

Corporation of the County of Lanark

MUNICIPALITY OF MISSISSIPPI MILLS

SITE SERVICING REPORT

PROJECT: MENZIE ENCLAVES SUBDIVISION

ADDRESS:

ADELAIDE ST / MENZIE ST

MUNICIPALITY OF MISSISSIPPI MILLS, ON

PREPARED FOR:

13165647 Canada Inc

27 Queen Street East. #407,

Toronto, ON,

M5C 2M6

PREPARED BY:

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(613) 986 9170

<i>Date</i>	<i>Revision / Issue</i>
June 28, 2024	Municipality Comments Dated November 8, 2023, February 11, 2024 and June 18, 2024
January 31, 2023	Issued for a Subdivision Draft Plan Application

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DP-1 – Draft Plan of Subdivision	
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List of Related Reports:

- Stormwater Management Report

1.0 INTRODUCTION

13165647 Canada Inc. has retained *Advance Engineering Ltd.* to provide a site servicing study for the proposed residential subdivision located at the south west corner of unopened Adelaide St and Menzie St intersection in the north side of Mississippi Mills, Ontario. This report describes the existing infrastructure in the immediate area of the development site and estimates the anticipated servicing requirements. The adequacy of the existing sanitary and storm sewers, watermain to accommodate all required flows and demands associated with the proposed development will be examined. The report also provides information and assumptions used in the design of the sanitary sewer and watermain and should be read in conjunction with the design drawings prepared by *Advance Engineering Ltd.*. The report was prepared in support of an application for a subdivision plan approval by the applicant.

1.1 SITE DESCRIPTION

The proposed development is on a single parcel of land and is approximately 2.8426 hectares (7.02 acres) with a rectangular shape of 185 m in length and 155 m in width (Figure-1, **Appendix A**). The legal description of the property is: “Park Lot 2, Block C, Henderson Section, And Lot 1 to 25 inclusive, Park Block C, McLean Section, And Alfred Street, And Alexandra Street, Registered Plan 6262, Former Town of Almonte, Municipality of Mississippi Mills, County of Lanark”. The site is bounded as follows:

- Adelaide St (unopened) and a future development (*Hannan Hills*) beyond to the north,
- *Spring Creek* and Menzie St (unopened) to the east,
- Augusta St (unopened) and *Spring Creek* beyond to the south, and,
- residential dwellings and McDermott St beyond to the west.

The site is currently vacant and covered with trees and tall grass. The property is not currently serviced by municipal water, sanitary or storm sewers.

1.2 BACKGROUND AND LAND USE

The site has never been developed. Under the Comprehensive Zoning By-Law #11-83, consolidated March 10, 2020, a zoning amendment is required to change the zoning type of the site from “D” zoning to proposed “R1” and “R2” zonings.

The site has been surveyed by *Annis, O’Sullivan, Vollebekk Ltd.*, Job No.: 22733-22, field work completed October 31, 2022.

The following documents have been provided by the Municipality and the Owner:

1- “*Hannan Hills, Serviceability and Conceptual Stormwater Management Report*” dated May 20, 2021, by *Novatech*. File: 118201, Ref: R-2021-010.

2- *Master Plan Update Report* prepared by *J.L.Richards* for the Municipality of Mississippi Mills, dated February 2018, JLR No.: 27456-01

1.3 PROPOSED DEVELOPMENT

The proposed development consists of the construction of paved roadways, sidewalks, sanitary and storm sewers, watermains and other utilities to service the proposed subdivision lots. The project will be completed in one phase. All proposed right-of-ways (ROW) are 18 m wide and will encompass 8.5m of asphalt pavement and mountable curbs. The sidewalk will be constructed on one side of the subdivision streets. The final subdivision layout will have two intersections with Adelaide St. A paved pathway is proposed at south east side of the subdivision and will link the subdivision to Menzie St.

As per the draft plan dated May 2024, the proposed 55 residential units are divided as follows:

- 1 Single detached (Lot 12)
- 36 Semi-detached dwelling units (Blocks 3 to 11 and 13 to 21)
- 18 Townhouses (Blocks 22, 23, 24 and 25)

The semi-detached lots come with attached garages with areas not less than 225 m² and frontages not less than 7.5 m for each dwelling unit. In addition to the residential lots, it is proposed one block for stormwater management (Block 27), one block for the creek setback (Block 28) and two blocks for road widening along Adelaide and Augusta.

1.4 EXISTING INFRASTRUCTURE

1.4.1 WATER

Existing municipal watermain:

There is no watermain in the immediate area of the site. The preliminary servicing plan for *Hannan Hills* development shows a proposed 250 mm diameter watermain running east-west within the north side of Adelaide St. It will connect to the existing 250 mm diameter watermain identified at Honeyborne St across the creek and Menzie St.

Available Capacities:

Existing capacities will be examined based on anticipated water demand for both developments.

1.4.2 WASTEWATER

Existing municipal sewer: There is no sanitary sewer in the immediate area of the site. There are existing sanitary sewers at Maude St to the south of the site and at Finner Court to the west of the site. The preliminary servicing plan for *Hannan Hills* shows a proposed 200 mm diameter pipe running east to west along Adelaide St and connected to a proposed 300 mm diameter sewer running north to south along Florence St. The invert at the outlet manhole at Victoria St / Florence St is assumed at 134.9. The two proposed manholes at Adelaide St intersections with Street A and Street B have invert elevations of 137.44 and 136.84 and grate elevations of 140.05 and 140.15 approximately.

Available Capacities:

Figure 25 of the Master Plan shows a committed capacity of **5.97 L/s** in the coming 5-10 years for *Victoria and Menzie Residential infill*, which includes the proposed subdivision and *Hannan Hills* development.

1.4.3 STORMWATER

The site is located in the sub-watershed of *Spring Creek*. There is no storm water sewer in the immediate area of the subdivision. There are existing detention ponds in the area that outlet into the creek.

Utility service connections to the developed site will be coordinated with the appropriate utility companies prior to construction.

2.0 WATER SERVICING

2.1 DESIGN CRITERIA

The water demand for the proposed development has been calculated based on *Ottawa Design Guidelines - Water Distribution* and subsequent technical bulletins as follows:

- Population: 149.2 person (residential occupancy for single family dwelling 3.4 person per unit and for semi-detached and townhomes 2.7 person per unit)
- Average daily demand per capita per day = 350 L/pers./day (as per Municipality request)
- Peaking factor for maximum daily demand = 4.9
- Peaking factor for peak hourly demand = 7.4

Peaking factor are provided by interpolation from Table 3-3 of the MOECP “*Design Guidelines for Drinking-Water Systems*”, used for water systems serving fewer than 500 people.

- Required fire flow (RFF): is calculated as per the *Ontario Building Code (OBC)*, A-3.2.5.7 Division B, Building Code Compendium, and cross-referenced with the 2020 version of the *Fire Underwriter’s Survey (FUS)*.
- System pressures requirements:

Pressure Check	Minimum Pressure		Maximum Pressure	
	(kPa)	(psi)	(kPa)	(psi)
Normal Use	345	50	552	80
Peak Hour Demand	276	40	552	80
Maximum Day and Fire Flow	140	20	552	80
Maximum pressure at any point in occupied areas			552	80
Maximum pressure at any point in unoccupied areas			689	100

Table -1 System Pressure Requirements

- Proposed Watermain:
 - 150 mm diameter PVC Class 150 DR 18 – Roughness Coefficient = 100
 - 200 mm diameter PVC Class 150 DR 18 – Roughness Coefficient = 110
- Residential areas serving more than 50 dwellings require a minimum of two watermain connections separated by an isolation valve.

2.2 PROPOSED SERVICING AND CALCULATIONS

2.2.1 DOMESTIC WATER DEMAND

Domestic water demands are summarized as follows (Refer to **Appendix B** for full calculations):

Design Parameter	Value
Population in capita	149.2
Residential Average Demand Volume Per Capita in L/c/day	280
Average Demand Volume in m ³ /day	41.8
Maximum Daily Demand (4.9 x Average) in m ³ /day **	204.7
Maximum Hourly Demand (7.4 x Average Daily) in m ³ /day **	309.1
Maximum Hourly Water Flow Required in L/s	3.58

Table -2 Anticipated Domestic Water Demand

2.2.2 FIRE FLOW DEMAND

1- Ontario Building Code (OBC), A-3.2.5.7 Division B, Building Code Compendium:

Minimum water supply required in Litres: $Q = K.V.S_{tot}$ where:

Q: minimum water supply in litres

K: water supply coefficient from Table 1

V: total building volume in cubic metres

S_{tot} : total of spatial coefficient values from property line exposures on all sides as obtained from the formula: $S_{tot} = 1 + (S_{side1} + S_{side2} + S_{side3} + \dots \text{ etc.})$; S_{tot} need not exceed 2.0.

A minimum of water supply flow rate for firefighting shall be 2 700 L/min.

2- Required Basic Fire Flow (FUS 2020 – PART II. 1): $F = 220 C A^{0.5}$ where

F: required fire flow in litres per minute

C: coefficient related to the type of construction

A: the total floor area in m²

Adjustments to the calculated fire flow can be made based on occupancy, sprinkler protection and exposure to other structures. The Final Fire Flow shall not exceed 45,000 L/min nor be less than 2,000 L/min.

The specific details of future buildings were not available at the time of preparation of this report, therefore, assumptions for the building materials, fire separations and contents have been considered based on experience about similar buildings. Combustible construction with limited combustible occupancy and no sprinkler has been assumed in our calculation for single and semi detached and townhouse blocks. An average lot size with a maximum of 30% lot coverage, as permitted by current zoning By-law, have been considered. Expositions were calculated according to permitted setbacks. Refer to spreadsheets in **Appendix B** for detailed calculations using both methods.

OBC calculation method has resulted in 2,700 L/min required flow rate. FUS calculations will govern the design and has resulted in the following:

Single and semi detached family lot: a required fire flow demand varying between of 7,000 L/min 11,000 L/min for semi detached houses. However since the wood frame structures are expected to be separated by less than 3 m (2.4 m according to the proposed zoning), they represent a single fire area which will require a large RFF. Ottawa guidelines, as per the Technical Bulletin ISDTB-2014-02, caps the required fire flow for single detached dwellings at **10,000 L/min** (167 L/s) provided that there is a minimum separation of 10 m between the backs of adjacent units. That condition is met.

Furthermore, a simple method provided in Table 7, page 33 of FUS 2020, allows **8,000 L/min** RFF for one and two family dwellings with wood frame construction with exposure distance of less than 3 m. In our case the minimum distance is 2.4 m.

The required fire flow for single and semi-detached is 10,000 L/min based on Ottawa Guidelines interpretation of FUS and 8,000 L/min based on FUS 2020 simple method.

