

PROPOSED
THREE-STOREY RESIDENTIAL APARTMENT BUILDING SITE
PART OF LOTS 32 AND 33
CONCESSION 5 (RIDEAU FRONT)
4000 OLD RICHMOND ROAD
CITY OF OTTAWA

SERVICEABILITY REPORT
REPORT R-819-106A (REV. #1)
SEPTEMBER 2026

T.L. MAK ENGINEERING CONSULTANTS LTD.
DECEMBER 2024
REFERENCE FILE NUMBER 819-106

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Introduction

The developer of this site (Jami Omar Mosque) is proposing to redevelop the existing residential vacant lot described as Part of Lots 32 and 33 Concession 5 (Rideau Front) in the City of Ottawa by constructing a (3)-storey residential apartment building consisting of forty-nine (49) residential units, including three (3) 2-bedroom units, twenty-six (26) 1-bedroom units and twenty (20) studio/bachelor units. There is one (1) underground parking level proposed in this building.

The municipal address of the property is referenced as 4000 Old Richmond Road and it is located in the City Ward (Ward 8 – College). The proposed development property is situated on the east side of Old Richmond Road, south of Seyton Drive and north of Sanibel Private. See site plan and legal survey plan in Appendix A for details.

A site geotechnical report was prepared by the owner's soils engineer EXP entitled "Geotechnical Investigation – Proposed Building Additions" – 4000 Old Richmond Road, 572 Moodie Drive (Project No. OTT-00260904-AO dated September 4, 2020) for this proposed development property.

T.L. Mak Engineering Consultants Ltd. has been retained to provide a "Servicing Report" for this site as a supplement to the site re-zoning application process.

Existing Site Conditions and Servicing

The property under consideration is presently vacant with a temporary gravel area on-site which is currently used for vehicular parking. Approximately 55% of the existing site is currently grass surface covered and with about 45% gravel area. For additional details of the site's pre-development conditions, refer to the coloured Google Image and aerial photography from (GeoOttawa 2019) in Appendix B.

The existing topography of the land is found to be draining from front to rear or west to east across the site. The existing gradient of the lot is sloping at an approximate average gradient of 1.6%.

As for the availability of underground municipal services, there are existing municipal services along Old Richmond Road in front of this property consisting of a 750 mm diameter storm sewer, a 250 mm diameter sanitary sewer, and a 300 mm diameter watermain for development of this property. Refer to the City of Ottawa Old Richmond Road UCC and As-Built plan and profile drawings included in Appendix C for details.

Proposed Residential Apartment Building Site

A three (3)-storey residential apartment building consisting of (49) residential units is proposed for development at this property. Vehicle access to one level of underground parking is available for this site via an access laneway at the southeast corner of the site to the vehicle parking spaces and bicycle parking area. A secondary vehicle access to this building at the main floor level is located at the rear or east side of the building. A hard surface pathway is proposed at the front and along the north side of the lot for pedestrian access to the front doors and north side doors. An amenity area is also provided in the rear yard.

A. Water Supply

The proposed building is located within Pressure Zone 2W, on the lot occupying the intersection of Old Richmond Road and Moodie Drive.

The proposed building at 4000 Old Richmond Road is a new 3-storey apartment building, with an underground parking. The building contains twenty (20) bachelor units, twenty-six (26) 1-bedroom units, and three (3) 2-bedroom units. The average gross floor area is 1,444 m²/floor, for a total building area of 4,333 m² (excluding the underground parking). See Site Plan details attached in Appendix D.

The building is to be serviced by a connection to the existing 200 mm diameter watermain extending from the 300 mm diameter watermain at the intersection of Old Richmond Road and Seyton Drive. This watermain currently serves the adjacent property (Jami Omar Mosque at 3990 Old Richmond Road). To adequately service both properties, a new connection to the City's network is required. This involves installing a new 200 mm diameter watermain that connects the existing 305 mm diameter watermain along Old Richmond Road, north of Seyton Drive, to the existing watermain servicing the Jami Omar Mosque, east of the existing isolation valve along that watermain.

Demand Projections

The domestic demands were calculated using the City of Ottawa's Water Design Guidelines, where the residential consumption rate of 280 L/cap/d was used to estimate average day demands (AVDY). The serviced population is less than 500 people, hence, the Maximum day (MXDY) and Peak Hour demands were calculated using peaking factors values suggested by the MECP. As such, Maximum day (MXDY) were calculated by multiplying AVDY demands by a factor of 7.9. Peak hour (PKHR) demands were calculated by multiplying AVDY by a factor of 11.9. Persons per unit (PPU) for each unit were estimated based on the City of Ottawa's Water Design Guidelines. **Table 1** shows the estimated domestic demands of the proposed building.

Table 1: Estimated Domestic Demand at 4000 Old Richmond Rd

Unit Type	Unit Count	PPU	Consumption Rate (L/c/d)	AVDY		MXDY		PKHR	
				L/d	L/s	L/d	L/s	L/d	L/s
Apartment, Bachelor	20	1.4	280	7,840	0.09	61,858	0.72	93,178	1.08
Apartment, 1-Bedroom	26	1.4		10,192	0.12	80,415	0.93	121,132	1.40
Apartment, 2-Bedroom	3	2.1		1,764	0.02	13,918	0.16	20,965	0.24
Total	49			19,796	0.23	156,190	1.81	235,275	2.72

The required fire flow was determined following the Fire Underwriter Survey (FUS) method and is provided in the attached worksheet in Appendix D. The proposed building at 4000 Old Richmond Rd will be non-combustible construction and will not have sprinklers. The underground parking is assumed to be more than 50% below ground level. The resulting total required FUS fire flow is 12,000 L/min (200 L/s) for a duration of 2.5 hours. Details are provided in the attached **FUS Fire Flow Calculation** in Appendix D. **Figure 1** in Appendix D provides separation distances from adjacent buildings. The proposed Site Plan attached was used to determine distances from the proposed building to the property lines.

In summary:

- AVDY = 19,796 L/d (0.23 L/s)
- MXDY = 156,190 L/d (1.81 L/s);
- PKHR = 235,275 L/d (2.72 L/s); and,
- Fire Flow = 12,000 L/min (200 L/s)

Boundary Conditions

The hydraulic gradeline (HGL) boundary conditions for 4000 Old Richmond Road, as presented in **Table 2**, were provided by the City on December 12, 2024 (see attached **Water Boundary Conditions Email** in Appendix D).

Table 2: Boundary Conditions for 4000 Old Richmond Road

Demand Scenario	Head (m)
Minimum HGL (Peak Hour)	126.8
Maximum HGL (Average Day)	132.1
Maximum Day + Fire Flow (217 L/s)	123.8

Hydraulic Analysis

Peak Hour & Average Day

During peak hour demands, the resulting minimum hydraulic gradeline of 126.8 m corresponds to a peak hour pressure of 263 kPa (38 psi). This value is 13 kPa (2 psi) below the minimum pressure objective of 276 kPa (40 psi) for residential buildings up to two storeys. It is recommended that the service line be oversized to reduce the headloss entering the building, and therefore meet the minimum pressure objective. Adding 5 psi per floor above two stories, a minimum pressure of approximately 310 kPa (45 psi) would be required for the third floor to provide an equivalent pressure to 40 psi on the second floor. The 5 psi per floor value is determined by accounting for additional elevation head and additional pipe headloss required to reach each additional floor. The proponent will have to consider providing internal booster pumping to ensure adequate pressure throughout the building.

During average day demands, the resulting maximum hydraulic gradeline of 132.1 m corresponds to a maximum pressure of 315 kPa (46 psi). This value is less than the maximum pressure objective of 552 kPa (80 psi) and therefore considered acceptable.

Supporting Hydraulic Calculations are attached in Appendix D.

Maximum Day + Fire Flow

A maximum day plus fire flow hydraulic gradeline of 123.8 m corresponds to a residual pressure of 233 kPa (34 psi) at this location and is above the minimum residual pressure requirements of 140 kPa (20 psi).

