November 1st, 2022

Attention: **Jennifer McGahan**

Reference: **1835 Stittsville Main Street Redevelopment**
Zoning By-law Amendment
Servicing Brief
City File No. D02-02-22-0016
Our Project No. 22008

Dear Ms. McGahan:

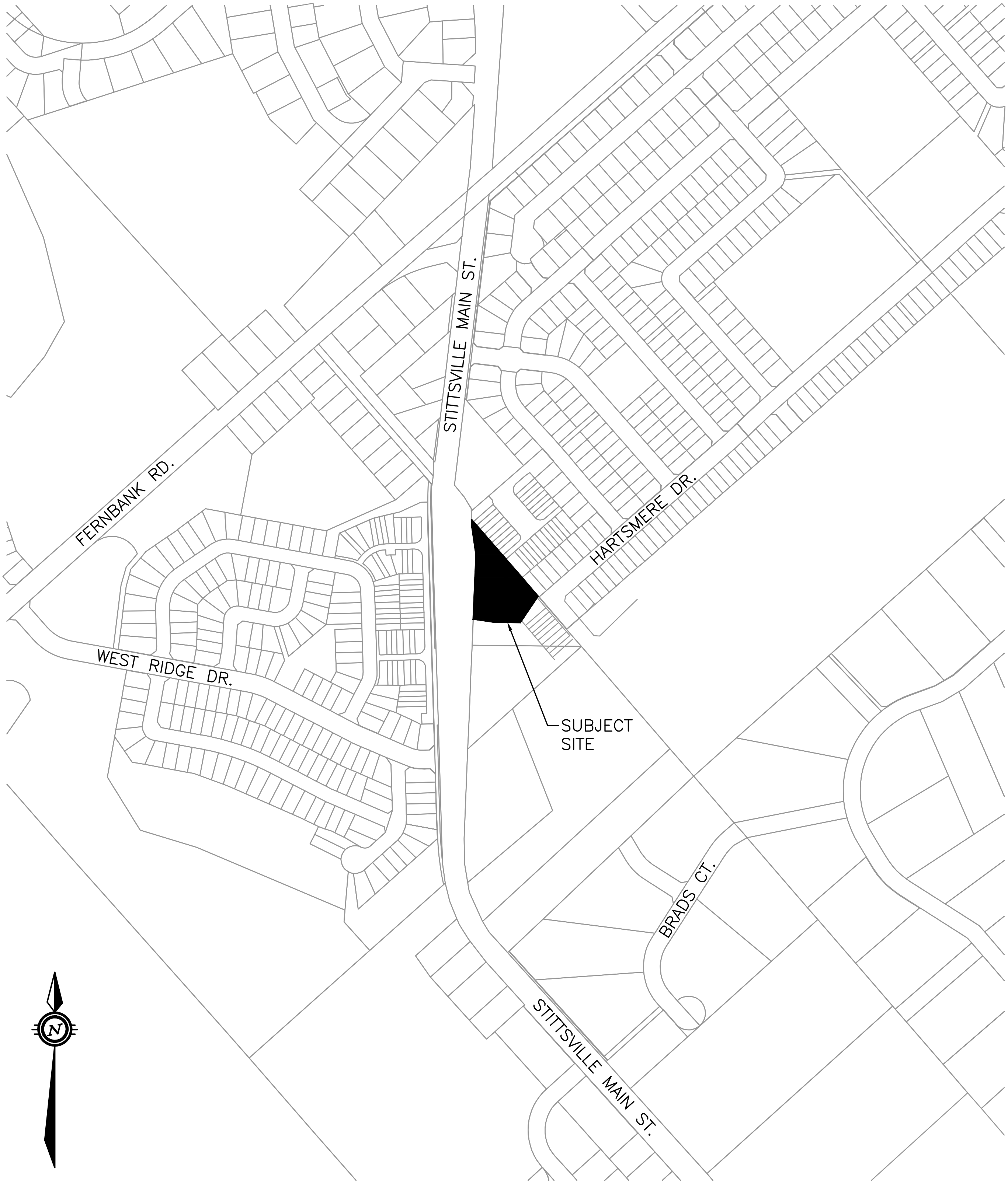
This Servicing Brief has been prepared to summarize the servicing and grading designs required in support of the zoning by-law amendment for the redevelopment of the property (currently zoned Rural Countryside Zone, RU) located at 1835 Stittsville Main Street in the community of Stittsville. The property is bounded by Stittsville Main Street to the west and existing residential homes to the north, east and south (refer to Fig. 1.0 – Key Plan following page 1). The redevelopment work is to include a severance of the 0.53 hectare property to create two lots and one retained parcel. The redevelopment will require a rezoning from the current Rural Countryside Zone (RU) designation to Residential Third Density (R3). The developer is proposing to construct two new single-family homes in addition to the existing dwelling to remain, however, the rezoning designation would allow for a higher density development.

1.0 Servicing Design

The Stittsville South – Area 6 subdivision abuts the south-east property boundary of the subject site. The subdivision design was detailed in the report *Detailed Servicing & Stormwater Management Report*, prepared by Novatech, dated July 18, 2016 (herein referred to as the Novatech Report). As part of the subdivision design (previously approved by the City of Ottawa), service stubs were provided for the future Bell lands (i.e. subject site) within a 6.0 metre service easement off of Hartsmere Drive (refer to Novatech design drawings under **Attachment A**). At the time, the subject site was anticipated to be developed into a 100-unit senior's residence. The existing services provided within the 6.0 metre easement include:

- A 150 mm diameter watermain
- A 200 mm diameter sanitary sewer
- A 375 mm diameter storm sewer

The existing service stubs contained within the 6.0 metre easement were originally proposed to be extended into the subject site to service the two new single-family homes. The extension of the existing infrastructure (water, sanitary and storm) was to be contained within a proposed 6.0 metre easement located along the north-east property boundary. However, through multiple consultations with the City of Ottawa, it was ultimately concluded that the City would not accept water supply for fire protection via an extension of the existing watermain stub off Hartsmere Drive. The City's primary concerns with



Robinson
Land Development

scale N.T.S.	1835 STITTSVILLE MAIN STREET		project no. 22008
date 11/02/22	KEY PLAN		FIG 1.0
drawn by BLM			

the original proposal were related to the requirement for easements on private property and the lack of accessibility between the proposed hydrant location and the new dwellings.

In keeping the recommendations provided by the City, the new dwellings are proposed to be serviced with municipal infrastructure via extensions of the existing sanitary sewer system and existing watermain system located within the Stittsville Main Street right-of-way. The existing municipal systems will be extended from Stittsville Main Street along the existing asphalt driveway which is contained within the City owned right-of-way. The existing dwelling will continue to be serviced via the existing well and septic system, however, the existing service stubs off Hartsmere Drive could be utilized to service the existing dwelling if the Owner desires to do so in the future. Refer to correspondence with the City under **Attachment A**.

1.1 Water Servicing

1.1.1 Hydraulic Model

As discussed under **Section 1.0**, the City will not accept water supply for fire protection via an extension of the existing watermain stub off Hartsmere Drive. As requested by the City, water supply for domestic use and fire protection will be provided by an extension of the 203 mm diameter watermain located within the Stittsville Main Street right-of-way. A proposed 254 mm diameter watermain extension will be provided along the existing asphalt driveway which is contained within the City owned right-of-way.

The new dwellings on proposed Lots 2 and 3 will be serviced by new 25 mm diameter water service connections to the proposed 254 mm diameter watermain extension located along the existing driveway. The existing dwelling on Lot 1 will continue to be serviced by the existing on-site well, however, the existing watermain stub off Hartsmere Drive could be utilized to service the existing dwelling if the Owner desires to do so in the future.

A water distribution hydraulic model was created using H2OMap Water software for the proposed development. The hydraulic model incorporated the proposed watermain layout, proposed hydrant location, boundary conditions provided by the City of Ottawa, and typical “C” factors in accordance with the current Ottawa Water Distribution Design Guidelines. The boundary conditions provided by the City are based on previous revision water demands and fire flows, however, the outputs are not expected to significantly change. Refer to the Hydraulic Water Model figure and boundary conditions provided under **Attachment B**.

1.1.2 Domestic Demands

Water demands for the proposed development on the existing municipal system have been calculated in accordance with the current Ottawa Water Distribution Design Guidelines. Since the population is below 500 persons, maximum day and maximum hour peaking factors shall be in accordance with Table 3-3 of the MOE Design Guidelines For Drinking Water Systems. Water demands for the proposed development have been calculated as follows:

2 Single-Family Homes x (3.4 persons/unit) = **6.8 persons**
Average Daily Demand = (6.8 persons) x (280 L/person/day) / 86400 s/day = **0.022 L/s**
Maximum Daily Demand = (9.5) x (0.022 L/s) = **0.209 L/s**
Maximum Hourly Demand = (14.3) x (0.209 L/s) = **2.994 L/s**

Since the rezoning of the property would permit a higher density development in the future, water demands have also been assessed assuming that the two single-family homes are replaced with a 5-unit townhouse (largest footprint achievable based on zoning setbacks). Water demands for the demonstration development have been calculated as follows:

5-Unit Townhouse x (2.7 persons/unit) = **13.5 persons**
Average Daily Demand = (13.5 persons) x (280 L/person/day) / 86400 s/day = **0.044 L/s**
Maximum Daily Demand = (9.5) x (0.044 L/s) = **0.416 L/s**
Maximum Hourly Demand = (14.3) x (0.416 L/s) = **5.943 L/s**

As calculated above, the demonstration development (i.e. 5-unit townhouse) will create water demands approximately 2 times greater than the proposed development (i.e. 2 single-family homes). Refer to the watermain design sheets provided under **Attachment B** for more details.

1.1.3 Domestic Model Results

As noted under *Section 7.3* of the *Novatech Report*, the Bell Lands (i.e. subject site) was anticipated to have low pressures during peak hour conditions that does not meet the minimum City of Ottawa design criteria of 40 psi. This was, however, based on the assumed configuration of a 100-unit senior's residence. A hydraulic simulation was completed for the proposed redevelopment using the water demands calculated in **Section 1.1.2** above. The system was analyzed at the proposed service connections to each new dwelling. The results of the hydraulic simulation have been summarized in **Table 1** below:

Table 1: Hydraulic Simulation Domestic Demands

Condition	Lot 2 (psi)	Lot 3 (psi)
Peak Hour Pressure	45.06	45.06
Maximum Pressure	52.17	52.17

Notes:
1. Lot 2 is denoted as junction J6 on the Hydraulic Model in **Attachment B**.
2. Lot 3 is denoted as junction J2 on the Hydraulic Model in **Attachment B**.

As demonstrated in **Table 1** above, the peak hour pressure at each new dwelling is expected to be above the minimum allowable pressure of 40 psi. Further, the maximum pressure at each dwelling is expected to be below the maximum allowable pressure of 80 psi. A hydraulic simulation was also completed using demands for the townhouse demonstration scenario, however, the changes to outputs were very marginal. Therefore, the hydraulic simulation has demonstrated that the proposed water servicing has been designed in accordance with the current Ottawa Water Distribution Design Guidelines. Water model outputs for the proposed single-family scenario and demonstration townhouse scenario have been provided in **Attachment B**.

1.1.4 Fire Flow

The total required fire flow for the three single-family dwellings and the demonstration 5-unit townhouse have been calculated in accordance with the Water Supply for Public Fire Protection, Fire Underwriters Survey, v.2020 (herein referred to as the FUS guidelines). The total required fire flows have been determined using the full calculation method from the FUS guidelines and summarized below:

Total Required Fire Flow (Lot #1; Existing Single-Family)	**7,000 L/min**
Total Required Fire Flow (Lot #2, Proposed Single-Family)	**7,000 L/min**
Total Required Fire Flow (Lot #3, Proposed Single-Family)	**7,000 L/min**
Total Required Fire Flow (Lot #2, Proposed Townhouse)	**7,000 L/min**

Refer to supporting FUS calculations under **Attachment B** for more details.

In accordance with the FUS guidelines, for one and two-family dwellings not exceeding two storeys in height and having a total effective area of not more than 450 m^2, the total required fire flow may be determined using the values provided in Table 7 of the guidelines. For dwellings exceeding 450 m^2 or for row housing, the total required fire flow may be determined from Table 8. The total required fire flows have been determined using the simple calculation method from the FUS guidelines and summarized below:

Total Required Fire Flow (Lot #1; Existing Single-Family)	**6,000 L/min**
Total Required Fire Flow (Lot #2, Proposed Single-Family)	**4,000 L/min**
Total Required Fire Flow (Lot #3, Proposed Single-Family)	**4,000 L/min**
Total Required Fire Flow (Lot #2, Proposed Townhouse)	**6,000 L/min**

Since the proposed development is not considered to be large or complex, the simple method would be deemed appropriate in determining the total required fire flows.

A max. day plus fire flow simulation was completed for the proposed hydrant location. The simulation determined that there is an available fire flow of 9,549.17 L/min at a reference pressure of 20 psi. Under the townhouse demonstration scenario, the available fire flow is marginally lower at a value of 9,534.45 L/min. Since the available fire flow from the proposed hydrant is higher than the required fire flows calculated above, the hydrant location is adequate to service the proposed development. Refer to the fire flow reports under **Attachment B**. It should be noted that under current conditions, the existing dwelling does not have adequate fire protection and therefore any improvements for this dwelling should be considered beneficial.

1.1.5 Hydrant Analysis

As discussed under **Section 1.0**, the City will not accept water supply for fire protection via an extension of the existing watermain stub off Hartsmere Drive due to the requirement for easements on private property and the lack of accessibility between the proposed hydrant location and the new dwellings. Therefore, a new hydrant with a connection to the proposed 254 mm diameter watermain extension, is proposed to be located along the existing asphalt driveway, contained within the City owned right-of-way. The proposed hydrant location will be easily accessible and will not require the creation of any easements, alleviating the City's previous concerns. The proposed hydrant will also be located towards the end of the proposed watermain extension, in keeping with the City's standard drawing for residential dead-end streets. The existing asphalt driveway will be required to operate as the designated fire route, the suitability of which should be reviewed by the local fire department.

In accordance with City of Ottawa Technical Bulletin ISTB-2018-02, the aggregate fire flow capacity of all contributing fire hydrants within 150 metres of a building (measured in accordance with Table 1 – Maximum flow to be considered from a given hydrant), shall not be less than the required fire flow. As demonstrated on the hydrant coverage plans (provided under **Attachment B**), the contributing fire flow (from hydrants within 150 metres) is greater than the required fire flow for each dwelling. Therefore, it has been further demonstrated that there is sufficient fire flow available to support the proposed development.

1.1.6 Water Age Analysis

As requested by the City, a water age analysis has been completed for the proposed watermain extension given that the system terminates at a dead-end. The estimated water age for the proposed development scenario (i.e. 2 single-family homes) has been calculated as follows:

Watermain Cross-Sectional Area = $\pi(r^2) = \pi(0.254/2)^2 = 0.0507\ m^2$

Watermain Length = 121 m

Watermain Volume = $(0.0507\ m^2) \times (121\ m) = 6.13\ m^3$

Average Day Demand = (6.8 persons) x (280 L/person/day) = 1904 L/day = 1.904 m^3/day

Water Age = $(6.13\ m^3) / (1.904\ m^3/day)$ = **3.22 days**

For comparison the water age has also been calculated for the demonstration scenario (i.e. 5-unit townhouse) as follows:

Average Day Demand = (13.5 persons) x (280 L/person/day) = 3780 L/day = 3.78 m^3/day

Water Age = $(6.13\ m^3) / (3.78\ m^3/day)$ = **1.62 days**

As demonstrated above, the estimated water age under the lowest demand scenario is 3.22 days which is reasonable to maintain water quality.

1.2 Sanitary Servicing

As requested by the City, an extension of the existing sanitary sewer system within the Stittsville Main Street right-of-way will be required to service the proposed development. A proposed 200 mm diameter sanitary sewer extension will be provided along the existing asphalt driveway which is contained within the City owned right-of-way. The proposed sanitary sewer system will outlet to the existing sanitary maintenance hole (MH43A) located on the westside of Stittsville Main Street. The existing sewer system was designed by IBI Group in support of the Harris Lands development. Refer to the design drawings provided under **Attachment A**.

The new dwellings on proposed Lots 2 and 3 will be serviced by new 135 mm diameter sanitary service connections to the proposed 200 mm diameter sanitary sewer extension located along the existing driveway. The existing dwelling on Lot 1 will continue to be serviced by the existing on-site septic system, however, the existing sanitary sewer stub off Hartsmere Drive could be utilized to service the existing dwelling if the Owner desires to do so in the future.

Using current City of Ottawa design guidelines, the peak sanitary design flow for the proposed development has been calculated as follows:

Population = 2 single-family homes x (3.4 persons/unit) = **6.8 persons**

Peak Factor = **3.74** (Harmon Equation)

Peak Population Flow = (3.74) x (6.8 persons) x (280 L/person/day) / (86400 s/day)
Peak Population Flow = **0.08 L/s**

Extraneous Flow = (0.47 ha) x (0.33 L/s/ha) = **0.16 L/s**

Peak Design Flow = (0.08 L/s) + (0.16 L/s) = **0.24 L/s**

Since the rezoning of the property would permit a higher density development in the future, sanitary flows have also been assessed assuming that the two single-family homes are replaced with a 5-unit townhouse (largest footprint achievable based on zoning setbacks). The peak sanitary design flow for the demonstration development has been calculated as follows:

Population = 5-Unit Townhouse x (2.7 persons/unit) = **13.5 persons**

Peak Factor = **3.72** (Harmon Equation)

Peak Population Flow = (3.72) x (13.5 persons) x (280 L/person/day) / (86400 s/day)
Peak Population Flow = **0.16 L/s**

Extraneous Flow = (0.47 ha) x (0.33 L/s/ha) = **0.16 L/s**

Peak Design Flow = (0.16 L/s) + (0.16 L/s) = **0.32 L/s**

As calculated above, the proposed development (i.e. 2 single-family homes) is expected to generate a peak sanitary design flow of 0.24 L/s. The demonstration development (i.e. 5-unit townhouse) is expected to generate a peak sanitary design flow of 0.32 L/s. Given that the capacities of the proposed sanitary sewers are above 26 L/s, there is adequate capacity to convey peak flows from the proposed development or the higher density development scenario. The Asset Management Branch will advise of any capacity concerns within the existing sanitary sewer system (as noted in correspondence with City under **Attachment A**). The proposed sanitary sewers have also been designed to meet the acceptable full flow velocity range of 0.60 m/s to 3.0 m/s in accordance with the current City of Ottawa Sewer Design Guidelines. Refer to the sanitary sewer design sheet and Sanitary Drainage Area Plan provided under **Attachment C**.

1.3 Storm Servicing

Given the constraints of the proposed development, the City is willing to accept the implementation of sump pumps for the dwelling foundation drainage systems. Therefore, no storm services will be required for the new dwellings and sump pump outlets to the proposed rear yard swale system will be provided (refer correspondence with City under **Attachment A**). The rear yard swale system has been designed to outlet to the existing catch basin located along the property line adjacent to Hartsmere Drive. Flows captured by the existing catch basin will be conveyed to the existing storm sewer system on Hartsmere Drive via the existing 375 mm diameter storm sewer stub contained within the existing easement.

As noted in the Novatech Report, storm drainage from the Bell Lands (i.e. subject site) was allocated within the storm sewer system designed for the Stittsville South subdivision. The subject site was assigned an area of 0.532 hectares and a runoff coefficient value of 0.75. The design parameters allocated for the subject site assumed that the property would be developed into a 100-unit senior's residence. However, the proposed redevelopment of the property is much less impactful to the downstream storm sewer system than what was allocated in the Novatech Report. The weighted runoff coefficient for the redevelopment will be approximately 0.35 compared to the 0.75 value which was previously assumed in the Novatech design. The 5-year peak design flow for the total site area has been calculated to be 43.25 L/s which is approximately 23% of the 375 mm diameter storm sewer stub capacity. As indicated in the storm sewer design sheets prepared by Novatech for the Stittsville South subdivision (refer to **Attachment D**), the downstream storm sewers (from Hartsmere Drive to the existing SWM facility on Parade Drive) will have sufficient capacity to accommodate the 5-year peak flow from the subject site.

2.0 Grading Design

The proposed grading has been designed to tie into existing elevations along the property boundaries and to minimize cut/fill where possible. The proposed grading has been designed in accordance with the following City of Ottawa design guidelines:

- Maximum slope in grassed areas between 2% and 7%.
- Grades above 7% require terracing.
- Maximum terracing of 3H:1V.
- Driveway grades between 2% and 6%.
- Rear terrace grades to be minimum 0.30 metres above swale spillover elevation.
- Swales shall have minimum depth of 150 mm and maximum depth of 600 mm.

During detailed design, the need for a perforated rear yard subdrain system will be assessed. Refer to the conceptual Grading Plans (DWG. 22008-GR1, GR2) under **Attachment A**.

3.0 Conclusion

It has been demonstrated that the redevelopment of the property located at 1835 Stittsville Main Street can be accomplished to include two new single-family lots (or a higher density townhouse block) and one retained parcel. The redevelopment of the property can be adequately serviced for water, sanitary and storm by incorporating the following key design features:

- A 254 mm diameter watermain extension of the existing watermain system located within the Stittsville Main Street right-of-way for domestic water supply.
- A new hydrant located adjacent to the existing driveway contained within the City owned right-of-way for fire protection.
- A 200 mm diameter sanitary sewer extension from the existing sanitary sewer system located within the Stittsville Main Street right-of-way.
- The implementation of sump pumps for the new dwelling foundation drainage systems with outlets to the proposed rear yard swale system.
- A grading design which ties into existing elevations along the property boundaries.

If you require additional information or clarification, please contact the undersigned.

Yours truly,

ROBINSON LAND DEVELOPMENT

Brandon MacKechnie, P. Eng.
Project Engineer

Angela Jonkman, P. Eng.
Manager – Land Development & Drainage Services

Attachment A

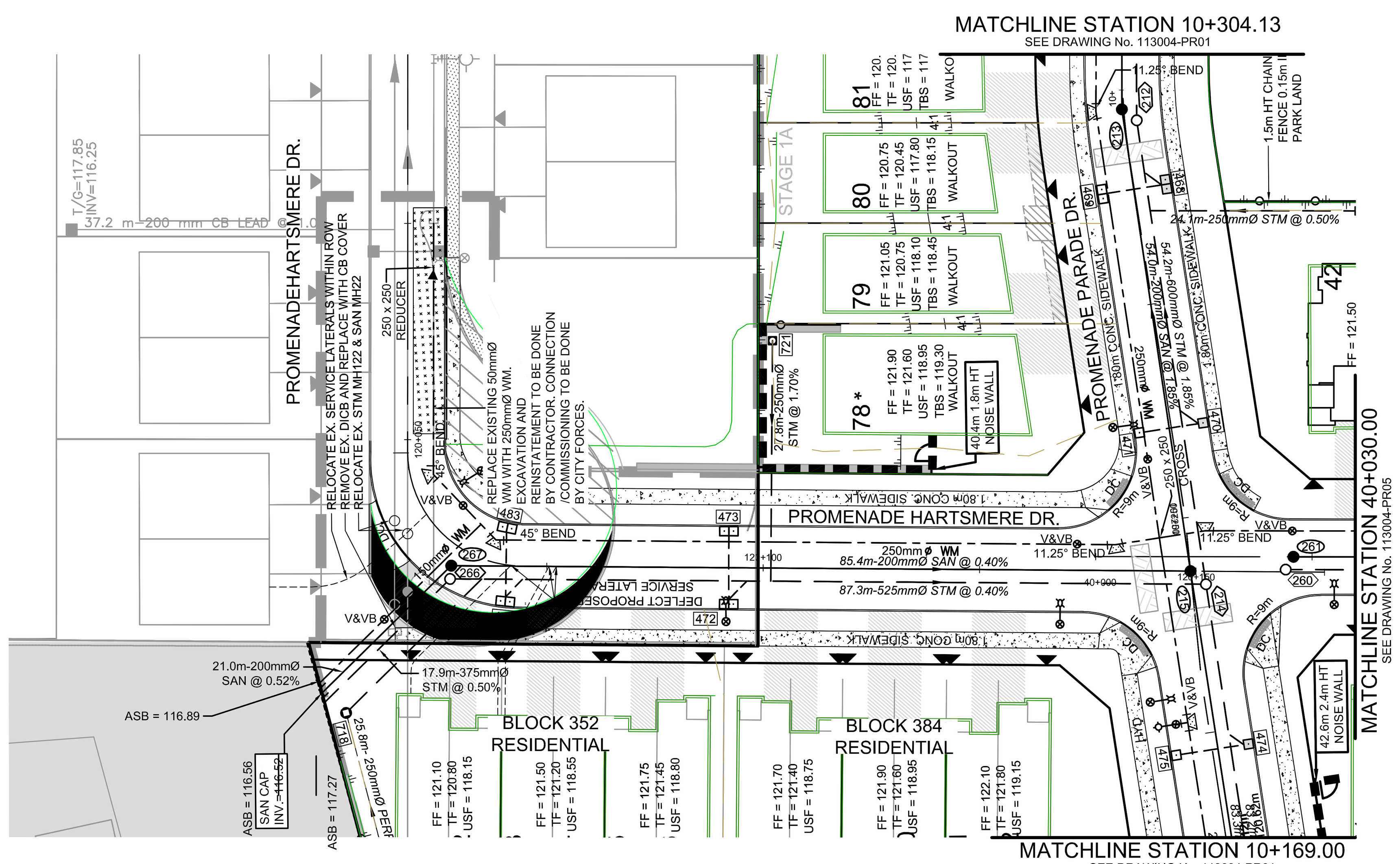
Novatech Design Drawings –
Stittsville South – Area 6

