng, C.E.T

Project Manager

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

Development Review - Centeral Branch

City of Ottawa | Ville d'Ottawa

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

613.580.2400 ext./poste 19346, reza.bakhit@ottawa.ca

Please note: Given the current pandemic, I will be working from home until further notice; reaching me by email is the easiest. I will be checking my voicemail, just not as frequently as I normally would be.

From: Ryan Faith <r.faith@dbgrayengineering.com>
Sent: Monday, December 20, 2021 11:11 AM
To: Bakhit, Reza <reza.bakhit@ottawa.ca>
Cc: Douglas Gray <d.gray@dbgrayengineering.com>
Subject: Request for Boundary Conditions - 216 McArthur Avenue

Hi Reza,

Please provide the boundary conditions for the 400mm watermain at 216 McArthur Avenue. We have calculated the following expected demands:

Average daily demand: 0.1 L/s

Maximum daily demand: 0.5 L/s

Maximum hourly demand: 0.8 L/s

Fire flow demand: 45.0 L/s (OBC)

Fire flow + maximum daily demand: 45.5 L/s

Calculations are attached.

Thanks,

Ryan Faith

D.B. Gray Engineering Inc.

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

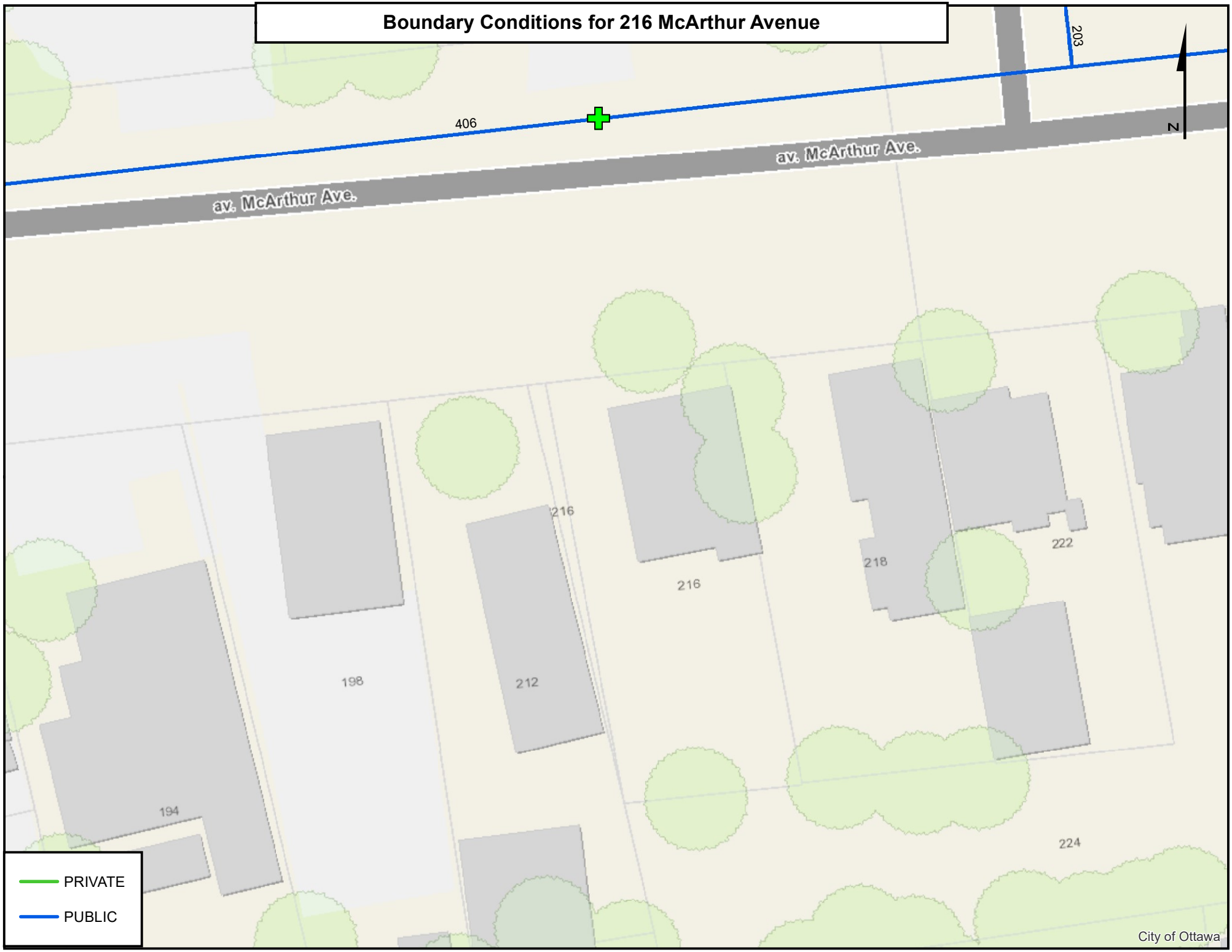
700 Long Point Circle 613-425-8044
Ottawa, Ontario r.faith@dbgrayengineering.com

'

'

216 McArthur Avenue REVISED December 2021.pdf

1085K


Boundary Conditions for 216 McArthur Avenue
406
av. McArthur Ave.
av. McArthur Ave.
203
N
216
216
218
222
198
212
194
224
PRIVATE
PUBLIC
City of Ottawa

03-Jan-23

216 McArthur Ave
3-Storey Mixed-Use Building
Ottawa, Ontario

Peak Water Demand

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

	No.	F.V.	Total		
Bathtub	11	8	88	12	Units
Toilet - tank	13	6	78		
Toilet - flush valve	0	24	0		
Lavs.	13	1.5	19.5		
Bidet	0	2	0		
Urinal - wall flush valve	0	10	0		
Shower	1	2.5	2.5		
K. Sink	12	1.8	21.6		
Dishwasher	12	1.3	15.6		
Clothes Washer	12	3	36		
Commercial Sink	2	4	8		
J. Sink	0	4	0		
Commercial Dishwasher	2	4	8		
Commercial Washer	0	4	0		
Hose 1/2 in	1	5	5		
Hose 3/4 in	0	12	0		
			282.2		