Based on Table 1 of Appendix I of the City of Ottawa Technical Bulletin ISTB-2018-02 and a desktop review (i.e., Google Street View) to confirm hydrant class, the combined hydrant flow coverage for the building is estimated to be 13,300 L/min (refer to **Table 3**), which exceeds the FUS required fire flow (RFF) of 12,000 L/min. Hydrant coverage and classes are illustrated in **Figure 2** attached in Appendix D.

Table 3: Fire Hydrant Coverage

Building	Calculated FUS Fire Flow Demand (L/min)	Fire Hydrants					Combined Hydrant Flow Coverage (L/min)
		Hydrant Class	Within 75 m		Between 75 m and 150 m		
			Quantity	Contrib. to RFF	Quantity	Contrib. to RFF	
4000 Old Richmond Rd	12,000	AA	1	5,700	2	3,800	13,300
		A					
		B					
		C					

Conclusions

Based on the boundary conditions provided, the local watermain network in the vicinity of the proposed building at 4000 Old Richmond Road provides adequate fire flow capacity, as per the Fire Underwriters Survey (FUS) method. Anticipated pressures during basic day demand conditions are within the pressure objectives as per the City of Ottawa's Drinking Water Design Guidelines. However, during peak hour demand conditions, the minimum pressure is below the required pressure. To meet the minimum pressure requirements, the proponent will need to consider providing an internal booster.

Furthermore, a new connection to the City's network is required to adequately service both the 4000 and 3990 Old Richmond Road properties. This involves installing a new 200 mm diameter watermain that connects the existing 305 mm diameter watermain along Old Richmond Road, north of Seyton Drive, to the existing 200 mm diameter watermain servicing the Jani Omar Mosque (3990 Old Richmond Road), east of the existing isolation valve. The proposed building at 4000 Old Richmond Rd will be serviced via a connection to the existing 200 mm diameter watermain. See Proposed Site Servicing Layout Plan (Dwg. No. 819-106 S-1) for details.

B. Sanitary Flow

The peak sanitary flow for the 49 units, which comprise of three (3) 2-bedroom units, twenty-six (26) 1-bedroom units and twenty (20) studio/bachelor units, is estimated at $Q = 0.87$ L/s with an infiltration rate of 0.08 L/s. Refer to Appendix E sheet 1 of 1 regarding sanitary flow calculations. This flow will enter the existing 250 mm diameter sanitary sewer on Old Richmond Road via the proposed 150 mm diameter PVC sanitary service lateral from the three (3)-storey residential apartment building. At this site, a water sampling inspection chamber (per City of Ottawa standard detail S18.1) is proposed at the front property line for City's inspection use.

The existing peak sanitary flow of the site for the existing vacant lot is $Q = 0.08$ L/s with an infiltration rate of 0.08 L/s. The net increase in flow from this proposed development is 0.79 L/s which is not expected to negatively impact the existing 250 mm dia. sanitary sewer.

Waste water from the Old Richmond Road 250 mm dia. sanitary sewer then in turn outlets north into the existing downstream 525 mm dia. PVC sanitary collector sewer located along Moodie Drive which further outlets north to the 900 mm dia. sanitary collector sewer that crosses HWY 417.

C. Storm Flow

The storm-water outlet for the proposed development property will be the existing 750 mm diameter concrete storm sewer located on Old Richmond Road. Stormwater attenuation on site

will be accomplished by means of rooftop storage with controlled roof drains that regulate flow off site.

The building foundation weeping-tile drainage system shall have its own separate pipe for gravity flow where weeping-tile water is outletted via a 150 mm diameter storm pipe to the existing 750 mm diameter storm sewer. The storm-water outlet for the rooftop water from roof drains will also be a separately designated proposed 150 mm diameter PVC pipe that will be outletted directly into the existing 750mm diameter storm sewer.

Four (4) roof drains are proposed for this apartment building to restrict flow to a total controlled flow of 7.56 L/s under the 100-Year storm event into the Old Richmond Road storm sewer. The maximum calculated allowable flow rate off-site is 23.94 L/s and the net allowable controlled release rate from this site is estimated at 6.31 L/s.

Based on the residential site plan from the owner's architect, the average post-development runoff coefficient is estimated at $C = 0.76$ and $A = 0.2428$ hectares.

An estimation of the pre-development flow condition was carried out using the criteria accepted by the City of Ottawa. If post-development C value exceeds the lesser of the $C_{pre} = 0.46$ or $C_{allow} = 0.5$ (max) then SWM is required. So from our calculations, the $C_{pre} = 0.46$ value will be used at $t_c = 10$ minutes for pre-development allowable flow calculation off-site.

The pre-development calculated flow rate into the existing 750 mm dia. storm sewer for this proposed development property is the lesser of either the two (2)-Year storm event where $C_{allow} = 0.5$ (max.) runoff value or the average C_{pre} value which is 0.46 using $t_c = 10$ minutes. Because this site $C_{post} = 0.76$ and $C_{pre} = 0.46$ then SWM measures are required.

Therefore, based on our calculation, on-site retention is required for this proposed development site, because the site post-development C value of 0.76 is greater than the $C_{pre} = 0.46$.

The storage volume for the five (5)-Year and up to the 100-year storm event will be stored by means of flat rooftop at the top of the 3-storey residential apartment building. Also refer to the site storm drainage report (Report No. R-819-106) for further details.

Conclusion

At this proposed residential building site and to develop this lot to house a (3)-storey 49-unit apartment building on a 0.2428 ha. parcel of land, the estimated allowable flow off-site is calculated at 23.94 L/s based on City of Ottawa Drainage and Stormwater Management (SWM) criteria of 2-Year pre-development flow at **$C_{pre} = 0.46$ which outlets to the existing Old Richmond Road storm sewer system.** For on-site SWM attenuation, the flat rooftop of the

proposed residential apartment building will be utilized and (4) controlled roof drains are incorporated with a controlled maximum release rate of (1.89 L/s or 30.0 U.S. gal/min.) for Roof Drain #1 to Roof Drain #4 inclusive. The controlled flow from this site totals to 6.32 L/s for the 5-Year post development condition and 7.56 L/s for the 100-Year post development condition. The uncontrolled 5-Year post development flow from the site outletting to the **Old Richmond Road storm system** is estimated at 9.13 L/s and 13.41 L/s for the 100-Year event respectively.

During the 5-Year storm event for the flat rooftop storage, the ponding depth on this rooftop is estimated at 120 mm at the drain and 0 mm at the roof perimeter assuming a 1.0% (min.) roof pitch to the drain. The rooftop storage available at Roof Area #1 is 6.25 m³, Roof Area #2 is 9.16 m³, Roof Area #3 is 7.08 m³ and Roof Area #4 is 9.71 m³ for a total of 32.20 m³ which is greater than the required volume of 24.57 m³.

During the 100-Year storm event for the flat rooftop storage, the ponding depth on this rooftop is estimated at 150 mm (6 inches) at the drain and 0 mm at the roof perimeter assuming a 1.0% (min.) roof pitch to the drain. The rooftop storage available at Roof Area #1 is 12.28 m³, Roof Area #2 is 17.12 m³, Roof Area #3 is 13.93 m³ and Roof Area #4 is 18.84 m³ for a total of 62.17 m³ which is greater than the required volume of 56.32 m³.

Therefore by means of flat building rooftop storage and grading the site to the proposed grades as shown on the Proposed Site Grading and Servicing Plan (Dwg. No. 819-106, G-1) and Proposed Stormwater Management Plan (Dwg. No. 819-106, SWM-1), the desirable 5-Year and up to the 100-Year storm event detention volume of 32.20 m³ and 62.17 m³ respectively will be available on-site. Refer to Appendix E for detailed calculations of available storage volume.