Townhouses: a required fire flow demand varying between of 11,000 L/min and 13,000 L/min depending on the Block. However, Ottawa guidelines, as per the Technical Bulletin ISDTB-2014-02, caps the required fire flow for townhouses at **10,000 L/min** (167 L/s) provided two conditions:

- a) firewalls with a minimum two hour fire-resistance rating that comply with OBC Div. B, Subsection 3.1.10, are constructed to separate a townhouse block into fire areas that comprise no more than the lesser of seven dwelling units, and 600 m² of building area. In our case, proposed townhouses with 4 units and 5 units have respectively 464 m² and 580 m² area.
- b) there is a minimum separation of 10 m between the backs of adjacent units. In our case, the minimum separation is 2 x 7.5 m = 15 m.

The simple method provided in Table 7, page 33 of FUS 2020, allows **8,000 L/min** RFF for row housing with wood frame construction with exposure of 3 to 10 m. In our case it is 4.6 m.

The required fire flow for townhouses is 10,000 L/min based on Ottawa Guidelines interpretation of FUS and 8,000 L/min based on FUS 2020 simple method.

Proposed Fire Hydrants:

Water supply for fire fighting will be delivered to the fire hydrants through the municipal system. 4 fire Hydrants are proposed with a maximum spacing of 110 m as per Table 4.9 of Ottawa Guidelines. All new hydrants are assumed to be Class AA with rated capacity of 5,700 L/min. A plan showing 45 m radius circles centered on each hydrants is attached in Appendix B.

2.2.3 HYDRAULIC ANALYSIS

Using an initial pressure at Adelaide watermain, a model using EPANET 2.2 software is used to assess headlosses and velocities within the proposed watermain under maximum day and required fire flow demand condition. The results shall remain comparable to the existing watermain in the area. Residual pressure shall be kept above 140 kPa and velocities less than 5 m/s.

The proposed fire hydrants shall be checked against Appendix I: "Guidelines on Coordination of Hydrant Placement with Required Fire Flow" of Technical Bulletin ISTB-2018-02, in which the aggregate fire flow capacity of all fire hydrants within 150 m of a building shall not be less than the required fire flow (10,000 L/min). This is done by assigning a 5,700 L/min flow to all hydrants located within 75 m from the test property and a 3,800 L/min flow to all hydrants with a distance more than 75 m but less than 150 m. Refer to **Appendix B** for results pertaining to critical blocks.

2.3 CONCLUSION

The anticipated water demand is summarized as follows:

Parameter	Anticipated Demand	
	(L/s)	(L/min)
Average Day Demand	0.60	36.3
Max Day Demand	2.96	177.7
Peak Hour	4.47	268.4
Required Fire Flow	167.0	10,000
Fire Flow + Max Day	170.0	10,178

Table -3 Summary of Anticipated Water Demand

It is proposed to provide water supply within the subdivision with a new 150 mm diameter PVC Class 150 DR 18 in the shape of a loop. The proposed watermain will be connected to the proposed 250 mm diameter watermain at Adelaide St at two locations as shown in the General Services Plan.

Water supply for fire fighting will be delivered through the municipal watermain system. Isolation valves will be installed at intersections with Adelaide St.

Under normal use, pressure shall be kept between 345 kPa (50 psi) and 552 kPa (80 psi). For peak hour demand pressure shall be greater than 276 kPa (40 psi) and lower than 552 kPa (80 psi). Residual pressure for fire flow and maximum day demand shall be kept greater than 140 kPa (20 psi).

3.0 SANITARY SERVICING

3.1 DESIGN CRITERIA

Using the *Ottawa Sewer Design Guidelines*, sanitary sewage flow for the proposed development is estimated as follows:

- Population: 149.2 persons
- Peak Flow Design Calculation:
 - Average daily flow per capita = 350 L/pers./day
 - Harmon's Residential Peaking Factor = $1 + (14 / (4 + (P / 1000)^{0.5}))$ (Max.= 4; Min.= 2)
 - Wet weather infiltration contribution (Extraneous): 0.28 L/s/effective gross ha
 - Dry weather infiltration contribution (Extraneous): 0.05 L/s/effective gross ha

Gross residential area includes lots and roadways. The creek buffer and the pond were not included.

3.2 PROPOSED SERVICING AND CALCULATIONS

The total peak design flow rate is the sum of the peak dry weather flow rate as generated by population and land use for the design contributing area plus all extraneous flow allowances. Detailed calculations for sanitary flows are exhibited in **Appendix B**. Results are summarized in the following table 4:

Design Parameter	Flow (m3/day)	Flow (L/s)
Average Dry Weather Flow Rate	63.22	0.73
Peak Dry Weather Flow Rate	196.38	2.27
Peak Wet Weather Flow Rate	257.97	2.99

Table -4 Summary of Anticipated Sanitary Flows

The total peak sanitary flow rate from the proposed development represents 10.6 % of the capacity of the proposed sewer at Adelaide St (24.1 L/s) running east to west along Adelaide St.

3.3 CONCLUSION

It is proposed to construct a sanitary sewer composed of 1200 mm inner diameter manholes and 200 mm diameter PVC DR 35 pipes with a minimum pipe slope of 0.34% within the subdivision. Refer to **Appendix B** for the sanitary sewer design sheet. The gravity sewer will outlet into Adelaide St proposed sanitary sewer. The maximum distance between manholes is 120 m. Hydraulic grade lines are kept at least 0.3 m below footings.

All sanitary laterals shall be 135 mm diameter DR 28 PVC pipes with minimum 1% slopes. Backwater valves shall be installed on all sanitary and storm laterals.

Sewage discharges will be domestic in type and in compliance with the *City of Ottawa Sewer Use By-law* and *Ontario Building Code (OBC)*.

4.0 STORMWATER AND STORMWATER MANAGEMENT

Development stormwater will be captured and conveyed through catchbasins and underground pipes to the detention structure within the site where it will be controlled and excess flow will be discharged gradually into the municipal drain at pre-development rate levels. The quality control consists of an enhanced level of treatment (80% of TSS removal) by on-site measures to protect receiving waters. A proposed Stormceptor will be installed at the south east side of the property. Refer to “Stormwater Management Report” for detailed analysis and calculations of quantity, quality controls and storage requirements.

5.0 EROSION AND SEDIMENT CONTROL MEASURES

Erosion and Sediment Control (ESC) measures will be implemented in order to mitigate the adverse environmental impacts caused by the release of silt-laden stormwater runoff into receiving watercourses and to ensure that sediment is contained within the site. The measures will be well kept during construction until vegetation has been re-established as specified in drawings and in accordance with the requirements of latest provincial standards *OPSS 805*.

Refer to “*Stormwater Management Report*” and “*Erosion and Sediment Control Plan*” for more details about erosion and sediment control.

6.0 CONCLUSION AND RECOMMENDATIONS

The preceding servicing report has been prepared to support the development of a residential subdivision composed of 55 units. The conclusions are as follows:

- ◆ Based on the estimated water demand, and upon confirmation by the Municipality of acceptable boundary conditions, the proposed 250 mm diameter watermain within Adelaide St has sufficient water supply capacity to support the proposed development.
- ◆ The watermain system is able to maintain a minimum pressure of 140 kPa at ground level at all points in the distribution system under maximum day demand plus fire flow conditions. The Municipality fire department shall review the required fire flow design.
- ◆ The proposed watermain within the subdivision will be of 150 mm diameter DR 18 PVC in the form of two loops. Water services shall be 25 mm diameter Type K soft copper or Cross-linked Polyethylene.
- ◆ The proposed sanitary sewer will be composed of a 200 mm diameter DR 35 PVC pipe and 1200 mm diameter manholes as per OPSD 701.010. The sewage will be conveyed gravitationally to the proposed Adelaide St sewer. Downstream sewer has adequate capacity to convey the estimated wastewater generated from the development.
- ◆ Blocks 3 and 17 will be serviced from Street A through the backyards. Easements may be required by the Municipality.
- ◆ Service connections shall comply with the City of Ottawa standards.
- ◆ The design of Adelaide St infrastructure will be coordinated with *Hannan Hills* design team.
- ◆ Stormwater will be conveyed through a proposed separate storm sewer within the right-of-ways to a proposed on-site stormwater management structure where quality and quantity control will be achieved. Discharge flow rates will match the pre-development levels.
- ◆ Hydro, gas main and telecommunication have not been examined in this report. Service connections of these utilities will be coordinated with authorities having jurisdictions prior to construction.

Respectfully submitted,

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APPENDICES

Appendix A

- Figure 1: Site Location

Appendix B

- Domestic Water Supply Calculations
- Fire Flow Calculations
- Sanitary Sewer Calculations

Appendix C

- Correspondences



FIGURE 1

APPENDIX - A

APPENDIX - B

ALMONTE SUBDIVISION – MENZIE/ADELAIDE ST MISSISSIPPI MILLS

ANTICIPATED WATER DEMAND

I- POPULATION

UNIT TYPE	QTY	PERSON PER UNIT *	TOTAL
Townhouses	18	2.7	48.6
Single Detached	1	3.4	3.4
Semi-Detached	36	2.7	97.2
Apartment (Average)	0	1.8	0.0
Total Units	55	Total Population	149.2

* As per Ottawa Sewer Design Guidelines – Table 4.1

II- DESIGN CRITERIA

Design Parameter	Value
Population in capita	149.2
Residential Average Demand Volume Per Capita in L/c/day	350
Average Demand Volume in m ³ /day	52.2
Maximum Daily Demand (4.9 x Average) in m ³ /day **	255.9
Maximum Hourly Demand (7.4 x Average Daily) in m ³ /day **	386.4
Maximum Hourly Water Flow Required in L/s	4.47

** Peak factors of 4.9 and 7.4 for maximum daily demand and maximum hourly demand from Table 3-3 of the MOE Design Guidelines for Drinking-Water Systems for population fewer than 500 persons.

