ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES

130 HUNTMAR DRIVE

Prepared for:

LIONESS DEVELOPMENT INC.

PROJECT No: 191002

CITY OF OTTAWA

FEBRUARY 2020

ATREL Engineering Ltd. Ltée
Engineers - Ingénieurs

REVISION 0

ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES
130 HUNTMAR DRIVE

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130 HUNTMAR DRIVE

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1.0 BACKGROUND

1.1 General

Atrel Engineering Ltd. has been retained by Lioness Development Inc. to complete an Assessment of Adequacy of Public Services in support of a Major Zoning By-Law Amendment and a Plan of Subdivision Application for 130 Huntmar Drive. The development consists of approximately 26 ha. of vacant land and is located within the City of Ottawa's urban boundary.

The proposed development is located north of Maple Grove Road and east of Huntmar Drive, as illustrated in ***Figure 1***. The proposed site, known as 130 Huntmar Drive, wraps around an existing school located at 180 Huntmar Drive, known as Kanata Academy Private School. The subject property is currently zoned as a Development Reserve (DR) Zone. A detailed sketch SK-1 is provided in Appendix "A" which shows the streets to which the development will be connected.

Figure 1 – Location Map

The proposed Draft Plan of Subdivision (see Appendix A) allows for residential mid-density (apartments), residential low density (singles / townhouses), a school site, a commercial block and a park. A concept plan is attached in Appendix "A" showing the different types of developments within the site. The proposed Draft Plan demonstrates the road network layout within the subject land and particularly the North-South Arterial road in a perpendicular alignment with a proposed round-about to provide better developable blocks. The purpose of this Assessment of Adequacy of Public Services is to demonstrate that there is sufficient capacity in the watermain, the wastewater and stormwater systems to accommodate the proposed development.

1.2 Existing Studies and Reports

The following studies and reports have been used to prepare this Assessment of Adequacy of Public Services for 130 Huntmar Drive:

- Kanata West Master Servicing Study (KWMSS), by Stantec, CCL, IBI, dated June 2006.
- Infrastructure Master Plan (IMP), dated November 2013.
- Design Brief for Pond 4 Kanata West, by DSEL, JFSA, revised August 25, 2014, 3rd submission.
- Functional Servicing and Stormwater Management Report for 173 Huntmar Road, City of Ottawa, by DSEL, dated March 2015, Revision 2,.
- Functional Servicing Report for 2325483 Ontario Inc. 195 Huntmar Drive, City of Ottawa, by DSEL, dated May 2019.

1.3 Existing Services

The site can be physically connected at the following locations (please refer to Appendix "A" – Location Map for existing street locations):

- there is an existing 300 mm diameter watermain on Maple Grove Road
- there is an existing 400mm diameter watermain stub on Huntmar Drive, just north of Maple Grove Road
- there is an existing 825mm diameter sanitary sewer on Maple Grove Road
- there is an existing pumping station on Maple Grove Road known as the Kanata West Pumping Station (KWPS)
- there is an existing 2400mm storm sewer on Maple Grove Road
- there is an existing pond east of the site known as Pond 4
- road connections are available on Huntmar Drive and Maple Grove Road
- Hydro, Bell Cable and Gas was not part of this Assessment of Adequacy of Public Services; it will be verified during the design process.

1.4 Required Permits/Approvals

Development of the site will be subject to the City of Ottawa planning and development approval process. The City of Ottawa and the Mississippi Valley Conservation Authority (MVCA) must approve the detailed engineering design drawings and reports prepared to support the proposed development prior to construction. Environment Compliance Approvals (ECA) from the Ministry of Environment, Conservation and Parks (MOECP) will need to be obtained in order to construct the sanitary sewers, storm sewers and watermain. Also, an amendment to the existing pond ECA will be required prior to the pond expansion.

1.5 Pre-consultation

A pre-consultation meeting was carried out on July 19, 2019 with the City of Ottawa. The Pre-Consultation Meeting Minutes and concept plan can be found in Appendix "A".

2.0 PROPOSED SERVICES

2.1 Grading Plan - Geotechnical Investigation

A geotechnical investigation was carried out in order to assess the possible design constraints. Maximum grade raises are tabulated in the report by Golder Associates.

These maximum grade raises were respected in the preparation of a macro grading plan (See Appendix "B" – 191002-GRM). As per Golder Associates, no unusual problems are anticipated during the site servicing with excavating the overburden using conventional hydraulic excavating equipment. The impact of raising the grades along neighbouring properties' boundaries will need to be looked at during detailed design. The grading around the existing school will be done by respecting the existing conditions, drainage and ensuring the grading does not impede the existing major flow route.

2.2 Sediment and Erosion Control

Straw bales will be placed on-site at every definable swale in order to control runoff. These controls will be cleaned and maintained during the course of the construction. Before construction, silt fence barriers will be installed, where necessary, along the perimeter of the site as well as along the perimeter of the existing stormwater pond (see Appendix "B" – 191002-ESCM).

2.3 Watermain

The watermain analysis was conducted using the H2ONET v.5.0 program as a design aid. Water supply to the 130 Huntmar Drive development will be provided through the installation of watermains.

As per the Infrastructure Master Plan, Kanata West Feedermain (refer to Appendix C for excerpt) a 600mm diameter watermain along Campeau Drive from Terry Fox Drive to Palladium Drive is planned to service the Kanata West area. The 600mm diameter feedermain is installed and extends on Huntmar Drive from Campeau Drive to Cyclone Taylor Boulevard. As per the Kanata West Feedermain scenario, the 600mm diameter feedermain remains to be extended from Cyclone Taylor Boulevard to Palladium Drive. Since the Feedermain is not yet installed up to Palladium Drive and no watermain is installed on Huntmar Drive between Palladium Drive and Maple Grove, the analysis was carried out with connections available only on Maple Grove Road.

This preliminary analysis was carried out with the use of hydraulic grade line elevations at various known connection points located at the boundaries of the proposed site. Hydraulic grade line elevations for the aforementioned connection points were provided by the City (see E-mail Correspondence with the City of Ottawa in Appendix "C").

The site will connect onto the Maple Grove Road watermain at 2 different locations. Refer to Table 1 in Appendix "C" for the Boundary Condition Data at connection points No.2 and No.3 supplied by the City of Ottawa.

There are three possible connections in the future to Huntmar Drive, however, as mentioned previously, there are currently no watermains. The possible connections could serve as a link between Lioness' development and the future development west of Huntmar Drive, known as 195 Huntmar Drive.

In this analysis, no connections to Huntmar Drive were used as the timing of both developments and watermain installation is unclear. The analysis makes use of two connections on Maple Grove Road as mentioned above, the future connection will only improve the overall system, thus, this analysis provides conservative results in comparison to the ultimate built out scenario of the local region.

Typical values for average daily water consumption were taken from the City of Ottawa's Water Distribution Guidelines. The following table summarizes the average daily consumption rates, maximum daily rates as well as peak hourly factors for each type of land use.

Water Supply Design Criteria

Type of development	Average daily demand	Maximum daily	Peak hourly
Residential	350 l/c·d	2.5 x avg. day	2.2 x max day
Commercial	28,000 l/ha./d	1.5 x avg. day	2.7 x avg. day
Institutional	28,000 l/ha./d	1.5 x avg. day	1.8 x avg. day

Total demands for the three different demand scenarios were calculated using the aforementioned consumption rates as well as population densities of 3.4 persons per unit for single family dwellings, 2.7 persons per unit for townhouses and 2.1 persons per unit for apartments or stacked residences.

The following table summarizes the anticipated water demand for the proposed development.

Average daily demand	Maximum daily	Peak hourly
8.4447 l/s	19.7933 l/s	41.8606 l/s

The studied water supply network was verified under the average day demand and the peak hourly demand with a minimum pressure of 276 kPa (See Tables 2 to 4 in Appendix "C" for details). Fire flows of 167 l/s (single dwellings), 200 l/s (townhouses) and 283 l/s (stacked and apartments) were also analyzed during maximum day conditions with a required minimum residual pressure of 140 kPa.

It is to be noted that pressure reducing valves will be required for all services as static pressures within the system are higher than 552 kPa.

2.3.1 Fire Underwriters Survey

Section 4.2.11 of the City of Ottawa Guidelines for water distribution offers guidance for the calculation of fire demand.

Furthermore, the Ontario Building Code (OBC) provides minimum requirements for fire protection on private properties. In particular, Section 7.2.11 of the OBC provides detailed steps for the installation of water service pipes and fire service mains. Part 3 of the OBC offers requirements for fire protection, sub-section A3.2.5.7 provides standards for firefighting.

Table 5 (Appendix "C") provides the detailed fire flow calculations as per the Fire Underwriters Survey (FUS) for each typical unit. Table 6 (Appendix "C") provides the fire flow analysis results during maximum day demand for each node within the system. During the analysis each node is verified with the highest fire flow in its surrounding.

The analysis was carried out to ensure the water quantity would be sufficient for firefighting purposes.

As mentioned above, preliminary calculations under the FUS show that the required fire flows are 167 l/s (single dwellings), 200 l/s (townhouses) and 283 l/s (stacked and apartments).

As a conservative approach, each node was analyzed with regards to the worst possible fire flow in the vicinity. By this standard, fire flows of 200 l/s (townhouses) and 283 l/s (stacked and apartments) were analyzed within the system.

At the time of the analysis, boundary conditions for fire flows of 167 l/s and 283 l/s

were provided. As a conservative approach, the 200 l/s fire flow analysis was conducted with the 283 l/s fire flow boundary conditions. The system will be further analyzed with updated boundary conditions during the detailed design process. This preliminary analysis shows that all requirements under maximum day demand are satisfied.

2.4 Sanitary Sewer

The 130 Huntmar Drive site is located in close proximity to the Kanata West Pumping Station (KWPS), which is located on Maple Grove Road. The Kanata West Master Servicing Study (KWMSS), dated June 2006, includes the 130 Huntmar Drive site to be serviced by the KWPS. It proposes that the southeast portion of the development (shown in green) be serviced by the existing Maple Grove Road sanitary trunk sewer, while the northwest portion (shown in yellow) be serviced by a future 675mm diameter trunk sewer (refer to Appendix "D" for the "Preferred Waste Water Option – Drawing S-1" from the KWMSS). The KWMSS is also in agreement with the IMP (2013) which identifies a trunk sewer running along the north side of the property (refer to an excerpt from the IMP in Appendix "D"). The future 675mm diameter trunk sewer in the KWPSS was intended to service the land west of Huntmar Drive (shown in blue), which includes 195 Huntmar Drive.

In May of 2019, DSEL completed a report titled "Functional Servicing Report for 2325483 Ontario Inc. 195 Huntmar Drive" which proposed to re-arrange the sanitary trunks. Drawing No.4 of this report is attached in Appendix "D". This study proposes to install a sewer on Huntmar Drive down to the intersection of Maple Grove Road and connect into the EX. SANMH 10.

This analysis proposes to direct the entire sanitary runoff of 130 Huntmar to the Maple Grove trunk at sanitary maintenance hole 95. In addition, the system has been designed and accounts for the lands west of Huntmar.

The upstream flows can be directed to the proposed system via two entrances; one at the intersection of Huntmar Drive and Street No. 3, and, the other, at the intersection of Huntmar Drive and Street No. 1 (refer to the drawing 191002-SANM - Macro Sanitary Drainage Plan in Appendix "D")

2.4.1 Upstream Flow to Huntmar Drive and Street No. 3 (MH 301)

Looking at DSEL's drawing No.4, the northern portion (shown in purple), will enter the proposed sanitary system through SANMH 301 on Huntmar Drive. A summary of the tributary areas and populations is shown below:

Location	Type	Area (ha)	Population
Part of Trunk 6 – 195 Huntmar Drive	Residential (Huntmar Dr.)	1.58	0
	Commercial	6.83	683
	Institutional	0	0
	Green Space	5.82	194

DSEL's sewer computation sheets (attached in Appendix "D") which correlate with drawing No.4 show the total tributary areas and population listed above.

2.4.2 Upstream Flow to Huntmar Drive and Street No. 1 (MH 78A)

Again, in relation to DSEL's drawing No.4, the flows from Trunk 1 and a portion of Huntmar Drive will be directed to sanitary maintenance hole 78A. A summary of the tributary areas and populations is shown below:

Location	Type	Area (ha)	Population
Trunk 6 – 195 Huntmar Drive	Residential – Huntmar Dr.	0.83	0
	Commercial	5.88	588
	Institutional	0	0
	Green Space	0	0
Trunk 1 – 195 Huntmar Drive	Residential	108.05	7569
	Commercial	35.71	3571
	Institutional	7.48	748
	Green Space	0.53	17.6

DSEL's sewer computation sheets (attached in Appendix "D") which correlate with drawing No.4 show the total tributary areas and population listed above.

2.4.3 Outlet on Maple Grove Road

The sanitary sewers within 130 Huntmar Drive development are sized to accommodate the runoff from the areas mentioned above and outlet to ex. SAN MH 95 on Maple Grove Road (refer to drawing 191002-SANM in Appendix "D"). The proposed sewer alignment corresponds, in part, with Figure 1 from the "Proposed Alignments for Kanata West Development North-South Sanitary Collector Sewers Functional Design Study" by IBI Group.

