PROPOSED STACKED TOWNHOUSE

RESIDENTIAL DEVELOPMENT SITE

PART OF PARK LOT 12

R-PLAN 162

1258 MARENGER STREET

CITY OF OTTAWA

SERVICEABILITY REPORT

REPORT R-819-98A

T.L. MAK ENGINEERING CONSULTANTS LTD.

JUNE 2020

REFERENCE FILE NUMBER 819-98

Introduction

The developer of this property is proposing to redevelop the existing residential lot described as Park Lot 12 R-Plan 162 by constructing (2)-three storey stacked townhouses on site. There are (12) stacked townhouse units proposed in this project. The west building will have 8 units and the east building will have 4 units.

The municipal address of this property is 1258 Marenger Street and it is located in the City of Ottawa Ward #1. The site is situated on the west side of Marenger Street, south of Youville Drive and north of St. Joseph Boulevard. See site plan and legal survey plan in Appendix A for details.

Lot area size of this property is ±0.1417 hectares. In addition to the (2) stacked townhouse buildings, the other development features will comprise of a vehicle entranceway and exit at the front north half of the property, a (17) space parking lot is proposed along the north side of the site, bicycle parking, an amenity area at the rear (west) side of the lot, interlock walkway at the front of the townhouse units, landscaped areas throughout the site etc. to meet City of Ottawa's site plan requirements.

A geotechnical report was prepared by the owner's soils engineer Kollaard Associates entitled "Geotechnical Investigation" (Project No. 200083) dated February 2020.

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 property is currently occupied by a stucco clad bungalow residential building which is a one storey dwelling with an asphalt driveway entrance located along the south side of the property and a vehicle gravel parking area found to the rear of the existing house. For additional details of the site's pre-development condition, refer to the Google Image and aerial photography from (GeoOttawa - 2019) in Appendix B.

The site is mostly (±74%) grassed or soft landscaped covered. The remainder of site (±26%) is hard impermeable surfaces that consist of gravel, asphalt, concrete and roof areas.

Topography of the land is found to be generally sloping from south to north. The front portion of the existing property drains directly onto the Marenger Street road right of way.

The existing house water and service lateral(s) currently servicing the existing dwelling will be abandoned. The existing water service shall be blanked at the main and the existing house lateral(s) shall be capped at the front property line for re-development of this lot.

As for the availability of underground municipal services, there are existing municipal services along Marenger Street in front of this property consisting of a 300mm diameter storm sewer, 250mm diameter sanitary sewer and a 150mm diameter watermain for development of this property. Refer to the City of Ottawa Marenger Street "As-Built" plan and profile drawing included in Appendix C for details.

Proposed Residential Stacked Townhouse Building Site

Vehicle entranceway, access road and parking are required for development of this site. Interlock pavers are proposed at the front (north) side of the new buildings. An amenity area with garbage enclosure, bicycle parking, etc. are proposed at the rear (west side) of the lot which is located behind the west townhouse building.

A. Water Supply

Two new buildings (Building A and Building B) located at 1258 Marenger Street are proposed. The first building (Building A) will be a 3-storey, four unit stacked townhouse with a footprint area of 1,090 ft^2 (101 m^2) and the adjacent building (Building B) will be a 3-storey, eight unit stacked townhouse with a footprint area of 2,180 ft^2 (202 m^2). Each unit in both buildings will be a two-bedroom unit with 1.5 bathrooms. The finished basement units are at least 50% below ground elevation and not included in the fire flow calculation per the Fire Underwriters Survey (FUS) guidelines. The building is to be serviced by the existing 152mm diameter watermain along Marenger Street.

Demand Projections

The domestic demands were calculated using the City of Ottawa's Water Design Guidelines, where the residential consumption rate of 350 L/cap/d was used to estimate average day demands (AVDY). Maximum day (MXDY) demands were calculated by multiplying AVDY demands by a factor of 2.5. Peak hour (PKHR) demands were calculated by multiplying MXDY by a factor of 2.2. Persons per unit (PPU) for each unit were estimated based on the City of Ottawa's Water Design Guidelines. Table 1 shows the estimated domestic demands of the existing building.

Table 1: Estimated Domestic Demand

Floor	Unit Type	# of Units	PPU	AVDY		MXDY		PKHR	
				L/d	L/s	L/d	L/s	L/d	L/s
Upper Units	2-Bedroom	6	2.1	4,410	0.05	11,025	0.13	24,255	0.28
Lower Units	2-Bedroom	6		4,410	0.05	11,025	0.13	24,255	0.28
	Total	***12***		8,820	0.10	22,050	0.26	48,510	0.56

The fire flow required was determined following the Fire Underwriter Survey (FUS) method and is provided in the attached worksheet. The buildings are proposed to be constructed using ordinary construction methods. The buildings will not have a sprinkler system. The developer confirmed that the basement units would be more than 50% below ground level and therefore not included in the calculation. The resulting total required fire flow is 5,000 L/min (83 L/s) for a duration of 1.75 hours for Building A and 7,000 L/min (117 L/s) for a duration of 2.00 hours for Building B. Details are provided in the attached FUS Fire Flow Calculations and in Figure 1 of Appendix D.

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

- AVDY = 8,820 L/d (0.10 L/s);
- MXDY = 22,050 L/d (0.26 L/s);
- PKHR = 48,510 L/d (0.56 L/s); and,
- Fire Flow = 5,000 L/min (83 L/s) and 7,000L/min (117L/s).

Boundary Conditions

The following hydraulic gradeline (HGL) boundary conditions for 1258 Marenger, which is to be connected to the 152mm diameter watermain along Marenger St, were provided by the City on June 23, 2020 (see attached Water Boundary Conditions Email found in Appendix D):

- Minimum HGL = 110.6m (71 psi),
- Maximum HGL = 114.5m (76 psi); and,
- Max Day + Fire Flow (7,500L/min) = 79.7m (27 psi).

The ground elevation at this location is approximately 60.8m.

Hydraulics Analysis

Peak Hour & Average Day

During peak hour demands, the resulting minimum hydraulic gradeline of 110.6 m corresponds to a peak hour pressure of 488 kPa (71 psi) (see attached Supporting Hydraulic Calculations in Appendix D for details). This value is above the minimum pressure objective of 276 kPa (40 psi).

During average day demands, the resulting maximum hydraulic gradeline of 114.5m corresponds to a maximum pressure of 526 kPa (76 psi). This value is less than the maximum pressure objective of 552 kPa (80 psi).

Maximum Day + Fire Flow

A MXDY+FF (7,500L/min) HGL of 79.7 m corresponds to a residual pressure of 185 kPa (27 psi) at this location and is above the minimum residual pressure requirement of 140 kPa (20 psi).

Based on Table 1 of Appendix I of the City of Ottawa Technical Bulletin ISTB-2018-02 and a desktop review (i.e. Google Street View) to confirm hydrant class, the combined hydrant flow coverages for the buildings are estimated to be 7,570 L/min and 11,400L/min which exceeds the FUS required fire flow (RFF) of 5,000 L/min and 7,000L/min respectively for Buildings A & B. It is noted that hydrant flow coverages are limited to the available flow per the City's Boundary Condition. Hydrant coverage and classes are illustrated in Figure 2 attached in Appendix D. A breakdown of available hydrant flow is summarized in Table 2.

Table 2: Fire Hydrant Coverage

Building	Calculated FUS Fire Flow Demand (L/min)	Available Fire Flow from City Boundary Conditions (L/min)	Fire Hydrants					Combined Hydrant Flow Coverage (L/min)*
			Hydrant Class	Within 75 m		Between 75 m and 150 m		
				Quantity	Contrib. to RFF	Quantity	Contrib. to RFF	
1258 Marenger St. Bldg A	5,000	7,500	AA	2	5,700			11,400
			A					
			B					
1258 Marenger St. Bldg B	7,000	7,500	AA			2	3,785	7,570
			A					
			B					

**Ultimate hydrant flow coverage is limited to available fire flow per the City's Boundary Condition.*

Conclusions

In conclusion, based on the boundary conditions provided, the 152mm diameter watermain along Marenger Street provides adequate fire flow capacity as per the Fire Underwriters Survey, as well as anticipated demand flows within the pressure objectives during peak demand and basic demand conditions as per the City of Ottawa's Drinking Water Design Guidelines.

B. Sanitary Flow

The peak sanitary flow for the 12 units, which comprised of twelve (12)-bedroom unit is estimated at Q = 0.46L/s with an infiltration rate of 0.04L/s. Refer to Appendix E regarding sanitary flow calculations. This flow will enter the existing 250mm diameter sanitary sewer pipe from the site via a proposed site sanitary sewer system consisting of (2) manholes and approximately 50.0m of 200mm diameter PVC sanitary pipe.

