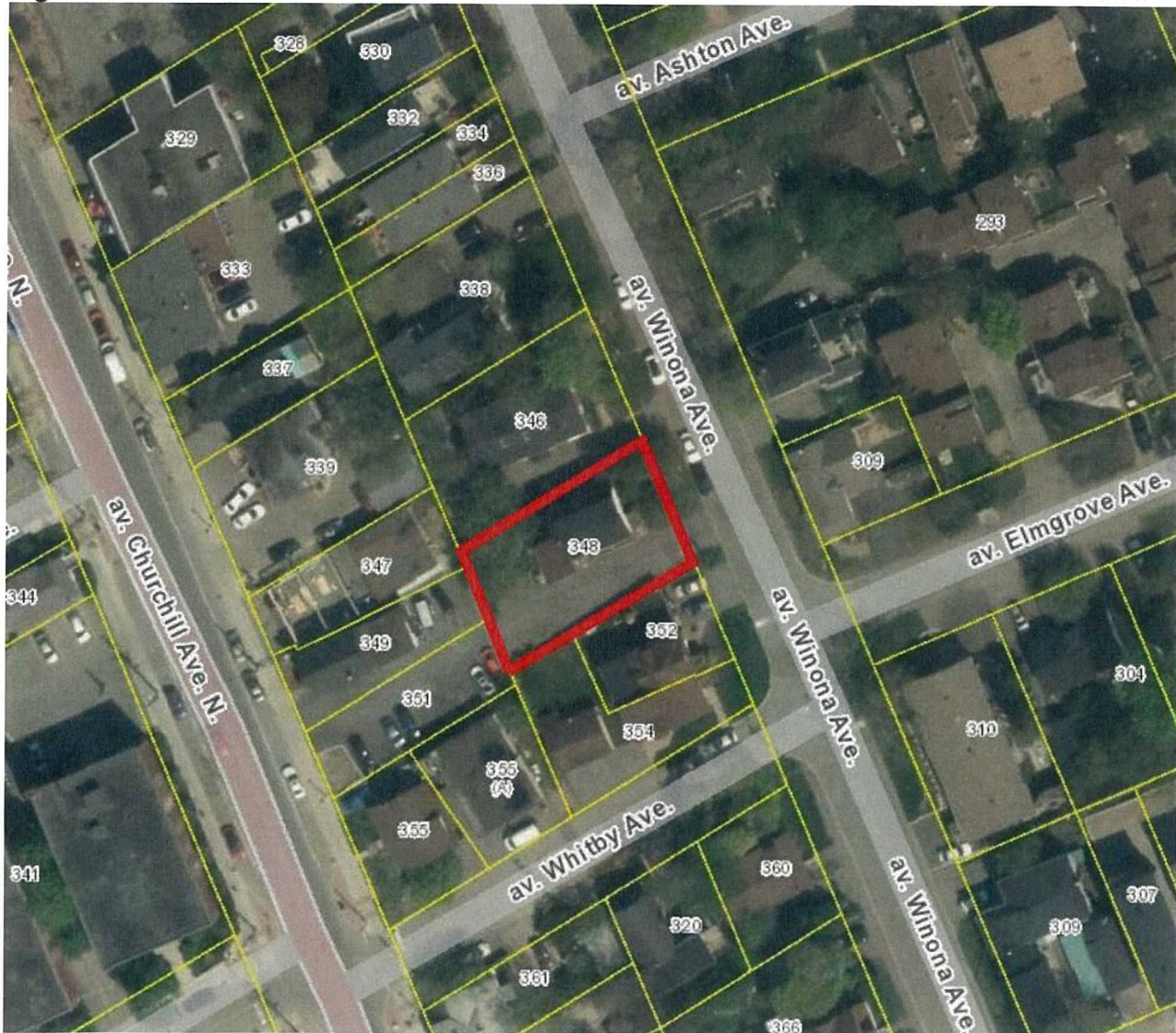


TECHNICAL MEMORANDUM

DATE: NOVEMBER 20, 2018
TO: SERENE SHAHZADEH
FROM: MIROSLAV SAVIC
RE: 348 WINONA AVENUE – ADEQUACY OF PUBLIC SERVICES

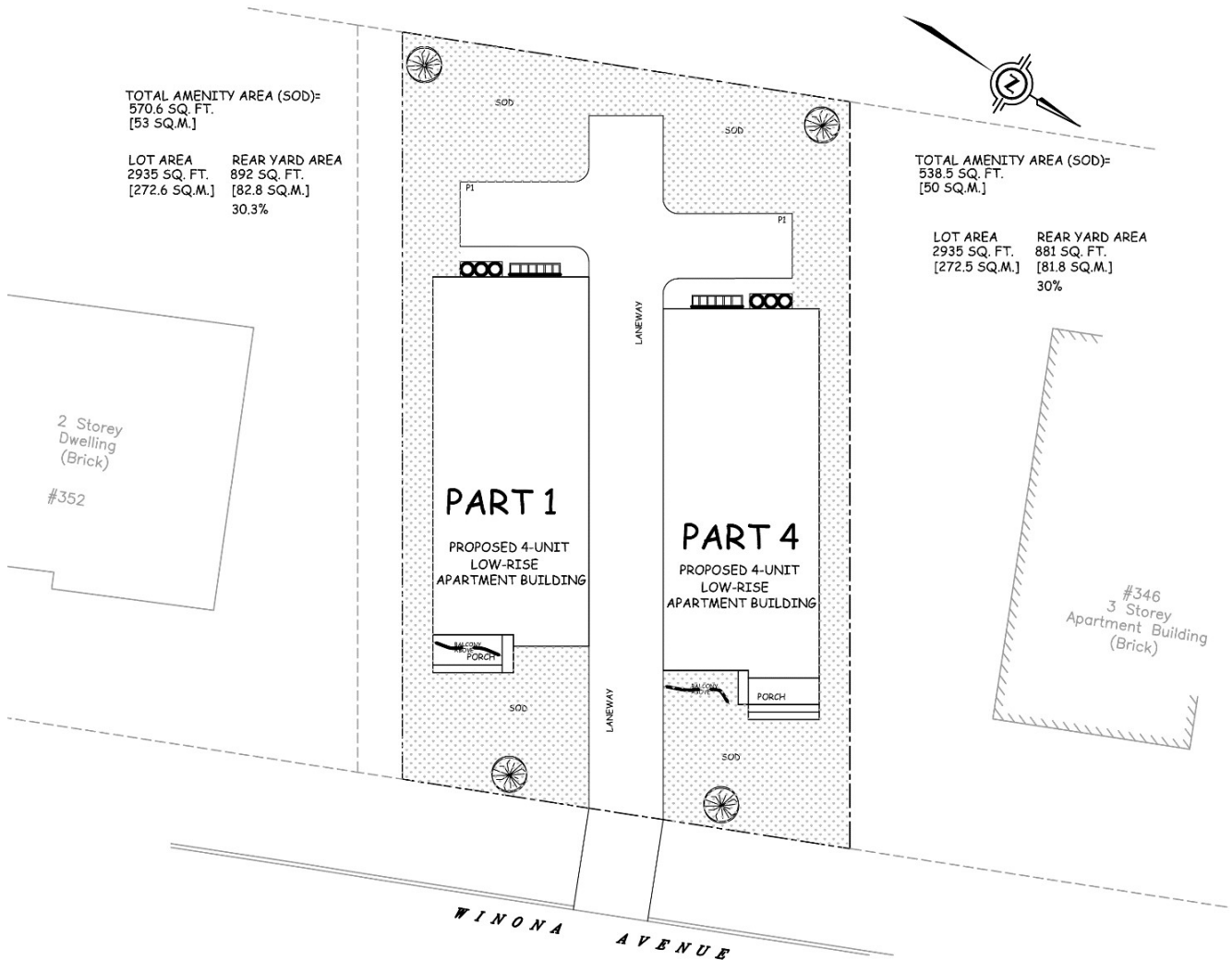
Novatech has been retained to review the adequacy of existing services for the Zoning By-law Amendment and the Site Plan application of the property at 348 Winona Avenue in the City of Ottawa.

Figure 1: Aerial View of The Site



The Subject Site is currently subdivided into two lots, and is occupied by two triplexes that are under construction. The proposed development is the establishment of a fourth residential unit in the basement of each triplex being currently constructed. This converts the use of the buildings from a triplex to a low-rise apartment building. Refer to **Figure 2** for the proposed Site Plan.

