

**PROPOSED
THREE STOREY APARTMENT BUILDING SITE
LOTS 191 AND 192
R-PLAN 441
304-308 DONALD STREET
CITY OF OTTAWA**

**SERVICEABILITY REPORT
REPORT R-824-63A (REV. #1)
NOVEMBER 2024**

T.L. MAK ENGINEERING CONSULTANTS LTD.

JULY 2024

REFERENCE FILE NUMBER 824-63

Introduction

The developer of this site is proposing to redevelop the existing (2) residential lots described as Part of Lots 191 and 192 Registered Plan 441 City of Ottawa by constructing a (3) storey residential apartment building consisting of thirty one (31)-units, including eight (8) 2-bedroom units, ten (10) 1-bedroom units and thirteen (13) bachelor units with a vehicle access road at the west side of the site off Edith Avenue including rear yard parking.

The municipal address of the (2) properties are referenced as 304 and 308 Donald Street and it is located in the City Ward (Ward 13 - Rideau Rockcliffe). The site is situated on the south side of Donald Street, west of Lola Street and east of Edith Avenue. See site plan and legal survey plan in Appendix A for details.

The area of this property is ± 0.1086 hectares. In addition to the three (3) storey residential apartment building, the other development features will comprise of a hard surface pathway to the front of lot from both the front entrance and east side yard, an amenity area is also located in the rear yard, as well as a vehicle access lane along the east side of the site off Edith Avenue including (10) proposed parking spaces at the rear of the building and landscaped areas throughout the site, etc., to meet the City of Ottawa's site plan requirements.

A site geotechnical report was prepared by the owner's soils engineer Paterson Group entitled Geotechnical Investigation – Proposed Development 304 & 308 Donald Street (Project No. PG7089-1) dated May 8, 2024 for this proposed development property.

The City of Ottawa requires the owner to apply and consolidate the parcels (304 and 308 Donald Street) of land into one ownership otherwise the proposed stormwater works will be servicing more than one parcel of land and thus does not meet the exemption set out in O.Reg. 525/98. This would mean an Environmental application for Certification of Approval (ECA) would be required regardless of who owns the parcels. The owner has confirmed that the two (2) properties at 304 and 308 Donald Street is under one ownership namely 1000832314 Ontario Inc. and therefore no ECA would be required for this site development.

This serviceability report will provide the City of Ottawa with our serviceability brief to address the proposed servicing scheme for this site.

Existing Site Conditions and Servicing

This amalgamated property is presently occupied by two residential buildings. Each of the building has its own asphalt driveway for vehicle access and parking. Approximately one-half of the existing site is currently hard surface covered and consisting of asphalt/gravel areas with the remaining one-half of the areas being roof area, porches, decks, sheds, grass and

landscaped areas. For additional details of the site's pre-development conditions, refer to the coloured Google Image and aerial photography from (GeoOttawa 2022) in Appendix B.

The existing topography of the land is found to be the split lot drainage type with approximately one-half of the site draining to the rear of the lot (south) and the remaining half draining to the front (north) and the site is currently sloping and draining both to the south to north across the site. The existing gradient of the (2) amalgamated lots are sloping at an approximate average gradient of 0.38%.

The existing water service and sanitary lateral currently servicing the existing dwelling on 304 and 308 Donald Street will be removed. The existing water services shall be blanked at the main and the existing house laterals shall be capped at the front property line for re-development of this site.

As for the availability of underground municipal services, there are existing municipal services along Donald Street in front of this property consisting of a 1200 mm diameter storm sewer, a 600 mm diameter sanitary sewer, and a 400mm diameter watermain for development of this property. Additionally, there are existing municipal services along Edith Avenue at the east side of this property consisting of 1350 mm diameter storm sewer, a 600 mm diameter sanitary sewer, and a 200 mm diameter watermain for development of this property. Refer to the City of Ottawa Donald Street UCC and As-Built plan and profile drawings included in Appendix C for details.

Because the site will be connecting to and outletting into the separated storm sewer system along Edith Avenue in the City of Ottawa, therefore, the approval exemption under Ontario Regulations 525/98 would apply since storm water discharges from this site will outlet flow into a downstream storm sewer. Thus, an Environmental Compliance Approval (ECA) application will not be required to be submitted to the Ministry.

Proposed Residential Apartment Building Site

Vehicle access to rear yard parking is available for this site via an access laneway along the west side of the site to the (10) vehicle parking spaces and bicycle parking area. A hard surface pathway is proposed at the front and along the east side of the lot for pedestrian access to the east side door. An amenity area is also provided in the rear yard.

A. Water Supply

The proposed building located within the City of Ottawa's Pressure Zone 1E at 304-308 Donald Street is a 3-storey residential multi-unit building with a basement. The building contains thirty-one (31) total units, eight (8) 2-bedroom, ten (10) 1-bedroom, and thirteen (13) bachelor units.

Each floor covers an area of around 5,547 ft², for a gross floor area of about 16,640 ft², excluding the basement. The building is to be serviced by the 400 mm diameter watermain along Donald Street. The ground elevation along Donald Street is approximately 60.6 m.

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). Persons per unit (PPU) for each unit were estimated based on the City of Ottawa’s Water Design Guidelines.

Following discussions with the City, peaking factors are to be estimated from Table 3-3 of the MECP Design Guidelines for Drinking-Water Systems, given that the proposed development population is less than 500 people. Maximum day (MXDY) demands were calculated by multiplying AVDY demands by a factor of 8.7. Peak hour (PKHR) demands were calculated by multiplying AVDY by a factor of 13.2. Table 1 shows the estimated domestic demands of the proposed building.

Table 1: Estimated Domestic Demand

Unit Type	Unit Count	PPU	Consumption	AVDY		MXDY		PKHR	
				L/d	L/s	L/d	L/s	L/d	L/s
Apartment, 2-Bedroom	8	2.1	280	4,704	0.05	40,925	0.47	62,093	0.72
Apartment, 1-Bedroom	10	1.4		3,920	0.05	34,104	0.39	51,744	0.60
Apartment, Bachelor	13	1.4		5,096	0.06	44,335	0.51	67,267	0.78
Total	31			13,720	0.16	119,364	1.38	181,104	2.10

The fire flow required was determined following the Fire Underwriter Survey (FUS) method and is provided in the attached worksheet. The proposed building will be of wood frame construction. It is understood that the building will not be equipped with sprinklers, and that the basement is more than 50% below ground level. The resulting required fire flow is 18,000 L/min (300 L/s) for a duration of 4.00 hours.

Details are provided in the attached FUS Fire Flow Calculations. Figure 1 provides separation distances from adjacent buildings. The proposed Site Plan attached in Appendix D was used to determine distances from the proposed building to the property lines.

In summary, the estimated water demands for the proposed building are as follows:

- AVDY = 13,720 L/d (0.16 L/s)
- MXDY = 119,364 L/d (1.38 L/s);
- PKHR = 181,104 L/d (2.10 L/s); and,
- Fire Flow = 18,000 L/min (300 L/s)

Boundary Conditions

The hydraulic gradeline (HGL) boundary conditions for 304-308 Donald Street, as presented in **Table 2**, were provided by the City on June 13, 2024 (see attached **Water Boundary Conditions Email** in Appendix D).

Table 2: Boundary Conditions

Demand Scenario	Head (m)
Minimum HGL (Peak Hour)	109.9
Maximum HGL (Average Day)	118.5
Maximum Day + Fire Flow (300 L/s)	108.2

It should be noted boundary conditions for the available fire flow demand scenario are from a multi-hydrant analysis, considering local hydrants within 150 m of the property flowing simultaneously (refer to the **Water Boundary Conditions Email** in Appendix D). This value was considered in the hydraulic analysis to compare to the fire flow requirement for the proposed building.

Hydraulic Analysis

Peak Hour & Average Day

During peak hour demands, the resulting minimum hydraulic gradeline of 109.9 m corresponds to a peak hour pressure of 483 kPa (70 psi). This value is above the minimum pressure objective of 276 kPa (40 psi) for residential buildings up to two storeys. Adding 5 psi per floor above two stories, to account for headloss due to elevation and pipe losses, a minimum pressure of 310 kPa (45 psi) would be required for the third floor. The peak hour pressure at ground level is above this objective and therefore considered acceptable.

During average day demands, the resulting maximum hydraulic gradeline of 118.5 m corresponds to a maximum pressure of 568 kPa (82 psi). This value is above than the maximum pressure objective of 552 kPa (80 psi). As per the City guidelines, pressures exceeding 552 kPa (80 psi) require reduction mitigation, which could be achieved with a pressure reducing valve along the service line to the proposed building.

Supporting Hydraulic Calculations are attached in Appendix D.