III- SUMMARY

Parameter	Anticipated Demand	
	(L/s)	(L/min)
Average Day Demand	0.60	36.3
Max Day Demand	2.96	177.7
Peak Hour	4.47	268.4
Required Fire Flow	167.0	10,000
Fire Flow + Max Day	170.0	10,178

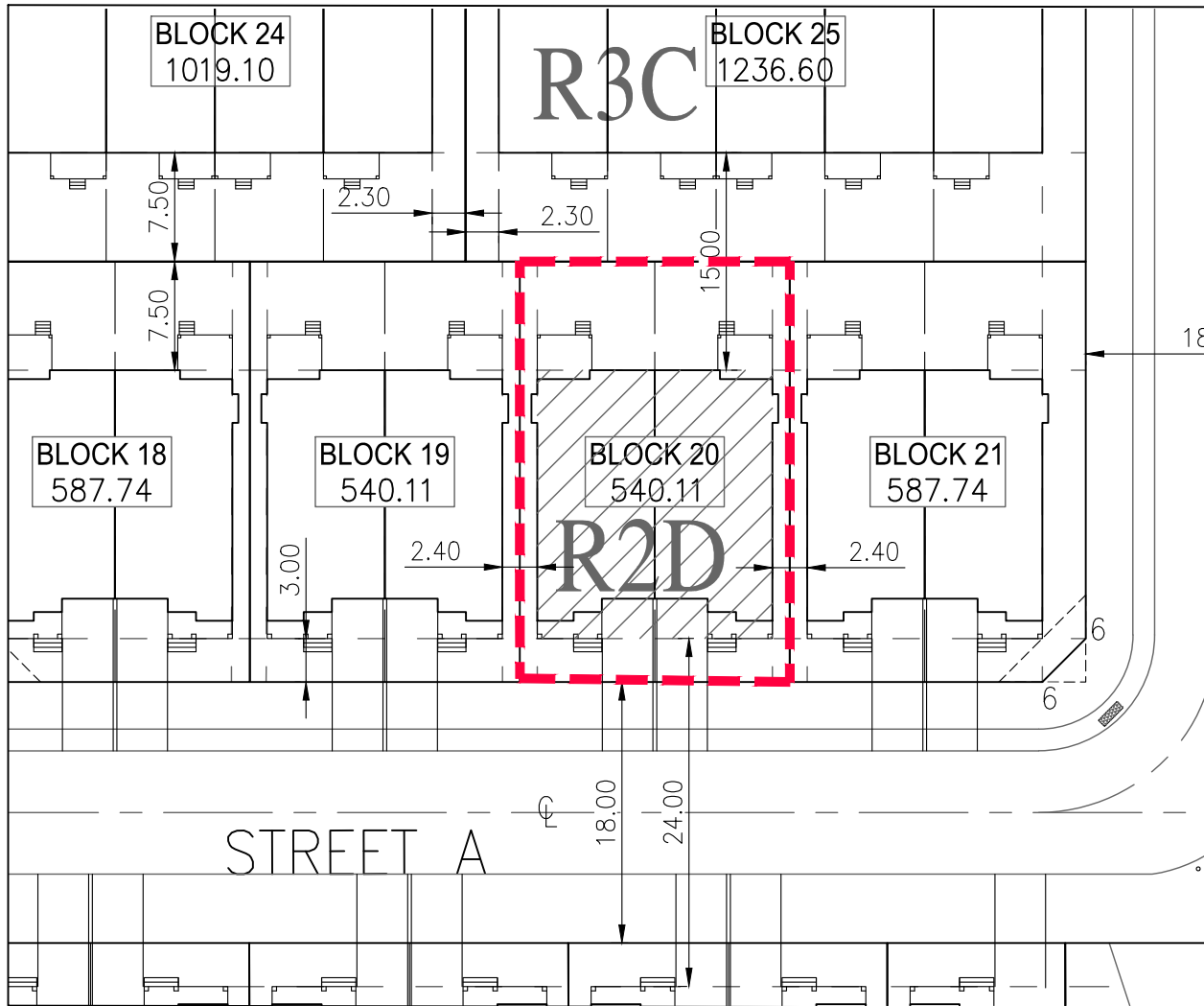
IV- PRESSURE REQUIREMENTS

Pressure Check	Minimum Pressure		Maximum Pressure	
	(kPa)	(psi)	(kPa)	(psi)
Normal Use	345	50	552	80
Peak Hour Demand	276	40	552	80
Maximum Day and Fire Flow	140	20	552	80
Maximum pressure at any point in occupied areas			552	80
Maximum pressure at any point in unoccupied areas			689	100

* Proposed watermain pipe: 150 and 200 mm diameter

* Friction Factors for 150 and 200 diameter: 100 and 110

* Proposed 4 fire hydrants; maximum distance between fire hydrants= 110 m



AS PER ZONING BY-LAW (R2D):
 MAXIMUM BUILDING FOOTPRINT: 30% OF LOT AREA
 MINIMUM SETBACKS: AS SHOWN

BLOCK 20 AREA = 540.18 m²
 30% OF LOT AREA = 162.05 m²

ZONING: R2D
 MIN. LOT AREA: 225 m² (EACH UNIT)
 MIN. FRONTAGE: 7.5 m
 MIN. FRONT YARD: 3 m
 MIN. REAR YARD: 7.5 m
 MIN. SIDE YARD: 1.2 m (EXT. SY: 3 m)
 MAX. HEIGHT: 11 m
 MAXIMUM BUILDING FOOTPRINT = 30% OF LOT AREA

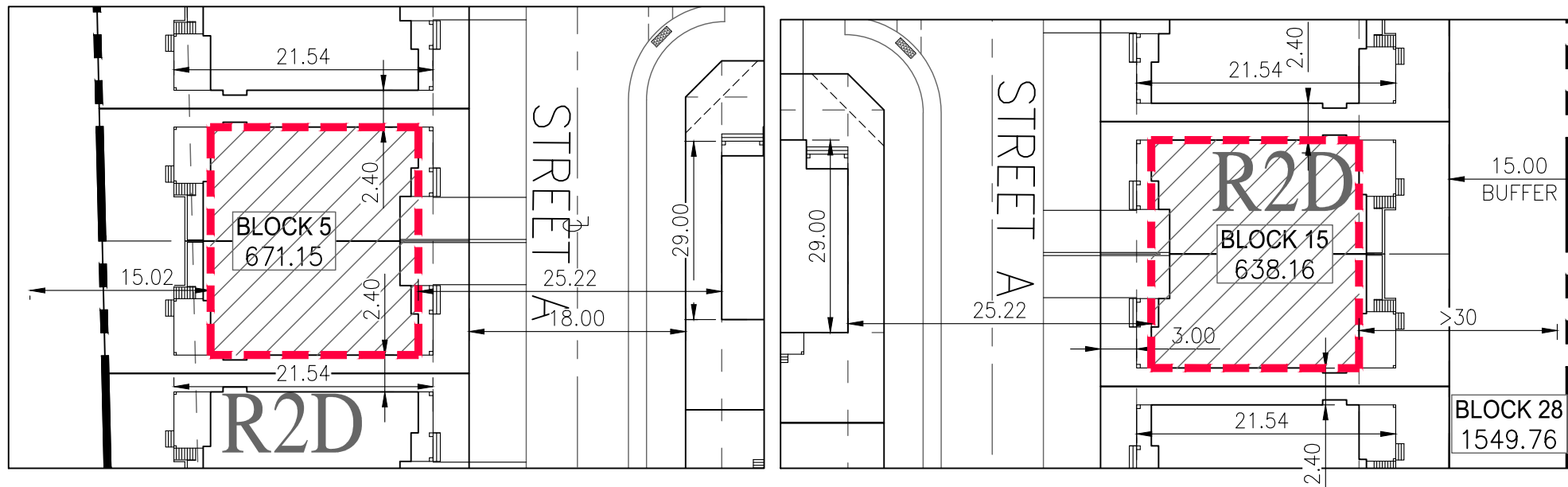
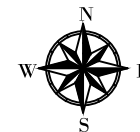
NOTES

- * DISTANCES ARE IN METRE
- * PLAN NORTH SHOWN IS NOT THE GEOGRAPHIC NORTH



SUBJECT BUILDING

TYPICAL SEMI-DETACHED LOT LAYOUT USED FOR FIRE FLOW DEMAND ESTIMATION (1:500)

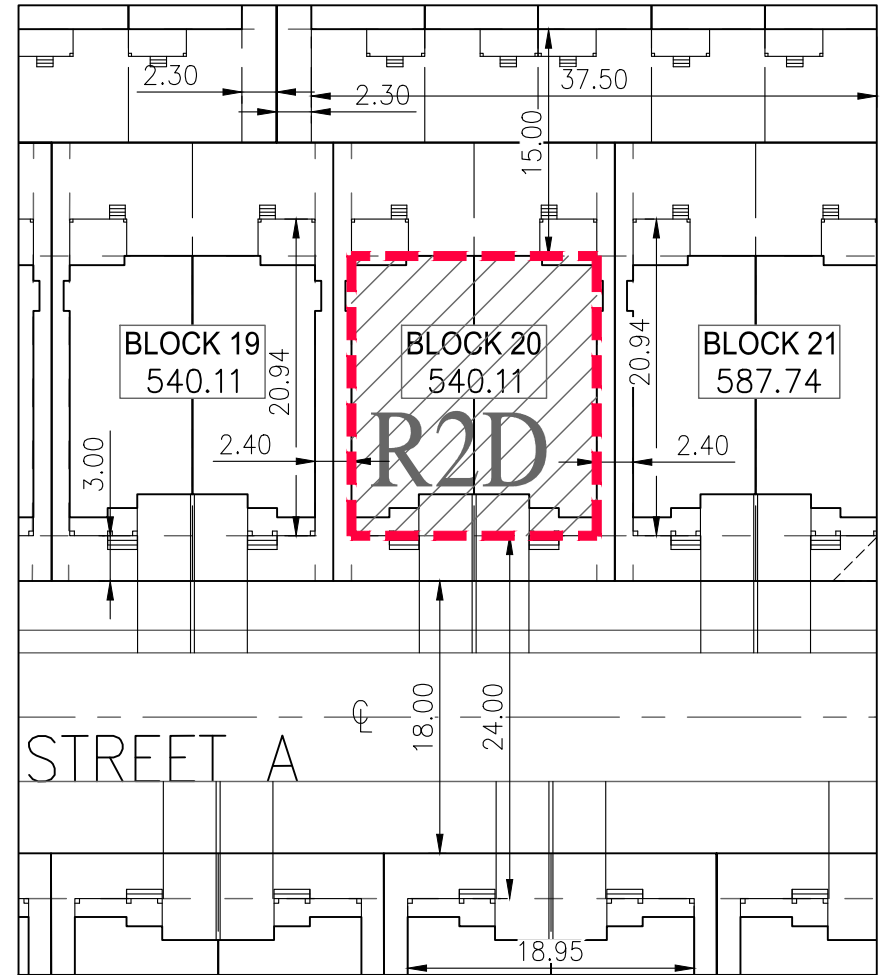
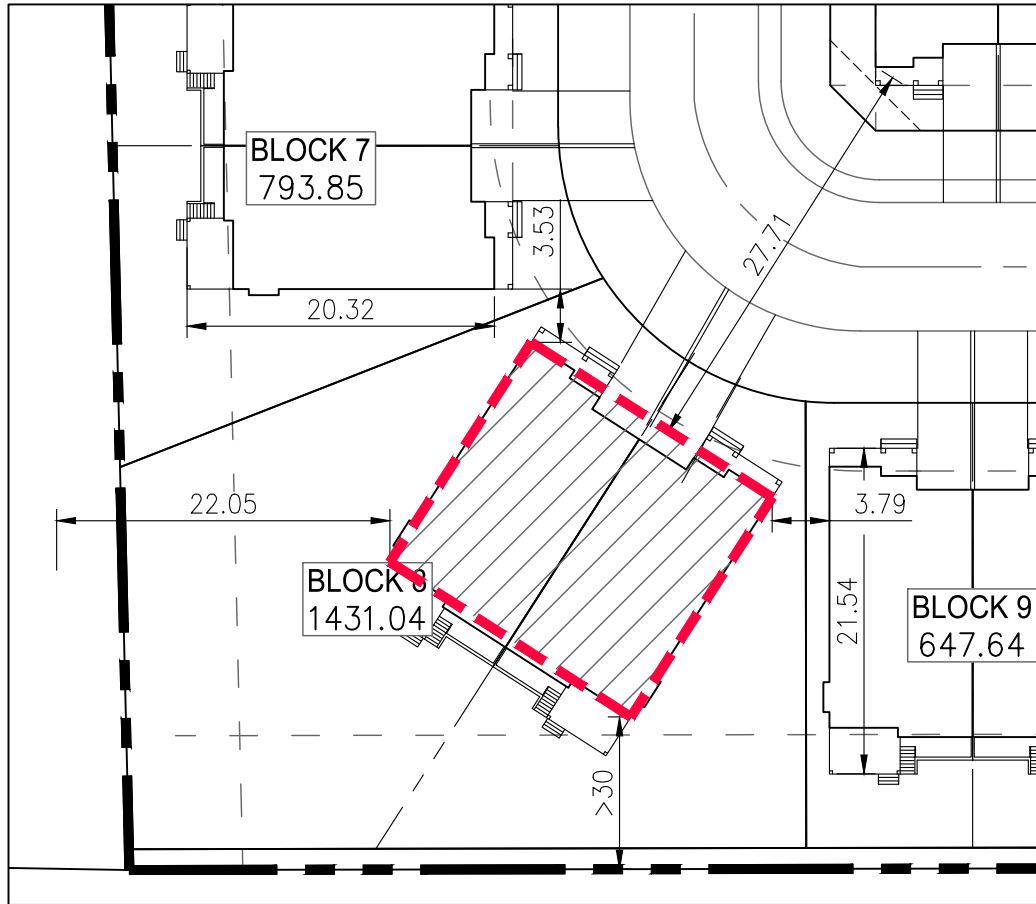