Figure 2: Site Plan

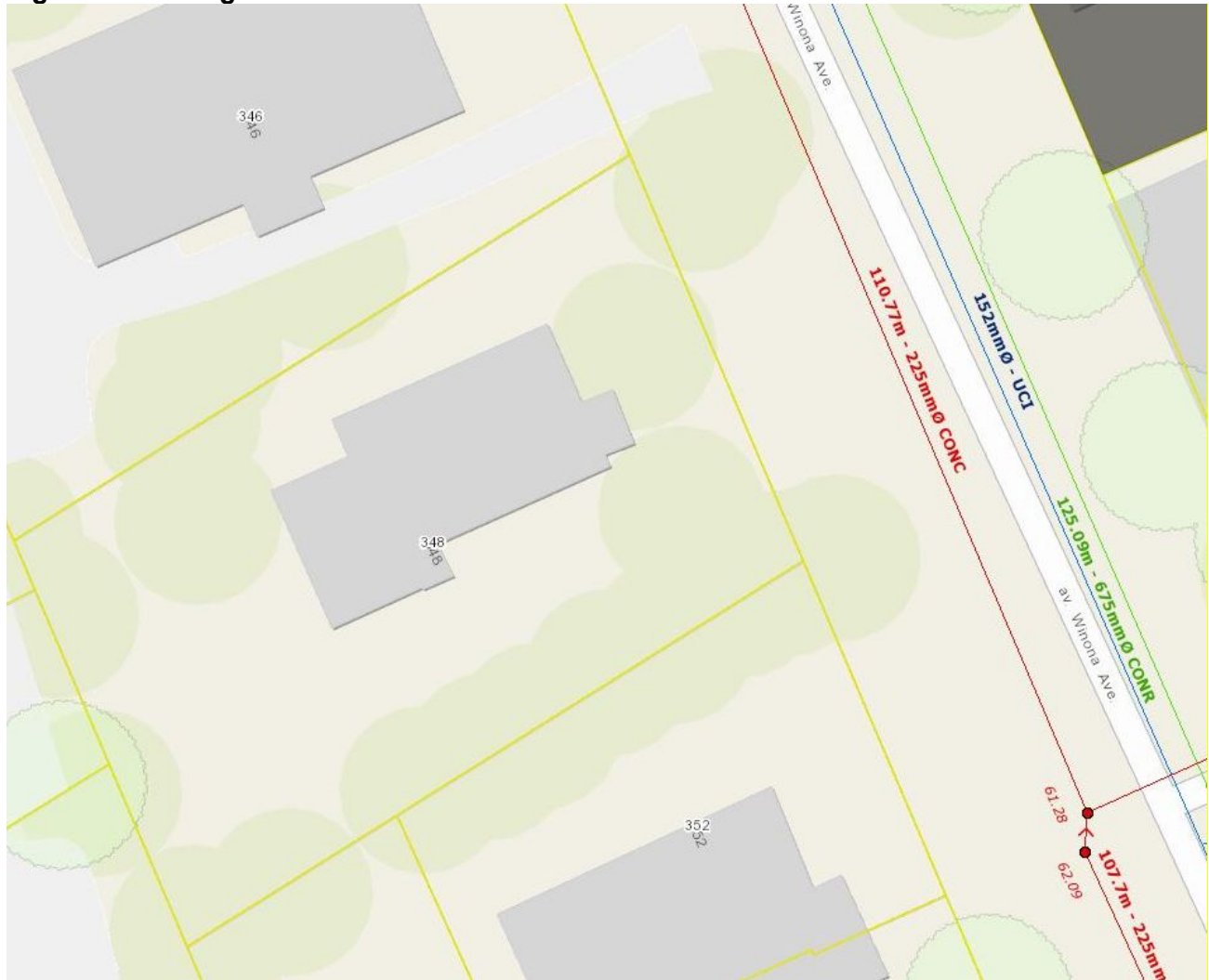


The memo will review the water, sanitary and storm servicing requirements for the proposed development of the two 4-unit low-rise apartment buildings and will provide an analysis on the existing infrastructure surrounding the site to ensure there is adequate capacity.

WATER SERVICING

There is an existing public 150mm diameter watermain in Winona Avenue that currently services the the subject site. Refer to **Figure 3 Existing Services**.

Figure 3: Existing Services



The water demands for the proposed development were calculated and provided to the City of Ottawa to obtain boundary conditions to confirm serviceability. The domestic water demand calculations are based on a theoretical population for the proposed apartment units based on criteria provided in the City of Ottawa Water Design Guidelines.