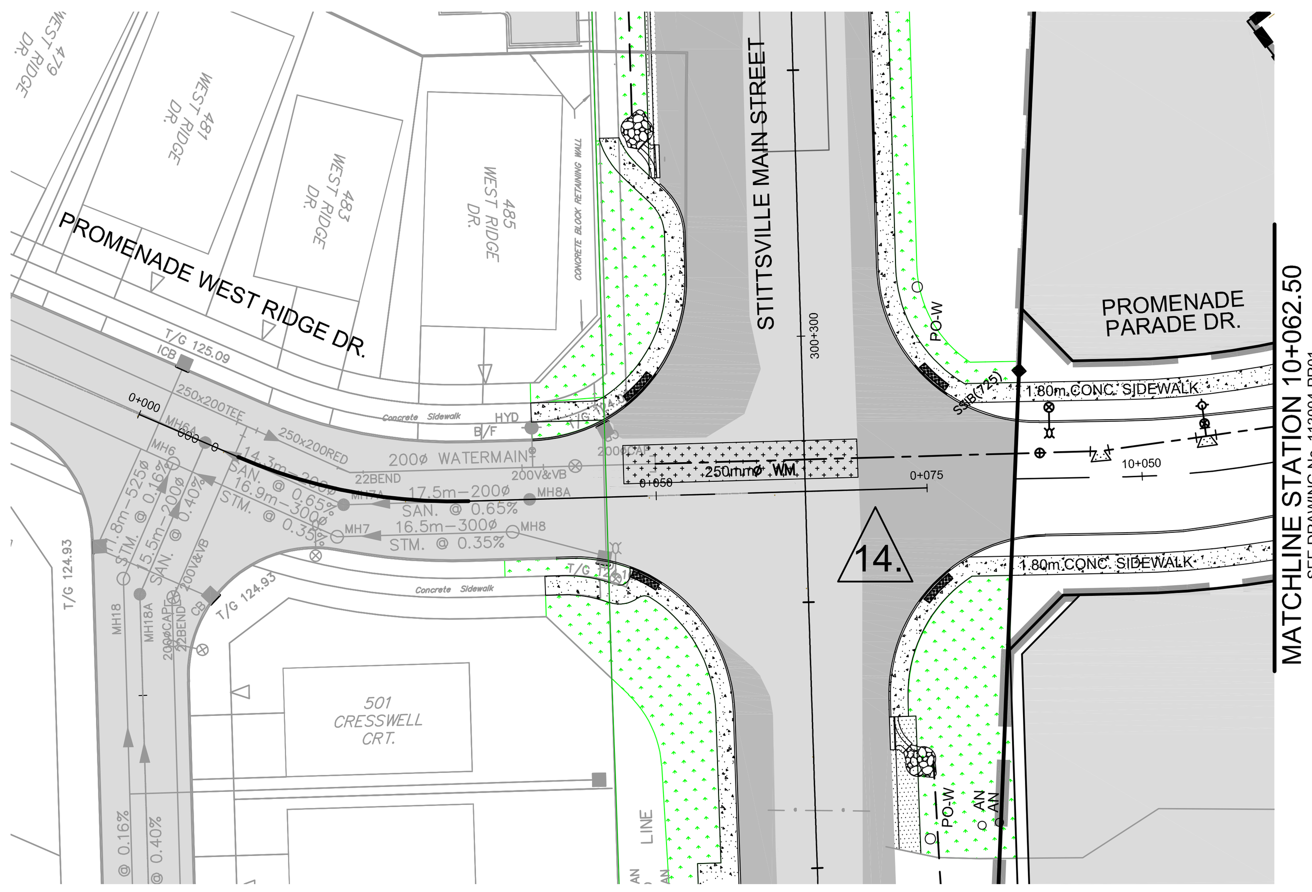
IBI Design Drawings – Harris Lands

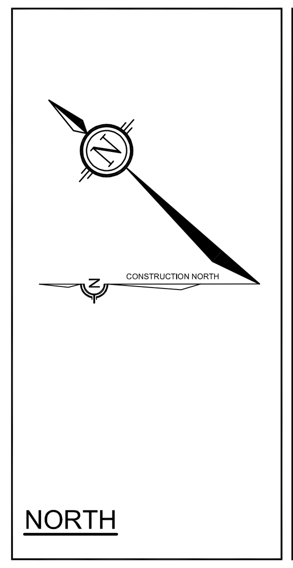
Correspondence with City

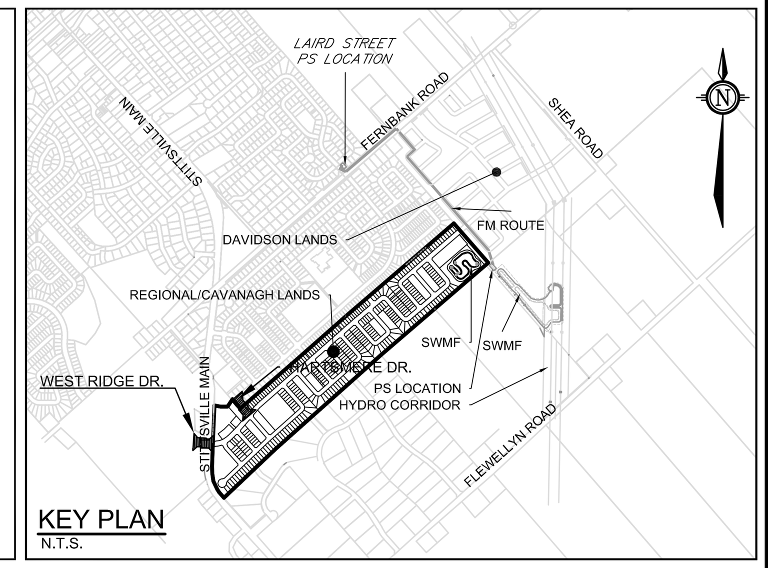
Conceptual Servicing Plans
(DWG. 22008-S1,S2)

Conceptual Grading Plans
(DWG. 22008-GR1, GR2)

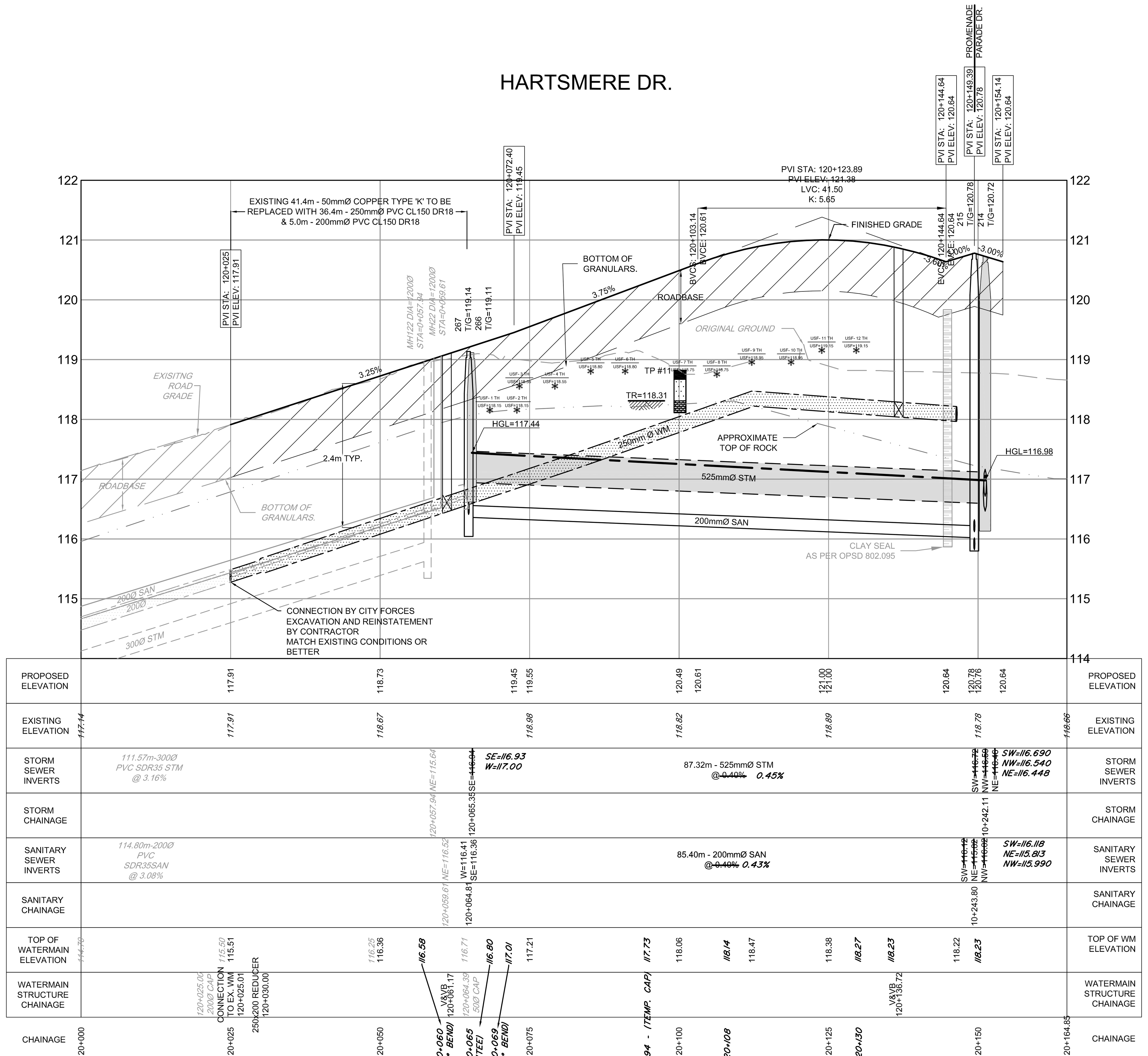




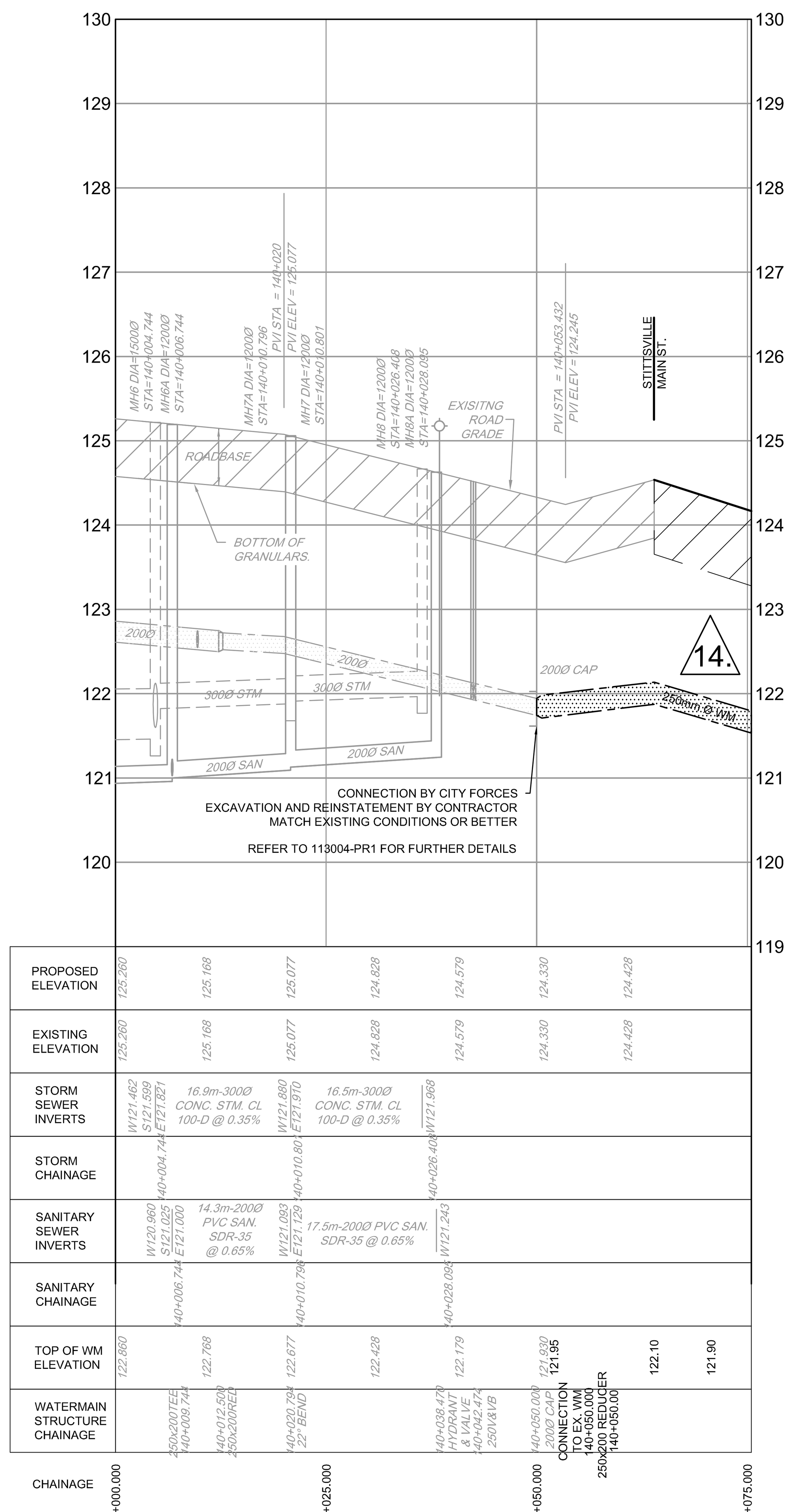




HARTSMERE DR.



WEST RIDGE DR.



NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY	No.	REVISION	DATE	BY
16.	BLOCK 353 AS-BUILT ADDED	JAN 25/22	BHB	8.	REVISED AS PER CITY COMMENTS	APR 05/16	BHB
15.	AS-BUILT NOTES	APR 12/18	BHB	7.	ISSUED FOR TENDER	JAN 20/16	BHB
14.	REVISED WM FROM STA 140+050 TO STA 140+075	MAY 24/17	BHB	6.	MINOR REVISIONS	DEC 23/15	BHB
13.	ISSUED FOR EARLY SERVICING	OCT 26/16	BHB	5.	REVISED AS PER CITY COMMENTS	DEC 16/15	BHB
12.	ISSUED FOR MOECC-ECA APPROVAL	SEPT 21/16	BHB	4.	ISSUED FOR CITY REVIEW	SEPT 14/15	BHB
11.	REVISED AS PER CITY COMMENTS	SEPT 09/16	BHB	3.	ISSUED TO BUILDER FOR INFORMATION	APR 17/15	BHB
10.	ISSUED FOR MANHOLE SHOP DRAWINGS	AUG 30/16	BHB	2.	ISSUED TO BUILDER FOR INFORMATION	NOV 26/14	BHB
9.	REVISED AS PER CITY COMMENTS	JULY 18/16	BHB	1.	ISSUED FOR INFORMATION	AUG 15/14	BHB

SCALE
1:500

1:500
0 5 10 15 20

DESIGN BCS/ TGP
CHECKED BHB
DRAWN TGP/EST
CHECKED BHB
APPROVED GJM

FOR REVIEW ONLY

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

REVIEWED BY DEVELOPMENT REVIEW BRANCH
Signed
Date 2016
Plan Number 17274 D07-16-13-0033

CITY OF OTTAWA
STITTSVILLE SOUTH - AREA 6

PLAN AND PROFILE
HARTSMERE DR.
STA 120+000.00 TO 120+164.85
WEST RIDGE DR.
STA 140+000.00 TO 140+075.00

PROJECT No. 113004-00
REV REV # 16
DRAWING No. 113004-PR09

PLANB1.DWG - 1000mmx707mm

CATCHBASIN TABLE				
CB No.	STATION	T/G ELEVATION	INVERT	ICD DIA. (mm)
444	40+115.27	119.68	117.88	152
445	40+115.27	119.68	118.08	
446	40+079.61	120.07	118.27	152
447	40+079.61	120.07	118.47	
448	10+209.83	120.26	118.46	152
449	10+210.82	120.26	118.66	
450	30+105.34	121.13	119.33	127
451	30+105.34	121.13	119.53	
452	30+068.18	121.28	119.48	102
453	30+068.18	121.28	119.68	
454	30+025.78	121.41	119.61	83
455	30+025.74	121.41	119.81	
456	50+188.33	121.01	119.21	152
457	50+188.32	121.01	119.41	
458	20+118	121.29	119.49	127
459	20+118	121.29	119.69	
460	50+115.54	121.89	120.09	152

CATCHBASIN TABLE				
CB No.	STATION	T/G ELEVATION	INVERT	ICD DIA. (mm)
461	50+115.53	121.89	120.29	
462	50+041.02	123.38	121.58	152
463	50+041.10	123.38	121.78	
470	10+260.52	120.38	118.68	83
471	10+260.52	120.38	118.78	
472	120+096.58	120.22	118.42	
473	120+096.53	120.22	118.62	
474	10+223	120.53	118.73	127
475	10+223	120.53	118.93	
476	10+183.72	121.12	119.32	152
477	10+183.90	121.12	119.52	
478	10+119.94	122.08	120.28	127
479	10+119.94	122.08	120.48	
480	10+069.13	122.87	121.07	83
481	10+069.56	122.86	121.26	
482	120+070.29	119.41	117.81	
483	120+068.76	119.36	117.76	

STM MANHOLE TABLE					
MH ID	STATION	T/G ELEV	INVERT	DIA. (mm)	OPSD
214	10+242.11	120.72	SW=116.72 NW=116.59 NE=116.46	1500.00	701.011
216	10+159.01	121.52	SW=118.56 NE=118.55 SE=118.82	1200.00	701.010
218	10+086.87	122.52	NE=119.92 W=119.95	1200.00	701.010
220	10+066.91	123.02	E=120.19	1200.00	701.010
250	50+298.15	120.10	SW=116.62 NE=116.53 NW=116.98	1500.00	701.011
252	50+216.22	121.35	NE=117.92 NW=118.34 SW=117.92	1500.00	701.011
254	50+135.20	121.67	SW=118.96 NE=118.36 NW=118.50	1800.00	701.012
256	50+015.34	124.02	NE=120.76	1200.00	701.010
260	40+021.95	120.64	SE=117.70	1200.00	701.010
264	20+061.20	122.17	SE=118.89	1200.00	701.010
266	120+065.35	119.11	SE=116.94	1200.00	701.010

SAN MANHOLE TABLE					
MH ID	STATION	T/G ELEV	INVERT	DIA. (mm)	OPSD
215	10+243.80	120.78	SW=116.12 NE=115.82 NW=116.02	1200.00	701.010
217	10+160.60	121.57	SW=117.96 NE=117.95 SE=118.03	1200.00	701.010
219	10+085.63	122.62	W=119.39 NE=119.36	1200.00	701.010
251	50+299.66	120.12	NE=115.89 SW=115.98 NW=116.39	1200.00	701.010
253	50+217.76	121.39	NW=117.55 SW=117.30 NE=117.29	1200.00	701.010
255	50+133.73	121.74	SW=118.36 NW=117.86 NE=117.76	1200.00	701.010
257	50+013.76	124.06	NE=120.16	1200.00	701.010
261	40+022.84	120.69	SE=117.09	1200.00	701.010
265	20+059.70	122.23	SE=118.25	1200.00	701.010
267	120+064.81	119.14	W=116.41 SE=116.36	1200.00	701.010

LANDSCAPE CB TABLE		
LYCB No.	T/G ELEVATION	INVERT
827	118.09	117.00
828	118.99	117.90
829	120.05	118.80
830	121.25	120.00
831	121.31	120.07
832	121.53	120.28
833	122.84	121.69
837	119.69	118.16
838	119.64	118.30
839	119.54	118.50
840	120.09	117.87
841	120.55	119.31
842	120.41	118.85
843	120.12	119.02
844	120.35	119.10

RYCB TABLE			
RYCB No.	T/G ELEVATION	INVERT	ICD DIA. (mm)
712	119.46	117.18	127
713	121.06	118.96	127
714	120.97	118.92	127
717	119.81	117.28	127
718	119.42	117.58	
719	120.57	118.04	152
720	122.19	119.94	127
721	118.79	117.21	

NOTE:
DURING SERVICING, GRADING, AND REINSTATEMENT WORKS, TIE INTO EXISTING ELEVATIONS AND ELIMINATE ENCROACHMENT INTO ADJACENT PROPERTY LANDS, WHERE POSSIBLE. PERMISSION REQUIRED FOR WORKS ON ADJACENT PROPERTY LANDS.

USE PROTECTION FENCING AND BEST EFFORTS TO REDUCE IMPACT TO ADJACENT LANDS' EXISTING FEATURES INCLUDING, BUT NOT LIMITED TO, RETAINING WALLS, FENCES, HARD AND SOFT LANDSCAPE. ANY DISTURBED AREA IS TO BE REINSTATED TO EXISTING CONDITIONS OR BETTER, TO THE SATISFACTION OF PROPERTY OWNER AND CITY.

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY	No.	REVISION	DATE	BY	No.	REVISION	DATE	BY
				16.	ISSUED FOR EARLY SERVICING	OCT 26/16	BHB	8.	REVISED FOR TENDER ADDENDUM #1	FEB 04/16	BHB
				15.	REVISED RYCB STRUCTURES & ISSUED FOR LAYOUT	OCT 17/16	BHB	7.	ISSUED FOR TENDER	JAN 20/16	BHB
				14.	ISSUED FOR MOECC-ECA APPROVAL	SEPT 21/16	BHB	6.	REVISED AS PER CITY COMMENTS	DEC 16/15	BHB
21.	BLOCK 353 AS-BUILT ADDED	JAN 25/22	BHB	13.	REVISED AS PER CITY COMMENTS	SEPT 09/16	BHB	5.	ISSUED FOR CITY REVIEW	SEPT 14/15	BHB
20.	ISSUED FOR COMMENCE WORK NOTIFICATION STAGE 2A	OCT 18/17	BHB	12.	ISSUED FOR MANHOLE SHOP DRAWINGS	AUG 29/16	BHB	4.	ISSUED TO BUILDER FOR INFORMATION	JUL 21/15	BHB
19.	CLOUDED AREAS RELOTTED, PART LOT CONTROL	OCT 18/17	BHB	11.	REVISED AS PER CITY COMMENTS	JULY 18/16	BHB	3.	ISSUED TO BUILDER FOR INFORMATION	APR 24/15	BHB
18.	REVISED WM FROM STA 10+000 TO STA 10+005	MAY 24/17	BHB	10.	REVISED AS PER CITY COMMENTS	APR 05/16	BHB	2.	ISSUED TO BUILDER FOR INFORMATION	NOV 26/14	BHB
17.	ISSUED FOR FINAL APPROVAL	MAR 26/17	BHB	9.	REVISED FOR ADDENDUM #3	APR 01/16	BHB	1.	ISSUED FOR INFORMATION	AUG 15/14	BHB

REVIEWED BY DEVELOPMENT REVIEW BRANCH
Signed ____________
Date ____________ 2016
Plan Number 17274 D07-16-13-0033

SCALE 1:500

DESIGN BCS/ TGP
CHECKED BHB
DRAWN BCS/ TGP
CHECKED BHB
APPROVED GJM

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
B. H. BAHIA
100164647
PROVINCE OF ONTARIO

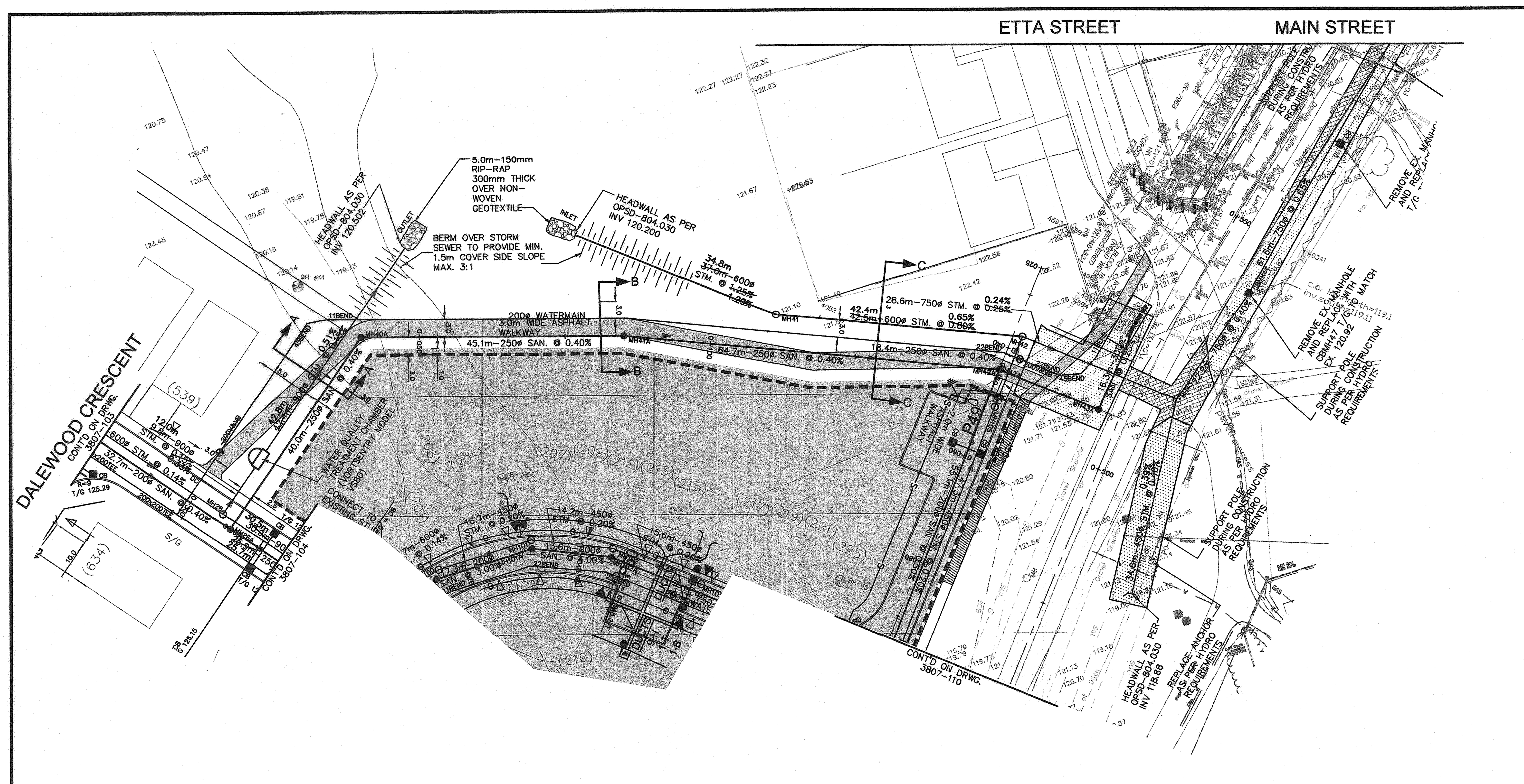
NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

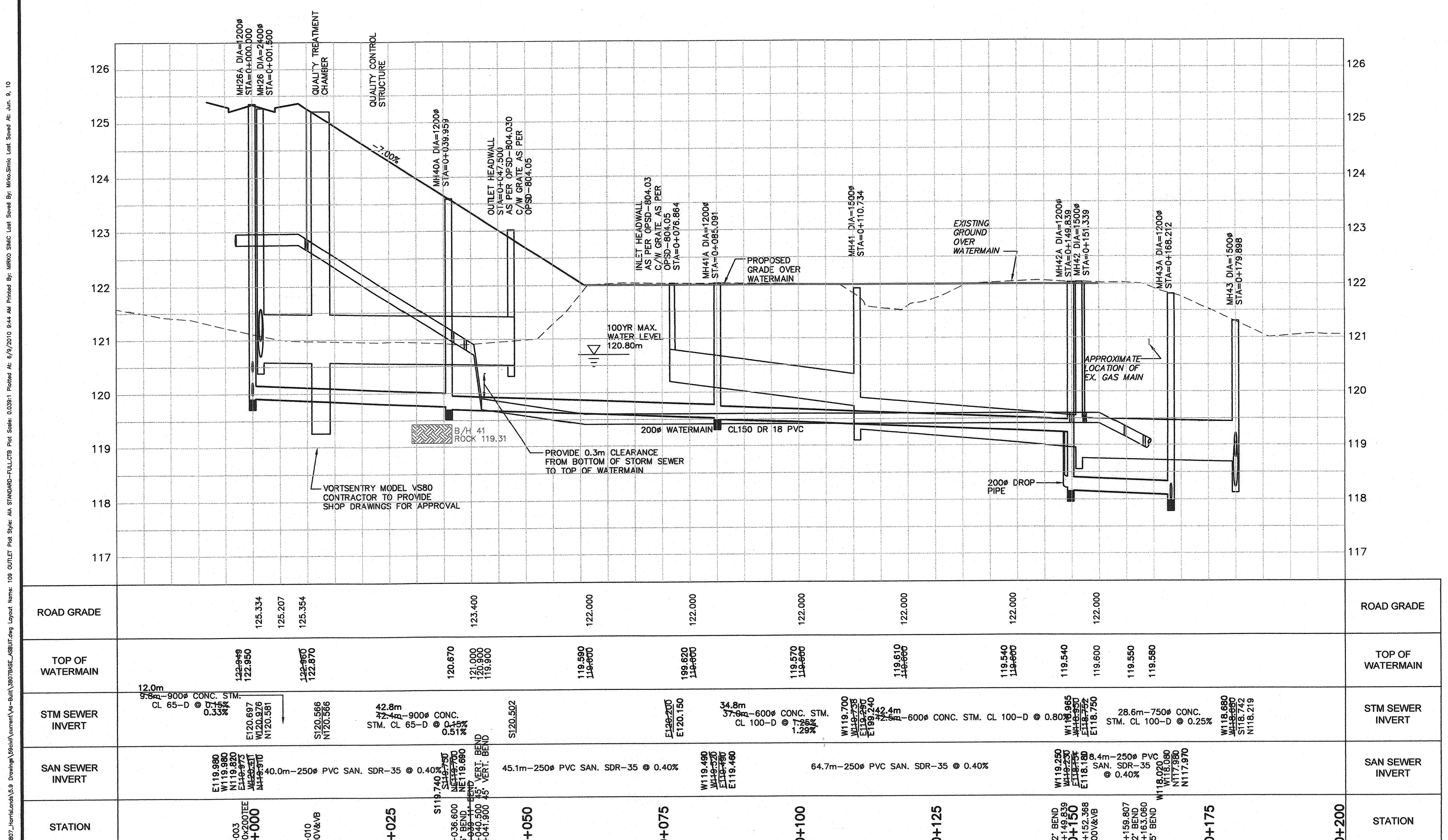
CITY OF OTTAWA
STITTSVILLE SOUTH - AREA 6