SUBJECT BUILDING

NOTES

- * DISTANCES ARE IN METRE
- * PLAN NORTH SHOWN IS NOT THE GEOGRAPHIC NORTH

FIRE FLOW DEMAND – LAYOUT USED IN FUS 2020 CALCULATION (1:500)



NOTES

- * DISTANCES ARE IN METRE
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FIRE FLOW DEMAND – LAYOUT USED IN FUS 2020 CALCULATION (1:500)



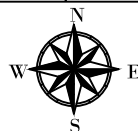
SUBJECT BUILDING





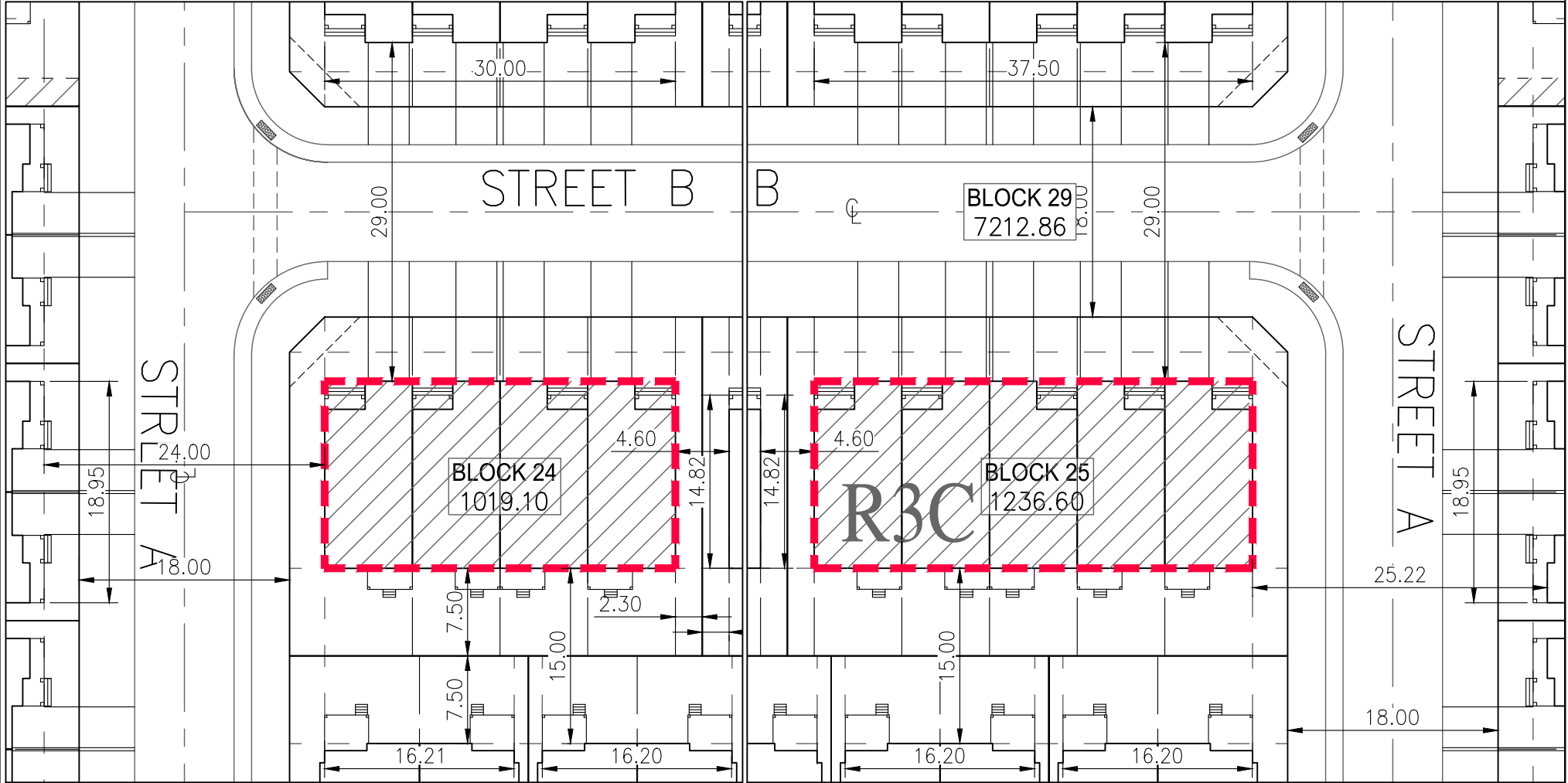
* PLAN NORTH SHOWN IS NOT THE GEOGRAPHIC NORTH

FIRE FLOW DEMAND – LAYOUT USED IN FUS 2020 CALCULATION (1:500)



SUBJECT BUILDING

ALMONTE SUBDIVISION - JUNE 2024



NOTES

- * DISTANCES ARE IN METRE
- * PLAN NORTH SHOWN IS NOT THE GEOGRAPHIC NORTH



FIRE FLOW DEMAND – LAYOUT USED IN FUS 2020 CALCULATION (1:500)

Ontario Building Code 2012 (OBC), Appendix A, division B, A-3.2.5.7

Water supply for firefighting: $Q = K.V.S_{tot}$

Q = minimum supply of water available in litres (L)

K = water supply coefficient for residential occupancy C and combustible construction A-3.2.5.7 Table 1

V = total building volume in cubic metres

S_{tot} = total of spatial coefficient values from property line exposure on all sides, to a maximum of 2.0

$$S_{tot} = 1 + (S_{side1} + S_{side2} + S_{side3} + \dots \text{ etc.})$$

Typical Semi Detached Block (Block 20)

Average Building Height =	11.0 m
Building Footprint =	162 m ²
Total Building A Volume V =	1 782 m ³

K from A-3.2.5.7 Table 1 = 23 Building of combustible construction. Floor assemblies are fire separations but with no fire-resistance rating.

* $S_{tot} = 1 + (S_{side1} + S_{side2} + S_{side3} + \dots \text{ etc.})$ As per figure 1

		$S_{side\ i}$
Exposure Distance N =	15.0 m	0
Exposure Distance S =	24.0 m	0
Exposure Distance E =	2.4 m	0.5
Exposure Distance W =	2.4 m	0.5
Total Spatial Coefficient =		2

Minimum supply of water in litres Q = 81 972 L

For Q < 108 000 L

Required Minimum Water Supply Flow Rate as per Table 2, A-3.2.5.7 :

2 700 L/min at a minimum pressure of 140 kPa

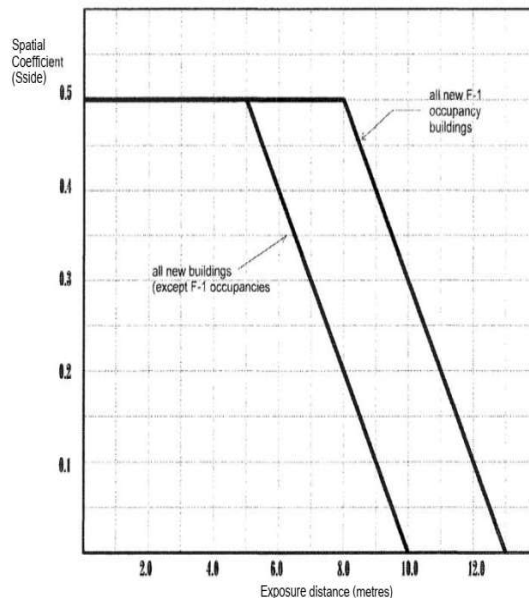


Figure 1
Spatial Coefficient vs Exposure Distance

Further clarification of intent and sample problems and solutions are contained in the "Fire Protection Water Supply Guideline for Part 3 in the Ontario Building Code". This guideline may be obtained through the Office of the Fire Marshal's web site at: "www.ofm.gov.on.ca"

Fire Flow Protection according to the Fire Underwriters Survey (FUS) Guidelines 2020

Typical single family lot – Lot width 12 m

Required Basic Fire Flow (FUS – PART II) $RFF = 220C\sqrt{A}$

Where: **RFF**: required fire flow in litres per minute; **C**: construction coefficient related to the type of construction

A: total effective floor area (effective building area) in sq.m

		Option	Charge		
A	Type of Construction	Type V Wood Frame Construction	1.5	Type V Wood Frame Construction	1.5
		Type IV-A Mass Timber Construction	0.8		
		Type IV-B Mass Timber Construction	0.9		
		Type IV-C Mass Timber Construction	1.0		
		Type IV-D Mass Timber Construction	1.5		
		Type III Ordinary Construction	1.0		
		Type II Noncombustible Construction	0.8		
		Type I Fire Resistive Construction	0.6		
Ground Floor Area					109.0 m³
B Second Floor Area					109.0 m³
Total Effective Floor Area A					218.0 m³
C Fire Flow $F = 220 C A^{0.5}$					4 872 L/min
Rounded to the nearest 1,000 L/min RFF =					5 000 L/min

		Option	Charge		
D	Occupancy Adjustment	Non-Combustible	-25%	Limited-Combustible	-15%
		Limited-Combustible	-15%		
		Combustible	0%		
		Free Burning	15%		
		Rapid Burning	20%		
Occupancy Adjustment					- 750 L/min
Fire Flow					4 250 L/min

		Option	Charge		
E	Sprinkler Protection	None	0%	None	0%
		Automatic Sprinkler Protection (NFPA 13)	30%		
		Water Supply is Standard for System & Hose Lines	10%		
		Fully Supervised System	10%		
		Additional Reduction	0%		
Sprinkler Reduction					000 L/min