Peak Demand (fig 4-2 or 4-3 AWWA M22)			35	USgpm		
Pressure @ Meter	522.5	kPa	76	psi		
Pressure Factor (table 4-1 AWWA M22)			1.14			
Peak Demand			40	USgpm		
Irrigation - hose 1/2 in	0		0	USgpm	(includes pressure factor)	
(assumes hose bibs operating in non peak hours)						
TOTAL PEAK DEMAND	151	l/min	40	USgpm	2.5	l/s
Nominal Size			1.5	in	38	mm
			7.3	ft/s	2.2	m/s

APPENDIX B

SANITARY SERVICING

D.B. Gray Engineering Inc.

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

700 Long Point Circle
Ottawa, Ontario

613-425-8044
d.gray@dbgrayengineering.com

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: 216 McArthur Avenue

Designed By: D.B.G

October 6, 2021

n = 0.013

Location		Section								Cumulative Residential		Section Non-Residential			Cumulative					Sewer Data							
		Single Family ppu = 3.4	Semi / Townhouse ppu = 2.7	Duplex / Triplex ppu = 2.3	Apartment (average) ppu = 1.8	Apartment (1 Bed) ppu = 1.4	Apartment (2 Bed) ppu = 2.1	Apartment (3 Bed) ppu = 3.1	Area																	
From	To	No. of Units	No. of Units	No. of Units	No. of Units	No. of Units	No. of Units	No. of Units	(ha)	Pop.	Peaking Factor	Area (ha)	Flow (L/ha/day)	Peaking Factor	Flow (L/s)	Area (ha)	Sewage Flow (L/s)	Infiltration Flow (L/s)	Total Flow (L/s)	Material	Actual Diameter (mm)	Nominal Diameter (mm)	Slope (%)	Length (m)	Capacity (L/s)	Velocity (m/s)	Ratio Q/Qfull
		Existing Triplex																								
Existing Triplex	Existing 375 SAN			3					0.0353	6.9	3.20					0.0353	0.07	0.01	0.08	PVC	135.0	135	1.00	11	11.50	0.80	0.01
		Proposed Mixed Use Building																								
Proposed Building	Existing 375 SAN					12			0.02118	16.8	3.20	0.01412	28000	4.5	0.02	0.0353	0.19	0.01	0.21	PVC	152.4	150	2.00	9.3	22.47	1.23	0.01
																					Existing 375 SAN in McArthur Avenue					
																					381.0	375	0.27		95.04	0.83	

APPENDIX C

STORMWATER MANAGEMENT & STORM SERVICING

D.B. Gray Engineering Inc.

Ryan Faith <r.faith@dbgrayengineering.com>

RE: RVCA Stormwater Management Comments - 216 McArthur Avenue

1 message

Glen McDonald <glen.mcdonald@rvca.ca> Tue, Dec 14, 2021 at 11:56 AM
To: Ryan Faith <r.faith@dbgrayengineering.com>
Cc: Douglas Gray <d.gray@dbgrayengineering.com>

Ryan, given that this is a redevelopment proposal on a lot that is serviced with a municipal storm sewer, the RVCA does not have specific requirements for storm water management, other than to note that you should meet whatever runoff coefficient and other criteria that the City of Ottawa may specify for the receiving storm sewer. RVCA would also encourage you utilized storm water best management practices to improve water quality and minimize runoff by promoting infiltration.

Glen

Glen McDonald MCIP RPP

Director of Planning and Watershed Science

glen.mcdonald@rvca.ca ext. 1133

The RVCA will close at noon on Friday, December 24, 2021 and will re-open on Tuesday, January 4, 2022 at 8:30 a.m.

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, December 14, 2021 11:10 AM
To: Glen McDonald <glen.mcdonald@rvca.ca>
Cc: Douglas Gray <d.gray@dbgrayengineering.com>
Subject: Fwd: RVCA Stormwater Management Comments - 216 McArthur Avenue

Hi Glen,

I understand Jamie is away. Please see below.

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

---------- Forwarded message ---------
From: **Ryan Faith** <r.faith@dbgrayengineering.com>
Date: Tue, Dec 14, 2021 at 11:04 AM
Subject: Re: RVCA Stormwater Management Comments - 216 McArthur Avenue
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Douglas Gray <d.gray@dbgrayengineering.com>

Hi Jamie,

Just following up on this.

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 Fri, Nov 19, 2021 at 8:58 AM Ryan Faith <r.faith@dbgrayengineering.com> wrote:

> Hi Jamie,
>
> We are working on a proposed 3 storey mixed use building on 353 sq.m of land at 216 McArthur Avenue in Ottawa.
>
> 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

Summary Tables

ONE HUNDRED YEAR EVENT					
Drainage Area	Pre-Development Flow 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 I (Uncontrolled Flow Off Site)	-	-	3.23	-	-
AREA II (Roof)	-	-	2.79	6.38	6.38
TOTAL	16.59	5.11	6.02	6.38	6.38

FIVE YEAR EVENT					
Drainage Area	Pre-Development Flow 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 I (Uncontrolled Flow Off Site)	-	-	1.65	-	-
AREA II (Roof)	-	-	1.95	2.81	2.81
TOTAL	8.70	5.11	3.60	2.81	2.81

November 22, 2022

216 McArthur Avenue

Ottawa, Ontario

STORMWATER MANAGEMENT CALCULATIONS

Rational Method

PRE-DEVELOPMENT CONDITIONS

100-Year Flow Rate

			C
Roof Area:	90	sq.m	1.00
Asphalt/Concrete Area:	238	sq.m	1.00
Gravel Area:	0	sq.m	0.875
Landscaped Area:	25	sq.m	0.25
Total Catchment Area:	353	sq.m	0.95

