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SITE SERVICING BRIEF

DATE: 2017-11-22 *EMAIL*

TO: **City of Ottawa IAD Review Officer**

SUBJECT: **770 Brookfield Road - Ultimate**
Site Servicing Brief

OUR FILE: DSEL Project No.17-966

ATTACHMENTS:

- Master Site Plan, prepared by Hobin Architecture, dated November 10, 2017
- City of Ottawa – Water Distribution System Map
- Water Calculation Sheet, prepared by DSEL, dated November 22, 2017
- Water Boundary Conditions, prepared by the City of Ottawa, dated October 20, 2017
- City of Ottawa – Sanitary Trunk Sewers and Collection Areas Map
- Sanitary Calculation Sheet, prepared by DSEL, dated November 22, 2017
- Storm Calculation Sheet, prepared by DSEL, dated November 22, 2017
- Existing Storm Water Path, prepared by DSEL, dated November 22,2017
- Correspondence with the RVCA, dated December 17, 2014
- Correspondence with the MOE, dated November 10, 2017

1.0 INTRODUCTION

David Schaeffer Engineering Ltd. (DSEL) has been retained by Hobin Architecture Inc to prepare a Servicing Brief in support of the application for a Zoning by-law Amendment (ZBLA) for the development at 770 Brookfield Road.

The subject property is located within the City of Ottawa urban boundary, in the River ward. As illustrated in ***Figure 1***, the subject property is located 160m east of the Riverside

Drive and Brookfield Road intersection and is primarily a surface parking lot. Comprised of a single parcel of land, the subject property measures approximately ***2.47 ha*** and is zoned General Mixed Use (GM).

Figure 1: Site Location

The proposed ultimate development consists of 6 residential/commercial buildings. The full build-out would include approximately ***2,244 m²*** of ground level retail with surface and underground parking lots. The residential component consists of ***808*** units. A copy of the Master Site Plan is included in the ***Appendix***.

The objective of this brief is to provide sufficient detail to show the existing servicing supports the ultimate development.

The ultimate development is a single parcel; as a result, the stormwater management system qualifies for an exemption under the OWRA. Correspondence with the MOECC is included in the ***Appendix***.

2.0 WATER SUPPLY SERVICING

2.1 Existing Water Supply Services

The subject property lies within the 2W2C pressure zone. Based on City of Ottawa Water Distribution mapping included in the ***Appendix***, the existing development is serviceable

from the local 300mm diameter watermain within the Brookfield Road right-of-way and the existing 200mm diameter watermain located in the former Hobson Road right-of-way.

2.2 Water Supply Design

It is anticipated that the development be serviced via connections to the existing 300mm diameter municipal watermain within the Brookfield Road right-of-way.

In accordance with City of Ottawa technical bulletin ISDTB-2014-02, redundant service connections will be required due to an estimated design flow of greater than 50 m^3/day, for the ultimate development.

Table 1 summarizes the ***Water Supply Guidelines*** employed in the preparation of the water demand estimate.

Table 1: Water Supply Design Criteria

Design Parameter	Value
Residential Average Apartment	1.8 P/unit
Residential Average Daily Demand	350 L/d/P
Residential Maximum Daily Demand	2.5 x Average Daily *
Residential Maximum Hourly	5.5 x Average Daily *
Commercial Retail	2.5 L/m^2/d
Commercial Maximum Daily Demand	1.5 x avg. day
Commercial Maximum Hour Demand	1.8 x max. day
Minimum Watermain Size	150mm diameter
Minimum Depth of Cover	2.4m from top of watermain to finished grade
During normal operating conditions desired operating pressure is within	350kPa and 480kPa
During normal operating conditions pressure must not drop below	275kPa
During normal operating conditions pressure must not exceed	552kPa
During fire flow operating pressure must not drop below	140kPa

Daily average based on Appendix 4-A from **Water Supply Guidelines*
*** Residential Max. Daily and Max. Hourly peaking factors per MOE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500 persons.*
-Table updated to reflect ISD-2010-2

Table 2 summarizes the anticipated water demand for the ultimate development based on development statistics provided by Hobin Architecture. See the ***Appendix*** for associated calculations.

Table 2: Proposed Water Demand

Design Parameter	Anticipated Demand[1] (L/min)	Boundary Condition[2] Connection 1 (m H_2O / kPa)	Boundary Condition[2] Connection 2 (m H_2O / kPa)
Average Daily Demand	357.5	56.3 / 552.3	56.9 / 558.3
Max Day + Fire Flow	890.0 + 17,000 = 17,890.0	28,020 L/min @ 140 kPa	29,040 L/min @ 140 kPa
Peak Hour	1955.6	46.2 / 459.2	46.8 / 459.2

1) Water demand calculation per ***Water Supply Guidelines***. See the ***Appendix*** for detailed calculations.
2) Boundary conditions supplied by the City of Ottawa for the demands indicated in the correspondence; assumed ground elevation 78.2m for Connection 1 and 77.6m for Connection 2. See the ***Appendix.***

Fire flow requirements are to be determined in accordance with Local Guidelines (***FUS***), City of Ottawa ***Water Supply Guidelines***, and the Ontario Building Code.

Using the ***FUS*** method a conservative estimation of fire flow had been established. The following assumptions were assumed:

- Type of construction – Non-Combustible Construction
- Occupancy type – Non-Combustible
- Sprinkler Protection – Supervised Sprinkler System

Table 3 summarizes the estimated fire flows for each building. Detailed calculations can be found in ***Appendix***.

Table 3: FUS Estimated Fire Flow Summary

Phase	Anticipated Demand (L/min)
Building A	18,000
Building B	13,000
Building C	16,000
Building D	13,000
Building E1	5,000
Building E2	5,000

As shown by ***Table 3***, the above assumptions result in an estimated maximum fire flow of approximately ***18,000 L/min***, actual building materials selected will affect the estimated flow. A certified fire protection system specialist would need to be employed to design the building fire suppression system and confirm the actual fire flow demand.

The City of Ottawa was contacted to obtain boundary conditions associated with the estimated water demand as indicated in the boundary request correspondence included in ***Appendix***.

Initial boundary conditions obtained indicate residual pressures during average day demands exceed the required pressure range as specified in ***Table 1*** and the ***Water Supply Guidelines***; as a result, buildings will need to be equipped with pressure reducing valves.

Based on the Master Site Plan, the estimated water demand for the site increased by approximately 33%. An updated water boundary request has been sent to the City of Ottawa. No response was received at the time of publication.

2.3 Water Supply Conclusion

Estimated water demand under proposed conditions was submitted to the City of Ottawa for establishing boundary conditions. As demonstrated by ***Table 2***, residual pressures during average day demands exceed the required pressure range as specified within the ***Water Supply Guidelines*** pressure range, pressure reducing valves will be required.

Based on the Master Site Plan, the estimated water demand for the site increased by approximately 33%. An updated water boundary request has been sent to the City of Ottawa. No response was received at the time of publication.

3.0 WASTEWATER SERVICING

3.1 Existing Wastewater Services

The subject site lies within the Rideau River Collector Sewer catchment area, as shown by the City sewer mapping included in ***Appendix C***. An existing 250mm diameter sanitary sewer within the Brookfield Road right-of-way and an existing 300mm sanitary sewer within the Hobson Road right-of-way are available to service the proposed development.

3.2 Wastewater Design

It is anticipated that the development be serviced via independent sanitary laterals; Phase I of the development is anticipated to be connected to the existing 250mm sanitary sewer within the Brookfield Road right-of-way and Phase II is anticipated to be connected to the existing 300mm sanitary sewer within the Hobson Road right-of-way.

Table 4 summarizes the ***City Standards*** employed in the evaluation of the existing wastewater sewer system and proposed use.

Table 4: Wastewater Design Criteria

Design Parameter	Value
Residential Average Apartment	1.8 P/unit
Average Daily Demand	350 L/d/per
Peaking Factor	Harmon's Peaking Factor. Max 4.0, Min 2.0
Commercial Floor Space	5 L/m^2/d
Infiltration and Inflow Allowance	0.28L/s/ha
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sewer Size	250mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6m/s
Maximum Full Flowing Velocity	3.0m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012.	

Table 5 demonstrates the estimated peak flow from the ultimate development. See the ***Appendix*** for associated calculations.

Table 5: Summary of Estimated Peak Wastewater Flow

Design Parameter	Total Phase I Flow (L/s)	Total Phase II Flow (L/s)	Total Flow (L/s)
Estimated Average Dry Weather Flow	3.2	3.0	6.2
Estimated Peak Dry Weather Flow	11.2	10.9	22.1
Estimated Peak Wet Weather Flow	11.6	11.3	22.8

DSEL estimated the peak wet weather sanitary flow based on the development statistics provided by Hobin Architecture.

A sanitary analysis was conducted for the local municipal sanitary sewers located across the frontage of the subject property in order to assess the available capacity. The analysis was conducted from the site to the upstream extents of the drainage area located near the intersection of Hobson Road and Springland Drive, as shown by the sanitary drainage plan in ***Appendix***.

City of Ottawa Sewer Design Guidelines (2004) Figure 4.3 'Peak Flow Design Parameters' were employed to generate a conservative estimate of the existing wastewater flow conditions within the sewer.

Based on the sanitary analysis, the controlling section of the local sewer system is located at the intersection of Brookfield Road and Hobson Road (nodes 2-3) with an available residual capacity of ***15.8 L/s***; the existing sanitary sewer has sufficient capacity to accommodate the peak wet weather flow of ***11.6 L/s*** for the Phase I development. See ***Appendix*** for detailed calculations.

Based on the sanitary analysis, the section of the local sewer system located within the former Hobin Road right-of-way (nodes 3-4) has an available capacity of ***32.7 L/s***; the existing sanitary sewer has sufficient capacity to accommodate the peak wet weather flow of ***11.3 L/s*** for the Phase II development. See ***Appendix*** for detailed calculations.