From the owner's building designer and the building design plans which confirms that peak waste water flow from water usage is typical for a stack townhouse building of this size. No additional amenities are proposed.

The existing peak sanitary flow of the site for a single detached dwelling unit is Q = 0.09L/s with an infiltration rate of 0.04L/s. The net increase in flow from this proposed development is 0.37L/s which is not expected to negatively impact the existing 250mm diameter Marenger Street sanitary sewer.

Waste water from the Marenger Street 250mm diameter sanitary sewer then in turn eventually outlets into the existing 525mm diameter concrete sanitary collector sewer located north of this site at Grey Nuns Drive.

C. Storm Flow

The storm water outlet for the proposed development property will be the existing 300mm storm sewer located on Marenger Street. Storm water attenuation on site will be accomplished by means of parking lot surface storage and underground drainage piping and drainage structure storage with a specified inlet control device (ICD) in CB/MH#1 that will regulate flow off-site.

The building foundation weeping tile drainage system will outlet into a separately designed 200mm diameter storm piping system that will be wyed and outletted into the proposed 300mm diameter outlet storm pipe from this site.

Based on the residential site plan from the owner's architect, the average post-development runoff coefficient is estimated at C = 0.67 and A = 0.142 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 valve exceeds the lesser of the C_{pre} = 0.37 or C_{allow} = 0.4 (max) then SWM is required. So from our calculations, the C_{pre} = 0.37 will be used at t_c = 10 minutes for pre-developement allowable flow off-site.

The pre-development flow rate calculation into a storm sewer for this residential area is the lesser of the five (5)-year storm event where C_{allow} = 0.4(max) runoff value and t_c = 10 minutes or the average C_{pre} value which is 0.37 using t_c = 10 minutes. Because this site C_{post} = 0.67 and C_{pre} = 0.37 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 0.67 is greater than the C_{pre} = 0.37.

The storage volume for the five (5)-year and up to the 100-year storm event will be stored by means of parking lot surface storage, underground drainage structure and piping storage. Also refer to the site storm drainage report (Report No. R-819-98) for further details.

To control the five (5)-year storm-water release rate off site to an allowable rate of 15.22L/s, a site storage volume of approximately 13.14m^3 minimum is required during the five (5)-year event.

The calculated site storage volume of 13.14 m^3 minimum is required from the site development area for the five (5)-year storm event. The estimated HWL of 58.85m will provide a total available storage volume of 16.44 m^3 consisting of parking lot and roadway surface ponding together with the proposed parking lot underground storm pipes and drainage structures. In total, the five (5)-year available site storage volume is approximately 16.44 m^3, which is greater than the required site storage volume of 13.14 m^3. See Appendix E for details.

To control the (100-year + 20.0%) storm-water release rate off site to an allowable rate of 15.22L/s, a site storage volume of approximately 35.95 m^3 minimum is required during the 100-year event.

The calculated site storage volume of 35.95m^3 minimum is required from the site development area for the (100-year + 20.0%) storm event. The estimated HWL of 58.95m will provide a total available storage volume of 45.19m^3 consisting of the parking-lot and roadway surface ponding together with the proposed parking-lot underground storm pipes and drainage structures. In total, the 100-year available site storage volume is 45.19 m^3, which is greater than the required site storage volume of 35.95 m^3. See Appendix E for details.

Therefore, by means of grading the site to the proposed grades and constructing the proposed underground storm piping and drainage structures as shown on the Proposed Site Grading Plan Dwg. 819-98 G-1 and Site Servicing Plan Dwg. 819-98 S-1 respectively, the desirable five (5)-year and (100+20.0%)-year storm event detention volume of 16.44 m^3 and 45.19 m^3 respectively will be available on site, as detailed on the Proposed Site Grading Plan Dwg. 819-98 G-1.

An inlet control device (ICD) will be installed at the outlet of CB/MH1 in the 300 mm diameter storm pipe (outlet pipe) with Q=15.22 L/s under a head of 2.28m. The ICD type recommended is a Hydrovex Regulator (125 VHV-2) or equivalent. See Appendix F for ICD details.

The building weeping tile drainage will be outletted via a proposed 200mm diameter PVC storm pipe system which is proposed to WYE into the proposed 300mm diameter PVC site outlet storm sewer where the wye connection is located downstream of stormceptor EF-04. The townhouse building 100mm diameter PVC storm lateral will be connected directly into this separate storm pipe system to avoid potential surcharging storm water into the building. Refer to Dwg. 819-98 S-1 for details.

To achieve a minimum of 80 percent TSS removal, a Stormceptor structure (Model EF-04) is proposed to be installed for the site development of this property. This structure shall be located downstream of the proposed CB/MH1, which houses the site's inlet control device (ICD). Based on the Stormceptor system that is proposed for this site, area of the lot, and impervious ratio, a greater than 80 percent TSS removal is estimated for all rainfall events including large storms.

Water Quality

Storm water quality treatment is required for this proposed development.

For this site, based on the City of Ottawa's drainage criteria and on recommendations set out by Rideau Valley Conservation Authority (RVCA), water quality treatment for 80 percent (min.) removal of total suspended solids (TSS) is required for redevelopment of this property. See (Appendix D) regarding RVCA's pre-consultation comments for water quality requirements.

The said property is in the watershed area where the existing 300mm diameter storm sewer fronting on 1258 Marenger Street outlets to a water course where no municipal treatment for water quality is provided. Therefore, a Stormceptor system is proposed to support the water quality improvement objective. Stormceptor (Model EF-04) was selected to provide the water quality objective removal of TSS at a level above 80 percent, which is above the minimum requirement of 80 percent TSS removal. In addition to TSS removal, the Stormceptor system is also an oil and sediment separator. Refer to the Storm Drainage Report (Report No. R-819-98)

Appendix D for the RVCA's pre-consultation comments and Stormceptor sizing details from the manufacturer.

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 Marenger Street road right of way adjacent to this property. Siltsack shall be inspected every 2 to 3 weeks and after every major storm. The deposits will be disposed of as per the requirements of the contract. See Dwg. #819-98 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 STACKED TOWNHOUSE

RESIDENTIAL DEVELOPMENT SITE

R-PLAN 162

1258 MARENGER STREET

CITY OF OTTAWA

APPENDIX A

SITE PLAN AND LEGAL SURVEY PLAN

SITE & PROJECT STATISTICS

GENERAL INFORMATION	
Zoning	R4Z
Min. Lot Area	450m²
Max. Building Height	15m
Min. Front Yard	3m
Min. Rear Yard	1.5m
Min. Int. Side Yard	1.5m

PROJECT STATISTICS	
Lot Area	311.2m²
Building Height	xm
Front Yard	3m
Rear Yard	6m
Int. Side Yard	1.5m
	8.0m at 21m
Number of Proposed Units	12 units
Existing Units on Site	1 Units
Total Number of Units	12 Units

PARKING CALCULATION
As per Section 101

Parking Space Rate Area	Area C
Residential Units	12 units
Required Parking *1.2 spaces/unit for 12 units - Table 101*	14 spaces
Resident Parking Provided	15 spaces

VISITOR PARKING CALCULATION
As per Section 112

Parking Space Rate Area	Area C
Required Visitor Parking *0.2 spaces/unit for 12 units - Table 102*	2 spaces
Visitor Parking Provided	2 spaces
Total Parking Required	16 spaces
Total Parking Provided	17 spaces

BICYCLE PARKING CALCULATION
As per Table 111A

Dwelling Units	12 units
Required Parking *0.5sp/unit for 12 units(111A(b)(i))*	6 spaces
Total Parking Provided	6 spaces

AMENITY AREA CALCULATION
As per Table 137

Total Amenity Area Req'd *Does not apply to building with less than 9 units - 137 (1)*	N/A

3 SP-01 ZONING
SCALE: 1 : 1

TOPOGRAPHIC PLAN OF SURVEY OF
PART OF LOTS 12
REGISTERED PLAN 142
CITY OF OTTAWA

ANNIS, O'SULLIVAN, VOLLEBEKK LTD... APPENTASE DUTRISAC SURVEYING INC. 2019

SURVEY INFO
SCALE: NTS

SITE PLAN SYMBOLS LEGEND

- BUILDING ENTRANCE
- BOARD FENCE
- EXISTING ELEVATION
- BICYCLE PARKING
- UTILITY POLE

SYMBOLS LEGEND
SCALE: NTS

1. WINDOW WELL
2. ENTRANCE STAIR
3. CONCRETE SIDEWALK
4. BALCONY
5. PRIVACY SCREEN
6. INTERLOCKING STONE
7. LANDSCAPE STONE RETAINING WALL