However, in evaluating on a flow basis, the flow off-site into the Old Richmond Road storm sewer system from this site, the 5-Year maximum post development flow rate draining off-site is the uncontrolled flow from the lot plus controlled rooftop flow which equals to 15.45 L/s (9.13 L/s + 6.32 L/s) which is less than 23.94 L/s set by the SWM criteria for this site. During the 100-Year storm event, the maximum post development flow rate off-site is estimated at 20.97 L/s (13.41 L/s + 7.56 L/s) which is also less than 23.94 L/s.

Therefore in terms of comparing pre and post development on a flow basis for this proposed development site, the total maximum allowable five (5)-Year release rate of 23.94 L/s will not be exceeded since the estimated 5-Year post development flow is 15.45 L/s. For storm events up to and including the 100-Year event, the total maximum allowable release rate of 23.94 L/s will also not be exceeded (estimated at 20.97 L/s).

For stormwater flow onto the existing abutting Mosque Parking Lot at the rear of this property, the 5-Year flow is estimated at 5.73 L/s and the 100-Year flow is approximately 11.42 L/s.

The building weeping tile drainage will outlet via its separate 150mm diameter PVC storm lateral. The roof drains will be outletted also via a separate 150mm PVC storm lateral, whereupon both laterals are connected directly to the existing Old Richmond Road 750mm diameter storm sewer. The City of Ottawa recommends that pressurized drain pipe material be used in the building for the roof drain leader pipe in the event of surcharging in the City Storm sewer system. Refer to the proposed grading and servicing plan Dwg. No. 819-106 G-1 for details.

Erosion and Sediment Control

The contractor shall implement Best Management Practices to provide for protection of the receiving storm sewer during construction activities. These practices are required to ensure no sediment and/or associated pollutants are released to the receiving watercourse. These practices include installation of a "silt sack" catch basin sediment control device or equal in catch basins as recommended by manufacturer on-site and off-site within the Old Richmond Road road right-of-way and off-site including the existing catchbasins on Mosque property at the rear of the site adjacent to this property. Siltsack shall be inspected every 2 to 3 weeks and after every major storm. The deposits will be disposed of as per the requirements of the contract. See Dwg. No. 819-106 ESC-1 for details.

Refer to Appendix F for the summary of the Development Servicing Study Checklist that is applicable to this development.

PREPARED BY T.L. MAK ENGINEERING CONSULTANTS LTD.


TONY L. MAK, P.ENG



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PART OF LOTS 32 AND 33
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APPENDIX A
SITE PLAN AND LEGAL SURVEY PLAN

TOPOGRAPHICAL SKETCH OF
THE INTERSECTION OF
OLD RICHMOND ROAD AND
SEYTON DRIVE

Prepared by Annis, O'Sullivan, Vollebakk Ltd.
Field work completed: November 19, 2024
REVISION NOTE: Inverts added January 6, 2025



Metric
DISTANCES AND COORDINATES SHOWN ON THIS PLAN
ARE IN METRES AND CAN BE CONVERTED TO FEET BY
DIVIDING BY 0.3048.

Caution
This is NOT a Plan of Survey and shall not be used except for the purpose indicated in the title block.
Boundary information compiled from Plan 41R-16593 and Registered Plan 4M-1415.

Notes & Legend

[illegible]

ELEVATION NOTES

- ELEVATION NOTES**
1. Elevations shown are geodetic and are derived from Vertical Control Monument No. 0191680051A having an elevation of 117.89 metres (CGVD28 geoidetic datum).
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or distorted and that its relative elevation and description agrees with the information shown on this drawing.

UTILITY NOTES

- DISCLAIMER**
This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
1. Only verify surface utilities were located.
2. All underground services were located by DepthView, on November 20, 2024.
3. Sanitary and storm sewer inverts are measured by DepthView Locates on November 20, 2024 surface elevations noted.
4. A full location of underground plant by the pertinent utility authority is mandatory before any work including breaking ground, grading, excavating etc.



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**APPENDIX B
SITE PRE-DEVELOPMENT CONDITION
GOOGLE IMAGE (2019)
AND
AERIAL PHOTOGRAPHY 2019 (GEOOTTAWA)**

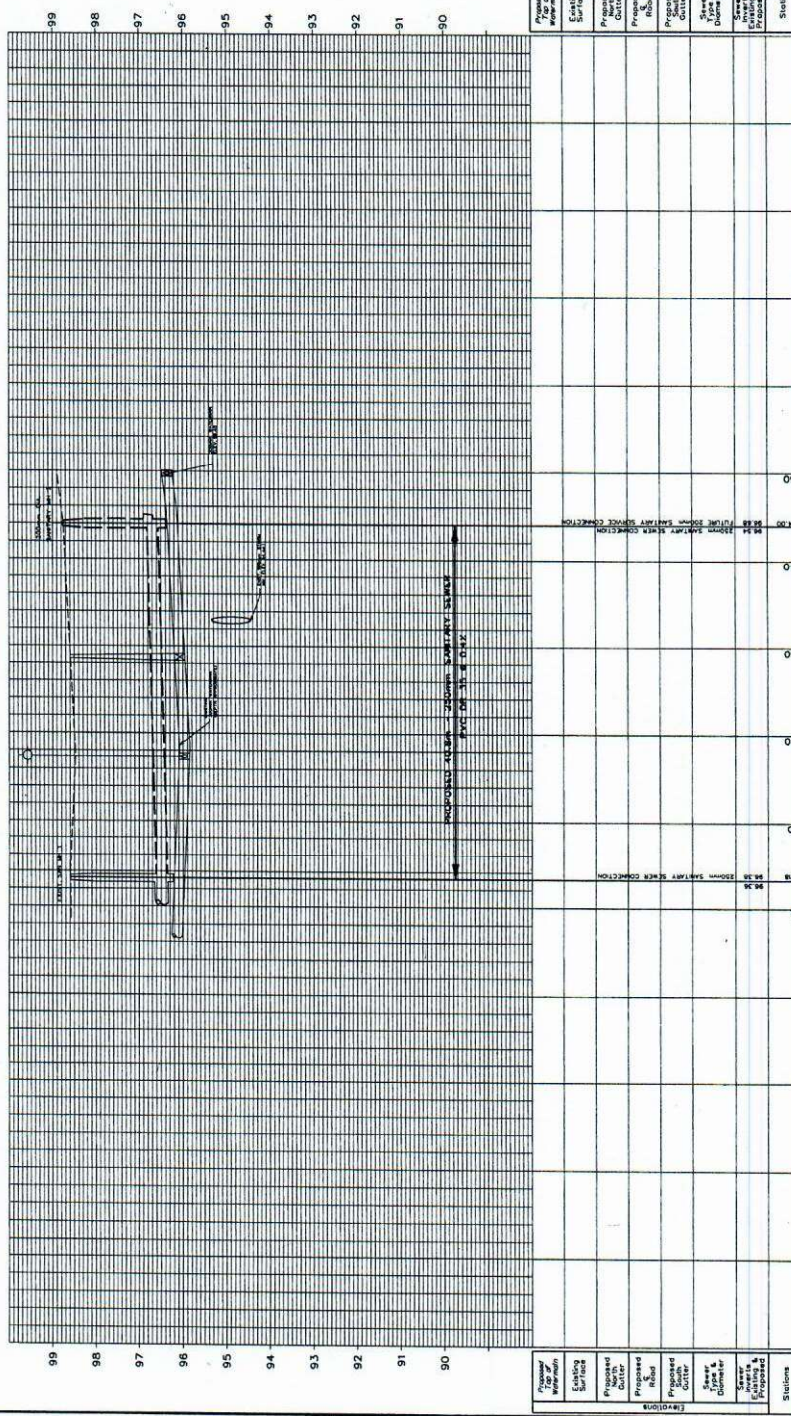
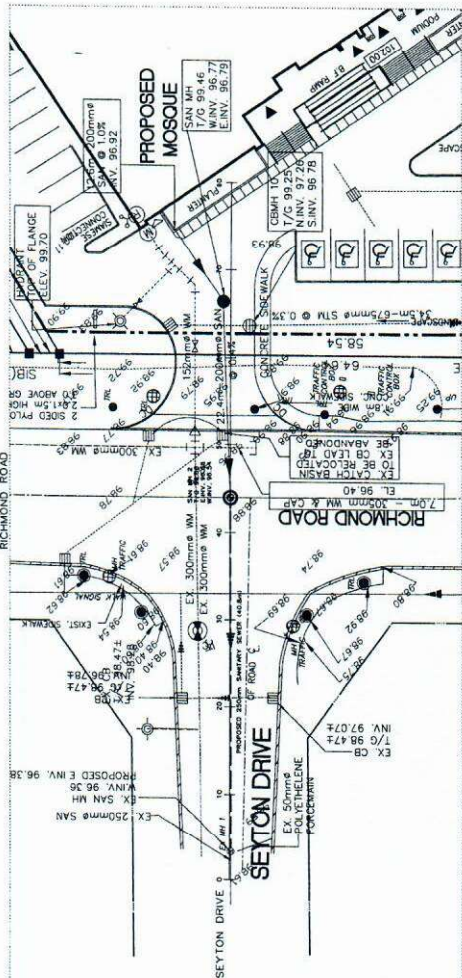