3.3 Wastewater Servicing Conclusion

The site is tributary to the Rideau River Collector sewer; based on the sanitary analysis sufficient capacity is available to accommodate the anticipated ***22.8 L/s*** peak wet weather flow from the ultimate development.

4.0 STORMWATER MANAGEMENT

4.1 Existing Stormwater Services

Stormwater runoff from the subject property is tributary to the City of Ottawa sewer system located within the Sawmill Creek sub-watershed. As such, approvals for proposed development within this area are under the approval authority of the City of Ottawa.

Flows that influence the watershed in which the subject property is located are further reviewed by the principal authority. The subject property is located within the Ottawa River watershed, and is therefore subject to review by the Rideau Valley Conservation Authority (RVCA). Consultation with the RVCA is located in ***Appendix***.

It was assumed that the existing development contained no stormwater management controls for flow attenuation. The estimated pre-development peak flows for the 2, 5, and 100-year are summarized in ***Table 6***:

Table 6: Summary of Existing Peak Storm Flow Rates

City of Ottawa Design Storm	Estimated Peak Flow Rate (L/s)
2-year	204.2
5-year	276.0
100-year	589.7

4.2 Post-development Stormwater Management Target

Stormwater management requirements for the proposed development were reviewed with the City of Ottawa, where the proposed development is required to:

- Meet an allowable release rate based on a Rational Method Coefficient of 0.50, employing the City of Ottawa IDF parameters for a 2-year storm with a time of concentration equal to or greater than 10 minutes.
- Attenuate all storms up to and including the City of Ottawa 100-year design event on site.

- Provide quality controls to an enhanced level of treatment due to the site's distance from the outlet; correspondence with the RVCA is included in the ***Appendix***.

Based on the above the allowable release rate for the ultimate development is ***198.5 L/s***.

4.3 Proposed Stormwater Management System

To meet the stormwater objectives the ultimate development may contain a combination of roof top flow attenuation along with surface and subsurface storage.

To meet stormwater quality criteria specified by RVCA, an enhanced level of quality control (80% TSS removal) will be required for any travelled surfaces.

Table 7 summarizes post-development flow rates. The following storage requirement estimate assumes that approximately 10% of the development area will be directed to the outlet without flow attenuation. These areas will be compensated for in areas with flow attenuation controls.

Table 7: Stormwater Flow Rate Summary

Control Area	5-Year Release Rate	5-Year Storage	100-Year Release Rate	100-Year Storage
	(L/s)	(m^3)	(L/s)	(m^3)
Unattenuated Areas	42.9	0.0	91.9	0.0
Attenuated Areas	53.3	432.9	106.6	865.0
Total	**96.2**	**432.9**	**198.5**	**865.0**

It is anticipated that approximately ***865.0 m^3*** of storage will be required on site to attenuate flow to the established release rate of ***198.5 L/s***; storage calculations are contained within ***Appendix D***.

Actual storage volumes will need to be confirmed at the detailed design stage based on a number of factors including grading constraints.

4.5 Stormwater Servicing Conclusions

Post development stormwater runoff will be required to be restricted to the allowable target release rate for storm events up to and including the 100-year storm in accordance with ***City Standards***. The post-development allowable release rate was calculated as ***198.5 L/s*** based on consultation with the City of Ottawa. It is estimated that ***865.0 m^3*** will be required to meet this release rate.

Based on consultation with the RVCA, enhanced stormwater quality controls are required.

5.0 CONCLUSION AND RECOMMENDATIONS

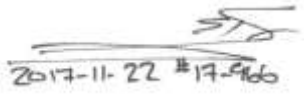
David Schaeffer Engineering Ltd. (DSEL) has been retained by Hobin Architecture Inc. to prepare a Servicing Brief in support of the application for a Zoning by-law Amendment (ZBLA) at 770 Brookfield Road. The preceding report outlines the following:

- Based on boundary conditions provided by the City, average day demands exceed the required pressure range as specified by the City of Ottawa, pressure reducing valves will be required;
- The FUS method for estimating fire flow indicated ***18,000 L/min*** is required for the ultimate development;
- It is estimated that the ultimate development will have a peak wet weather flow of ***22.8 L/s***; based on the sanitary analysis conducted the existing municipal sewer infrastructure has sufficient capacity to support the development;
- Based on pre-consultation with the City of Ottawa, the proposed development will be required to attenuate post development flows to an equivalent release rate of ***198.5 L/s*** for all storms up to and including the 100-year storm event;
- It is anticipated that stormwater objectives may be met through storm water retention via roof top, surface and subsurface storage, it is estimated that ***865.0 m^3*** of storage will be required to attenuate flow to the established release rate above;
- Based on consultation with the RVCA, stormwater quality controls to an enhanced level of treatment are required;
- Based on consultation with the MOECC, the proposed development is except from an ECA.

Yours truly,
David Schaeffer Engineering Ltd.

Per: Robert D. Freel, P.Eng.

Yours truly,
David Schaeffer Engineering Ltd.



Per: Adam D. Fobert, P.Eng.

Yours truly,
David Schaeffer Engineering Ltd.

Per: Alison J. Gosling, EIT.

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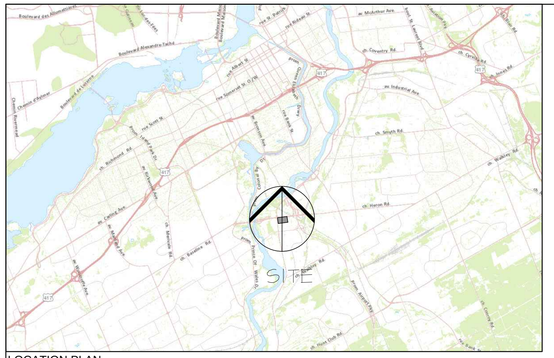
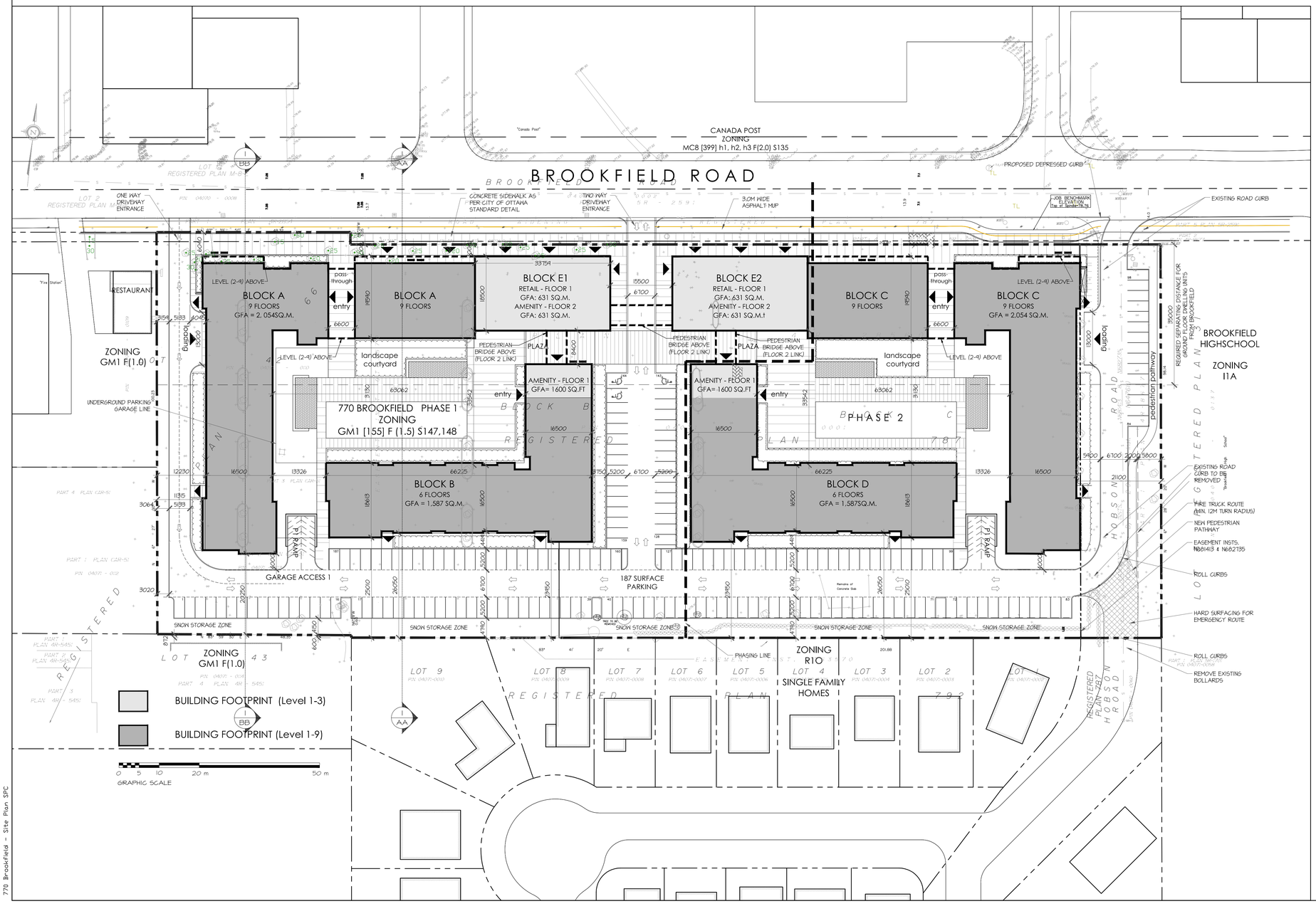
APPENDIX



LOCATION PLAN



None
770 Brookfield - Site Plan SPC

SURVEY INFORMATION TAKEN FROM:

TOPOGRAPHICAL PLAN OF BLOCKS B AND C
AND PART OF HOBSON ROAD (as closed)
REGISTERED PLAN 787 AND
PART OF LOTS 42 AND 43
REGISTERED PLAN 66
CITY OF OTTAWA

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.