Bransby William Formula

$$Tc = \frac{0.057 \bullet L}{Sw^{0.2} \bullet A^{0.1}} \text{ min}$$

Sheet Flow Distance (L):	30	m
Slope of Land (Sw):	1	%
Area (A):	0.0353	ha
Time of Concentration (Sheet Flow):	2	min
Area (A):	353	sq.m
Time of Concentration:	10	min
Rainfall Intensity (i):	179	mm/hr
Runoff Coeficient (C):	0.95	
100-Year Pre-Development Flow Rate (2.78AiC):	16.59	L/s

5-Year Flow Rate

			C
Roof Area:	90	sq.m	0.90
Asphalt/Concrete Area:	238	sq.m	0.90
Gravel Area:	0	sq.m	0.70
Landscaped Area:	25	sq.m	0.20
Total Catchment Area:	353	sq.m	0.85
Area (A):	353	sq.m	
Time of Concentration:	10	min	
Rainfall Intensity (i):	104	mm/hr	
Runoff Coeficient (C):	0.85		
5-Year Pre-Development Flow Rate (2.78AiC):	8.70	L/s	

Maximum Allowable Release Rate

			C	
Roof Area:	90	sq.m	0.90	
Asphalt/Concrete Area:	238	sq.m	0.90	
Gravel Area:	0	sq.m	0.70	
Landscaped Area:	25	sq.m	0.20	
Total Catchment Area:	353	sq.m	0.85	
Area (A):	353	sq.m		
Time of Concentration:	10	min		
Rainfall Intensity (i):	104	mm/hr		(5 year event)
Runoff Coeficient (C):	0.50			
100-Year Maximum Allowable Release Rate (2.78AiC):	5.11	L/s		

ONE HUNDRED-YEAR EVENT

DRAINAGE AREA I (Uncontrolled Flow Off Site)

(ONE HUNDRED YEAR EVENT)

			C
Roof Area:	5	sq.m	1.00
Asphalt/Concrete Area:	45	sq.m	1.00
Gravel Area:	0	sq.m	0.875
Landscaped Area:	60	sq.m	0.25
Total Catchment Area:	110	sq.m	0.59
Area (A):	110	sq.m	
Time of Concentration:	10	min	
Rainfall Intensity (i):	179	mm/hr	
Runoff Coeficient (C):	0.59		
Flow Rate (2.78AiC):	3.23	L/s	

DRAINAGE AREA II (Roof)

(ONE HUNDRED-YEAR EVENT)

			C
Total Catchment Area:	243	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: 112 mm

Maximum Release Rate: 2.79 L/s Pond Area: 151 sq.m

Achieved Volume: 6.38 cu.m

Maximum Volume Required: 6.38 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	16.40	2.79	13.61	4.08
10	179	12.06	2.79	9.27	5.56
15	143	9.65	2.79	6.86	6.18
20	120	8.10	2.79	5.31	6.38
25	104	7.02	2.79	4.23	6.34
30	92	6.21	2.79	3.42	6.15
35	83	5.58	2.79	2.79	5.86
40	75	5.08	2.79	2.29	5.49
45	69	4.66	2.79	1.88	5.07
50	64	4.32	2.79	1.53	4.60
55	60	4.03	2.79	1.24	4.09
60	56	3.78	2.79	0.99	3.55
65	53	3.56	2.79	0.77	2.99
70	50	3.36	2.79	0.57	2.41
75	47	3.19	2.79	0.40	1.82
80	45	3.04	2.79	0.25	1.20
85	43	2.90	2.79	0.11	0.58
90	41	2.78	2.78	0.00	0.00
95	39	2.66	2.66	0.00	0.00
100	38	2.56	2.56	0.00	0.00
105	36	2.47	2.47	0.00	0.00
110	35	2.38	2.38	0.00	0.00
115	34	2.30	2.30	0.00	0.00
120	33	2.22	2.22	0.00	0.00
125	32	2.15	2.15	0.00	0.00
130	31	2.09	2.09	0.00	0.00
135	30	2.03	2.03	0.00	0.00
140	29	1.97	1.97	0.00	0.00
145	28	1.92	1.92	0.00	0.00
150	28	1.87	1.87	0.00	0.00
180	24	1.61	1.61	0.00	0.00
210	21	1.43	1.43	0.00	0.00
240	19	1.28	1.28	0.00	0.00
270	17	1.17	1.17	0.00	0.00
300	16	1.07	1.07	0.00	0.00

FIVE-YEAR EVENT

DRAINAGE AREA I (Uncontrolled Flow Off Site)

(FIVE-YEAR EVENT)

			C
Roof Area:	5	sq.m	0.90
Asphalt/Concrete Area:	45	sq.m	0.90
Gravel Area:	0	sq.m	0.70
Landscaped Area:	60	sq.m	0.20
Total Catchment Area:	110	sq.m	0.52
Area (A):	110	sq.m	
Time of Concentration:	10	min	
Rainfall Intensity (i):	104	mm/hr	
Runoff Coeficient (C):	0.52		
Flow Rate (2.78AiC):	1.65	L/s	

DRAINAGE AREA II (Roof)

(FIVE-YEAR EVENT)

			C
Total Catchment Area:	243	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:	79	mm
Maximum Release Rate:	1.95	L/s