The preliminary sanitary system was designed using the City of Ottawa Sewer Design Guidelines dated October 2012. Section 4.3 provides standards for population densities in Ottawa. The following table shows the "Per Unit Populations" used:

Per Unit Populations

Unit Type	Persons per unit
Single Family	3.4
Townhouses	2.7
Apartments: 2 bedroom	2.1

City of Ottawa has provided a technical bulletin (ISTB-2018-01) with updated sanitary design parameters for flows and overflow criteria. The design parameters used for this analysis are tabulated below:

Design Parameters

Parameter	Design
Residential Flow Rate (l/d/cap)	280
Commercial Flow Rate (l/d/gross ha.)	28,000
Institutional Flow Rate (l/d/gross ha.)	28,000
Industrial Flow Rate (l/d/gross ha.)	35,000
Green Space Flow Rate (l/d/gross ha.)	9,300
Infiltration Rate – Dry Weather (l/s/ha.)	0.05
Infiltration Rate – Wet Weather (l/s/ha.)	0.28
Total Infiltration Rate (l/s/ha.)	0.33
Harmon Correction Factor	0.8
Institutional / Commercial / Industrial Peak Factor	1.5/1*

*Peak factor = 1.5 if contributing area >20%, 1.0 if contributing area <20%

Sanitary flows and peaking factors were calculated using the above values during this analysis.

The proposed sanitary system within 130 Huntmar has been designed to accommodate runoff from 195 Huntmar Drive, the Mion land and other surrounding lands as described in the previous sections.

Using the Maple Grove Sanitary Sewer Capacity Analysis (10/MH91-SANMH 3)(DSEL, May 2019) which is a modified version of IBI's drawing S-1 mentioned in the previous section and the corresponding Sanitary Sewer Calculation Sheet, tributary areas and populations were taken and used to analyze the capacity of the existing Maple Grove trunk sewer (refer to Appendix "D" for both excerpts of plans and calculation sheets).

It was determined that a 600mm diameter trunk sewer along Street No.1 and a 675mm diameter trunk sewer along Street No.3 would be adequate to service the subject land.

Using the current recommended wastewater parameters, the total peak flow to ex. MH

95 is 506.74 l/s (refer to the Sanitary Sewer Computation Form, Table 7 in Appendix "D"). The downstream sewers on Maple Grove road are all 825mm diameter sewers down to the existing 1200mm diameter sewer, and the slightest sewer slope is 0.36%. The sewer from Ex. MH 95 to Ex. MH 96 is shown with a slope of 0.36%, while it's actual pipe slope is 0.39%, to show the remaining capacity in the sewer of 44%.

2.5 Storm Sewer and Stormwater Management

The 130 Huntmar Drive storm water servicing was designed in relation to the KWMSS and the Pond 4 study to be directed to the Pond 4, located north of the site. A small portion, located west of the site, was designed to be directed to the Maple Grove Road existing trunk while the remaining of the site was designed to outlet to a future trunk that ultimately connects to the north forebay of the pond. Refer to an excerpt Storm Drainage plan from the Pond 4 study by DSEL/JFSA for the previous concept.

The "Design Brief for Pond 4 Kanata West" report by DSEL/JFSA dated August 25, 2014, recommends that the storm water of 130 Huntmar Drive be conveyed to the existing Storm Water Management Pond 4 located northeast of the proposed site (See Appendix "E" – 191002-STMM for the site's proposed storm sewer system). This existing SWM facility controls both the quantity and quality of the storm water for more than 278ha of land which includes the proposed site.

With the development of 130 and 195 Huntmar, Pond 4 needs to be expanded to control both the quantity and quality. Once the pond is expanded and the new inlet is constructed in the new forebay, the portion of the site to be directed to the new trunk and the areas to the west, including the east side of 195 Huntmar Drive, can be developed.

The attenuated flow is then discharged to Poole Creek, which ultimately reaches the Carp River. According to JFSA's memorandum the maximum pond level for the 100 year storm event will be at 94.70 m.

Drawing 191002-STMM shows the overall system layout and obvert elevations. The tributary areas have been taken from the Storm Sewer Calculation Sheet from 195 Huntmar Drive Functional Servicing Brief from DSEL (refer to excerpt in Appendix "E") in order to analyze the minor system. Additionally, Table 8 provide details of the minor system.

Due to the site being surrounded by arterial roads and the site's topography, it is proposed to design the site with a minor system capture rate of 340 l/s/ha for residential areas, 85 l/s/ha for the proposed school and park and 250 l/s/ha for the medium density residential and commercial while providing above ground storage on site. The major flow system runoff from the parcel connected to Maple Grove cannot be conveyed south via overland, and therefore, it shall store the 100 year storm event.

During the detailed design, surface storage will be maximized in order to store the excess runoff from the 100 year storm event and release what is necessary in the minor system to respect all City of Ottawa's guidelines.

The main storm drainage design constraints can be summarized as follows:

a) Minor System
    1) Inflow rates into the minor system vary and are detailed in JFSA's memorandum report.
    2) Inflow rate into the existing south trunk minor system (Maple Grove Road) should be limited to 907 l/s as per the KWMSS.
    3) All inlets will be equipped with inlet control devices. The term "inlet" means "a single catch basin" or "a group of interconnected catchbasins" connected by a single lead into the minor system.
    4) The hydraulic grade line shall be computed and the maximum permitted hydraulic grade line elevation is to be 0.30m below the underside of footing.

b) Major System
    1) Grading design is to be based on split lot drainage.
    2) On site detention storage may be provided in the following areas:
        i. Road low points (Sawtoothing design)
        ii. Parking Areas on private sites

c) Street and Rear Yard Emergency Overflow
    1) On street routing to emergency storage area must be provided and illustrated on the grade control plan. This routing must incorporate a maximum 0.35m flow depth on street under either static or dynamic conditions. An overall positive slope of 0.10% will be required across consecutive high points for routing purposes.
    2) A maximum ponding depth of 0.30m will be allowed in the rear yards.
    3) A ponding area plan that includes an identification number, the area, the depth, the volume and an elevation will be required.

d) Water Quality
    1) An Enhanced Level of Protection (80 % removal of Total Suspended Solids) needs to be achieved in the stormwater management wet pond. The Best Management Practices should also be implemented within the subdivision design and during construction.

The City of Ottawa provides requirements for minor system capture depending on the road's and development's type ranging from an equivalent 2 year, 5 year and 10 year storm event. Table 8 in Appendix "E" shows the proposed minor system under such conditions.

Additionally, Table 9 shows the calculations for the minor system under various restricted flows and includes the hydraulic grade line calculation results to ensure that a freeboard of 0.30 m is provided with the calculated underside of footings.

The minor system will be modeled during the detailed design stage to ensure adequate freeboard is provided throughout the development.

JFSA was retained to complete a preliminary stormwater analysis for 130 Huntmar Drive and to assess the existing Pond 4.
It was determined that the pond needs to be upsized by 25,600m^3 for a total storage volume of 72,100m^3.

The details of the pond expansion will be assessed during the detailed design. JFSA's memorandum can be found in Appendix "E" of this report.

3.0 CONCLUSION

This report has demonstrated that the proposed 130 Huntmar Drive site can be serviced by extending the existing sanitary sewers and watermain adjacent to the proposed development. The storm sewer system will be designed in conformance with the City of Ottawa standards and outlet to the Pond 4 SWM Facility. The Pond 4 SWM Facility can be expanded to service the site and satisfy the required water quality and water quantity criteria.

Based on the information provided in this report, the 130 Huntmar Drive site can be serviced to meet the City of Ottawa requirements.

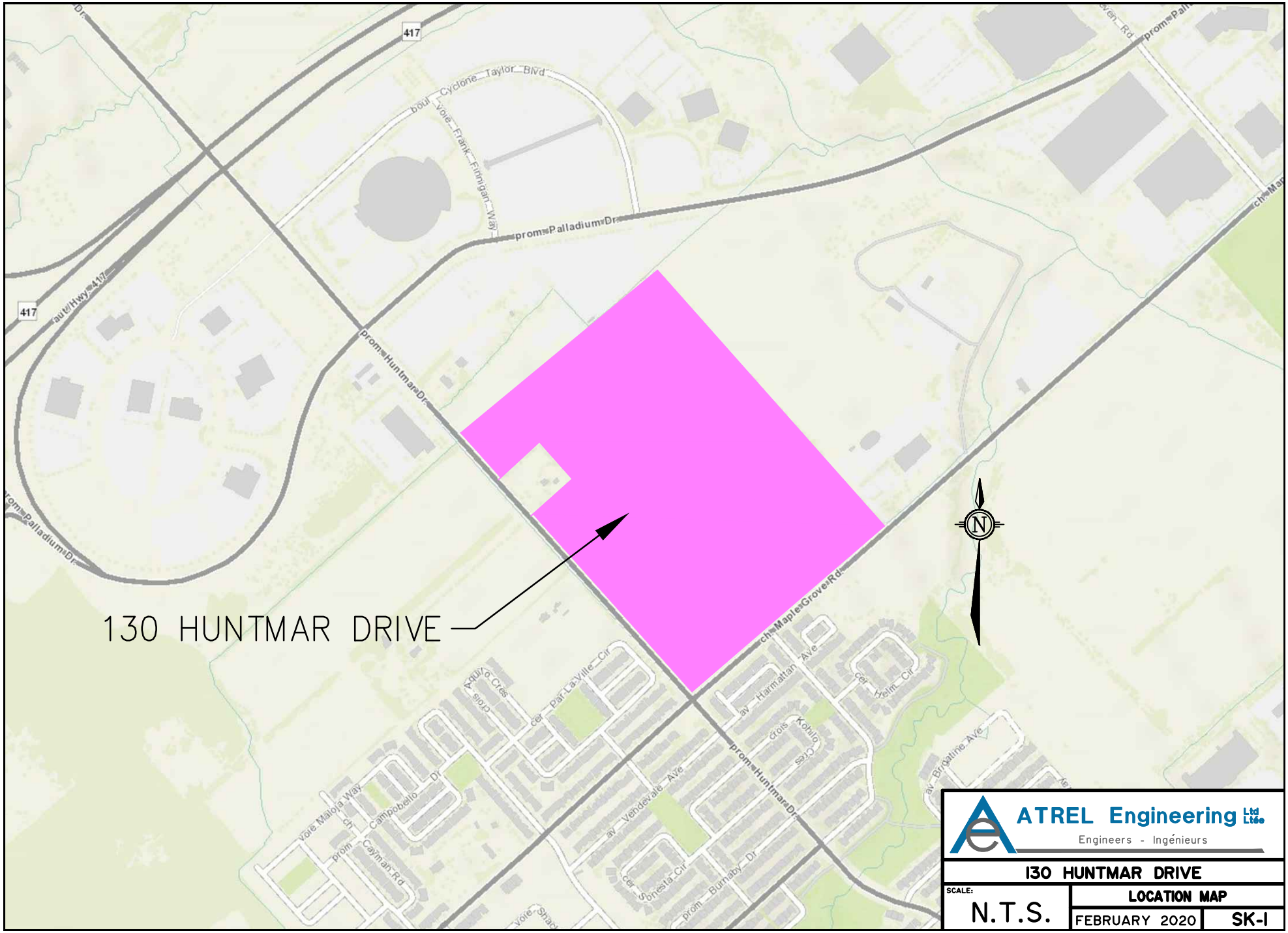
Prepared by:

ATREL ENGINEERING LTD **ATREL ENGINEERING LTD**

André Sauvé, P. Eng. Jean Décoeur, P. Eng.