SITE SUMMARY:

PROPERTY ADDRESS:	770 BROOKFIELD ROAD
ZONING:	GM 1 [155] F(1.5) S147, 148
SITE AREA (ZONING SCH. 147) SITE AREA (SURVEY)	24, 655 m² 24, 655 m²
PROPOSED USE:	APARTMENT BUILDING
BUILDING FOOTPRINT: (ABOVE GRADE)	BLOCK A = 2,054 m² BLOCK B = 1587 m² BLOCK C = 2,054 m² BLOCK D = 1587 m² BLOCK E1 = 631 m² BLOCK E2 = 631 m² TOTAL = 8544 m²

ZONING SUMMARY:

	REQUIRED	PROVIDED
SITE AREA: 24, 655m²	BUILDABLE GFA GFAm²	FSI-GFA FSI-GFAm²
BLOCK A	19, 130m²	15, 143m²
BLOCK B	9150m²	6700m²
BLOCK C	19, 130m²	15, 143m²
BLOCK D	9150m²	6700m²
BLOCK E1	1260m²	600m²
BLOCK E1	1260m²	600m²
TOTAL	60, 280m²	44886 m²
FSI - SITE	1.5	1.82
BUILDING HEIGHT	27m MAX.	27m

GFA DISTRIBUTION

TOTAL RESIDENTIAL GFA		42, 642m²
TOTAL RETAIL GFA		2244m²
TOTAL	60, 280m²	44886 m²

YARDS:

FRONT YARD: BROOKFIELD ROAD	3m MIN.	3m
REAR YARD:	7.5m (MIN.)	20.0 m
INTERIOR SIDE YARD:	3m (MIN.) 88.3 m WEST 12.2 m EAST	

VEHICULAR PARKING:

	REQUIRED	PROVIDED
RESIDENTIAL PARKING TOTAL 808 UNITS MINUS FIRST 12 UNITS 808 - 12 = 796 UNITS	(MIN. 0.5/UNIT) 398 SPACES	(MIN. 0.25/UNIT) 199 SPACES
VISITOR PARKING 808 UNITS	(MIN. 0.2/UNIT) 161.6 SPACES	162 SPACES
RETAIL PARKING *Current zoning provisions (Ottawa Zoning By-Law)	(MIN. 3.4/ 100m²)	
TENANT BLOCK E1-A 198 m² TENANT BLOCK E1-B 198 m² TENANT BLOCK E1-C 198 m²	6.7 SPACES 6.7 SPACES 6.7 SPACES	6.7 SPACES 6.7 SPACES 6.7 SPACES
TENANT BLOCK E2-D 198 m² TENANT BLOCK E2-E 198 m² TENANT BLOCK E2-F 198 m² TOTAL PARKING	6.7 SPACES 6.7 SPACES 6.7 SPACES 600 SPACES	6.7 SPACES 6.7 SPACES 6.7 SPACES 401 SPACES

PARKING DISTRIBUTION

PHASE 1 UNDERGROUND PARKING LEVEL		214 SPACES
SURFACE		187 SPACES
TOTAL	600 SPACES	401 SPACES

BICYCLE PARKING

	REQUIRED	PROVIDED
BICYCLE PARKING	(MIN. 0.5/UNIT)	
404 UNITS	202 SPACES	202 SPACES
RETAIL	(1 / 1, 500m²)	
1206m²	2.5 SPACES	3 SPACES
TOTAL	205 SPACES	205 SPACES

AMENITY

	REQUIRED	PROVIDED
BLOCK A 198 UNITS	1158 m² (MIN. 6m² / UNIT)	1, 002 m²
BLOCK B 150 UNITS	900 m² (MIN. 6m2 / UNIT)	346 m² + 124m² (EXT.)
LANDSCAPE COURTYARD TOTAL	2058 m²	1867 m² 3334 m²

BUILDING FOOTPRINT (1-9 STORIES)

BUILDING FOOTPRINT (1-3 STORIES)

HARD SURFACE PAVERS

LANDSCAPING TILES

UNDERGROUND PARKING FOOTPRINT

SITE LOT LINE

EASEMENTS

BUILDING ENVELOPE ABOVE GROUND FLOOR

PHASING LINE

SURROUNDING LOT LINES

OWNER

ATLANTIS INVESTMENTS INC.

PROJECT MANAGER

TURNER + TOWNSEND
110 LAURIER AVE. WEST, Suite 604,
Ottawa, ON
K1P 5V5

DOUG McNEIL
TEL (613) 221 1560

SURVEYOR

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CARLOS P. DA SILVA, P.ENG
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RONALD JACK, P.ENG.
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OTTAWA, ONTARIO K1Z 8L8

MARTHA LUSH
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ENGINEERING LTD.

120 IBER ROAD, UNIT 203
STITTSVILLE, ONTARIO K2S 1E9

ADAM D. FOBERT, P.ENG.
TEL (613) 836-0856 X 231

no.	date	revision
01	NOV 10, 2017	ISSUED FOR ZONING AMENDMENT

It is the responsibility of the appropriate contractor to check and verify all dimensions on site and report all errors and/or omissions to the architect.

All contractors must comply with all pertinent codes and by-laws.

Do not scale drawings.

This drawing may not be used for construction until signed.

ONTARIO ASSOCIATION OF ARCHITECTS
CHRISTOPHER J. HOBIN
LICENCE
3049

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hobinarc.com

HOBIN
ARCHITECTURE

PROJECT/LOCATION:
770 Brookfield Ave
Residential Apartment Building
770 Brookfield Ave.

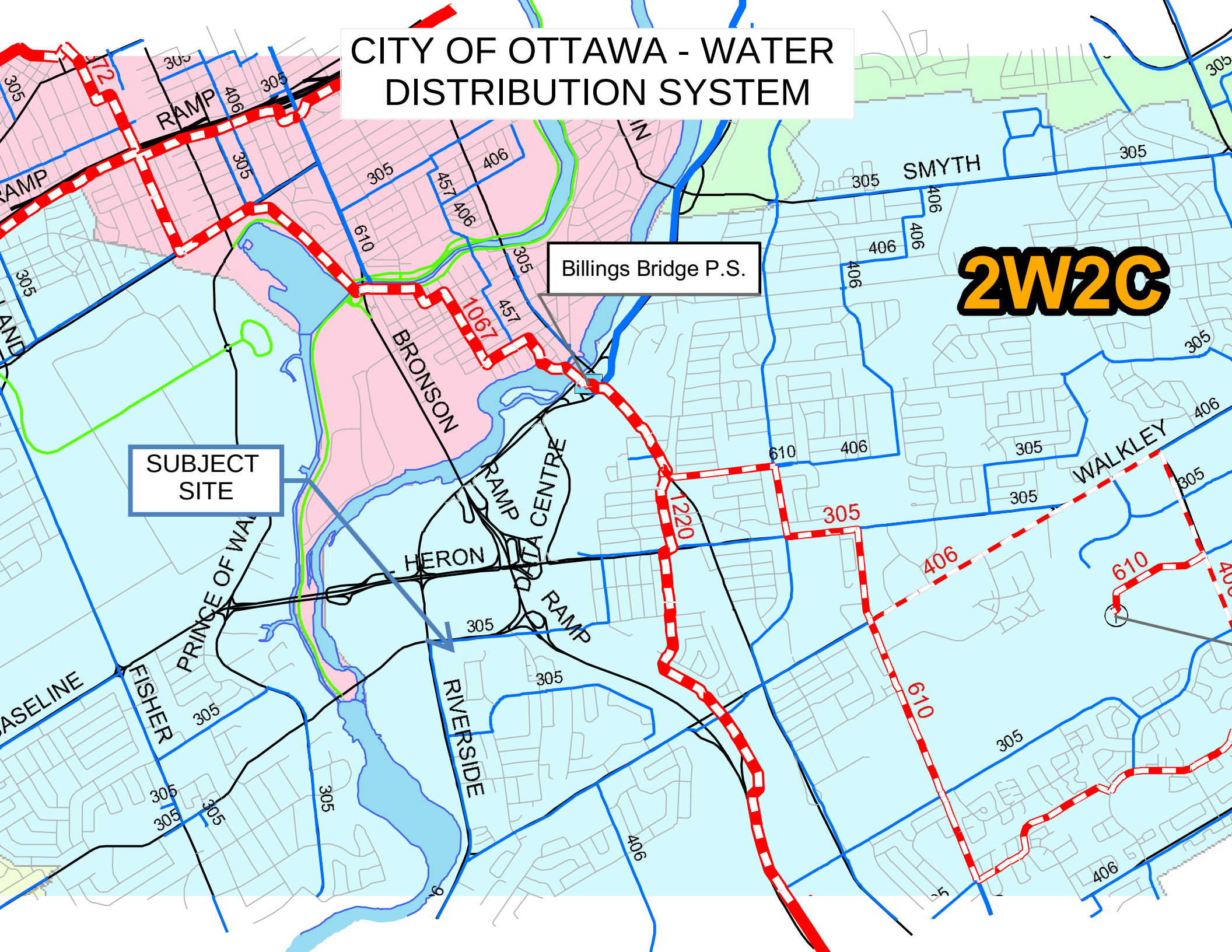
DRAWING TITLE:
Site Plan
Master

DRAWN BY:	DATE:	SCALE:
RL, JB	2017-11-10	1:500

PROJECT: 1741

DRAWING NO.:
A1.01

REVISION NO.:


CITY OF OTTAWA - WATER DISTRIBUTION SYSTEM
Billings Bridge P.S.
2W2C
SUBJECT SITE
SMYTH
BRONSON
RAMP
CENTRE
HERON
RIVERSIDE
FISHER
WALKLEY
PRINCE OF WA
ASELINE
1067
1220
610
406
305
457