Pond Area:	94	sq.m
Achieved Volume:	2.81	cu.m
Maximum Volume Required:	2.81	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	8.58	1.95	6.63	1.99
10	104	6.33	1.95	4.38	2.63
15	84	5.08	1.95	3.13	2.81
20	70	4.27	1.95	2.32	2.78
25	61	3.70	1.95	1.75	2.62
30	54	3.28	1.95	1.33	2.39
35	49	2.95	1.95	1.00	2.09
40	44	2.69	1.95	0.73	1.76
45	41	2.47	1.95	0.52	1.40
50	38	2.29	1.95	0.34	1.01
55	35	2.14	1.95	0.18	0.60
60	33	2.00	1.95	0.05	0.18
65	31	1.89	1.89	0.00	0.00
70	29	1.79	1.79	0.00	0.00
75	28	1.70	1.70	0.00	0.00
80	27	1.61	1.61	0.00	0.00
85	25	1.54	1.54	0.00	0.00
90	24	1.48	1.48	0.00	0.00
95	23	1.42	1.42	0.00	0.00
100	22	1.36	1.36	0.00	0.00
105	22	1.31	1.31	0.00	0.00
110	21	1.27	1.27	0.00	0.00
115	20	1.22	1.22	0.00	0.00
120	19	1.18	1.18	0.00	0.00
125	19	1.15	1.15	0.00	0.00
130	18	1.11	1.11	0.00	0.00
135	18	1.08	1.08	0.00	0.00
140	17	1.05	1.05	0.00	0.00
145	17	1.02	1.02	0.00	0.00
150	16	0.99	0.99	0.00	0.00
180	14	0.86	0.86	0.00	0.00
210	13	0.76	0.76	0.00	0.00
240	11	0.69	0.69	0.00	0.00
270	10	0.63	0.63	0.00	0.00
300	9	0.57	0.57	0.00	0.00

216 McArthur Avenue
Ottawa, Ontario

STORM SEWER DESIGN FORM
Rational Method

# FIVE YEAR EVENT
Q = 2.78 A i C

October 6, 2021

n = 0.013

Location			Areas (ha)				Individual	Accum.	Time of	Rainfall Intensity	Peak Flow	Pipe Data								
			Roof	Hard	Gravel	Landscape			Conc.	i	Q		Actual Diameter	Nominal Diameter	Slope	Length	Capacity	Velocity	Time of Flow	Ratio
Street	From	To	C = 0.9	C = 0.9	C = 0.7	C = 0.2	2.78AC	2.78AC	(min)	(mm/hr)	(L/s)	Material	(mm)	(mm)	(%)	(m)	(L/s)	(m/s)	(min)	Q/Qfull
	Roof	Existing	0.0243				0.0608	0.0608	10.00	104	6.33	PVC	152.4	150	1.00	12.1	15.89	0.87	0.23	0.40
	Drains	300 ST																		
													Existing 300 ST in McArthur Avenue							
													304.8	300	1.80		135.35	1.85		

APPENDIX D

PRE-CONSULTATION MEETING NOTES & CITY OF OTTAWA SERVICING STUDY CHECKLIST

Pre-Application Consultation Meeting Notes

Property Address: 216 McArthur Avenue
PC2021-0210
Tuesday, July 6, 2021
2pm – 3pm via Microsoft Teams

Attendees:

City of Ottawa
Seana Turkington, File Lead
Holly Newitt, Student Planner
Wally Dubyk, Transportation
Reza Bakhit, Engineer (regrets)
Christopher Moise, Urban Design
Gabriella Robertson-Tremblay, Urban Design
Mark Richardson, Forestry

Applicant Team
Suzanne Gibson, Architect
Chris Poirier, Owner

Subject: 216 McArthur Avenue

Meeting Notes:

Overview of proposal

- Existing 2-storey dwelling
- Proposing 3-storey mixed-use
    - Commercial and one dwelling at grade and residential in basement and upper floors
- Storage unit on ground floor for tenants and owner – potential for bike parking

Technical Comments:

Seana Turkington, Planning

- Currently, the property is designated Traditional Mainstreet as per Schedule B of the Official Plan. The Property is also within the Central Sector of the Montreal Road District Secondary Plan.
- Please note that a Draft of the New Official Plan was released in November 2020. The New Official Plan is scheduled to go to Council in the Fall of 2021. If a formal application is pursued, the policy regime may change, depending on timing of application submission. A formal submission will require a Planning Rationale. The associated Planning Rationale should speak to the New Official Plan policies and how this proposal complies.
- As per the Zoning By-law, the property is zoned Traditional Mainstreet (TM). The property is within Area Y of Schedule 1A of the Zoning By-law pertaining to minimum parking space rates. Please ensure the proposal complies with the requirements for Area Y, identified in Section 101 of the Zoning By-law.
- It is recommended that bicycle parking exceed, if possible, the minimum requirements set out in the Zoning By-law. Bike parking shall be secure and ideally protected from the elements. Bike parking should be shown on the Site Plan and demonstrate compliance with Section 111 of the Zoning By-law.
- This proposal will require amenity area as per Section 137(5) of the Zoning By-law. Amenity area provided should meet or exceed the requirements set out in the Zoning By-law, if possible.
- Please include more soft landscaping on site in the rear and front yards, where possible. It is highly recommended that species native to the Ottawa area, as well as pollinators, be utilized. For more information, please visit: https://ottawa.ca/en/living-ottawa/environment-conservation-and-climate/wildlife-and-plants/plants

- Staff would recommend increasing the rear yard setback in order to provide usable outdoor, at-grade amenity area for tenants.
- Please note that this proposal will trigger Cash-in-Lieu of Parkland and Development Charges as per the Parkland By-law and Development Charges By-law, respectively.