The required fire flow was calculated using the Fire Underwriter's Survey method and is based on 3-storey above ground wood frame construction.

The water demand calculations, boundary conditions and watermain analysis calculations for the existing public infrastructure are provided in **Appendix A**.

The results of the hydraulic analysis are summarized below in **Table 1**.

Table1: Water Analysis Results Summary

Condition	Water Demand	Min/Max Allowable Operating Pressures	Limits of Design Operating Pressures
High Pressure	0.06 L/s	80 psi (Max)	72.8 psi
Max Day + Fire Flow	133.16 L/s	20 psi (Min)	55.5 psi
Peak Hour	0.36 L/s	40 psi (Min)	63.7 psi

The results of the water analysis show there is adequate flow and pressure in the existing 150mm watermain in Winona Avenue to meet the required domestic and fire flow demands.

SANITARY SERVICING

There is an existing 225mm diameter sanitary sewer in Winona Avenue that currently services the subject site. Refer to **Figure 3 Existing Services**.

The peak sanitary flows from a single family dwelling previously located on site is calculated to be 0.04 L/s. The peak sanitary flow generated by the potential development are calculated to be 0.18 L/s. There is a total increase in peak sanitary flow of 0.14 L/s in the proposed condition. The sanitary flow calculations are based on criteria provided in the City of Ottawa Sewer Design Guidelines. Refer to **Appendix B** for detailed calculations.

A downstream analysis of the existing sanitary sewers was completed to confirm the capacity in the existing sewer system. The GeoOttawa website was used to determine existing sanitary sewer sizes, inverts, and the tributary drainage areas. According to the information on the GeoOttawa website, the existing sanitary sewer system consists of 225mm, 300mm, and 375mm diameter pipe network that outlets into the existing 1500mm diameter trunk sewer in Scott Street. The sanitary sewer design sheet and drainage area figure are provided in **Appendix B**.

A review of the downstream analysis, shows that the existing sanitary sewer system has excess capacity. Since the proposed development increases the flows for only 0.14 L/s from the existing condition, there are no concerns that the proposed development flows will have any adverse effects on the existing infrastructure.

STORM SERVICING AND STORMWATER MANAGEMENT

There is an existing 675mm diameter storm sewer in Winona Avenue. Refer to **Figure 3 Existing Services**. The foundation drainage from the proposed buildings will be connected to the Winona Avenue storm sewer. The surface drainage from the site will sheet drain towards the existing catchbasing in Winona Avenue.

The stormwater management (quantity and quality control) is not required by the City of Ottawa for the proposed development.

CONCLUSION

Based on the foregoing, the existing sanitary sewer and watermain infrastructure have sufficient capacity to service the proposed development. The stormwater management is not required by the City of Ottawa.

NOVATECH

Prepared by:



Miroslav Savic, P.Eng
Senior Project Manager | Land Development

Reviewed by:

Lee Sheets, C.E.T.
Director | Land Development & Public Sector Infrastructure

List of Appendices:

Appendix A:	Water Calculations
Appendix B:	Sanitary Sewer Calculations

APPENDIX A
Water Calculations

Miro Savic

From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: Monday, November 19, 2018 11:05 AM
To: Miro Savic
Cc: Lee Sheets; Renaud, Jean-Charles
Subject: RE: 348 Winona Avenue - Boundary Conditions
Attachments: 348 Winona Nov 2018.pdf

Good morning Mr. Savic.

Please find Boundary Conditions below as requested.

The following are boundary conditions, HGL, for hydraulic analysis at 348 Winona (zone 1W) assumed to be connected to the 152 mm on Winona Ave (see attached PDF for location).

Minimum HGL = 108.8 m

Maximum HGL = 115.2 m

Available Flow = 103 L/s assuming a residual pressure of 20 psi and a ground elevation of 63.9 m.

These are for current conditions and are based on computer model simulation.

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

If you require additional information or clarification, please do not hesitate to contact me anytime.