Hobin Architecture Inc.
770 Brookfield Road
Proposed Site Conditions - Ultimate

Water Demand Design Flows per Unit Count
City of Ottawa - Water Distribution Guidelines, July 2010

Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4		0
Semi-detached	2.7		0
Townhouse	2.7		0
Apartment			0
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8	808	1455

	Pop	Avg. Daily		Max Day		Peak Hour	
		m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Total Domestic Demand	1455	509.3	353.6	1273.1	884.1	2800.9	1945.1

Institutional / Commercial / Industrial Demand

				Avg. Daily		Max Day		Peak Hour	
Property Type	**Unit Rate**		**Units**	m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Commercial floor space	2.5	$L/m^2/d$	2,244	5.61	3.9	8.4	5.8	15.1	10.5
Office	75	$L/9.3m^2/d$		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Light	35,000	L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000	L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
			Total I/CI Demand	5.6	3.9	8.4	5.8	15.1	10.5
			Total Demand	**514.9**	**357.5**	**1281.5**	**890.0**	**2816.0**	**1955.6**

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

$F = 220C\sqrt{A}$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Non-Combustible Construction

C	0.8		*Type of Construction Coefficient per FUS Part II, Section 1*
A	19730.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	24721.6	L/min	
	25000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Non-Combustible	-25%	
Fire Flow	**18750.0**	**L/min**

3. Reduction for Sprinkler Protection

Sprinklered	-50%	
Reduction	**-9375**	**L/min**

4. Increase for Separation Distance

N	>45m	0%	
S	30.1m-45m	5%	
E	0m-3m	25%	
W	10.1m-20m	15%	
	% Increase	**45%**	*value not to exceed 75% per FUS Part II, Section 4*
	Increase	**8437.5**	**L/min**

Total Fire Flow

Fire Flow	17812.5	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	18000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by _____.
-Calculations based on Fire Underwriters Survey - Part II

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

$F = 220C\sqrt{A}$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Non-Combustible Construction

C	0.8		*Type of Construction Coefficient per FUS Part II, Section 1*
A	9150.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	16835.4	L/min	
	17000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Non-Combustible	-25%
Fire Flow	**12750.0 L/min**

3. Reduction for Sprinkler Protection

Sprinklered	-50%
Reduction	**-6375 L/min**

4. Increase for Separation Distance

N	3.1m-10m	20%	
S	30.1m-45m	5%	
E	20.1m-30m	10%	
W	10.1m-20m	15%	
	% Increase	**50%**	*value not to exceed 75% per FUS Part II, Section 4*

Increase	**6375.0 L/min**

Total Fire Flow

Fire Flow	12750.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	13000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by _____.
-Calculations based on Fire Underwriters Survey - Part II

Hobin Archiecture Inc.
770 Brookfield Road
FUS-Fire Flow Demand
Building C

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

$F = 220C\sqrt{A}$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Non-Combustible Construction

C	0.8		*Type of Construction Coefficient per FUS Part II, Section 1*
A	19730.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	24721.6	L/min	
	25000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Non-Combustible	-25%	
Fire Flow	**18750.0**	**L/min**

3. Reduction for Sprinkler Protection

Sprinklered	-50%	
Reduction	**-9375**	**L/min**

4. Increase for Separation Distance

N	>45m	0%	
S	20.1m-30m	10%	
E	>45m	0%	
W	0m-3m	25%	
	% Increase	**35%**	*value not to exceed 75% per FUS Part II, Section 4*
	Increase	**6562.5**	**L/min**

Total Fire Flow

Fire Flow	15937.5	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	16000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by _____.
-Calculations based on Fire Underwriters Survey - Part II

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

$F = 220C\sqrt{A}$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Non-Combustible Construction

C	0.8		*Type of Construction Coefficient per FUS Part II, Section 1*
A	9150.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	16835.4	L/min	
	17000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Non-Combustible	-25%	
Fire Flow	**12750.0**	**L/min**

3. Reduction for Sprinkler Protection

Sprinklered	-50%	
Reduction	**-6375**	**L/min**

4. Increase for Separation Distance

N	3.1m-10m	20%	
S	30.1m-45m	5%	
E	10.1m-20m	15%	
W	20.1m-30m	10%	
	% Increase	**50%**	*value not to exceed 75% per FUS Part II, Section 4*
	Increase	**6375.0**	**L/min**

Total Fire Flow

Fire Flow	12750.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	13000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by _____.
-Calculations based on Fire Underwriters Survey - Part II

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

$F = 220C\sqrt{A}$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Non-Combustible Construction

C	0.8		*Type of Construction Coefficient per FUS Part II, Section 1*
A	1260.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	6247.4	L/min	
	6000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Non-Combustible	-25%	
Fire Flow	**4500.0**	**L/min**

3. Reduction for Sprinkler Protection

Sprinklered	-50%	
Reduction	**-2250**	**L/min**

4. Increase for Separation Distance

N	30.1m-45m	5%	
S	3.1m-10m	20%	
E	10.1m-20m	15%	
W	0m-3m	25%	
	% Increase	**65%**	*value not to exceed 75% per FUS Part II, Section 4*
	Increase	**2925.0**	**L/min**

Total Fire Flow

Fire Flow	5175.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	5000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by _____.
-Calculations based on Fire Underwriters Survey - Part II

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

$F = 220C\sqrt{A}$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Non-Combustible Construction

C	0.8		*Type of Construction Coefficient per FUS Part II, Section 1*
A	1260.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	6247.4	L/min	
	6000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Non-Combustible	-25%	
Fire Flow	**4500.0**	**L/min**

3. Reduction for Sprinkler Protection

Sprinklered	-50%	
Reduction	**-2250**	**L/min**

4. Increase for Separation Distance

N	30.1m-45m	5%	
S	3.1m-10m	20%	
E	0m-3m	25%	
W	10.1m-20m	15%	
	% Increase	**65%**	*value not to exceed 75% per FUS Part II, Section 4*
	Increase	**2925.0**	**L/min**

Total Fire Flow

Fire Flow	5175.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	5000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by _____.
-Calculations based on Fire Underwriters Survey - Part II

Boundary Conditions Unit Conversion

Connection 1

	Height (m)	Elevation (m)	m H_2O	PSI	kPa		L/s	L/min
Avg. DD	134.5	78.2	56.3	80.1	552.3	Fire Flow @ 140kPa	467	28020
Fire Flow			0.0	0.0	0.0			
Peak Hour	124.4	78.2	46.2	65.7	453.2			

Connection 2

	Height (m)	Elevation (m)	m H_2O	PSI	kPa		L/s	L/min
Avg. DD	134.5	77.6	56.9	81.0	558.3	Fire Flow @ 140kPa	484	29040
Fire Flow			0.0	0.0	0.0			
Peak Hour	124.4	77.6	46.8	66.6	459.2			

Anthony Temelini

From: Oram, Cody <Cody.Oram@ottawa.ca>
Sent: Monday, October 30, 2017 10:29 AM
To: Anthony Temelini
Cc: Robert Freel; Alison Gosling
Subject: RE: 770 Brookfield - Boundary Condition Request
Attachments: 770 Brookfield Oct 2017.pdf

Hi Anthony,

The following are boundary conditions, HGL, for hydraulic analysis at 770 Brookfield St (zone 2C) assumed to be connected to the 305 mm on Brookfield St (see attached PDF for location).

Phase 1 Demands - Connection 1 Only

Minimum HGL = 124.6 m

Maximum HGL = 134.7 m

The maximum pressure is estimated to be above 80 psi. A pressure check at completion of construction is recommended to determine if pressure control is required.

Available fire flow = 467 L/s assuming a residual of 20 psi and a ground elevation of 78.4 m

Phase 2 Demands - Both Connections

Minimum HGL = 124.4 m (Both Connections)

Maximum HGL = 134.5 m (Both Connections)

The maximum pressure is estimated to be above 80 psi. A pressure check at completion of construction is recommended to determine if pressure control is required.

Available fire flow = 461 L/s assuming a residual of 20 psi and a ground elevation of 78.4 m (Connection 1)

Available fire flow = 484 L/s assuming a residual of 20 psi and a ground elevation of 77.7 m (Connection 2)

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.

Regards,

Cody Oram, P.Eng. Senior Engineer
Development Review, South Services

Planning, Infrastructure and Economic Development Department | Services de planification, d'infrastructure et de 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 **13422**, fax/téléc:613-580-2576, cody.oram@ottawa.ca

From: Anthony Temelini [mailto:ATemelini@dsel.ca]
Sent: Thursday, October 19, 2017 2:21 PM
To: Oram, Cody <Cody.Oram@ottawa.ca>
Cc: Robert Freel <RFreel@dsel.ca>; Alison Gosling <AGosling@dsel.ca>
Subject: RE: 770 Brookfield - Boundary Condition Request

Hi Cody,

In response to your questions:

1) It is not anticipated that the two connections will be looped within the municipal road allowance at this time;
2) Is it possible to get boundary conditions for both scenarios (i.e. boundary conditions for Phase 1 demands only and boundary conditions for the total demands)? At this time, there is still some uncertainty as to whether both connections would be installed independently or whether both would be installed as part of Phase 1.

Please let us know if you are able to provide the demands for both scenarios and feel free to contact me if you have any further questions.

Thank you,

Anthony Temelini, E.I.T.
Project Coordinator

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.524
email: atemelini@dsel.ca

From: Oram, Cody [mailto:Cody.Oram@ottawa.ca]
Sent: Wednesday, October 18, 2017 4:12 PM
To: Anthony Temelini
Cc: Robert Freel; Alison Gosling
Subject: RE: 770 Brookfield - Boundary Condition Request

Hi Anthony,

Our water modelling group requires clarification on the following;

1. Will the two connections be looped?
2. Does the consultant need boundary conditions for each phase, or just for the total demands? (If for each phase, are both connections to be installed in the first phase or only one?)