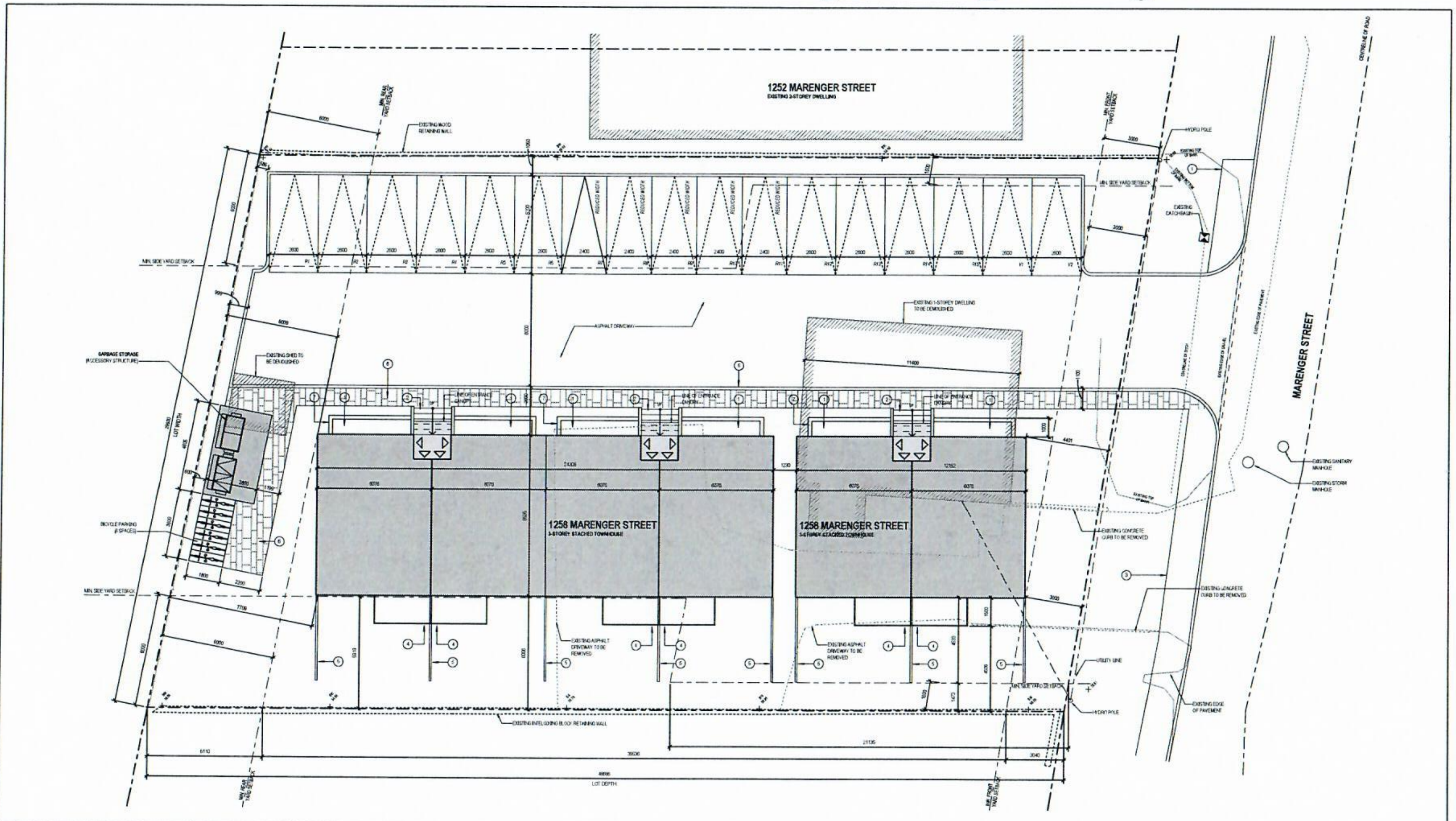
KEYNOTE LEGEND
SCALE: 1 : 1

2 SP-01 LOCATION PLAN
SCALE: 1 : 1

GENERAL ARCHITECTURAL NOTES:

1. This drawing is the property of the Architect and may not be reproduced or used without the expressed consent of the Architect.
2. Drawings are not to be scaled. The Contractor is responsible for checking and verifying all levels and dimensions and shall report all discrepancies to the Architect and obtain clarification prior to commencing work.
3. Upon notice in writing, the Architect will provide written/graphic clarification or supplementary information regarding the intent of the Contract Documents.
4. The Architectural drawings are to be read in conjunction with all other Contract Documents including Project Manuals and the Structural, Mechanical and Electrical Drawings.
5. Positions of exposed or finished Mechanical or Electrical devices, fittings and fixtures are indicated on the Architectural Drawings. Locations shown on the Architectural Drawings shall govern over Mechanical and Electrical Drawings. Mechanical and Electrical items not clearly located will be located as directed by the Architect.
6. These documents are not to be used for construction unless specifically noted for such purpose.

PRINTED: YYYY.MM.DD



1 SP-01 SITE PLAN
SCALE: 1 : 100

1 ISSUED FOR COORDINATION	20-02-26

ISSUE RECORD

project1 studio
Project1 Studio Incorporated

1258 Marenger St.

1258 Marenger Street
Ottawa, ON

PROJ	SCALE	DRAWN	REVIEWED
1929	NOTED	SB	RMK

SITE PLAN

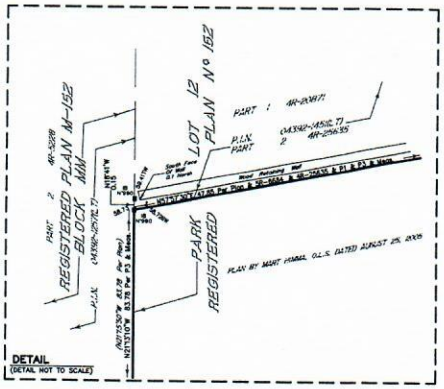
SP-01

INDEX : OTT-162-12-11

TOPOGRAPHIC SURVEY OF PART OF PARK LOT 12 REGISTERED PLAN N° 162 CITY OF OTTAWA 2019

SURVEYED BY: ARPENTAGE DUTRISAC SURVEYING INC.
SCALE 1 : 200

0 2 4 6 8 10 15 Metres



METRIC

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

NOTES

1) BUILDING TIES SHOWN HEREON ARE PERPENDICULAR TO PROPERTY LINE UNLESS OTHERWISE NOTED.
2) ADDITIONAL PRINTS OF THIS REPORT WILL NOT BE ISSUED WITHOUT UPDATING THE LAND REGISTRY OFFICE SEARCH, INSPECTING THE SITE, AND REVISING THE PLAN AND REPORT ACCORDINGLY.
3) ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE DERIVED FROM CONTROL MONUMENT 00119530185, IT HAVING AN ELEVATION OF 54.99 METRES.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:
1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT, AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON THE 14th DAY OF NOVEMBER, 2019

15th NOVEMBER, 2019
DATE

DENIS DUTRISAC
ONTARIO LAND SURVEYOR
ROCKLAND, ONTARIO

LEGEND

■	DENOTES	SURVEY MONUMENT FOUND
□	DENOTES	SURVEY MONUMENT PLANTED
SIB	DENOTES	STANDARD IRON BAR (25mm X 120cm)
IB	DENOTES	IRON BAR (16mm X 80cm)
SSIB	DENOTES	SHORT STANDARD IRON BAR (25mm X 80cm)
SU	DENOTES	SOURCE UNKNOWN
WIT.	DENOTES	WITNESS
TW	DENOTES	TOP OF WALL
BW	DENOTES	BOTTOM OF WALL
Meas.	DENOTES	MEASURED
P.I.N.	DENOTES	PARCEL IDENTIFICATION NUMBER
Plan	DENOTES	PLAN 4R-20971
P1	DENOTES	PLAN BY M. HAMAL O.L.S. DATED AUGUST 25TH, 2005
P2	DENOTES	CONDOMINIUM PLAN N° 834
P3	DENOTES	TOPOGRAPHIC PLAN BY DENIS DUTRISAC, O.L.S. DATED DECEMBER 21ST, 2011
O.L.S.	DENOTES	ONTARIO LAND SURVEYOR
INST. N°	DENOTES	INSTRUMENT NUMBER
CON.	DENOTES	CONCESSION
N° 647	DENOTES	H.R. FARLEY, O.L.S.
N° 990	DENOTES	J.G. PAYETTE, O.L.S.
N° 1491	DENOTES	DENIS DUTRISAC, O.L.S.

REFERENCE BEARING:

BEARINGS ARE ASTRONOMIC AND ARE REFERRED TO THE SOUTHERLY LIMIT OF PART 1 PLAN 4R-25635, IT HAVING A BEARING OF N57°57'30"E.