Wally Dubyk, Transportation

- McArthur Avenue is classified as an Arterial road. There are no additional protected ROW limits identified in the OP.
- The development site proposes 13 units and no parking spaces. This development would not generation sufficient traffic to warrant a TIA report.
- Please keep in mind that on street parking is not a viable option for tenants. Ensure that potential tenants are aware that there is no provision for parking.
- The closure of an existing private approach shall reinstate the sidewalk, shoulder, curb and boulevard to City standards.
- The Owner shall be required to enter into maintenance and liability agreement for all pavers, plant and landscaping material placed in the City right-of-way and the Owner shall assume all maintenance and replacement responsibilities in perpetuity.
- Bicycle parking spaces are required as per Section 111 of the Ottawa Comprehensive Zoning By-law. Bicycle parking spaces should be located in safe, secure places near main entrances and preferably protected from the weather.
- Should the property Owner wish to use a portion of the City's road allowance for construction staging, prior to obtaining a building permit, the property Owner must obtain an approved Traffic Management Plan from the Manager, Traffic Management, Transportation Services Department. The city has the right for any reason to deny use of the Road Allowance and to amend the approved Traffic Management Plan as required.
- Permanent structures such as curbing, stairs, retaining walls, and underground parking foundation also bicycle parking racks are not to extend into the City's right-of-way limits.

Christopher Moise, Urban Design

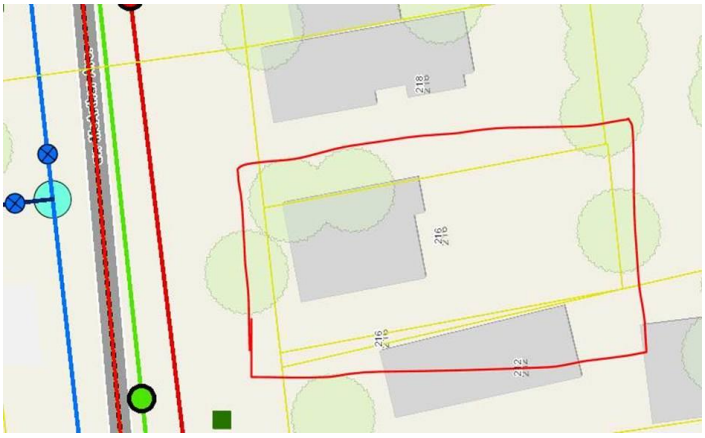
- This proposal runs along one of the City's Design Priority Areas however it need not attend the City's UDRP;
- We appreciate the drawings and illustrations provided for the pre-consult and have the following comments/questions regarding the proposal presented today:
    - **Site layout:** Although the wrapping lot at 224 McArthur may provide separation to the R2 properties to the south, we recommend that there be additional rear yard set-back considered to allow access to natural light and added protection for existing trees with clearance during construction;
    - **Amenity:** We recommend the rear yard would be an ideal place to accommodate the required amenity and double as rear yard set-back (as noted above);
    - **Front entrances:** We recommend the access to entrances be made from grade to avoid unnecessary ramps and stairs only to be replicated on the interior;
    - **Commercial at grade:** We recommend the commercial unit be accessed at grade to remove the need for all the ramps and stairs;
    - **Side-yard set-back:** Although a reduced set-back is anticipated in this zone, we recommend that an increased set-back (two or more meters) will protect the units which rely on the side yard for access to natural light noting our concern that the property to the west can also builds up to six storeys with a zero lot line condition;
    - **Below grade units:** Will these units have sufficient access to natural light? Would dropping the ground floor and using window wells provide a better condition? Perhaps using the basement as garbage/bicycle/storage?
    - **Landscaping:** We recommend additional soft landscaping be considered where possible around the site;
    - **Garbage/Bicycle storage:** We recommend these be provided internal to the building (if possible) or in a protected area in the rear yard, however, not in the front yard;
    - **Trees:** We recommend that every effort be made to protect existing trees for their community value and quality of space they provide to residents and surrounding properties;

- A scoped Design Brief is a required submittal for all Site Plan/Re-zoning applications and can be combined with the Planning Rationale. Please see the Design Brief Terms of Reference provided.
- This is an exciting project in an area full of potential. We look forward to helping you achieve its goals with the highest level of design resolution. We are happy to assist and answer any questions regarding the above.

Reza Bakhit, Engineering

General:

- It is the sole responsibility of the consultant to investigate the location of existing underground utilities in the proposed servicing area and submit a request for locates to avoid conflict(s). The location of existing utilities and services shall be documented on an **Existing Conditions Plan**.
- Any easements on the subject site shall be identified and respected by any development proposal and shall adhere to the conditions identified in the easement agreement. A **legal survey plan** shall be provided, and all easements shall be shown on the engineering plans.
- Reference documents for information purposes:
    - Ottawa Sewer Design Guidelines (October 2012)
    - Technical Bulletin PIEDTB-2016-01
    - Technical Bulletins ISTB-2018-01, ISTB-2018-02 and ISTB-2018-03.
    - Ottawa Design Guidelines - Water Distribution (2010)
    - Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
    - City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
    - City of Ottawa Environmental Noise Control Guidelines (January 2016)
    - City of Ottawa Accessibility Design Standards (2012) (City recommends development be in accordance with these standards on private property)
    - Ottawa Standard Tender Documents (latest version)
    - Ontario Provincial Standards for Roads & Public Works (2013)
    - Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-424 x.44455).
- Please note that this is the applicant responsibility to refer to the latest applicable guidelines while preparing reports and studies.



Disclaimer:
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Stormwater Management Criteria and Information:

- **Water Quantity Control:** Please control post-development runoff from the subject site, up to and including the **100-year storm event**, to **a 5-year pre-development level.** The pre-development runoff coefficient will need to be determined **as per existing conditions** but in no case more than 0.5. [**If 0.5 applies it needs to be clearly demonstrated in the report that the pre-development runoff coefficient is greater than 0.5**]. The time of concentration (T_c) used to determine the pre-development condition should be calculated. *Tc should not be less than 10 min. since IDF curves become unrealistic at less than 10 min; T_c of 10 minutes shall be used for all post-development calculations*].