Maximum Day + Fire Flow

A maximum day plus fire flow hydraulic gradeline of 108.2 m corresponds to a residual pressure of 467 kPa (68 psi) at this location, which is well above the minimal residual pressure

requirement of 140 kPa (20 psi). Hydrant coverage and classes in the vicinity of the proposed building are illustrated in **Figure 2** attached in Appendix D.

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, five (5) hydrants are located in the vicinity of the proposed building. Three (3) Class AA hydrants are within 75 m, both with a capacity contribution of up to 5,700 L/min. Two (2) others Class AA hydrants are within 150 m from the site, both with a capacity contribution of up to 3,800 L/min. The combined hydrant flow coverage for 304-308 Donald Street is therefore 24,700 L/min, which is above the FUS required fire flow of 18,000 L/min. A breakdown of the hydrant coverage is summarized in **Table 3** below.

Table 3: Fire Hydrant Coverage

Building	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	Max Contrib. to RFF	Quantity	Max Contrib. to RFF	
304-308 Donald Street	18,000 L/min (FUS)	AA	3	5,700	2	3,800	24,700
		A					
		B					
		C					

Conclusions

In conclusion, based on the boundary conditions provided, the local watermain network in the vicinity of the proposed building at 304-308 Donald Street provides adequate fire flow capacity as per the Fire Underwriters Survey (FUS) method. Anticipated demand flows meet the pressure objective during peak hour demand conditions, as per the City of Ottawa’s Drinking Water Design Guidelines. During average day demand conditions, the anticipated maximum pressure at ground level exceeds the maximum pressure objective for residential buildings as per the City of Ottawa’s Drinking Water Design Guidelines. This maximum pressure objective could be achieved with a pressure reducing valve along the service line to the proposed building as per building code recommendations.

B. Sanitary Flow

The peak sanitary flow for the 31 units, which comprise of eight (8) 2-bedroom units, ten (10) 1-bedroom units and thirteen (13) bachelor units, is estimated at $Q = 0.67$ L/s with an infiltration rate of 0.04 L/s. Refer to Appendix E sheet 1 of 1 regarding sanitary flow calculations. This flow will enter the existing 600 mm diameter sanitary sewer on Edith Avenue via the proposed 150 mm diameter PVC sanitary service lateral from the three (3)-storey residential apartment building.

The existing peak sanitary flow of the site for the (2) existing single detached dwelling units is $Q = 0.13$ L/s with an infiltration rate of 0.04 L/s. The net increase in flow from this proposed development is 0.54 L/s which is not expected to negatively impact the existing 600 mm dia. sanitary sewer.

Waste water from this site outlets to the existing Edith Avenue 600 mm dia. sanitary sewer which continues to flow south along Edith Avenue then west to Queen Mary Street and further outlets into the existing 1950 mm diameter trunk sanitary sewer at North River Road.

C. Storm Flow

Stormwater outlet for this proposed property will be the existing 1350 mm dia. concrete storm sewer located on Edith Avenue. The proposed residential apartment building rooftop is flat and will be able to provide on-site stormwater management (SWM) storage. Roof water from the building will be drained and controlled by five (5) roof drains each with a release rate of 0.95 L/s (15.0 US gal/min.) which then outlets directly into the existing 1350 mm dia. storm sewer via the proposed 150 mm dia. PVC storm pipe.

On-site drainage shall be graded and drained into a catch basin and a catch basin manhole and interconnected by underground storm water piping of 250 mm dia. to 300 mm dia. in size for SWM purposes.

The building foundation weeping-tile drainage system shall have its own separate pipe for gravity flow where weeping-tile water is outletted via a 150mm diameter storm pipe to the existing 1350mm dia. Edith Avenue storm sewer. The stormwater outlet for the rooftop water from roof drains will be a separately designated proposed 150mm diameter PVC pipe that will also be outletted directly into the existing 1350 mm diameter storm sewer.

Five (5) roof drains are proposed for this apartment building to restrict flow at a rate of 0.95 L/s each or 5×0.95 L/s = 4.75 L/s into the Edith Avenue storm sewer. The calculated net allowable controlled release rate from this site is estimated at 5.32 L/s and the total allowable off-site flow is estimated at 11.64 L/s.

Based on the residential site plan from the owner's architect, the average post-development runoff coefficient is estimated at $C = 0.70$ and $A = 0.1086$ 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 $C_{pre} = 0.57$ or $C_{allow} = 0.5$ (max) then SWM is required. So from our calculations, the $C_{allow} = 0.5$ (max) value will be used at $t_c = 10$ minutes for pre-development allowable flow calculation off-site.

The pre-development flow rate calculation into the 1350 mm dia. Edith Avenue storm sewer for this residential area is the lesser of either the five (5)-year storm event where $C_{allow} = 0.5$ (max.) runoff value or the average C_{pre} value which is 0.57 using $t_c = 10$ minutes. Because this site $C_{post} = 0.70$ and $C_{allow} = 0.5$ (max) 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 0.70 is greater than the $C_{allow} = 0.5$ (max).

The storage volume for the five (5)-year and up to the 100-year storm event attenuation will be stored by means of flat rooftop at the top of the residential apartment building and by the asphalt parking lot surface area located at the rear of the building. Refer also to the site storm drainage report (Report No. R-824-63) for further details.

Conclusion

For development of this residential site (± 0.1086 ha. in size) and in controlling the 2 year stormwater release rate off-site to a total allowable rate of 11.64 L/s with a net allowable controlled flow rate of 5.32 L/s from this site, a site storage volume of approximately 7.87 m³ (min.) is required during the 5 year event. We estimate that approximately 7.40 m³ (min.) of rooftop storage and 0.47 m³ (min.) from the proposed parking lot surface storage and underground storm piping at the rear of lot are necessary to attenuate the 5 year post development storm event.

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 1.8% (min.) roof pitch to the drain. The rooftop storage available at Roof Area #1 is 2.76 m³, Roof Area #2 is 2.58 m³, Roof Area #3 is 3.16 m³, Roof Area #4 is 2.64 m³, and 2.93 m³ at Roof Area #5 for a total of 14.07 m³ which is greater than the required volume of 7.40 m³.

As for the remaining storage volume of 0.47 m³ (min.) required from the controlled site development area, during the 5 year storm event, the estimated H.W.L. of 60.30 m will provide a total available storage volume of 0.84 m³ consisting of the rear parking lot surface storage and underground storm piping. In total the 5 year available site storage volume is approximately 14.91 m³ which is greater than the required site storage volume of 7.87 m³. See Appendix D for details.

In order to control the 100 year stormwater release rate off-site to a net allowable controlled rate of 5.32 L/s, a site storage volume of approximately 21.82 m³ (min.) is required during the 100 year event. We estimate that approximately 19.02 m³ (min.) of rooftop storage and 2.80 m³ (min.) from the proposed parking lot stormwater ponding area at CB#2, CB/MH#1 and

underground storm piping between CB/MH#1 and CB#2 are necessary to attenuate the 100-year post-development storm event. For the rear yard ponding areas, the City requires the 100-Year + 20.0% stress test storm event volume to be calculated and based on **Table 13**, 3.36 m³ (min.) storage volume is required from the related underground storm piping and surface ponding area at CB/MH#1 and CB#2.

During the 100 year storm event for the flat rooftop storage, the ponding depth on this rooftop is estimated at 150 mm at the drain and 0 mm at the roof perimeter assuming a 1.8% (min.) roof pitch to the drain. The rooftop storage available at Roof Area #1 is 5.80 m³, Roof Area #2 is 5.28 m³, Roof Area #3 is 6.23 m³, Roof Area #4 is 5.46 m³, and 5.44 m³ at Roof Area #5 for a total of 28.21 m³ which is greater than the required volume of 19.02 m³.

From the site, the 100-Year storage volume of 2.80 m³ (min.) is required from the controlled site development area during the 100 year storm event. The required volume is 3.36 m³ for the 100-Year + 20.0% stress test storm event. At the estimated H.W.L. of 60.35 m, at this level it will provide a total available storage volume of 3.38 m³ consisting of the proposed parking lot stormwater ponding area at CB/MH#1, CB#2 and underground storm piping between CB/MH#1 and CB#2 which are necessary to attenuate the 100-Year + 20.0% post development flow. In total the 100 year available site storage volume is 31.59 m³ which is greater than the required site storage volume of 22.38 m³. See Appendix E for details.

Therefore by means of flat building rooftop storage, grading the site to the proposed grades and constructing the proposed underground storm piping and drainage structures as shown on the Proposed Site Grading and Servicing Plan (Dwg. No. 824-63, G-1) and Proposed Stormwater Management Plan (Dwg. No. 824-63, SWM-1), the desirable 5 year and 100 year storm event detention volume of 14.91 m³ and 31.59 m³ respectively will be available on-site.