ARPENTAGE DUTRISAC SURVEYING INC.
ONTARIO LAND SURVEYORS
ROCKLAND
PHONE: (613) 446-7101
FAX: (613) 446-7162

PROPOSED STACKED TOWNHOUSE

RESIDENTIAL DEVELOPMENT SITE

R-PLAN 162

1258 MARENGER STREET

CITY OF OTTAWA

APPENDIX B

SITE PRE-DEVELOPMENT CONDITION

GOOGLE IMAGE (2019)

AND

AERIAL PHOTOGRAPHY 2015 (GEOOTTAWA)


1238
1259
1265
1267
1252
1250
1258
1943
1939
1921
rue Marenger St.
boul. St-Joseph Blvd.
1934

2015

2015

2019

PROPOSED STACKED TOWNHOUSE

RESIDENTIAL DEVELOPMENT SITE

R-PLAN 162

1258 MARENGER STREET

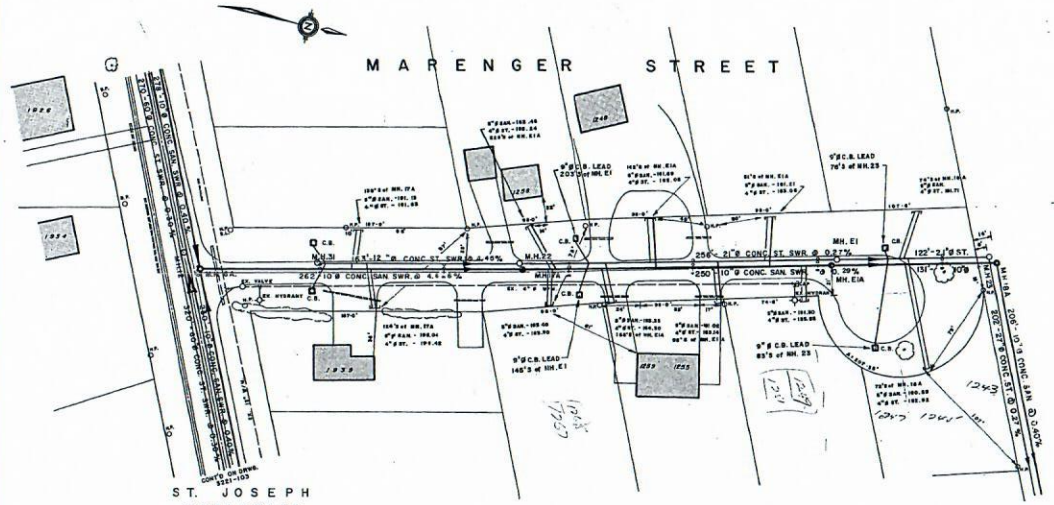
CITY OF OTTAWA

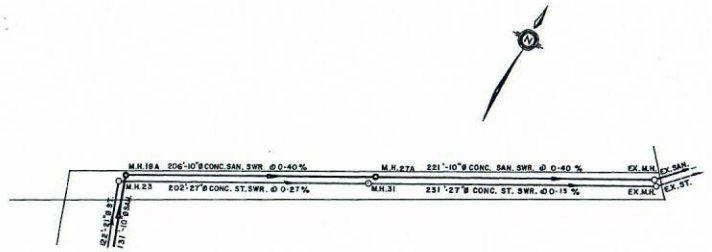
APPENDIX C

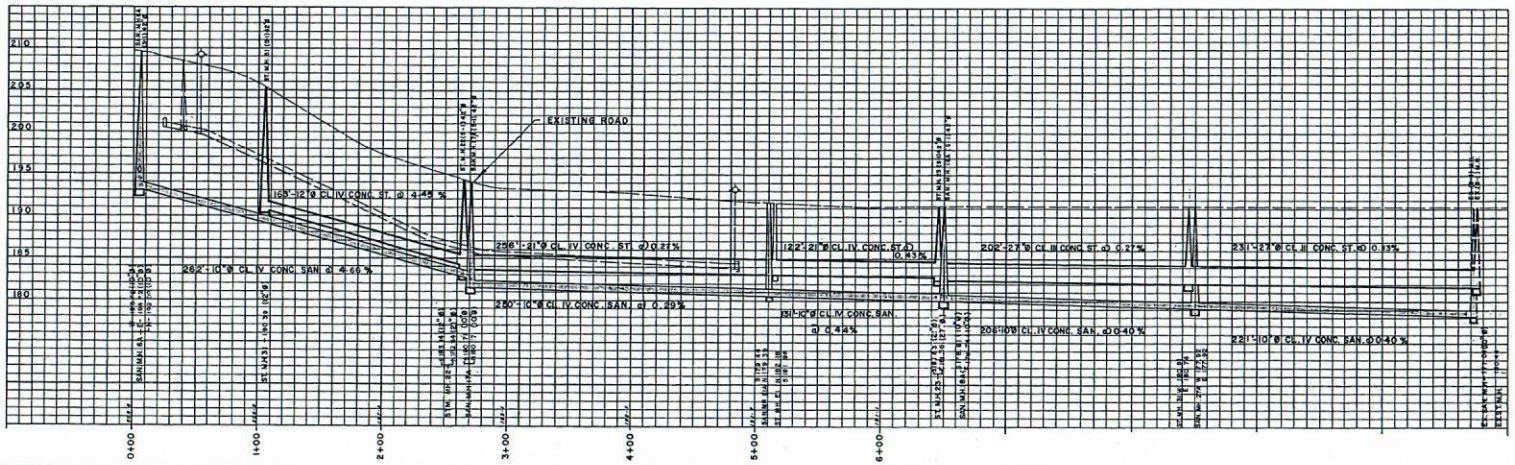
MARENGER STREET

PLAN AND PROFILE "AS-BUILT"

WATERMAIN AND SEWERS







STANDARD NOTES

1. ALL CONCRETE PIPE TO BE EQUAL TO A.S.T.M. SPECIFICATION C-76-73 CLASS III OR LATEST AMENDMENT, UNLESS OTHERWISE NOTED.
2. ALL ASBESTOS CEMENT PIPE SHALL BE EQUAL TO A.S.T.M. SPECIFICATION C-428-67 T CLASS 3500, OR LATEST AMENDMENT, UNLESS OTHERWISE NOTED.
3. ALL VITRIFIED CLAY PIPE TO BE EQUAL TO C.S.A. SPECIFICATION A-60.1 AND A-60.3 E.S. OR LATEST AMENDMENT, UNLESS OTHERWISE NOTED.
4. ALL MANHOLES SHALL CORRESPOND TO TOWNSHIP OF GLOUCESTER STANDARD S-1 FOR PIPE SIZES UP TO 42"Ø, UNLESS OTHERWISE NOTED. ALL MANHOLES SHALL BE CONSTRUCTED WITHOUT SUMPS.
5. ALL STORM AND SANITARY SEWER MAINS, HOUSE CONNECTIONS, MANHOLES, AND CATCHBASIN LEADS SHALL BE FITTED WITH APPROVED RUBBER GASKET JOINTS, UNLESS OTHERWISE NOTED.
6. ALL STORM AND SANITARY SEWER LATERALS TO HAVE 100% MINIMUM GRADE. THE LOCATION OF ALL LATERALS AT THE LOT LINE SHALL BE MARKED BY A 4"x 4"x 8' POST. THESE POSTS ARE TO BE PLACED WITH 4 FEET PROTRUDING FROM THE EXISTING GROUND.
7. UNLESS OTHERWISE NOTED, WATER, STORM AND SANITARY SEWER CONNECTIONS SHALL BE MADE IN COMMON TRENCH TO THE CENTRE LINE OF THE FRONTAGE OF EACH LOT.
8. ALL MANHOLES, VALVE CHAMBERS AND CATCH-BASINS SHALL BE FITTED WITH AN APPROVED POLYETHYLENE "GRAVEL CATCH" IMMEDIATELY FOLLOWING PRELIMINARY INSPECTION OF THE SEWERS AND PRIOR TO THE START OF ANY ROADWORK.
9. ALL WATERMAINS SHALL BE INSTALLED WITH 7'-0" OF COVER EXCEPT WHERE NOTED ON THE DRAWINGS.
10. Y — SEMI-DETACHED SERVICE
    I — SINGLE FAMILY SERVICE
11. THE LOCATION OF UTILITIES IS APPROXIMATE ONLY, AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL CONFIRM THE LOCATION OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION FROM DAMAGE DURING CONSTRUCTION.

NO	REVISIONS	DATE	INITIAL
2	AS BUILT	FEB/79	K.H.
1	REVISE SWR LENGTHS ST. JOSEPH BLVD	FEB/78	R.H.T.