Thank you,
Cody

From: Oram, Cody
Sent: Wednesday, October 18, 2017 9:50 AM
To: 'Anthony Temelini' <ATemelini@dsel.ca>
Cc: Robert Freel <RFreel@dsel.ca>; Alison Gosling <AGosling@dsel.ca>; Shillington, Jeffrey <jeff.shillington@ottawa.ca>
Subject: RE: 770 Brookfield - Boundary Condition Request

Hi Anthony,

I've requested the water boundary conditions and will forward them to you as soon as I get them.

Cody

From: Anthony Temelini [mailto:ATemelini@dsel.ca]
Sent: Tuesday, October 17, 2017 5:49 PM
To: Shillington, Jeffrey <jeff.shillington@ottawa.ca>
Cc: Oram, Cody <Cody.Oram@ottawa.ca>; Robert Freel <RFreel@dsel.ca>; Alison Gosling <AGosling@dsel.ca>
Subject: RE: 770 Brookfield - Boundary Condition Request

Hi Jeff,

I just wanted to follow up on my e-mail below. Have you had a chance to review the boundary condition request for 770 Brookfield?

Please let me know.

Thanks,

Anthony Temelini, E.I.T.
Project Coordinator

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.524
email: atemelini@dsel.ca

From: Anthony Temelini
Sent: Wednesday, October 11, 2017 10:19 AM
To: 'jeff.shillington@ottawa.ca'
Cc: cody.oram@ottawa.ca; Robert Freel; Alison Gosling
Subject: FW: 770 Brookfield - Boundary Condition Request

Hi Jeff,

In Cody's absence, can you please review the boundary condition request below for 770 Brookfield?

Please let me know if you have any questions or comments.

Thank you,

Anthony Temelini, E.I.T.
Project Coordinator

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.524
email: atemelini@dsel.ca

From: Anthony Temelini
Sent: Friday, October 06, 2017 1:06 PM
To: 'cody.oram@ottawa.ca'
Cc: Alison Gosling; Robert Freel
Subject: 770 Brookfield - Boundary Condition Request

Good afternoon Cody,

We would like to request updated water boundary conditions for 770 Brookfield Road using the following proposed development demands:

1. Location of Service / Street Number: 770 Brookfield Road

2. Type of development and the amount of fire flow required for the proposed development:

   - The phased development proposes approximately 544 total residential units and 550 m^2 of total commercial space.
   - It is anticipated that the development will have a dual connection to the existing 305 mm diameter watermain within Brookfield Road, as shown by the attached water distribution map.
   - Fire demand based on FUS will be used to calculate fire demand. Sufficient information is unavailable at this time to complete a calculation – we would request that the available fire flow at 140 kPa be provided for later comparison.

3. Demands

Phase 1

	L/min	L/s
Avg. Daily	119.8	2.00
Max Day	346.4	5.77
Peak Hour	514.0	8.57

Phase 2

	L/min	L/s
Avg. Daily	119.4	1.99
Max Day	345.8	5.76
Peak Hour	512.9	8.55

Total

	L/min	L/s
Avg. Daily	239.2	3.99
Max Day	692.2	11.53
Peak Hour	1026.9	17.12

It you have any questions please feel free to contact me.

Thank you,

Anthony Temelini, E.I.T.
Project Coordinator

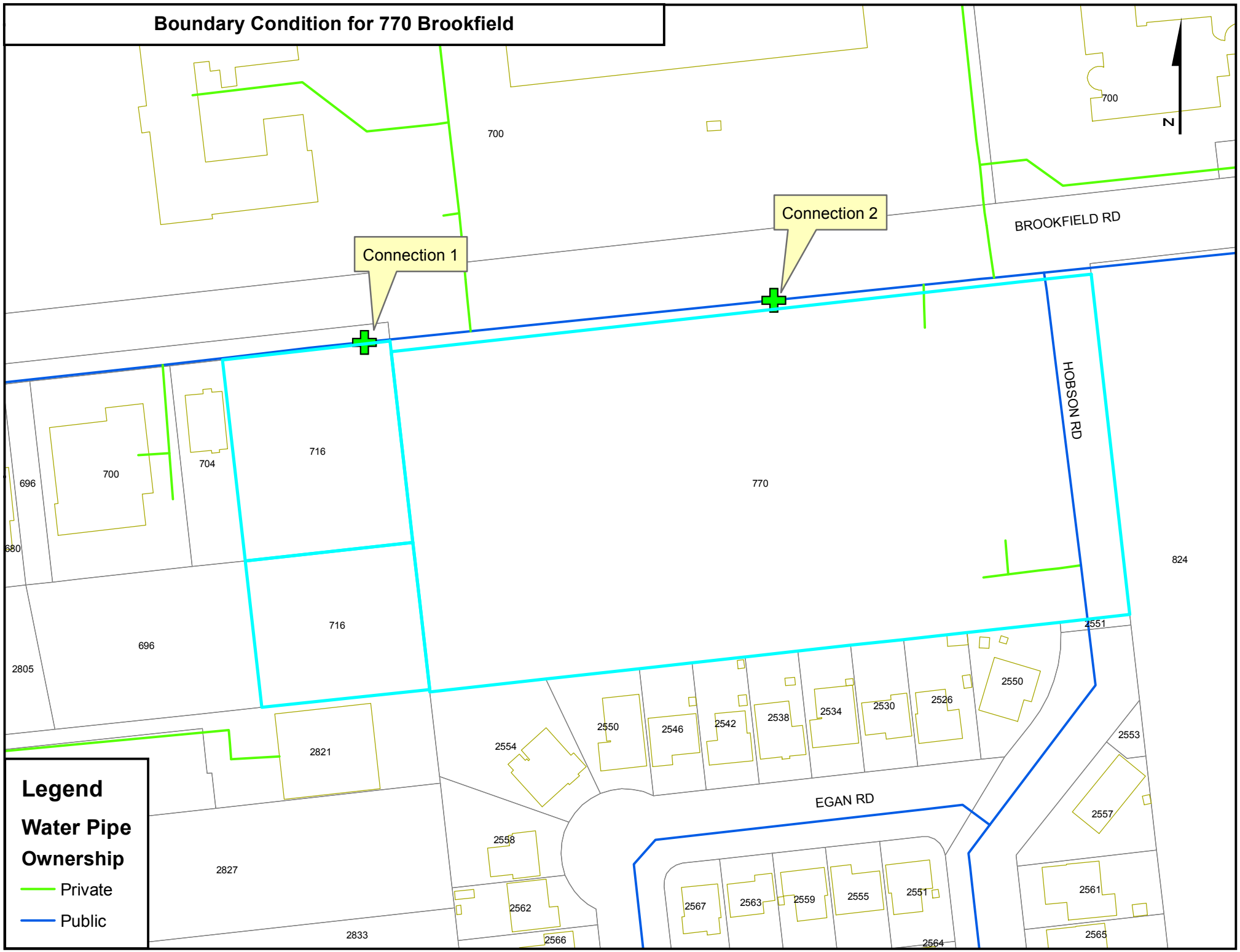
DSEL
david schaeffer engineering ltd.

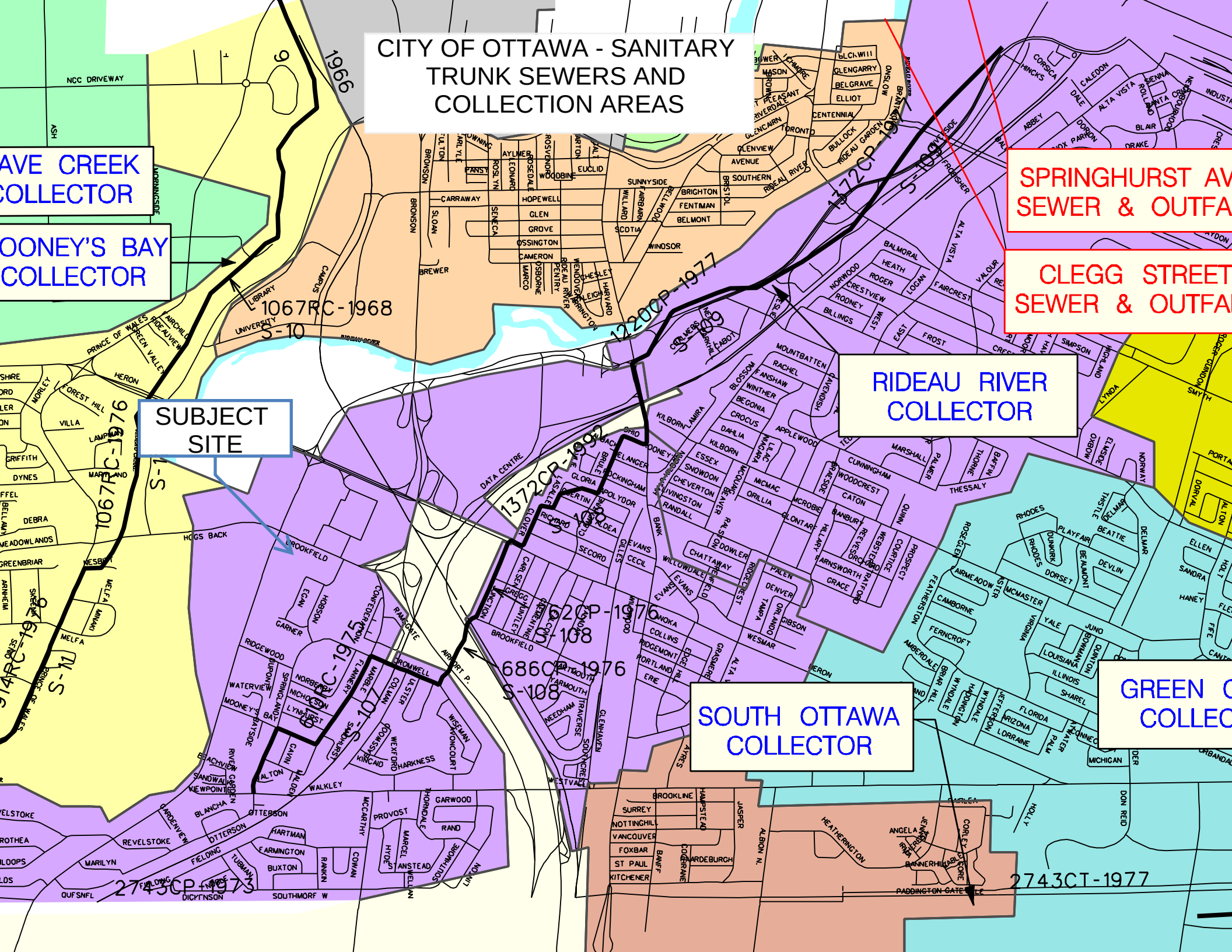
120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.524
email: atemelini@dsel.ca