An inlet control device (ICD) will be installed at the outlet of CB/MH #1 in the 250 mm diameter storm pipe (outlet pipe) with Q = 6.0 L/s minimum ICD size required by the City of Ottawa under a head of 1.10 m. A rooftop drain with a maximum release rate of 0.95 L/s will be installed at Roof Drain #1 to Roof Drain #5 inclusive on the proposed residential building flat rooftop as depicted on Dwg. No. 824-63, G-1 and Dwg. No. 824-63, SWM-1.

The ICD type recommended is a Hydrovex Regulator (No. 75 VHV-1) or equivalent. (See Appendix "F" of the **Storm Drainage Report [Report No. R-824-63]** for details).

In comparing the pre-development flow of the current site conditions to the post development flow, the SWM regulated flow plus uncontrolled flow from the proposed site under the post development conditions at the 2-Year event = 13.13 L/s (4.75 L/s + 6.0 L/s + 2.38 L/s) and the 100-Year event = 17.08 L/s (4.75 L/s + 6.0 L/s + 6.33 L/s) where both of the post development

flow events are less than current pre-development flow estimate for the site at 2-Year $_{pre} = 13.27$ L/s and 100-Year $_{pre} = 34.51$ L/s. Therefore with this proposed development, stormwater flow is improved from that of the existing condition.

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 Edith Avenue 1350mm 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. 824-63 G-1 for details.

Due to high HGL of the existing Edith Avenue and Donald Street storm sewer segment located in front of this property, the City of Ottawa will require a sump pump with emergency discharge that outlets onto the ground surface that drains to City's right-of-way, refer to City Dwg. No. P01 Rev. Date July 2019 for details.

For water quality control, to achieve a minimum 60 percent TSS removal, a Stormceptor structure (Model No. EFO4) is proposed to be installed for site development of this property. This Stormceptor structure shall be located downstream of the proposed CB/MH#1, which houses the site's inlet control device (ICD). Based on the Stormceptor system that is proposed for this site, size of lot and impervious ratio, a greater than 60 percent TSS removal is estimated for all rainfall events including large storms. (See Appendix "D" of the **Storm Drainage Report [Report No. R-824-63]** for details).

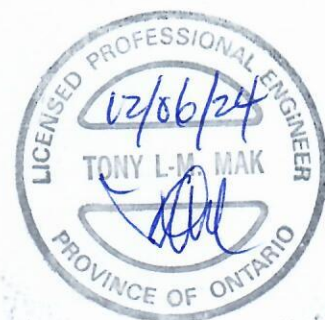
Erosion and Sediment Control

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 "siltsack" catch basin sediment control device or equal in catch basins as recommended by manufacturer on-site and off-site within the Donald Street and Edith Avenue road right of way adjacent to this property. Siltsack shall be inspected every 2 to 3 weeks and after major storm. The deposits will be disposed of as per the requirements of the contract. See Dwg. #824-63 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



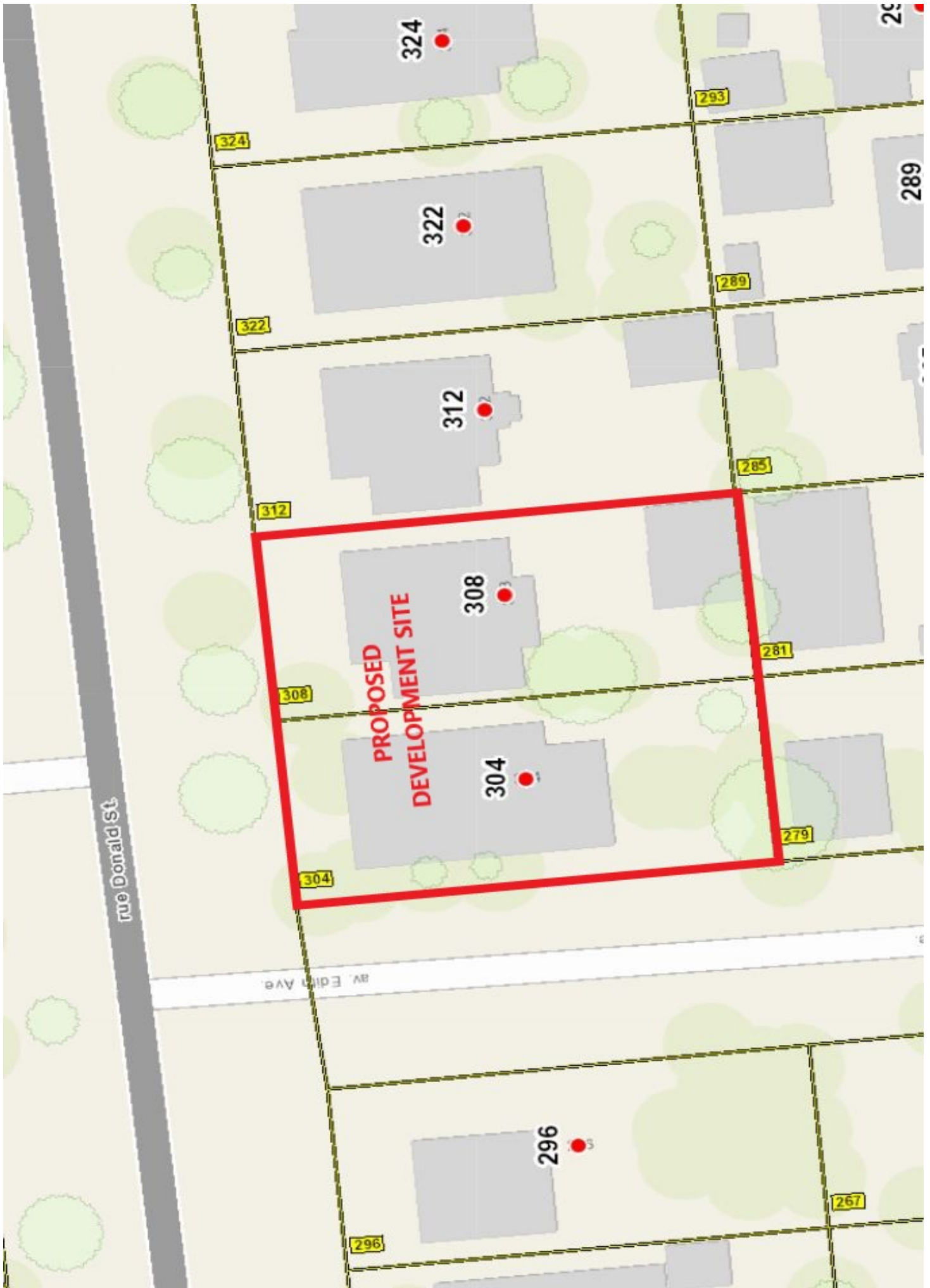
**PROPOSED
THREE STOREY APARTMENT BUILDING SITE
LOTS 191 AND 192
R-PLAN 441
304-308 DONALD STREET
CITY OF OTTAWA**