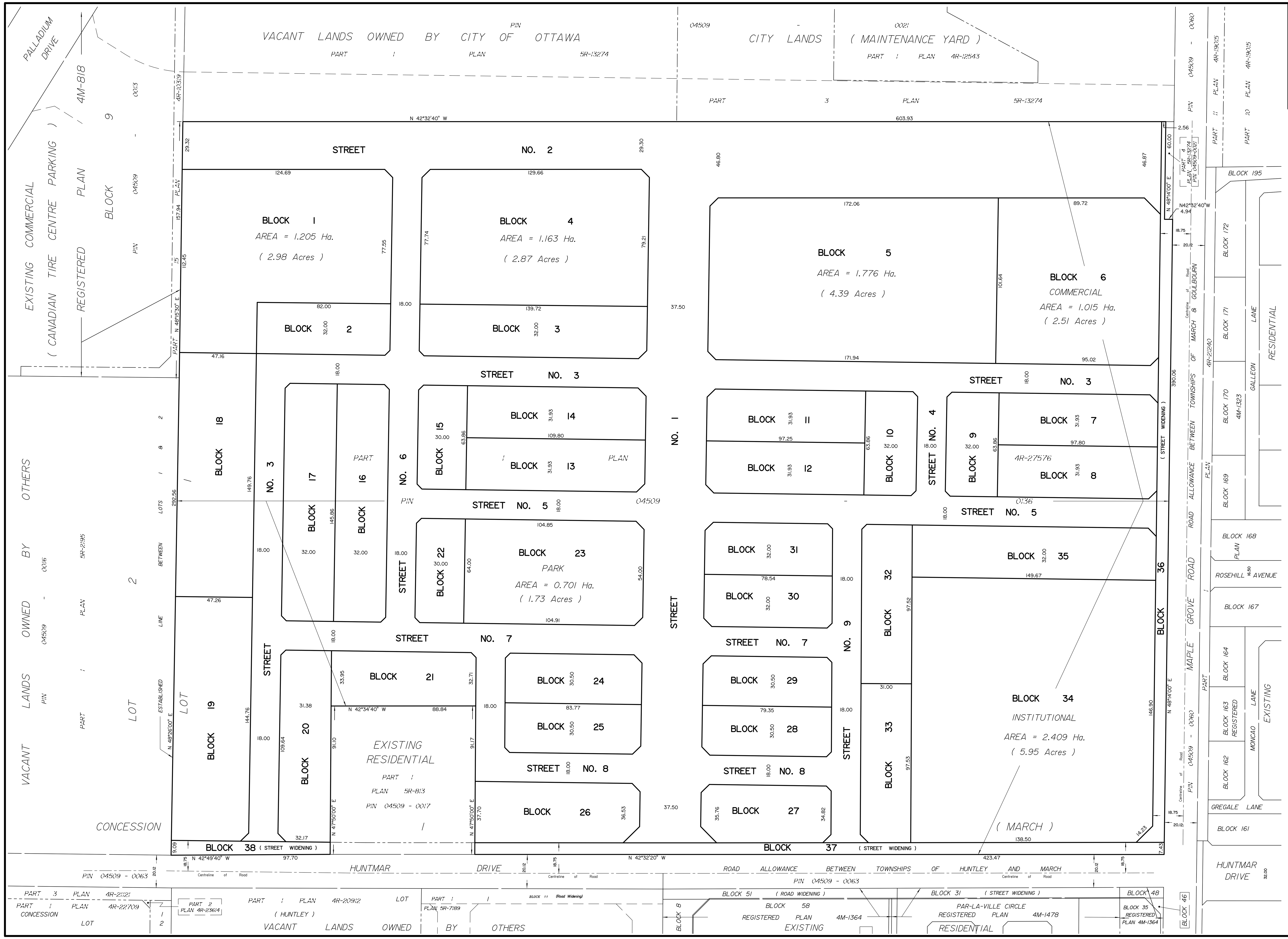
APPENDIX "A"

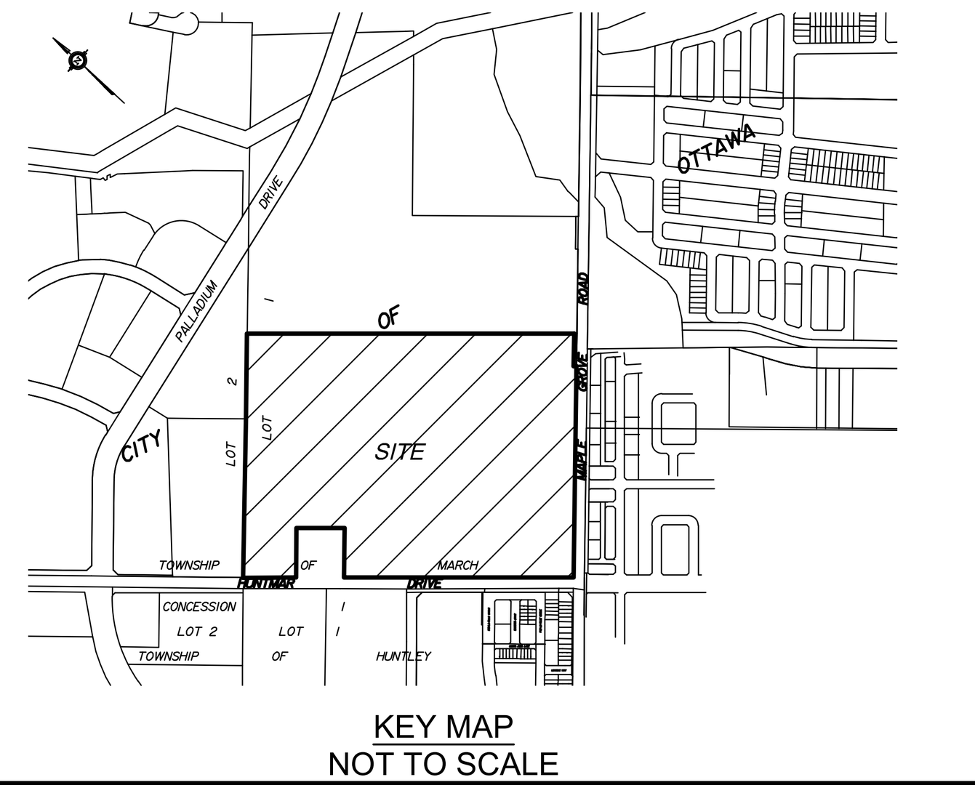
- SK-1 Location Map
- 130 Huntmar Drive – Draftplan of Subdivision
- 130 Huntmar Drive – Pre-Consultation Meeting Minutes
- 130 Huntmar Drive – Concept Plan



ATREL Engineering Ltd. Ltée.
Engineers - Ingénieurs

130 HUNTMAR DRIVE		
SCALE: N.T.S.	LOCATION MAP	
	FEBRUARY 2020	SK-1





SUBJECT TO THE CONDITIONS, IF ANY, SET FORTH IN OUR LETTER DATED

_________________________.

THIS DRAFT PLAN IS APPROVED BY THE CITY OF OTTAWA UNDER SECTION 51 OF THE PLANNING ACT.
THIS ____ DAY OF ____________, 20__ .

____
DERRICK MOODIE, MANAGER
DEVELOPMENT REVIEW-WEST
PLANNING, INFRASTRUCTURE AND ECONOMIC DEVELOPMENT DEPARTMENT, CITY OF OTTAWA

DRAFT PLAN OF SUBDIVISION OF

PART OF LOT 1
CONCESSION 1
Geographic Township of March
CITY OF OTTAWA
Prepared by Annis , O'Sullivan , Vollebekk Ltd.

Scale 1 : 1000
40 30 20 10 0 20 40 Metres

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

SURVEYOR'S CERTIFICATE

I CERTIFY THAT :
The boundaries of the lands to be subdivided and their relationship to adjoining lands have been accurately and correctly shown.

__________ Date

__________ Andre Roy
ONTARIO LAND SURVEYOR

OWNER'S CERTIFICATE

This is to certify that I am the owner / agent of the lands to be subdivided and that this plan was prepared in accordance with my instructions.

__________ Date

__________ Marcel Denomme
Urbandale Corporation
I have authority to bind the corporation

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51-17 OF THE PLANNING ACT
(a) see plan
(b) see plan
(c) see plan
(d) multi-family residential housing, institutional, park land and commercial
(e) see plan
(f) see plan
(g) see plan
(h) City of Ottawa
(i) see soils report
(j) see plan
(k) sanitary, storm sewers, municipal water, bell, hydro, cable and gas to be available
(l) see plan

REVISION SCHEDULE

NO.	REVISION	DATE	
2	for discussion	Oct. 9, 2019	N
1	PLAN PREPARED	, 2019	N

Ontario Land Surveyors
ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com

Job No. 20131-19 Urbandale Pt Lt 1 C1 MA DPS D2 | N

130 Huntmar
Pre-Consultation Meeting Minutes

Location: Room 4103E, City Hall
Date: July 8, 10 to 11am

Attendee	Role	Organization
Stream Shen	Planner	City of Ottawa
Eric Surprenant	Project Manager (Engineer)	
Melanie Knight	Urban Designer	
Rosanna Baggs	Project Manager (Transportation)	
Neeti Paudel	Project Manager (Transportation)	
Mike Russett	Parks Planner	
Samantha Gatchene	Planning Assistant	
Miguel Tremblay	Planner	Fotenn Consultants
Matt McElligott	Planner	
Jacob Bolduc	Planner	
Marcel Denomme	Developer	Urbandale
Jean Decoeur	Engineer	Atrel

Comments from Applicant

1. The applicant is proposing a residential subdivision with 188 singles, 488 towns and 580 apartment units. Also included in the subdivision is a French public elementary school block, a neighbourhood park, and a commercial block.
2. Applicant explained the project history and indicated that the long dormant period is to wait for the completion of the Kanata LRT EA project to clarify the LRT alignment.
3. Proposing to realign the NS Arterial (Robert Grant) into a perpendicular alignment to provide better developable blocks. The applicant is proposing a round-about at the bend similar to the geometry of the road within the Cavanagh/Shenkman subdivision at 195 Huntmar.
4. The applicant indicate that all the local roads will be 18m right-of-way and all local access to Huntmar Drive will be right-in right-out.

Planning Comments

1. This is a pre-consultation for a Major Zoning By-law Amendment and Plan of Subdivision Application. Application form, timeline and fees can be found here.

2. Commercial and higher density residential uses should be located beside the Huntmar/NS Arterial intersection and the NS Arterial/Maple Grove intersection.
3. The site is designated as Mixed-Use Centre within the Official Plan. Section 3.6.2 Policy 10 (e) require residential uses in the form of apartments and other multiples at a medium or high density. As a result, single-detached homes is not permitted in this subdivision.
4. The Kanata West Secondary Plan's height schedule indicate that this parcel has a maximum height limit of 4 stories.
5. The development of window streets along the future arterial road is encouraged.
6. Please consider a further mix of different residential housing types within the subdivision.
7. There is a requirement for a minimum of 5,000 jobs within a Mixed-Use Centre, the applicant will need to demonstrate how this subdivision contributes to the minimum requirement in the planning rationale.
8. Section 3.6.2 (MUC) Policy 14(e) relating to an intensification/redevelopment plan is not required for this subdivision.
9. This project is not subject to UDRP.
10. Please consult with the Ward Councillor prior to submission.

Engineering Comments

1. Please coordinate the installation of trunk sewers with adjacent property owners.
2. Given the redirection of some stormwater flow within the Cavanagh/Shenkman subdivision to pond 7, the interim condition of pond 4 may be sufficient to accommodate this proposed development. This requires further investigation by the applicant.

Transportation Comments

1. Follow Traffic Impact Assessment Guidelines
    a. Traffic Impact Assessment will be required.
    b. Start this process asap.
    c. Applicant advised that their application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
2. Geometric Road Design (GRD) drawings will be required with the first submission of underground infrastructure and grading drawings. These drawings should include such items as, but is not limited to:
    a. Road Signage and Pavement Marking for the subdivision;

   b. Intersection control measure at new internal intersections; and
   c. Location of depressed curbs and TWSIs;
   d. More details can be provided upon request

3. A pedestrian and traffic calming plan will be required prior to the submission of the GRD.
4. Include traffic calming measures on roads within the limits of their subdivision to limit vehicular speed and improve pedestrian safety. Traffic calming measures shall reference best management practices from the Canadian Guide to Neighbourhood Traffic Calming, published by the Transportation Association of Canada, and/or Ontario Traffic Manual, and/or the City of Ottawa's Draft Traffic Calming Design Guidelines. These measures may include either vertical or horizontal features (such measures shall not interfere with stormwater management and overland flow routing), including but not limited to:
   a. intersection or mid block narrowings, chicanes, medians;
   b. speed humps, speed tables, raised intersections, raised pedestrian crossings;
   c. road surface alterations (for example, use of pavers or other alternate materials, provided these are consistent with the City's Official Plan polices related to Design Priority Areas);
   d. pavement markings/signage; and
   e. temporary/seasonal installations such as flexi posts or removable bollards.
5. Refer to the Kanata West CDP and supporting TMP for guidance on the above.
6. Cross-sections shown in the TMP are dated and the City may require that these be revised to align with current design trends and practices, ie on-street cycle facilities vs off road facilities.
7. N-S Arterial (aka Robert Grant Extension between Huntmar and Maple Grove is to have a ROW of 37.5m for a four-lane divided arterial (4-UAD) cross-section.
8. The Major collector between Huntmar and Palladium will not be constructed.
9. Maple Grove Road (Terry Fox Drive to Huntmar Drive) proposed to be widened equally on both sides of the existing centerline; 37.5m ROW required.
10. Huntmar ROW protection of 37.5m.
11. Reduce the number of local road connections to the arterials.
12. Reconfigure the house orientation to reduce the number and need of noise barriers.
13. Ensure to pair driveways where possible; consideration for fire hydrant placement should be included in this exercise.
14. Corner triangles as per OP Annex 1 - Road Classification and Rights-of-Way at the following locations on the final plan will be required:

a. Local Road to Local Road: 3 metre x 3 metres
b. Local Road to Collector Road: 5 metre x 5 metres
c. Collector Road to Collector Road: 5 metre x 5 metres
d. Collector Road to Arterial Road: 5 metre x 5 metres

15. Noise Impact Studies required:
    i. Feasibility before draft approval
    ii. Detailed before registration
    b. Road
    c. LRT

Park Comments

1. 50/50 target split in accordance with KWCP for parkland dedication v.s. CIL contribution to Kanata West District Park is still applicable, however, only a guideline. Proposed park block is in keeping with this target.
2. Orientation of proposed park block is suitable for development.
3. Park block co-location with school block not preferred
4. Given that one of the park frontages is along the future north-south arterial road, question on how to allow for safe/controlled pedestrian movement to the park from the southern portion of the future community across the future north-south arterial. Controlled/safe crossing required in the future north-south arterial design.