F Exposures

North Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No	
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No	
	Exposed Wall Length	12.0 m	
	Exposed Wall Height in Number of Storeys	2	
	Length-Height Factor of Exposed Wall	24	
	Distance to the Exposure	6.0 m	
	Options		Charge
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Type V Wood Frame Construction	Type V Wood Frame Construction	16%
	Type III-IV w/ unprotected openings		
	Type III-IV w/o protected openings		
	Type I-II w/ unprotected openings		
	Type I-II w/o protected openings		

East Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	16.5 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	33
	Distance to the Exposure	2.4 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	Charge	21%
South Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	42.0 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	84
	Distance to the Exposure	30.0 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	Charge	8%
West Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	16.5 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	33
	Distance to the Exposure	2.4 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	Charge	21%

G

Total charge for exposures =	66%
Total adjustment for exposures =	2 805 L/min
Adjusted Fire Flow (D)-(E)+(F) =	7 055 L/min
Rounded to the nearest 1,000 L/min RFF =	7 000 L/min

Fire Flow Protection according to the Fire Underwriters Survey (FUS) Guidelines 2020

Typical Semi Detached lot – Block 5

Required Basic Fire Flow (FUS – PART II) $RF\dot{F} = 220C\sqrt{A}$

Where: **RF \dot{F}** : required fire flow in litres per minute; **C**: construction coefficient related to the type of construction

A: total effective floor area (effective building area) in sq.m

		Option	Charge		
A	Type of Construction	Type V Wood Frame Construction	1.5	Type V Wood Frame Construction	1.5
		Type IV-A Mass Timber Construction	0.8		
		Type IV-B Mass Timber Construction	0.9		
		Type IV-C Mass Timber Construction	1.0		
		Type IV-D Mass Timber Construction	1.5		
		Type III Ordinary Construction	1.0		
		Type II Noncombustible Construction	0.8		
		Type I Fire Resistive Construction	0.6		
Ground Floor Area					280.0 m³
B Second Floor Area					280.0 m³
Total Effective Floor Area A					560.0 m³
C Fire Flow $F = 220 C A^{0.5}$					7 809 L/min
Rounded to the nearest 1,000 L/min RFF =					8 000 L/min

		Option	Charge		
D	Occupancy Adjustment	Non-Combustible	-25%	Limited-Combustible	-15%
		Limited-Combustible	-15%		
		Combustible	0%		
		Free Burning	15%		
		Rapid Burning	20%		
Occupancy Adjustment					-1 200 L/min
Fire Flow					6 800 L/min

		Option	Charge		
E	Sprinkler Protection	None	0%	None	0%
		Automatic Sprinkler Protection (NFPA 13)	30%		
		Water Supply is Standard for System & Hose Lines	10%		
		Fully Supervised System	10%		
		Additional Reduction	0%		
Sprinkler Reduction					000 L/min

F Exposures

North Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems		No
	Exposed Building Fully Protected with Automatic Sprinkler Systems		No
	Exposed Wall Length		21.5 m
	Exposed Wall Height in Number of Storeys		2
	Length-Height Factor of Exposed Wall		43.08
	Distance to the Exposure		2.4 m
	Options		
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Type V Wood Frame Construction	Type V Wood Frame Construction	22%
	Type III-IV w/ unprotected openings		
	Type III-IV w/o protected openings		
	Type I-II w/ unprotected openings		
	Type I-II w/o protected openings		

East Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	29.0 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	58
	Distance to the Exposure	25.2 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	4%	
South Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	25.5 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	51.08
	Distance to the Exposure	2.4 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	22%	
West Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	20.0 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	40
	Distance to the Exposure	15.0 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	11%	

G

Total charge for exposures =	59%
Total adjustment for exposures =	4 012 L/min
Adjusted Fire Flow (D)-(E)+(F) =	10 812 L/min
Rounded to the nearest 1,000 L/min RFF =	11 000 L/min

Fire Flow Protection according to the Fire Underwriters Survey (FUS) Guidelines 2020

Typical Semi Detached lot – Block 8

Required Basic Fire Flow (FUS – PART II) $RFF = 220C\sqrt{A}$

Where: **RFF**: required fire flow in litres per minute; **C**: construction coefficient related to the type of construction

A: total effective floor area (effective building area) in sq.m

		Option	Charge		
A	Type of Construction	Type V Wood Frame Construction	1.5	Type V Wood Frame Construction	1.5
		Type IV-A Mass Timber Construction	0.8		
		Type IV-B Mass Timber Construction	0.9		
		Type IV-C Mass Timber Construction	1.0		
		Type IV-D Mass Timber Construction	1.5		
		Type III Ordinary Construction	1.0		
		Type II Noncombustible Construction	0.8		
		Type I Fire Resistive Construction	0.6		
Ground Floor Area					280.0 m³
B Second Floor Area					280.0 m³
Total Effective Floor Area A					560.0 m³
C Fire Flow $F = 220 C A^{0.5}$					7 809 L/min
Rounded to the nearest 1,000 L/min RFF =					8 000 L/min

		Option	Charge		
D	Occupancy Adjustment	Non-Combustible	-25%	Limited-Combustible	-15%
		Limited-Combustible	-15%		
		Combustible	0%		
		Free Burning	15%		
		Rapid Burning	20%		
Occupancy Adjustment					-1 200 L/min
Fire Flow					6 800 L/min

		Option	Charge		
E	Sprinkler Protection	None	0%	None	0%
		Automatic Sprinkler Protection (NFPA 13)	30%		
		Water Supply is Standard for System & Hose Lines	10%		
		Fully Supervised System	10%		
		Additional Reduction	0%		
Sprinkler Reduction					000 L/min

F Exposures			
North Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No	
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No	
	Exposed Wall Length	20.3 m	
	Exposed Wall Height in Number of Storeys	2	
	Length-Height Factor of Exposed Wall	40.64	
	Distance to the Exposure	6.5 m	
	Options		Charge
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Type V Wood Frame Construction	Type V Wood Frame Construction	16%
	Type III-IV w/ unprotected openings		
	Type III-IV w/o protected openings		
	Type I-II w/ unprotected openings		
	Type I-II w/o protected openings		

East Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	21.5 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	43.08
	Distance to the Exposure	6.8 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
		Charge
		17%
South Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	.0 m
	Exposed Wall Height in Number of Storeys	0
	Length-Height Factor of Exposed Wall	0
	Distance to the Exposure	30.0 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
		Charge
		0%
West Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	20.0 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	40
	Distance to the Exposure	22.1 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
		Charge
		2%

G

Total charge for exposures =	35%
Total adjustment for exposures =	2 380 L/min
Adjusted Fire Flow (D)-(E)+(F) =	9 180 L/min
Rounded to the nearest 1,000 L/min RFF =	9 000 L/min

Fire Flow Protection according to the Fire Underwriters Survey (FUS) Guidelines 2020

Typical Semi Detached lot – Block 15

Required Basic Fire Flow (FUS – PART II) $RFF = 220C\sqrt{A}$

Where: **RFF**: required fire flow in litres per minute; **C**: construction coefficient related to the type of construction
A: total effective floor area (effective building area) in sq.m

		Option	Charge		
A	Type of Construction	Type V Wood Frame Construction	1.5	Type V Wood Frame Construction	1.5
		Type IV-A Mass Timber Construction	0.8		
		Type IV-B Mass Timber Construction	0.9		
		Type IV-C Mass Timber Construction	1.0		
		Type IV-D Mass Timber Construction	1.5		
		Type III Ordinary Construction	1.0		
		Type II Noncombustible Construction	0.8		
		Type I Fire Resistive Construction	0.6		
Ground Floor Area					280.0 m³
B Second Floor Area					280.0 m³
Total Effective Floor Area A					560.0 m³
C Fire Flow $F = 220 C A^{0.5}$					7 809 L/min
Rounded to the nearest 1,000 L/min RFF =					8 000 L/min

		Option	Charge		
D	Occupancy Adjustment	Non-Combustible	-25%	Limited-Combustible	-15%
		Limited-Combustible	-15%		
		Combustible	0%		
		Free Burning	15%		
		Rapid Burning	20%		
Occupancy Adjustment					-1 200 L/min
Fire Flow					6 800 L/min

		Option	Charge		
E	Sprinkler Protection	None	0%	None	0%
		Automatic Sprinkler Protection (NFPA 13)	30%		
		Water Supply is Standard for System & Hose Lines	10%		
		Fully Supervised System	10%		
		Additional Reduction	0%		
Sprinkler Reduction					000 L/min

F Exposures

North Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	21.5 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	43.08
	Distance to the Exposure	2.4 m
Options		Charge
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
		22%

East Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	.0 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	0
	Distance to the Exposure	30.0 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	Charge	0%
South Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	25.5 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	51.08
	Distance to the Exposure	2.4 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	Charge	22%
West Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	29.0 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	58
	Distance to the Exposure	25.2 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	Charge	4%

G

Total charge for exposures =	48%
Total adjustment for exposures =	3 264 L/min
Adjusted Fire Flow (D)-(E)+(F) =	10 064 L/min
Rounded to the nearest 1,000 L/min RFF =	10 000 L/min

Fire Flow Protection according to the Fire Underwriters Survey (FUS) Guidelines 2020

Typical Semi Detached lot – Block 20

Required Basic Fire Flow (FUS – PART II) $RFF = 220C\sqrt{A}$

Where: **RFF**: required fire flow in litres per minute; **C**: construction coefficient related to the type of construction
A: total effective floor area (effective building area) in sq.m

		Option	Charge		
A	Type of Construction	Type V Wood Frame Construction	1.5	Type V Wood Frame Construction	1.5
		Type IV-A Mass Timber Construction	0.8		
		Type IV-B Mass Timber Construction	0.9		
		Type IV-C Mass Timber Construction	1.0		
		Type IV-D Mass Timber Construction	1.5		
		Type III Ordinary Construction	1.0		
		Type II Noncombustible Construction	0.8		
		Type I Fire Resistive Construction	0.6		
Ground Floor Area					280.0 m³
B Second Floor Area					280.0 m³
Total Effective Floor Area A					560.0 m³
C Fire Flow $F = 220 C A^{0.5}$					7 809 L/min
Rounded to the nearest 1,000 L/min RFF =					8 000 L/min

		Option	Charge		
D	Occupancy Adjustment	Non-Combustible	-25%	Limited-Combustible	-15%
		Limited-Combustible	-15%		
		Combustible	0%		
		Free Burning	15%		
		Rapid Burning	20%		
Occupancy Adjustment					-1 200 L/min
Fire Flow					6 800 L/min

		Option	Charge		
E	Sprinkler Protection	None	0%	None	0%
		Automatic Sprinkler Protection (NFPA 13)	30%		
		Water Supply is Standard for System & Hose Lines	10%		
		Fully Supervised System	10%		
		Additional Reduction	0%		
Sprinkler Reduction					000 L/min