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji
Project Manager - Infrastructure Approvals

Boundary Condition for 348 Winona



Legend

Water Pipe Ownership

- Private
- Public

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines



Engineers, Planners & Landscape Architects

Novatech #: 118157
 Project Name: 348 Winona
 Date: 14-Nov-18
 Input By: Miroslav Savic
 Reviewed By:

Legend

Input by User

No Information or Input Required

Building Description: 4-unit Apartment Building
 Wood frame

Step			Choose	Multiplier Options	Value Used	Total Fire Flow (L/min)	
	Required Fire Flow						
1	Construction Material						
	Coefficient related to type of construction C	Wood frame	Yes	1.5	1.5		
		Ordinary construction		1			
		Non-combustible construction		0.8			
		Fire resistive construction (< 3 hrs)		0.7			
		Fire resistive construction (> 3 hrs)		0.6			
2	Floor Area						
	A	Building Footprint (m ²)	84				
		Number of Floors/Storeys	3				
		Area of structure considered (m ²)			252		
	F	Base fire flow without reductions				5,000	
		F = 220 C (A) ^{0.5}					
	Reductions or Surcharges						
3	Occupancy hazard reduction or surcharge						
	(1)	Non-combustible	Yes	-25%	-25%	3,750	
		Limited combustible		-15%			
		Combustible		0%			
		Free burning		15%			
		Rapid burning		25%			
4	Sprinkler Reduction						
	(2)	Adequately Designed System (NFPA 13)	No	-30%		0	
		Standard Water Supply	No	-10%			
		Fully Supervised System	No	-10%			
		Cumulative Total					0%
5	Exposure surcharge (cumulative (%))						
	(3)	North Side	3.1 - 10 m		20%	2,625	
		East Side	20.1 - 30 m		10%		
		South Side	0 - 3 m		25%		
		West Side	10.1 - 20 m		15%		
		Cumulative Total			70%		
	(1) + (2) + (3)	Total Required Fire Flow, rounded to nearest 1000L/min			L/min	6,000	
		(2,000 L/min < Fire Flow < 45,000 L/min)			or	L/s	100
					or	USGPM	1,585
		Required Duration of Fire Flow (hours)			Hours	2	
		Required Volume of Fire Flow (m ³)			m ³	720	

348 WINONA AVENUE WATERMAIN ANALYSIS

WATER DEMAND

NUMBER OF 2 BDR UNITS	6
PERSONS PER 2 BDR UNIT	2.1
NUMBER OF 1 BDR UNIT	2
PERSONS PER UNIT	1.4
TOTAL POPULATION	16
AVERAGE DAY DEMAND	350 L/c/day

AVERAGE DAY DEMAND	0.06 L/s
MAXIMUM DAY DEMAND (2.5 x avg. day)	0.16 L/s
PEAK HOUR DEMAND (2.2 x avg. day)	0.36 L/s