CEPEO Comments

1. Please shift the school block towards the east so that it has frontage along Maple Grove and a local road.
2. Please consider the integration of a bus lay-by in the City easement along this site. We typically request a bus drop-off area sized for 6 to 8 buses along the frontage of all new school sites.

MVCA Comments

The attached mapping indicates that the subject lands are not subject to our regulation – we do not identify any natural hazards or natural heritage features within the scope of our review being associated with these lands.

We note that the lands are within the boundary of the Carp River Watershed/Subwatershed Study (CRWSS) and the Kanata West Implementation Plan.

The required targets as per the CRWSS are:

- Infiltration requirement based on moderate recharge area: 104mm/yr

- Water quality might be taken care of by the SWMF: 10% normal level of WQ, 10l/s (7day) low flow augmentation.
- Max temperature in Carp river: 30^0C, Carp river has moderately tolerant warm water fisheries community.

We understand that runoff from these lands would be directed towards Pond 4, which outlets to the Carp River. We understand that Phase 1 of this pond has been constructed. Confirmation should be provided on whether the existing pond has capacity for the subject lands, or whether this development would trigger an expansion to the pond. Should an expansion to the pond be required, a permit from us under O.Reg 153/06 will be required.

Forestry Comments

1. a Tree Conservation Report (TCR) must be supplied for review along with the various other plans/reports required by the City; an approved TCR is a requirement for Site Plan approval
2. any removal of privately-owned trees 10cm or larger in diameter requires a tree permit issued under the Urban Tree Conservation Bylaw; the permit is based on the approved TCR
3. the removal of City-owned trees will require the permission of Forestry Services who will also review the submitted TCR
4. the TCR must list all trees on site by species, diameter and health condition; similar groupings (stands) of trees can combined using averages by species, diameter class
5. the TCR must address all trees with a critical root zone that extends into the developable area – all trees that could be impacted by the construction that are outside the developable area need to be addressed.
6. Trees with a trunk that crosses/touches a property line are considered co-owned by both property owners; permission from the adjoining property owner must be obtained prior to the removal of co-owned trees
7. If trees are to be removed, the TCR must clearly show where they are, and document the reason they can not be retained – please provide a plan showing retained and removed treed areas
8. All retained trees must be shown and all retained trees within the area impacted by the development process must be protected as per City guidelines listed on Ottawa.ca
9. Please ensure newly planted trees have an adequate soil volume for their size at maturity. The following is a table of recommended minimum soil volumes:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

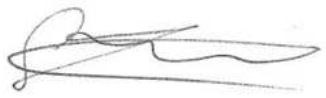
10. The City requests that all efforts are made to retain trees – trees should be healthy, and of a size and species that can grow into the site and contribute to Ottawa's urban forest canopy
11. For more information on the TCR process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca

Please refer to the links to "Guide to preparing studies and plans" and fees for general information. Additional information is available related to building permits, development charges, and the Accessibility Design Standards. Be aware that other fees and permits may be required, outside of the development review process. You may obtain background drawings by contacting informationcentre@ottawa.ca.

These pre-con comments are valid for one year. If you submit a development application(s) after this time, you may be required to meet for another pre-consultation meeting and/or the submission requirements may change. You are as well encouraged to contact us for a follow-up meeting if the plan/concept will be further refined.

Please contact me at stream.shen@ottawa.ca or at 613-580-2424 extension 24488 if you have any questions.

Sincerely,



Stream Shen MCIP RPP
Planner II
Development Review - West

130 HUNTMAR DR
OTTAWA

CONCEPT PLAN
OPTION 4

LEGEND

- RESIDENTIAL MID-DENSITY (APARTMENTS)
- RESIDENTIAL LOW DENSITY (SINGLES / TOWNHOUSES)
- SCHOOL SITE - 6ac
- COMMERCIAL
- PARKLAND DEDICATION
- PROPERTY BOUNDARY
- SETBACKS

0 25m 50m 100m

No.	REVISION	DATE	BY
3	OPTION 4	2019.03.14	RP
2	FOR CLIENT REVIEW	2019.01.22	EL
1	DRAFT	2018.12.20	RP

CLIENT
URBANDALE

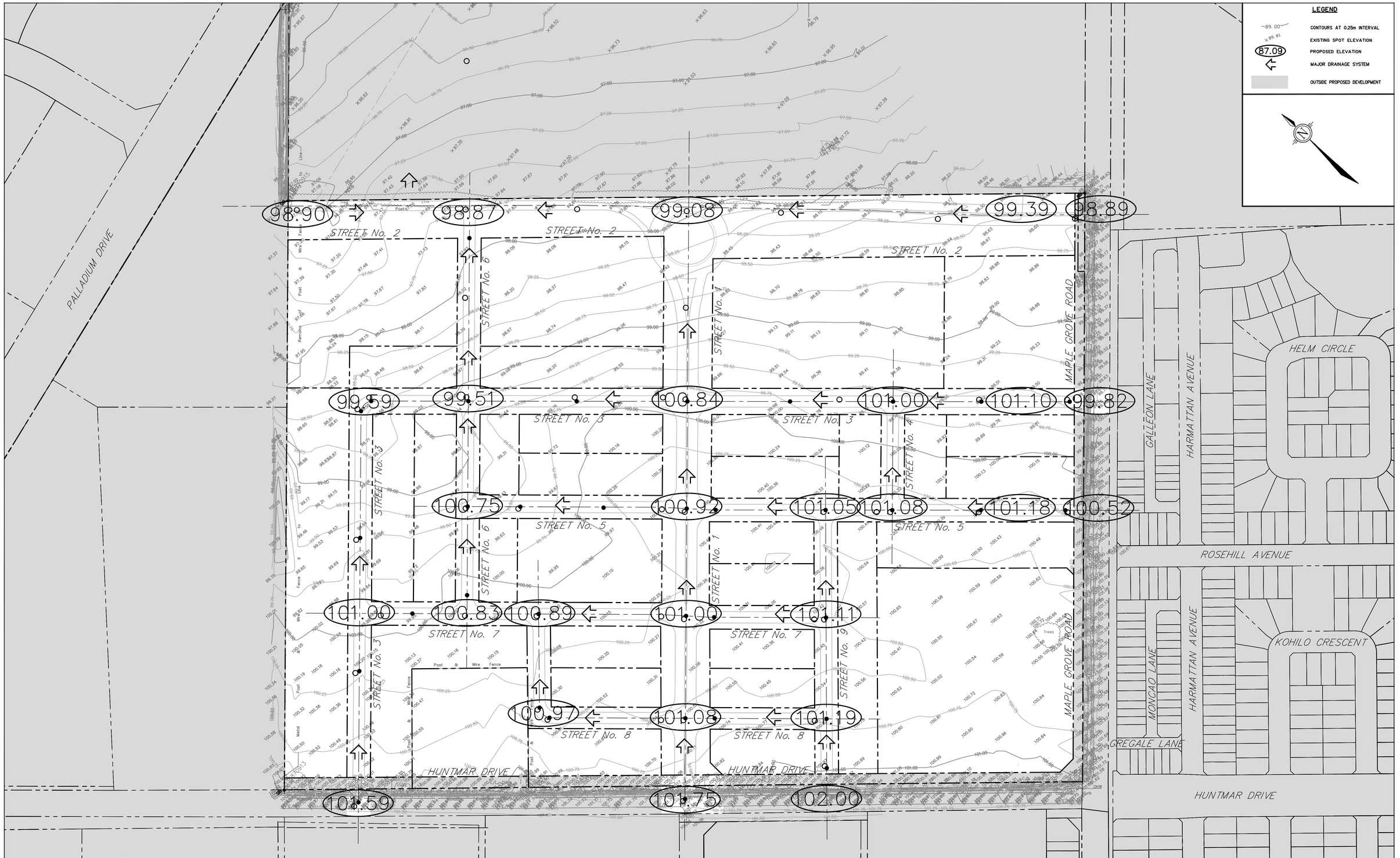
FOTENN
Planning + Design
223 McLeod Street, Ottawa ON K2P 0Z8
613.730.5709 www.fotenn.com

DESIGNED	RP
REVIEWED	MT
DATE	2018.12.20

P4

APPENDIX "B"

- 191002-GRM - Macro Grading Plan
- 191002-ESCM - Macro Erosion and Sediment Control Plan



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 △-APPLIES WHEN DRAWING MODIFIED	DATE	BY

SCALE
1 : 1 250
10m 0 10 20 30 40m
HORIZONTAL

DESIGN	AGS
CHECKED	JMD
DRAWN	CED
CHECKED	AGS
APPROVED	JMD

LICENSED PROFESSIONAL ENGINEER
A. G. Y. SAUVE
100142393
Feb 12, 2020
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
J. M. J. DECOEUR
Feb 12, 2020
PROVINCE OF ONTARIO

ATREL Engineering Ltd.
Engineers - Ingénieurs
1-2884 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6
TEL.: (613) 446-7423

CITY OF OTTAWA
130 HUNTMAR DR.

LIONESS DEVELOPMENT INC.

PROJECT No. 191002

DATE JANUARY 2020

PLAN
MACRO GRADING PLAN

DRAWING No. 191002-GRM

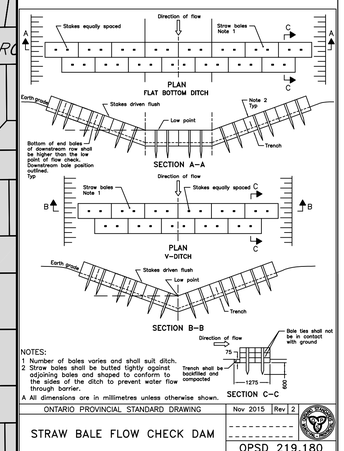
LEGEND

- EXISTING DECIDUOUS TREE
- EXISTING TREE LINE
- STRAW BALES AS PER OPSD 219.180
- SILT FENCE BARRIER AS PER OPSD 219.110
- 80 — EXISTING ELEVATION CONTOUR
- 85.67 EXISTING SPOT ELEVATION
- OUTSIDE PROPOSED DEVELOPMENT

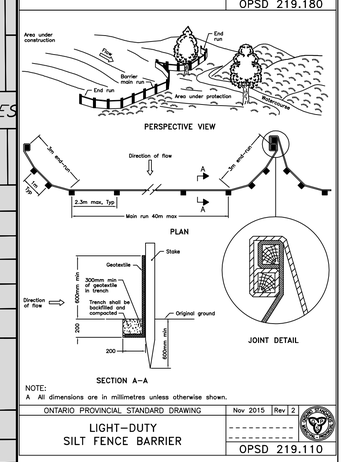
NOTES

1) ADDITIONAL TO THIS PLAN, THE CONTRACTOR SHALL IMPLEMENT THE "BEST MANAGEMENT PRACTICE" ALL ALONG CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE TO INSTALL, INSPECT, REPAIR AND REMOVE THE SEDIMENT AND EROSION CONTROL METHODS
2) A SUMP OF 600mm IN DEPTH WILL BE PROVIDED IN ALL CATCHBASINS IN ORDER TO MINIMIZE THE AMOUNT OF SUSPENDED SOLIDS FROM ENTERING THE SEWER SYSTEM.
3) DURING CONSTRUCTION, FILTER CLOTH WILL BE PLACED UNDER ALL CATCHBASIN AND MANHOLE FRAMES AND COVERS AND STRAW BALES WILL BE PLACED WHERE WATER RUNOFF CAN CARRY EXCESSIVE SEDIMENTS INTO THE SEWER SYSTEM.
4) STRAW BALES SHALL BE INSTALLED ALONG THE VARIOUS SWALES (MAN MADE OR EXISTING) WHERE JUDGED NECESSARY BY THE ENGINEER AND/OR THE CITY OF OTTAWA'S INSPECTOR.
5) STRAW BALES SHOULD BE INSTALLED AS PER OPSD 219.100 AND OPSD 219.180 AS APPROPRIATE.
6) STRAW BALES SHALL BE INSTALLED AT EVERY MAJOR POINT OF WATER ENTRY INCLUDING DITCH INLET CATCHBASINS AND CULVERTS.
7) ALL SEDIMENT CONTROL LOCATIONS MUST BE INSPECTED ON A REGULAR BASIS ESPECIALLY FOLLOWING A RAINFALL EVENT. SEDIMENTS SHALL BE REMOVED AND CONTROLS REINSTALLED AS NECESSARY.
8) SHOULD IT BE IMPOSSIBLE TO PREVENT OVERLAND SHEET FLOW TO AN EXTERNAL AREA DURING THE CONSTRUCTION PHASE; SUCH AREA SHALL BE PROTECTED WITH A SILT FENCE AS PER OPSD 219.110 AND/OR FILTER CLOTH IN CATCHBASINS.
9) FILTER CLOTH IN CBs SHOULD BE INSTALLED WITH GENEROUS EXCESS OF MATERIAL AROUND PERIMETER TO FACILITATE REMOVAL. FOR CBs POTENTIALLY SUBJECTED TO HEAVING SEDIMENT LOADING, A GRANULAR "PRE-FILTERED" SHOULD BE PROVIDED AROUND PERIMETER OF CB OR AT INTERVALS ALONG THE CURB.
10) ANY MATERIAL STOCKPILES SHOULD BE LOCATED ON FLAT AREAS WELL AWAY FROM ANY DRAINAGE INLETS.
11) NO SEDIMENT CONTROL STRUCTURES SHALL BE REMOVED UNLESS FOUND UNNECESSARY OR ANOTHER SEDIMENT CONTROL POINT IS INSTALLED ELSEWHERE TO REPLACE THE LATTER.
12) THE SEDIMENT AND EROSION CONTROL MEASURES MAY BE MODIFIED IN THE FIELD AT THE DISCRETION OF THE CITY OF OTTAWA SITE INSPECTOR OR CONSERVATION AUTHORITY.
13) THIS PLAN IS A "LIVING DOCUMENT" AND THAT ANY MODIFICATION TO THE PLAN SHALL BE SUBMITTED TO THE SATISFACTION OF MVCA AND MAY BE MODIFIED BY MVCA STAFF.