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**APPENDIX C
4000 OLD RICHMOND ROAD
CITY OF OTTAWA
PLAN AND PROFILE
AND
UCC DRAWINGS**

[illegible]

Revisions:			
No.	Date	Description	Drawn By
1	1978-03-30	ISSUED FOR CITY OF OTTAWA CONTRACT	W
2	1978-03-30	ISSUED FOR CITY OF OTTAWA CONTRACT	W
3	1978-03-30	ISSUED FOR CITY OF OTTAWA CONTRACT	W
4	1978-03-30	ISSUED FOR CITY OF OTTAWA CONTRACT	W
5	1978-03-30	ISSUED FOR CITY OF OTTAWA CONTRACT	W

Design:			
Designed By	Drawn By	Checked By	Date
W	W	W	1978-03-30
W	W	W	1978-03-30
W	W	W	1978-03-30
W	W	W	1978-03-30
W	W	W	1978-03-30

Construction Services Manager			
Construction Type	Inspector	Project Manager	Date
W	W	W	1978-03-30
W	W	W	1978-03-30
W	W	W	1978-03-30
W	W	W	1978-03-30
W	W	W	1978-03-30

Final Record Details:			
Construction Type	Inspector	Project Manager	Date
W	W	W	1978-03-30
W	W	W	1978-03-30
W	W	W	1978-03-30
W	W	W	1978-03-30
W	W	W	1978-03-30

Fender Notes:			
Inspector	Project Manager	Date	Checked By
W	W	1978-03-30	W
W	W	1978-03-30	W
W	W	1978-03-30	W
W	W	1978-03-30	W
W	W	1978-03-30	W

Fender Notes:			
Inspector	Project Manager	Date	Checked By
W	W	1978-03-30	W
W	W	1978-03-30	W
W	W	1978-03-30	W
W	W	1978-03-30	W
W	W	1978-03-30	W

Fender Notes:			
Inspector	Project Manager	Date	Checked By
W	W	1978-03-30	W
W	W	1978-03-30	W
W	W	1978-03-30	W
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W	W	1978-03-30	W

Fender Notes:			
Inspector	Project Manager	Date	Checked By
W	W	1978-03-30	W
W	W	1978-03-30	W
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W	W	1978-03-30	W
W	W	1978-03-30	W

Fender Notes:			
Inspector	Project Manager	Date	Checked By
W	W	1978-03-30	W
W	W	1978-03-30	W
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Fender Notes:			
Inspector	Project Manager	Date	Checked By
W	W	1978-03-30	W
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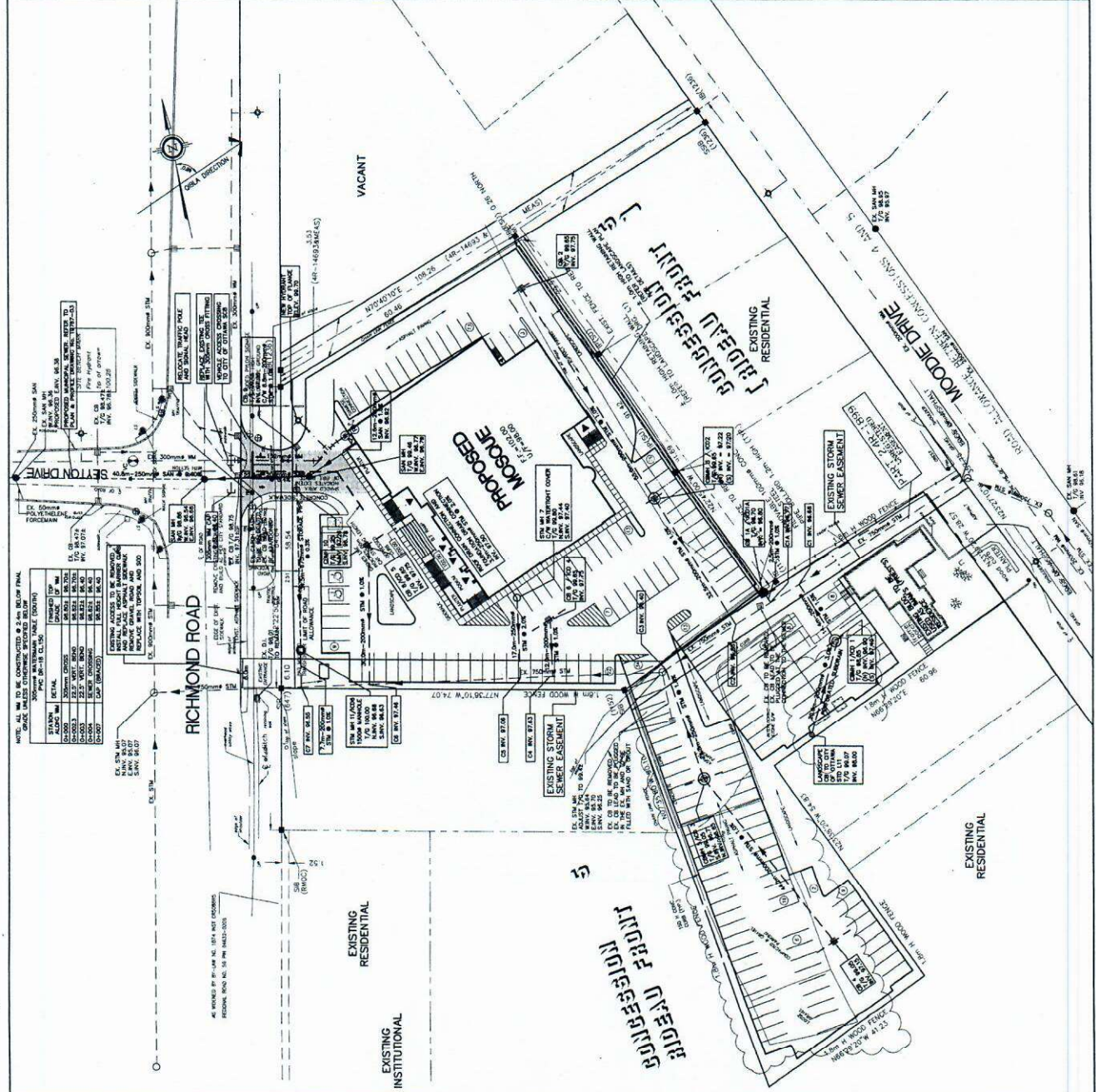
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Inspector	Project Manager	Date	Checked By
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Fender Notes:			
Inspector	Project Manager	Date	Checked By
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W	W	1978-03-30	W

Fender Notes:			
Inspector	Project Manager	Date	Checked By
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W	W	1978-03-30	W
W	W	1978-03-30	W
W	W	1978-03-30	W

