



Memorandum

DATE January 16, 2018 **FILE NO.** WMI# 14-293
City File # D11-009 2017

RE 400 – 430 Ferndale FSR Addendum

DISTRIBUTION Kathy Brislin **cc** Eli Turk
Gary Matthie

FROM Dean A. Ives, P.Eng.

In response to City of Barrie - Development Services comments regarding the water servicing for 400-430 Ferndale Drive, the water demand calculations were updated per Fire Underwriters Survey (FUS). This also then required additional comment and input from the City of Barrie Water Department with regard to an alternate watermain connection location.

As such, attached are the following:

- FUS calculation as reviewed by the City.
- Fire Flow calculations as reviewed by the City.
- Water Supply calculations as reviewed by the City.
- Water connection location sketch has provided by the City. The detailed design drawings are based upon Option #1.

In summary, the existing 150mm watermain on Hawthorne Crescent is adequate for providing domestic water for the proposed development, however it is not adequate to provide fire protection. As a result, the City reviewed and confirmed that the existing 300mm watermain on Ferndale Drive at the Cumming Drive intersection will be sufficient to provide fire protection per the FUS calculations. As such, the detailed design has been revised to reflect the attached sketch, Option #1

Please accept this memorandum as an Addendum to the March 2016 Functional Servicing Report (as submitted in support of planning level approvals for the 400 Ferndale development).



**FIRE PROTECTION WATER STORAGE
 DESIGN CALCULATIONS- NON-COMBUSTIBLE CONSTRUCTION**

Date: 15-Sep-17

Project No.: 14-293

Project: 430 Ferndale Dr. West

Prepared By: JR



<<< Elements Requiring Input Information

Fire Protection Water Storage

Reference: Part II Water Supply for Public Fire Protection, Fire Underwriters Survey, 1999

$F=220 \cdot C \cdot \sqrt{A}$

where F=the required fire flow in litre per minute

C=coefficient related to type of construction

1.5 for wood frame construction

1.0 for ordinary construction - brick or other masonry wall, combustible floor and interior

0.8 for non-combustible construction - unprotected metal structure components masonry or metals walls

0.6 for fire resistive - fully protected frame floors, roof

A= the total floor area in square metres - incl. all storeys excluding basements 50% below grade

C=	0.8		
A=	6220		
F=	13881		
Apply reduction for low contents fire hazard	-25	%	(apartment/ dwelling use)
F=	10410		
Apply reduction for automatic sprinklers designed to NFPA 13 (30%), systems with water supply (10%) and systems with electronic supervision (10%)	50	%	
F=	5205	litres/min	
F=	86.8	litres/sec	
Add to flow for separation <u>per side</u> where separation is less than 45m. Max increase is 75%	10	%	
F=	5726	litres/min	
F=	95.4	litres/sec	



POTABLE WATER SUPPLY DESIGN CALCULATIONS
 FOR SMALL RESIDENTIAL DEVELOPMENTS

Date: 14-Sep-17
 Project: 430 Ferndale Drive

Project No.: 14-293
 Prepared By: JR



<<< Elements Requiring Input Information

Water Supply Design Calculations

References: Ministry of the Environment (MOE), Design Guidelines for Drinking Water Systems (2008)
 City of Barrie Sanitary Sewage Collection Systems Policies & Design Guidelines (Sept. 2012)

Ultimate Development Scenario:

Proposed # of Residential Units	=	64	
Average Population Density	=	1.67	ppu (high density per City of Barrie Sanitary Sewage Guidelines)
Average Population Density	=	106.9	residents
Total	=	107	residents
residential demand (per resident)	=	270	L/day (typical minimum for design, per MOE 2008 Guidelines)
Average Domestic Flow	=	28,890	L/day

Using Table 3-3 of the MOE 2008 Manual, Peaking Factors for Drinking Water Systems Serving Fewer than 500 People:

Maximum Day Factor	=	4.9	(9.5 is the maximum factor used)
Maximum Day Demand Flow	=	141,561	L/day
	=	1.64	L/s
Peak Hour Factor	=	7.4	(14.3 is the maximum factor used)
Peak Hour Demand Flow	=	213,786	L/day
	=	2.47	L/s



FIRE FLOW ANALYSIS CALCULATIONS

Date: 15-Sep-17

Project No.: 14-293

Project: 430 Ferndale Drive

Prepared By: JR

Fire Flow Calculations

*See appended flow test report from Hydratest Ltd. for detailed data

Measured Data from the Hydratest Ltd. flow test at the municipal hydrant located at 87 Hawthorne Crescent, and the residual hydrant located at 391 Ferndale Drive South.

Static Pressure	88 P.S.I.	607 kPa
Residual Pressure (Single port from residual hydrant)	34 P.S.I.	234 kPa
Flow (Single port from the test hydrant)	950 USGPM	60 L/s

From the City of Barrie's Water Distribution Specification, the minimum fire flow criteria for Residential Single Family Streets is 57 L/s @ 138kPa. Since the measured fire flow is greater than the minimum required flow, the existing water distribution system can adequately service the proposed development without retrofit.

Hydrant Flow Calculations (@ 150kPa)

$Q_A = Q_T \cdot \sqrt{(h_a/h_t)}$ Reference: City of Barrie Water Transmission and Distribution Policies and Design Guidelines (May 25, 2015) Section 4.3.1.