F Exposures			
North Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No	
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No	
	Exposed Wall Length	37.5 m	
	Exposed Wall Height in Number of Storeys	2	
	Length-Height Factor of Exposed Wall	75	
	Distance to the Exposure	15.0 m	
	Options		Charge
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Type V Wood Frame Construction	Type V Wood Frame Construction	13%
	Type III-IV w/ unprotected openings		
	Type III-IV w/o protected openings		
	Type I-II w/ unprotected openings		
	Type I-II w/o protected openings		

East Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	14.8 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	29.64
	Distance to the Exposure	4.6 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	Charge	16%
South Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	16.2 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	32.4
	Distance to the Exposure	15.0 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	Charge	16%
West Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	19.0 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	37.9
	Distance to the Exposure	24.0 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	Charge	2%

G

Total charge for exposures =	38%
Total adjustment for exposures =	3 230 L/min
Adjusted Fire Flow (D)-(E)+(F) =	11 730 L/min
Rounded to the nearest 1,000 L/min RFF =	12 000 L/min

Fire Flow Protection according to the Fire Underwriters Survey (FUS) Guidelines 2020
Townhouse block – 4 units width – Block 22

Required Basic Fire Flow (FUS – PART II) $RFF = 220C\sqrt{A}$

Where: **RFF**: required fire flow in litres per minute; **C**: construction coefficient related to the type of construction
A: total effective floor area (effective building area) in sq.m

		Option	Charge		
A	Type of Construction	Type V Wood Frame Construction	1.5	Type V Wood Frame Construction	1.5
		Type IV-A Mass Timber Construction	0.8		
		Type IV-B Mass Timber Construction	0.9		
		Type IV-C Mass Timber Construction	1.0		
		Type IV-D Mass Timber Construction	1.5		
		Type III Ordinary Construction	1.0		
		Type II Noncombustible Construction	0.8		
		Type I Fire Resistive Construction	0.6		
Ground Floor Area					464.0 m³
B Second Floor Area					464.0 m³
Total Effective Floor Area A					928.0 m³
C Fire Flow $F = 220 C A^{0.5}$					10 053 L/min
Rounded to the nearest 1,000 L/min RFF =					10 000 L/min

		Option	Charge		
D	Occupancy Adjustment	Non-Combustible	-25%	Limited-Combustible	-15%
		Limited-Combustible	-15%		
		Combustible	0%		
		Free Burning	15%		
		Rapid Burning	20%		
Occupancy Adjustment					-1 500 L/min
Fire Flow					8 500 L/min

		Option	Charge		
E	Sprinkler Protection	None	0%	None	0%
		Automatic Sprinkler Protection (NFPA 13)	30%		
		Water Supply is Standard for System & Hose Lines	10%		
		Fully Supervised System	10%		
		Additional Reduction	0%		
Sprinkler Reduction					000 L/min

F Exposures

North Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	30.0 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	60
	Distance to the Exposure	25.5 m
	Options	
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
		4%

East Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	14.8 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	29.64
	Distance to the Exposure	4.6 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	Charge	16%
South Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	30.0 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	60
	Distance to the Exposure	29.0 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	Charge	4%
West Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	16.3 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	32.54
	Distance to the Exposure	24.0 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	Charge	2%

G

Total charge for exposures =	26%
Total adjustment for exposures =	2 210 L/min
Adjusted Fire Flow (D)-(E)+(F) =	10 710 L/min
Rounded to the nearest 1,000 L/min RFF =	11 000 L/min

Fire Flow Protection according to the Fire Underwriters Survey (FUS) Guidelines 2020

Townhouse block – 5 units Block 23

Required Basic Fire Flow (FUS – PART II) $RFF = 220C\sqrt{A}$

Where: **RFF**: required fire flow in litres per minute; **C**: construction coefficient related to the type of construction

A: total effective floor area (effective building area) in sq.m

		Option	Charge		
A	Type of Construction	Type V Wood Frame Construction	1.5	Type V Wood Frame Construction	1.5
		Type IV-A Mass Timber Construction	0.8		
		Type IV-B Mass Timber Construction	0.9		
		Type IV-C Mass Timber Construction	1.0		
		Type IV-D Mass Timber Construction	1.5		
		Type III Ordinary Construction	1.0		
		Type II Noncombustible Construction	0.8		
		Type I Fire Resistive Construction	0.6		
Ground Floor Area					580.0 m³
B Second Floor Area					580.0 m³
Total Effective Floor Area A					1 160.0 m³
C Fire Flow $F = 220 C A^{0.5}$					11 239 L/min
Rounded to the nearest 1,000 L/min RFF =					11 000 L/min

		Option	Charge		
D	Occupancy Adjustment	Non-Combustible	-25%	Limited-Combustible	-15%
		Limited-Combustible	-15%		
		Combustible	0%		
		Free Burning	15%		
		Rapid Burning	20%		
Occupancy Adjustment					-1 650 L/min
Fire Flow					9 350 L/min

		Option	Charge		
E	Sprinkler Protection	None	0%	None	0%
		Automatic Sprinkler Protection (NFPA 13)	30%		
		Water Supply is Standard for System & Hose Lines	10%		
		Fully Supervised System	10%		
		Additional Reduction	0%		
Sprinkler Reduction					000 L/min

F Exposures		
North Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	25.0 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	50
	Distance to the Exposure	28.0 m
	Options	
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
Options		4%

East Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	16.3 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	32.6
	Distance to the Exposure	24.0 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	2%	
South Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	37.5 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	75
	Distance to the Exposure	29.0 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	6%	
West Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	14.8 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	29.64
	Distance to the Exposure	4.6 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	21%	

G

Total charge for exposures =	33%
Total adjustment for exposures =	3 086 L/min
Adjusted Fire Flow (D)-(E)+(F) =	12 436 L/min
Rounded to the nearest 1,000 L/min RFF =	12 000 L/min

Fire Flow Protection according to the Fire Underwriters Survey (FUS) Guidelines 2020

Townhouse block – 4 units width – Block 24

Required Basic Fire Flow (FUS – PART II) $RFF = 220C\sqrt{A}$

Where: **RFF**: required fire flow in litres per minute; **C**: construction coefficient related to the type of construction

A: total effective floor area (effective building area) in sq.m

		Option	Charge		
A	Type of Construction	Type V Wood Frame Construction	1.5	Type V Wood Frame Construction	1.5
		Type IV-A Mass Timber Construction	0.8		
		Type IV-B Mass Timber Construction	0.9		
		Type IV-C Mass Timber Construction	1.0		
		Type IV-D Mass Timber Construction	1.5		
		Type III Ordinary Construction	1.0		
		Type II Noncombustible Construction	0.8		
		Type I Fire Resistive Construction	0.6		
Ground Floor Area					464.0 m³
B Second Floor Area					464.0 m³
Total Effective Floor Area A					928.0 m³
C Fire Flow $F = 220 C A^{0.5}$					10 053 L/min
Rounded to the nearest 1,000 L/min RFF =					10 000 L/min

		Option	Charge		
D	Occupancy Adjustment	Non-Combustible	-25%	Limited-Combustible	-15%
		Limited-Combustible	-15%		
		Combustible	0%		
		Free Burning	15%		
		Rapid Burning	20%		
Occupancy Adjustment					-1 500 L/min
Fire Flow					8 500 L/min

		Option	Charge		
E	Sprinkler Protection	None	0%	None	0%
		Automatic Sprinkler Protection (NFPA 13)	30%		
		Water Supply is Standard for System & Hose Lines	10%		
		Fully Supervised System	10%		
		Additional Reduction	0%		
Sprinkler Reduction					000 L/min

F Exposures

North Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	30.0 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	60
	Distance to the Exposure	29.0 m
	Options	
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
		4%

East Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	14.8 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	29.64
	Distance to the Exposure	4.6 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	Charge	16%
South Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	16.2 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	32.4
	Distance to the Exposure	15.0 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	Charge	16%
West Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	19.0 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	37.9
	Distance to the Exposure	24.0 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	Charge	2%

G

Total charge for exposures =	38%
Total adjustment for exposures =	3 230 L/min
Adjusted Fire Flow (D)-(E)+(F) =	11 730 L/min
Rounded to the nearest 1,000 L/min RFF =	12 000 L/min

Fire Flow Protection according to the Fire Underwriters Survey (FUS) Guidelines 2020

Townhouse block – 5 units Block 25

Required Basic Fire Flow (FUS – PART II) $RFF = 220C\sqrt{A}$

Where: **RFF**: required fire flow in litres per minute; **C**: construction coefficient related to the type of construction

A: total effective floor area (effective building area) in sq.m

		Option	Charge		
A	Type of Construction	Type V Wood Frame Construction	1.5	Type V Wood Frame Construction	1.5
		Type IV-A Mass Timber Construction	0.8		
		Type IV-B Mass Timber Construction	0.9		
		Type IV-C Mass Timber Construction	1.0		
		Type IV-D Mass Timber Construction	1.5		
		Type III Ordinary Construction	1.0		
		Type II Noncombustible Construction	0.8		
		Type I Fire Resistive Construction	0.6		
Ground Floor Area					580.0 m³
B Second Floor Area					580.0 m³
Total Effective Floor Area A					1 160.0 m³
C Fire Flow $F = 220 C A^{0.5}$					11 239 L/min
Rounded to the nearest 1,000 L/min RFF =					11 000 L/min

		Option	Charge		
D	Occupancy Adjustment	Non-Combustible	-25%	Limited-Combustible	-15%
		Limited-Combustible	-15%		
		Combustible	0%		
		Free Burning	15%		
		Rapid Burning	20%		
Occupancy Adjustment					-1 650 L/min
Fire Flow					9 350 L/min

		Option	Charge		
E	Sprinkler Protection	None	0%	None	0%
		Automatic Sprinkler Protection (NFPA 13)	30%		
		Water Supply is Standard for System & Hose Lines	10%		
		Fully Supervised System	10%		
		Additional Reduction	0%		
Sprinkler Reduction					000 L/min

F Exposures			
North Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No	
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No	
	Exposed Wall Length	37.5 m	
	Exposed Wall Height in Number of Storeys	2	
	Length-Height Factor of Exposed Wall	75	
	Distance to the Exposure	29.0 m	
	Options		Charge
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Type V Wood Frame Construction	Type V Wood Frame Construction	6%
	Type III-IV w/ unprotected openings		
	Type III-IV w/o protected openings		
	Type I-II w/ unprotected openings		
	Type I-II w/o protected openings		

East Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	19.0 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	37.9
	Distance to the Exposure	25.2 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	2%	
South Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	16.2 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	32.4
	Distance to the Exposure	15.0 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	11%	
West Side	Subject Building and Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Building Fully Protected with Automatic Sprinkler Systems	No
	Exposed Wall Length	14.8 m
	Exposed Wall Height in Number of Storeys	2
	Length-Height Factor of Exposed Wall	29.64
	Distance to the Exposure	4.6 m
Construction Type of Exposed Wall (FUS 2020 – Table 6 – page 31)	Options	
	Type V Wood Frame Construction	Type V Wood Frame Construction
	Type III-IV w/ unprotected openings	
	Type III-IV w/o protected openings	
	Type I-II w/ unprotected openings	
	Type I-II w/o protected openings	
	21%	