Fender Notes:			
Inspector	Project Manager	Date	Checked By
W	W	1978-03-30</	





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APPENDIX D

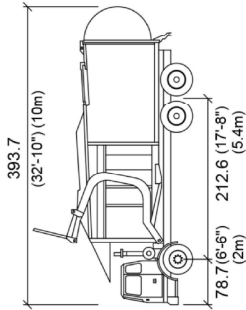
- **SITE PLAN**
- **WATER BOUNDARY CONDITIONS E-MAIL**
- **FIRE FLOW CALCULATION**
- **FUS EXPOSURE DISTANCES (FIGURE 1)**
- **SUPPORTING HYDRAULIC CALCULATIONS**
- **HYDRANT SPACING (FIGURE 2)**

ATTACHMENT 1: SITE PLAN

#18728

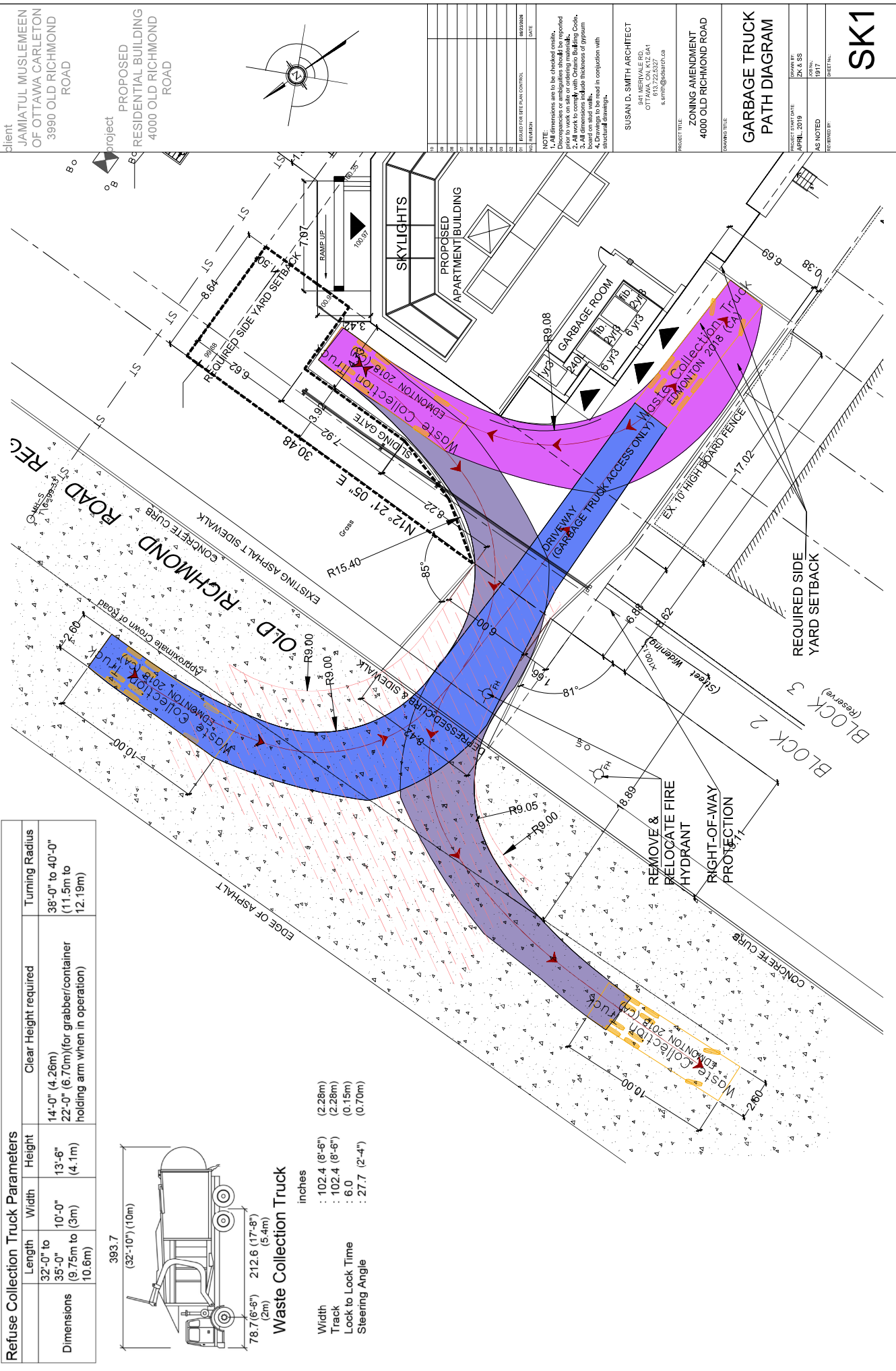
Refuse Collection Truck Parameters

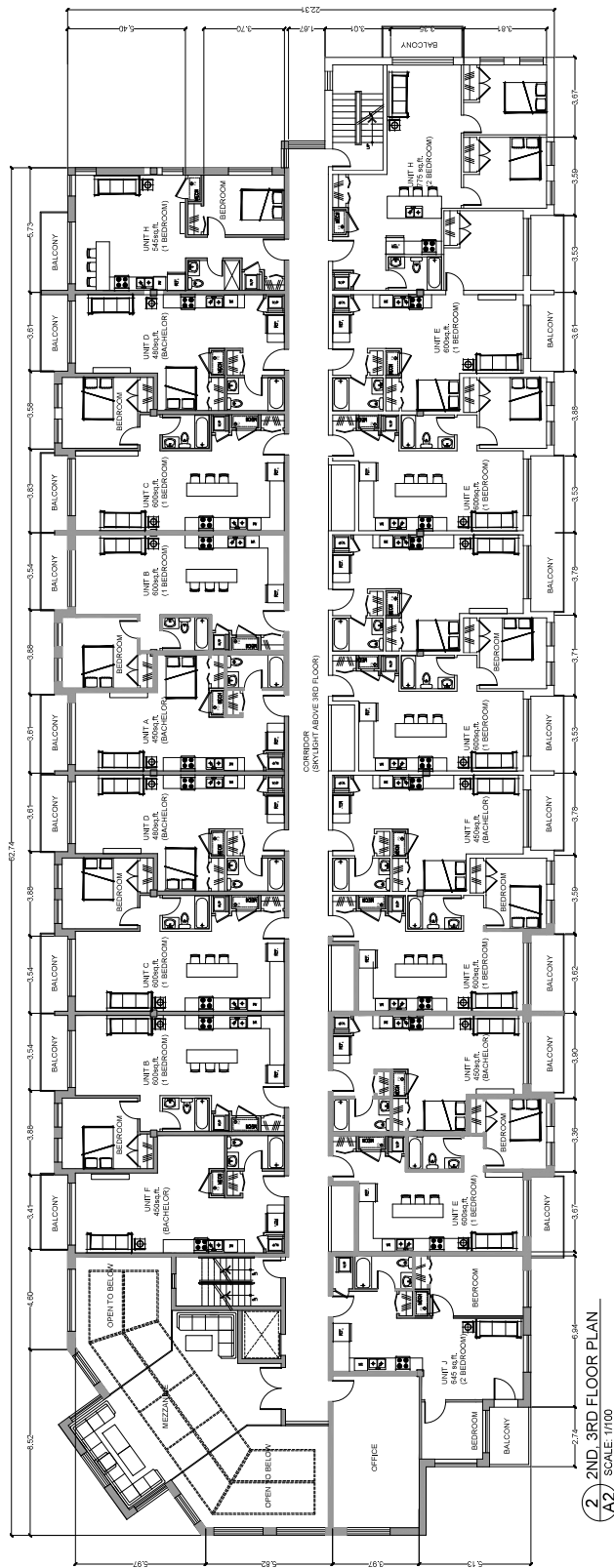
Dimensions	Length	Width	Height	Clear Height required	Turning Radius
	32'-0" to 35'-0" (9.75m to 10.6m)	10'-0" (3m)	13'-6" (4.1m)	14'-0" (4.26m) 22'-0" (6.70m) (for grabber/container holding arm when in operation)	38'-0" to 40'-0" (11.5m to 12.19m)



Waste Collection Truck

Width	102.4 (8'-6") (2.28m)
Track	102.4 (8'-6") (2.28m)
Lock to Lock Time	6.0 (0.15m)
Steering Angle	27.7 (2'-4") (0.70m)





ATTACHMENT 2: WATER BOUNDARY CONDITIONS E-MAIL

Tony Mak

From: Chetrar, Anton [anton.chetrar@ottawa.ca]
Sent: December 12, 2024 2:07 PM
To: TL MaK
Cc: Schaeffer, Gabrielle; 'Malam, Anver'; 'Mineault-Guitard, Alexandre'; 'Susan Smith'
Subject: RE: 4000 Old Richmond Road - Water Boundary Conditions Request
Attachments: 3999-4000 Old Richmond Road REVISED December 2024.pdf

Good afternoon Tony,

The following are boundary conditions, HGL, for hydraulic analysis at 3999-4000 Old Richmond Road (zone 2W2C) assumed to be connected via dual connection with a separation valve in between to the 305mm watermain on Old Richmond (see attached PDF for location).