Where,
 Q_A = Flow at 21.8PSI (150kPa) Q_T = Flow at Test
 h_a = Pressure drop available h_t = Pressure drop at test

$Q_A = 950 \cdot \sqrt{((88 - 20) / (88 - 34))}$
 1052 USGPM @ 21.8 P.S.I.
 66.4 L/s @ 150 kPa

Since the measured fire flow is less than the minimum required fire flow (as determined from the Fire Underwriters Survey calculation) + max day demand, the existing water distribution system is not adequate to service the proposed development for fire protection requirements per the FUS.

BARRIE PUBLIC UTILITIES COMMISSION VALVE LOCATION DRAWING

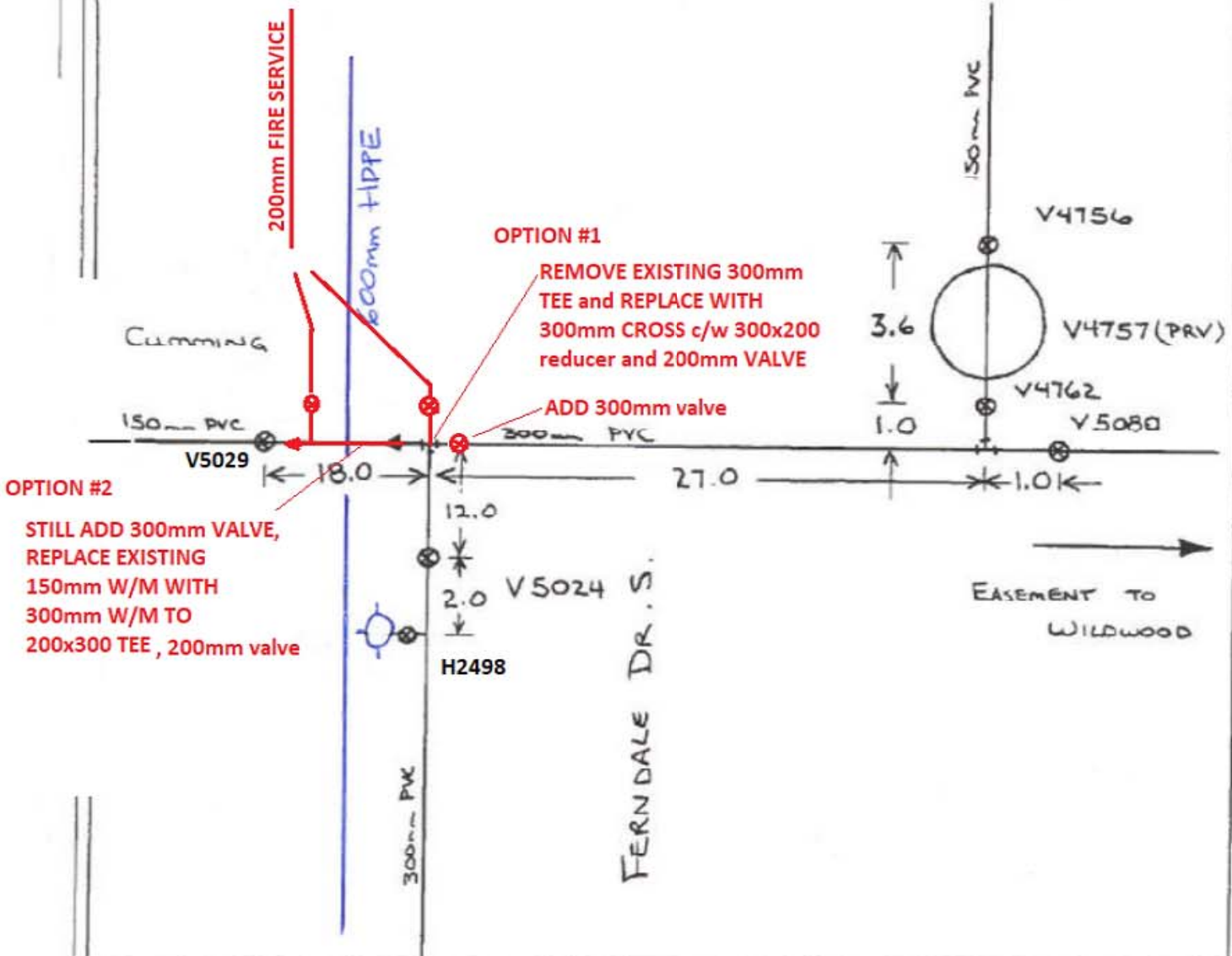
VALVE LOCATION: CUMMING DR. @ FERNDALE DR S

DRAWN BY: C.H.

DATE DRAWN: OCT '99

DATE REVISED: JUNE 5/06

INSPECTOR: _____



VALVE #:	SIZE:	MAKE:	TYPE:
TYPE OF BOX:	DEPTH OF NUT:	REMARKS:	
VALVE #:	SIZE:	MAKE:	TYPE:
TYPE OF BOX:	DEPTH OF NUT:	REMARKS:	
VALVE #:	SIZE:	MAKE:	TYPE:
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