G

Total charge for exposures =	40%
Total adjustment for exposures =	3 740 L/min
Adjusted Fire Flow (D)-(E)+(F) =	13 090 L/min
Rounded to the nearest 1,000 L/min RFF =	13 000 L/min

ALMONTE SUBDIVISION MENZIE / ADELAIDE ST MISSISSIPPI MILLS SANITARY SEWER DESIGN

1- DESIGN FLOW CALCULATION

$$Q_d = (M \cdot q \cdot P / 86.4) + I \cdot A \quad \text{Where:}$$

Q_d = Peak Design Flow (L/s)

M = Peaking Factor (Max = 4; Min = 1.5)

q = Average Daily Flow per capita per day (L/c/day)

P = Population

I = Infiltration Contribution (0.28 L/s/eff. gross ha)

A = Gross Drainage Area (ha) = Total land (-) Pond and Riparian

$$A \text{ (ha)} = 2.5459 \text{ ha}$$

$$q \text{ (L/c/day)} = 350 \text{ L/c/day}$$

$$\text{Population} = 149.2 \text{ Capita}$$

$$M \text{ (Harmon's Peaking Factor)} = 3.55 \quad M = 1 + (14 / (4 + (P/1000)^{0.5}))^k = 3.55$$

$$\text{Extraneous Flow } 0.28 \times A \text{ (L/s)} = 0.71 \text{ L/s} \quad K=0.8$$

$$\text{Extraneous Flow } 0.05 \times A \text{ (L/s)} = 0.13 \text{ L/s} \quad \text{As per Technical Bulletin}$$

$$\text{Average Dry Weather Flow Rate ADWF} = 0.73 \text{ L/s} \quad 0.05 \text{ L/s included}$$

$$\text{Peak Dry Weather Flow Rate PDWF} = 2.27 \text{ L/s} \quad 0.05 \text{ L/s included}$$

$$\text{Peak Wet Weather Flow Rate } Q_d \text{ (L/s)} = 2.99 \text{ L/s} \quad \text{(Design Flow)}$$

$$Q_d \text{ (m}^3\text{/day)} = 257.97 \text{ m}^3\text{/day}$$

2- SEWER CAPACITY CALCULATION – ADELAIDE ST

200mmØ @ 0.5%

Manning's Equation
 $Q = 1/n \cdot A \cdot R^{2/3} \cdot S^{1/2}$

$$D \text{ (mm)} = 203$$

$$A \text{ (m}^2\text{)} = 0.0324$$

$$n = 0.013 \text{ Manning Coefficient}$$

$$R \text{ (m)} = 0.05 \text{ Hydraulic Radius (m)}$$

$$S = 0.50\% \text{ Slope (\%)}$$

$$Q = 1/n \cdot A \cdot R^{2/3} \cdot S^{1/2}$$

$$\text{Full Pipe Capacity } Q_f \text{ (m}^3\text{/s)} = 0.0241 \text{ m}^3\text{/s} = 24.1 \text{ L/s}$$

$$V_f \text{ (m/s)} = 0.75 \text{ m/s}$$

3- PROPOSED SEWER CAPACITY CALCULATION (WITHIN THE SUBDIVISION)

Refer to sanitary sewer calculation sheet for all segments

For total sanitary flow rate at 0.32% slope:

Manning's Equation $Q=1/n \cdot A \cdot R^{2/3} \cdot S^{1/2}$	D (mm) =	203	
	A (m ²) =	0.0324	
	n =	0.013	Manning Coefficient
	R (m) =	0.05	Hydraulic Radius (m)
	S =	0.34%	Slope (%)
	$Q=1/n \cdot A \cdot R^{2/3} \cdot S^{1/2}$		
	Full Pipe Capacity Q _f (m ³ /s) =	0.0199	m ³ /s = 19.9 L/s
	V _f (m/s) =	0.61	m/s
	Minimum Velocity V _{sc} = 0.9885 * R ^(1/6) =	0.60	m/s (For self-cleaning)

	Q _{avg} (Dry) (L/s) =	2.27	L/s
	Pipe % Full = Q _{avg} /Q _{full} =	11.42%	0.114
	Graph y/D = f(Q _{avg} /Q _{full} , V _{avg} /V _{full}) =>	y/D = 0.205	y = 42 mm
	And V _{avg} /V _{full} =	0.63	
	V _{avg} =	0.39	m/s n = Constant

	Q _d (Wet) (L/s) =	2.99	L/s
	Pipe % Full = Q _{avg} /Q _{full} =	15.00%	0.150
	Graph y/D = f(Q _{avg} /Q _{full} , V _{avg} /V _{full}) =>	y/D = 0.239	y = 49 mm
	And V _d /V _{full} =	0.7	
	V _d =	0.43	m/s n = Constant

NOTES:

Minimum diameter for sanitary main sewer: 200 mm (8")

Maximum velocity = 3 m/s

Minimum velocity = 0.6 m/s

Minimum depth of cover 2.5 m from crown of sewer to finished grade

Minimum vertical clearance between sewer and watermain is 0.30m and 0.5m if sewer above

Minimum horizontal clearance between sewer and watermain is 2.5 m

Special treatment of manholes and pipe if high groundwater level

Maximum spacing of manholes 120 m

Drops at manholes: 30 mm (straight sewer) and 60 mm (45 to 90 deg sewer)

Pipe material: PVC DR of 35 320 kPa or equivalent

Manholes: precast or poured concrete as per OPSD standards

Bedding: as per OPSD standards and geotechnical

GRAPH USED TO DETERMINE ACTUAL FLOW DEPTH AND VELOCITY

Q/Q_{full}	h/D	v/v_{full}	R/D	Q/Q_{full}	h/D	v/v_{full}	R/D
0.095	0.205	0.64	0.1233	0.610	0.568	1.04	0.2697
0.100	0.211	0.65	0.1265	0.620	0.575	1.04	0.2715
0.105	0.216	0.66	0.1291	0.630	0.581	1.05	0.2731
0.110	0.221	0.67	0.1317	0.640	0.587	1.05	0.2745
0.115	0.226	0.68	0.1343	0.650	0.594	1.05	0.2762
0.120	0.231	0.69	0.1369	0.660	0.600	1.05	0.2776
0.125	0.236	0.69	0.1395	0.670	0.607	1.06	0.2793
0.130	0.241	0.70	0.1421	0.680	0.613	1.06	0.2806
0.135	0.245	0.71	0.1441	0.690	0.620	1.06	0.2821
0.140	0.250	0.72	0.1466	0.700	0.626	1.06	0.2834
0.145	0.255	0.72	0.1491	0.710	0.633	1.06	0.2848
0.150	0.259	0.73	0.1511	0.720	0.640	1.07	0.2862
0.155	0.263	0.74	0.1531	0.730	0.646	1.07	0.2874
0.160	0.268	0.74	0.1556	0.740	0.653	1.07	0.2887
0.165	0.272	0.75	0.1575	0.750	0.660	1.07	0.2900
0.170	0.276	0.76	0.1595	0.760	0.667	1.07	0.2912
0.175	0.281	0.76	0.1619	0.770	0.675	1.07	0.2925
0.180	0.285	0.77	0.1638	0.780	0.682	1.07	0.2936
0.190	0.293	0.78	0.1676	0.790	0.689	1.07	0.2947
0.200	0.301	0.79	0.1714	0.800	0.697	1.07	0.2958
0.210	0.309	0.80	0.1751	0.805	0.701	1.08	0.2964
0.220	0.316	0.81	0.1784	0.810	0.705	1.08	0.2969
0.230	0.324	0.82	0.1820	0.815	0.709	1.08	0.2974
0.240	0.331	0.83	0.1851	0.820	0.713	1.08	0.2979
0.250	0.339	0.84	0.1887	0.825	0.717	1.08	0.2984
0.260	0.346	0.85	0.1918	0.830	0.721	1.08	0.2989
0.270	0.353	0.86	0.1948	0.835	0.725	1.08	0.2993
0.280	0.360	0.86	0.1978	0.840	0.729	1.07	0.2997
0.290	0.367	0.87	0.2007	0.845	0.734	1.07	0.3002
0.300	0.374	0.88	0.2037	0.850	0.738	1.07	0.3006
0.310	0.381	0.89	0.2066	0.855	0.742	1.07	0.3010
0.320	0.387	0.89	0.2090	0.860	0.747	1.07	0.3014
0.330	0.394	0.90	0.2118	0.865	0.751	1.07	0.3018
0.340	0.401	0.91	0.2146	0.870	0.756	1.07	0.3022
0.350	0.407	0.92	0.2170	0.875	0.761	1.07	0.3025
0.360	0.414	0.92	0.2197	0.880	0.766	1.07	0.3028
0.370	0.420	0.93	0.2220	0.885	0.770	1.07	0.3031
0.380	0.426	0.93	0.2243	0.890	0.775	1.07	0.3033
0.390	0.433	0.94	0.2269	0.895	0.781	1.07	0.3036
0.400	0.439	0.95	0.2291	0.900	0.786	1.07	0.3038
0.410	0.445	0.95	0.2313	0.905	0.791	1.07	0.3040
0.420	0.451	0.96	0.2334	0.910	0.797	1.07	0.3041
0.430	0.458	0.96	0.2359	0.915	0.803	1.06	0.3042
0.440	0.464	0.97	0.2380	0.920	0.808	1.06	0.3043
0.450	0.470	0.97	0.2401	0.925	0.814	1.06	0.3043
0.460	0.476	0.98	0.2420	0.930	0.821	1.06	0.3043
0.470	0.482	0.99	0.2441	0.935	0.827	1.06	0.3042
0.480	0.488	0.99	0.2461	0.940	0.834	1.05	0.3040
0.490	0.494	1.00	0.2481	0.945	0.841	1.05	0.3037
0.500	0.500	1.00	0.2500	0.950	0.849	1.05	0.3033
0.510	0.506	1.00	0.2519	0.955	0.856	1.05	0.3029
0.520	0.512	1.01	0.2538	0.960	0.865	1.04	0.3022
0.530	0.519	1.01	0.2559	0.965	0.874	1.04	0.3014
0.540	0.525	1.02	0.2577	0.970	0.883	1.04	0.3004
0.550	0.531	1.02	0.2595	0.975	0.894	1.03	0.2989
0.560	0.537	1.02	0.2612	0.980	0.905	1.03	0.2972
0.570	0.543	1.03	0.2629	0.985	0.919	1.02	0.2946
0.580	0.550	1.03	0.2649	0.990	0.935	1.02	0.2908
0.590	0.556	1.03	0.2665	0.995	0.956	1.01	0.2844
0.600	0.562	1.04	0.2681	1.000	1.000	1.00	0.2500

APPENDIX - C



Pre-Consultation Meeting Notes
Virtual zoom meeting – July 14, 2022
Prepared By: Julie Stewart

In Attendance

Ash Sharma -owner
Sampat Poddar – owner
Mongi Mabourak – Engineer
Greg Winters – Planner, Novatech
Susan Gordon – Engineer, Novatech
James Ireland – Project Planner, Novatech
Ken Kelly – CAO, Mississippi Mills
Cory Smith – Public Works, Mississippi Mills
Melanie Knight – Senior Planner, Mississippi Mills
Julie Stewart – County Planner, County of Lanark

Ash provided a brief overview of the proposed development,
Provided a draft concept plan dated May 3, 2022

Legal

The owner needs to provide the block map, parcel abstract and other legal information to confirm ownership and details of the subject land.