BOUNDARY CONDITIONS

MINIMUM HGL =	108.8 m
MAXIMUM HGL =	115.2 m
MAX DAY + FIRE =	103 m

PRESSURE TESTS

AVERAGE GROUND ELEVATION = 64.0 m

HIGH PRESSURE TEST = MAX HGL - AVG GROUND ELEV x 1.42197 PSI/m < 80 PSI
HIGH PRESSURE = **72.8 PSI**

LOW PRESSURE TEST = MIN HGL - AVG GROUND ELEV x 1.42197 PSI/m > 40 PSI
LOW PRESSURE = **63.7 PSI**

MAX DAY + FIRE FLOW TEST = MAX DAY + FIRE - AVG GROUND ELEV x 1.42197 PSI/m > 20 PSI
55.5 PSI

APPENDIX B
Sanitary Sewer Calculations

LEGEND



DRAINAGE AREA (ha)
DOWNSTREAM MAINTENANCE HOLE
of RESIDENTIAL UNITS / POPULATION



COMMERCIAL DEVELOPMENT AREA (ha)
DEVELOPMENT TYPE
of COMMERCIAL UNITS / PEAK FLOW



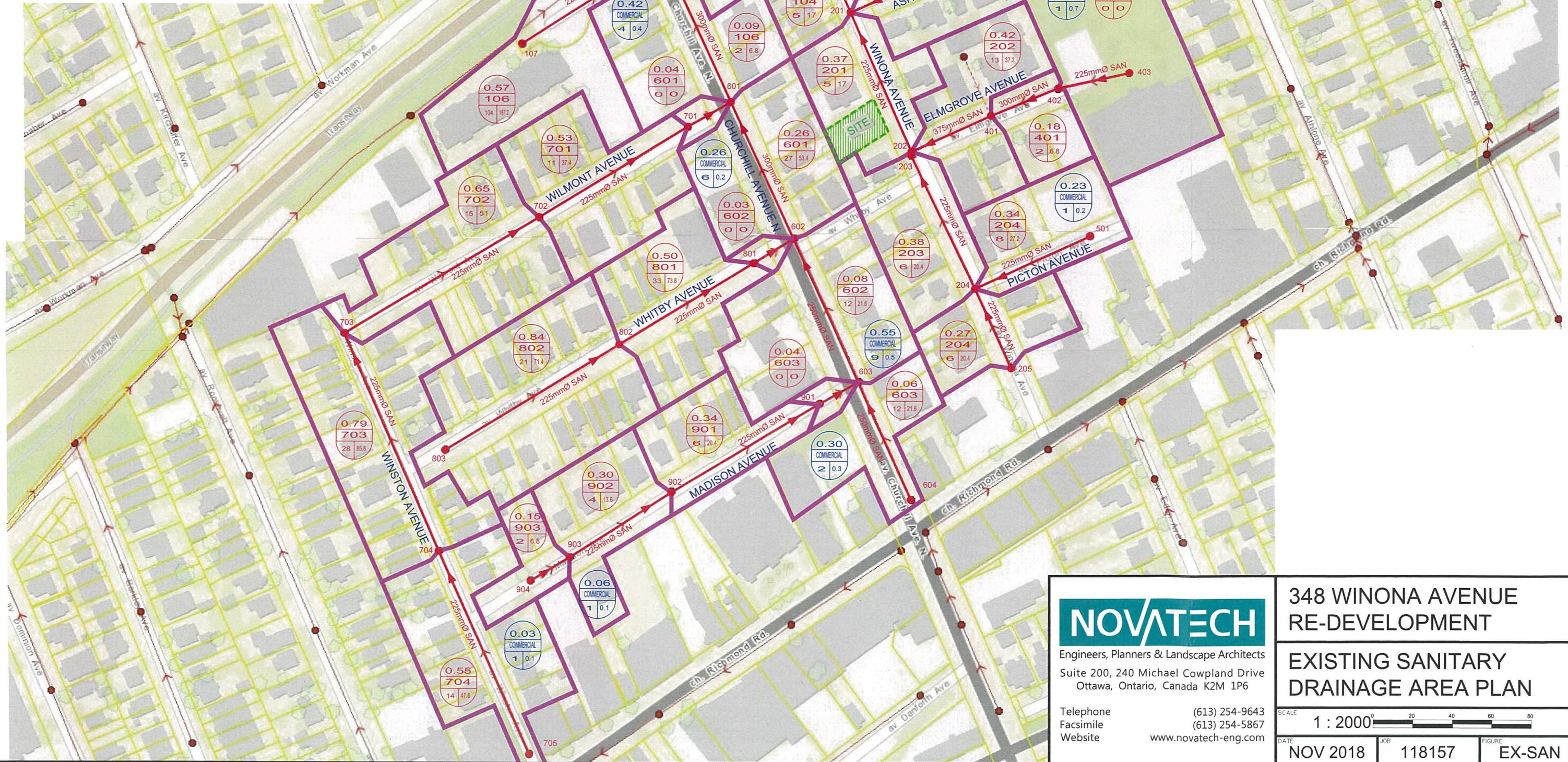
SANITARY SEWER, MH AND FLOW DIRECTION



DRAINAGE AREA BOUNDARY



SUBJECT SITE BOUNDARY



NOVATECH

Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone
Facsimile
Website

(613) 254-9643
(613) 254-5867
www.novatech-eng.com

348 WINONA AVENUE
RE-DEVELOPMENT

EXISTING SANITARY
DRAINAGE AREA PLAN

SCALE 1 : 2000

DATE NOV 2018 JOB 118157 FIGURE EX-SAN

Existing Condition Sanitary Flows

Location			Residential		Commercial		Residential Cumulative		Peak Factor		Commercial		Residential	Infiltration		PEAK DESIGN FLOW (l/s)	PIPE					
Street / Area	From	To	Population	Area (ha)	Area (ha)	Accu. Area (ha)	Pop.	Area (ha)	Res Peak Factor	Comm Peak Factor	Peak Flow (l/s)	Accu. Peak Flow	Acc. Peak Flow (l/s)	Infil. Flow (l/s)	Accu Infil. Flow		Size (mm)	Slope (%)	Length (m)	Capacity (l/s)	Full Flow Vel. (m/s)	Q/Q _{full} (%)
Madison Avenue	904	903	6.8	0.15			6.8	0.15	3.5	1.5	0.0	0.0	0.08	0.04	0.04	0.12	225	0.26	23.3	22.9	0.58	0.5%
Madison Avenue	903	902	13.6	0.30	0.06	0.06	20.4	0.45	3.5	1.5	0.1	0.1	0.23	0.10	0.14	0.43	225	0.35	61.2	26.5	0.67	1.6%