- Any storm events greater than the established **5-year allowable** release rate, up to and including the **100-year storm event**, shall be detained on-site. The SWM measures required to avoid impact on downstream sewer system will be subject to review.
- Please note that foundation drainage is to be independently connected to sewer main unless being pumped with appropriate back up power, sufficient sized pump and back flow prevention. **It is recommended that the foundation drainage system be drained by a sump pump connection to the storm sewer to minimize risk of basement flooding as it will provide the best protection from the uncontrolled sewer system compared to relying on the backwater valve.**
- **Water Quality Control:** Please consult with the local conservation authority (RVCA) regarding water quality criteria prior to submission of a Site Plan Control Proposal application to establish any water quality control restrictions, criteria and measures for the site. Correspondence and clearance shall be provided in the Appendix of the report.
- Please note that as per *Technical Bulletin PIEDTB-2016-01 section 8.3.11.1 (p.12 of 14)* **there shall be no surface ponding on private parking areas during the 5-year storm rainfall event**.
- **If Underground Storage proposed:** Please note that the Modified Rational Method for storage computation in the Sewer Design Guidelines was originally intended to be used for above ground storage (i.e. parking lot) where the change in head over the orifice varied from 1.5 m to 1.2 m (assuming a 1.2 m deep CB and a max ponding depth of 0.3 m). This change in head was small and hence the release rate fluctuated little, therefore there was no need to use an average release rate.
- When underground storage is used, the release rate fluctuates from a maximum peak flow based on maximum head down to a release rate of zero. This difference is large and has a significant impact on storage requirements. **We therefore require that an average release rate equal to 50% of the peak allowable rate shall be applied to estimate the required volume. Alternatively, the consultant may choose to use a submersible pump in the design to ensure a constant release rate.**
- In the event that there is a disagreement from the designer regarding the required storage, The City will require that the designer demonstrate their rationale utilizing dynamic modelling, that will then be reviewed by City modellers in the Water Resources Group.
- Please provide information on UG storage pipe. Provide required cover over pipe and details, chart of storage values, capacity etc. How will this pipe be cleaned of sediment and debris?
- Provide information on type of underground storage system including product name and model, number of chambers, chamber configuration, confirm invert of chamber system, top of chamber system, required cover over system and details, interior bottom slope (for self-cleansing), chart of storage values, length, width and height, capacity, entry ports (maintenance) etc.
- Provide a cross section of underground chamber system showing invert and obvert/top, major and minor HWLs, top of ground, system volume provided during major and minor events. UG storage to provide actual 2- and 100-year event storage requirements.
- In regard to all proposed UG storage, ground water levels (and in particular HGW levels) will need to be reviewed to ensure that the proposed system does not become surcharged and thereby ineffective.
- Modeling can be provided to ensure capacity for both storm and sanitary sewers for the proposed development by City's Water Distribution Dept. – Modeling Group, through PM and upon request.
- Please note that the minimum orifice dia. for a plug style **ICD is 83mm and the minimum flow rate from a vortex ICD is 6 L/s** in order to reduce the likelihood of plugging.
- Post-development site grading shall match existing property line grades in order to minimize disruption to the adjacent residential properties. A **topographical plan of survey** shall be provided as part of the submission and a note provided on the plans.
- Please provide a **Pre-Development Drainage Area Plan** to define the pre-development drainage areas/patterns. **Existing drainage patterns shall be maintained and discussed as part of the proposed SWM solution**.
- **If rooftop control and storage is proposed** as part of the SWM solutions sufficient details (Cl. 8.3.8.4) shall be discussed and document in the report and on the plans. Roof drains are to be connected downstream of any incorporated ICDs within the SWM system and not to the foundation drain system. Provide a **Roof Drain Plan** as part of the submission.
- Considering the size of the site, it would be acceptable to control the roof portion only and leave the remainder of the site uncontrol as long as the uncontrolled portion is directed towards the right of way.

The grading plan should clearly demonstrate that the uncontrolled portion of the site would send the runoff towards the ROW.

- If **Window wells** are proposed, they are to be indirectly connected to the footing drains. A detail of window well with indirect connection is required, as is a note at window well location speaking to indirect connection.
- There must be at least **15cm of vertical clearance** between the spill elevation and the ground elevation at the building envelope that is in proximity of the flow route or ponding area. The exception in this case would be at reverse sloped loading dock locations. At these locations, a minimum of 15cm of vertical clearance must be provided below loading dock openings. Ensure to provide discussion in report and ensure grading plan matches if applicable.

Storm:

- A 300mm dia. CONC Storm sewer (1972) is available within **McArthur Ave.**

Sanitary:

- A 375mm dia. CONR Sanitary Sewer (2000) is available within **McArthur Ave.**
- Sanitary sewer **monitoring maintenance hole** is required to be installed at the property line (on the private side of the property) as per City of Ottawa Sewer-Use By-Law 2003-514 (14) Monitoring Devices.
- Please provide the new Sanitary sewer discharge and we confirm if sanitary sewer main has the capacity. **(An analysis and demonstration that there is sufficient/adequate residual capacity to accommodate any increase in wastewater flows in the receiving and downstream wastewater system is required to be provided. Needs to be demonstrated that there is adequate capacity to support any increase in wastewater flow.)**
- Please apply the wastewater design flow parameters in **Technical Bulletin PIEDTB-2018-01**.
- A backwater valve is required on the sanitary service for protection.