Planning

Blocks 16-19 on concept plan have frontage on Adelaide Street and new internal street. Melanie to review and provide comment on preferred streetscape.

Affordable Housing needs to be provided and secured by agreement. Consultation with other agencies encouraged, for example, CMHC or Lanark County.

Engineering / Servicing

- Concept plan shows 18m road, the standard is 20 m. If 18m then this needs to be justified. Cory will provide the specs and cross-section for 18m and 20m to engineer's.
- Servicing - will be an issue. Cory will send information from the master plan.
- Cory advised that he previously provided a letter to the owner in regards to servicing.
- A conceptual plan for servicing will need to be provided.

- There is a need to figure out best way to service the area.

Susan Gordon

- Advised there is a need to look at servicing for the whole area. The engineers will need to look at Cavanagh development and Sharma development together.

The owner and all consultants are to re-group and determine whom is involved in the project. Once that is established a further meeting with MVCA and Gemtec can be coordinated by the County.

Please refer to the attached Pre-Consultation Checklist and comments from the Municipality of Mississippi Mills.



The Corporation of the
Municipality of Mississippi Mills

Municipal Office
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February 28, 2022

Memo

By: Cory Smith, A/Director of Public Works

Re: Servicing requirements for the development area known as Lots 21-25 Plan 6262
1.65 ha (4.1 ac) Menzie Parcel

This memo has been prepared as a general overview of servicing requirements for the development area known as the 1.65 ha (4.1 ac) Menzie Parcel. This memo is based on information in the Water and Wastewater Master Plan. Additional works may be required based on the density of the development and other changes to the existing system.

The property is approximately 1.65 ha (4.1 ac) in size. It is bounded to the North by an unopened/unmaintained segment of Adelaide St., to the East by an unopened segment of Menzie Street. This segment also contains a reach of the Almonte Municipal Drain. To the south it is bounded by an unopened road allowance that appears to be the continuation of Augusta St. This segment also contains a reach of the Almonte Municipal Drain. To the West the property is bounded by a 1.25 ha (3.1 ac) parcel described as Plan 6262 BLK C, Lot 2.

The areas bounded by the Municipal Drain should be evaluated for required buffer zones resulting from what may be considered an unevaluated wetland. Consultation with the Mississippi Valley Conservation Authority is recommended as there may be additional development requirements under the Regulatory Framework of the Conservation Authority.

Roadways

It is intended that the site is to be accessed from the unopened/unmaintained extension of Adelaide St. Adelaide St. would need to be upgraded and extended to meet Mississippi Mills Municipal Standards for an urban right-of-way cross section. The design should consider incorporating access to the 1.25 ha (3.1 ac) lot to the West of the property.

Water Servicing

Water servicing has not been extended to this site at this time. Water servicing is likely to occur from an extension of the watermain on Adelaide St. The Master Plan also calls for an extension of the watermain down the unopened road allowance for Menzie Street. Considerations for looping of the system need to be contemplated in the design and boundary conditions should be modelled for this site to be incorporated into the design and requirements for servicing this site. Figure 17 from the Water Wastewater master plan has been attached to this memo for reference.

Sanitary Servicing

Sanitary servicing has not been extended to this site at this time. It is anticipated that sanitary servicing will connect into a sanitary main to be constructed in the unopened road allowance of Florence Street. The connection to the unconstructed main will likely be from the unopened segment of Adelaide St. and will require construction of a new sanitary main along Adelaide. A pump station may be required, or alternative routes could be reviewed during design.

Stormwater Management

Stormwater Management will require review by the designer. The outlet is most likely to be to the Almonte Municipal Drain. A review of the downstream effects on the drain will be required. Consultation with the MVCA should also occur.

Other Considerations

Extension of the roadway along Adelaide St. and water and sewer services may be beneficial to other development properties in the area. Considerations of cost sharing alternatives should be explored.

Cory Smith
A/Director of Roads and Public Works
Mississippi Mills
613 256-2064 ext. 229.



CORPORATION OF THE MUNICIPALITY OF MISSISSIPPI MILLS

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August 11, 2022

Julie Stewart, County Planner

jstewart@lanarkcounty.ca

**RE: PROPOSED MENZIES SUBDIVISION
PRECONSULTATION COMMENTS
FILE: TBD**

Please see attached the Planning and Engineering comments regarding the proposed Plan of Subdivision for the Menzie's lands (located at the southerly corner of the unopened road allowance of Adelaide Street and Menzie Road in Almonte). The following comments are based on the concept plan of subdivision submitted to the County for a formal pre-consultation meeting (attached).

Planning

1. Blocks 16 to 19 – the dwellings should be oriented towards Adelaide Street as opposed to Street B to provide activation of Adelaide Street.
2. Consider orienting Blocks 3 or 15 towards Adelaide Street
3. Sidewalks should be added to the Adelaide St right of way
4. The 18-metre cross section can be found in our Urban Design Guidelines
5. A concurrent Zoning By-law Amendment application will be required which reflects the proposed land uses.

Engineering

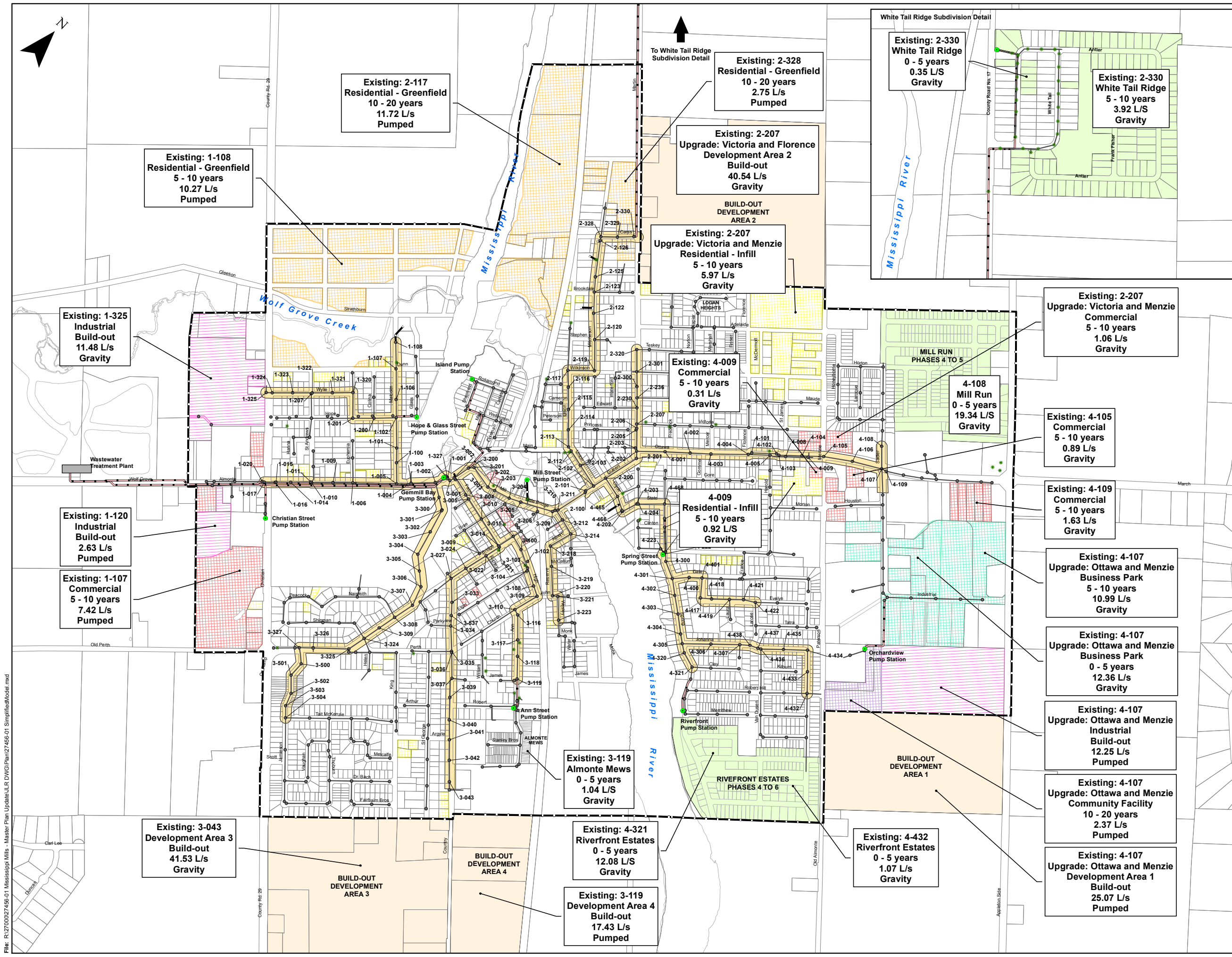
Please see attached the Servicing memo previously provided to the applicant. Public Works has been in direct contact with Novatech Engineering following the pre-consultation meeting and has provided the necessary engineering information.

I trust the above will assist you. If you have any further questions regarding this matter, please feel free to contact me at your convenience.

Respectfully yours,

Melanie Knight, MCIP, RPP
Senior Planner
Municipality of Mississippi Mills

Cc: Cory Smith, A/Director of Public Works



Infrastructure

- 4-102 Manhole ID
- Pumping Station
- Cleanout
- Sanitary Manhole
- Sanitary Sewer
- Private Foremain
- Foremain
- Sanitary Trunk Sewers

Land Use

- Almonte Ward Limits
- Existing Lots
- Future Lots
- Registered Subdivision
- Build Out
- Business Park (17.0 ha)
- Community Facility (3.1 ha)
- Commercial (15.6 ha)
- Industrial (24.1 ha)
- Residential - Greenfield (34.2 ha)
- Residential - Infill (16.0 ha)

Manhole ID

- Intersection
- Development Name or Type
- Development Timeline
- Estimated Park Flow
- Anticipated Future Trunk Servicing

No.	ISSUE / REVISION	DATE

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CLIENT:

CONSULTANT: **J.L. Richards**
ENGINEERS - ARCHITECTS - PLANNERS
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CONSULTANT:

PROFESSIONAL STAMP: [Blank]

PROJECT: **MUNICIPALITY OF MISSISSIPPI MILLS
ALMONTE WARD WATER AND
WASTEWATER INFRASTRUCTURE
MASTER PLAN UPDATE**
MISSISSIPPI MILLS, ONTARIO

DRAWING: **WASTEWATER HYDRAULIC MODEL
DEMAND ALLOCATION**

DESIGN: MB	DRAWING #:
DRAWN: KTK	
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FIGURE 25

File: R:\27000027456-01 Mississippi Mills - Master Plan Update\JLR DWG\Plan\27456-01 SimplifiedModel.mxd

PLOT DATE: January 5, 2018 10:32:24 AM