Minimum HGL: 126.8 m
Maximum HGL: 132.1 m
Max Day + Fire Flow (200 L/s): 123.8 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.

Let me know if you have any questions.

Regards,

Anton Chetrar | P. Eng

Project Manager, Infrastructure - Gestionnaire de projet, Projets d'infrastructure

Development Review All Wards (DRAW) | Direction de l'examen des projets d'aménagement - Tous les quartiers (EPATQ)

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

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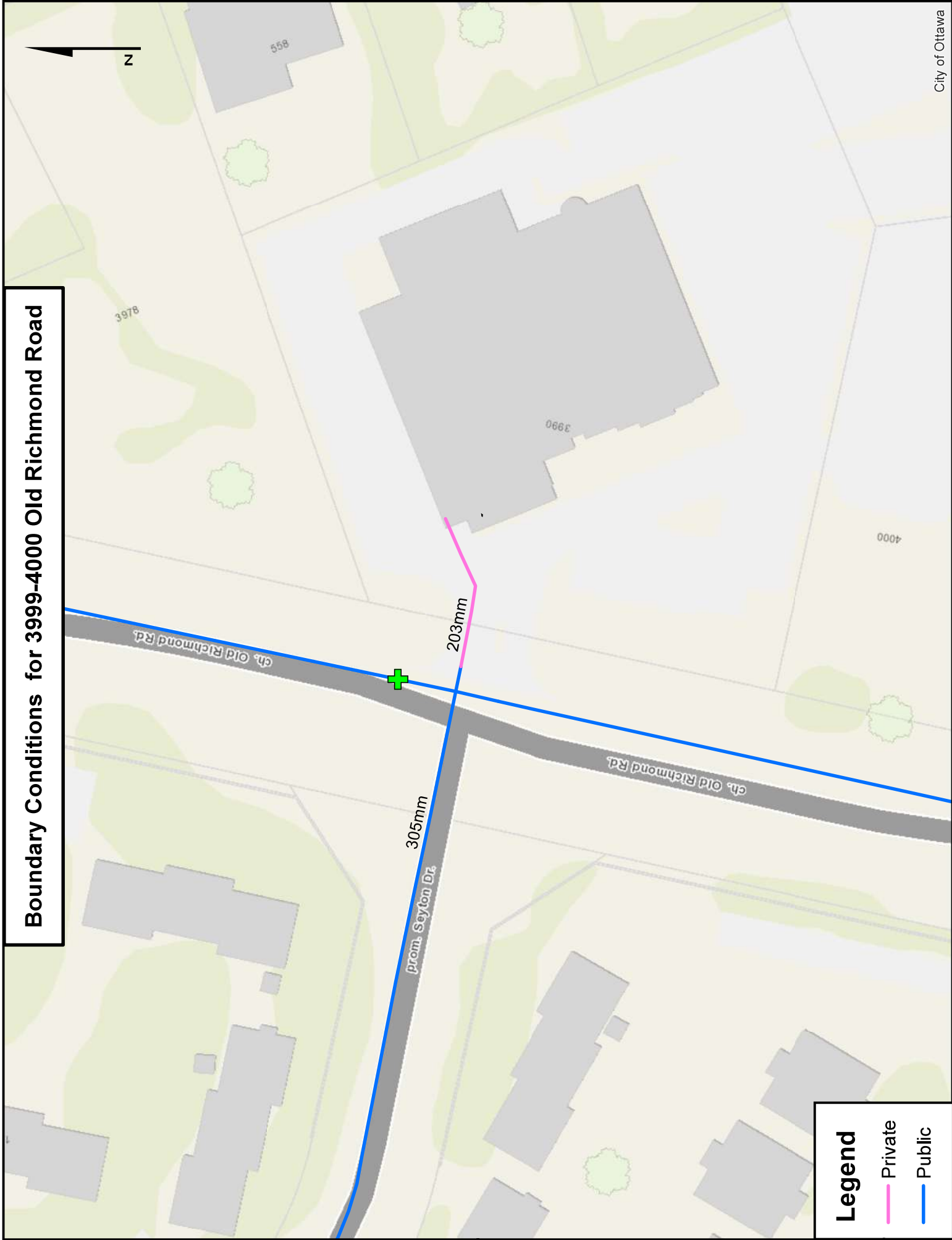
anton.chetrar@ottawa.ca

Boundary Conditions for 3999-4000 Old Richmond Road

Legend

Private

Public



ATTACHMENT 3: FIRE FLOW CALCULATIONS



FUS Fire Flow Calculation Sheet - 2020 FUS Guidelines

Stantec Project #: 163401084
Project Name: 4000 Old Richmond Rd
Date: 12/13/2024
Fire Flow Calculation #: 1

Data inputted by: Hamidreza Mohabbat MASc.
Data reviewed by: Alexandre Mineault-Guitard M.A.Sc., ing., P.Eng.

Description:

Notes: 49 Total Residential Units. 3 storeys, assumed basement more than 50% below grade. Assumed non-combustible construction (all structural elements, including loadbearing walls, columns, arches, floors and roofs are constructed with a minimum 1-hour fire resistance rating). Building setbacks per latest site plan (dated 2024/10/17).

Step	Task	Notes					Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type II - Noncombustible Construction / Type IV-A - Mass Timber Construction					0.8	-
2	Determine Effective Floor Area	Sum of Two Largest Floors + 50% of Eight Additional Floors				Vertical Openings Protected?	NO	-
3	Determine Required Fire Flow	1444	1444	1444			3,611	-
4	Determine Occupancy Charge	(F = 220 x C x A ^{1/2}). Round to nearest 1000 L/min					-	11,000
5	Determine Sprinkler Reduction	Limited Combustible					-15%	9,350
		None					0%	
		Non-Standard Water Supply or N/A					0%	0
		Not Fully Supervised or N/A					0%	
5A	Determine Bylaw Requirement	% Coverage of Sprinkler System					0%	
6	Determine Increase for Exposures (Max. 75%)	Community bylaw requiring all building that may be built within 30m of subject building to be fully sprinkler protected					NO	-
		Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?
		Front	> 30	15	2	21-41	Type V	NO
		Right	20.1 to 30	42	3	> 100	Type V	NO
		Rear	> 30	9	2	0-20	Type V	NO
7	Determine Final Required Fire Flow	Left	3.1 to 10	70	2	> 100	Type V	NO
		Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min						12,000
		Total Required Fire Flow in L/s						200
		Required Duration of Fire Flow (hrs)						2.50
7		Required Volume of Fire Flow (m³)						1,800