'

Boundary Condition for 770 Brookfield




CITY OF OTTAWA - SANITARY TRUNK SEWERS AND COLLECTION AREAS
AVE CREEK COLLECTOR
OONEY'S BAY COLLECTOR
SUBJECT SITE
RIDEAU RIVER COLLECTOR
SOUTH OTTAWA COLLECTOR
SPRINGHURST AV SEWER & OUTFA
CLEGG STREET SEWER & OUTFA
GREEN C COLLEC
1067RC-1968
S-10
1372CP-1977
S-109
1220CP-1977
1372CP-1992
S-108
620CP-1976
S-108
686CT-1976
S-108
1067RC-1976
S-11
914RC-1976
S-11
1067RC-1975
S-107
2743CP-1973
2743CT-1977
NCC DRIVEWAY
1966
HOGS BACK
DATA CENTRE
AIRPORT P.

770 Brookfield Road
Proposed Site Conditions - Phase I

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2004

Site Area	1.24	**ha**

Extraneous Flow Allowances

Infiltration / Inflow	**0.35**	**L/s**

Domestic Contributions

Unit Type	Unit Rate	Units	Pop
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
Stacked Townhouse	2.3		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8	404	728

Total Pop	**728**	
Average Domestic Flow	**2.95**	**L/s**
Peaking Factor	**3.69**	
Peak Domestic Flow	**10.88**	**L/s**

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate		No. of Units	Avg Wastewater (L/s)
Commercial floor space*	5	$L/m^2/d$	2,095	0.24
Hospitals	900	L/bed/d		0.00
School	70	L/student/d		0.00
Industrial - Light**	35,000	L/gross ha/d		0.00
Industrial - Heavy**	55,000	L/gross ha/d		0.00

Average I/C/I Flow	**0.24**
Peak Institutional / Commercial Flow	0.36
Peak Industrial Flow**	0.00
Peak I/C/I Flow	**0.36**

** assuming a 12 hour commercial operation*

*** peak industrial flow per City of Ottawa Sewer Design Guidelines Appendix 4B*

Total Estimated Average Dry Weather Flow Rate	**3.2**	**L/s**
Total Estimated Peak Dry Weather Flow Rate	**11.2**	**L/s**
Total Estimated Peak Wet Weather Flow Rate	**11.6**	**L/s**

Hobin Architecture Inc.
770 Brookfield Road
Proposed Site Conditions - Phase II

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2004

Site Area 1.24 **ha**

Extraneous Flow Allowances

Infiltration / Inflow **0.35 L/s**

Domestic Contributions

Unit Type	**Unit Rate**	**Units**	**Pop**
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
Stacked Townhouse	2.3		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8	404	728

Total Pop **728**

Average Domestic Flow **2.95 L/s**

Peaking Factor **3.69**

Peak Domestic Flow **10.88 L/s**

Institutional / Commercial / Industrial Contributions

Property Type	**Unit Rate**		**No. of Units**	**Avg Wastewater (L/s)**
Commercial floor space*	5	$L/m^2/d$	149	0.02
Hospitals	900	L/bed/d		0.00
School	70	L/student/d		0.00
Industrial - Light**	35,000	L/gross ha/d		0.00
Industrial - Heavy**	55,000	L/gross ha/d		0.00

Average I/C/I Flow **0.02**

Peak Institutional / Commercial Flow 0.03
Peak Industrial Flow** 0.00
Peak I/C/I Flow **0.03**

** assuming a 12 hour commercial operation*

*** peak industrial flow per City of Ottawa Sewer Design Guidelines Appendix 4B*

Total Estimated Average Dry Weather Flow Rate	**3.0 L/s**
Total Estimated Peak Dry Weather Flow Rate	**10.9 L/s**
Total Estimated Peak Wet Weather Flow Rate	**11.3 L/s**

Hobin Architecture Inc.
770 Brookfield Road
Proposed Site Conditions - Ultimate

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2004

Site Area 2.47 **ha**

Extraneous Flow Allowances

Infiltration / Inflow **0.69 L/s**

Domestic Contributions

Unit Type	**Unit Rate**	**Units**	**Pop**
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
Stacked Townhouse	2.3		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8	808	1455

Total Pop **1455**

Average Domestic Flow **5.89 L/s**

Peaking Factor **3.69**

Peak Domestic Flow **21.74 L/s**

Institutional / Commercial / Industrial Contributions

Property Type	**Unit Rate**		**No. of Units**	**Avg Wastewater (L/s)**
Commercial floor space*	5	$L/m^2/d$	2,244	0.26
Hospitals	900	L/bed/d		0.00
School	70	L/student/d		0.00
Industrial - Light**	35,000	L/gross ha/d		0.00
Industrial - Heavy**	55,000	L/gross ha/d		0.00

Average I/C/I Flow **0.26**

Peak Institutional / Commercial Flow 0.39
Peak Industrial Flow** 0.00
Peak I/C/I Flow **0.39**

** assuming a 12 hour commercial operation*

*** peak industrial flow per City of Ottawa Sewer Design Guidelines Appendix 4B*

Total Estimated Average Dry Weather Flow Rate	**6.2 L/s**
Total Estimated Peak Dry Weather Flow Rate	**22.1 L/s**
Total Estimated Peak Wet Weather Flow Rate	**22.8 L/s**

EXISTING SANITARY SEWER CALCULATION SHEET

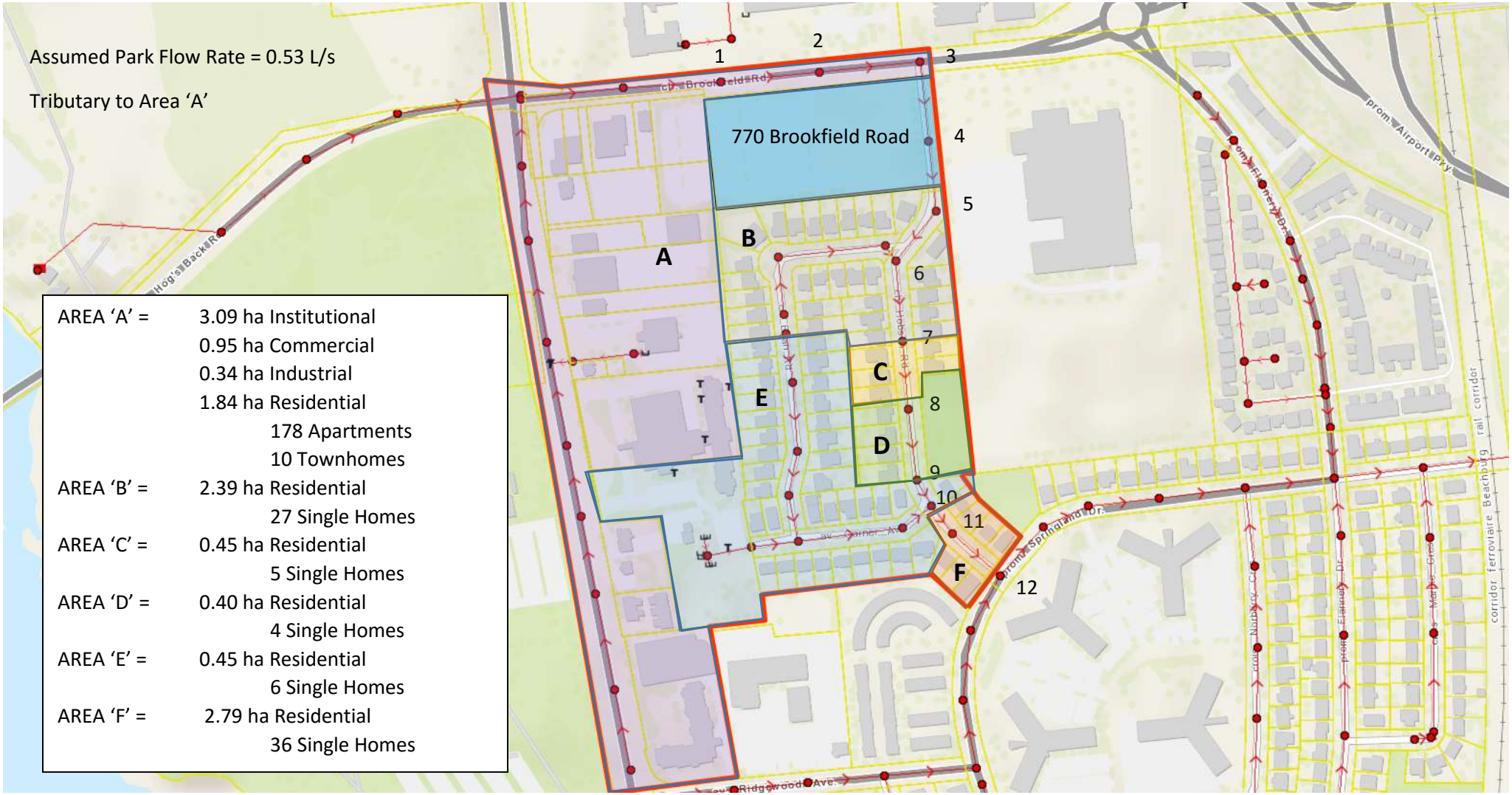
CLIENT: **HOBIN ARCHITECTURE INC.**
LOCATION: **770 Brookfield Road**
FILE REF: **17-966**
DATE: **22-Nov-17**