SILTATION CURTAIN
STREET 2
STREET No. 6
STREET No. 1
STREET No. 3
STREET No. 4
STREET No. 5
STREET No. 7
STREET No. 9
STREET No. 8
MAPLE GROVE ROAD
GALLEON LANE
HARMATTAN AVENUE
HELM CIRC
ROSEHILL AVENUE
MONCAO LANE
KOHILO CRES
GREGALE LANE
HUNTMAR DRIVE



ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	2
STRAW BALE FLOW CHECK DAM			
OPSD 219.180			



ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	2
LIGHT–DUTY SILT FENCE BARRIER			
OPSD 219.110			

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No.	REVISION △–APPLIES WHEN DRAWING MODIFIED	DATE	BY

SCALE
1 : 1 250
10m 0 10 20 30 40m
HORIZONTAL

DESIGN	AGS
CHECKED	JMD
DRAWN	CED
CHECKED	AGS
APPROVED	JMD

LICENSED PROFESSIONAL ENGINEER
A. G. Y. SAUVE
100142393
Feb. 12, 2020
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
J.M. DECOEUR
Feb 12/2020
PROVINCE OF ONTARIO

ATREL Engineering Ltd.
Engineers - Ingénieurs
1-2884 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6
TEL.: (613) 446-7423

CITY OF OTTAWA
130 HUNTMAR DR.

LIONESS DEVELOPMENT INC.

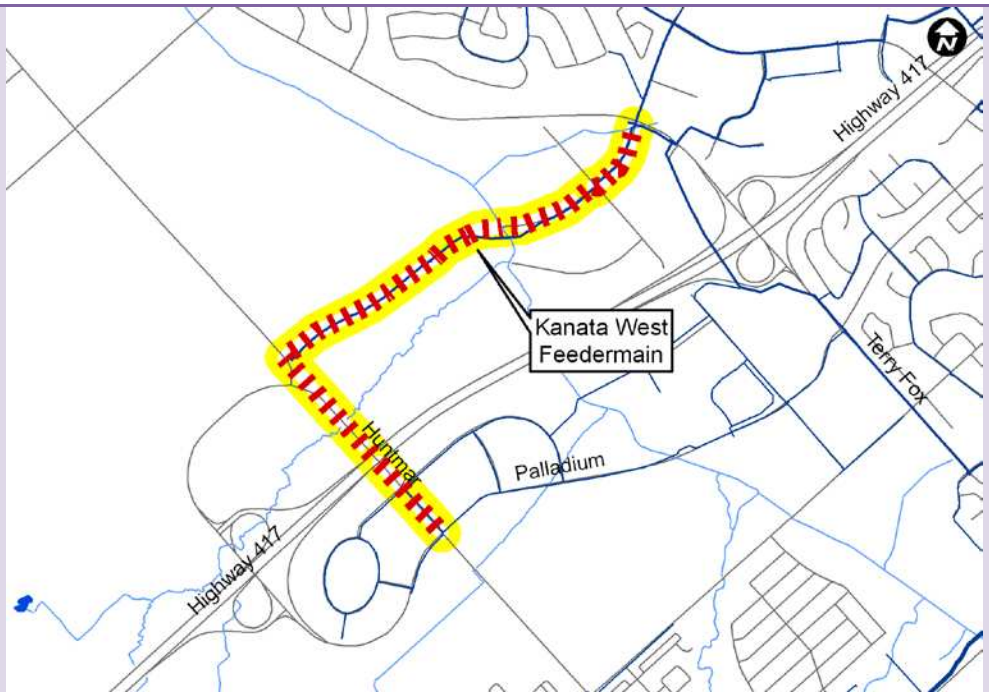
PROJECT No. 191002
DATE JANUARY 2020
DRAWING No. 191002-ESCM

PLAN MACRO EROSION AND SEDIMENT CONTROL PLAN

APPENDIX "C"

- Excerpt from Infrastructure Master Plan (2013), Kanata West Feedermain
- City of Ottawa – Boundary Conditions for 130 Huntmar Drive
- 191002-WM1 - Watermain Layout and Demand
- Table 1: Boundary Condition Data
- Table 2: Node Data
- Table 3: Pipe Data
- Table 4: Average Day and Peak Hour Demand Results
- Table 5: Fire Flow Calculations
- Table 6: Maximum Day plus Fire Flow Results

Kanata West Feedermain



Scope and Justification

Construct 610 mm watermain along Campeau Dr. from Terry Fox Dr. to Palladium Dr. to support development in the Kanata West area, in accordance with the Master Servicing Study for the area.

Timing

2013 – 2018: Construct feedermain

Action Item Funding

Construction Cost Estimate = $12.0M

Capital Cost Estimate* = $22.6M (90% Development Charges, 10% Rate)

**including construction cost, engineering, city internal costs and contingency allowance. Funding split subject to review as part of 2014 Development Charges by-law.*

EA Requirements and Consultation

The 610 mm watermain along Campeau and Gallantry are Schedule 'A' project – No consultation required prior to implementation.

The 610 mm along Huntmar is a Schedule 'B' project as it includes a major water crossing – Notices, consultation and filing of Environmental Project File for public review required.

Follow Up Actions

Project to be coordinated with urban development needs.

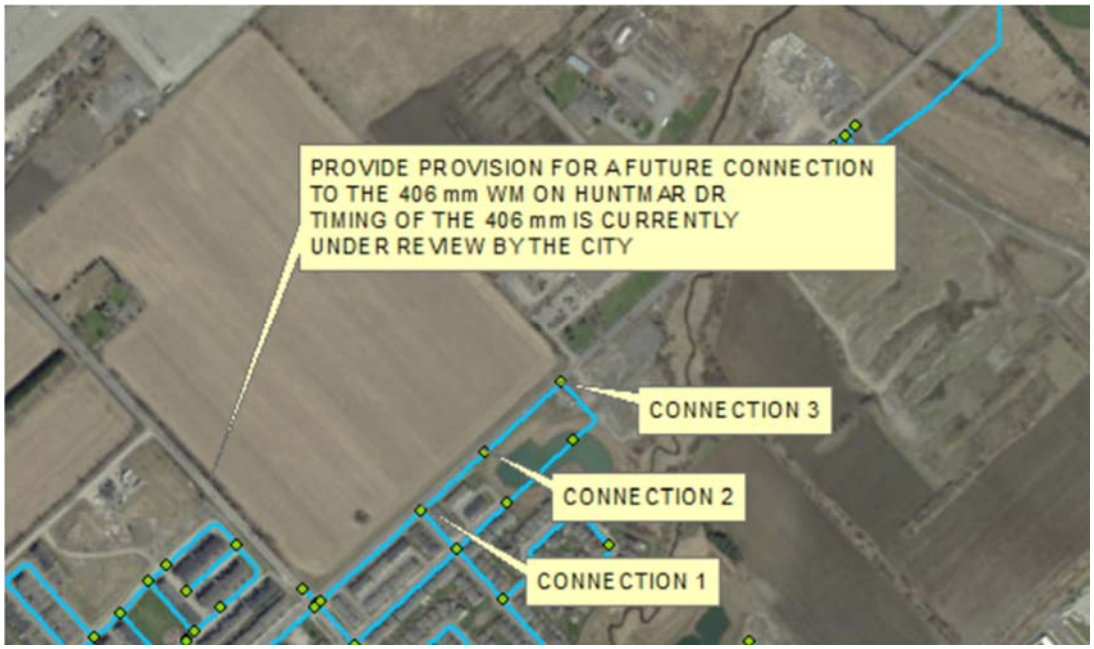
Boundary Conditions for 130 Huntmar Drive

Provided Information:

Date Provided December-19

Scenario	Demand	
	L/min	L/s
Average Daily Demand	469	7.81
Maximum Daily Demand	1,172	19.54
Peak Hour	2,580	43.00
Fire Flow Demand #1	10,020	167.00
Fire Flow Demand #2	16,980	283.00

Location:



Results:

Connection 1 - Maple Grove Road

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	161.0	85.5
Peak Hour	156.3	78.7
Max Day plus Fire 1	153.2	74.3
Max Day plus Fire 2	150.8	70.9

[1] Ground Elevation = 100.9m

Connection 2 - Maple Grove Road

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	161.0	86.9
Peak Hour	156.3	80.1
Max Day plus Fire 1	151.8	73.9
Max Day plus Fire 2	147.5	67.7

[1] Ground Elevation = 99.9m

Connection 3 - Maple Grove Road

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	161.0	88.7
Peak Hour	156.3	81.9
Max Day plus Fire 1	150.6	73.9
Max Day plus Fire 2	144.3	65.0

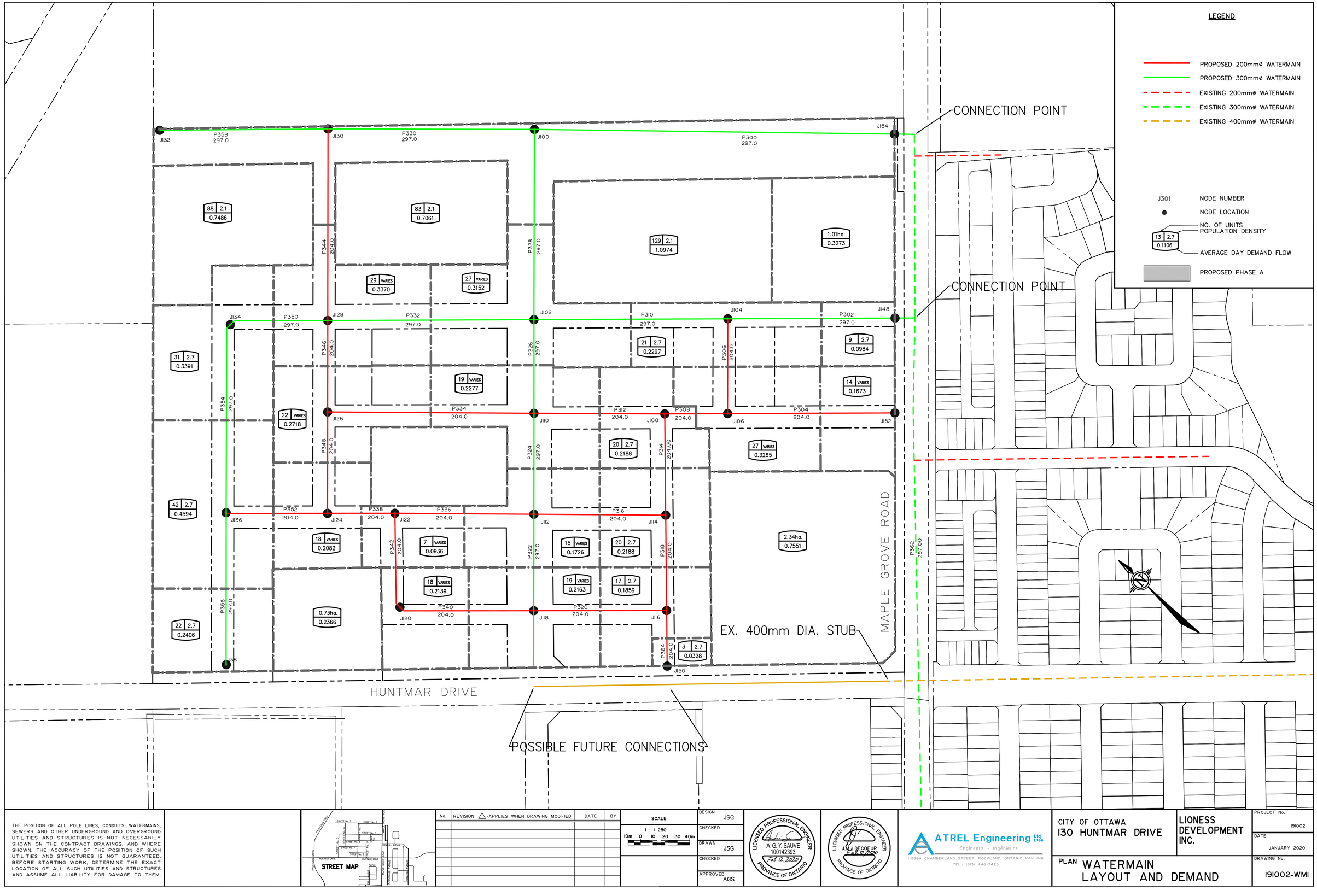
[1] Ground Elevation = 98.6m

Notes:

1. Pressure reducing valves are required since pressures are greater than 80 psi.
2. Looping of the watermain is required to decrease vulnerability of the water system in case of breaks.
3. Provide provision for a future connection to the 406mm watermain on Huntmar Drive. Timing of the 406mm watermain is currently under review by the City.