**APPENDIX A
SITE PLAN AND LEGAL SURVEY PLAN**

**PROPOSED
THREE STOREY APARTMENT BUILDING SITE
LOTS 191 AND 192
R-PLAN 441
304-308 DONALD STREET
CITY OF OTTAWA**

**APPENDIX B
SITE PRE-DEVELOPMENT CONDITION
GOOGLE IMAGE (2021)
AND
AERIAL PHOTOGRAPHY 2022 (GEOOTTAWA)**







**PROPOSED
THREE STOREY APARTMENT BUILDING SITE
LOTS 191 AND 192
R-PLAN 441
304-308 DONALD STREET
CITY OF OTTAWA**

**APPENDIX C
DONALD STREET
CITY OF OTTAWA
PLAN AND PROFILE
AND
UCC DRAWINGS**

Ottawa
 CONVENT INC.
 6505-5260
 14282-32

Part B
 CLYNN AVENUE & EDITH AVENUE
 ROAD RECONSTRUCTION

EDITH AVENUE
 PLAN AND PROFILE
 STA. 2+270 TO STA. 2+390

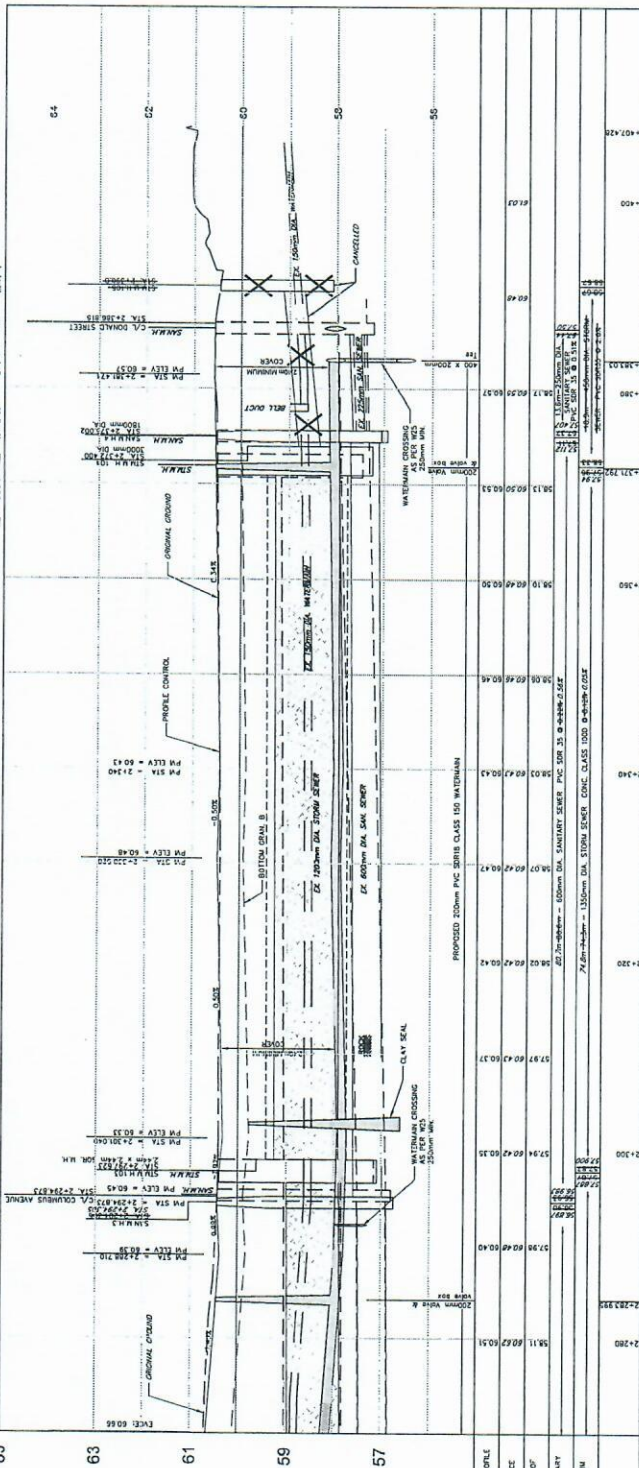
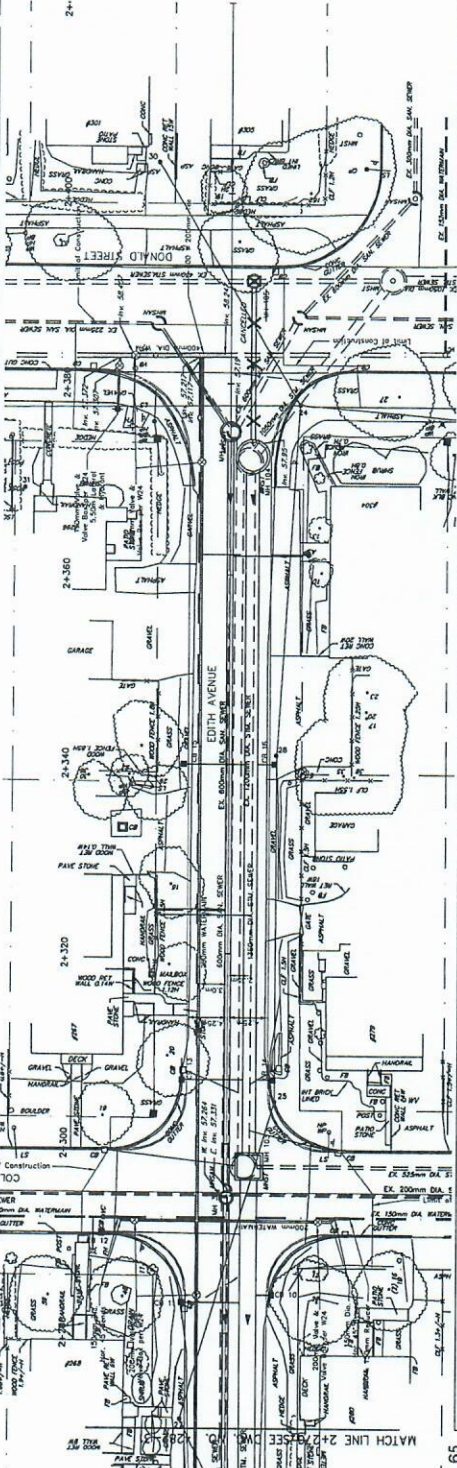
W. BENNETT PING
 Project Engineer
 Date: January 2008

Site: METEOROL 1:500
 METEOROL 1:500

SH
 SURVEYING
 ENGINEERS
 INC.

NO.	REVISIONS	BY	DATE
1	PRELIMINARY CIRCULATION	JMB	01/13/07
2	ISSUED FOR TENDERS	JMB	03/27/08
3	ISSUED FOR CONSTRUCTION	JMB	06/02/08
4	AS BUILT	MM	02/24/14

NOTE: It is the client's responsibility to ensure that the location shown on this plan is correct. The contractor shall be responsible for obtaining permission from all property owners for the location of utilities and shall be responsible for obtaining permission from all property owners.



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STATION	PROPOSED CA PROFILE	EXISTING SURFACE	PROPOSED TOP OF WATERMAIN	PROPOSED TOP OF SANITARY SEWER	PROPOSED STORM INVERT
2+280	58.11	60.42	60.51		
2+285	57.98	60.42	60.35		
2+290	57.87	60.42	60.42		
2+295	58.02	60.42	60.42		
2+300	58.07	60.42	60.47		
2+305	58.03	60.42	60.43		
2+310	58.05	60.42	60.45		
2+315	58.13	60.50	60.37		
2+320	58.13	60.50	60.33		
2+325	58.13	60.50	60.33		
2+330	58.13	60.50	60.33		
2+335	58.13	60.50	60.33		
2+340	58.03	60.42	60.43		
2+345	58.05	60.42	60.45		
2+350	58.05	60.42	60.45		
2+355	58.05	60.42	60.45		
2+360	58.05	60.42	60.45		
2+365	58.05	60.42	60.45		
2+370	58.05	60.42	60.45		
2+375	58.05	60.42	60.45		
2+380	58.13	60.50	60.37		
2+385	58.13	60.50	60.37		
2+390	58.13	60.50	60.37		
2+400	58.13	60.50	60.37		

REVISIONS / REVISIONS	DATE	BY
DOWN FROM WORDS UNIT P. 10	AUG 2009	LV
NEW ROAD ON DONALD ST.	NOV 05/08	RJ
ADDED ROAD AND CONDUIT ADDED BY L.O.A	AUG 2009	LV
ADDED TELEPHONE AND CABLE BY COLUMBUS	AUG 2009	JF
STREET LIGHTS ADDED	AUG 2008	DF
ADDED ROAD ON COLUMBUS DATA RECORDS	JAN 2004	BC

LEGEND

- Water Main, Water Channel, 75% Hydraulic
- Street Main, Gas, Sewer, Storm
- Crack Seal, Chasing, 15% Prod, Repair Work
- 1" Poly A/B/C, Ductwork, Low Voltage
- Power Supply, Panel, Neutral, Transformer, Street, Regulator
- 4" Poly, 4" Water Main, 4" Gas, 4" Sewer
- CC: Traffic Sign to Match My Plans: Complete, Unfilled
- Street Sign Post: B.C. Crack, Street, Gas, Sewer
- Traffic Control Box (Marked) Box, B, B, B, B, B
- Heat Meter Meter Hole, Heat Light Camera
- Scale Meter Hole, Meter by Post
- Regulator
- 1" Poly, 1" Conduit, Label
- Ditch
- Abandoned
- Street
- Property Line
- Heat Meter

TELECOM GLOSSARY

- A: Access
- AT: Auto
- B: Bandwidth
- C: Capacity
- D: Data
- E: Equipment
- F: Frequency
- G: Gateway
- H: Host
- I: Interface
- J: Junction
- K: Key
- L: Line
- M: Modem
- N: Network
- O: Optical
- P: Protocol
- Q: Quality
- R: Rate
- S: Service
- T: Terminal
- U: Unit
- V: Voice
- W: Wire
- X: X.25
- Y: Year
- Z: Zone

GLOSSARY - OTHER

- 10: Feet of Distance
- 100: Feet of Distance
- 1000: Feet of Distance
- 10000: Feet of Distance
- 100000: Feet of Distance
- 1000000: Feet of Distance