Water:

- A 406mm dia. PVC watermain (1999) is available within **McArthur Ave**.
- Existing residential service to be blanked at the main. (This has to be shown and noted on the servicing plans) . If its proposed to reuse the **existing services**, a CCTV inspection and report to ensure existing services to be re-used are in good working order and meet current minimum size requirements. Located services to be placed on site servicing plans. In addition, the servicing report should discuss the CCTV findings and provide justifications that the existing services can be used. (A memo from the engineer may be required)
- **Water Supply Redundancy:** Residential buildings with a basic day demand greater than 50m^3/day (0.57 L/s) are required to be connected to a minimum of two water services separated by an isolation valve to avoid a vulnerable service area as per the *Ottawa Design Guidelines - Water Distribution, WDG001, July 2010 Clause 4.3.1 Configuration.* The basic day demand for this site not expected to exceed 50m^3/day.
- Please **review Technical Bulletin ISTB-2018-0**, maximum fire flow hydrant capacity is provided in Section 3 Table 1 of Appendix I. A **hydrant coverage figure** shall be provided and **demonstrate there is adequate fire protection for the proposal**. Two or more public hydrants are anticipated to be required to handle fire flow.
- Boundary conditions are required to confirm that the require fire flows can be achieved as well as availability of the domestic water pressure on the City street in front of the development. Use Table 3-3 of the MOE Design Guidelines for Drinking-Water System to determine Maximum Day and Maximum Hour peaking factors for 0 to 500 persons and use Table 4.2 of the Ottawa Design Guidelines, Water Distribution for 501 to 3,000 persons. Please provide the following information to the City of Ottawa via email to request water distribution network boundary conditions for the subject site. Please note that once this information has been provided to the City of Ottawa it takes approximately 5-10 business days to receive boundary conditions.
    - Type of Development and Units
    - Site Address
    - A plan showing the proposed water service connection location.
    - **Average Daily Demand** (L/s)
    - **Maximum Daily Demand** (L/s)

- **Peak Hour Demand** (L/s)
- **Fire Flow** (L/min)
  - [*Fire flow demand requirements shall be based on* ***Fire Underwriters Survey (FUS)*** *Water Supply for Public Fire Protection 1999*]
  - *Exposure separation distances shall be defined on a figure to support the FUS calculation and required fore flow (RFF).*
- **Hydrant capacity shall be assessed to demonstrate the RFF can be achieved**. Please identify which hydrants are being considered to meet the RFF on a fire hydrant coverage plan as part of the boundary conditions request.

Road Reinstatement (If applicable)

- Where servicing involves three or more service trenches, either a full road width or full lane width 40 mm asphalt overlay will be required, as per amended Road Activity By-Law 2003-445 and City Standard Detail Drawing R10. The amount of overlay will depend on condition of roadway and width of roadway(s).

Required Engineering Plans and Studies:

- Plans:
  - Existing Conditions and Removals Plan
  - Site Servicing Plan
  - Grade Control and Drainage Plan
  - Erosion and Sediment Control Plan
  - Roof Drainage Plan
  - Topographical survey
- Reports:
  - Site Servicing and Stormwater Management Report (It should include the Assessment of Adequacy of Public Services / Site Servicing Study)
  - Geotechnical Study/Investigation
  - Slope Stability Assessment Reports (if required, please see requirements below)
  - Phase I ESA
  - Phase II ESA (Depending on the recommendations of the Phase I ESA)
  - Noise Control Study
- Please refer to the **City of Ottawa Guide to Preparing Studies and Plans [Engineering]:**
  - Specific information has been incorporated into both the Guide to Preparing Studies and Plans for a site plan. The guide outlines the requirement for a statement to be provided on the plan about where the property boundaries have been derived from.
  - Added to the general information for servicing and grading plans is a note that an **O.L.S**. should be engaged when reporting on or relating information to property boundaries or existing conditions. The importance of engaging an **O.L.S.** for development projects is emphasized.

Phase One Environmental Site Assessment:

- A Phase I ESA is required to be completed in accordance with Ontario Regulation 153/04 in support of this development proposal to determine the potential for site contamination. Depending on the Phase I recommendations a Phase II ESA may be required.
- The Phase I ESA shall provide all the required Environmental Source Information as required by O. Reg. 153/04. ERIS records are available to public at a reasonable cost and need to be included in the ESA report to comply with O.Reg. 153/04 and the Official Plan. The City will not be in a position to approve the Phase I ESA without the inclusion of the ERIS reports.
- Official Plan Section 4.8.4: https://ottawa.ca/en/city-hall/planning-and-development/official-plan-and-master-plans/official-plan/volume-1-official-plan/section-4-review-development-applications#4-8-protection-health-and-safety

Geotechnical Investigation:

- A Geotechnical Study/Investigation shall be prepared in support of this development proposal.
- Reducing the groundwater level in this area can lead to potential damages to surrounding structures due to excessive differential settlements of the ground. The impact of groundwater lowering on adjacent

properties needs to be discussed and investigated to ensure there will be no short term and long-term damages associated with lowering the groundwater in this area.
- Geotechnical Study shall be consistent with the **Geotechnical Investigation and Reporting Guidelines for Development Applications**. https://documents.ottawa.ca/sites/default/files/documents/cap137602.pdf

Slope Stability Assessment Reports
- A report addressing the stability of slopes, prepared by a qualified geotechnical engineer licensed in the Province of Ontario, should be provided **wherever** a site has slopes (existing or proposed) steeper than 5 horizontal to 1 vertical (i.e., 11 degree inclination from horizontal) and/or more than 2 metres in height.
- A report is also required for sites having retaining walls greater than 1 metre high, that addresses the global stability of the proposed retaining walls. https://documents.ottawa.ca/en/document/slope-stability-guidelines-development-applications

Noise Study:
- A **Transportation Noise Assessment** is required as the subject development is located within 100m proximity of an Arterial Road.
- A **Stationary Noise Assessment** is required in order to assess the noise impact of the proposed sources of stationary noise (mechanical HVAC system/equipment) of the development onto the surrounding residential area to ensure the noise levels do not exceed allowable limits specified in the City Environmental Noise Control Guidelines. https://documents.ottawa.ca/sites/default/files/documents/enviro_noise_guide_en.pdf

Exterior Site Lighting:
- Any proposed light fixtures (both pole-mounted and wall mounted) must be part of the approved Site Plan. All external light fixtures must meet the criteria for Full Cut-off Classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the please provide the City with a **Certification (Statement) Letter** from an acceptable professional engineer stating that the design is compliant.