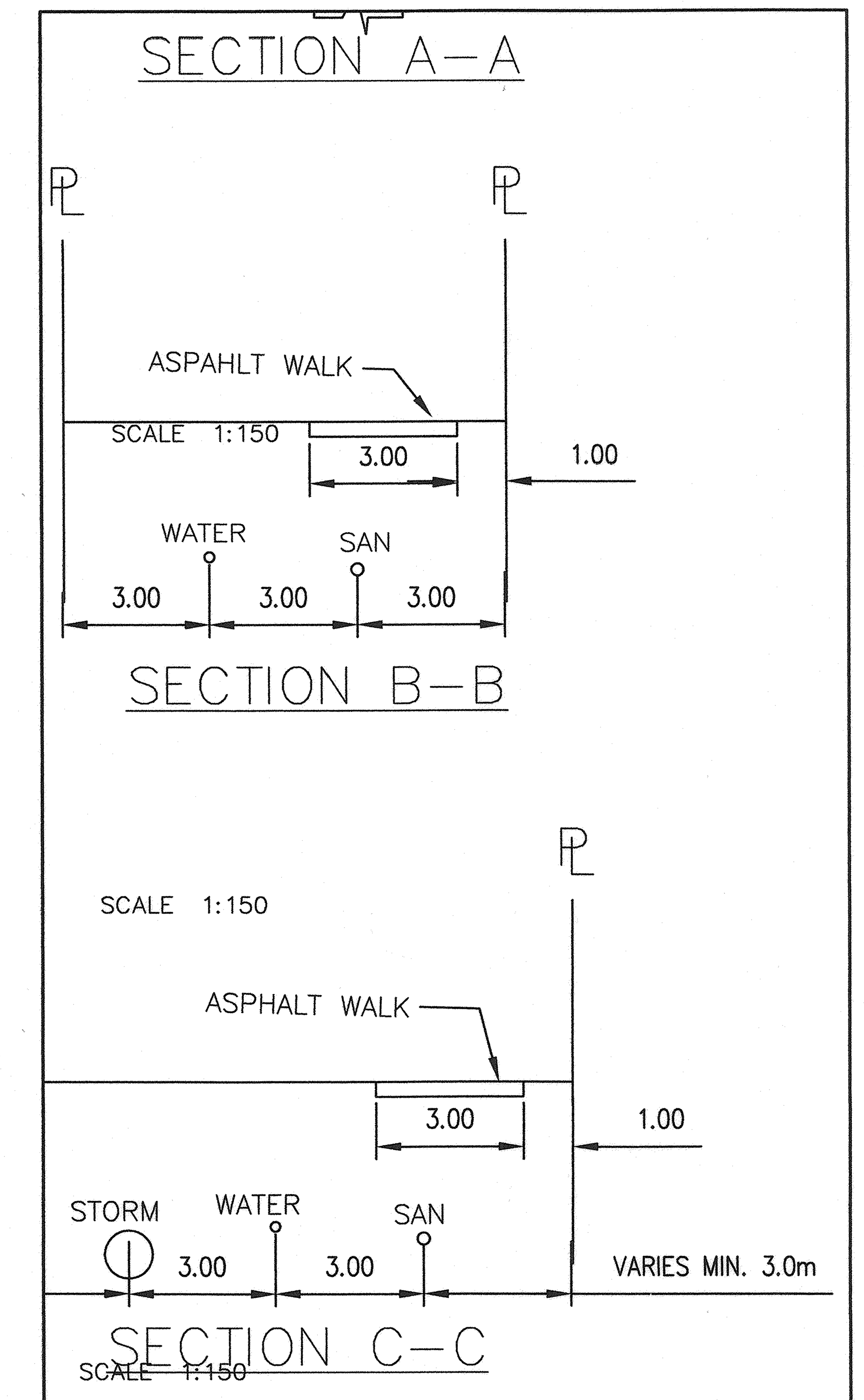
GENERAL PLAN AND SERVICES

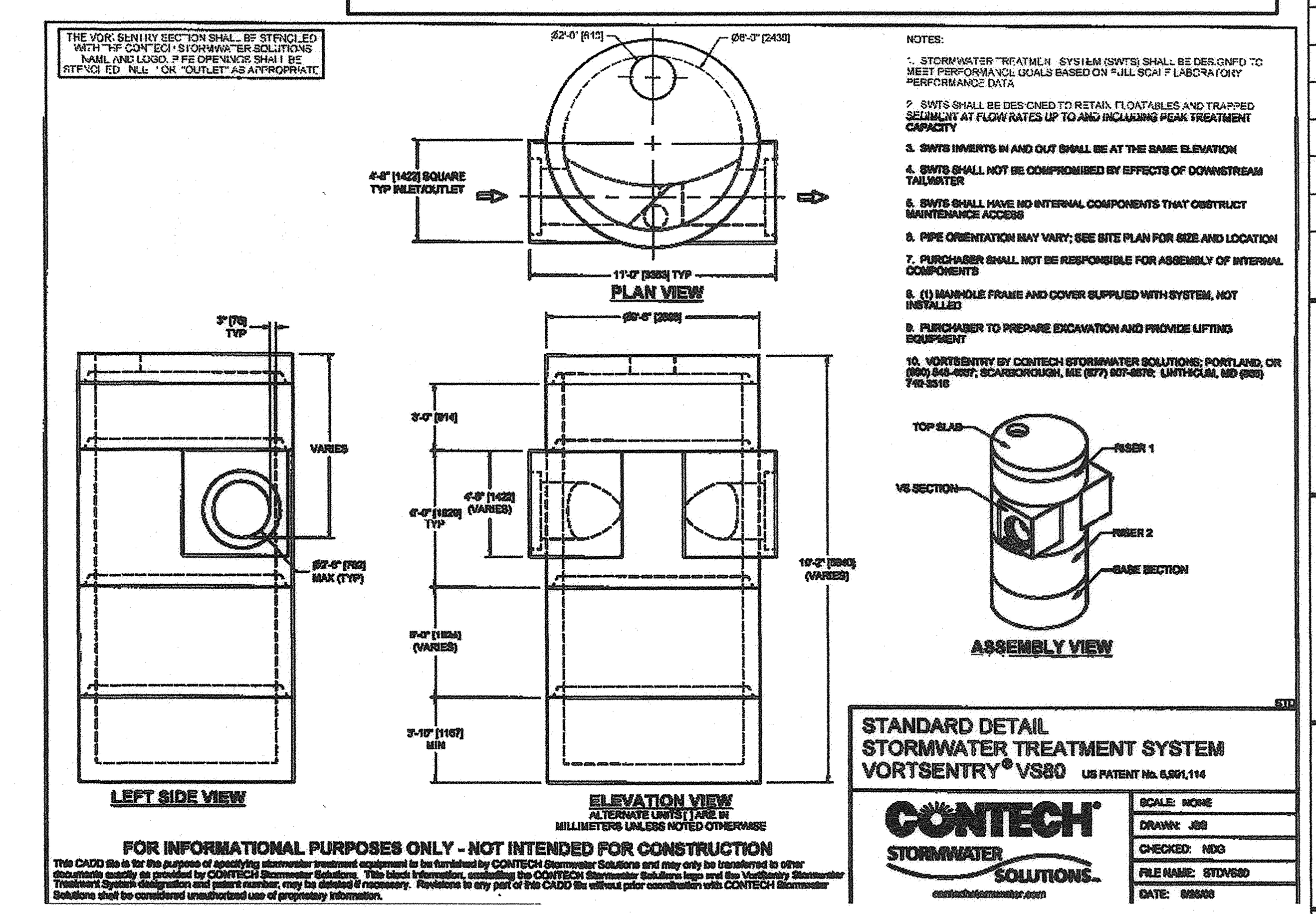
PROJECT No. 113004-00
REV REV # 21
DRAWING No. 113004-GP1

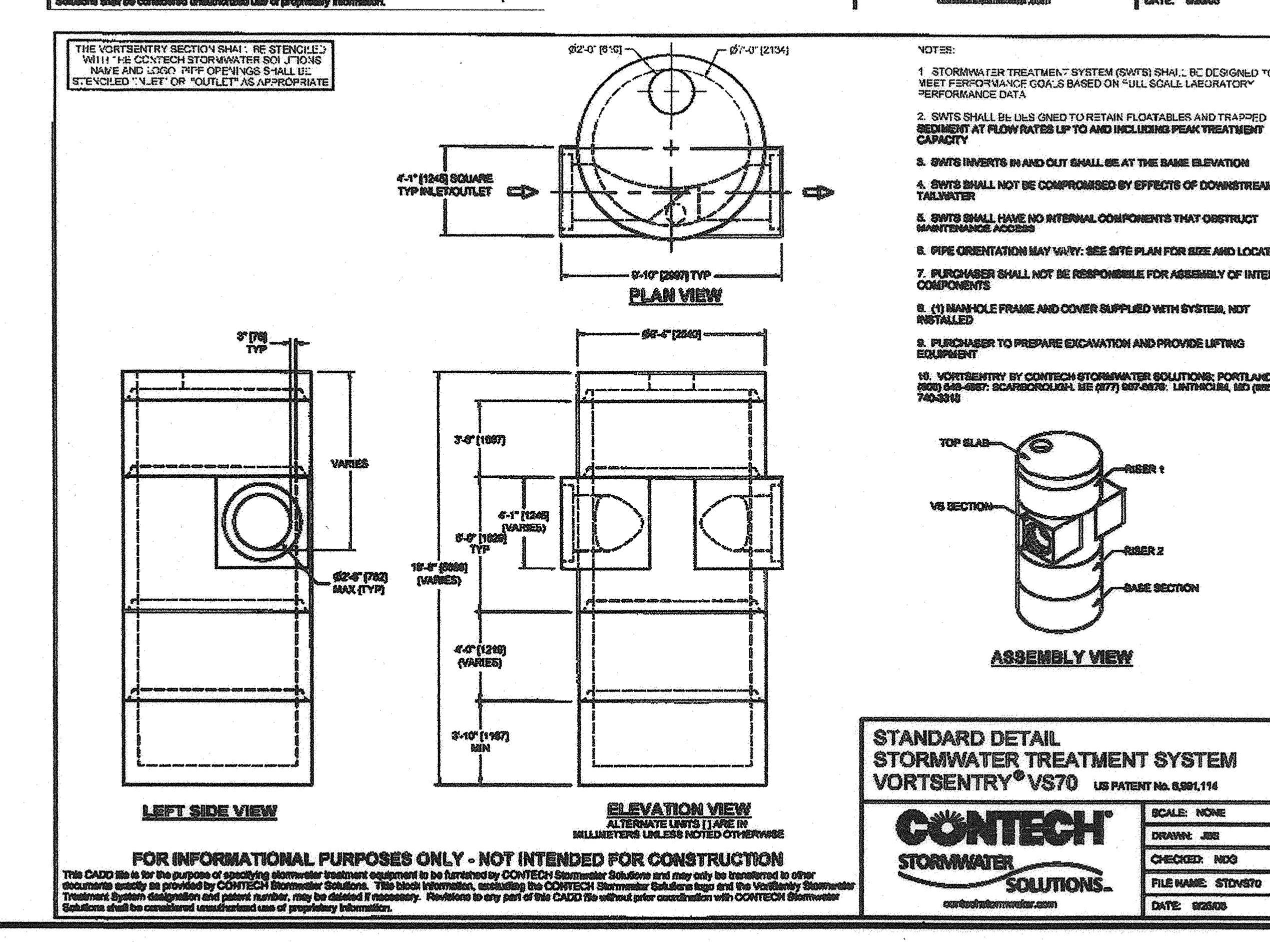
PLANB1.DWG - 1000mmx707mm











NOTES :

1. ALL WATERMAIN CONSTRUCTION IN ACCORDANCE WITH CURRENT CITY OF OTTAWA DRAWINGS & SPECIFICATIONS.
2. ALL SEWER AND ROADWAY CONSTRUCTION IN ACCORDANCE WITH CURRENT CITY OF OTTAWA DRAWINGS & SPECIFICATIONS.
3. ALL CONNECTIONS TO EXISTINGS WATERMAIN BY CITY OF OTTAWA FORCES. CONTRACTOR TO EXCAVATE, BACKFILL, COMPACT AND REINSTATE.
4. CATHODIC PROTECTION AS PER CITY OF OTTAWA STANDARDS.
5. INSULATION AT ALL STRUCTURES PER CITY OF OTTAWA DETAIL W23.
6. ALL STREET AND REAR YARD CB'S TO HAVE INLET RESTRICTURES SEE DRAWING 3807-800.
7. FOR LEGAL BOUNDARY INFORMATION REFER TO REGISTERED PLAN 4M- BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9	AS-BUILTS		10/03/11
8	REVISED AS PER NEW LEGAL		08/05/29
7	REVISE QTC AND MH'S	DGY	07/11/14
6	REVISE QCC AND MH'S	DGY	07/10/03
5	REVISED AS PER CITY COMMENTS	DGY	07/09/04
4	REVISED AS PER CITY COMMENTS	DGY	07/08/17
3	GENERAL REVISIONS	DGY	07/05/28
2	ISSUED FOR CITY REVIEW	DGY	07/05/10
1	ISSUED FOR OWNER REVIEW	DGY	07/01/15

IBI GROUP
333 Preston Street
Suite 400
Ottawa, Ontario
Canada K1S 5N4
Tel (613)225-1311
FAX (613)225-9868

Project Title

HARRIS LANDS

THOMAS CAVANAGH CONSTRUCTION LTD.

LICENSED PROFESSIONAL ENGINEER
D. G. Yannoulopoulos
PROVINCE OF ONTARIO

N

Drawing Title

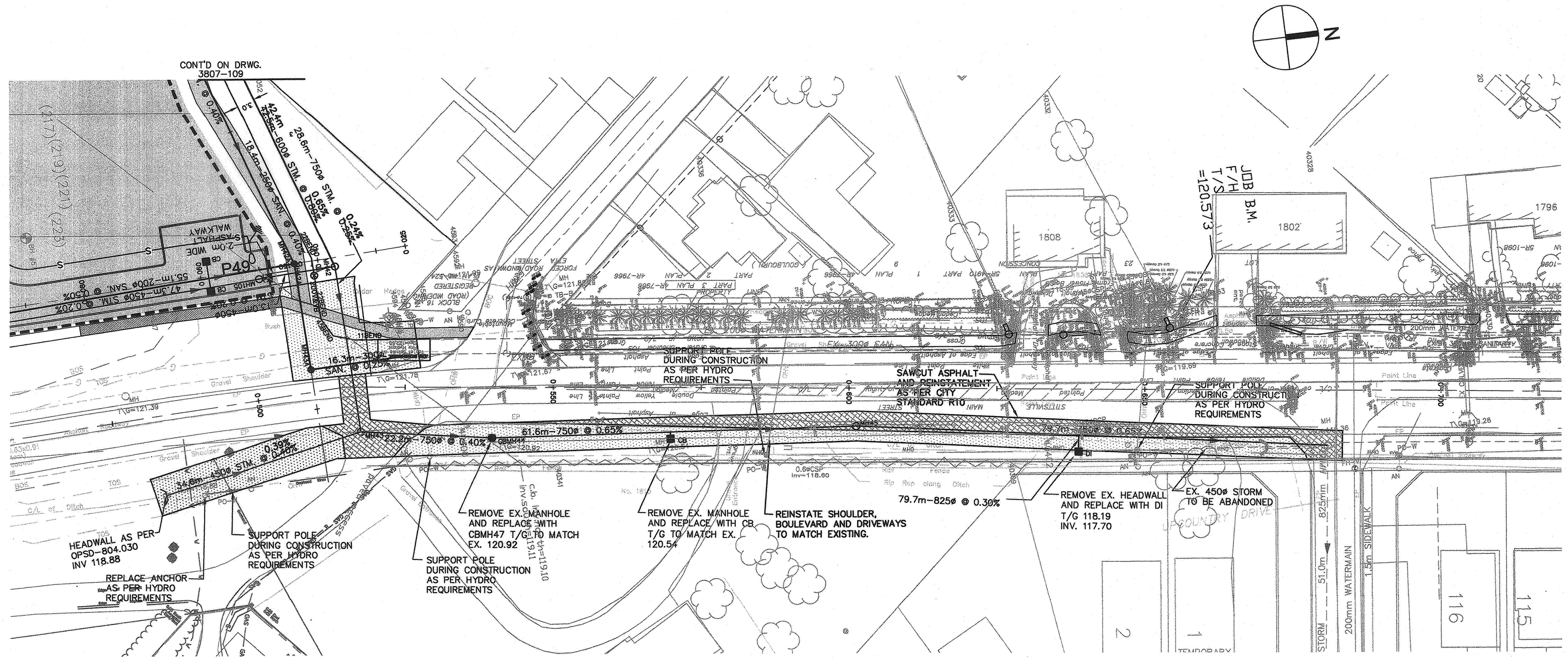
STORM OUTLET, SANITARY AND WATER CONNECTION

FROM DALEWOOD CRESCENT TO MAIN STREET

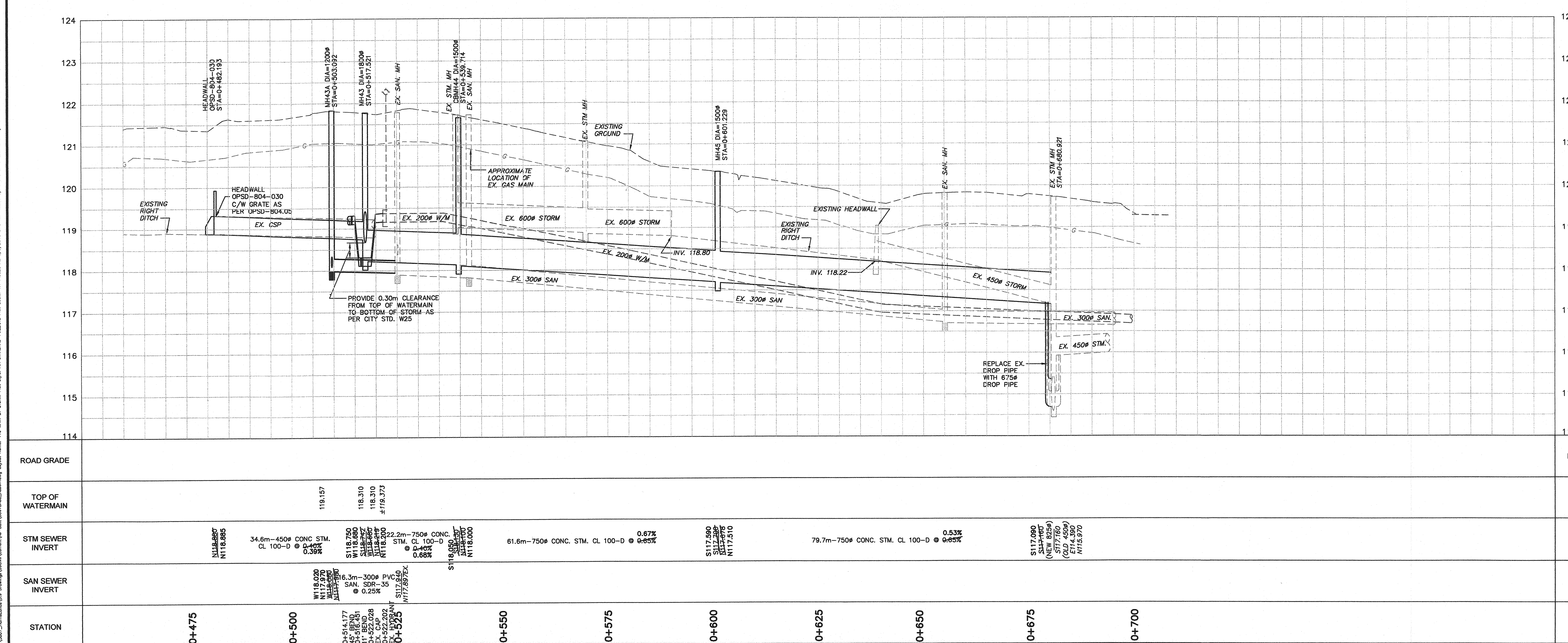
Scale
HOR. 1:500
VER. 1:50

Design	Date
D.G.Y.	JAN. 2007
Drawn	Checked
D.P.S.	D.G.Y.
Project No.	Drawing No.
3807	109

14763



MAIN STREET



NOTES :

1. ALL WATERMAIN CONSTRUCTION IN ACCORDANCE WITH CURRENT CITY OF OTTAWA DRAWINGS & SPECIFICATIONS.
2. ALL SEWER AND ROADWAY CONSTRUCTION IN ACCORDANCE WITH CURRENT CITY OF OTTAWA DRAWINGS & SPECIFICATIONS.
3. ALL CONNECTIONS TO EXISTINGS WATERMAIN BY CITY OF OTTAWA FORCES. CONTRACTOR TO EXCAVATE, BACKFILL, COMPACT AND REINSTATE.
4. CATHODIC PROTECTION AS PER CITY OF OTTAWA STANDARDS.
5. INSULATION AT ALL STRUCTURES PER CITY OF OTTAWA DETAIL W23.
6. ALL STREET AND REAR YARD CB'S TO HAVE INLET RESTRICTURES SEE DRAWING 3807-800.
7. FOR LEGAL BOUNDARY INFORMATION REFER TO REGISTERED PLAN 4M- BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7	AS-BUILTS		10/03/11
6	REVISED AS PER NEW LEGAL		08/05/29
5	REVISED AS PER CITY COMMENTS	DGY	07/09/04
4	REVISED AS PER CITY COMMENTS	DGY	07/08/17
3	GENREAL REVISONS	DGY	07/05/28
2	ISSUED FOR CITY REVIEW	DGY	07/05/10
1	ISSUED FOR OWNER REVIEW	DGY	07/01/15

IBI GROUP
333 Preston Street
Suite 400
Ottawa, Ontario
Canada K1S 5N4
Tel (613)225-1311
FAX (613)225-9868

Project Title

HARRIS LANDS

THOMAS CAVANAGH CONSTRUCTION LTD.

LICENSED PROFESSIONAL ENGINEER
D. G. Yannoulopoulos
PROVINCE OF ONTARIO

Drawing Title

MAIN STREET

FROM STA. 0+460 TO UPCOUNTRY DRIVE

Scale
HOR. 1:500
VER. 1:50

Design	Date
D.G.Y.	JAN. 2007
Drawn	Checked
D.P.S.	D.G.Y.
Project No.	Drawing No.
3807	110

14763

Brandon Mackechnie

From: Dieme, Abi <Abibatou.Dieme@ottawa.ca>
Sent: September 21, 2022 5:11 PM
To: Brandon Mackechnie
Cc: Angela Jonkman; Gorni, Colette; Jennifer McGahan
Subject: RE: 1835 Stittsville Main - Revised Hydrant Location

"CAUTION: External Sender"

Hi Brandon,

Thank you for your patience.
I have circulated your latest submission to the City's Asset Management Branch and met with them to discuss the proposed servicing. I have received the following notes:

- As per technical bulletin 2018-02, hydrants are to be measured along fire access roads to the building. Therefore, similar to the fire hydrant initially proposed on Hartsmere Drive, the existing fire hydrants on Parade Drive and Hartsmere Drive cannot be considered for fire protection. As such, two new fire hydrants are required for this site instead of one
- Private fire hydrants are not allowed for single residential properties. For safety matter, the proposed fire hydrants must be maintained by the City. Additionally, Fire Services wouldn't be aware that the private hydrants serve all three properties. Therefore, the proposed hydrants must be publicly owned and on City property.
- Easements in general are not desirable due to the challenge of obtaining unhindered access with equipment.
- City's easements must not include any other services.

The City originally required for this proposed development that watermain and sanitary sewer be extended from Stittsville Main to independently service the lots from municipal infrastructure. At that time, the consultant (Novatech) indicated that 170m of watermain and sewer extensions wouldn't be financially feasible and proposed instead 70m of private mains within the rear yard.
We're now at a stage where approximately 170m of watermain is required to properly service the proposed development along with a public easement through the site to maintain the fire hydrants lead, in addition to the private mains and easement along the back yard.
It is the City's opinion that the option to service the proposed development by extending the watermain and sanitary sewer from Stittsville Main along the laneway should be reconsidered for the following reasons:

Current Proposal	Watermain and Sanitary Sewer extensions from Stittsville Main along the laneway
• 68.4m private sanitary main • 60.4m private storm main • Approximately 170m of watermain (considering the second fire hydrant required) • Two fire hydrants for fire protection	• Less than 150m watermain and sanitary sewer extension • Storm sewer extension would not be required. The City would allow sump pumps for foundations drains discharging to the storm sewer within Hartsmere Drive through rear yard swale (or to the front yard if there's adequate outlet within the laneway) • Two fire hydrants for fire protection

• A third fire hydrant required at the rear yard if a flushing device is not provided (see W37.2)	• Lot 1 can be serviced from the existing stubs within 205 Hartsmere Drive, if the applicant chooses to do so. This can reduce the required length of watermain and sanitary sewer extensions. Note that the owner would be responsible for the maintenance of the services crossing 205 Hartsmere Drive
• Each dwelling will be serviced from the back through shared private mains	• Each dwelling will be serviced through the front from a public watermain as per current Guidelines
• Public easement required through the site and 205 Hartsmere Drive to maintain the fire hydrant leads. The easement would be minimum 6.0m free of any other services, trees, shrubs, fences, curbs and walls. • A separate private easement required for the private sewers and portion of the proposed watermain servicing dwellings 2 and 3.	• No public or private easement required. The new lots would be independently serviced through public services. This would meet the City's standard requirement for severance that all parcels be independently serviced and directly connected to municipal services. There won't be any restrictions on the installations of fences, accessory structures or landscaping except within the swale area. Each owner would be responsible for the maintenance of the swale within their backyard and ensure drainage is not blocked for adjacent properties
• Owners would be responsible for the maintenance, repair and replacement of the private sewer mains and portion of watermain servicing dwellings 2 and 3. A Joint Use and Maintenance Agreement would be required	• The City is responsible for the maintenance, repair, and replacement of public services

The next steps would be to confirm adequacy of services from Stittsville Main by:

- Conducting a hydraulic analysis to confirm adequate pressures and water age. New boundary conditions have been requested for connection to the watermain on Stittsville Main
- Demonstrating that gravity connection to the existing sanitary sewer can be accommodated. Asset Management Branch will advise of any capacity concerns

I am available to meet and discuss further should you have any questions or concerns

Regards,
Abi

From: Dieme, Abi
Sent: September 12, 2022 10:14 AM
To: Brandon Mackechnie <bmackechnie@rcii.com>
Cc: Angela Jonkman <ajonkman@rcii.com>; Gorni, Colette <colette.gorni@ottawa.ca>
Subject: RE: 1835 Stittsville Main - Revised Hydrant Location

Hi Brandon,

This proposal is not common and requires coordination with different engineers in the City's Asset Management team. I've received comments last week and our next step is an internal meeting to discuss the servicing configuration, specially the easement. We will likely meet this week. The City does not allow fire hydrants within residential single dwellings as they're required for fire protection and would be better maintained by the City.
I thank you for your patience and will reach out as soon as possible for an update.