DESIGN PARAMETERS

Avg. Daily Flow Res.	350	L/p/d	Peak Fact Res. Per Harmons:	Min = 2.0, Max =4.0	Infiltration / Inflow	0.28	L/s/ha
Avg. Daily Flow Comn	50,000	L/ha/d	Peak Fact. Comm.	1.5	Min. Pipe Velocity	0.60	m/s full flowing
Avg. Daily Flow Instit.	50,000	L/ha/d	Peak Fact. Instit.	1.5	Max. Pipe Velocity	3.00	m/s full flowing
Avg. Daily Flow Indus	35,000	L/ha/d	Peak Fact. Indust. per MOE graph		Mannings N	0.013	

Location			Residential Area and Population									Commercial		Institutional		Industrial			Infiltration				Pipe Data											
Area ID	Up	Down	Area	Number of Units by type				Pop.	Cumulative Area	Cumulative Pop.	Peak. Fact.	Q_{res}	Area	Accu. Area	Area	Accu. Area	Area	Accu. Area	Q_{C+I+I} †	Total Area	Accu. Area	Infiltration Flow†	Total Flow	DIA	Slope	Length	$A_{hydraulic}$	R	Velocity	Q_{cap}	Q / Q full	$Q_{residual}$	US INV	DS INV
			(ha)	Singles	Semi's	Town's	Apt's		(ha)		(-)	(L/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(mm)	(%)	(m)	(m^2)	(m)	(m/s)	(L/s)	(-)	(L/s)		
A †	1	2	1.840			10	178	347.0	1.840	347.0	4.00	5.62	0.95	0.95	3.09	3.09	0.34	0.34	4.3	6.220	6.220	1.742	11.68	250	0.29	123.7	0.049	0.063	0.65	32.1	0.36	20.4	75.27	74.91
	2	3	0.000					0.0	1.840	347.0	4.00	5.62		0.95		3.09		0.34	4.3	0.000	6.220	1.742	11.68	250	0.21	126.7	0.049	0.063	0.56	27.4	0.43	15.8	74.91	74.64
	3	4	0.000					0.0	1.840	347.0	4.00	5.62		0.95		3.09		0.34	4.3	0.000	6.220	1.742	11.68	300	0.21	99.9	0.071	0.075	0.63	44.3	0.26	32.7	74.64	74.43
	4	5	0.000					0.0	1.840	347.0	4.00	5.62		0.95		3.09		0.34	4.3	0.000	6.220	1.742	11.68	300	0.20	88.3	0.071	0.075	0.62	43.7	0.27	32.0	74.43	74.25
B	5	6	2.390	27				92.0	4.230	439.0	4.00	7.11		0.95		3.09		0.34	4.3	2.390	8.610	2.411	13.84	300	0.21	80.0	0.071	0.075	0.63	44.6	0.31	30.8	74.25	74.08
	6	7	0.000					0.0	4.230	439.0	4.00	7.11		0.95		3.09		0.34	4.3	0.000	8.610	2.411	13.84	300	0.22	100.3	0.071	0.075	0.64	45.3	0.31	31.5	74.08	73.86
C	7	8	0.450	5				17.0	4.680	456.0	3.99	7.38		0.95		3.09		0.34	4.3	0.450	9.060	2.537	14.23	300	0.43	85.7	0.071	0.075	0.90	63.5	0.22	49.3	73.86	73.49
D	8	9	0.400	4				14.0	5.080	470.0	3.99	7.59		0.95		3.09		0.34	4.3	0.400	9.460	2.649	14.55	300	0.18	89.1	0.071	0.075	0.58	41.0	0.36	26.4	73.49	73.33
	9	10	0.000					0.0	5.080	470.0	3.99	7.59		0.95		3.09		0.34	4.3	0.000	9.460	2.649	14.55	300	0.43	37.4	0.071	0.075	0.89	63.2	0.23	48.7	73.33	73.17
E	10	11	0.450	6				20.0	5.530	490.0	3.98	7.90		0.95		3.09		0.34	4.3	0.450	9.910	2.775	14.98	300	0.26	42.4	0.071	0.075	0.70	49.2	0.30	34.3	73.17	73.06
F	11	12	2.790	36				122.0	8.320	612.0	3.93	9.74		0.95		3.09		0.34	4.3	2.790	12.700	3.556	17.61	300	0.23	79.7	0.071	0.075	0.65	46.0	0.38	28.4	73.06	72.88

† Park flow included as part of the indicated flow rate


Assumed Park Flow Rate = 0.53 L/s
Tributary to Area 'A'
770 Brookfield Road
A
B
C
D
E
F
1
2
3
4
5
6
7
8
9
10
11
12
AREA 'A' = 3.09 ha Institutional
0.95 ha Commercial
0.34 ha Industrial
1.84 ha Residential
178 Apartments
10 Townhomes
AREA 'B' = 2.39 ha Residential
27 Single Homes
AREA 'C' = 0.45 ha Residential
5 Single Homes
AREA 'D' = 0.40 ha Residential
4 Single Homes
AREA 'E' = 0.45 ha Residential
6 Single Homes
AREA 'F' = 2.79 ha Residential
36 Single Homes

Hobin Architecture Inc.
770 Brookfield Road
Existing Site Conditions - Ultimate

Estimated Peak Stormwater Flow Rate
City of Ottawa Sewer Design Guidelines, 2012

Existing Drainage Charateristics From Internal Site

Area	2.470	ha
C	0.51	Rational Method runoff coefficient
L	103.4	m
Up Elev	78.87	m
Dn Elev	77.27	m
Slope	1.5	%
Tc	16.8	min

	Imp.	Perv.	Total
Area	1.110	1.360	2.470
C	0.9	0.2	0.51

1) Time of Concentration per Federal Aviation Administration

$$t_c = \frac{1.8(1.1-C)L^{0.5}}{S^{0.333}}$$

tc, in minutes
C, rational method coefficient, (-)
L, length in ft
S, average watershed slope in %

Estimated Peak Flow

	2-year	5-year	100-year	
i	57.9	78.2	133.6	mm/hr
Q	204.2	276.0	589.7	L/s

Note:
C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

Stormwater - Proposed Development
City of Ottawa Sewer Design Guidelines, 2012

Target Flow Rate

Area 2.47 ha
C 0.50 Rational Method runoff coefficient
t_c 16.8 min

2-year
i 57.9 mm/hr
Q 198.5 L/s

Estimated Post Development Peak Flow from Unattenuated Areas

Total Area 0.25 ha
C 0.60 Rational Method runoff coefficient

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual}* (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
10.0	104.2	42.9	42.9	0.0	0.0	178.6	91.9	91.9	0.0	0.0

Note:
C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

Estimated Post Development Peak Flow from Attenuated Areas

Total Area 2.22 ha
C 0.85 Rational Method runoff coefficient

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
10	104.2	546.9	52.9	494.0	296.4	178.6	1102.6	106.6	996.0	597.6
15	83.6	438.6	53.0	385.6	347.0	142.9	882.4	106.6	775.8	698.2
20	70.3	368.7	53.1	315.7	378.8	120.0	740.7	106.6	634.1	760.9
25	60.9	319.6	53.1	266.5	399.8	103.8	641.3	106.6	534.7	802.0
30	53.9	283.1	53.2	229.9	413.8	91.9	567.3	106.6	460.7	829.3
35	48.5	254.7	53.2	201.4	423.0	82.6	509.9	106.6	403.3	847.0
40	44.2	231.9	53.3	178.6	428.8	75.1	464.0	106.6	357.4	857.9
45	40.6	213.2	53.3	159.9	431.9	69.1	426.4	106.6	319.8	863.5
50	37.7	197.6	53.3	144.3	432.9	64.0	394.9	106.6	288.3	865.0
55	35.1	184.4	53.4	131.0	432.3	59.6	368.2	106.6	261.6	863.3
60	32.9	172.9	53.4	119.5	430.3	55.9	345.1	106.6	238.6	858.9
65	31.0	162.9	53.4	109.5	427.1	52.6	325.1	106.6	218.5	852.2
70	29.4	154.2	53.4	100.7	423.0	49.8	307.5	106.6	200.9	843.7
75	27.9	146.4	53.5	92.9	418.1	47.3	291.8	106.6	185.2	833.5
80	26.6	139.4	53.5	85.9	412.5	45.0	277.8	106.6	171.2	822.0
85	25.4	133.2	53.5	79.7	406.2	43.0	265.2	106.6	158.7	809.2
90	24.3	127.5	53.5	74.0	399.4	41.1	253.9	106.6	147.3	795.3
95	23.3	122.3	53.5	68.8	392.1	39.4	243.5	106.6	136.9	780.5
100	22.4	117.6	53.6	64.1	384.3	37.9	234.1	106.6	127.5	764.8
105	21.6	113.3	53.6	59.7	376.2	36.5	225.4	106.6	118.8	748.4
110	20.8	109.3	53.6	55.7	367.7	35.2	217.4	106.6	110.8	731.3

Note:
C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

5-year $Q_{attenuated}$ 53.34 L/s **100-year $Q_{attenuated}$ 106.58 L/s**
5-year Max. Storage Required 432.9 m^3 **100-year Max. Storage Required 865.0 m^3**

Summary of Release Rates and Storage Volumes

Control Area	5-Year Release Rate (L/s)	5-Year Storage (m^3)	100-Year Release Rate (L/s)	100-Year Storage (m^3)
Unattenuated Areas	42.9	0.0	91.9	0.0
Attenutated Areas	53.3	432.9	106.6	865.0
Total	**96.2**	**432.9**	**198.5**	**865.0**

BROOKFIELD ROAD

HOBSON ROAD

78.87

LENGTH=103.4m

EXISTING STORM WATER PATH

DSEL
david schaeffer engineering ltd
SMART SUBDIVISIONS™

120 Iber Road Unit 103
Stittsville, Ontario, K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

PROJ NO.:	17-966
DRAWN BY:	AJG
DATE:	2017-11-22
SCALE:	1:750
FIGURE NO.:	FIG-1

z:\projects\17-966_atlantis_770-brookfield\b_design\b2_drawings\b2-2_main (dsel)\sub-1\cad\2017-11-22_966_spa_ajg.dwg

Robert Freel

From: Jocelyn Chandler <jocelyn.chandler@rvca.ca>
Sent: December-17-14 2:40 PM
To: Robert Freel
Subject: RE: 770 Brookfield - RVCA Pre-consult

Hello Bobby,
As discussed:
The stormwater from this site will be connected to the municipal sewers on either Brookfield or Hobson Rd which outlet 500 or 1000 metres respectively downstream to Sawmill Creek with no quality treatment. Sawmill Creek requires 80% TSS removal for travelled surfaces. The rooftops and landscaped areas do not require quality treatment for surface water quality objectives.