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.



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No.	REVISION △-APPLIES WHEN DRAWING MODIFIED	DATE	BY

SCALE 1 : 1 250 (10m 0 10 20 30 40m)

DESIGN JSG
CHECKED
DRAWN JSG
CHECKED
APPROVED AGS

LICENSED PROFESSIONAL ENGINEER A. G. Y. SAUVE 100142393 Feb 12, 2020 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER J. M. J. DECOEUR Feb 12/2020 PROVINCE OF ONTARIO

ATREL Engineering Ltd Ltée.
Engineers - Ingénieurs
1-2884 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6
TEL.: (613) 446-7423

CITY OF OTTAWA
130 HUNTMAR DRIVE

LIONESS DEVELOPMENT INC.

PROJECT No. 191002

DATE JANUARY 2020

PLAN WATERMAIN LAYOUT AND DEMAND

DRAWING No. 191002-WMI

TABLE 1: Boundary Condition Data

DATE: **February 2020**
DESIGNED BY: JSG
CHECKED BY: AGS

PROJECT: **130 Huntmar Drive**
CLIENT: Urbandale Corporation
PROJECT #: 191002
BY: Atrel Engineering Ltd

Connection	X COORDINATE (m)	Y COORDINATE (m)	HEAD				LOCATION
			AVERAGE DAY (m)	MAX. DAY + 167 l/s (m)	MAX. DAY + 283 l/s (m)	PEAK HOUR (m)	
2	350495.71	5016913.83	161.00	151.80	147.50	156.30	120m East of Rosehill Ave
3	350597.88	5017004.74	161.00	150.60	144.30	156.30	250m East of Rosehill Ave

TABLE 2: NODE DATA

PROJECT: **130 Huntmar Drive**

DATE: **February 2020**

CLIENT: Urbandale Corporation

DESIGNED BY: JSG

PROJECT #: 191002

CHECKED BY: AGS

BY: Atrel Engineering Ltd

NODE. NO.	AVERAGE DAY DEMAND (l/s)	ELEVATION (m)	X COORDINATE (m)	Y COORDINATE (m)
J100	1.0974	99.08	350395.03	5017241.06
J102	0.3152	100.84	350285.80	5017143.79
J104	0.2297	101.00	350390.47	5017026.64
J106	1.0816	101.08	350333.68	5016976.34
J108	0.2188	101.05	350299.67	5017014.40
J110	0.2277	100.92	350229.14	5017093.34
J112	0.1726	101.00	350167.90	5017038.81
J114	0.2188	101.11	350238.98	5016959.26
J116	0.1859	101.19	350180.51	5016906.14
J118	0.2163	101.08	350108.91	5016986.27
J120	0.4505	101.19	350039.00	5017068.99
J122	0.0936	101.11	350093.36	5017122.24
J124	0.2082	101.17	350056.19	5017163.84
J126	0.2718	101.09	350117.48	5017218.32
J128	0.3370	99.51	350174.19	5017268.71
J130	0.7061	98.87	350281.83	5017364.37
J132	0.7486	98.70	350189.45	5017465.01
J134	0.3391	99.59	350119.31	5017325.64
J136	0.4594	101.25	350001.56	5017224.99
J138	0.2406	101.59	349909.39	5017142.94
J148	0.0984	99.82	350483.55	5016927.66
J150	0.0328	102.00	350141.58	5016869.28
J152	0.1673	100.52	350424.41	5016875.10
J154	0.3273	98.89	350585.39	5017018.96

FIRE FLOW CALCULATIONS Table 3

CONSULTANT: ATREL ENGINEERING LTD
BY: JSG
DATE: February 2020

CLIENT: Urbandale Corporation
191002
PROJECT NAME: 130 Huntmar Drive

C = Coefficient related to type of construction

· wood frame	1.5	X
· ordinary construction	1.0	
· non-combustible construction	0.8	
· fire resistive construction (<2 hrs.)	0.7	
· fire resistive construction (>2 hrs.)	0.6	
· Interpolation		
		1.5

A = Area of structure considered (m²)

Building No.	SINGLES	TH	STACKED	APARTMENT		
Location No.						
Combined gross floor area	3200	722.2	1200	1100		

(1) F = The required flow in litres per minutes (L/min)

= 220·C·(A)^½	18668	8868	11432	10945	0	0

(2) Occupancy hazard reduction or surcharge (contents, L/min)

· non-combustible	- 25%					
· limited combustible	- 15%					
· combustible	- 0%	-15	-15	-15	-15		
· free burning	+ 15%					
· rapid burning	+ 25%					
Required Flow (L/min)		15868	7538	9717	9303	0	0

(3) Sprinkler protection reduction (entire building, % of (2), L/min)

· non-comb. - fire resistive construction with very low fire hazard (- 75%)						
· other	0	0	0	0	0	0
Reduction (L/min)	0	0	0	0		

(4) Exposure surcharge (% of 2, L/min)

· PW(Unpierced boundary party wall)	10%	North	22.0	10	1587	22.0	10	754	10.0	20	1943	10.0	20	1861			0			0
· 0 to 3.0 m	25 %																			
· 3.1 to 10.0 m	20 %	East	2.4	25	3967	3.1	20	1508	10.0	20	1943	10.0	20	1861			0			0
· 10.1 to 20.0 m	15 %																			
· 20.1 to 30.0 m	10 %	South	15.0	15	2380	15.0	15	1131	10.0	20	1943	10.0	20	1861			0			0
· 30.1 to 45.0 m	5 %																			
Maximum	75 %	West	2.4	25	3967	3.1	20	1508	10.0	20	1943	10.0	20	1861			0			0
Exposure surcharge total			11901			4900			7774			7442			0			0		

(5) Fire Flow

= (2) - (3) + (4)	27769	12438	17491	16745	0	0

(6) Round off fire flow (L/min) Fc

· to nearest 1,000 L/min if less than 10,000 L/min.	28000	12000	17000	17000	0	0
	(467 l/s)	(200 l/s)	(283 l/s)	(283 l/s)		

(7) Available Fire Flow Ft, (L/min)

Hyd No						
Hyd flow						
From	---	---	---	---	---	---
To	11937	14780	22534	22534	0	0
	(198.95 l/s)	(246.33 l/s)	(375.57 l/s)	(375.57 l/s)		
Comment	Ok	OK	OK	OK		

As per the "Technical Bulletin ISDTB-2014-02 - Revisions to Ottawa Design Guidelines - Water", single dwellings with minimum separation of 10 meters between the backs of adjacent units may be capped to 10,000 l/min (167 l/s)

TABLE 4: AVERAGE DAY AND PEAK HOUR DEMAND RESULTS

PROJECT: **130 Huntmar Drive**
DATE: **February 2020**
CLIENT: Urbandale Corporation
DESIGNED BY: JSG
PROJECT #: 191002
CHECKED BY: AGS
BY: Atrel Engineering Ltd

NODE NO.	Elevation (m)	AVERAGE DAY DEMAND			PEAK HOUR DEMAND		
		Demand (l/s)	HGL (m)	Pressure (kPa)	Demand (l/s)	HGL (m)	Pressure (kPa)
J100	99.08	1.0974	161.07	607.40	6.0357	156.90	566.63
J102	100.84	0.3152	161.06	590.12	1.7336	156.89	549.22
J104	101.00	0.2297	161.06	588.55	1.2634	156.90	547.74
J106	101.08	1.0816	161.06	587.76	3.1550	156.88	546.78
J108	101.05	0.2188	161.06	588.06	1.2034	156.88	547.06
J110	100.92	0.2277	161.06	589.34	1.2524	156.88	548.36
J112	101.00	0.1726	161.06	588.55	0.9493	156.88	547.54
J114	101.11	0.2188	161.06	587.47	1.2034	156.88	546.46
J116	101.19	0.1859	161.06	586.69	1.0225	156.88	545.67
J118	101.08	0.2163	161.06	587.76	1.1897	156.88	546.75
J120	101.19	0.4505	161.06	586.69	1.6024	156.87	545.66
J122	101.11	0.0936	161.06	587.47	0.5148	156.87	546.45
J124	101.17	0.2082	161.06	586.88	1.1451	156.87	545.86
J126	101.09	0.2718	161.06	587.67	1.4949	156.88	546.66
J128	99.51	0.3370	161.06	603.15	1.8535	156.88	562.17
J130	98.87	0.7061	161.06	609.45	3.8836	156.89	568.51
J132	98.70	0.7486	161.06	611.11	4.1173	156.88	570.14
J134	99.59	0.3391	161.06	602.37	1.8651	156.88	561.36
J136	101.25	0.4594	161.06	586.10	2.5267	156.87	545.07
J138	101.59	0.2406	161.06	582.77	1.3233	156.87	541.74
J148	99.82	0.0984	161.06	600.12	0.5412	156.92	559.57
J150	102.00	0.0328	161.06	578.75	0.1804	156.88	537.73
J152	100.52	0.1673	161.06	593.25	0.9202	156.88	552.25
J154	98.89	0.3273	161.09	609.48	0.8837	157.10	570.44
	Total =	8.4447	l/s		Total =	41.8606	l/s

TABLE 5: PIPE DATA

DATE: **February 2020**
DESIGNED BY: JSG
CHECKED BY: AGS

PROJECT: **130 Huntmar Drive**
CLIENT: Urbandale Corporation
PROJECT #: 191002
BY: Atrel Engineering Ltd

PIPE NO.	FROM	TO	LENGTH (m)	INSIDE DIAMETER (mm)	ROUGHNESS	AVERAGE DAY DEMAND				PEAK HOUR DEMAND			
						FLOW (L/S)	VELOCITY (m/s)	HEADLOSS (m)	HL/1000 (m/km)	FLOW (L/S)	VELOCITY (m/s)	HEADLOSS (m)	HL/1000 (m/km)
P2002	RES2002	J154	18.92	297	120	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
P300	J100	J154	292.52	297	120	-8.1129	0.1171	0.0219	0.0747	-26.6892	0.3852	0.1983	0.6779
P302	J104	J148	135.87	297	120	0.0985	0.0014	0.0000	0.0000	-13.7417	0.1984	0.0269	0.1983
P304	J106	J152	135.95	204	110	0.1673	0.0051	0.0001	0.0004	0.9202	0.0282	0.0013	0.0097
P306	J104	J106	75.86	204	110	0.8218	0.0251	0.0006	0.0078	5.2326	0.1601	0.0184	0.2428
P308	J106	J108	51.04	204	110	-0.4271	0.0131	0.0001	0.0026	1.1574	0.0354	0.0008	0.0149
P310	J104	J102	157.10	297	120	-1.1500	0.0166	0.0003	0.0020	7.2457	0.1046	0.0095	0.0606
P312	J108	J110	105.86	204	110	-0.5149	0.0158	0.0003	0.0032	-1.3498	0.0413	0.0021	0.0197
P314	J108	J114	82.00	204	110	-0.1310	0.0040	0.0000	0.0002	1.3038	0.0399	0.0015	0.0186
P316	J114	J112	106.67	204	110	-0.3195	0.0098	0.0001	0.0014	-0.6480	0.0198	0.0005	0.0051
P318	J114	J116	79.00	204	110	-0.0303	0.0009	0.0000	0.0000	0.7485	0.0229	0.0005	0.0066
P320	J116	J118	107.46	204	110	-0.2490	0.0076	0.0001	0.0009	-0.4544	0.0139	0.0003	0.0026
P322	J118	J112	79.00	297	120	-0.6310	0.0091	0.0001	0.0007	-2.7239	0.0393	0.0008	0.0099
P324	J112	J110	82.00	297	120	-1.2191	0.0176	0.0002	0.0020	-5.5838	0.0806	0.0031	0.0374
P326	J110	J102	75.86	297	120	-2.0462	0.0295	0.0004	0.0059	-9.4826	0.1369	0.0076	0.0998
P328	J102	J100	146.26	297	120	-4.3938	0.0634	0.0035	0.0240	-10.4803	0.1513	0.0176	0.1201
P330	J100	J130	167.39	297	120	2.6217	0.0378	0.0015	0.0092	10.1733	0.1468	0.0190	0.1137
P332	J102	J128	167.51	297	120	0.8825	0.0127	0.0002	0.0012	6.5097	0.0940	0.0083	0.0498
P334	J110	J126	167.59	204	110	0.0846	0.0026	0.0000	0.0001	1.2966	0.0397	0.0031	0.0183
P336	J112	J122	111.88	204	110	0.0960	0.0029	0.0000	0.0002	1.2626	0.0386	0.0020	0.0175
P338	J122	J124	55.79	204	110	-0.2779	0.0085	0.0001	0.0010	0.2297	0.0070	0.0000	0.0007
P340	J118	J120	108.30	204	110	0.1702	0.0052	0.0001	0.0005	1.0843	0.0332	0.0014	0.0131
P342	J120	J122	76.10	204	110	-0.2803	0.0086	0.0001	0.0012	-0.5181	0.0159	0.0002	0.0032
P344	J130	J128	144.01	204	110	1.1670	0.0357	0.0022	0.0151	2.1725	0.0665	0.0069	0.0477
P346	J128	J126	75.86	204	110	0.5200	0.0159	0.0003	0.0034	1.7068	0.0522	0.0023	0.0304
P348	J126	J124	82.00	204	110	0.3328	0.0102	0.0001	0.0014	1.5085	0.0462	0.0020	0.0243
P350	J128	J134	79.07	297	120	1.1925	0.0172	0.0002	0.0021	5.1219	0.0739	0.0025	0.0318
P352	J124	J136	82.00	204	110	-0.1534	0.0047	0.0000	0.0002	0.5931	0.0181	0.0004	0.0043
P354	J134	J136	154.90	297	120	0.8534	0.0123	0.0002	0.0012	3.2568	0.0470	0.0021	0.0138
P356	J136	J138	123.40	297	120	0.2406	0.0035	0.0000	0.0000	1.3233	0.0191	0.0003	0.0026
P358	J130	J132	136.61	297	120	0.7486	0.0108	0.0001	0.0010	4.1173	0.0594	0.0029	0.0212
P360	RES2000	J148	18.41	297	120	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
P364	J116	J150	53.60	204	110	0.0328	0.0010	0.0000	0.0000	0.1804	0.0055	0.0000	0.0003