ATTACHMENT 4: FIGURE 1 – FUS EXPOSURE DISTANCES

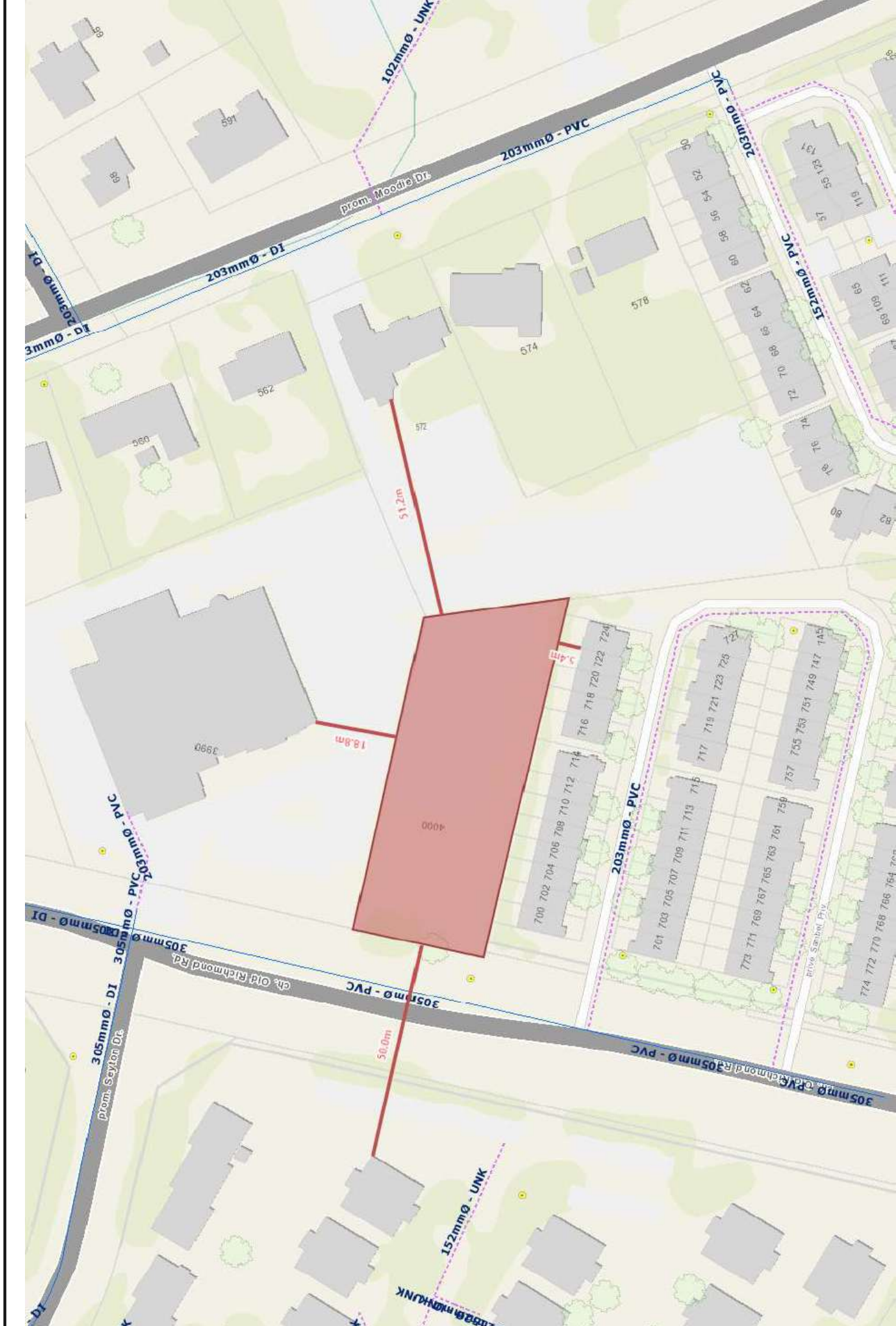


Figure 1: FUS Exposure Distances (Property Line to Adjacent Buildings)

Source: geoOttawa 2024; Contains information licensed under the Open Government Licence – City of Ottawa.

ATTACHMENT 5: SUPPORTING HYDRAULIC CALCULATIONS



Supporting Hydraulic Calculations

Stantec Project #: 163401084

Project Name: 4000 Richmond Road

Date: December 13, 2024

Data inputted by: Alexandre Mineault-Guitard, P.Eng., ing.

Data reviewed by: Kevin Alemany, M.A.Sc., P.Eng.

Boundary Conditions provided by the City:

Scenario 1: Peak Hour (Min HGL): 126.8 m;

Scenario 2: Average Day (Max HGL): 132.1 m; and

Scenario 3: Maximum Day plus Fire Flow: 123.8 m.

Sample Calculations

$$HGL (m) = hp + hz \quad (1)$$

where: hp = Pressure Head (m); and hz = Elevation Head (m), estimated from topography.

For Scenario 1, we have:

$$HGL(m) = 126.8 \text{ and } hz (m) = 100.$$

Rearranging Equation 1, we can calculate the Pressure Head (hp) as follow:

$$hp (m) = HGL - hz$$

$$\therefore hp = 126.8 - 100.0 \text{ m} = 26.8 \text{ m}.$$

To convert from Pressure Head (m) to a pressure value (kPa), the following equation can be used:

$$P (kPa) = (\rho * g * hp) / 1000 \quad (2)$$

where: ρ = density of water = 1000 kg/m^3 ; and g = gravitational acceleration = 9.81 m/s^2 .

Using Equation 2, we can calculate the Pressure Head (hp) as follow:

$$P (kPa) = (1000 * 9.81 * 26.8) / 1000$$

$$\therefore P = 263 \text{ kPa}.$$

Considering that $1 \text{ kPa} = 0.145 \text{ psi}$, the pressure under Scenario 1 is equal to:

$$P = 38 \text{ psi}.$$

Applying the same procedures, the pressures under Scenario 2 and Scenario 3 are calculated as follows:

Scenario 2: $P = 46 \text{ psi}$; and Scenario 3: $P = 34 \text{ psi}$.

To summarize:

Scenario 1: Minimum Pressure under Peak Hour Demand: 263 kPa (38 psi)
Scenario 2: Maximum Pressure under Average Day Demand: 315 kPa (46 psi)
Scenario 3: Minimum Pressure under Maximum Day + Fire Flow Demand: 233 kPa (34 psi)