TOWNSHIP OF GLOUCESTER
ENGINEERING DEPARTMENT

MARENGER STREET
STA. 0+00 TO STA. 6+00

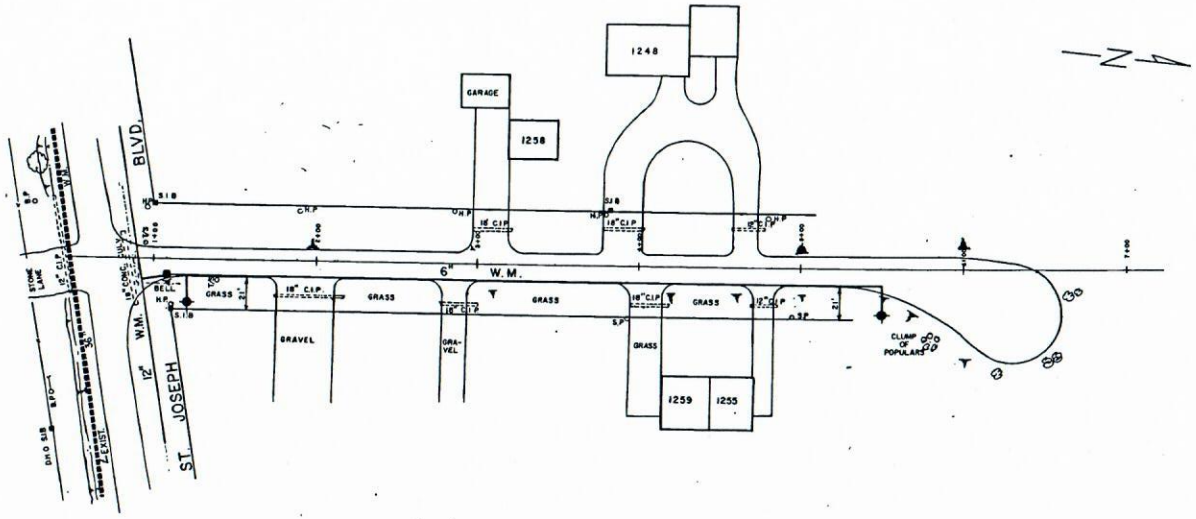
CUMMING – COCKBURN & ASSOCIATES LIMITED
CONSULTING MUNICIPAL ENGINEERS
WATERLOO - TORONTO - OTTAWA

L.B. BRADLEY

SCALE	HORIZ. 1"= 40' VERT. 1"= 8'
DRAWN BY	R.H.T.
CHECKED	D.W.
DATE	JUNE 77
FIELD BOOK	
DRWG. No.	3221-107

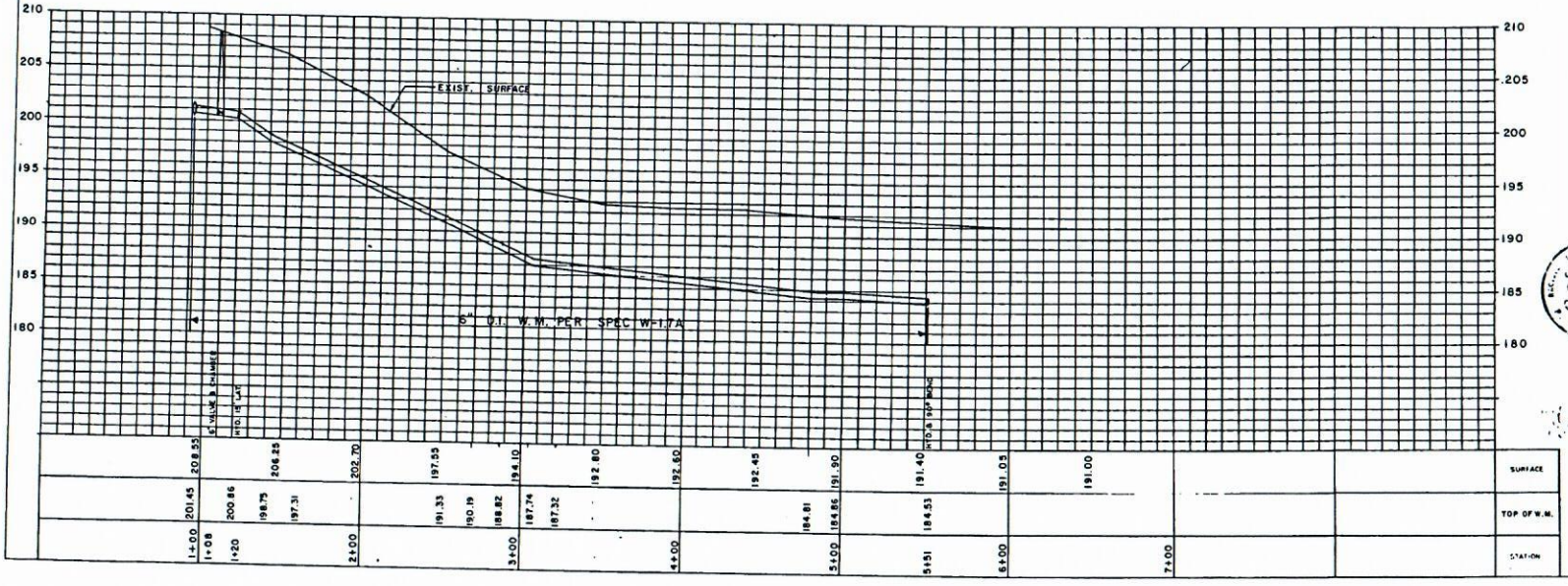
VE01-AO4-101 E8474

MARENGER ST.



NOTES

1. ALL UNDERGROUND UTILITIES ARE APPROXIMATE. CONTRACTOR IS REQUIRED TO NOTIFY THE UTILITY COMPANIES BEFORE EXCAVATING.



STATION	TOP OF W.M.	SURFACE
1+00	201.45	208.55
1+08		
1+20	200.86	206.25
	198.75	
	197.31	
2+00		202.70
		197.55
	191.33	
	190.19	
	188.82	
3+00		194.10
	187.74	
	187.32	
		192.80
4+00		192.60
		192.45
	184.81	
5+00	184.86	191.90
		191.40
5+51	184.53	
		191.05
6+00		191.00
7+00		

DATE	REVISIONS	DRN	APPR
NOV. 21/77	W.M. AS BUILT FROM BOOK 412	S.P.B.	

HOR. 0 20 40 60 80 100 120 FEET
VER. 0 3 6 9 12 FEET

REGIONAL MUNICIPALITY OF OTTAWA - CARLETON
WORKS DEPARTMENT

MARENGER ST.

FROM ST. JOSEPH BLVD. TO ± 450' NORTH

6" W.M.

W.L. KEAY	F.E. AYERS	4/5/77	SH. 3 of 4

6523

PROPOSED STACKED TOWNHOUSE

RESIDENTIAL DEVELOPMENT SITE

R-PLAN 162

1258 MARENGER STREET

CITY OF OTTAWA

APPENDIX D

CITY OF OTTAWA

- **WATER DATA BOUNDARY CONDITIONS**
- **FUS CALCULATIONS**
- **SUPPORTING HYDRAULIC CALCULATIONS**
- **FUS EXPOSURE DISTANCE FIGURE**
- **GEOOTTAWA MAP (CONFIRMING HYDRANT CLASS)**

TL MaK

From: Mashaie, Sara [sara.mashaie@ottawa.ca]
Sent: June 23, 2020 4:13 PM
To: TL MaK
Cc: 'Service - My Revelstoke Home'; Curry, William; 'Rocco - My Revelstoke Home'
Subject: RE: 1258 Marenger Street Water Boundary Conditions
Attachments: 1258 Marenger Street_Boundary Conditions_22June2020.docx

Hi Tony,

Please find attached the boundary conditions. The comment below was provided by our water modelling team:

The existing 152 DI dead-end watermain can only provide +/- 7,500 l/min of fire flow (refer to results shown for scenario 1). The required fire flow of 13,000 l/min can be achieved if the watermain is upgraded to a 203 mm (refer to results shown for scenario 2).

Regards,

Sara Mashaie, P.Eng., ing.
Project Manager | Gestionnaire de Projet
Development Review, East Branch | Examen des projets d'aménagement, Secteur est
Planning, Infrastructure and Economic Development Department | Services de la planification, de l'infrastructure et du développement économique
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West. Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 27885, sara.mashaie@ottawa.ca

From: Mashaie, Sara
Sent: June 16, 2020 3:53 PM
To: TL MaK <tlmakecl@bellnet.ca>
Cc: 'Service - My Revelstoke Home' <service@myrevelstokehome.com>; Curry, William <William.Curry@ottawa.ca>; 'Rocco - My Revelstoke Home' <rocco@myrevelstokehome.com>
Subject: RE: 1258 Marenger Street Water Boundary Conditions

Hi Tony,

I have checked in with our water modelling team, and they have informed me that they will provide a response next week.