Regards,
Abi

From: Brandon Mackechnie <bmackechnie@rcii.com>
Sent: September 12, 2022 10:07 AM
To: Dieme, Abi <Abibatou.Dieme@ottawa.ca>
Cc: Angela Jonkman <ajonkman@rcii.com>; Gorni, Colette <colette.gorni@ottawa.ca>
Subject: RE: 1835 Stittsville Main - Revised Hydrant Location

Hi Abi,

I'm just following up on my previous email below to see if the City has any additional comments or concerns. Our Client is eager to resubmit but we would like to confirm that the City is generally accepting of our proposed changes before doing so.

Thanks,

Brandon MacKechnie, P.Eng. | Project Engineer

Robinson Consultants 350 Palladium Drive, Suite 210, Ottawa ON, K2V 1A8
T.(613) 592-6060 ext. 130 | rcii.com

From: Brandon Mackechnie
Sent: August 31, 2022 3:44 PM
To: Dieme, Abi <Abibatou.Dieme@ottawa.ca>
Cc: Angela Jonkman <ajonkman@rcii.com>; Gorni, Colette <colette.gorni@ottawa.ca>
Subject: FW: 1835 Stittsville Main - Revised Hydrant Location

Hi Abi,

Please refer to our responses in "red" below:

1. Proposed hydrant 1 must be a public hydrant as it will be located within the Right-of-Way (ROW). This includes the proposed hydrant lead crossing the property up to the connection to the watermain on Hartsmere Drive; therefore the easement would be in favor of the City. City's watermain easements are required to be free of any

private utilities and/or sewers. The Infrastructure and Water Services Department (IWSD) is being consulted on possibility to allow the proposed configuration on an exceptional basis provided that the easement is widened to facilitate access and maintenance of the future public watermain. The required easement width would be confirmed by IWSD. Response: The hydrant location can be pulled back to be fully contained with the property of Lot 1 and therefore will remain as a private hydrant. The hydrant will still be accessible from the existing driveway within the City ROW. Will this resolve the City's concerns regarding the hydrant being public and required easements?

2. Access easement will be required through 205 Hartsmere Drive. Response: The 205 Hartsmere property should already have a 6.0m easement which contains the existing storm, sanitary, and watermain stubs previously approved and installed to service this property.
3. Please provide the results of the water age analysis Response: Outputs from the water age analysis are attached. The analysis was simulated for a period of 14 days using the average day demand of 0.033 L/s.
4. The size of the watermain must be either 203mm or 252mm, there is no 214mm per City Guidelines. Response: To clarify, the nominal watermain diameter will be 200mm in keeping with City guidelines. The inside diameter of a 200mm diameter PVCO pipe, used in the modelling analysis, is 214mm.
5. A fire hydrant (or any other flushing device) is required within the rear yard dead-end Response: The proposed watermain layout terminates with the service connection to the furthest dwelling to improve water quality in keeping with the City detail for end-end streets (W37.2). Further, the water age analysis provided has indicated that worst case (Lot 3) water age is only 9.8 hours and therefore a flushing device is not warranted.
6. The horizontal distance between the watermain and sewers must be revised to 2.5m between the edges. For alternatives, please consult F-6-1 – Procedures to govern separation of sewers and watermains. Response: In accordance with F-6-1, for watermains and sewers with less than 2.5m of horizontal separation, the sewer shall be constructed of materials and with joints equivalent to watermain standards. Sewers which meet these requirements will be specified.
7. Unrelated to water servicing, the storm sewer configuration within 205 Hartsmere Drive doesn't seem accurate based on information available in the records. Response: The existing servicing shown is in keeping with the as-built drawings, prepared by Novatech for the Stittsville South – Area 6 development. The drawings are attached for your reference.

If you have any questions, please don't hesitate to contact me.

Regards,

Brandon MacKechnie, P.Eng. | Project Engineer

Robinson Consultants 350 Palladium Drive, Suite 210, Ottawa ON, K2V 1A8
T.(613) 592-6060 ext. 130 | rcii.com

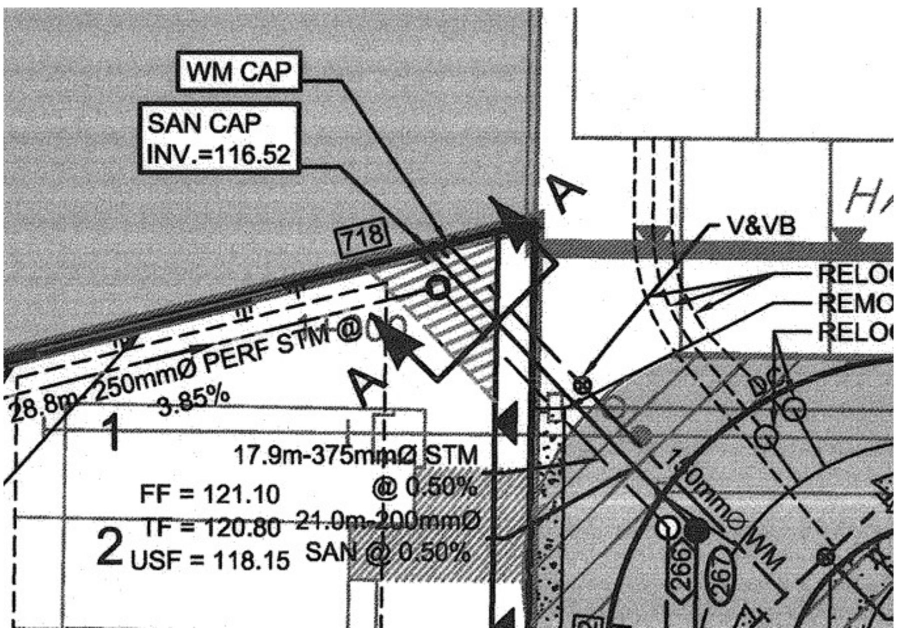
From: Dieme, Abi <Abibatou.Dieme@ottawa.ca>
Sent: August 29, 2022 12:02 PM
To: Brandon Mackechnie <bmackechnie@rcii.com>
Cc: Angela Jonkman <ajonkman@rcii.com>; Gorni, Colette <colette.gorni@ottawa.ca>
Subject: RE: 1835 Stittsville Main - Revised Hydrant Location

"CAUTION: External Sender"

Hello,

I am still waiting for feedback from the Infrastructure and Water Services Department (IWSD) . For now I can provide the following notes. I'll update them once I hear back from IWSD:

1. Proposed hydrant 1 must be a public hydrant as it will be located within the Right-of-Way (ROW). This includes the proposed hydrant lead crossing the property up to the connection to the watermain on Hartsmere Drive; therefore the easement would be in favor of the City. City's watermain easements are required to be free of any private utilities and/or sewers. The Infrastructure and Water Services Department (IWSD) is being consulted on possibility to allow the proposed configuration on an exceptional basis provided that the easement is widened to facilitate access and maintenance of the future public watermain. The required easement width would be confirmed by IWSD.
2. Access easement will be required through 205 Hartsmere Drive.
3. Please provide the results of the water age analysis
4. The size of the watermain must be either 203mm or 252mm, there is no 214mm per City Guidelines.
5. A fire hydrant (or any other flushing device) is required within the rear yard dead-end
6. The horizontal distance between the watermain and sewers must be revised to 2.5m between the edges. For alternatives, please consult *F-6-1 – Procedures to govern separation of sewers and watermains.*
7. Unrelated to water servicing, the storm sewer configuration within 205 Hartsmere Drive doesn't seem accurate based on information available in the records.



Regards,
Abi

From: Brandon Mackechnie <bmackechnie@rcii.com>
Sent: August 29, 2022 8:09 AM
To: Dieme, Abi <Abibatou.Dieme@ottawa.ca>
Cc: Angela Jonkman <ajonkman@rcii.com>; Gorni, Colette <colette.gorni@ottawa.ca>
Subject: RE: 1835 Stittsville Main - Revised Hydrant Location

ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

Hi Abi,

I'm just following up for a status update on the review of our revised hydrant location for 1835 Stittsville Main Street previously sent for comments on August 5th.

Thanks,

Brandon MacKechnie, P.Eng. | Project Engineer

Robinson Consultants 350 Palladium Drive, Suite 210, Ottawa ON, K2V 1A8
T.(613) 592-6060 ext. 130 | rcii.com

From: Dieme, Abi <Abibatou.Dieme@ottawa.ca>
Sent: August 15, 2022 4:05 PM
To: Brandon Mackechnie <bmackechnie@rcii.com>
Cc: Angela Jonkman <ajonkman@rcii.com>; Gorni, Colette <colette.gorni@ottawa.ca>
Subject: RE: 1835 Stittsville Main - Revised Hydrant Location

"CAUTION: External Sender"

Hello,

I've circulated the Water Department. I'll send you comments as soon as they get back to me.

Regards,
Abi

From: Brandon Mackechnie <bmackechnie@rcii.com>
Sent: August 15, 2022 3:49 PM
To: Dieme, Abi <Abibatou.Dieme@ottawa.ca>
Cc: Angela Jonkman <ajonkman@rcii.com>; Gorni, Colette <colette.gorni@ottawa.ca>
Subject: RE: 1835 Stittsville Main - Revised Hydrant Location

CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.

ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

I'm just following up on my previous email below to see if you have had a chance to review our revised hydrant location. Our client is eager to resubmit, but we would like to ensure that the City is generally satisfied with our revised approach before we waste anymore time with a resubmission.

Thanks,

Brandon MacKechnie, P.Eng. | Project Engineer

Robinson Consultants 350 Palladium Drive, Suite 210, Ottawa ON, K2V 1A8
T.(613) 592-6060 ext. 130 | rcii.com

From: Brandon Mackechnie
Sent: August 5, 2022 12:02 PM
To: Abibatou.Dieme@ottawa.ca
Cc: Angela Jonkman <ajonkman@rcii.com>; colette.gorni@ottawa.ca
Subject: 1835 Stittsville Main - Revised Hydrant Location

Hi Abi,

Refer to the attached plan for our revised approach to address the City's concerns regarding fire protection access. The key changes are as follows:

1. The existing 150mm dia. watermain stub will be blanked to the satisfaction of the City.
2. A new 214mm dia. PVCO watermain connection will be made to the existing 250mm diameter watermain on Hartsmere Drive.
3. The 214mm watermain will be extended to the City ROW along Stittsville Main Street to provide a new hydrant adjacent to the existing driveway (owned by the City).
4. Increasing the pipe size from 150mm to 214mm will provide increased fire flow to meet the minimum requirement for the development.
5. We have located the watermain on the south side of the shared lot line between Lot 1 (existing) and Lot 2 since Lot 1 has more available area to install a watermain.
6. We have tentatively shown a 6.0m easement where the watermain passes through Lot 1. The requirements for this easement will need to be discussed with the City.
7. City of Ottawa fire services will need to review the revised hydrant location and comment if the existing driveway (owned by the City) is satisfactory for use as a fire route. The existing driveway does not meet the minimum 6.0m width requirement, but hopefully they will be willing to make an exception given the constraints present with this parcel of land.
8. The main concern of not having an accessible route between the hydrant and the main entrances of the dwellings has been addressed.

Can you please review the attached plan and provide any additional comments or concerns the City may have before we finalize our resubmission package. Note that I will be on holidays for the week of August 8-12th so please copy Angela on any responses to this email.

Thanks,

Brandon MacKechnie, P.Eng. | Project Engineer

Robinson Consultants 350 Palladium Drive, Suite 210, Ottawa ON, K2V 1A8
T.(613) 592-6060 ext. 130 | rcii.com

'

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.

'

This email originated from an External Sender. Please do not click links, open attachments or reply unless you recognize the source.

'

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.

'

This email originated from an External Sender. Please do not click links, open attachments or reply unless you recognize the source.

'

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.

'

This email originated from an External Sender. Please do not click links, open attachments or reply unless you recognize the source.

NOTES

THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

NO.	REVISION DESCRIPTION	DATE	BY
3	REVISED PER COMMENTS	01/11/22	AHJ
2	REVISED PER COMMENTS	07/06/22	AHJ
1	ISSUED FOR ZONING BY-LAW AMENDMENT	10/02/22	AHJ

SCALE

HORIZONTAL 1:250

LICENSED PROFESSIONAL ENGINEER
Nov. 1/22
B.L. MACKECHNIE
100199554
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
NOV. 1, 2022
A.H. JONKMAN
PROVINCE OF ONTARIO

Robinson Land Development
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

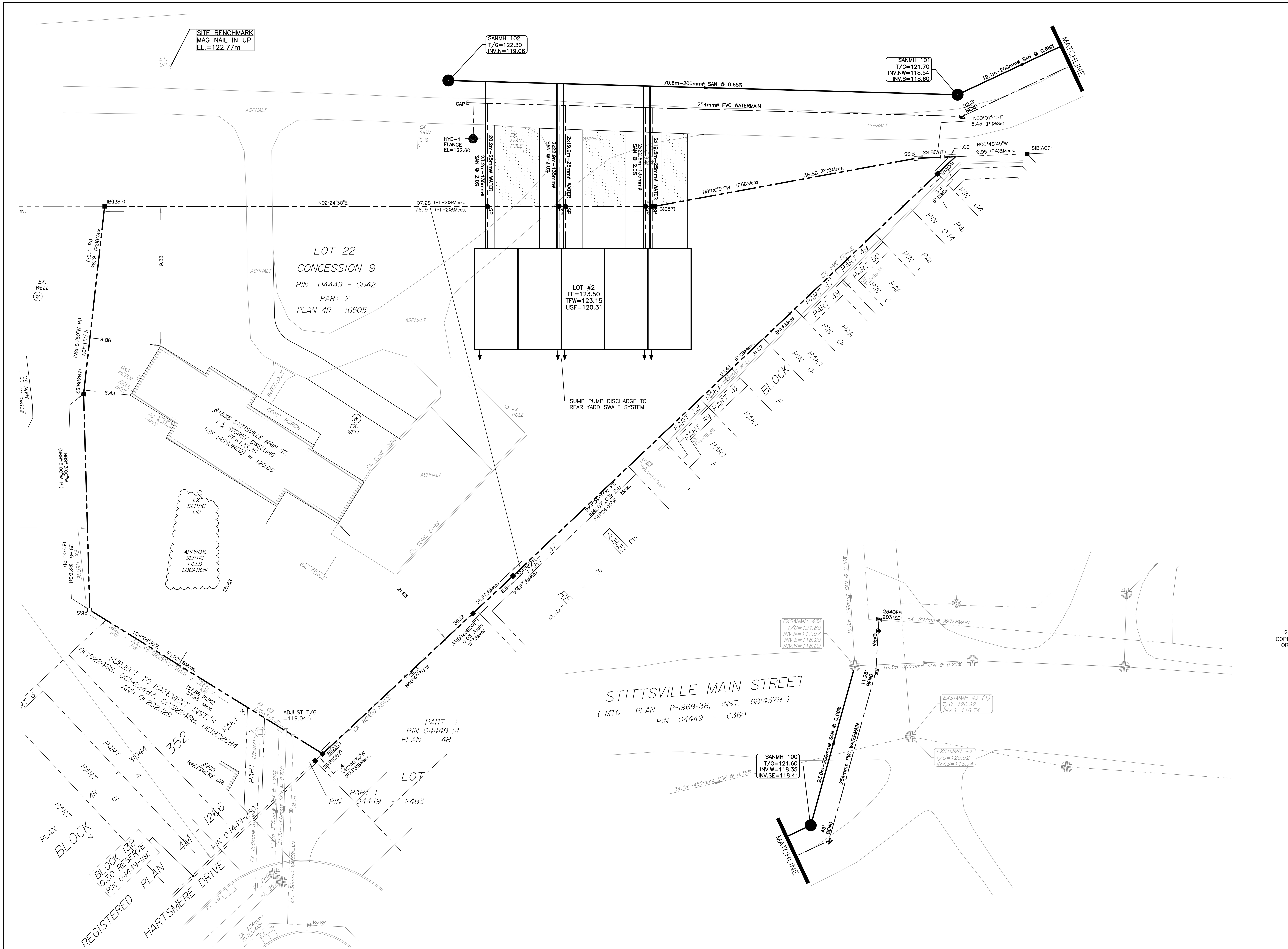
DESIGN	BLM
CHECKED	AHJ
DRAWN	BLM
CHECKED	AHJ
APPROVED	AHJ

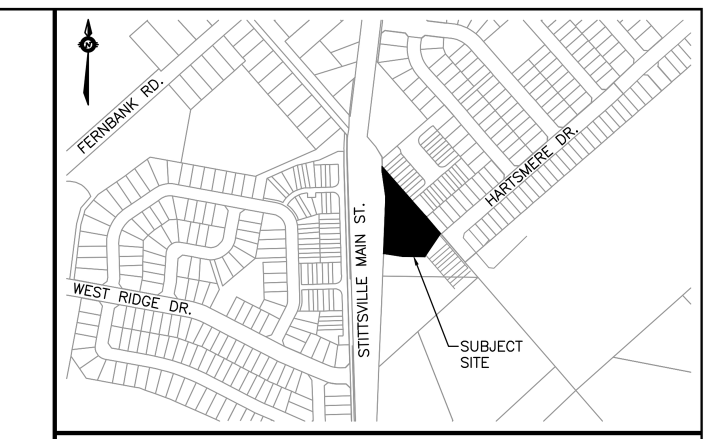
JENNIFER McGAHAN
WIRE INVESTMENT CORP.

1835 STITTSVILLE MAIN STREET
STITTSVILLE, ON

PROPOSED DEVELOPMENT
CONCEPTUAL SERVICING PLAN

PROJECT No.	22008
SURVEY	AOV
DATED	NOVEMBER 2022
DWG. No:	22008-S1

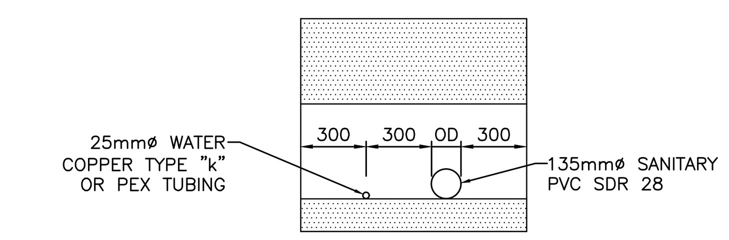




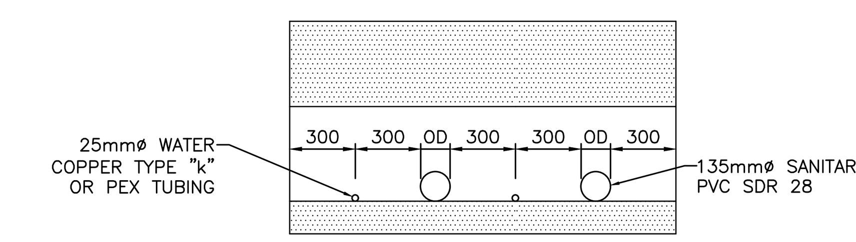
KEY PLAN

LEGEND

- PROPERTY BOUNDARY
- EXISTING HYDRANT
- EXISTING VALVE & VALVE BOX
- EXISTING WATERMAIN
- EXISTING SANITARY SEWER & MANHOLE
- EXISTING STORM SEWER & MANHOLE
- EXISTING CATCH BASIN
- HYDRANT
- CURB STOP & SERVICE POST
- WATERMAIN
- SANITARY SEWER & MANHOLE



TYP. SINGLE SERVICE COMMON TRENCH (MODIFIED S11.3)
N.T.S.



TYP. DOUBLE SERVICE COMMON TRENCH (MODIFIED S11.3)
N.T.S.

NOT FOR CONSTRUCTION

NOTES

THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

NO.	REVISION DESCRIPTION	DATE	BY
1	REVISED PER COMMENTS	01/11/22	AHJ

SCALE: HORIZONTAL 1:250 (0, 2m, 4m, 10m)

LICENSED PROFESSIONAL ENGINEER — Nov. 1/22 — B.L. MACKECHNIE — 100199554 — PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER — NOV. 1, 2022 — A.H. JONKMAN — PROVINCE OF ONTARIO

Robinson Land Development
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

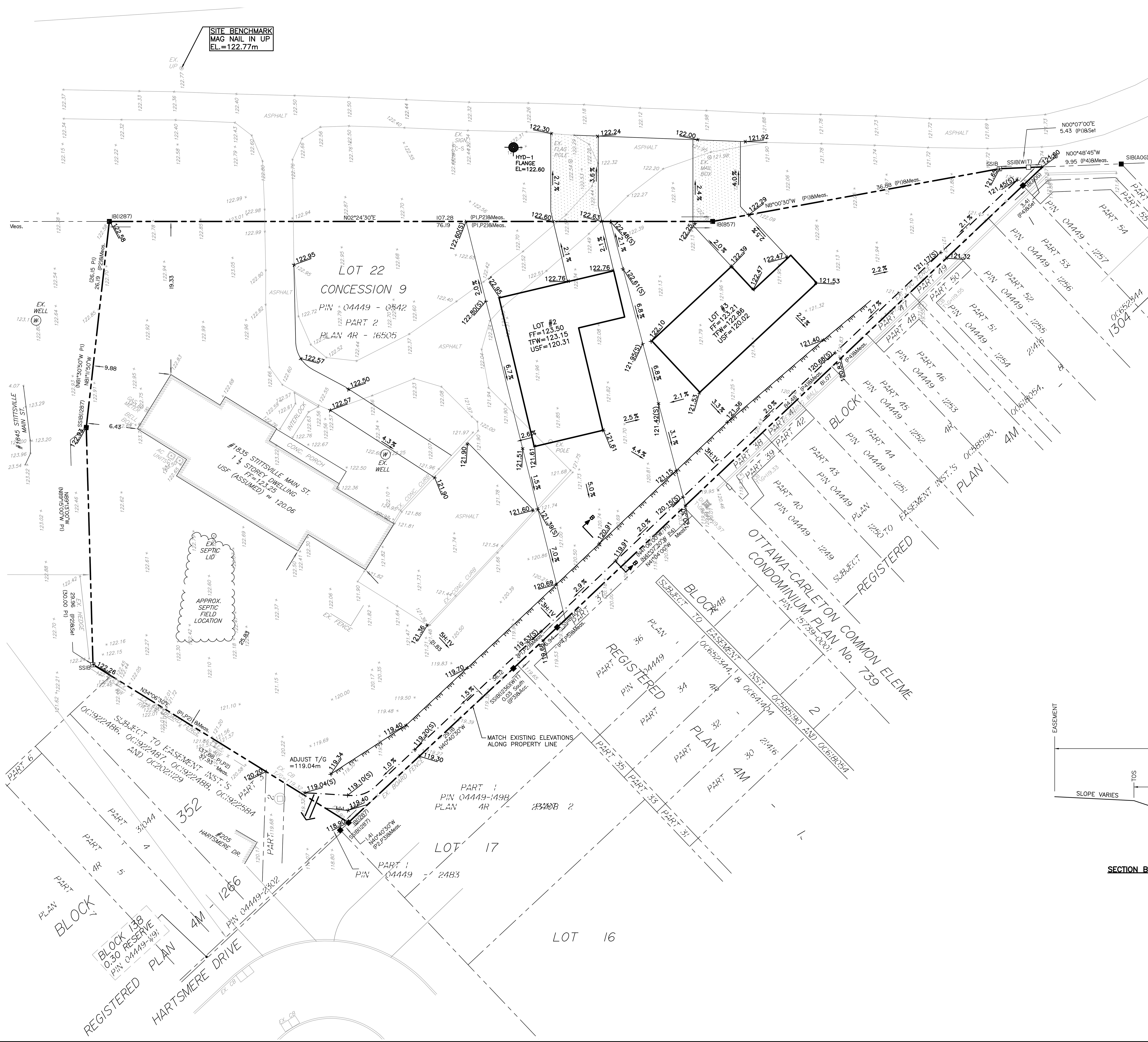
DESIGN	BLM
CHECKED	AHJ
DRAWN	BLM
CHECKED	AHJ
APPROVED	AHJ

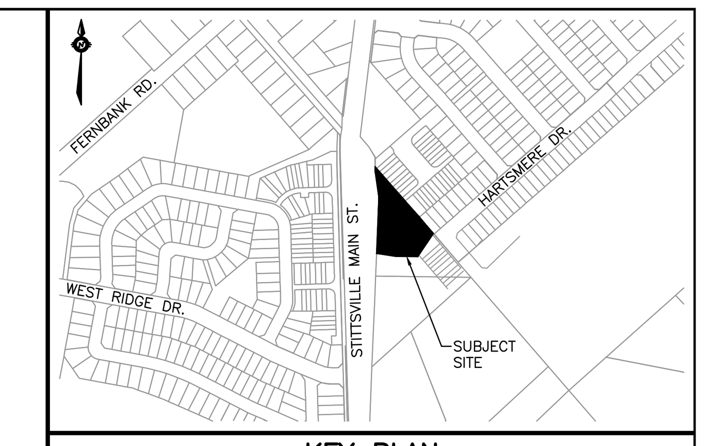
JENNIFER McGAHAN
WIRE INVESTMENT CORP.

1835 STITTSVILLE MAIN STREET
STITTSVILLE, ON

DEMONSTRATION DEVELOPMENT
CONCEPTUAL SERVICING PLAN

PROJECT No.	22008
SURVEY	AOV
DATED	NOVEMBER 2022
DWG. No:	22008-S2



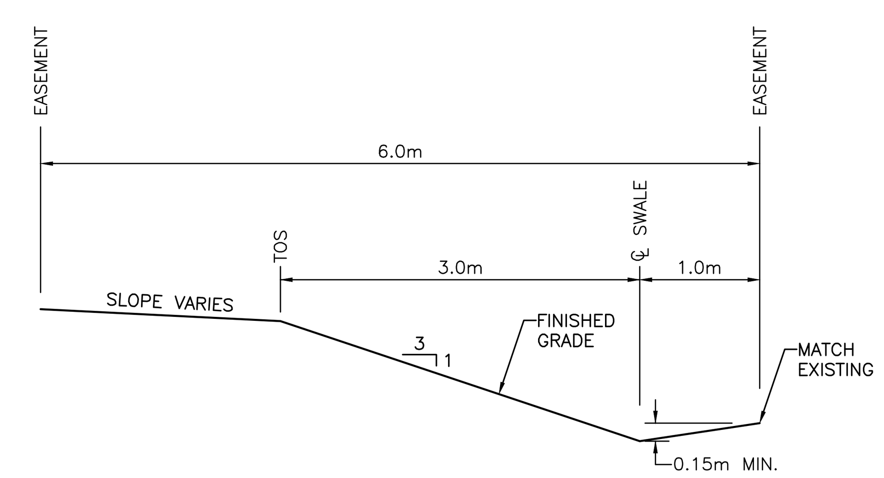


KEY PLAN

LEGEND

- PROPERTY BOUNDARY
- EXISTING ELEVATION
- PROPOSED GRADE
- PROPOSED SWALE GRADE
- DRAINAGE DIRECTION AND SLOPE
- SWALE
- TERRACING (3H:1V MAX.)
- HYDRANT
- MAJOR OVERLAND FLOW ROUTE

FF: FINISHED FLOOR
TFW: TOP OF FOUNDATION
USF: UNDERSIDE OF FOOTING



SECTION B-B – TYPICAL GRADING
N.T.S.