CAUTIONATION

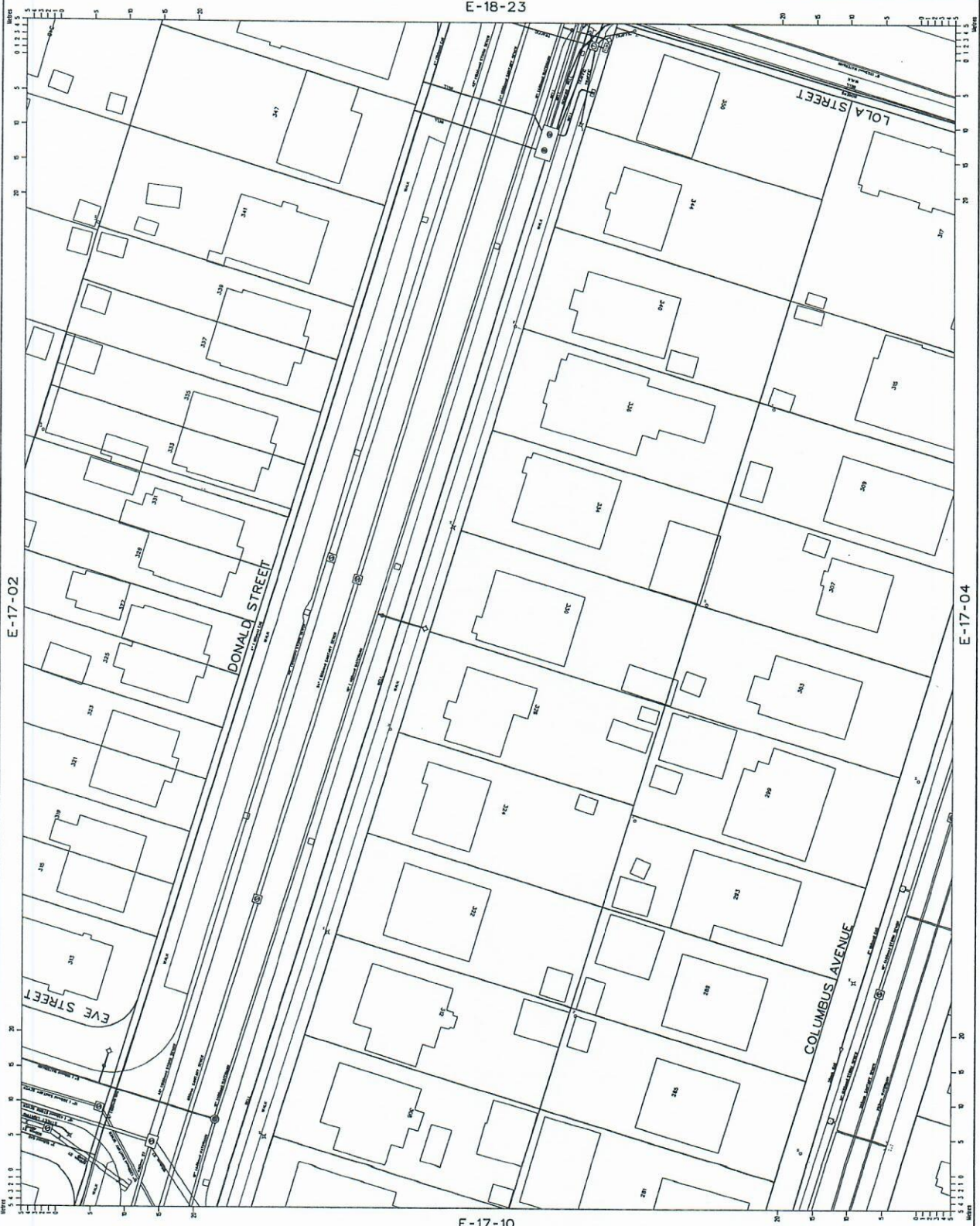
Although this plan is published for the public, it is not intended to be used as a legal document. It is intended to be used as a guide only. The City of Ottawa is not responsible for any errors or omissions in this plan. The user of this plan is advised to verify the information contained herein with the appropriate authorities.



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OTTAWA UTILITY COORDINATING COMMITTEE
 CENTRAL REGISTRY
 COMITÉ DE COORDINATION UTILITAIRES
 REGISTRE CENTRAL



E-17-02

E-18-23

E-17-04

E-17-10

E-17-03

SCALE: 1:150

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**PROPOSED
THREE STOREY APARTMENT BUILDING SITE
LOTS 191 AND 192
R-PLAN 441
304-308 DONALD STREET
CITY OF OTTAWA**

**APPENDIX D
CITY OF OTTAWA**

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

ATTACHMENT 1: SITE PLAN



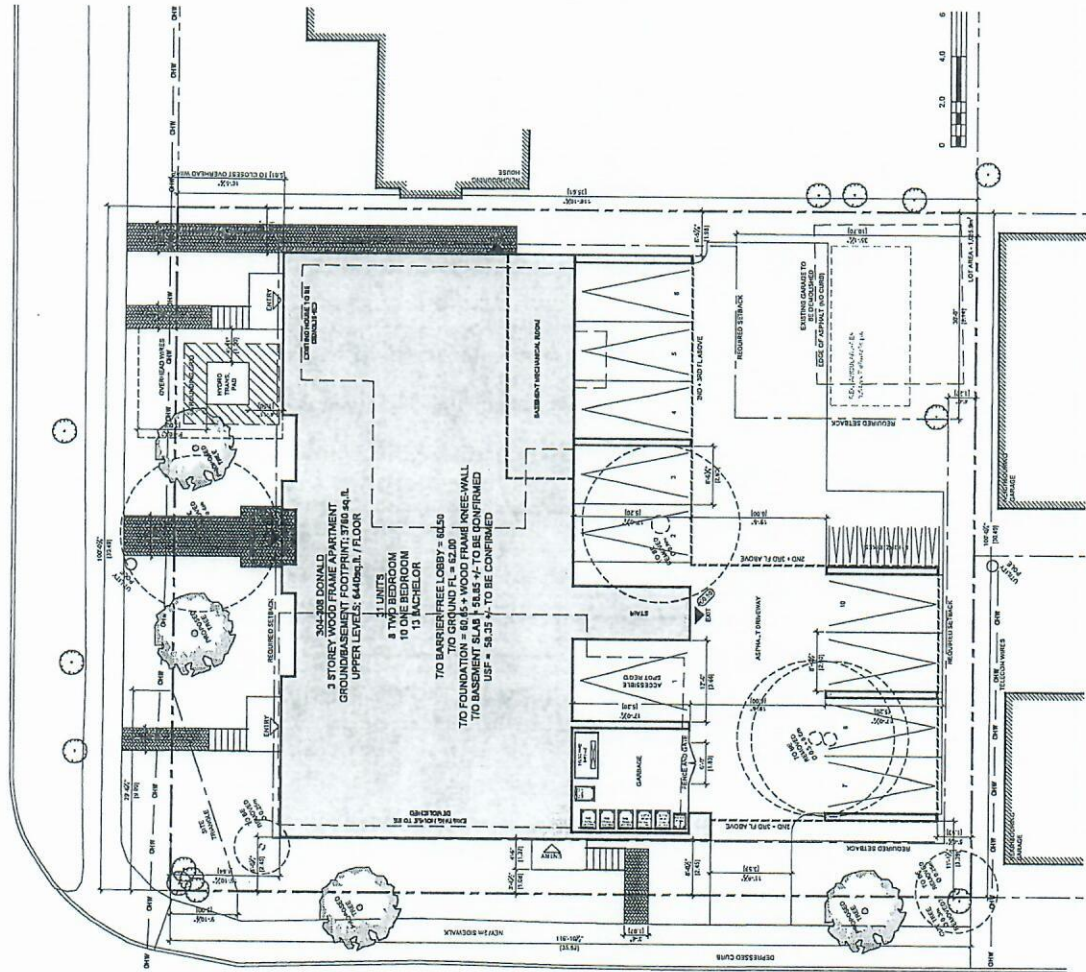
RJH ARCHITECTURE + PLANNING
 41 Cleveland Avenue North
 431-852-3389 www.rjharch.com

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- NOTE:**
- 1. ALL DIMENSIONS ARE IN FEET AND INCHES UNLESS OTHERWISE NOTED.
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DONALD STREET



EDITH AVENUE

It is the responsibility of the appropriate supervisor to check the accuracy of the information provided in this plan. The information is provided as a guide only and is not intended to be used as a basis for any legal action. The information is provided as a guide only and is not intended to be used as a basis for any legal action.