Regards,

Sara Mashaie, P.Eng., ing.
Project Manager | Gestionnaire de Projet
Development Review, East Branch | Examen des projets d'aménagement, Secteur est
Planning, Infrastructure and Economic Development Department | Services de la planification, de l'infrastructure et du développement économique

City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West. Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 27885, sara.mashaie@ottawa.ca

From: TL MaK <tlmakecl@bellnet.ca>
Sent: June 16, 2020 3:11 PM
To: Mashaie, Sara <sara.mashaie@ottawa.ca>
Cc: 'Service - My Revelstoke Home' <service@myrevelstokehome.com>; Curry, William <William.Curry@ottawa.ca>; 'Rocco - My Revelstoke Home' <rocco@myrevelstokehome.com>
Subject: RE: 1258 Marenger Street Water Boundary Conditions

Hi Sara,

We are following up on our e-mail of June 4, 2020 regarding the water boundary conditions.

Could you please contact the City's modeling team to see if they have any information for our 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: Mashaie, Sara [mailto:sara.mashaie@ottawa.ca]
Sent: June 4, 2020 10:57 AM
To: TL MaK
Cc: Service - My Revelstoke Home; Curry, William
Subject: RE: 1258 Marenger Street Water Boundary Conditions

Hi Tony,

Thank you for your email. I have forwarded your request to our modelling team.

Please note that Will Curry (in c.c. of the email) is the Project Manager on this file. The boundary conditions will be sent to your attention once received.

Regards,

Sara Mashaie, P.Eng., ing.
Project Manager | Gestionnaire de Projet

Development Review, East Branch | Examen des projets d'aménagement, Secteur est
Planning, Infrastructure and Economic Development Department | Services de la planification, de l'infrastructure et du développement économique
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West. Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 27885, sara.mashaie@ottawa.ca

From: TL MaK <tlmakecl@bellnet.ca>
Sent: June 04, 2020 10:34 AM
To: Mashaie, Sara <sara.mashaie@ottawa.ca>
Cc: 'Service - My Revelstoke Home' <service@myrevelstokehome.com>
Subject: 1258 Marenger Street Water Boundary Conditions

Hi Sara,

We are the Civil Engineers for this project. Presently we are requesting the City for water boundary conditions for our project at 1258 Marenger Street.

Two new buildings located at 1258 Marenger Street are proposed. The first building is a 3 storey, eight unit stacked townhome and the adjacent building will be a 3-storey, four unit stacked townhome. Each unit will be a two bedroom unit with 1.5 bathrooms. The finished basement units are considered to be above 50% above ground elevation and included in the fire flow calculation.

The distance between the two buildings (1.2m) and the proposed construction material is wood frame, therefore; the fire flow is calculated for the both buildings as a whole per the fire Underwriters Survey (FUS) requirement.

In the east building, each floor covers an area of 1,090 ft^2 (101.3 m^2) for a gross floor area of 4,360 ft^2 (405.0 m^2). In the west building, each floor covers an area of 2,180 ft2 (202.5 m2) for a gross floor area of 4,360 ft2 (810.1 m2).

The building is to be serviced by the 150mm diameter watermain along Marenger St.

The domestic demands were calculated using the City of Ottawa's Water Design Guidelines, where the residential consumption rate of 350 L/cap/d was used to estimate average day demands (AVDY). Maximum day (MXDY) demands were calculated by multiplying AVDY demands by a factor of 2.5. Peak hour (PKHR) demands were calculated by multiplying MXDY by a factor of 2.2. Persons per unit (PPU) for each unit were estimated based on the City of Ottawa's Water Design Guidelines. **Table 1** shows the estimated domestic demands of the existing building.

Table 1: Estimated Domestic Demand

Floor	Unit Type	# of Units	PPU	AVDY		MXDY		PKHR	
				L/d	L/s	L/d	L/s	L/d	L/s
Upper Units (3&4)	2-Bedroom	6	2.1	4,410	0.05	11,025	0.13	24,255	0.28
Lower Units (1&1)	2-Bedroom	6		4,410	0.05	11,025	0.13	24,255	0.28
	Total	***4***		8,820	0.10	22,050	0.26	48,510	0.56

The fire flow required was determined following the Fire Underwriter Survey (FUS) method and is provided in the attached worksheet. The buildings are proposed to be constructed of woodframe materials. The building will not have a sprinkler system. It was assumed that the basement is more than 50% above ground level and is included in the calculation. The resulting total required fire flow is 13,000 L/min (217 L/s) for a duration of 2.75 hours.

In summary:

- AVDY = 8,820 L/d (0.10 L/s);
- MXDY = 22,050 L/d (0.26 L/s);
- PKHR = 48,510 L/d (0.56 L/s); and,
- Fire Flow = 13,000 L/min (217 L/s).

The City is requested to provide boundary conditions for the Average Day, Maximum Day, Peak Hour and Fire Flow conditions indicated above.

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

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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This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

Le présent courriel a été expédié par le système de courriels de la Ville d'Ottawa. Toute distribution, utilisation ou reproduction du courriel ou des renseignements qui s'y trouvent par une personne autre que son destinataire prévu est interdite. Je vous remercie de votre collaboration.

'

Boundary Conditions
1258 Marenger Street

Provided Information

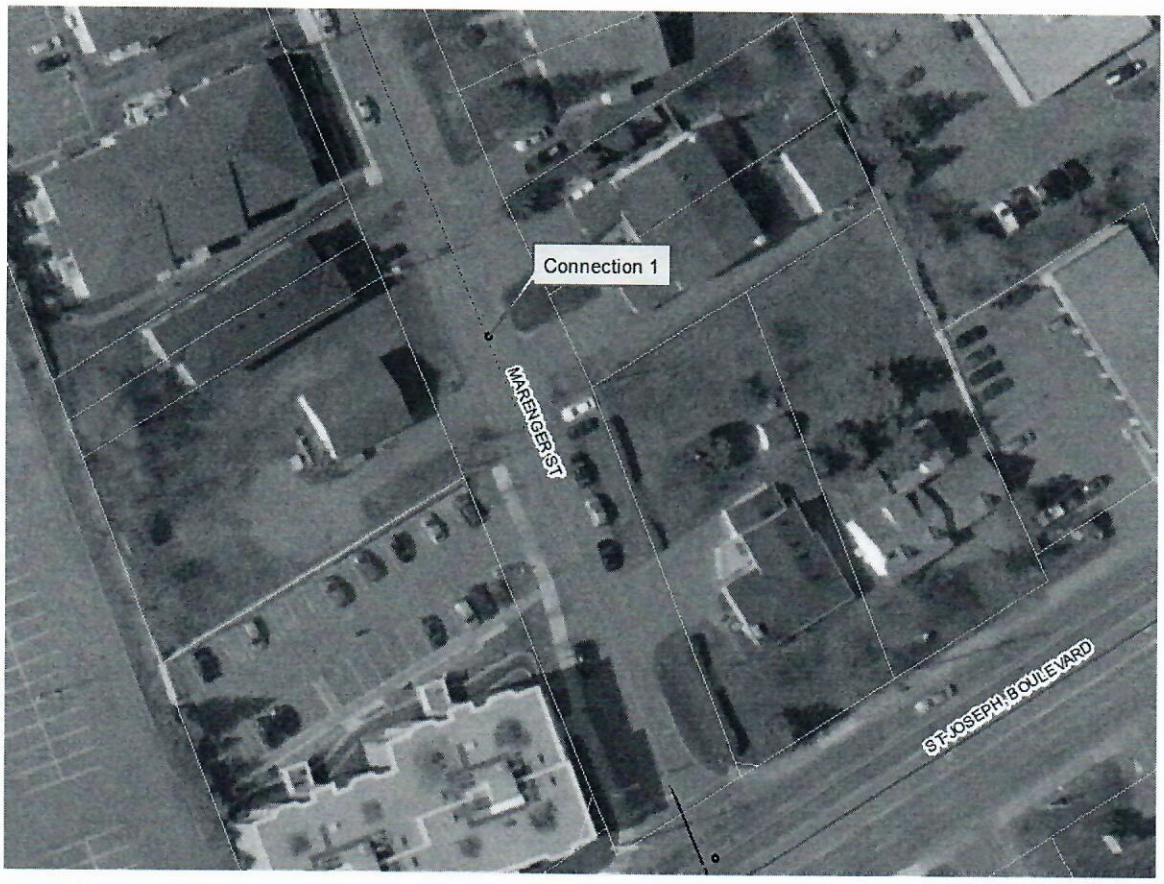
Scenario 1*	Demand	
	L/min	L/s
Average Daily Demand	6	0.10
Maximum Daily Demand	16	0.26
Peak Hour	34	0.56
Fire Flow Demand #1	7,500	125.00
Fire Flow Demand #2	13,000	217.00