Madison Avenue	902	901	20.4	0.43			40.8	0.88	3.5	1.5	0.0	0.1	0.46	0.12	0.26	0.77	225	0.43	87.0	29.4	0.74	2.6%
Madison Avenue	901	603		0.04			40.8	0.92	3.5	1.5	0.0	0.1	0.46	0.01	0.27	0.78	250	0.50	23.0	42.0	0.86	1.9%
Whitby Avenue	803	802	71.4	0.84			71.4	0.84	3.4	1.5	0.0	0.0	0.79	0.24	0.24	1.03	225	0.50	103.1	31.7	0.80	3.2%
Whitby Avenue	802	801	73.8	0.50			145.2	1.34	3.4	1.5	0.0	0.0	1.58	0.14	0.38	1.95	225	1.00	80.2	44.9	1.13	4.4%
Whitby Avenue	801	602		0.03			145.2	1.37	3.4	1.5	0.0	0.0	1.58	0.01	0.38	1.96	250	1.80	23.8	79.7	1.63	2.5%
Wilmont Avenue	705	704	47.6	0.55	0.03	0.03	47.6	0.55	3.5	1.5	0.0	0.0	0.53	0.16	0.16	0.72	225	0.25	112.5	22.4	0.56	3.2%
Wilmont Avenue	704	703	85.6	0.79			133.2	1.34	3.4	1.5	0.0	0.0	1.45	0.22	0.38	1.86	225	0.26	120.7	22.9	0.58	8.1%
Wilmont Avenue	703	702	51.0	0.65			184.2	1.99	3.3	1.5	0.0	0.0	1.99	0.18	0.57	2.58	225	0.36	115.0	26.9	0.68	9.6%
Wilmont Avenue	702	701	37.4	0.53			221.6	2.52	3.3	1.5	0.0	0.0	2.37	0.15	0.71	3.11	225	0.50	88.4	31.7	0.80	9.8%
Wilmont Avenue	701	601		0.04			221.6	2.56	3.3	1.5	0.0	0.0	2.37	0.01	0.73	3.12	250	1.10	25.6	62.3	1.27	5.0%
Churchill Avenue N.	604	603	21.6	0.06	0.30	0.30	21.6	0.06	3.5	1.5	0.3	0.3	0.25	0.10	0.10	0.61	250	2.10	65.2	86.1	1.76	0.7%
Churchill Avenue N.	603	602	21.6	0.08	0.55	0.85	84.0	1.06	3.4	1.5	0.5	0.7	0.93	0.18	0.55	2.22	250	0.40	79.5	37.6	0.77	5.9%
Churchill Avenue N.	602	601	53.4	0.26	0.26	1.11	282.6	2.69	3.3	1.5	0.2	1.0	3.00	0.15	1.08	5.04	300	0.34	77.5	56.3	0.80	8.9%
Churchill Avenue N.	601	106	6.8	0.09	0.42	1.53	511.0	5.34	3.2	1.5	0.4	1.3	5.26	0.14	1.95	8.54	300	0.51	82.4	69.0	0.98	12.4%
Picton Avenue	501	204	27.2	0.11	0.23	0.23	27.2	0.11	3.5	1.5	0.2	0.2	0.31	0.10	0.10	0.60	225	0.50	63.4	31.7	0.80	1.9%