SITE PLAN

DATE: APR. 2024
 SCALE: 1/8" = 1'-0"

DONALD / EDITH APARTMENTS
 304-398 Donald St., Clinton, Ontario

ATTACHMENT 2: FUS FIRE FLOW CALCULATION



FUS Fire Flow Calculation - Long Method

Calculations based on: "Water Supply for Public Fire Protection" by Fire Underwriters' Survey, 2020

Stantec Project #: 163401084
 Project Name: 304-308 Donald Street Water Servicing Analysis
 Date: May 3, 2024
 Data inputted by: Melissa Nelson
 Data reviewed by: Alexandre Mineault-Guitard, P.Eng

Fire Flow Calculation #: 1
 Building Type/Description/Name: Residential

Notes: The building is 3-storey residential multi-unit building consisting of 31 residential units with a basement that is more than 50% below grade. The building contains eight (8) Two Bedroom Units, ten (10) One Bedroom Units, and thirteen (13) Bachelor Units. The building will be wood frame construction with no sprinkler system. The average floor area is 5,547 sq.ft, for a gross floor area of 16,640 sq.ft.

Fire Underwriters Survey Determination of Required Fire Flow - Long Method													
Step	Task	Term	Options	Multiplier Associated with Option	Choose:	Value Used	Unit	Total Fire Flow (L/min)					
1	Choose Frame Used for Construction of Unit	Coefficient related to type of construction (C)	Framing Material										
			Type V - Wood Frame	1.5	Type V - Wood Frame	1.5	m						
			Type IV-A - Mass Timber	0.8									
			Type IV-B - Mass Timber	0.9									
			Type IV-C - Mass Timber	1									
			Type IV-D - Mass Timber	1.5									
			Type III - Ordinary construction	1									
			Type II - Non-combustible construction	0.8									
Type I - Fire resistive construction	0.6												
2	Choose Type of Housing (If TH, Enter Number of Units Per TH Block)	Floor Space Area											
		Type of Housing	Single Family	0	Other (Comm, Ind, Apt etc.)	31	Units						
			Townhouse - indicate # of units	0									
Other (Comm, Ind, Apt etc.)	31												
2.2	# of Storeys	Number of Floors/Storeys in the Unit (do not include basement if 50% below grade):			3	3	Storeys						
3	Enter Ground Floor Area of One Unit	Average Floor Area (A) based on total floor area of all floors for one unit (non-fire resistive construction):			5,547	5,547	Area in Square Metres (m ²)						
		Square Feet (ft2):											
3.1	Obtain Total Effective Building Area	Total Effective Building Area (# of Storeys x # of Units (if single family or townhouse) x Average Floor Area):			1,546	1546							
4	Obtain Required Fire Flow without Reductions	Required Fire Flow (without reductions or increases per FUS) (F = 220 * C * √A) Round to nearest 1,000 L/min						13,000					
5	Apply Factors Affecting Burning	Reductions/Increases Due to Factors Affecting Burning											
5.1	Choose Combustibility of Building Contents	Occupancy Content Hazard Reduction or Surcharge	Non-combustible	-0.25	Limited combustible	-0.15	N/A	11,050					
			Limited combustible	-0.15									
			Combustible	0									
			Free burning	0.15									
			Rapid burning	0.25									
5.2	Choose Reduction Due to Presence of Sprinklers	Sprinkler Reduction	Adequate Sprinkler conforms to NFPA13	-0.3	None	0	N/A	0					
			None	0									
		Water Supply Credit	Water supply is standard for sprinkler and fire dept. hose line	-0.1	Water supply is not standard or N/A	0	N/A	0					
			Water supply is not standard or N/A	0									
			Sprinkler Supervision Credit	Sprinkler system is fully supervised					-0.1	Sprinkler not fully supervised or N/A	0	N/A	0
			Sprinkler not fully supervised or N/A	0									
5.3	Choose Presence of Sprinklers for Exposures within 30m	Sprinkler Conforms to NFPA13	Adequate sprinkler for exposures conforms to NFPA13	None for exposures		0	N/A	0					
			None for exposures										
		Water Supply	Water supply is standard for sprinkler and fire dept. hose line of exposures	Water supply is not standard or N/A for exposures		0	N/A						
			Water supply is not standard or N/A for exposures										
		Sprinkler Supervision	Sprinkler system of exposures is fully supervised	Sprinkler not fully supervised or N/A for exposures		0	N/A						
			Sprinkler not fully supervised or N/A for exposures										
5.4	Choose Separation Distance Between Units	Exposure Distance Between Units	North Side	30.1m or greater	0.6	m	6,630						
			East Side	0 to 3.0m									
			South Side	0 to 3.0m									
			West Side	0 to 3.0m									
			West Side	20.1 to 30.1m									
6	Obtain Required Fire Flow, Duration & Volume	<i>Total Required Fire Flow, rounded to nearest 1,000 L/min, with max/min limits applied:</i>						18,000					
		<i>Total Required Fire Flow (above) in L/s:</i>						300					
		<i>Required Duration of Fire Flow (hrs)</i>						4.00					
		<i>Required Volume of Fire Flow (m³)</i>						4,320					

ATTACHMENT 3: FIGURE 1 – FUS EXPOSURE DISTANCES

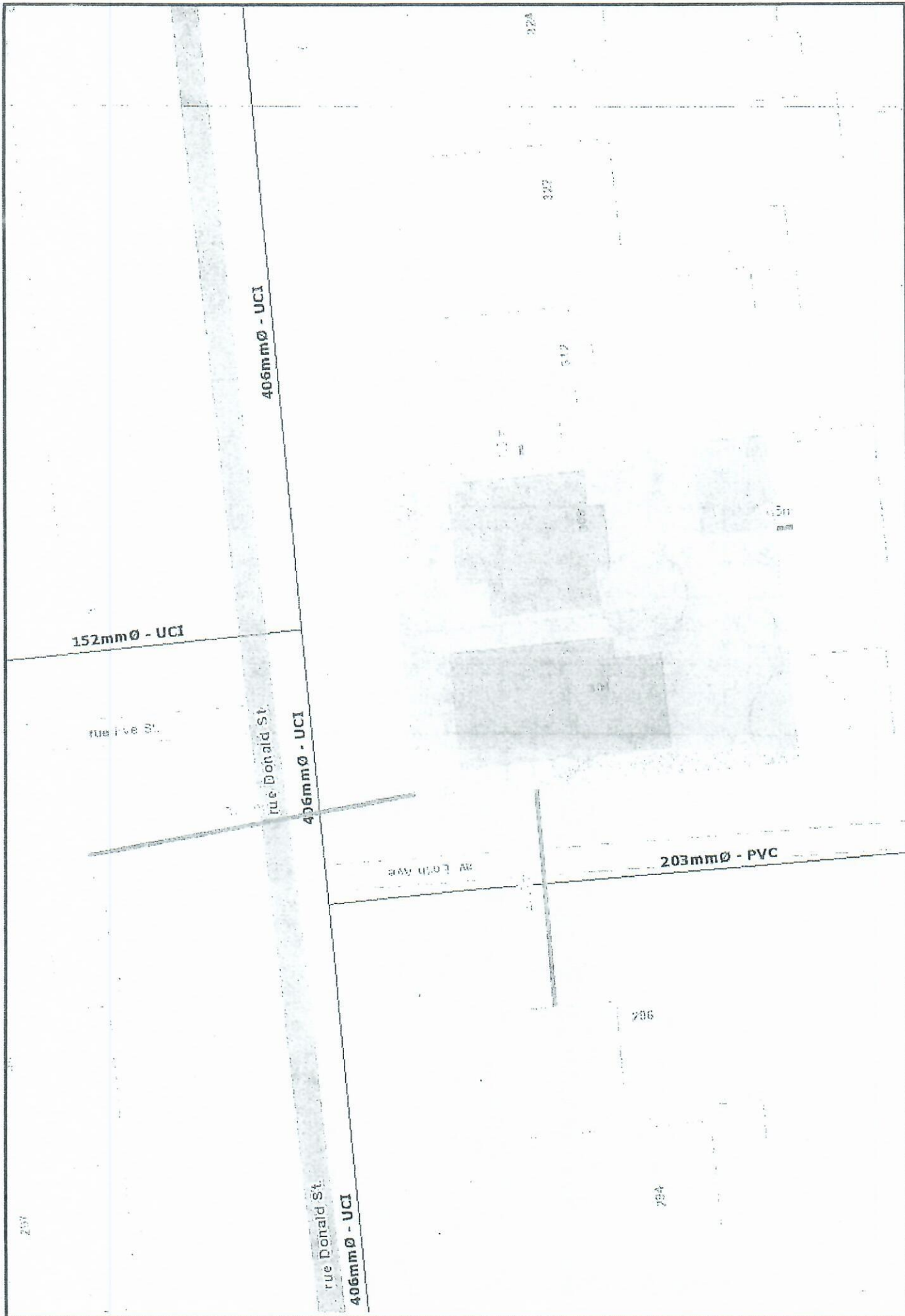


Figure 1: FUS Exposure Distances (Property Line to Adjacent Buildings)

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

ATTACHMENT 4: WATER BOUNDARY CONDITIONS

Mineault-Guitard, Alexandre

From: TL MaK <tlmakecl@bellnet.ca>
Sent: Friday, June 14, 2024 10:53 AM
To: Mineault-Guitard, Alexandre
Cc: Alemany, Kevin; 'Alfred Abboud'
Subject: RE: 304-308 Donald Street - Water Boundary Conditions Request
Attachments: 304-308 Donald Street Multi-Hydrant Analysis June 2024.pdf

Hi Alex,

Attached please find the Water Boundary Conditions received from the City on June 13, 2024 for your calculation use.