Jocelyn

Jocelyn Chandler M.Pl. MCIP, RPP
Planner, RVCA
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jocelyn.chandler@rvca.ca
www.rvca.ca
mail: Box 599 3889 Rideau Valley Dr., Manotick, ON K4M 1A5
courier: 3889 Rideau Valley Dr., Nepean, ON K2C 3H1

From: Robert Freel [mailto:rfreel@dsel.ca]
Sent: Wednesday, December 17, 2014 2:16 PM
To: Jocelyn Chandler
Subject: 770 Brookfield - RVCA Pre-consult

Hi Jocelyn,

As discussed please find attached conceptual site plans for the Brookfield development Phase 1 and ultimate. It is contemplated that servicing would occur from both Brookfield and Hobson Roads. Can you provide any criteria that maybe required with regards to quality.

If you would like to discuss please feel free to contact me.

Thanks,

Bobby Freel, EIT.

DSEL

david schaeffer engineering ltd.

120 Iber Road, Unit 203
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.258
cell: (613) 314-7675
email: rfreel@DSEL.ca

Alison Gosling

From: Des Rochers, Christina (MOECC) <Christina.Desrochers@ontario.ca>
Sent: Friday, November 10, 2017 1:38 PM
To: Alison Gosling
Subject: RE: 770 Brookfield Road

Thank you Alison,

Based on your clarification below and having reviewed the project information provided for the proposed Hobin Architecture Inc. development, it is the Ministry's position that you have correctly identified that the works proposed at 770 Brookfield Road meet the exemption requirements set out in Ontario Regulation 525/98 made under the Ontario Water Resources Act.

Subsection 53(1) and (3) of the Act do not apply to the use, operation, establishment, alteration, extension or replacement of or a change in a storm water management facility that,

- *(a) is designed to service one lot or parcel of land;*
- *(b) discharges into a storm sewer that is not a combined sewer;*
- *(c) does not service industrial land or a structure located on industrial land; and*
- *(d) is not located on industrial land.*

As we discussed on November 9, 2017, should the parcel be subdivided into more than one lot after the completion of the development, an ECA will become a mandatory requirement.

Thank you.

Christina Des Rochers
Water Inspector | Inspectrice de l'eau
Safe Drinking Water Branch | Direction du contrôle de la qualité de l'eau potable
Ministry of the Environment and Climate Change | Ministère de l'Environnement et de l'Action en Matière de changement climatique
Tel. 613-521-3450 ex. 231
Fax. 613-521-5437
Spills Action Centre | Centre d'intervention en cas de déversement 1-800-268-6060

From: Alison Gosling [mailto:AGosling@dsel.ca]
Sent: November-10-17 9:02 AM
To: Des Rochers, Christina (MOECC)
Subject: RE: 770 Brookfield Road

Hi Christina,

It is our understanding that the development will remain under the one ownership in the post-development phase and there will be one stormwater system to service the entire parcel.

Thank you,

Alison Gosling, E.I.T.
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.542
fax: (613) 836-7183
email: agosling@dsel.ca

From: MOECCOttawaSewage (MOECC) [mailto:MOECCOttawaSewage@ontario.ca]
Sent: Tuesday, October 31, 2017 11:05 AM
To: Alison Gosling <AGosling@dsel.ca>
Cc: Des Rochers, Christina (MOECC) <Christina.Desrochers@ontario.ca>
Subject: RE: 770 Brookfield Road

Good morning,

The MOECC Ottawa District Office has received your pre-submission consultation request. The Water Inspector assigned to your file is Christina Des Rochers and will be contacting you.

Thank you,

Jéhanne Hurlbut
District Administrative Assistant (Bilingual)
Ontario Ministry of the Environment and Climate Change
Ottawa District Office
103-2430 Don Reid Drive
Ottawa, ON K1H 1E1
Ph: (613) 521-3450 X 221

From: Alison Gosling [mailto:AGosling@dsel.ca]
Sent: Monday, October 30, 2017 12:19 PM
To: MOECCOttawaSewage (MOECC) <MOECCOttawaSewage@ontario.ca>
Subject: 770 Brookfield Road

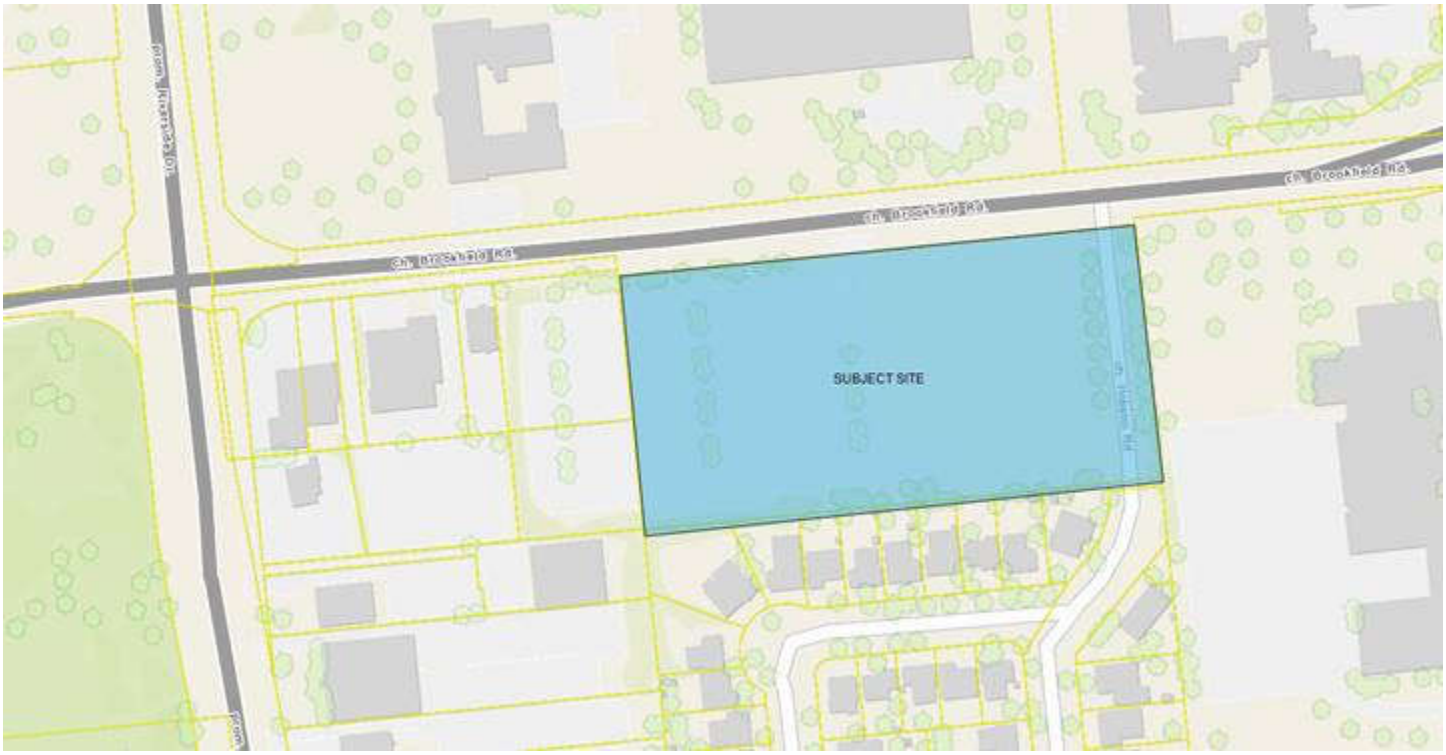
Good afternoon,

We just wanted to touch base with you regarding a proposed Phase I development we are working on located at 770 Brookfield Road.

Currently comprised a single parcel of land, the existing 2.5ha site currently an above ground parking lot and is zoned General Mixed Use. The development proposes to construct 5 residential/commercial buildings.It appears that the existing site currently directs flow towards the private catch basin system within the subject site and is tributary to the Sawmill Creek sub-watershed.

As the proposed sewage works and stormwater management facility will be servicing a single parcel of land which will be owned and operated by a single entity, does not discharge to a combined sewer system, and is not proposed to be used for industrial purposes, it is assumed this falls within the exemption requirements for an Environmental Compliance Approval as per O.Reg 525/98, Section 3 (a) & Ontario Water Resources Act Section 53. 6 (c).

I hope you could comment on my assumption that this property would be exempt from requiring an ECA. Please feel free to call to discuss this further.



Thank you,

Alison Gosling, E.I.T.
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

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email: agosling@dsel.ca