Elmgrove Avenue	403	402			0.84	0.84	0.0	0.00	3.6	1.5	0.7	0.7	0.00	0.24	0.24	0.96	225	0.76	37.0	39.1	0.98	2.5%
Elmgrove Avenue	402	401	6.8	0.18			6.8	0.18	3.5	1.5	0.0	0.7	0.08	0.05	0.29	1.09	300	0.74	36.5	83.1	1.18	1.3%
Elmgrove Avenue	401	202	37.2	0.42			44.0	0.60	3.5	1.5	0.0	0.7	0.49	0.12	0.40	1.63	375	0.20	44.3	78.3	0.71	2.1%
Ashton Avenue	301	201	42.1	0.57			42.1	0.57	3.5	1.5	0.0	0.0	0.47	0.16	0.16	0.63	225	0.46	79.6	30.4	0.77	2.1%
Winona Avenue	205	204	20.4	0.27			20.4	0.27	3.5	1.5	0.0	0.0	0.23	0.08	0.08	0.31	225	0.78	43.8	39.6	1.00	0.8%
Winona Avenue	204	203	20.4	0.38			68.0	0.76	3.4	1.5	0.0	0.0	0.76	0.11	0.28	1.03	225	2.80	75.5	75.1	1.89	1.4%
Winona Avenue	203	202		0.00			68.0	0.76	3.4	1.5	0.0	0.0	0.76	0.00	0.28	1.03	225	7.50	1.6	122.8	3.09	0.8%
Winona Avenue	202	201	17.0	0.37			129.0	1.73	3.4	1.5	0.0	0.0	1.41	0.10	0.78	2.19	225	0.57	27.7	33.9	0.85	6.5%
Winona Avenue	201	104	17.0	0.25	0.19	0.19	188.1	2.55	3.3	1.5	0.2	0.2	2.03	0.12	1.07	3.26	225	0.79	80.1	39.9	1.00	8.2%
Scott Street	107	106	187.2	0.57			187.2	0.57	3.3	1.5	0.0	0.0	2.02	0.16	0.16	2.18	225	1.00	85.0	44.9	1.13	4.9%
Scott Street	106	105					698.2	5.91	3.1	1.5	0.0	0.0	7.05	0.00	2.11	9.16	300	0.74	10.8	83.1	1.18	11.0%
Scott Street	105	104		0.18			698.2	6.09	3.1	1.5	0.0	0.0	7.05	0.05	2.16	9.21	300	1.50	65.7	118.3	1.68	7.8%
Scott Street	104	103	70.2	0.29	0.06	0.06	956.5	8.93	3.0	1.5	0.1	0.1	9.45	0.10	3.32	12.83	375	0.25	59.5	87.6	0.79	14.6%
Scott Street	103	102			0.66	0.66	956.5	8.93	3.0	1.5	0.6	0.6	9.45	0.18	3.51	13.59	375	0.26	57.2	89.3	0.81	15.2%
Scott Street	102	101					956.5	8.93	3.0	1.5	0.0	0.6	9.45	0.00	3.51	13.59	375	0.35	5.7	103.6	0.94	13.1%
Scott Street	101	100					956.5	8.93	3.0	1.5	0.0	0.6	9.45	0.00	3.51	13.59	375	0.25	10.3	87.6	0.79	15.5%