ATTACHMENT 6: FIGURE 2 – HYDRANT SPACING

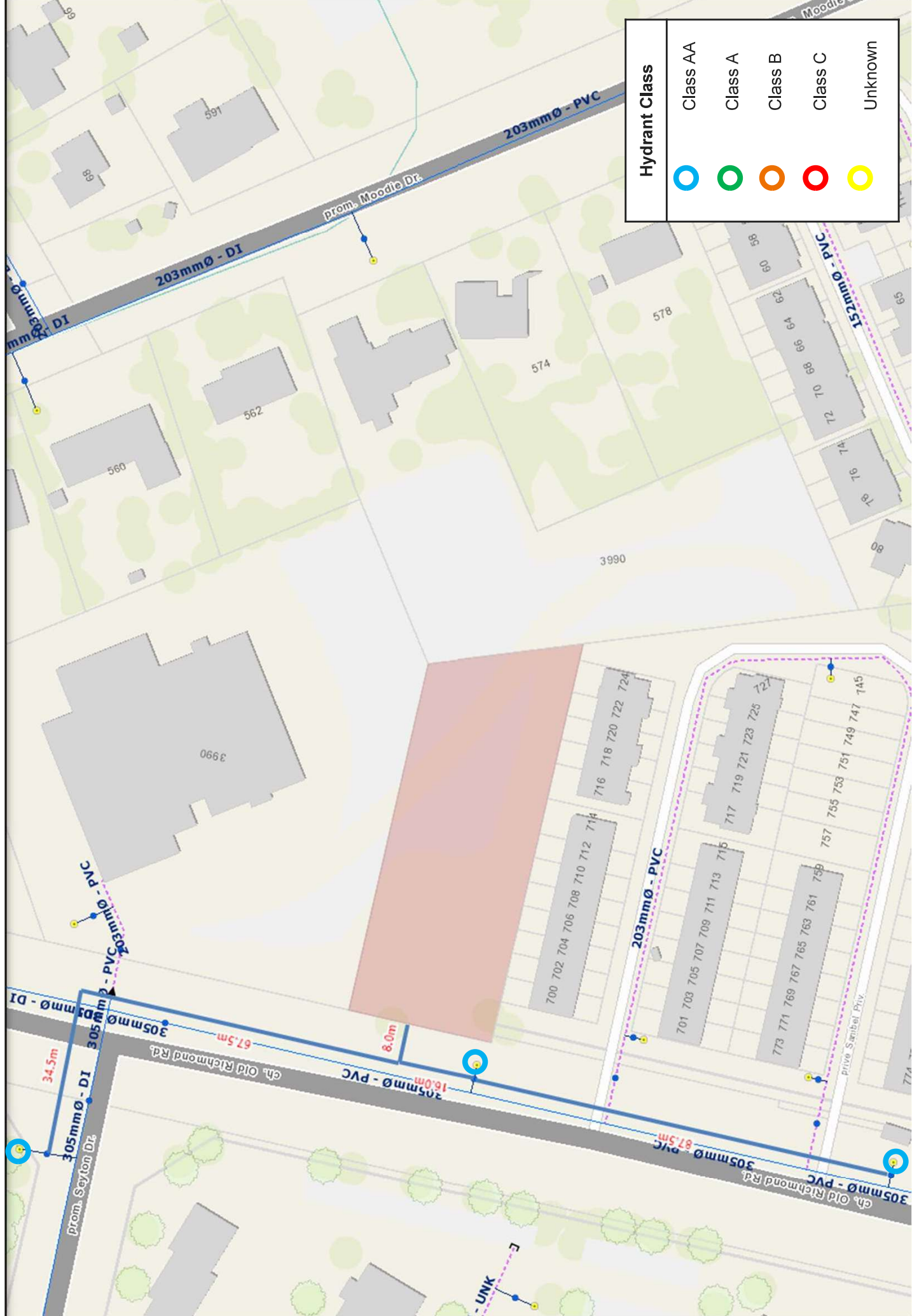


Figure 2: Hydrant Spacing

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PROPOSED
THREE-STOREY RESIDENTIAL APARTMENT BUILDING SITE
PART OF LOTS 32 AND 33
CONCESSION 5 (RIDEAU FRONT)
4000 OLD RICHMOND ROAD
CITY OF OTTAWA

APPENDIX E
CITY OF OTTAWA
SANITARY SEWER DESIGN SHEET
SHEET No. 1 OF 1

- Q = average daily per capita flow (200 L/cap.d)
- I = unit of peak extraneous flow (25 L/ha.s)
- M = peaking factor
- Q (p) = peak population flow (L/s)
- Q (I) = peak extraneous flow (L/s)
- Q (d) = peak design flow

$$M = 1 + \frac{14}{4} \sqrt{P} \quad \text{where } P = \text{population in } 1000's$$

$$Q(P) = \frac{PQM}{L/s}$$

$$Q(1) = 1A \text{ (L/s) where } A = \text{area in hectares}$$

$$Q(d) = Q(p) + Q(1) \text{ (L/s)}$$

$$K = 0.8$$

DENSITY

- BACHELOR = 1.4
- 1 BEDROOM = 1.4
- 2 BEDROOM = 2.1

LOCATION			INDIVIDUAL		CUMULATIVE		PROPOSED SEWER										
STREET	FROM	TO	Pop.	Area A (hectares)	Pop.	Area A (hectares)	Peaking factor M	Pop. flow Q(p) (L/s)	Peak extraneous flow Q(i) (L/s)	Peak design flow Q(d) (L/s)	Length (m)	Pipe size (mm)	Type of pipe	Grade %	Capacity (L/s) $n=0.013$	Full flow velocity (m/s)	Actual velocity at Q(d)
4000 OLD RICHMONDS ROAD	SITE	EX. 2500 SANITARY SEWER	70.7	0.2824	70.7	0.2824	3.43	0.79	0.08	0.87	22.0	150	PVC	1% (mm)	10.8	1.12	

LICENSED PROFESSIONAL ENGINEER
TOMMY LAM, M.ASCE
12/31/24
1613124

PROVINCIAL ENGINEERING SOCIETY OF ONTARIO

(FILE # 819-106)	DESIGN	TLM	PROJECT 4000 OLD RICHMOND ROAD PROPOSED THREE (3) STOREY RESIDENTIAL APART. BUILDING SITE
	CHECKED	TLM	
	DATE	December 2024	
	SHEET No. 1 of 1		

(FILE # 901-618-106)

**PROPOSED
THREE-STOREY RESIDENTIAL APARTMENT BUILDING SITE
PART OF LOTS 32 AND 33
CONCESSION 5 (RIDEAU FRONT)
4000 OLD RICHMOND ROAD
CITY OF OTTAWA**

**APPENDIX F
DEVELOPMENT SERVICING STUDY CHECKLIST SUMMARY**

Servicing study guidelines for development applications

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

- ☐ Executive Summary (for larger reports only).
- ☒ Date and revision number of the report.
- ☒ Location map and plan showing municipal address, boundary, and layout of proposed development.
- ☒ Plan showing the site and location of all existing services.
- ☐ 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.
- ☐ Summary of Pre-consultation Meetings with City and other approval agencies.
- ☐ 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 defensible design criteria.
- ☒ Statement of objectives and servicing criteria.
- ☒ Identification of existing and proposed infrastructure available in the immediate area.
- ☐ 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).
- ☐ Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.
- ☐ 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.
- ☐ Proposed phasing of the development, if applicable.

- ☒ Reference to geotechnical studies and recommendations concerning servicing.
- ☒ All preliminary and formal site plan submissions should have the following information:
 - Metric scale
 - North arrow (including construction North)
 - Key plan
 - Name and contact information of applicant and property owner
 - Property limits including bearings and dimensions
 - Existing and proposed structures and parking areas
 - Easements, road widening and rights-of-way
 - Adjacent street names

4.2 Development Servicing Report: Water

- ☐ Confirm consistency with Master Servicing Study, if available
- ☒ Availability of public infrastructure to service proposed development
- ☒ Identification of system constraints
- ☒ Identify boundary conditions
- ☒ Confirmation of adequate domestic supply and pressure
- ☒ Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.
- ☒ 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.
- ☐ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design
- ☐ Address reliability requirements such as appropriate location of shut-off valves
- ☒ Check on the necessity of a pressure zone boundary modification.
- ☒ 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

- ☒ Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.
- ☐ Description of off-site required feeder mains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.
- ☒ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.
- ☒ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

4.3 Development Servicing Report: Wastewater

- ☒ Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).
- ☐ Confirm consistency with Master Servicing Study and/or justifications for deviations.
- ☐ Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.
- ☒ Description of existing sanitary sewer available for discharge of wastewater from proposed development.
- ☐ 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)
- ☒ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.
- ☐ Description of proposed sewer network including sewers, pumping stations, and forcemains.
- ☐ 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).
- ☐ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.
- ☐ Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.
- ☐ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.
- ☐ Special considerations such as contamination, corrosive environment etc.

4.4 Development Servicing Report: Stormwater Checklist

- ☒ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)
- ☐ Analysis of available capacity in existing public infrastructure.
- ☒ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.
- ☒ Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.
- ☐ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.
- ☒ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.
- ☐ Set-back from private sewage disposal systems.
- ☐ Watercourse and hazard lands setbacks.
- ☐ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.
- ☐ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.
- ☒ Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- ☐ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- ☒ 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.
- ☐ Any proposed diversion of drainage catchment areas from one outlet to another.
- ☒ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- ☐ 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.
- ☐ Identification of potential impacts to receiving watercourses
- ☐ Identification of municipal drains and related approval requirements.
- ☒ Descriptions of how the conveyance and storage capacity will be achieved for the development.
- ☒ 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.
- ☒ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.
- ☐ Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.
- ☐ Identification of fill constraints related to floodplain and geotechnical investigation.

4.5 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 the 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.
- ☐ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.
- ☐ Changes to Municipal Drains.
- ☐ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

4.6 Conclusion Checklist

- ☒ Clearly stated conclusions and recommendations
- ☐ 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