* Using existing 150mm pipe

Scenario 2*	Demand	
	L/min	L/s
Average Daily Demand	6	0.10
Maximum Daily Demand	16	0.26
Peak Hour	34	0.56
Fire Flow Demand #1	10,000	167.00
Fire Flow Demand #2	13,000	217.00

* Upgrading existing pipe to 200mm

Location



Results: Scenario 1

Connection 1 –Merenger St.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	114.5	76.2
Peak Hour	110.6	70.8
Max Day plus Fire 1	79.7	26.9
Max Day plus Fire 2	20.9	-56.8

[1] Ground Elevation = 60.8 m

Results: Scenario 2

Connection 1 –Merenger St.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	114.5	76.2
Peak Hour	110.6	70.8
Max Day plus Fire 1	97.5	52.2
Max Day plus Fire 2	87.9	38.4

[1] Ground Elevation = 60.8 m

Notes:

1. A second watermain connection is required to decrease vulnerability of the water system in case of breaks.

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. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

Stantec

FUS Fire Flow Calculation

Calculations based on: "*Water Supply for Public Fire Protection*" by Fire Underwriters' Survey, 1999

Stantec Project #: 163401084
Project Name: 1258 Marenger
Date: August 6, 2020
Data inputted by: Kevin Alemany, M.A.Sc., P.Eng.
Data reviewed by: Jasmin Sidhu, P.Eng.

Fire Flow Calculation #: Building A
Building Type/Description/Name: Apartment building

Notes:

Table A: 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	**Framing Material**						
		Coefficient related to type of construction (C)	Wood Frame	1.5	Ordinary construction	1	m	
			Ordinary construction	1				
			Non-combustible construction	0.8				
			Fire resistive construction (< 2 hrs)	0.7				
			Fire resistive construction (> 2 hrs)	0.6				
2	Choose Type of Housing (if TH, Enter Number of Units Per TH Block)	**Floor Space Area**						
		Type of Housing	Single Family	1	Other (Comm, Ind, Apt etc.)	4	Units	
			Townhouse - indicate # of units	1				
			Other (Comm, Ind, Apt etc.)	4				
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 total floor area of all floors (non-fire resistive construction):			1,090	304	Area in Square Meters (m^2)	
					Square Feet (ft2)			
4	Obtain Required Fire Flow without Reductions	Required Fire Flow (without reductions or increases per FUS) ($F = 220 * C * \sqrt{A}$) Round to nearest 1,000 L/min						4,000
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	3,400
			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 Separation Distance Between Units	Exposure Distance Between Units	North Side	3.1 to 10.0m	0.2	0.6	m	2,040
			East Side	30.1 to 45.0m	0.05			
			South Side	20.1 to 30.1m	0.1			
			West Side	0 to 3.0m	0.25			
6	Obtain Required Fire Flow, Duration & Volume	*Total Required Fire Flow, rounded to nearest 1,000 L/min, with max/min limits applied:*						5,000
		Total Required Fire Flow (above) in L/s:						83
		Required Duration of Fire Flow (hrs)						1.75
		Required Volume of Fire Flow (m^3)						525

Stantec

FUS Fire Flow Calculation

Calculations based on: "*Water Supply for Public Fire Protection*" by Fire Underwriters' Survey, 1999

Stantec Project #: 163401084
Project Name: 1258 Marenger
Date: August 6, 2020
Data inputted by: Kevin Alemany, M.A.Sc., P.Eng.
Data reviewed by: Jasmin Sidhu, P.Eng.

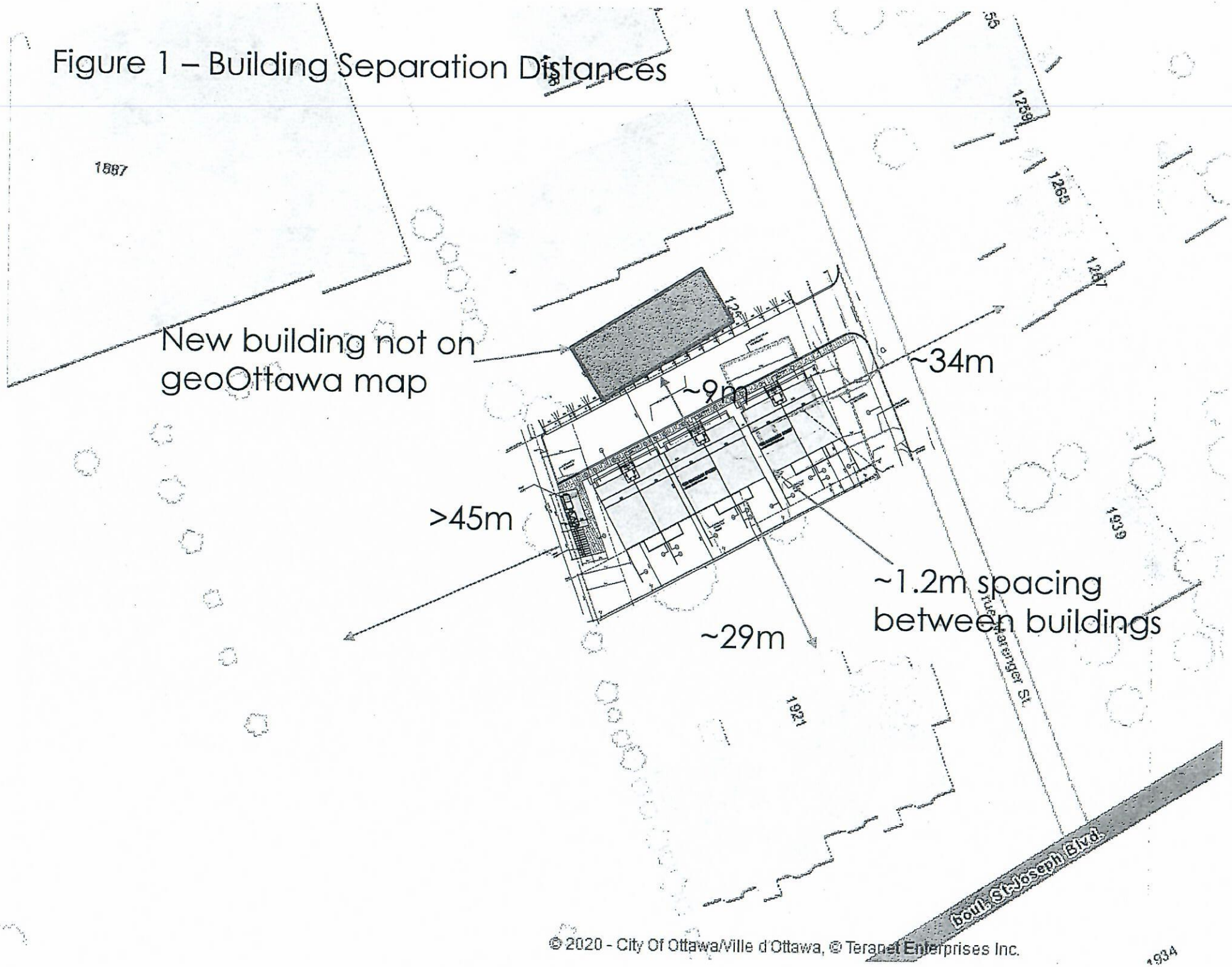
Fire Flow Calculation #: Building B
Building Type/Description/Name: Apartment building

Notes:

Table A: 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	**Framing Material**						
		Coefficient related to type of construction (C)	Wood Frame	1.5	Ordinary construction	1	m	
			Ordinary construction	1				
			Non-combustible construction	0.8				
			Fire resistive construction (< 2 hrs)	0.7				
			Fire resistive construction (> 2 hrs)	0.6				
2	Choose Type of Housing (if TH, Enter Number of Units Per TH Block)	**Floor Space Area**						
		Type of Housing	Single Family	1	Other (Comm, Ind, Apt etc.)	4	Units	
			Townhouse - indicate # of units	1				
			Other (Comm, Ind, Apt etc.)	4				
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 total floor area of all floors (non-fire resistive construction):			2,160	608	Area in Square Meters (m^2)	
					Square Feet (ft2)			
4	Obtain Required Fire Flow without Reductions	Required Fire Flow (without reductions or increases per FUS) ($F = 220 * C * \sqrt{A}$) Round to nearest 1,000 L/min						5,000
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	4,250
			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 Separation Distance Between Units	Exposure Distance Between Units	North Side	3.1 to 10.0m	0.2	0.55	m	2,338
			East Side	0 to 3.0m	0.25			
			South Side	20.1 to 30.1m	0.1			
			West Side	45.1m or greater	0			
6	Obtain Required Fire Flow, Duration & Volume	*Total Required Fire Flow, rounded to nearest 1,000 L/min, with max/min limits applied:*						7,000
		Total Required Fire Flow (above) in L/s:						117
		Required Duration of Fire Flow (hrs)						2.25
		Required Volume of Fire Flow (m^3)						945

Figure 1 – Building Separation Distances



Stantec

Supporting Hydraulic Calculations

Stantec Project #: 163401084
Project Name: 569 McLeod Street
Date: August 5, 2020
Data inputted by: Kevin Alemany, M.A.Sc., P.Eng.
Data reviewed by: Jasmin Sidhu, P.Eng.