NOT FOR CONSTRUCTION

NOTES

THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

NO.	REVISION DESCRIPTION	DATE	BY
3	REVISED PER COMMENTS	01/11/22	AHJ
2	REVISED PER COMMENTS	07/06/22	AHJ
1	ISSUED FOR ZONING BY-LAW AMENDMENT	10/02/22	AHJ

SCALE
0 2m 4m 10m
HORIZONTAL 1:250

LICENSED PROFESSIONAL ENGINEER
Nov. 1/22
B. L. MACKECHNIE
100199554
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
NOV. 1, 2022
A.H. JONKMAN
PROVINCE OF ONTARIO

Robinson
Land Development

350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

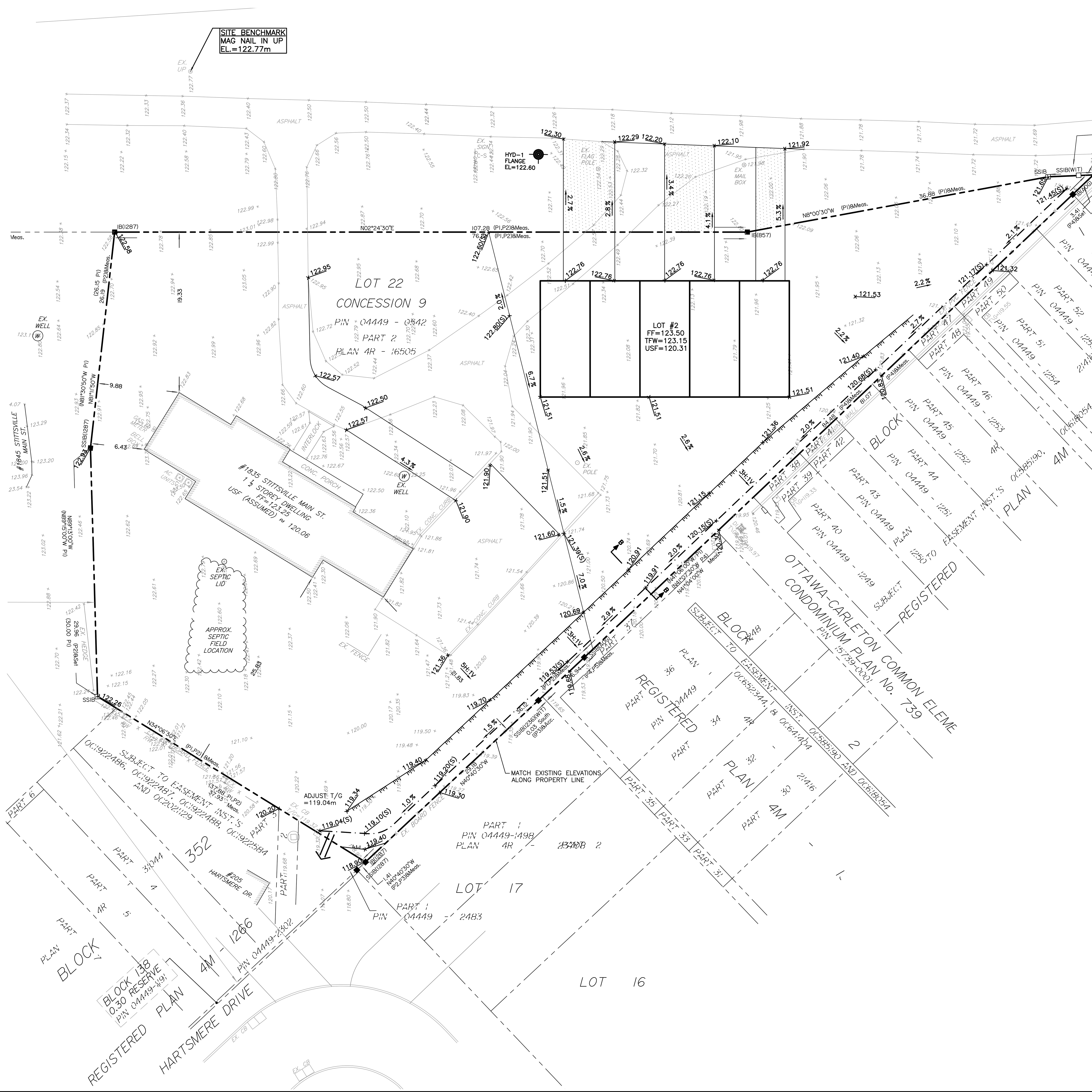
DESIGN	BLM
CHECKED	AHJ
DRAWN	BLM
CHECKED	AHJ
APPROVED	AHJ

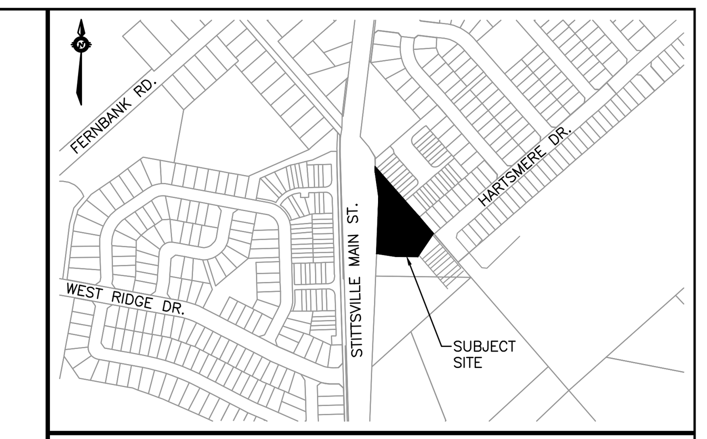
JENNIFER McGAHAN
WIRE INVESTMENT CORP.

1835 STITTSVILLE MAIN STREET
STITTSVILLE, ON

PROPOSED DEVELOPMENT
CONCEPTUAL GRADING PLAN

PROJECT No.	22008
SURVEY	AOV
DATED	NOVEMBER 2022
DWG. No:	22008-GR1



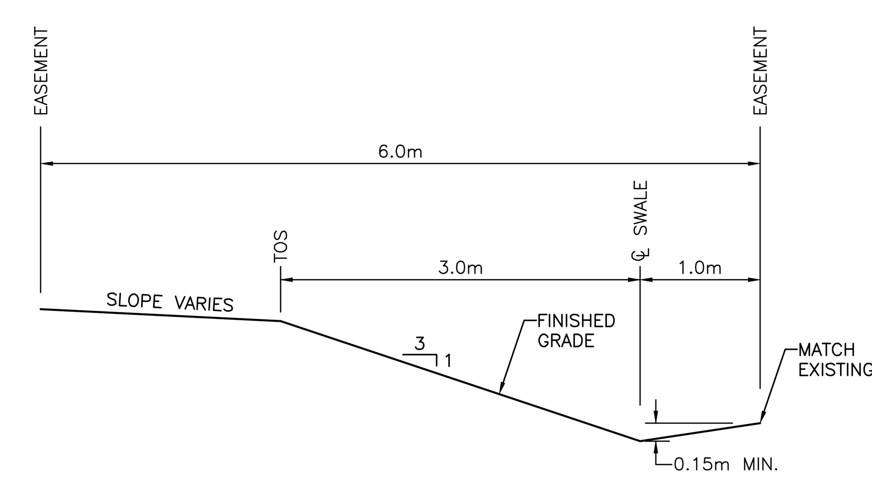


KEY PLAN

LEGEND

	PROPERTY BOUNDARY
+121.00	EXISTING ELEVATION
121.00	PROPOSED GRADE
121.00(S)	PROPOSED SWALE GRADE
2.0%	DRAINAGE DIRECTION AND SLOPE
	SWALE
	TERRACING (3H:1V MAX.)
	HYDRANT
	MAJOR OVERLAND FLOW ROUTE

FF: FINISHED FLOOR
TFW: TOP OF FOUNDATION
USF: UNDERSIDE OF FOOTING



SECTION B-B – TYPICAL GRADING
N.T.S.

NOT FOR CONSTRUCTION

NOTES
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

NO.	REVISION DESCRIPTION	DATE	BY
1	REVISED PER COMMENTS	01/11/22	AHJ

SCALE: HORIZONTAL 1:250 (0, 2m, 4m, 10m)

LICENSED PROFESSIONAL ENGINEER — Nov. 1/22 — B.L. MACKECHNIE — 100199554 — PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER — NOV. 1, 2022 — A.H. JONKMAN — PROVINCE OF ONTARIO

Robinson Land Development
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	AHJ
DRAWN	BLM
CHECKED	AHJ
APPROVED	AHJ

JENNIFER McGAHAN
WIRE INVESTMENT CORP.

1835 STITTSVILLE MAIN STREET
STITTSVILLE, ON

DEMONSTRATION DEVELOPMENT
CONCEPTUAL GRADING PLAN

PROJECT No.	22008
SURVEY	AOV
DATED	NOVEMBER 2022
DWG. No:	22008-GR2

Attachment B

Hydraulic Water Model Figure

Boundary Conditions

Watermain Design Sheets

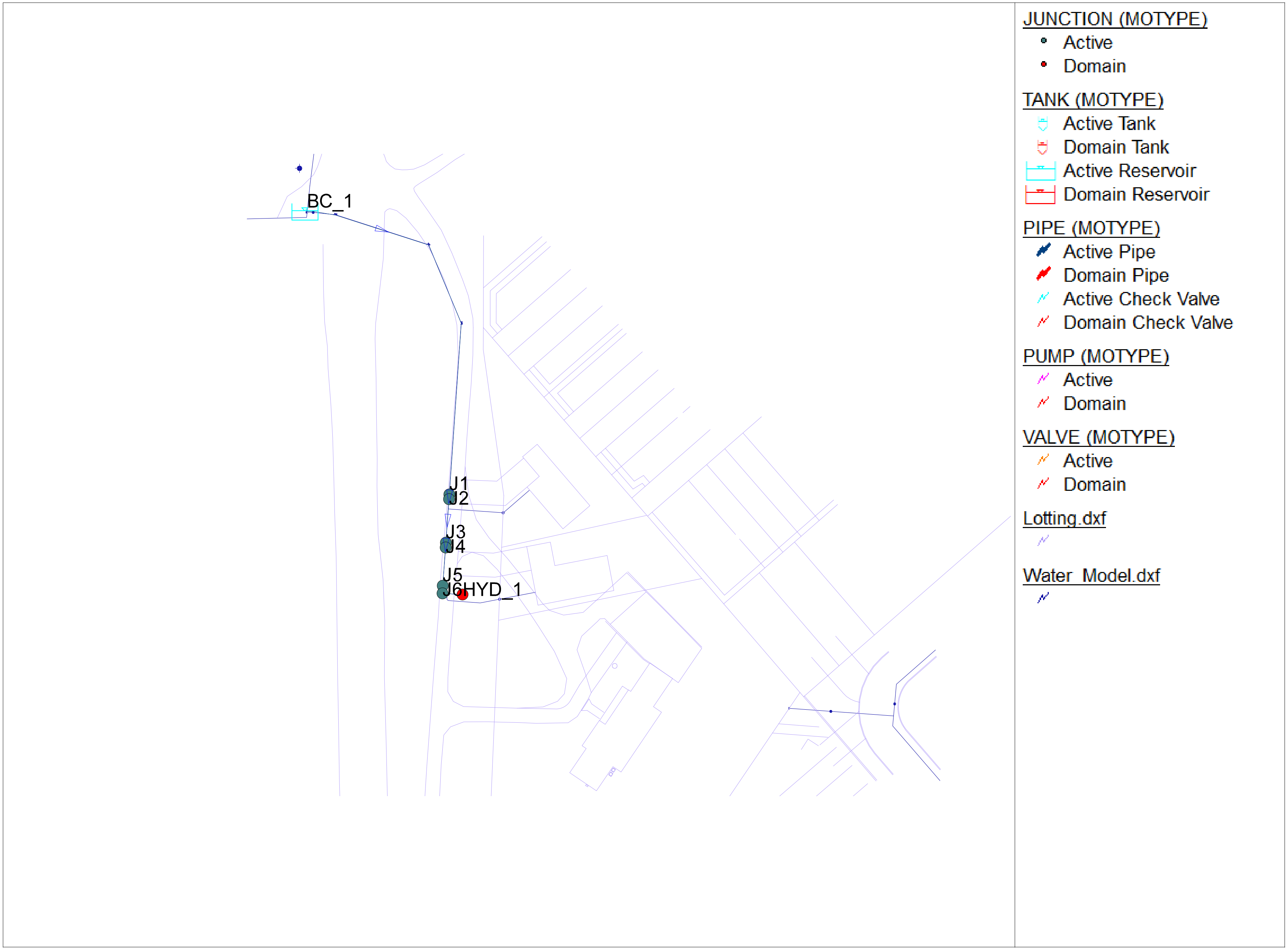
Water Model Outputs

FUS Calculations

Fire Flow Reports

Hydrant Coverage Plans

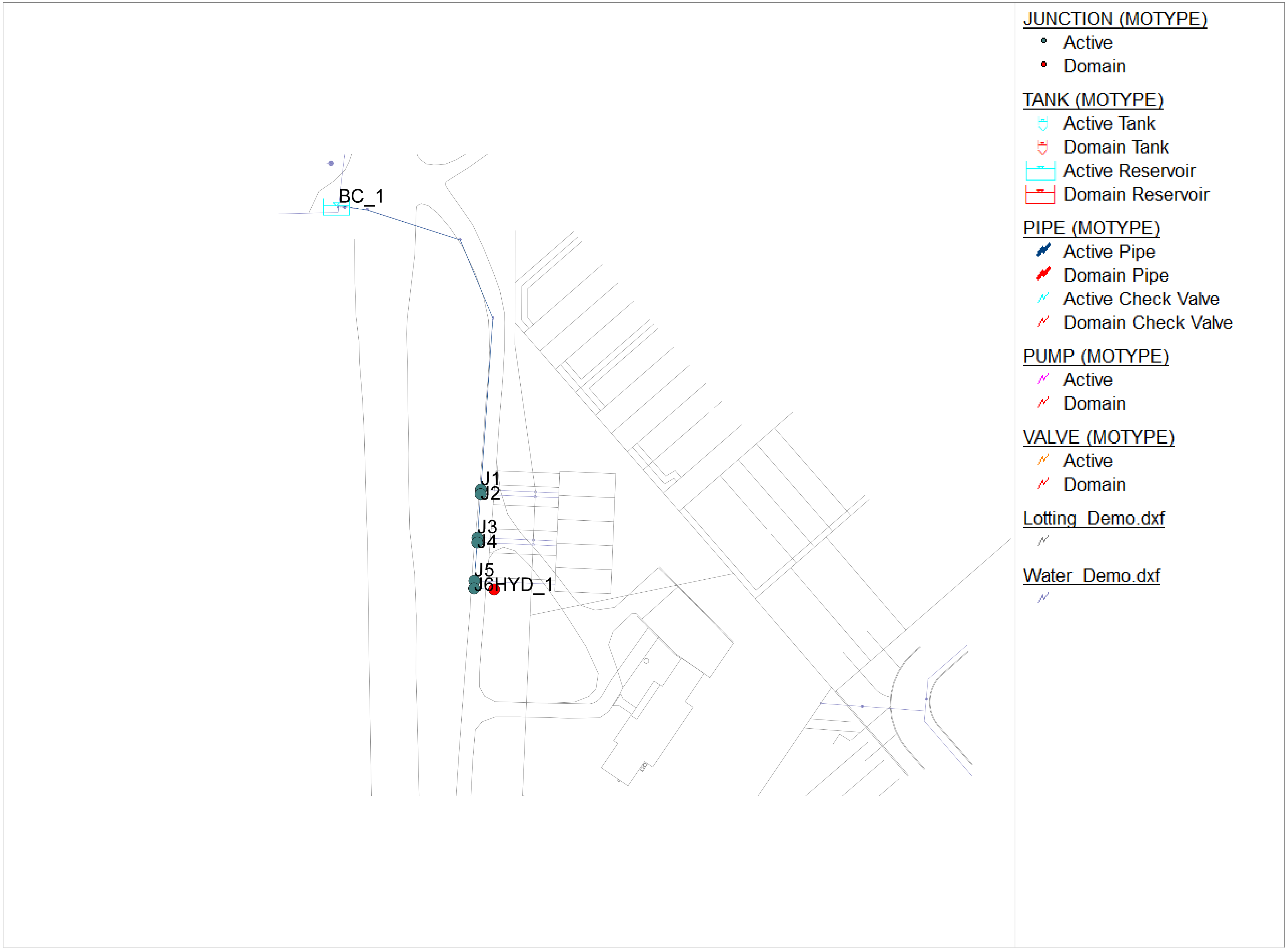
1835 Stittsville Main Street



Prepared By:

Date: Monday, October 31, 2022

1835 Stittsville Main Street



Prepared By:

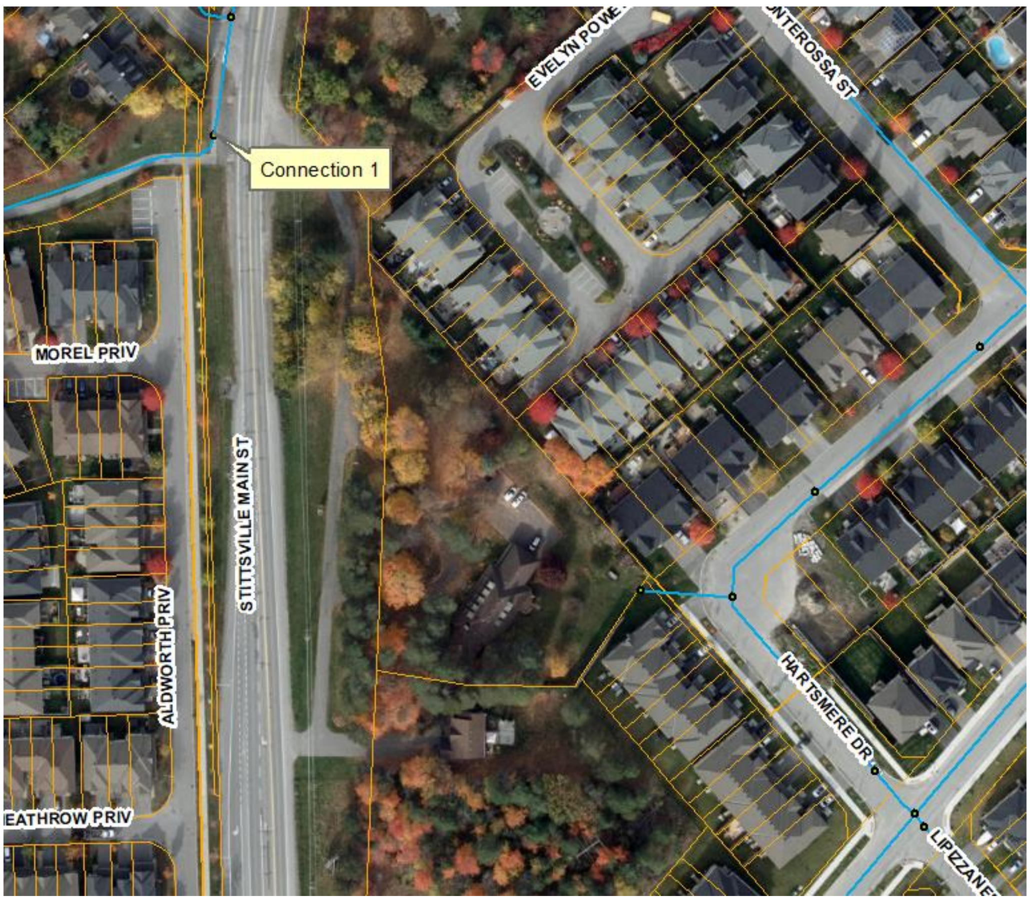
Date: 31/10/2022 11:16:54 AM

Boundary Conditions
1835 Stittsville Main Street

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	2	0.03
Maximum Daily Demand	19	0.31
Peak Hour	269	4.49
Fire Flow Demand #1	9,000	150.00

Location



Results

Connection 1 – Stittsville Main Street

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	160.2	54.5
Peak Hour	155.2	47.4
Max Day plus Fire 1	144.3	32.0

Ground Elevation = 121.9 m

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.

WATERMAIN DESIGN SHEET

1835 Stittsville Main Street, Ottawa

Project No. 22008

JUNCTION NODE	RESIDENTIAL POPULATION UNIT COUNT SINGLE FAMILY	TOWNHOUSE	APARTMENTS	TOTAL POPULATION	COMMERCIAL AREA (ha)	INSTITUTIONAL AREA (ha)	AVG. DAY DEMAND (L/s) RES.	COMM.	INST.	TOTAL	MAX. DAILY DEMAND (L/s) RES.	COMM.	INST.	TOTAL	MAX. HOURLY DEMAND (L/s) RES.	COMM.	INST.	TOTAL
J1	2			6.8			0.022			0.022	0.209			0.209	2.994			2.994
Total	**2**			**6.8**			**0.022**			**0.022**	**0.209**			**0.209**	**2.994**			**2.994**

Notes:

1. Residential peaking factors as per Table 3-3 of the MOE Design Guidelines for Drinking Water Systems (2008).

Population Density		
Single Family =	3.4	cap/unit
Townhouses =	2.7	cap/unit
Apartments =	1.8	cap/unit

Avg. Day Demand:			Max. Daily Demand:			Max. Hourly Demand:		
Residential	280	L/cap/day	Residential	9.5	x Avg. Day	Residential	14.3	x Max. Day
Commercial	28000	L/ha/day	Commercial	1.5	x Avg. Day	Commercial	1.8	x Max. Day
Institutional	28000	L/ha/day	Institutional	1.5	x Avg. Day	Institutional	1.8	x Max. Day

Table 3-3: Peaking Factors for Drinking-Water Systems Serving Fewer than 500 People

DWELLING UNITS SERVICED	EQUIVALENT POPULATION	NIGHT MINIMUM HOUR FACTOR	MAXIMUM DAY FACTOR	PEAK HOUR FACTOR
10	30	0.1	9.5	14.3
50	150	0.1	4.9	7.4
100	300	0.2	3.6	5.4
150	450	0.3	3.0	4.5
167	500	0.4	2.9	4.3

WATERMAIN DESIGN SHEET

1835 Stittsville Main Street, Ottawa

Project No. 22008

JUNCTION NODE	RESIDENTIAL POPULATION				COMMERCIAL AREA (ha)	INSTITUTIONAL AREA (ha)	AVG. DAY DEMAND (L/s)				MAX. DAILY DEMAND (L/s)				MAX. HOURLY DEMAND (L/s)			
	UNIT COUNT			TOTAL POPULATION														
	SINGLE FAMILY	TOWNHOUSE	APARTMENTS				RES.	COMM.	INST.	TOTAL	RES.	COMM.	INST.	TOTAL	RES.	COMM.	INST.	TOTAL
J1		5		13.5			0.044			0.044	0.416			0.416	5.943			5.943
Total		**5**		**13.5**			**0.044**			**0.044**	**0.416**			**0.416**	**5.943**			**5.943**

Notes:
1. Residential peaking factors as per Table 3-3 of the MOE Design Guidelines for Drinking Water Systems (2008).

Population Density		
Single Family =	3.4	cap/unit
Townhouses =	2.7	cap/unit
Apartments =	1.8	cap/unit

Avg. Day Demand:			Max. Daily Demand:			Max. Hourly Demand:		
Residential	280	L/cap/day	Residential	9.5	x Avg. Day	Residential	14.3	x Max. Day
Commercial	28000	L/ha/day	Commercial	1.5	x Avg. Day	Commercial	1.8	x Max. Day
Institutional	28000	L/ha/day	Institutional	1.5	x Avg. Day	Institutional	1.8	x Max. Day

Table 3-3: Peaking Factors for Drinking-Water Systems Serving Fewer than 500 People

DWELLING UNITS SERVICED	EQUIVALENT POPULATION	NIGHT MINIMUM HOUR FACTOR	MAXIMUM DAY FACTOR	PEAK HOUR FACTOR
10	30	0.1	9.5	14.3
50	150	0.1	4.9	7.4
100	300	0.2	3.6	5.4
150	450	0.3	3.0	4.5
167	500	0.4	2.9	4.3

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (psi)
1		HYD_1	0.00	122.60	155.20	46.34
2		J1	0.00	123.50	155.20	45.06
3		J2	1.50	123.50	155.20	45.06
4		J3	0.00	123.50	155.20	45.06
5		J4	1.50	123.50	155.20	45.06
6		J5	0.00	123.50	155.20	45.06
7		J6	0.00	123.50	155.20	45.06

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (psi)
1		HYD_1	0.00	122.60	155.19	46.33
2		J1	1.19	123.50	155.19	45.05
3		J2	1.19	123.50	155.19	45.05
4		J3	1.19	123.50	155.19	45.05
5		J4	1.19	123.50	155.19	45.05
6		J5	1.19	123.50	155.19	45.05
7		J6	0.00	123.50	155.19	45.05

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (psi)
1		HYD_1	0.00	122.60	160.20	53.45
2		J1	0.00	123.50	160.20	52.17
3		J2	0.01	123.50	160.20	52.17
4		J3	0.00	123.50	160.20	52.17
5		J4	0.01	123.50	160.20	52.17
6		J5	0.00	123.50	160.20	52.17
7		J6	0.00	123.50	160.20	52.17

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (psi)
1		HYD_1	0.00	122.60	160.20	53.45
2		J1	0.01	123.50	160.20	52.17
3		J2	0.01	123.50	160.20	52.17
4		J3	0.01	123.50	160.20	52.17
5		J4	0.01	123.50	160.20	52.17
6		J5	0.01	123.50	160.20	52.17
7		J6	0.01	123.50	160.20	52.17

	PIPE: ID (Char)	PIPEHYD: DIAMETER (Num)	PIPEHYD: ROUGHNESS (Num)	LINK: FROM (Char)	LINK: TO (Char)
1	P1	254.00	110.00	BC_1	J1
2	P2	254.00	110.00	J1	J2
3	P3	254.00	110.00	J2	J3
4	P4	254.00	110.00	J3	J4
5	P5	254.00	110.00	J4	J5
6	P6	254.00	110.00	J5	J6
7	P7	163.00	110.00	J6	HYD_1

0 10m 20m 40m

HORIZONTAL 1:1000

LEGEND

PROPERTY BOUNDARY

AREA BOUNDARY USED IN STEP B

EXPOSURE LENGTH USED IN STEP F

Robinson Land Development

scale 1:1000	1835 STITTSVILLE MAIN STREET		project no. 22008
date 01/11/22			
drawn by BLM	FUS SKETCH – LOT 1		FUS1

Project Name:	1835 Stittsville Main Street
Project Location:	1835 Stittsville Main Street
Project No:	22008
Date:	Nov. 01-22
Building Type:	Single-Family
Building Being Considered:	Lot 1 (Existing Dwelling)

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	**Type of Construction**	**Options**	**C**	Wood Frame (Type V)	1.5	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				310	m^2
	Second Floor Area				155	m^2
	Total Effective Floor Area				**465.0**	**m^2**
C	**Fire Flow**				**7,000**	**L/min**
D	**Occupancy Class**	**Options**	**Charge**	Limited Combustible	-0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**-1050**	**L/min**
	Fire Flow				**5,950**	**L/min**
E	**Sprinkler Protection**	**Options**	**Charge**			
		Automatic Sprinkler Protection	-0.30	None	0.00	
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinkler System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				10	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				20	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame			
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**+3m See Note 3**	16.6	m
	West Side Exposure Charge				**0.10**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				19.3	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				38.6	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame			
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**+3m See Note 3**	23	m
	North Side Exposure Charge				**0.02**	
	East Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				16.7	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				33.4	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame			
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				

		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**+3m See Note 3**	27.5	m
	East Side Exposure Charge			**0.02**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			19	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			38	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**Separtion >30m; No exposure**	35.6	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0.14**	**< 0.75**
	Increase for Exposures			**833**	**L/min**
G	**Total Required Fire Flow**			**7,000**	**L/min**

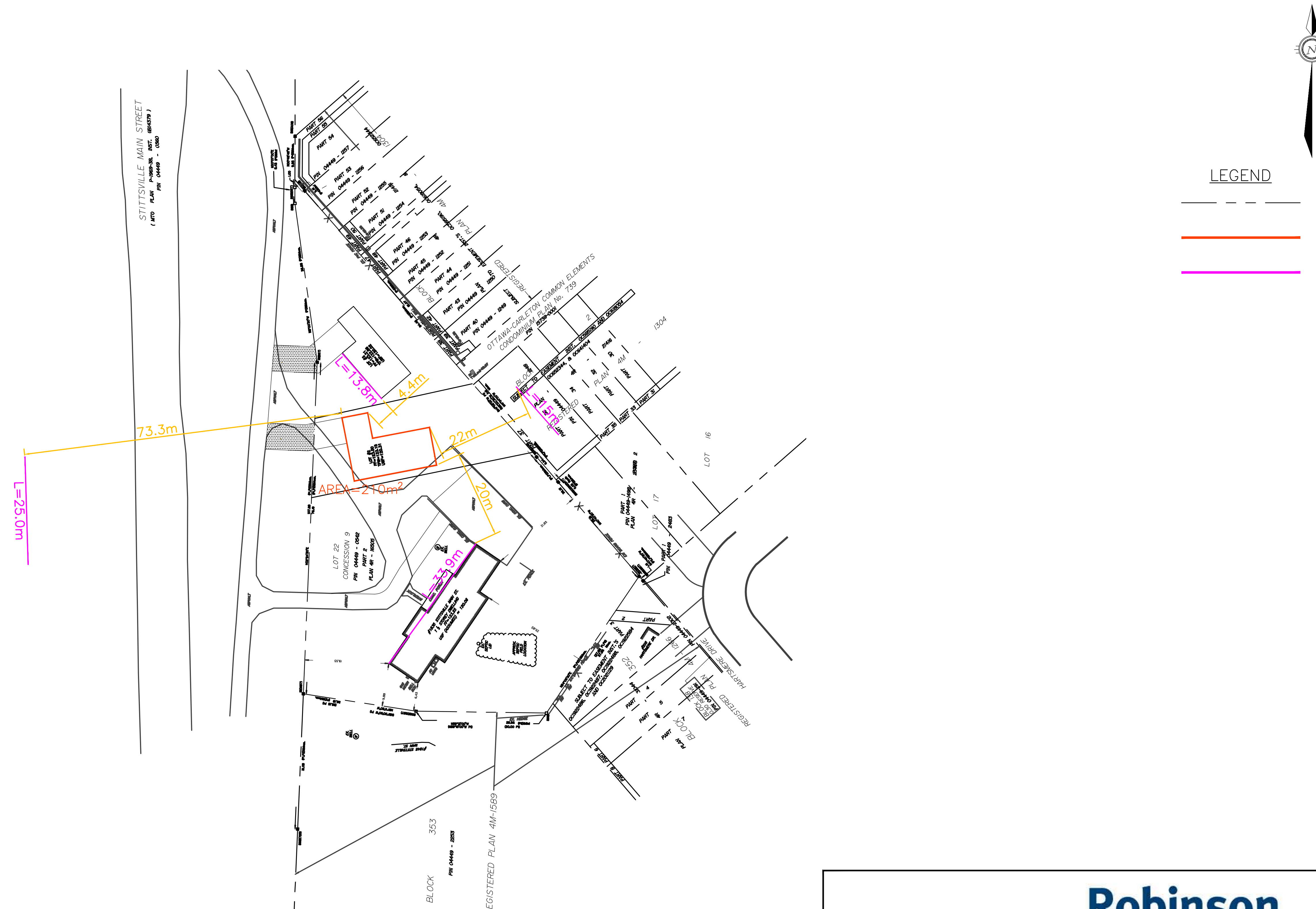
Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Floor areas used in Step B are conservative values as they include the exterior footprint and garages.

3. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

4. Step B, second storey floor area assumed to be half of building footprint area (noted as 1.5 storey dwelling on topographic survey)



LEGEND

PROPERTY BOUNDARY

AREA BOUNDARY USED IN STEP B

EXPOSURE LENGTH USED IN STEP F

0 10m 20m 40m

HORIZONTAL 1:1000

Robinson Land Development

scale		project no.
1:1000	1835 STITTSVILLE MAIN STREET	22008
date 01/11/22		
drawn by BLM	FUS SKETCH – LOT 2	FUS2

Project Name:	1835 Stittsville Main Street
Project Location:	1835 Stittsville Main Street
Project No:	22008
Date:	Nov. 01-22
Building Type:	Single-Family
Building Being Considered:	Lot 2 (Proposed Dwelling)

Robinson Land Development

Calculations for Total Required Fire Flow

Step	**Parameter**				**Value**	
A	**Type of Construction**	**Options**	**C**	Wood Frame (Type V)	1.5	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				210	m^2
	Second Floor Area				210	m^2
	Total Effective Floor Area				**420.0**	**m^2**
C	**Fire Flow**				**7,000**	**L/min**
D	**Occupancy Class**	**Options**	**Charge**	Limited Combustible	-0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**-1050**	**L/min**
	Fire Flow				**5,950**	**L/min**
E	**Sprinkler Protection**	**Options**	**Charge**			
		Automatic Sprinkler Protection	-0.30	None	0.00	
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinkler System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				25	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				50	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**Separtion >30m; No exposure**	73.3	m
	West Side Exposure Charge				**0.00**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				13.8	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				27.6	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**+3m See Note 3**	7.4	m
	North Side Exposure Charge				**0.16**	
	East Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				15	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				30	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				

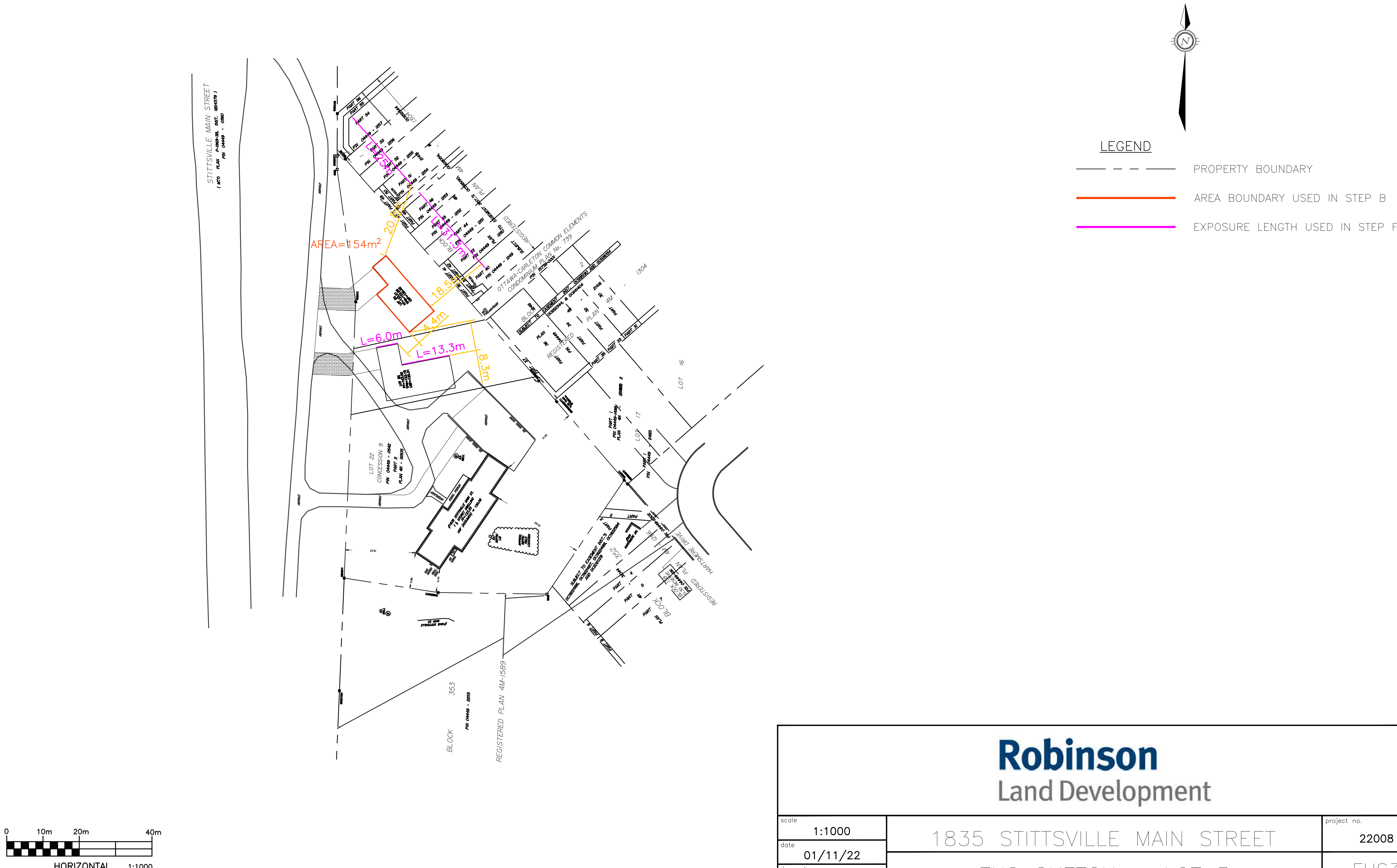
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**+3m See Note 3**	25	m
	East Side Exposure Charge			**0.02**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			33.9	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			67.8	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**+3m See Note 3**	23	m
	South Side Exposure Charge			**0.06**	
	Total Exposure Charage			**0.24**	**< 0.75**
	Increase for Exposures			**1428**	**L/min**
G	**Total Required Fire Flow**			**7,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Floor areas used in Step B are conservative values as they include the exterior footprint and garages.

3. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).



Robinson Land Development

scale 1:1000	1835 STITTSVILLE MAIN STREET	project no. 22008
date 01/11/22	FUS SKETCH – LOT 3	FUS3
drawn by BLM		

Project Name:	1835 Stittsville Main Street	Robinson Land Development
Project Location:	1835 Stittsville Main Street	
Project No:	22008	
Date:	Nov. 01-22	
Building Type:	Single-Family	
Building Being Considered:	Lot 3 (Proposed Dwelling)	

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	**Type of Construction**	**Options**	**C**	Wood Frame (Type V)	1.5	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				154	m^2
	Second Floor Area				154	m^2
	Total Effective Floor Area				**308.0**	**m^2**
C	**Fire Flow**				**6,000**	**L/min**
D	**Occupancy Class**	**Options**	**Charge**	Limited Combustible	-0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**-900**	**L/min**
	Fire Flow				**5,100**	**L/min**
E	**Sprinkler Protection**	**Options**	**Charge**			
		Automatic Sprinkler Protection	-0.30	None	0.00	
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinkler System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				6	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				12	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame			
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**+3m See Note 3**	7.4	m
	West Side Exposure Charge				**0.15**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				25	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				50	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame			
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**+3m See Note 3**	23.8	m
	North Side Exposure Charge				**0.04**	
	East Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				31.3	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				62.6	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame			
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				

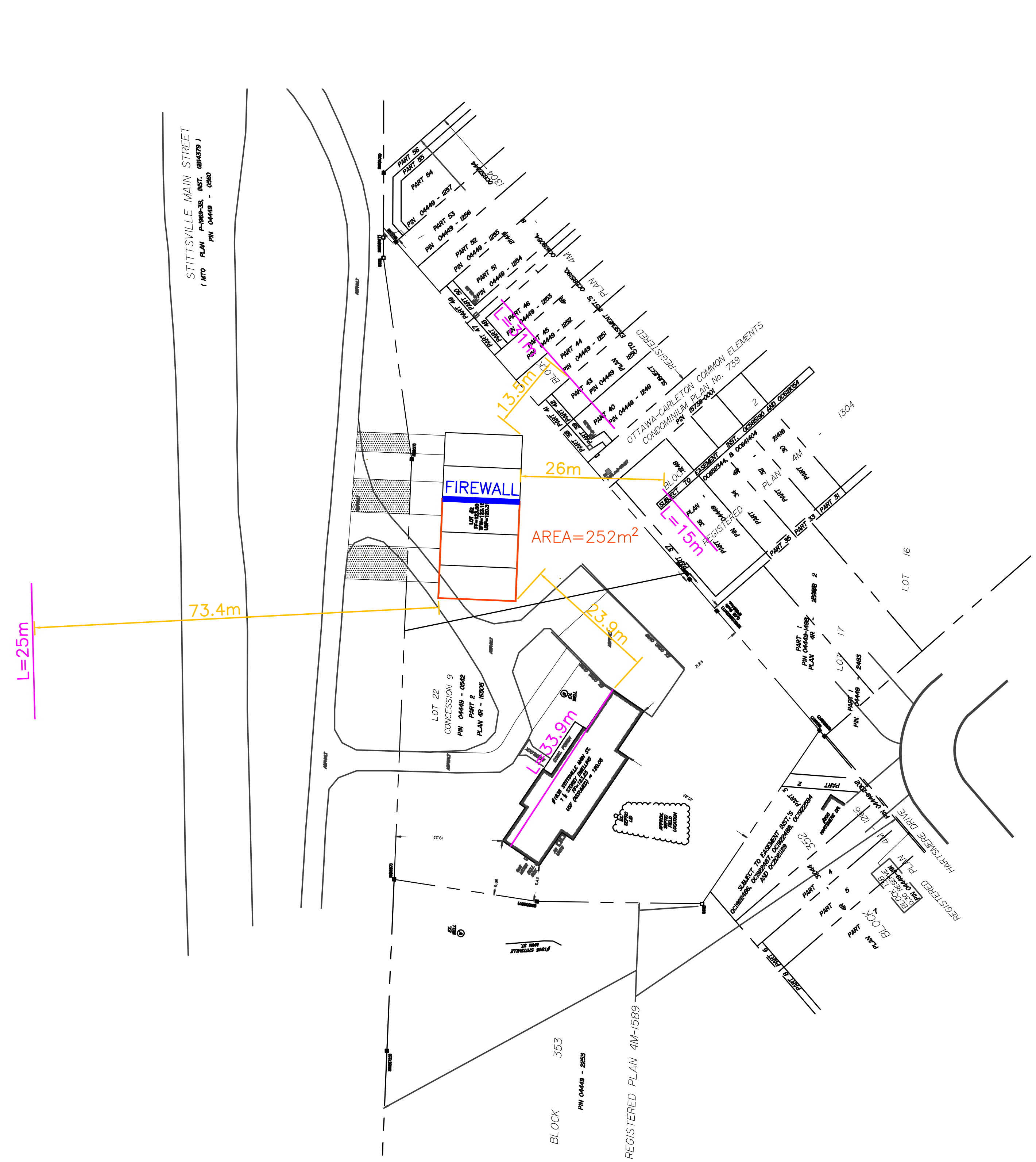
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance			18.5	m
	East Side Exposure Charge			**0.13**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			13.3	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			26.6	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**+3m See Note 3**	11.3	m
	South Side Exposure Charge			**0.11**	
	Total Exposure Charage			**0.43**	**< 0.75**
	Increase for Exposures			**2193**	**L/min**
G	**Total Required Fire Flow**			**7,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Floor areas used in Step B are conservative values as they include the exterior footprint and garages.

3. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).



LEGEND

PROPERTY BOUNDARY

AREA BOUNDARY USED IN STEP B

EXPOSURE LENGTH USED IN STEP F

0 10m 20m 40m

HORIZONTAL 1:1000

Robinson Land Development

scale 1:1000	1835 STITTSVILLE MAIN STREET		project no. 22008
date 01/11/22			
drawn by BLM	FUS SKETCH – TOWNHOUSE		FUS4

Project Name:	1835 Stittsville Main Street	Robinson Land Development
Project Location:	1835 Stittsville Main Street	
Project No:	22008	
Date:	Nov. 01-22	
Building Type:	5-Unit Townhouse (with firewall)	
Building Being Considered:	Lot 2 (Proposed Dwelling)	

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	**Type of Construction**	**Options**	**C**	Wood Frame (Type V)	1.5	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				252	m^2
	Second Floor Area				252	m^2
	Total Effective Floor Area				**504.0**	$\mathbf{m^2}$
C	**Fire Flow**				**7,000**	**L/min**
D	**Occupancy Class**	**Options**	**Charge**	Limited Combustible	-0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**-1050**	**L/min**
	Fire Flow				**5,950**	**L/min**
E	**Sprinkler Protection**	**Options**	**Charge**			
		Automatic Sprinkler Protection	-0.30	None	0.00	
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	No	0.00	
		Full Supervision of the Sprinkler System	-0.10	No	0.00	
	Sprinkler Reduction				**0**	**L/min**
F	**Exposures**					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				25	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				50	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**Separtion >30m; No exposure**	73.4	m
	West Side Exposure Charge				**0.00**	
	North Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				31	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				62	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**+3m See Note 3**	16.5	m
	North Side Exposure Charge				**0.13**	
	East Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Building Fully Protected with Automatic Sprinker Systems				No	
	Exposed Wall Length				15	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				30	m.storeys
	Construction Type of Exposed Wall	**Options**		Wood Frame		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				

		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**+3m See Note 3**	29	m
	East Side Exposure Charge			**0.02**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Building Fully Protected with Automatic Sprinker Systems			No	
	Exposed Wall Length			33.9	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			67.8	m.storeys
	Construction Type of Exposed Wall	**Options**	Wood Frame		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**+3m See Note 3**	26.9	m
	South Side Exposure Charge			**0.06**	
	Total Exposure Charage			**0.21**	**< 0.75**
	Increase for Exposures			**1249.5**	**L/min**
G	**Total Required Fire Flow**			**7,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Floor areas used in Step B are conservative values as they include the exterior footprint and garages.

3. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

4. Step B, floor area assumes implementation of firewall to reduce effective floor area to 3-units.

1835 Stittsville Main Street - Max Day + FF - SF

		ID	Static Demand (Lpm)	Static Pressure (psi)	Static Head (m)	Fire-Flow Demand (Lpm)	Residual Pressure (psi)	Available Flow at Hydrant (Lpm)
1		HYD_1	0.00	30.85	144.30	8,999.94	21.13	9,549.17

		ID	Available Flow Pressure (psi)
1		HYD_1	20.00

		ID	Static Demand (Lpm)	Static Pressure (psi)	Static Head (m)	Fire-Flow Demand (Lpm)	Residual Pressure (psi)	Available Flow at Hydrant (Lpm)
1		HYD_1	0.00	30.85	144.30	8,999.94	21.10	9,534.45

		ID	Available Flow Pressure (psi)
1		HYD_1	20.00

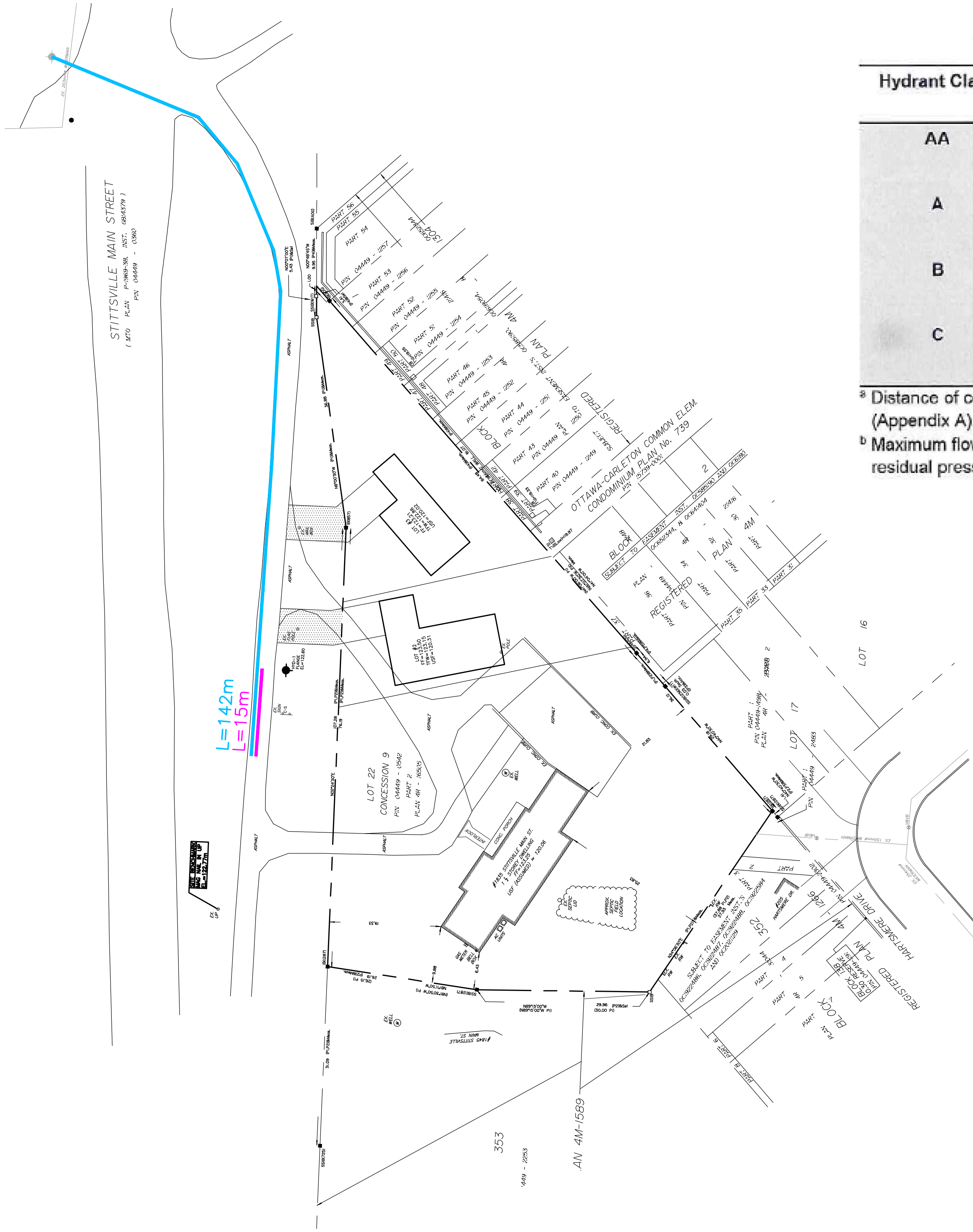


Table 1. Maximum flow to be considered from a given hydrant

Hydrant Class	Distance to asset/structure/building (m)[a]	Contribution to required fire flow (L/min)[b]
AA	≤ 75	5,700
	> 75 and ≤ 150	3,800
A	≤ 75	3,800
	> 75 and ≤ 150	2,850
B	≤ 75	1,900
	> 75 and ≤ 150	1,500
C	≤ 75	800
	> 75 and ≤ 150	800

[a] Distance of contributing hydrant from the structure, measured in accordance with NFPA 1 (Appendix A).

[b] Maximum flow contribution to be considered for a given asset/structure/building, at a residual pressure of 20 psi, measured at the location of the main, at ground level.

N

LEGEND

- PROPERTY BOUNDARY
- EXISTING HYDRANT COVERAGE LENGTH
- PROPOSED HYDRANT COVERAGE LENGTH
- EXISTING HYDRANT
- PROPOSED HYDRANT

LOT 1 HYDRANT COVERAGE TABLE

HYDRANT ID	DISTANCE TO BUILDING (m)	CONTRIBUTION TO REQUIRED FIRE FLOW (L/min)
HYD-1	15	5,700
EX HYD	142	3,800
PROVIDED		9,500
REQUIRED		6,000

NOTES:
1. CONTRIBUTION TO REQUIRED FIRE FLOW DETERMINED USING TABLE 1 FROM CITY OF OTTAWA TECHNICAL BULLETIN ISTB-2018-02 APPENDIX I.
2. ASSUMED HYDRANT CLASS: AA.
3. REQUIRED FIRE FLOW AS PER FUS GUIDELINES.

0 10m 20m 40m
HORIZONTAL 1:1000

Robinson Land Development

scale 1:1000	1835 STITTSVILLE MAIN STREET	project no. 22008
date 01/11/22	LOT 1 – HYDRANT COVERAGE PLAN	HYD-1
drawn by BLM		

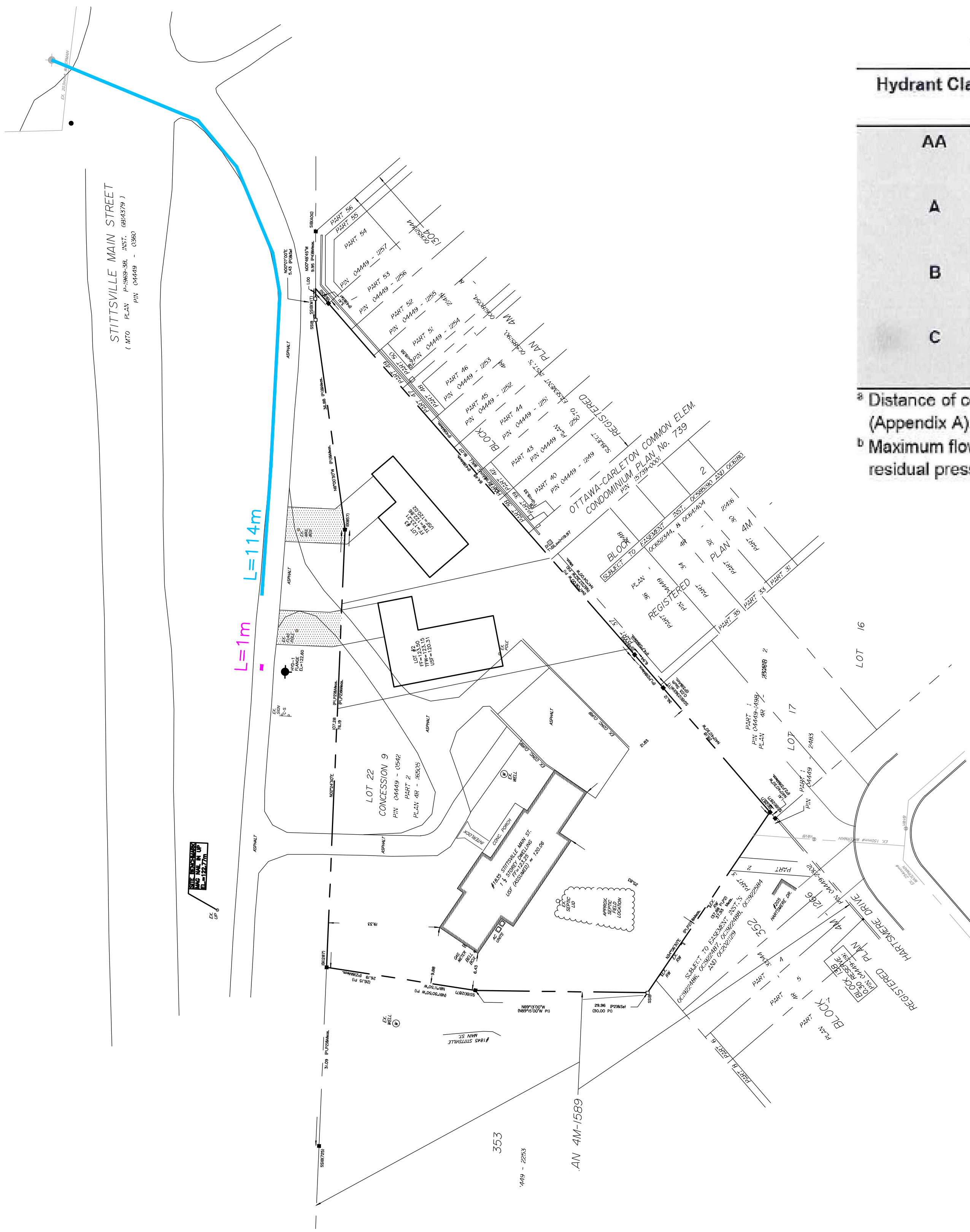


Table 1. Maximum flow to be considered from a given hydrant

Hydrant Class	Distance to asset/structure/building (m)[a]	Contribution to required fire flow (L/min)[b]
AA	≤ 75	5,700
	> 75 and ≤ 150	3,800
A	≤ 75	3,800
	> 75 and ≤ 150	2,850
B	≤ 75	1,900
	> 75 and ≤ 150	1,500
C	≤ 75	800
	> 75 and ≤ 150	800

[a] Distance of contributing hydrant from the structure, measured in accordance with NFPA 1 (Appendix A).
[b] Maximum flow contribution to be considered for a given asset/structure/building, at a residual pressure of 20 psi, measured at the location of the main, at ground level.