Thank you,

Tony Mak

T.L. Mak Engineering Consultants Ltd.
1455 Youville Drive, Suite 218
Ottawa, ON. K1C 6Z7
Tel. 613-837-5516 | Fax: 613-837-5277
E-mail: tlmakecl@bellnet.ca

From: Duquette, Vincent [<mailto:Vincent.Duquette@ottawa.ca>]
Sent: June 13, 2024 12:00 PM
To: TL MaK
Cc: 'Alfred Abboud'; Chetrar, Anton
Subject: RE: 304-308 Donald Street - Water Boundary Conditions Request

Hi Tony,

See below boundary condition results from the multi hydrant analysis.

The following are boundary conditions, HGL, for hydraulic analysis at 304-308 Donald Street (zone 1E) assumed to be connected to the 406mm watermain on Donald Street (see attached PDF for location).

Minimum HGL: 109.9 m

Maximum HGL: 118.5 m *The maximum pressure is estimated to be more than 80 psi. A pressure check at completion of construction is recommended to determine if pressure control is required.*

Max Day+ Fire Flow (300 L/s): 108.2 m

A multi-hydrant analysis was performed with five existing hydrants within 150 m of the property. **The total aggregate flow assuming the three identified hydrants running simultaneously provides the required fire flow for the site.**

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.

Best Regards,

Vincent Duquette, E.I.T

Project Manager, Infrastructure Approvals | Gestionnaire de projet, Projets d'infrastructure
Development Review – All Ward | Direction de l'examen des projets d'aménagement - Tous les quartiers
Planning, Development and Building Services Department (PDBS) | Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West | 110 avenue Laurier Ouest
Ottawa, ON K1P 1J1
613.580.2424 ext./poste 14048, vincent.duquette@ottawa.ca

From: Duquette, Vincent

Sent: June 12, 2024 4:02 PM

To: TL MaK <tlmakecl@bellnet.ca>

Cc: 'Alfred Abboud' <alfredabboud@gmail.com>; Chettrar, Anton <anton.chettrar@ottawa.ca>

Subject: RE: 304-308 Donald Street - Water Boundary Conditions Request

Hi Tony,

I followed up with our Drinking Water Department which had some concerns with the elevated requested fire flow, as well as the multi hydrant analysis with 5 fire hydrants. We cleared up those concerns with the Fire Department engineer. Drinking Water department is now processing the multi hydrant analysis. I will provide results when available. Thank you for your continued patience on this item.

As for the stormwater quality control requirements, prior to Bill 23, the RVCA used to provide comments on the quality control requirements for a specific site. As a result of changes made through Bill 23 and starting in 2023, the quality control comments were deferred to municipalities. The target quality control for sites discharging to the natural watercourse (Rideau River in this case) is enhanced protection of 80% TSS removal. However given the recent findings about the performance of Oil Grit Separators (OGS) not being able to meet 80% TSS removal target and the size of the proposed parking area, we will allow a quality control target of 60% (basic protection) TSS removal for this project only. Please note that only the parking area, covered and uncovered, is considered to generate suspended solids. Roof water is considered clean and can be directed to the storm system with no quality control measures.

Best Regards,

Vincent Duquette, E.I.T

Project Manager, Infrastructure Approvals | Gestionnaire de projet, Projets d'infrastructure
Development Review – All Ward | Direction de l'examen des projets d'aménagement - Tous les quartiers
Planning, Development and Building Services Department (PDBS) | Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West | 110 avenue Laurier Ouest

Ottawa, ON K1P 1J1
613.580.2424 ext./poste 14048, vincent.duquette@ottawa.ca

From: TL MaK <tlmakecl@bellnet.ca>
Sent: June 11, 2024 10:54 AM
To: Duquette, Vincent <Vincent.Duquette@ottawa.ca>
Cc: 'Alfred Abboud' <alfredabboud@gmail.com>
Subject: RE: 304-308 Donald Street - Water Boundary Conditions Request

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

Hi Vincent,

Further to our telephone conversation today and our e-mail request of May 3, 2024 for water boundary conditions, could you please follow-up with Water Works Department so that we could ascertain the results for the water boundary conditions and so that we can complete our servicing report in the near future.

Thank you for your help.

Regards,

Tony Mak

T.L. Mak Engineering Consultants Ltd.
1455 Youville Drive, Suite 218
Ottawa, ON. K1C 6Z7
Tel. 613-837-5516 | Fax: 613-837-5277
E-mail: tlmakecl@bellnet.ca

From: TL MaK [<mailto:tlmakecl@bellnet.ca>]
Sent: May 3, 2024 10:11 AM
To: 'Duquette, Vincent'
Subject: 304-308 Donald Street - Water Boundary Conditions Request

Hi Vincent,

Regarding this site, we are requesting for water boundary conditions from the City of Ottawa to be provided for our hydraulic analysis. The particulars are as follows:

The proposed building located within Pressure Zone 1E at 304-308 Donald Street is a 3-storey residential multi-unit building with a basement. The building contains thirty-one (31) total units, eight (8) 2-bedroom, ten (10) 1-bedroom, and thirteen (13) bachelor units. Each floor covers an average area of around 5,547 sq.ft, for a gross floor area of 16,640 sq. ft, excluding the basement. The building is to be serviced by the 400 mm diameter watermain along Donald Street.

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). Persons per unit (PPU) for each unit were estimated based on the City of Ottawa's Water Design Guidelines. Following discussions with the City, peaking factors are to be estimated from Table 3-3 of the MECP Design Guidelines for Drinking-Water Systems, given that the

proposed development population is less than 500 people. Maximum day (MXDY) demands were calculated by multiplying AVDY demands by a factor of 8.7. Peak hour (PKHR) demands were calculated by multiplying AVDY by a factor of 13.2. Table 1 shows the estimated domestic demands of the existing building.

Table 1: Estimated Domestic Demand

Unit Type	Unit Count	PPU	Consumption	AVDY		MXDY		PKHR	
				L/d	L/s	L/d	L/s	L/d	L/s
Apartment, 2-Bedroom	8	2.1	280	4,704	0.05	40,925	0.47	62,093	0.72
Apartment, 1-Bedroom	10	1.4		3,920	0.05	34,104	0.39	51,744	0.60
Apartment, Bachelor	13	1.4		5,096	0.06	44,335	0.51	67,267	0.78
Total	31			13,720	0.16	119,364	1.38	181,104	2.10

The fire flow required was determined following the Fire Underwriter Survey (FUS) method and is provided in the attached worksheet. The proposed building will be of wood frame construction. It is understood that the building will not be equipped with sprinklers, and that the basement is more than 50% below ground level. The resulting required fire flow is 18,000 L/min (300 L/s) for a duration of 4.00 hours.

It is recommended to consider flow from multiple hydrants (as per ISTB-2018-02) to assess whether the distribution network can deliver the required fire flow. Our desktop review, which included Google Street view, identified three (3) Class AA hydrants within 75 metres of the proposed building. Additionally, there are two (2) extra Class AA hydrants located within 150 m from the building. The attached figure, extracted from GeoOttawa, provides a visual representation of these hydrants. Given this information, we kindly request a multi-hydrant analysis from the City.

In summary:

- AVDY = 13,720 L/d (0.16 L/s);
- MXDY = 119,364 L/d (1.38 L/s);
- PKHR = 181,104 L/d (2.10 L/s); and,
- Fire Flow = 18,000 L/min (300 L/s).

The City is requested to provide boundary conditions for the Average Day, Maximum Day, Peak Hour and Fire Flow conditions (multi-hydrant analysis) indicated above.

Thank you for your prompt attention to this matter. Please forward the boundary conditions as soon as possible.

Have a great weekend.