Boundary Conditions provided by the City:

Scenario 1: Peak Hour (Min HGL): 110.6 m;
Scenario 2: Average Day (Max HGL): 114.5 m; and
Scenario 3: Maximum Day plus Fire Flow: 79.7 m.

Sample Calculations

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

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

For Scenario 1, we have:

HGL(m) = 110.6 and hz (m) = 60.8.

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

$hp\ (m) = HGL - hz$

hp = 110.6 - 60.8 m = 49.8 m.

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

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

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

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

P (kPa) = (1000 * 9.81 * 49.8) / 1000

P = 488 kPa.

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

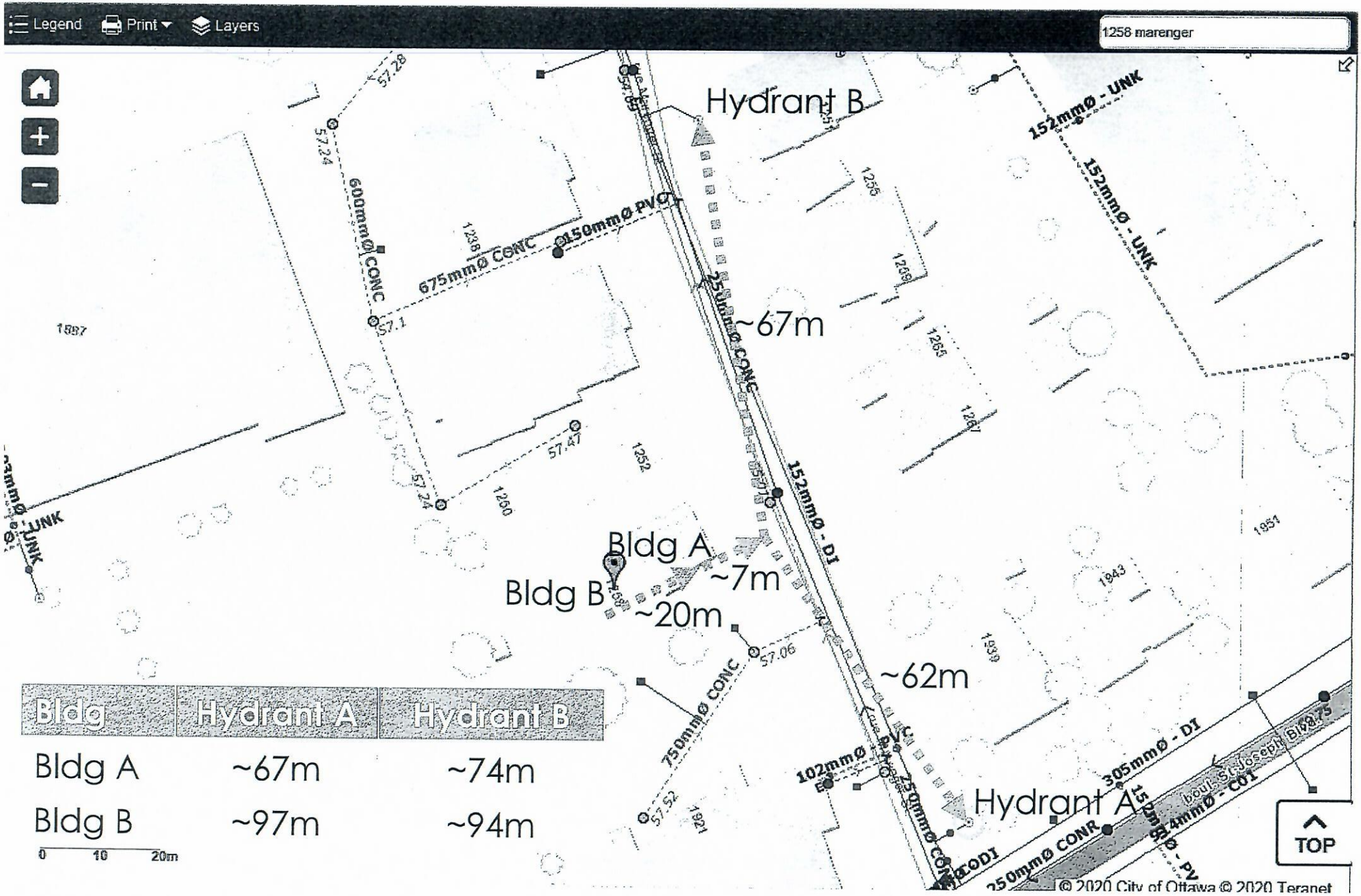
P = 71 psi.

Applying the same procedures, the pressures under Scenario 2 and Scenario 3 are calculated as follows:
Scenario 2: P = 76 psi; and Scenario 3: P = 27 psi.

To summarize:

Scenario 1: Minimum Pressure under Peak Hour Demand: 488 kPa (71 psi)
Scenario 2: Maximum Pressure under Average Day Demand: 526 kPa (76 psi)
Scenario 3: Minimum Pressure under Maximum Day + Fire Flow Demand: 185 kPa (27 psi)

Figure 2: Hydrant Coverage for 1258 Marenger Street



Bldg	Hydrant A	Hydrant B
Bldg A	~67m	~74m
Bldg B	~97m	~94m

0 10 20m

PROPOSED STACKED TOWNHOUSE

RESIDENTIAL DEVELOPMENT SITE

R-PLAN 162

1258 MARENGER STREET

CITY OF OTTAWA

APPENDIX E

SANITARY SEWER DESIGN SHEET

SHEET 1 OF 1

SANITARY SEWER DESIGN SHEET

q = average daily per capita flow (280 L/cap. d)
I = unit of peak extraneous flow (0.28 L/ha. s)
M = peaking factor = 4.0 (MAX.)
Q (p) = peak population flow (L/s)
Q (i) = peak extraneous flow (L/s)
Q (d) = peak design flow

PPU
2.7 PER UNIT

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

$Q(p) = \frac{PqM}{86.4}$ (L/s)

Q(i) = IA (L/s) where A = area in hectares

Q(d) = Q(p) + Q(i) (L/s)

LOCATION			INDIVIDUAL		CUMULATIVE		Peaking factor M	Pop. flow Q(p) (L/s)	Peak extraneous flow Q(i) (L/s)	Peak design flow Q(d) (L/s)	PROPOSED SEWER						
STREET	FROM	TO	Pop.	Area A (hectares)	Pop.	Area A (hectares)					Length (m)	Pipe size (mm)	Type of pipe	Grade %	Capacity (L/s) n=0.013	Full flow velocity (m/s)	Actual velocity at Q(d)
1258 MARENGER	SAN MH#2A	SAN MH#1A	32.4	0.142	32.4	0.142	4	0.42	0.04	0.46	39.5	200	PVC	1.0	32.8	1.04	
	SAN MH#1A	EX. 250Ø SAN. SWR @ MARENGER STREET	Ø	Ø	32.4	0.142	4	0.42	0.04	0.46	10.0	200	PVC	1.0	32.8	1.04	

LICENSED PROFESSIONAL ENGINEER
08/13/20
TONY L.M. MAK
PROVINCE OF ONTARIO

DESIGN	TLM	PROJECT	1258 MARENGER STREET PROPOSED STACKED TOWNHOUSE RESIDENTIAL DEVELOPMENT SITE
CHECKED	TLM		
DATE	JULY 2020		

SHEET No. 1 of 1

(FILE #819-98)

PROPOSED STACKED TOWNHOUSE

RESIDENTIAL DEVELOPMENT SITE

R-PLAN 162

1258 MARENGER STREET

CITY OF OTTAWA

APPENDIX F

DEVELOPMENT SERVICING STUDY

CHECKLIST SUMMARY

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 defendable 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 feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.

☒ 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.

- [x] 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.
- [x] 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.
- [x] 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.
- [x] Descriptions of how the conveyance and storage capacity will be achieved for the development.
- [x] 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.
- [x] 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