City of Ottawa Sewer Design Guidelines

Single Family Lot	3.4	persons/unit
Average Townhome Unit	2.7	persons/unit
Average Apartment Unit	1.8	persons/unit
Average Domestic Flow	280	l/person/day
Institutional / Commercial Flow	50000	l/ha/day
Extraneous Flows	0.28	l/ha/day
Residential Peaking Factor	Harmon Equation, Correction Factor = 0.8	
Institutional / Commercial Peaking Factor		
	1.5	

Notes: Used the Average Apt./Persons Per Unit Value of 1.8 when determining the apartment populations.
 The number of units in an apartment buildings are assumed values.
 Existing pipe information has been taken from the Geo Ottawa website. Where invert information was not available, the minimum pipe slope was assumed.

348 WINONA AVENUE

SANITARY FLOW

PROPOSED APPARTMENT BUILDINGS

NUMBER OF 2 BDR UNITS	6
PERSONS PER 2 BDR UNIT	2.1
NUMBER OF 1 BDR UNIT	2
PERSONS PER UNIT	1.4
TOTAL POPULATION	16
AVERAGE DAILY FLOW	280 L/c/day
PEAK FACTOR (HARMON FORMULA)	3.51
PEAK SANITARY FLOW	0.18 L/s

SINGLE FAMILY HOUSE

SINGLE FAMILY HOUSE	1
PERSONS PER UNIT	3.4
AVERAGE DAILY FLOW	280 L/c/day
PEAK FACTOR (HARMON FORMULA)	3.56
PEAK SANITARY FLOW	0.04 L/s