Regards,

Tony Mak

T.L. Mak Engineering Consultants Ltd.
 1455 Youville Drive, Suite 218
 Ottawa, ON. K1C 6Z7
 Tel. 613-837-5516 | Fax: 613-837-5277

E-mail: tlmakecl@bellnet.ca

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Multi-Hydrant Analysis for 304-308 Donald Street

370032H050

370032H051

370032H252

370032H052

370032H053

Legend

Private

Public

ATTACHMENT 5: SUPPORTING HYDRAULIC CALCULATIONS



Supporting Hydraulic Calculations

Stantec Project #: 163401084
Project Name: 304-308 Donald Street
Date: June 17, 2024
Data inputted by: Alexandre Mineault-G, P.Eng.
Data reviewed by: Alexandre Mineault-G, P.Eng.

Boundary Conditions provided by the City:

Scenario 1: Peak Hour (Min HGL): 109.9 m;
Scenario 2: Average Day (Max HGL): 118.5 m; and
Scenario 3: Maximum Day plus Fire Flow: 108.2 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:

$$HGL(m) = 109.9 \text{ and } hz (m) = 60.6.$$

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

$$hp (m) = HGL - hz$$
$$\therefore hp = 109.9 - 60.6 \text{ m} = 49.3 \text{ m}.$$

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/m³; and g = gravitational acceleration = 9.81 m/s².

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

$$P (kPa) = (1000 * 9.81 * 49.3) / 1000$$
$$\therefore P = 483 \text{ kPa}.$$

Considering that 1 kPa = 0.145 psi, the pressure under Scenario 1 is equal to:

$$P = 70 \text{ psi}.$$

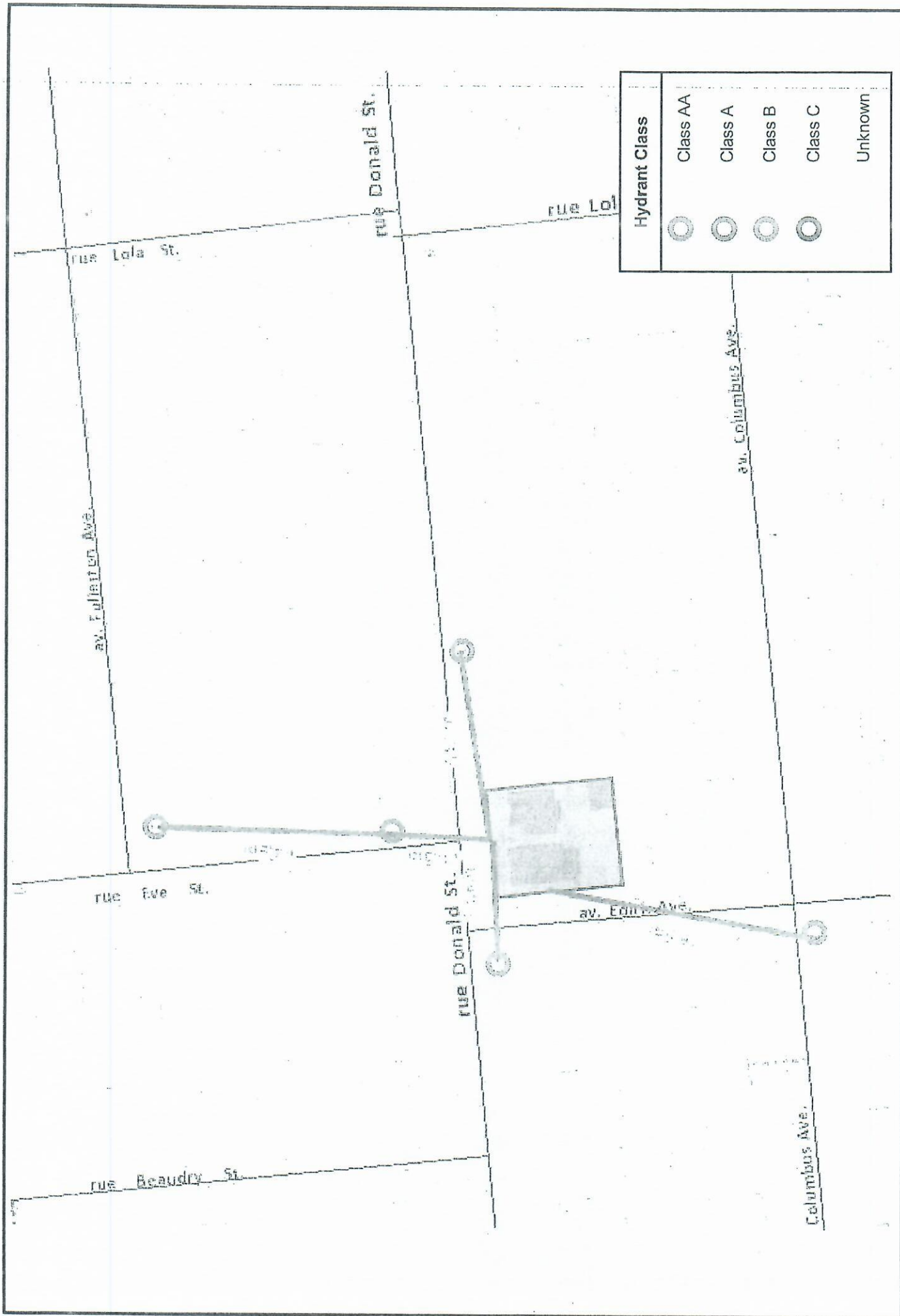
Applying the same procedures, the pressures under Scenario 2 and Scenario 3 are calculated as follows:

Scenario 2: P = 82 psi; and Scenario 3: P = 68 psi.

To summarize:

Scenario 1: Minimum Pressure under Peak Hour Demand: 483 kPa (70 psi)
Scenario 2: Maximum Pressure under Average Day Demand: 568 kPa (82 psi)
Scenario 3: Minimum Pressure under Maximum Day + Fire Flow Demand: 467 kPa (68 psi)

ATTACHMENT 6: FIGURE 2 – HYDRANT SPACING



Hydrant Class	Symbol
Class AA	○
Class A	●
Class B	○
Class C	○
Unknown	○

Figure 2: Hydrant Spacing

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

**PROPOSED
THREE STOREY APARTMENT BUILDING SITE
LOTS 191 AND 192
R-PLAN 441
304-308 DONALD STREET
CITY OF OTTAWA**

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

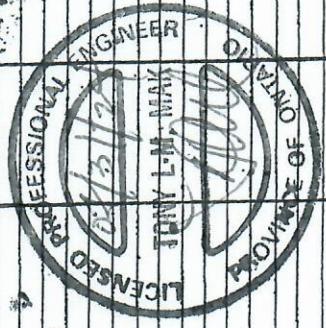
SANITARY SEWER DESIGN SHEET

q = average daily per capita flow (L/cap. d)
 i = unit of peak extraneous flow (L/ha. h)
 M = peaking factor A (MAX.)
 $Q(p)$ = peak population flow (L/s)
 $Q(l)$ = peak extraneous flow (L/s)
 $Q(d)$ = peak design flow

$M = 1 + \frac{14}{4 + \sqrt{P}}$ where P = population in 1000's
 $Q(p) = P q M$ (L/s)
 86.4
 $Q(l) = iA$ (L/s) where A = area in hectares
 $Q(d) = Q(p) + Q(l)$ (L/s)

RESIDENTIAL DENSITY
 2 BEDROOM - 2.1 PPU
 1 BEDROOM - 1.4 PPU

STREET	LOCATION		TO	INDIVIDUAL		CUMULATIVE	Peaking factor M	Pop. flow Q(p) (L/s)	Peak extraneous flow Q(l) (L/s)	Peak design flow Q(d) (L/s)	Length (m)	PROPOSED SEWER			Full flow velocity (m/s)	Actual velocity at Q(d)
	FROM	Area A (hectares)		Area A (hectares)	Pop. flow Q(p) (L/s)							Pop. flow Q(p) (L/s)	Pipe size (mm)	Type of pipe		
304-308 DONALD STREET	SITE	EX 6000 SANITARY SEWER		49	0.1086	49	0.1086	4	0.635	0.036	15.0	150	PVC	1.0	1.12	



DESIGN: TLM CHECKED: TLM DATE: JULY 2024	PROJECT: 304-308 DONALD STREET PROPOSED 3 STOREY APARTMENT BUILDING SIDE - CITY OF OTTAWA
(FILE # 824-63)	SHEET NO. <u>1</u> of <u>1</u>

**PROPOSED
THREE STOREY APARTMENT BUILDING SITE
LOTS 191 AND 192
R-PLAN 441
304-308 DONALD STREET
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