LEGEND

PROPERTY BOUNDARY
EXISTING HYDRANT COVERAGE LENGTH
PROPOSED HYDRANT COVERAGE LENGTH
EXISTING HYDRANT
PROPOSED HYDRANT

LOT 2 HYDRANT COVERAGE TABLE		
HYDRANT ID	DISTANCE TO BUILDING (m)	CONTRIBUTION TO REQUIRED FIRE FLOW (L/min)
HYD-1	1	5,700
EX HYD	114	3,800
PROVIDED		9,500
REQUIRED		4,000

NOTES:
1. CONTRIBUTION TO REQUIRED FIRE FLOW DETERMINED USING TABLE 1 FROM CITY OF OTTAWA TECHNICAL BULLETIN ISTB-2018-02 APPENDIX I.
2. ASSUMED HYDRANT CLASS: AA.
3. REQUIRED FIRE FLOW AS PER FUS GUIDELINES.

0 10m 20m 40m
HORIZONTAL 1:1000

Robinson Land Development

scale 1:1000	1835 STITTSVILLE MAIN STREET		project no. 22008
date 01/11/22	LOT 2 - HYDRANT COVERAGE PLAN		HYD-2
drawn by BLM			

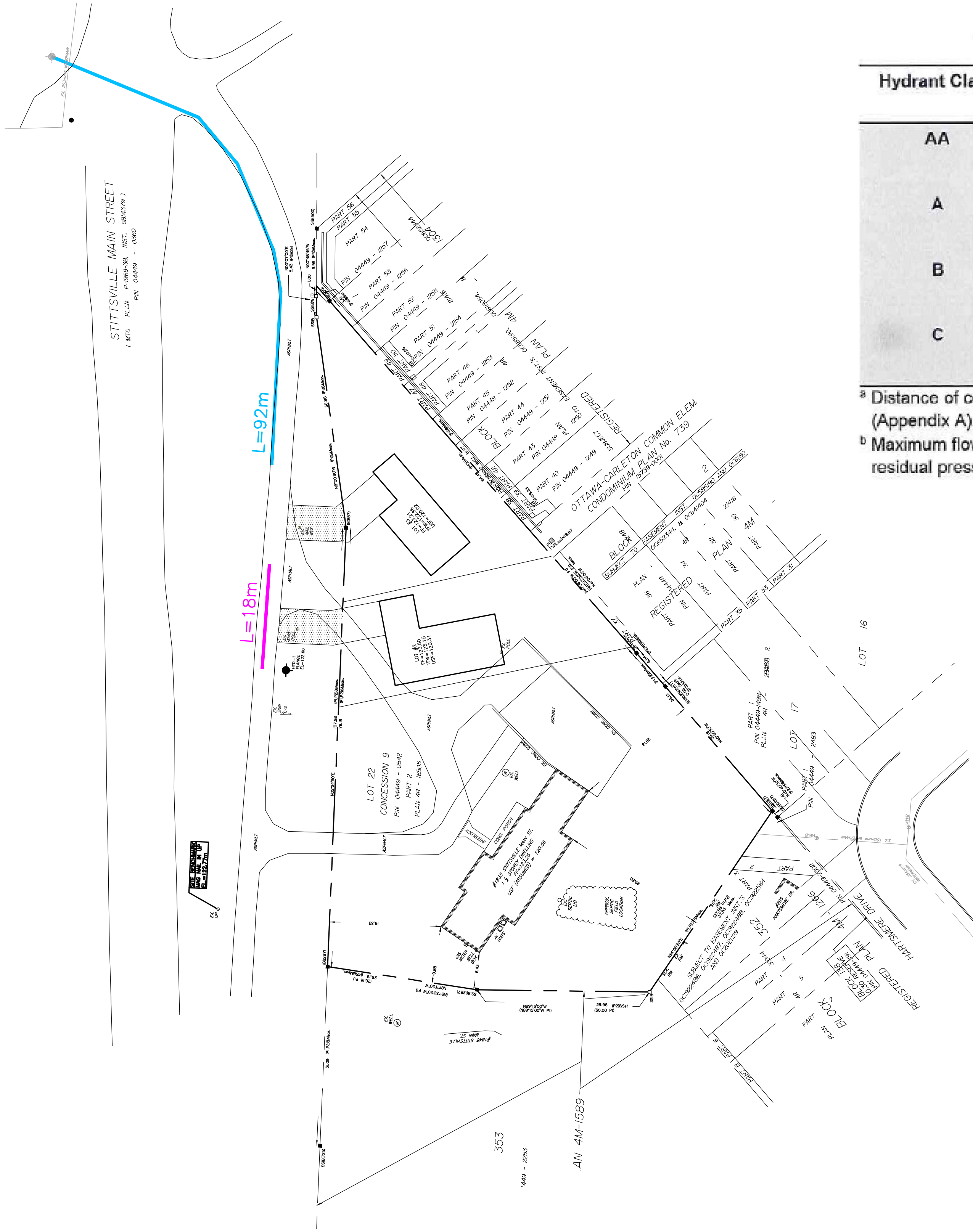


Table 1. Maximum flow to be considered from a given hydrant

Hydrant Class	Distance to asset/structure/building (m)[a]	Contribution to required fire flow (L/min)[b]
AA	≤ 75	5,700
	> 75 and ≤ 150	3,800
A	≤ 75	3,800
	> 75 and ≤ 150	2,850
B	≤ 75	1,900
	> 75 and ≤ 150	1,500
C	≤ 75	800
	> 75 and ≤ 150	800

[a] Distance of contributing hydrant from the structure, measured in accordance with NFPA 1 (Appendix A).
[b] Maximum flow contribution to be considered for a given asset/structure/building, at a residual pressure of 20 psi, measured at the location of the main, at ground level.

LEGEND

PROPERTY BOUNDARY

HYDRANT COVERAGE LENGTH

EXISTING HYDRANT

PROPOSED HYDRANT

LOT 3 HYDRANT COVERAGE TABLE		
HYDRANT ID	DISTANCE TO BUILDING (m)	CONTRIBUTION TO REQUIRED FIRE FLOW (L/min)
HYD-1	18	5,700
EX HYD	92	3,800
PROVIDED		9,500
REQUIRED		4,000

NOTES:
1. CONTRIBUTION TO REQUIRED FIRE FLOW DETERMINED USING TABLE 1 FROM CITY OF OTTAWA TECHNICAL BULLETIN ISTB-2018-02 APPENDIX I.
2. ASSUMED HYDRANT CLASS: AA.
3. REQUIRED FIRE FLOW AS PER FUS GUIDELINES.

0 10m 20m 40m
HORIZONTAL 1:1000

Robinson Land Development

scale 1:1000	1835 STITTSVILLE MAIN STREET	project no. 22008
date 01/11/22	LOT 3 – HYDRANT COVERAGE PLAN	HYD-3
drawn by BLM		

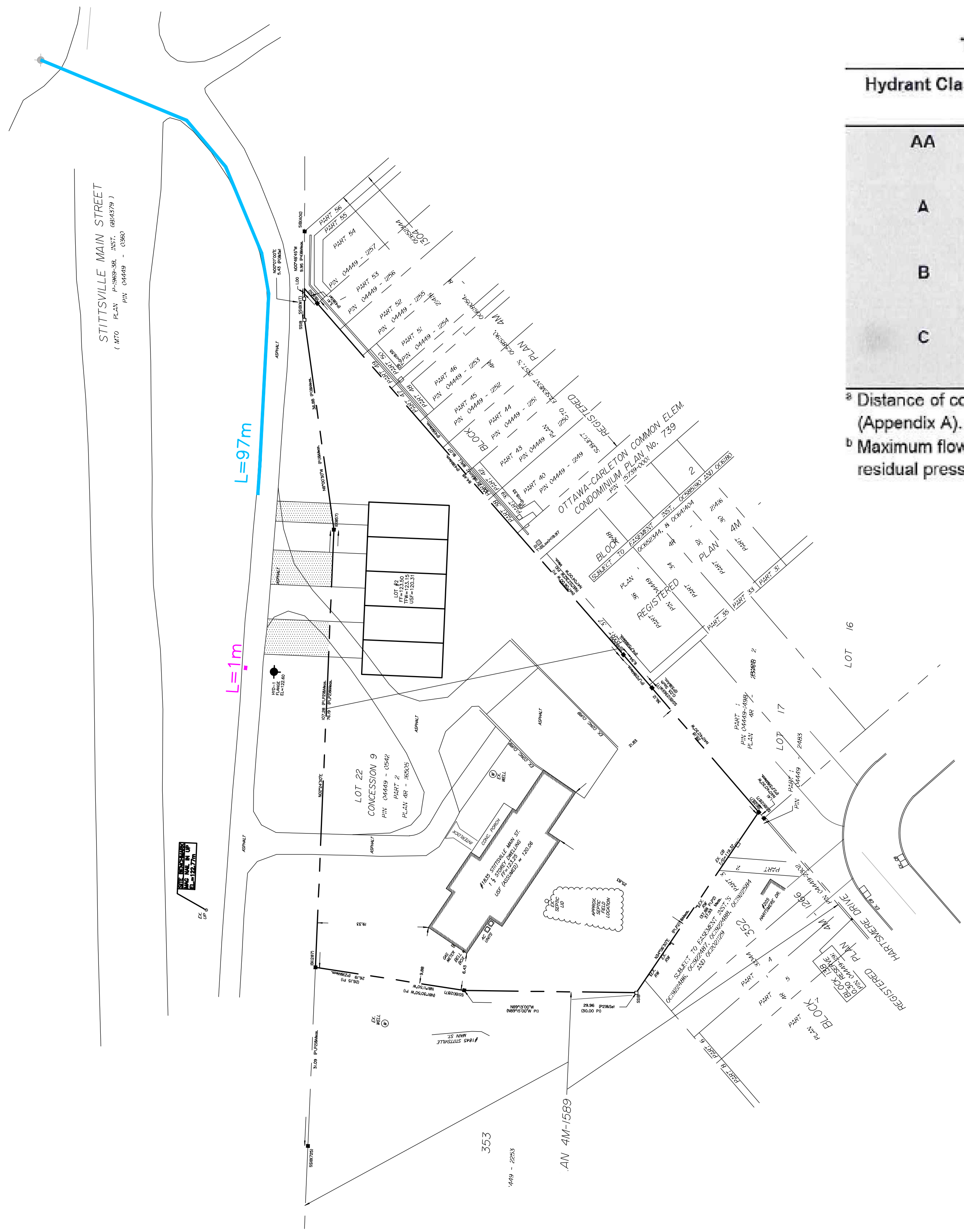


Table 1. Maximum flow to be considered from a given hydrant

Hydrant Class	Distance to asset/structure/building (m)[a]	Contribution to required fire flow (L/min)[b]
AA	≤ 75	5,700
	> 75 and ≤ 150	3,800
A	≤ 75	3,800
	> 75 and ≤ 150	2,850
B	≤ 75	1,900
	> 75 and ≤ 150	1,500
C	≤ 75	800
	> 75 and ≤ 150	800

[a] Distance of contributing hydrant from the structure, measured in accordance with NFPA 1 (Appendix A).
[b] Maximum flow contribution to be considered for a given asset/structure/building, at a residual pressure of 20 psi, measured at the location of the main, at ground level.

LEGEND

- PROPERTY BOUNDARY
- EXISTING HYDRANT COVERAGE LENGTH
- PROPOSED HYDRANT COVERAGE LENGTH
- EXISTING HYDRANT
- PROPOSED HYDRANT

TH HYDRANT COVERAGE TABLE

HYDRANT ID	DISTANCE TO BUILDING (m)	CONTRIBUTION TO REQUIRED FIRE FLOW (L/min)
HYD-1	1	5,700
EX HYD	97	3,800
PROVIDED		9,500
REQUIRED		6,000

NOTES:
1. CONTRIBUTION TO REQUIRED FIRE FLOW DETERMINED USING TABLE 1 FROM CITY OF OTTAWA TECHNICAL BULLETIN ISTB-2018-02 APPENDIX I.
2. ASSUMED HYDRANT CLASS: AA.
3. REQUIRED FIRE FLOW AS PER FUS GUIDELINES.

0 10m 20m 40m
HORIZONTAL 1:1000

Robinson Land Development

scale 1:1000	1835 STITTSVILLE MAIN STREET	project no. 22008
date 01/11/22	TH – HYDRANT COVERAGE PLAN	HYD-4
drawn by BLM		

Attachment C

Novatech Sanitary Sewer Design Sheet

Novatech Sanitary Drainage Area Plan

Sanitary Sewer Design Sheet

Sanitary Drainage Area Plans
(DWG. 22008-SAN1, SAN2)

STITTSVILLE SOUTH - AREA 6
SANITARY SEWER DESIGN SHEET

JOB# 113004

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION			FLOW																		PROPOSED SEWER						
			RESIDENTIAL UNITS				PARK	COMMERCIAL	INDIVIDUAL		CUMULATIVE				PEAK FACTOR (M)	POPUL. FLOW	PEAK PARK FLOW	PEAK COMMERCIAL FLOW	PEAK EXTRAN. FLOW	PEAK DESIGN FLOW							
FROM MH	TO MH	STREET	SINGLES	SEMIS/ TOWNS	STACKS	APT.	PARK AREA (ha.)	COMMERCIAL AREA (ha.)	POPUL. (1000's)	AREA (ha.)	POPUL. (1000's)	PARK AREA (ha)	COMMERCIAL AREA (ha)	RESIDENTIAL AREA (ha.)		Q(p) L/s	Q(pk) L/s	Q(c) L/s	Q(e) (L/s)	Q(d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	TYPE	SLOPE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	RATIO (Q/Qfull)
221	219	PARADE			70				0.161	1.023	0.161	0.00	0.00	1.023	4.000	2.609	0.00	0.00	0.287	2.895	35.3	200	PVC	1.15	36.693	1.13	8%
219	217	PARADE	4	9					0.038	0.596	0.199	0.00	0.00	1.620	4.000	3.223	0.00	0.00	0.454	3.676	75.7	200	PVC	1.85	46.540	1.44	8%
217	215	PARADE		5					0.014	0.293	0.212	0.00	0.00	1.913	4.000	3.442	0.00	0.00	0.536	3.977	83.3	200	PVC	2.20	50.751	1.56	8%
267	215	HARSTMERE		12		100			0.242	1.027	0.242	0.00	0.00	1.027	4.000	3.928	0.00	0.00	0.288	4.215	84.3	200	PVC	0.40	21.640	0.67	19%
215	213	PARADE	2						0.007	0.190	0.462	0.00	0.00	3.131	3.992	7.464	0.00	0.00	0.877	8.341	54.0	200	PVC	1.85	46.540	1.44	18%
213	211	PARADE	7						0.024	0.412	0.485	0.00	0.00	3.543	3.981	7.828	0.00	0.00	0.992	8.820	69.0	200	PVC	1.85	46.540	1.44	19%
211	209	PARADE	6				1.33		0.020	1.694	0.506	1.33	0.00	5.238	3.972	8.138	0.06	0.00	1.467	9.665	75.0	200	PVC	1.55	42.599	1.31	23%
257	255	CAPMOLINA	9						0.031	0.893	0.031	0.00	0.00	0.893	4.000	0.496	0.00	0.00	0.250	0.746	120.0	200	PVC	1.50	41.907	1.29	2%
265	255	FALABELLA	5		82				0.206	1.531	0.206	0.00	0.00	1.531	4.000	3.331	0.00	0.00	0.429	3.760	77.4	200	PVC	0.50	24.195	0.75	16%
255	253	CAPMOLINA	7						0.024	0.557	0.260	0.00	0.00	2.982	4.000	4.213	0.00	0.00	0.835	5.048	84.0	200	PVC	0.55	25.376	0.78	20%
263	253	QUARTER HORSE	13						0.044	0.761	0.044	0.00	0.00	0.761	4.000	0.716	0.00	0.00	0.213	0.929	119.4	200	PVC	0.40	21.640	0.67	4%
253	251	CAPMOLINA	5						0.017	0.425	0.321	0.00	0.00	4.169	4.000	5.205	0.00	0.00	1.167	6.372	81.9	200	PVC	1.60	43.281	1.33	15%
261	251	LIPIZZANER		31					0.084	0.940	0.084	0.00	0.00	0.940	4.000	1.356	0.00	0.00	0.263	1.620	117.2	200	PVC	0.60	26.504	0.82	6%
251	249	CAPMOLINA	7						0.024	0.573	0.429	0.00	0.00	5.683	4.000	6.947	0.00	0.00	1.591	8.538	90.3	200	PVC	1.35	39.756	1.23	21%
249	247	CAPMOLINA	7						0.024	0.616	0.453	0.00	0.00	6.299	3.996	7.325	0.00	0.00	1.764	9.089	98.3	200	PVC	1.35	39.756	1.23	23%
247	245	CAPMOLINA	1						0.003	0.148	0.456	0.00	0.00	6.448	3.995	7.377	0.00	0.00	1.805	9.182	10.9	200	PVC	1.35	39.756	1.23	23%
245	243	CAPMOLINA	11						0.037	0.632	0.493	0.00	0.00	7.080	3.977	7.948	0.00	0.00	1.982	9.930	71.4	200	PVC	0.60	26.504	0.82	37%
243	209	CAPMOLINA	8						0.027	0.432	0.521	0.00	0.00	7.512	3.965	8.361	0.00	0.00	2.103	10.464	55.9	200	PVC	0.60	26.504	0.82	39%
209	207	PARADE	7						0.024	0.411	1.050	1.33	0.00	13.162	3.786	16.106	0.06	0.00	3.685	19.850	82.0	250	PVC	0.85	57.197	1.13	35%
207	205	PARADE	7	9					0.048	0.622	1.098	1.33	0.00	13.784	3.773	16.787	0.06	0.00	3.860	20.704	82.0	250	PVC	0.85	57.197	1.13	36%
241	205	PEDIGREE	14						0.048	0.776	0.048	0.00	0.00	0.776	4.000	0.771	0.00	0.00	0.217	0.989	119.0	200	PVC	0.35	20.243	0.62	5%
205	203	PARADE	7	9					0.048	0.609	1.194	1.33	0.00	15.170	3.749	18.132	0.06	0.00	4.248	22.437	82.0	250	PVC	0.60	48.055	0.95	47%
239A	239B	MANEGE	16						0.054	0.865	0.054	0.00	0.00	0.865	4.000	0.881	0.00	0.00	0.242	1.124	107.7	200	PVC	0.40	21.640	0.67	5%
239B	203	MANEGE							0.000	0.000	0.054	0.00	0.00	0.865	4.000	0.881	0.00	0.00	0.242	1.124	11.1	200	PVC	0.40	21.640	0.67	5%
203	201	PARADE	7						0.024	0.417	1.272	1.33	0.00	16.453	3.730	19.222	0.06	0.00	4.607	23.886	82.0	250	PVC	0.60	48.055	0.95	50%
237	235	STALLION	1	28					0.079	0.893	0.079	0.00	0.00	0.893	4.000	1.280	0.00	0.00	0.250	1.530	112.8	200	PVC	0.50	24.195	0.75	6%
235	233	STALLION	2						0.007	0.256	0.086	0.00	0.00	1.150	4.000	1.390	0.00	0.00	0.322	1.712	11.0	200	PVC	0.50	24.195	0.75	7%
233	231	STALLION	5						0.017	0.431	0.103	0.00	0.00	1.581	4.000	1.666	0.00	0.00	0.443	2.108	74.2	200	PVC	0.50	24.195	0.75	9%
231	229	STALLION	4						0.014	0.499	0.116	0.00	0.00	2.081	4.000	1.886	0.00	0.00	0.583	2.469	82.0	200	PVC	0.50	24.195	0.75	10%
229	227	STALLION	4						0.014	0.483	0.130	0.00	0.00	2.564	4.000	2.106	0.00	0.00	0.718	2.824	74.7	200	PVC	0.50	24.195	0.75	12%
227	225	STALLION	2						0.007	0.230	0.137	0.00	0.00	2.794	4.000	2.217	0.00	0.00	0.782	2.999	10.9	200	PVC	0.50	24.195	0.75	12%
225	223	STALLION	11						0.037	0.541	0.174	0.00	0.00	3.336	4.000	2.823	0.00	0.00	0.934	3.757	113.2	200	PVC	0.50	24.195	0.75	16%
223	201	STALLION	8						0.027	0.418	0.201	0.00	0.00	3.754	4.000	3.263	0.00	0.00	1.051	4.315	11.1	200	PVC	0.50	24.195	0.75	18%
201	159	PARADE	6						0.020	0.410	1.494	1.33	0.00	20.62	3.681	22.275	0.06	0.00	5.773	28.105	82.0	300	PVC	0.50	71.334	0.98	39%
157	155	BECKETT	11						0.037	0.530	0.037	0.00	0.00	0.530	4.000	0.606	0.00	0.00	0.148	0.754	112.7	200	PVC	0.40	21.640	0.67	3%
155	159	BECKETT	6						0.020	0.330	0.058	0.00	0.00	0.860	4.000	0.937	0.00	0.00	0.241	1.177	12.0	200	PVC	0.70	28.628	0.88	4%
159	145	PARADE	13						0.044	0.631	1.596	1.33	0.00	22.108	3.660	23.661	0.06	0.00	6.190	29.908	82.0	300	PVC	0.50	71.334	0.98	42%
157	153	BECKETT	2						0.007	0.244	0.007	0.00	0.00	0.244	4.000	0.110	0.00	0.00	0.068	0.179	10.9	200	PVC	0.30	18.741	0.58	1%
153	151	BECKETT	6						0.020	0.561	0.027	0.00	0.00	0.805	4.000	0.441	0.00	0.00	0.226	0.666	66.8	200	PVC	0.30	18.741	0.58	4%
151	149	BECKETT	1						0.003	0.114	0.031	0.00	0.00	0.920	4.000	0.496	0.00	0.00	0.258	0.753	11.1	200	PVC	0.50	24.195	0.75	3%
149	147	BECKETT		14					0.038	0.445	0.068	0.00	0.00	1.365	4.000	1.108	0.00	0.00	0.382	1.491	112.3	200	PVC	0.50	24.195	0.75	6%
147	145	BECKETT		9					0.024	0.393	0.093	0.00	0.00	1.759	4.000	1.502	0.00	0.00	0.492	1.994	11.9	200	PVC	0.85	31.546	0.97	6%
145	143	PARADE	9						0.031	0.589	1.719	1.33	0.00	24.456	3.636	25.322	0.06	0.00	6.848	32.226	74.3	300	PVC	0.50	71.334	0.98	45%
143	141	PARADE	3						0.010	0.262	1.729	1.33	0.00	24.719	3.634	25.459	0.06	0.00	6.921	32.436	13.9	300	PVC	0.50	71.334	0.98	45%
141	139	PARADE	6						0.020	0.359	1.750	1.33	0.00	25.078	3.630	25.732	0.06	0.00	7.022	32.810	61.2	300	PVC	0.50	71.334	0.98	46%
139	137	PARADE	12						0.041	0.569	1.791	1.33	0.00	25.647	3.623	26.277	0.06	0.00	7.181	33.514	60.8	300	PVC	0.50	71.334	0.98	47%
137	135	PARADE	2						0.007	0.222	1.797	1.33	0.00	25.870	3.621	26.368	0.06	0.00	7.244	33.667	12.3	300	PVC	0.50	71.334	0.98	47%
135	133	PARADE	5						0.017	0.404	1.814	1.33	0.00	26.274	3.618	26.594	0.06	0.00	7.357	34.007	74.3	300	PVC	0.50	71.334	0.98	48%

STITTSVILLE SOUTH - AREA 6
SANITARY SEWER DESIGN SHEET

JOB# 113004

NOVATECH
Engineers, Planners & Landscape Architects

123	121	HICKSTEAD	3						0.010	0.262	0.010	0.00	0.00	0.262	4.000	0.165	0.00	0.00	0.073	0.239	12.9	200	PVC	0.50	24.195	0.75	1%
121	119	HICKSTEAD	10						0.034	0.512	0.044	0.00	0.00	0.775	4.000	0.716	0.00	0.00	0.217	0.933	60.7	200	PVC	0.60	26.504	0.82	4%
119	133	HICKSTEAD	10						0.034	0.502	0.078	0.00	0.00	1.277	4.000	1.267	0.00	0.00	0.358	1.625	71.4	200	PVC	0.80	30.604	0.94	5%
133	131	PARADE	5						0.017	0.403	1.910	1.33	0.00	27.955	3.601	27.859	0.06	0.00	7.827	35.741	82.0	375	PVC	0.30	100.184	0.88	36%
115	117	CAVALLO		16					0.043	0.496	0.043	0.00	0.00	0.496	4.000	0.700	0.00	0.00	0.139	0.839	70.9	200	PVC	1.90	47.164	1.45	2%
117	131	CAVALLO		18					0.049	0.541	0.092	0.00	0.00	1.038	4.000	1.488	0.00	0.00	0.291	1.778	71.0	200	PVC	1.90	47.164	1.45	4%
131	129	PARADE	6						0.020	0.402	2.022	1.33	0.00	29.395	3.582	29.338	0.06	0.00	8.231	37.624	74.3	375	PVC	0.30	100.184	0.88	38%
129	127	PARADE	1						0.003	0.083	2.025	1.33	0.00	29.478	3.582	29.383	0.06	0.00	8.254	37.692	12.4	375	PVC	0.30	100.184	0.88	38%
127	125	PARADE	6						0.020	0.374	2.046	1.33	0.00	29.852	3.578	29.651	0.06	0.00	8.359	38.064	69.0	375	PVC	0.30	100.184	0.88	38%
125	113	PARADE	4				0.85		0.014	1.126	2.059	2.18	0.00	30.979	3.576	29.829	0.09	0.00	8.674	38.593	63.9	375	PVC	0.15	70.841	0.62	54%
123	115	HICKSTEAD	6						0.020	0.401	0.020	0.00	0.00	0.401	4.000	0.331	0.00	0.00	0.112	0.443	73.4	200	PVC	1.35	39.756	1.23	1%
115	113	HICKSTEAD	6						0.020	0.686	0.041	0.00	0.00	1.088	4.000	0.661	0.00	0.00	0.305	0.966	83.0	200	PVC	1.35	39.756	1.23	2%
113	111	HICKSTEAD	7						0.024	0.532	2.124	2.18	0.00	32.599	3.565	30.674	0.09	0.00	9.128	39.892	111.0	375	PVC	0.15	70.841	0.62	56%
111	109	HICKSTEAD	5						0.017	0.401	2.141	2.18	0.00	33.000	3.563	30.896	0.09	0.00	9.240	40.226	115.7	375	PVC	0.60	141.682	1.24	28%
Friendly Cres.			70						0.238	4.860																	
Davidson			329	230	0	172	2.14	2.93	2.101	32.710																	
109	107										4.480	4.32	2.93	70.571	3.289	59.682	0.16	2.54	20.580	82.970	71.7	375	PVC	0.25	91.455	0.80	91%
107	105										4.480	4.32	2.93	70.571	3.289	59.682	0.16	2.54	20.580	82.970	62.1	375	PVC	0.25	91.455	0.80	91%
105	101										4.480	4.32	2.93	70.571	3.289	59.682	0.16	2.54	20.580	82.970	11.0	375	PVC	2.00	258.675	2.27	32%
101	99										4.480	4.32	2.93	70.571	3.289	59.682	0.16	2.54	20.580	82.970	73.3	450	CONC	2.00	420.634	2.56	20%
99	PS										4.480	4.32	2.93	70.571	3.289	59.682	0.16	2.54	20.580	82.970	6.1	450	CONC	2.00	420.634	2.56	20%

Design Parameters:

1) Q(e) = 0.28 L/sec/ha	Singles	**3.4**	persons/unit
2) Q(p) = (PxqxM/86,400)	Semis/Towns	**2.7**	persons/unit
3) Q(pk) = 1000 L/d/ha x M	Stacked	**2.3**	persons/unit
4) Q(c) = 50000 L/d/ha x N	Apartements	**2.1**	persons/unit

5) Q(d) = Q(p) + Q(pk) + Q(c)+ Q(e)

Definitions:

P = Population
q = Average per capita flow = 350 L/person/day
M = Residential Peaking Factor (Harmon Formula from section 4.4.1 of the City Sewer Design Guidelines):

N =Commercial / Park Peaking Factor (1.5) from City Design Guidelines
Q(d) = Design Flow (L/sec)
Q(p) = Population Flow (L/sec)
Q(pk) = Park Flow (L/sec)
Q(c) = Commercial Flow (L/sec)
Q(e) = Extraneous Flow (L/sec)

STITTSVILLE SOUTH - AREA 6
SANITARY SEWER DESIGN SHEET

Date	April 5, 2016	
Design	BHB	
Job No.	**Dwg. Reference:**	**Checked and Stamped:**
113004	113004-SAN	--

LICENSED PROFESSIONAL ENGINEER
B. H. BAHIA
100164647
April 5, 2016.
PROVINCE OF ONTARIO

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
3.	ISSUED FOR TENDER	JAN 20/16	BHB
2.	REVISED AS PER CITY COMMENTS	DEC 16/15	BHB
1.	ISSUED FOR CITY REVIEW	SEPT 14/15	BHB

SCALE
1:1000

DESIGN	BCS/TGP
CHECKED	BHB
DRAWN	BCS/TGP
CHECKED	BHB
APPROVED	GJM

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
B. H. BAHIA
100164647
PROVINCE OF ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

CITY OF OTTAWA
STITTSVILLE SOUTH - AREA 6

SANITARY DRAINAGE AREA PLAN

PROJECT No. 113004-00
REV REV # 3
DRAWING No. 113004-SAN1

PLAN81.DWG - 1000mmx707mm

SANITARY SEWER DESIGN SHEET
1835 STITTSVILLE MAIN STREET, STITTSVILLE

LOCATION			RESIDENTIAL AREA AND POPULATION						RESIDENTIAL FLOW				PIPE						
			UNIT COUNT		INDIVIDUAL		CUMULATIVE												
STREET	FROM MH	TO MH	SINGLE-FAMILY	TOWNHOUSE	POP.	AREA (ha)	POP.	AREA (ha)	PEAK FACTOR	PEAK POP. FLOW (L/s)	EXTRAN. FLOW (L/s)	PEAK DESIGN FLOW (L/s)	LENGTH (m)	DIAMETER (mm)	SLOPE (%)	CAPACITY (L/s)	VELOCITY (m/s)	EXCESS CAPACITY (L/s)	PERCENT FULL
TO STITTSVILLE MAIN STREET SANITARY SEWER (PROPOSED DEVELOPMENT)																			
DRIVEWAY	102	101	2	0	6.8	0.38	6.8	0.38	3.74	0.08	0.13	0.21	70.6	201.16	0.65	26.88	0.85	26.67	0.77
DRIVEWAY	101	100	0	0	0.0	0.05	6.8	0.43	3.74	0.08	0.14	0.22	19.1	201.16	0.68	27.49	0.87	27.27	0.82
DRIVEWAY	100	*EX43A*	0	0	0.0	0.04	6.8	0.47	3.74	0.08	0.16	0.24	23.0	201.16	0.66	27.09	0.85	26.85	0.88
TO STITTSVILLE MAIN STREET SANITARY SEWER (DEMONSTRATION DEVELOPMENT)																			
DRIVEWAY	102	101	0	5	13.5	0.38	13.5	0.38	3.72	0.16	0.13	0.29	70.6	201.16	0.65	26.88	0.85	26.59	1.07
DRIVEWAY	101	100	0	0	0.0	0.05	13.5	0.43	3.72	0.16	0.14	0.30	19.1	201.16	0.68	27.49	0.87	27.19	1.11
DRIVEWAY	100	*EX43A*	0	0	0.0	0.04	13.5	0.47	3.72	0.16	0.16	0.32	23.0	201.16	0.66	27.09	0.85	26.77	1.17

DESIGN PARAMETERS

Average Daily Flow =	280	L/person/day
Comm./Inst. Flow =	28000	L/ha/day
Industrial Flow =		
Maximum Residential Peak Factor =	4.0	
Harmon - Correction Factor (K) =	0.8	
Comm./Inst. Peak Factor =	1.5	
Extraneous Flow =	0.33	L/s/ha
Minimum Velocity =	0.6	m/s
Maximum Velocity =	3.0	m/s

Per Unit Populations:

Single Family	3.4	persons/unit
Semi-detached	2.7	persons/unit
Duplex	2.3	persons/unit
Townhouse	2.7	persons/unit
Apartments:		
Bachelor	1.4	persons/unit
1 Bedroom	1.4	persons/unit
2 Bedroom	2.1	persons/unit
3 Bedroom	3.1	persons/unit
Average Apt.	1.8	persons/unit

Robinson Land Development

NOTES

THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

NO.	REVISION DESCRIPTION	DATE	BY
1	REVISED PER COMMENTS	01/11/22	AHJ

SCALE
HORIZONTAL 1:250

LICENSED PROFESSIONAL ENGINEER
Nov. 1/22
B. L. MACKECHNIE
100199554
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
NOV. 1, 2022
A.H. JONKMAN
PROVINCE OF ONTARIO

Robinson Land Development
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	AHJ
DRAWN	BLM
CHECKED	AHJ
APPROVED	AHJ

JENNIFER McGAHAN
WIRE INVESTMENT CORP.

1835 STITTSVILLE MAIN STREET
STITTSVILLE, ON

PROPOSED DEVELOPMENT
SANITARY DRAINAGE AREA PLAN

PROJECT No.	22008
SURVEY	AOV
DATED	NOVEMBER 2022
DWG. No:	22008-SAN1

NOTES

THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

NO.	REVISION DESCRIPTION	DATE	BY
1	REVISED PER COMMENTS	01/11/22	AHJ

SCALE: HORIZONTAL 1:250

LICENSED PROFESSIONAL ENGINEER – Nov. 1/22 – B.L. MACKECHNIE – 100199554 – PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER – NOV. 1, 2022 – A.H. JONKMAN – PROVINCE OF ONTARIO

Robinson Land Development
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	AHJ
DRAWN	BLM
CHECKED	AHJ
APPROVED	AHJ

JENNIFER McGAHAN
WIRE INVESTMENT CORP.

1835 STITTSVILLE MAIN STREET
STITTSVILLE, ON

DEMONSTRATION DEVELOPMENT
SANITARY DRAINAGE AREA PLAN

PROJECT No.	22008
SURVEY	AOV
DATED	NOVEMBER 2022
DWG. No:	22008-SAN2

Attachment D

Novatech Storm Sewer Design Sheet

Novatech Storm Drainage Area Plan

Storm Sewer Design Sheet

Stittsville Area 6
STORM SEWER DESIGN SHEET (5-YEAR EVENT)
JOB# 113004

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION				AREA (ha)									FLOW							PROPOSED SEWER								
Area	Street	FROM MH	TO MH	R= 0.20	R= 0.40	R= 0.45	R= 0.50	R= 0.55	R= 0.60	R= 0.65	R= 0.70	R= 0.75	INDIV. 2.78 AC	ACCUML. 2.78 AC	TIME OF CONC.	DESIGN STORM	RAINFALL INTENSITY	Peak Flow (L/sec) Q 5YR	Peak Flow (L/sec) Q total	DIA. ACTUAL (mm)	DIA. (mm)	TYPE	SLOPE (%)	LENGTH (m)	CAPACITY (L/s)	VELOCITY (m/s)	FLOW TIME (min)	Ratio (Q/Qfull)
A-01	PARADE	220	218								0.07		0.14	0.14	10.00	5	104.19	15.0	15.0	0.457	450	CONC	1.15	21.1	318.7	1.94	0.18	5%
A-03	PARADE	218	216						0.10				0.17	0.17	10.18	5	103.25	74.7	74.7	0.457	450	CONC	1.85	73.5	404.3	2.46	0.50	18%
A-02	PARADE	218	216								0.21		0.41	0.72														
															10.68													
A-04	PARADE	216	214									0.87	1.82	1.82	15.00	5	83.56	151.7	151.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
															15.00													
A-06	PARADE	216	214				0.34						0.47	0.47	15.00	5	83.56	334.0	334.0	0.457	450	CONC	2.20	83.2	440.8	2.69	0.52	76%
A-05, A07	PARADE	216	214								0.51		0.99	4.00														
															15.52													
A-10	HEARTSMERE	266	214						0.22				0.37	0.37	10.00	5	104.19	96.7	96.7	0.533	525	CONC	0.40	85.6	283.6	1.27	1.12	34%
A-09	HEARTSMERE	266	214								0.29		0.55	0.93														
															11.12													
A-12	PARADE	214	212						0.16				0.27	0.27	15.52	5	81.93	450.7	450.7	0.610	600	CONC	1.85	54.2	870.7	2.98	0.30	52%
A-11, A-13	PARADE	214	212								0.16		0.30	5.50														
A-14	PARADE	212	210								0.16		0.32	5.82	15.82	5	81.00	471.4	471.4	0.610	600	CONC	1.85	71.7	870.7	2.98	0.40	54%
A15	PARADE	210	208	1.01									0.56	0.56	16.22	5	79.81	575.6	575.6	0.686	675	CONC	1.55	75.0	1,091.1	2.95	0.42	53%
A-16	PARADE	210	208			0.21							0.26	0.26														
A-17	PARADE	210	208								0.29		0.57	7.21														
															16.64													
A-18, A-19	CAMPOLINA	256	254								0.49		0.95	0.95	10.00	5	104.19	98.5	98.5	0.381	375	PVC	1.6	120.0	231.2	2.03	0.99	43%
															10.99													
A-20	FALABELLA	264	254									1.13	2.36	2.36	15.00	5	83.56	197.0	197.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A-21	FALABELLA	264	254								0.30		0.59	2.95	15.00	5	83.56	246.1	246.1	0.610	600	CONC	0.50	77.3	452.7	1.55	0.83	54%
															15.83													
A-22	CAMPOLINA	254	252		0.46								0.51	0.51	15.83	5	80.97	443.3	443.3	0.686	675	CONC	0.55	81.0	650.0	2.75	0.49	68%
A-23	CAMPOLINA	254	252		0.33								0.36	0.36														
A-24	CAMPOLINA	254	252								0.37		0.71	5.47														
															16.32													
A-25, A-26, A-27	QUARTER HORSE	216	252								0.45		0.88	0.88	10.00	5	104.19	91.2	91.2	0.457	450	CONC	0.40	119.4	188.0	2.75	0.72	49%
															10.72													
A-28	CAMPOLINA	252	250		0.34								0.38	0.38	16.32	5	79.52	541.2	541.2	0.686	675	CONC	1.60	81.9	1,108.6	3.00	0.45	49%
A-29	CAMPOLINA	252	250								0.23		0.46	6.81														
															16.78													
A-30,31	LIPIZZANER	260	250								0.52		1.02	1.02	10.00	5	104.19	105.8	105.8	0.457	450	CONC	0.60	119.7	230.2	2.75	0.73	46%
															10.73													
A-32	CAMPOLINA	250	248								0.24		0.47	8.29	16.78	5	78.23	648.2	648.2	0.762	750	CONC	1.35	93.3	1,348.7	2.75	0.57	48%
A-34	CAMPOLINA	248	246		0.30								0.33	0.33	17.34	5	76.68	758.6	758.6	0.762	750	CONC	1.35	97.4	1,348.7	2.96	0.55	56%
A-35	CAMPOLINA	248	246		0.38								0.42	0.75														
A-33, A-36	CAMPOLINA	248	246								0.27		0.52	9.89														
A-37	CAMPOLINA	246	244										0.00	9.89	17.89	5	75.25	744.5	744.5	0.762	750	CONC	1.35	12.1	1,348.7	2.75	0.07	55%
A-37	CAMPOLINA	244	242								0.42		0.83	10.72	17.96	5	75.06	804.5	804.5	0.991	975	CONC	0.60	70.5	1,810.1	2.75	0.43	44%
A-38	CAMPOLINA	242	208								0.22		0.42	11.14	18.39	5	73.99	824.0	824.0	0.991	975	CONC	0.60	55.9	1,810.1	2.75	0.34	46%
															18.73													
A-39	PARADE	208	206				0.37						0.52	0.52	18.73	5	73.17	1,458.2	1,458.2	1.067	1050	CONC	0.85	79.0	2,625.3	2.94	0.45	56%
A-40	PARADE	208	206						0.636				1.06	19.93														
															19.18													

Stittsville Area 6
STORM SEWER DESIGN SHEET (5-YEAR EVENT)
JOB# 113004

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION				AREA (ha)									FLOW							PROPOSED SEWER								
Area	Street	FROM MH	TO MH	R= 0.20	R= 0.40	R= 0.45	R= 0.50	R= 0.55	R= 0.60	R= 0.65	R= 0.70	R= 0.75	INDIV. 2.78 AC	ACCUML. 2.78 AC	TIME OF CONC.	DESIGN STORM	RAINFALL INTENSITY	Peak Flow (L/sec) Q 5YR	Peak Flow (L/sec) Q total	DIA. ACTUAL (mm)	DIA. (mm)	TYPE	SLOPE (%)	LENGTH (m)	CAPACITY (L/s)	VELOCITY (m/s)	FLOW TIME (min)	Ratio (Q/Qfull)
A-56	STALLION	232	234		0.38								0.42	0.42	10.00	5	104.19	43.7	43.7	0.381	375	PVC	0.30	12.3	100.1	0.88	0.23	44%
A-41	STALLION	234	236								0.25		0.48	0.90	10.23	5	102.98	92.5	92.5	0.533	525	CONC	0.50	111.9	317.0	1.42	1.31	29%
A-42	STALLION	236	206								0.29		0.57	1.47	11.55	5	96.67	141.9	141.9	0.533	525	CONC	0.50	13.5	317.0	1.42	0.16	45%
															11.71													
A-44	PARADE	206	204			0.58							0.72	0.72	19.18	5	72.11	1,646.3	1,646.3	1.067	1050	CONC	0.85	84.9	2,625.3	2.94	0.48	63%
A-43	PARADE	206	204								0.37		0.71	22.83														
															19.66													
A-46	PEDIGREE	240	204				0.36						0.50	0.50	10.00	5	104.19	148.5	148.5	0.533	525	CONC	0.35	118.4	265.3	1.19	1.66	56%
A-45, A-47, A-48	PEDIGREE	240	204								0.47		0.92	1.43														
															11.19													
A-49	PARADE	204	202								0.48		0.94	25.19	19.66	5	71.01	1,788.8	1,788.8	1.372	1350	CONC	0.60	79.0	4,311.6	2.75	0.48	41%
															20.14													
A-52	MANEGE	238	202			0.37							0.46	0.46	10.00	5	104.19	149.5	149.5	0.457	450	CONC	0.40	119.0	188.0	1.14	1.73	80%
A-50, A-51, A-53	MANEGE	238	202								0.50		0.98	1.43														
															11.73													
A-54	PARADE	202	200			0.36							0.45	0.45	20.14	5	69.95	1,936.2	1,936.2	1.372	1350	CONC	0.60	85.0	4,311.6	2.75	0.52	45%
A-55	PARADE	202	200								0.31		0.61	27.68														
															20.65													
A-57	STALLION	232	230								0.27		0.53	0.53	10.00	5	104.19	55.6	55.6	0.457	450	CONC	1.75	73.3	393.2	2.75	0.44	14%
A-58	STALLION	230	228		0.33								0.37	0.37	10.44	5	101.90	154.1	154.1	0.610	600	CONC	0.50	82.0	452.7	1.55	0.88	34%
A-59	STALLION	230	228								0.31		0.61	1.51														
A-60	STALLION	228	226		0.07								0.07	0.07	11.33	5	97.68	208.8	208.8	0.686	675	CONC	0.50	76.9	619.7	1.68	0.76	34%
A-61	STALLION	228	226								0.28		0.55	2.14														
A-62	STALLION	224	222								0.34		0.66	2.79	12.09	5	94.32	263.5	263.5	0.762	750	CONC	0.50	63.6	820.8	1.80	0.59	32%
A-63	STALLION	222	200								0.23		0.45	3.25	12.68	5	91.89	298.2	298.2	0.762	750	CONC	0.50	59.7	820.8	1.80	0.55	36%
															13.23													
A-64	PARADE	200	152			0.30							0.38	0.38														
A-65	PARADE	200	152			0.28							0.34	0.34	20.65	5	68.85	2,220.2	2,220.2	1.372	1350	CONC	0.50	79.0	3,935.9	2.66	0.49	56%
A-66	PARADE	200	152								0.31		0.60	32.25														
															21.15													
A-67, A-68	BECKETT	150	148								0.54		1.05	1.05	10.00	5	104.19	109.9	109.9	0.457	450	CONC	0.40	111.8	188.0	1.14	1.63	58%
A-67, A-68	BECKETT	148	152										0.00	1.05	11.63	5	96.32	101.6	101.6	0.457	450	CONC	0.40	12.0	188.0	2.75	0.07	54%
															11.70													
A-69	PARADE	152	138								0.28		0.54	33.84	21.15	5	67.83	2,295.4	2,295.4	1.372	1350	CONC	0.50	85.0	3,935.9	2.75	0.52	58%
															21.66													
A-70	BECKETT	150	146										0.00	0.00	10.00	5	104.19	0.0	0.0	0.381	375	PVC	0.30	12.1	100.1	0.88	0.23	0%
A-70	BECKETT	146	144								0.30		0.57	0.57	10.23	5	103.00	59.1	59.1	0.457	450	CONC	0.30	68.0	162.8	2.75	0.41	36%
A-70	BECKETT	144	142										0.00	0.57	10.64	5	100.92	57.9	57.9	0.533	525	CONC	0.50	12.3	317.0	1.42	0.14	18%
A-71	BECKETT	142	140			0.37							0.46	0.46	10.79	5	100.22	203.8	203.8	0.610	600	CONC	0.50	111.4	452.7	2.75	0.68	45%
A-72, A-73	BECKETT	142	140								0.51		1.00	2.03														
A-72, A-73	BECKETT	140	138										0.00	2.03	11.46	5	97.06	197.4	197.4	0.610	600	CONC	0.50	11.9	452.7	1.55	0.13	44%
															11.59													

Stittsville Area 6
STORM SEWER DESIGN SHEET (5-YEAR EVENT)
JOB# 113004

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION				AREA (ha)									FLOW							PROPOSED SEWER								
Area	Street	FROM MH	TO MH	R= 0.20	R= 0.40	R= 0.45	R= 0.50	R= 0.55	R= 0.60	R= 0.65	R= 0.70	R= 0.75	INDIV. 2.78 AC	ACCUML. 2.78 AC	TIME OF CONC.	DESIGN STORM	RAINFALL INTENSITY	Peak Flow (L/sec) Q 5YR	Peak Flow (L/sec) Q total	DIA. ACTUAL (mm)	DIA. (mm)	TYPE	SLOPE (%)	LENGTH (m)	CAPACITY (L/s)	VELOCITY (m/s)	FLOW TIME (min)	Ratio (Q/Qfull)
A-74	PARADE	138	136			0.27							0.34	0.34														
A-76	PARADE	138	136			0.03							0.04	0.04	21.66	5	66.80	2,489.1	2,489.1	1.372	1350	CONC	0.50	72.2	3,935.9	2.66	0.45	63%
A-75, A-77	PARADE	138	136								0.522		1.02	37.26														
A-75, A-77	PARADE	136	134										0.00	37.26	22.12	5	65.93	2,456.6	2,456.6	1.372	1350	CONC	0.50	12.6	3,935.9	2.75	0.08	62%
A-78	PARADE	134	132			0.39							0.49	0.49	22.19	5	65.78	2,523.7	2,523.7	1.372	1350	CONC	0.50	59.2	3,935.9	2.66	0.37	64%
A-79	PARADE	134	132								0.32		0.62	38.37														
A-80	PARADE	132	130								0.35		0.68	39.05	22.56	5	65.09	2,541.7	2,541.7	1.524	1500	CONC	0.50	62.7	5,212.9	2.75	0.38	49%
A-81	PARADE	130	128		1.06								1.18	40.23	22.94	5	64.39	2,590.7	2,590.7	1.524	1500	CONC	0.50	13.6	5,212.9	2.75	0.08	50%
A-82	PARADE	128	126			0.33							0.41	0.41														
A-83	PARADE	128	126			0.17							0.22	0.22	23.02	5	64.24	2,663.1	2,663.1	1.524	1500	CONC	0.50	72.2	5,212.9	2.86	0.42	51%
A-84	PARADE	128	126								0.305		0.59	41.45														
															23.45													
A-85	HICKSTEAD	116	114			0.16							0.20	0.20	10.00	5	104.19	82.4	82.4	0.381	375	PVC	0.60	61.7	141.6	1.24	0.83	58%
A-86	HICKSTEAD	116	114								0.31		0.59	0.79														
A-87	HICKSTEAD	114	126								0.35		0.68	1.47	10.83	5	100.01	147.4	147.4	0.457	450	CONC	0.80	71.4	265.8	1.62	0.73	55%
															11.56													
A-88	PARADE	126	124				0.40						0.55	0.55														
A-89	PARADE	126	124								0.19		0.36	43.84	23.45	5	63.50	2,783.8	2,783.8	1.524	1500	CONC	0.30	82.0	4,037.9	2.21	0.62	69%
															24.06													
A-90	CAVALLO	110	112								0.25		0.48	0.48	10.00	5	104.19	50.1	50.1	0.381	375	PVC	1.90	70.9	251.9	2.21	0.53	20%
A-91	CAVALLO	112	124								0.33		0.65	1.13	10.53	5	101.45	114.7	114.7	0.533	525	CONC	0.45	71.0	300.8	2.75	0.43	38%
															10.97													
A-92	PARADE	124	122				0.40						0.55	0.55	24.06	5	62.43	2,893.8	2,893.8	1.524	1500	CONC	0.30	73.4	4,037.9	2.21	0.55	72%
A-93	PARADE	124	122								0.42		0.82	46.35														
															24.62													
A-94	HICKSTEAD	118	110			0.27							0.33	0.33	10.00	5	104.19	80.4	80.4	0.381	375	PVC	1.35	74.2	212.4	1.86	0.66	38%
A-95	HICKSTEAD	118	110								0.23		0.44	0.77														
A-96	HICKSTEAD	110	104								0.28		0.55	1.32	10.66	5	100.81	132.9	132.9	0.381	375	PVC	1.35	83.0	212.4	1.86	0.74	63%
															11.41													
A-97	HICKSTEAD	108	106			0.09							0.11	0.11	10.00	5	104.19	63.2	63.2	0.457	450	PVC	0.25	78.2	148.6	0.91	1.44	43%
A-98	HICKSTEAD	108	106								0.26		0.50	0.61														
A-99	HICKSTEAD	106	104			0.16							0.20	0.20														
A-100	HICKSTEAD	106	104			0.32							0.40	0.40	11.44	5	97.16	202.0	202.0	0.762	750	CONC	0.20	90.2	519.1	1.14	1.32	39%
A-101, A-102	HICKSTEAD	106	104								0.45		0.87	2.08														
															12.76													
A-103	PARADE	104	102								0.46		0.90	4.30	12.76	5	91.57	393.5	393.5	0.762	750	CONC	0.35	120.0	686.7	1.51	1.33	57%
A-103	PARADE	102	100										0.00	4.30	14.09	5	86.62	372.3	372.3	0.762	750	CONC	0.35	14.9	686.7	1.51	0.16	54%
A-103	PARADE	122	100										0.00	50.65	24.62	5	61.52	3,115.6	3,115.6	1.524	1500	CONC	0.30	23.1	4,037.9	2.21	0.17	77%
															24.79													

DESIGN PARAMETERS
Definitions:
Q = 2.78 AIR, where
Q= Peak Flow in Litres per Second (l/s)
A= Area in hectares (ha)
I= Rainfall Intensity (mm/lr)
R= Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min Pipe Velocity = 0.80 m/s
3) Tc =10 min (subdivision)

Stittsville Area 6 - Regional and Cavanagh Lands STORM SEWER DESIGN SHEET				
Date	April 5, 2016			
Design	T.P.	B.C.S		
Job No.		Dwg. Reference:	Checked and Stamped:	
113004		113004-STM	BHB	

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

M:\2013\113004\CAD\Design\113004-STM.dwg, CAVANGH, Jul 19, 2016 - 10:10am, tphillips

REVIEWED BY DEVELOPMENT REVIEW BRANCH

Signed ____________

Date ____________ 2016

Plan Number D07-16-13-0033

No.	REVISION	DATE	BY
5.	REVISED AS PER CITY COMMENTS	JULY 18/16	BHB
4.	REVISED AS PER CITY COMMENTS	APR 05/16	BHB
3.	ISSUED FOR TENDER	JAN 20/16	BHB
2.	REVISED AS PER CITY COMMENTS	DEC 16/15	BHB
1.	ISSUED FOR CITY REVIEW	SEPT 14/15	BHB

SCALE 1:1000

1:1000 0 10 20 30 40

DESIGN BCS/TGP
CHECKED BHB
DRAWN BCS/TGP
CHECKED BHB
APPROVED GJM

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER B. H. BAHIA 100164647 PROVINCE OF ONTARIO
July 18, 2016

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

CITY OF OTTAWA
STITTSVILLE SOUTH - AREA 6

STORM DRAINAGE AREA PLAN

PROJECT No. 113004-00
REV REV # 5
DRAWING No. 113004-STM1

PLANB1.DWG - 1000mmx707mm

STORM SEWER DESIGN SHEET
1835 STITTSVILLE MAIN STREET, STITTSVILLE

LOCATION				AREA (ha)		INDIV. 2.78AR	ACCUM. 2.78AR	TIME OF CONC. (min)	5 YR RAINFALL INTENSITY (mm/hr)	5 YR PEAK FLOW (L/s)	PROPOSED SEWER						
DRAINAGE AREA	STREET NAME	FROM MH	TO MH	TOTAL AREA	C						PIPE DIA. (mm)	GRADE (%)	LENGTH (m)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min)	5 YEAR PERCENT FULL
TO HARTSMERE DR. STORM SEWER																	
PROPOSED	EX. EASEMENT	*EX CB*	*EX 266*	0.53	0.35	0.52	0.52	15.00	83.56	43.25	*366.42*	*1.29*	*17.8*	*187.41*	*1.78*	*0.17*	*23%*
DEMO	EX. EASEMENT	EX CB	EX 266	0.53	0.32	0.47	0.47	15.00	83.56	39.55	366.42	1.29	17.8	187.41	1.78	0.17	*21%*

Design Parameters

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Peak flows calculated using the Rational Method.
   Q = 2.78CIA, where:
   Q = Peak Flow (L/s)
   A = Drainage Area (ha)
   I = Rainfall Intensity (mm/hr)
   C = Runoff Coefficient
3. Manning's roughness coefficient = 0.013
4. Full flow velocity: MIN 0.8 m/s; MAX 3.0 m/s (City of Ottawa Sewer Design Guidelines, v.2012)

IDF curve equations (Intensity in mm/hr)

100 year Intensity $= 1735.688 / (\text{Time in min} + 6.014)^{0.820}$
50 year Intensity $= 1569.580 / (\text{Time in min} + 6.014)^{0.820}$
25 year Intensity $= 1402.884 / (\text{Time in min} + 6.018)^{0.819}$
10 year Intensity $= 1174.184 / (\text{Time in min} + 6.014)^{0.816}$
5 year Intensity $= 998.071 / (\text{Time in min} + 6.053)^{0.814}$
2 year Intensity $= 732.951 / (\text{Time in min} + 6.199)^{0.810}$

Robinson
Land Development