Snow Storage:
- Any portion of the subject property which is intended to be used for permanent or temporary snow storage shall be as shown on the approved site plan and grading plan. Snow storage shall not interfere with approved grading and drainage patters or servicing. Snow storage areas shall be setback from the property lines, foundations, fencing or landscaping a minimum of 1.5m. Snow storage areas shall not occupy driveways, aisles, required parking spaces or any portion of a road allowance. If snow is to be removed from the site please indicate this on the plan(s).

Gas pressure regulating station
- A gas pressure regulating station may be required depending on HVAC needs (typically for 12+ units). Be sure to include this on the Grading, Site Servicing, SWM and Landscape plans. This is to ensure that there are no barriers for overland flow routes (SWM) or conflicts with any proposed grading or landscape features with installed structures and has nothing to do with supply and demand of any product.

Construction approach
- Please contact the Right-of-Ways Permit Office TMconstruction@ottawa.ca early in the Site Plan process to determine the ability to construct site and copy File Lead Seana.Turkington@ottawa.ca on this request.

Mark Richardson, Forestry

TCR requirements:
- A Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City
    - An approved TCR is a requirement of Site Plan approval.

    - The TCR may be combined with the LP provided all information is supplied.
- As of January 1 2021, any removal of privately-owned trees 10cm or larger in diameter, or publicly (City) owned trees of any diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.
- The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR:
    - If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester.
    - Compensation may be required for city owned trees – if so, it will need to be paid prior to the release of the tree permit.
- The TCR must list all trees on site by species, diameter and health condition.
- Please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line).
- The TCR must list all trees on adjacent sites if they have a critical root zone that extends onto the development site.
- If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained.
- All retained trees must be shown and all retained trees within the area impacted by the development process must be protected as per City guidelines available at Tree Protection Specification or by searching Ottawa.ca:
    - The location of tree protection fencing must be shown on a plan;
    - Show the critical root zone of the retained trees;
    - If excavation will occur within the critical root zone, please show the limits of excavation.
- The City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.
- For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca or on City of Ottawa.

LP tree planting requirements:
For additional information on the following please contact adam.palmer@Ottawa.ca

- Minimum Setbacks
    - Maintain 1.5m from sidewalk or MUP/cycle track.
    - Maintain 2.5m from curb.
    - Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.
    - Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing.
    - Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.
- Tree specifications
    - Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
    - Maximize the use of large deciduous species wherever possible to maximize future canopy coverage.
    - Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).
    - Plant native trees whenever possible.
    - No root barriers, dead-man anchor systems, or planters are permitted.
    - No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree).
- Hard surface planting
    - Curb style planter is highly recommended.

- No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.
- Trees are to be planted at grade.

- Soil Volume
  - Please ensure adequate soil volumes are met:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

Please note that these soil volumes are not applicable in cases with Sensitive Marine Clay.

- Sensitive Marine Clay
  - Please follow the City's 2017 Tree Planting in Sensitive Marine Clay guidelines.

Next steps:

It is recommended that the applicant to discuss the proposal with the local Councillor and the community association.

Application Submission Information

Application Type: **Site Plan Control, Standard, Staff Approval (**Please reach out to staff prior to formal submission to confirm fees and site plan application type.)

For information on Site Plan Control Thresholds under the Site Plan Control By-law, please visit: https://documents.ottawa.ca/sites/documents/files/siteplan_thresholds_en.pdf

For information on Applications, including fees, please visit: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/fees-and-funding-programs/development-application-fees

The application processing timeline generally depends on the quality of the submission. For more information on standard processing timelines, please visit: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/development-application-forms#site-plan-control

Prior to submitting a formal application, it is recommended that you pre-consult with the Ward Councillor.

Application Submission Requirements

For information on the preparation of Studies and Plans and the City's Planning and Engineering requirements, please visit: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans

Please provide electronic copy (PDF) of all plans and studies required.

All plans and drawings must be produced on A1-sized paper and folded to 21.6 cm x 27.9 cm (8½"x 11").

Note that many of the plans and studies collected with this application must be signed, sealed and dated by a qualified engineer, architect, surveyor, planner or designated specialist.

City of Ottawa Servicing Study Checklist

General Content

Executive Summary (for large reports only): not applicable

Date and revision number of the report: see cover page of Servicing Study and Stormwater Management Report

Location map and plan showing municipal address, boundary, and layout of proposed development: see drawings C-1 to C-3

Plan showing the site and location of all existing services: see drawings C-1 to C-3

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 Study and Stormwater Management Report

Identification of existing and proposed infrastructure available in the immediate area: see drawings C-1 to C-3

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-3

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 1.6 on drawing C-3

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 Servicing Study and Stormwater Management Report

Identification of system constraints: see page 2 of Servicing Study and Stormwater Management Report

Confirmation of adequate domestic supply and pressure: see page 3 of Servicing Study and Stormwater Management Report

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 Servicing Study and Stormwater Management Report and Appendix A

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 of Servicing Study and Stormwater Management Report

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 of Servicing Study and Stormwater Management Report

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 of Servicing Study and Stormwater Management Report

(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 of Servicing Study and Stormwater Management Report

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 Appendix B

Description of proposed sewer network including sewers, pumping stations, and forcemains: see page 3 of Servicing Study and Stormwater Management Report

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 3 to 5 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-1 & C-2

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 page 3 to 4 of 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: see page 3 to 4 of 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-3 and see page 3 to 4 of 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-3 and see page 3 to 4 of 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 page 3 to 4 of 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: see page 3 to 4 of 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 3 to 4 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 drawing C-2 and notes 2.1 to 2.5 on drawing C-3.

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: not applicable

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 5 of Servicing Brief and Stormwater Management Report

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