TABLE 6: MAXIMUM DAY PLUS FIRE FLOW RESULTS

DATE: **February 2020**
DESIGNED BY: JSG
CHECKED BY: AGS

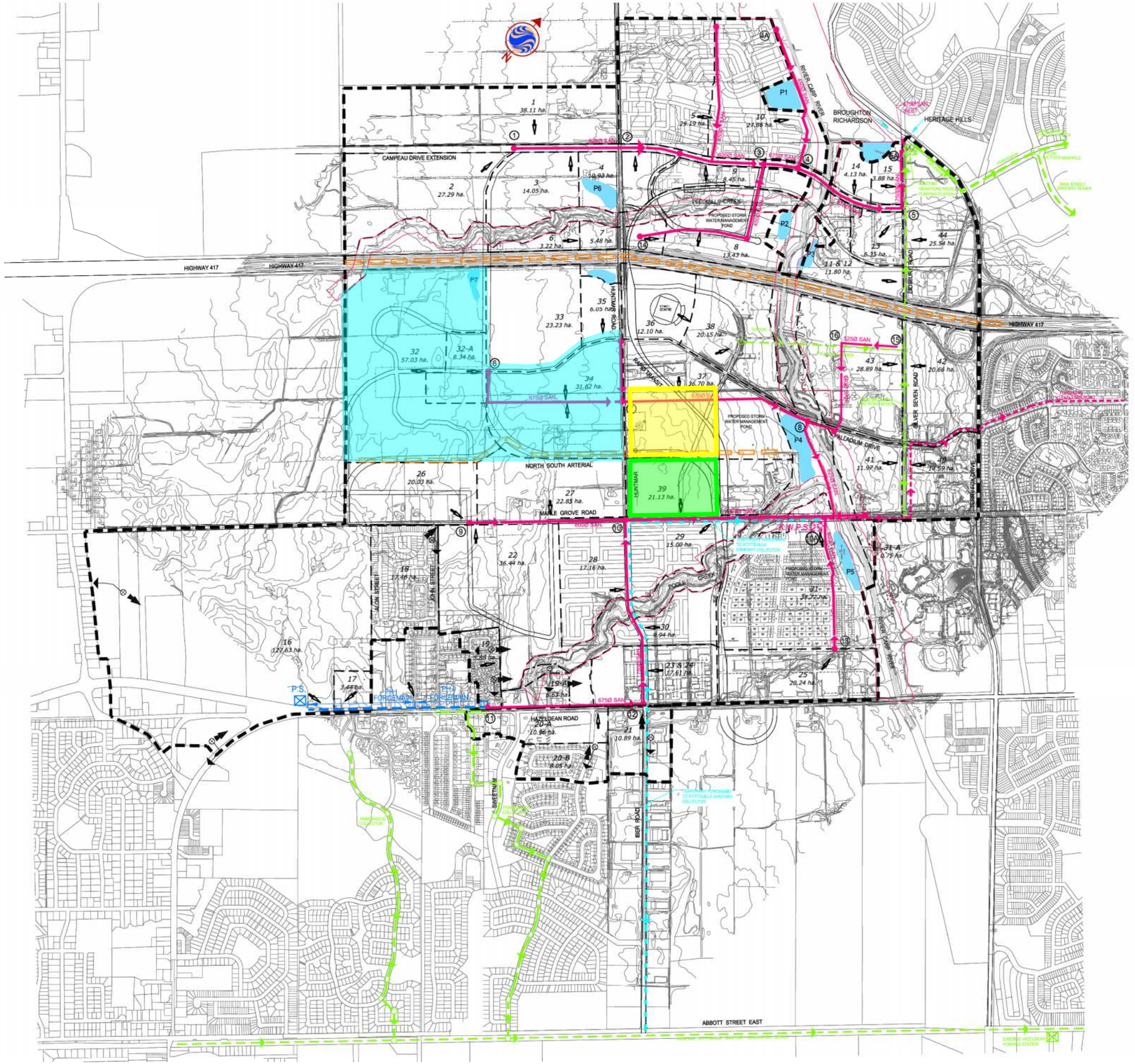
PROJECT: **130 Huntmar Drive**
CLIENT: Urbandale Corporation
PROJECT #: 191002
BY: Atrel Engineering Ltd

NODE NO.	Static Demand (L/s)	Static Pressure (kPa)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (kPa)	Available Flow @ Hydrant (L/s)	Available Flow Pressure (kPa)	Total Demand (L/s)	Available Flow @ Hydrant (L/s)	Critical NODE ID	Critical Node Pressure (kPa)	Critical Node Head (m)	Adjusted Available Flow (L/s)	Design Flow (L/s)
J100	2.7435	590.77	159.37	283.00	406.62	581.76	140.0	285.7415	581.7632	J100	139.96	113.36	581.76	581.19
J102	0.7880	573.46	159.36	283.00	391.42	573.03	140.0	283.7860	573.0332	J150	134.79	115.76	567.68	567.68
J104	0.5743	571.90	159.36	283.00	397.02	603.72	140.0	283.5723	603.7242	J104	139.96	115.28	603.73	603.72
J106	1.9490	571.08	159.36	200.00	405.83	407.55	140.0	201.9476	407.5529	J106	139.96	115.36	407.55	407.43
J108	0.5470	571.37	159.36	200.00	416.65	433.58	140.0	200.5456	433.5809	J108	139.96	115.33	433.58	433.35
J110	0.5693	572.66	159.36	200.00	441.84	528.04	140.0	200.5679	528.0365	J150	138.87	116.17	527.01	527.00
J112	0.4315	571.86	159.36	200.00	432.93	488.78	140.0	200.4301	488.7795	J112	139.96	115.28	488.78	488.78
J114	0.5470	570.78	159.36	200.00	406.11	406.26	140.0	200.5456	406.2635	J114	139.96	115.39	406.26	406.14
J116	0.4648	570.00	159.36	200.00	373.80	346.40	140.0	200.4634	346.3997	J150	132.03	115.47	342.12	342.10
J118	0.5408	571.08	159.36	200.00	422.32	451.35	140.0	200.5394	451.3456	J118	139.96	115.36	451.35	451.02
J120	0.8897	570.00	159.36	200.00	375.41	349.29	140.0	200.8883	349.2885	J120	139.96	115.47	349.29	349.26
J122	0.2340	570.78	159.36	200.00	408.73	412.13	140.0	200.2326	412.1295	J122	139.96	115.39	412.13	411.98
J124	0.5205	570.20	159.36	200.00	413.60	426.35	140.0	200.5191	426.3525	J124	139.96	115.45	426.35	426.15
J126	0.6795	570.98	159.36	200.00	413.93	425.48	140.0	200.6781	425.4836	J126	139.96	115.37	425.48	425.29
J128	0.8425	586.47	159.36	283.00	380.79	513.59	140.0	283.8405	513.5945	J138	128.03	114.66	503.28	503.08
J130	1.7653	592.78	159.36	283.00	363.10	467.71	140.0	284.7633	467.7050	J130	139.96	113.15	467.71	467.64
J132	1.8715	594.44	159.36	283.00	291.94	375.57	140.0	284.8695	375.5709	J132	139.96	112.98	375.57	375.57
J134	0.8478	585.68	159.36	200.00	437.65	464.30	140.0	200.8464	464.3021	J138	134.35	115.30	459.97	459.58
J136	1.1485	569.41	159.36	200.00	407.09	411.45	140.0	201.1471	411.4514	J138	136.63	115.53	409.24	409.10
J138	0.6015	566.08	159.36	200.00	369.40	343.64	140.0	200.6001	343.6366	J138	139.96	115.87	343.64	343.61
J148	0.2460	583.50	159.37	283.00	425.34	749.51	140.0	283.2440	749.5085	J148	139.96	114.10	749.51	749.31
J150	0.0820	562.06	159.36	200.00	257.12	246.45	140.0	200.0806	246.4485	J150	139.96	116.28	246.45	246.33
J152	0.4183	576.56	159.36	200.00	151.45	201.51	140.0	200.4169	201.5132	J152	139.96	114.80	201.51	201.51
J154	0.4910	593.23	159.43	283.00	423.36	662.08	140.0	283.4890	662.0785	J154	139.96	113.17	662.08	662.02

Total = 19.7933 l/s

APPENDIX "D"

- KWMSS – Preferred Waste-Water Option – Drawing S-1
- Infrastructure Master Plan – Kanata West Sewers Page 200 (2013)
- Kanata West – 195 Huntmar Drive – Conceptual Sanitary Servicing Plan – Drawing No.4 (April 2019)
- 195 Huntmar Drive – Sanitary Sewer Calculation Sheet (DSEL) (April 2019)
- 191002-SANM - Macro Sanitary Drainage Area Plan
- Proposed Alignments for Kanata West Development North-South Sanitary Collector Sewers Functional Design Study (IBI Group)
- Maple Grove San Sewer Capacity Analysis (10/MH91 – SAMH3) (DSEL)
- Maple Grove Sanitary Sewer Capacity Analysis Calculation Sheets
- Table 7 - Sanitary Sewer Design Sheet



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Legend

- ULTIMATE MAJOR DRAINAGE LIMIT
- SUBCATCHMENT AREAS
- PROPOSED TRUNK SEWER
- PROPOSED FORCEMAIN
- TEMPORARY FORCEMAIN
- PROPOSED STITTSVILLE PUMPING STATION AND FORCEMAIN
- EXISTING TRUNK SEWER
- MAJOR DRAINAGE SPLIT
- ① NODES
- EXISTING PUMPING STATION AND FORCEMAIN (TO BE DECOMMISSIONED)
- 44 25.54 ha. INPUT POINT AND AREA IN HECTARES
- EXISTING PUMPING STATION GRAVITY OUTLET

5	REVISED FOR DEC.21/03 SUBMISSION	G.B.U.	S.J.P.	05/12/21
4	REVISED TRUNK SEWER FROM 16 TO KWPS	R.M.W.	R.M.W.	05/10/05
3	ARROWS FOR EXIST. PUMP STATIONS ADDED	R.M.W.	R.M.W.	05/08/09
2	REPORT JUNE 2005	R.M.W.	R.M.W.	05/06/07
1	REPORT APR. 2005	R.M.W.	R.M.W.	05/04/20
Revision		By	Appd.	Date

File Name:

Dwn. Chkd. Dsgn. Date

Seals

Client/Project

Kanata West Concept Plan
Master Servicing Study

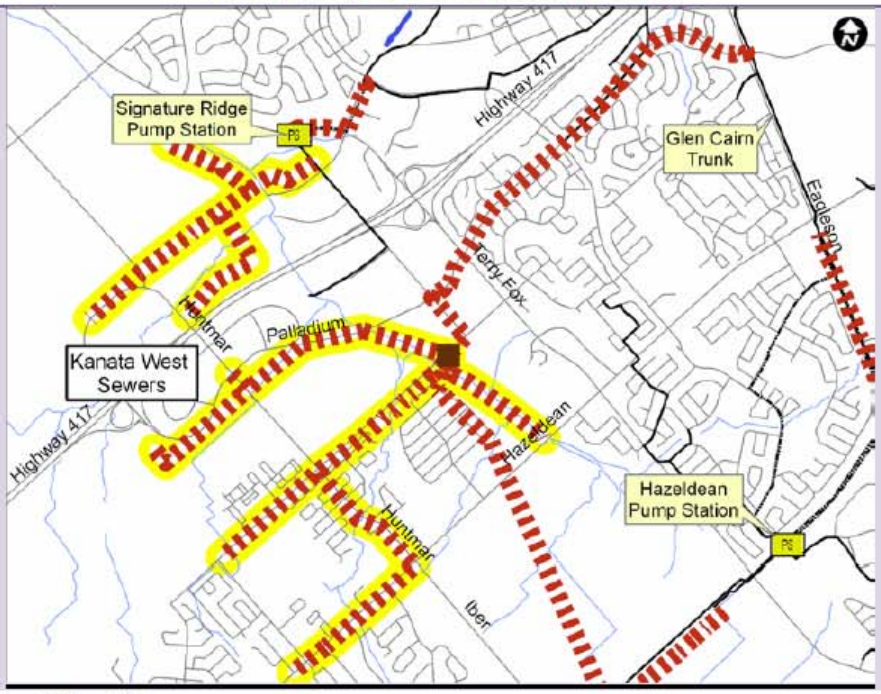
Ottawa, Ontario

Title

Preferred Waste-Water Option

Project No.	Scale	Sheet	Revision
60400406	1:7500 (0 75 225 375m)		
Drawing No.		7 of 7	5
S-1			

Kanata West Sewers



Scope and Justification

To service new development in Kanata West area, construct new collector sewers to provide outlet for new subdivisions. These collectors were identified in the Kanata West Master Servicing Study (Stantec 2006). The construction of collector sanitary sewers servicing the Kanata West development area will, for the most part, occur as part of the construction of local subdivisions. This budget item accounts for the cost of over-sizing local sewers which will be recovered by local developers.

Timing

2013 - 2024: Construction of collector sewers.
(Rate of development will determine the exact timing).

Action Item Funding

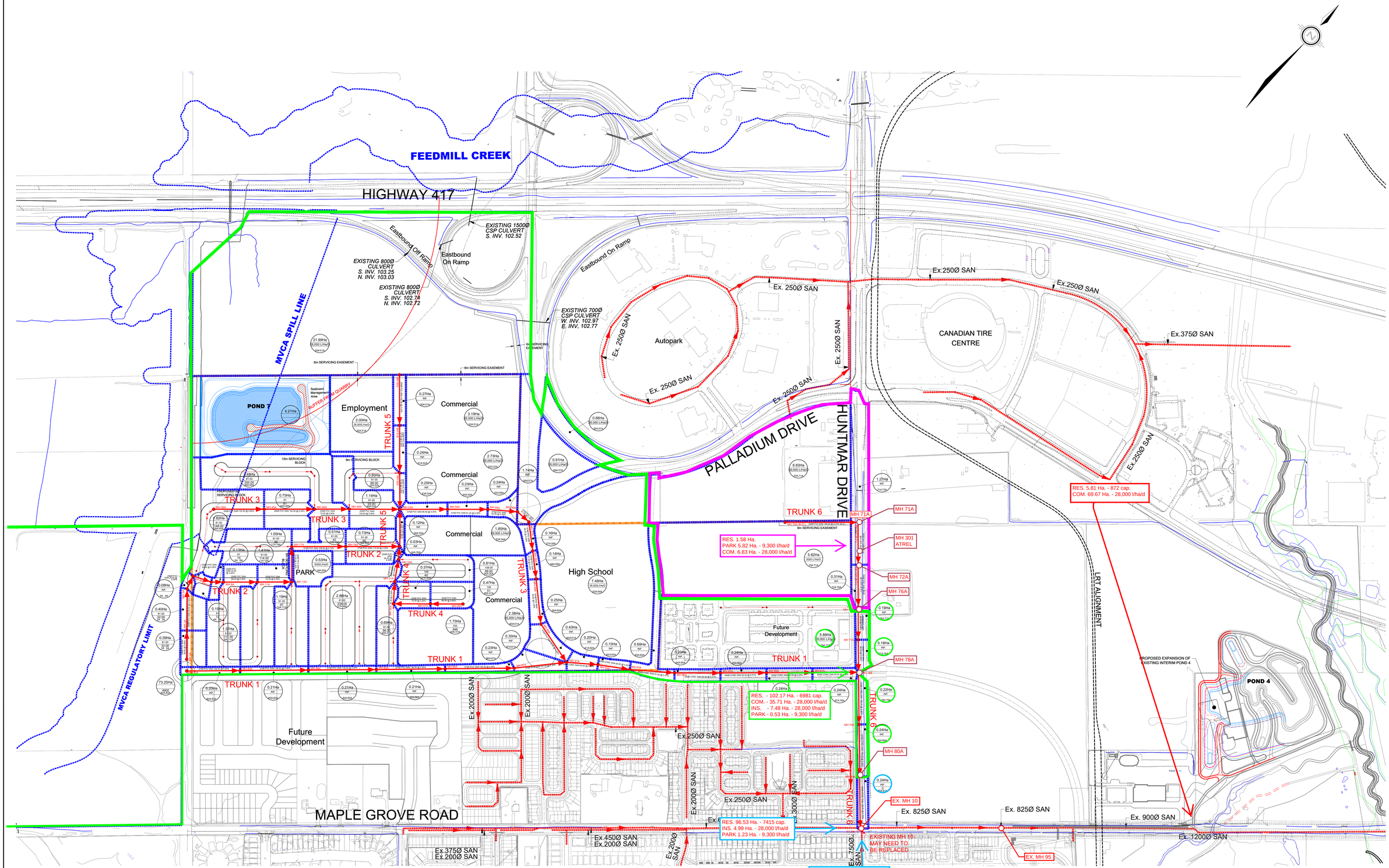
Construction Cost Estimate = $7.1 M
Capital Cost Estimate* = $11.3 M (100% Development Charges, 0% Rate)
**Including construction cost, engineering, city internal costs and contingency allowance.*

EA Requirements and Consultation

Schedule B Class EA has been completed and the project is approved.

Follow Up Actions

Coordinate design and construction with local subdivision development.



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LEGEND:

- STUDY LIMIT
- PROPOSED SANITARY
- SANITARY MANHOLE
- EXISTING SANITARY
- SANITARY TRIBUTARY BOUNDARY
- EXISTING DITCH

0.73Ha / 75 / MH 54A / MH 81A — DRAINAGE AREAS (HA) / POPULATION PER HECTARE / POPULATION / UPSTREAM MANHOLE / DOWNSTREAM MANHOLE

KANATA WEST - 195 HUNTMAR DRIVE

CONCEPTUAL SANITARY SERVICING PLAN

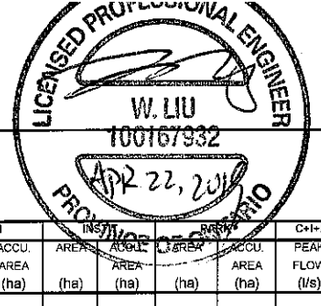
CITY OF OTTAWA

PROJECT No. :	12-624
SCALE	1:2500
DATE:	April 2019
DRAWING No.	4

CITY PLAN No. 17714

CITY FILE No. D07-16-16-0011

SANITARY SEWER CALCULATION SHEET



Ottawa

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION							COMM		INSTI		PARK		C+I+I	INFILTRATION				PIPE					VEL	
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	(FULL) (m/s)	(ACT.) (m/s)
Trunk4 - 04																											
	26A	27A	0.47		51	0.47	51	3.7	0.60	2.38	2.38		0.00		0.00	1.16	2.85	2.85	0.94	2.70	66.0	200	0.65	26.44	0.10	0.84	0.54
	27A	30A	0.37		40	0.84	91	3.6	1.06		2.38		0.00		0.00	1.16	0.37	3.22	1.06	3.28	75.0	200	0.34	19.12	0.17	0.61	0.45
			0.69		56	1.53	147				2.38		0.00		0.00		0.69	3.91									
	30A	31A	1.75		446	3.28	593	3.3	6.43		2.38		0.00		0.00	1.16	1.75	5.66	1.87	9.46	45.0	250	0.30	32.57	0.29	0.66	0.57
	31A	34A	2.88		234	6.16	827	3.3	8.79		2.38		0.00		0.00	1.16	2.88	8.54	2.82	12.77	45.5	250	0.30	32.57	0.39	0.66	0.62
			0.03		0	6.19	827				2.38		0.00		0.00		0.03	8.57									
	34A	35A	0.81		88	7.00	915	3.3	9.67		2.38		0.00		0.00	1.16	0.81	9.38	3.10	13.92	26.5	250	0.30	32.57	0.43	0.66	0.64
To Trunk5 - 05, Pipe 35A - 53A						7.00	915				2.38		0.00		0.00			9.38									
Trunk2 - 02																											
	1A	2A	0.39		32	0.39	32	3.7	0.38		0.00		0.00		0.00	0.00	0.39	0.39	0.13	0.51	58.5	200	0.65	26.44	0.02	0.84	0.33
	2A	3A	0.40		32	0.79	64	3.6	0.75		0.00		0.00		0.00	0.00	0.40	0.79	0.26	1.01	85.0	250	0.30	32.57	0.03	0.66	0.30
	3A	4A	0.08		0	0.87	64	3.6	0.75		0.00		0.00		0.00	0.00	0.08	0.87	0.29	1.04	29.0	250	0.30	32.57	0.03	0.66	0.30
	4A	5A	0.15		12	1.02	76	3.6	0.89		0.00		0.00		0.00	0.00	0.15	1.02	0.34	1.23	39.0	250	0.30	32.57	0.04	0.66	0.31
	5A	8A	0.13		10	1.15	86	3.6	1.01		0.00		0.00		0.00	0.00	0.13	1.15	0.38	1.39	24.5	250	0.30	32.57	0.04	0.66	0.33
	8A	11A	1.37		111	2.52	197	3.5	2.25		0.00		0.00		0.00	0.00	1.37	2.52	0.83	3.08	69.0	250	0.30	32.57	0.09	0.66	0.41
	11A	14A	1.41		114	3.93	311	3.5	3.48		0.00		0.00		0.00	0.00	1.41	3.93	1.30	4.78	70.0	250	0.30	32.57	0.15	0.66	0.47
	14A	17A	1.19		97	5.12	408	3.4	4.51		0.00		0.00		0.00	0.00	1.19	5.12	1.69	6.20	72.0	250	0.30	32.57	0.19	0.66	0.51
			0.51		42	5.63	450				0.00		0.00		0.00		0.51	5.63									
	17A	18A	1.05		86	6.68	536	3.4	5.85		0.00		0.00		0.00	0.00	1.05	6.68	2.20	8.05	109.5	375	0.15	67.91	0.12	0.61	0.41
	18A	35A	0.73		60	7.41	596	3.3	6.46		0.00		0.00	0.53	0.53	0.09	1.26	7.94	2.62	9.17	110.0	375	0.30	96.03	0.10	0.87	0.54
To Trunk5 - 05, Pipe 35A - 53A						7.41	596				0.00		0.00		0.53			7.94									
Trunk5 - 05																											
			0.27		0	0.27	0			2.00	2.00		0.00		0.00		2.27	2.27									
						0.27	0			3.19	5.19		0.00		0.00		3.19	5.46									
	50A	51A				0.27	0			21.99	27.18		0.00		0.00	13.21	21.99	27.45	9.06	22.27	102.5	250	0.30	32.57	0.68	0.66	0.71
	51A	52A	0.24		0	0.51	0				27.18		0.00		0.00	13.21	0.24	27.69	9.14	22.35	97.0	250	0.30	32.57	0.69	0.66	0.71
	52A	53A	0.85		68	1.36	68	3.6	0.80	2.73	29.91		0.00		0.00	14.54	3.58	31.27	10.32	25.66	73.5	250	0.30	32.57	0.79	0.66	0.73
To Trunk3 - 03, Pipe 53A - 54A						1.36	68				29.91		0.00		0.00			31.27									
Contribution From Trunk2 - 02, Pipe 18A - 35A						7.41	596				0.00		0.00		0.53		7.94	7.94									
Contribution From Trunk4 - 04, Pipe 34A - 35A						7.00	915				2.38		0.00		0.00		9.38	17.32									
	35A	53A	0.12		0	14.53	1511	3.1	15.38		2.38		0.00		0.53	1.24	0.12	17.44	5.76	22.38	75.5	375	0.30	96.03	0.23	0.87	0.70
To Trunk3 - 03, Pipe 53A - 54A						14.53	1511				2.38		0.00		0.53			17.44									
Trunk3 - 03																											
	39A	40A	1.82		148	1.82	148	3.6	1.70		0.00		0.00		0.00	0.00	1.82	1.82	0.60	2.31	102.5	200	0.65	26.44	0.09	0.84	0.51
	40A	46A	0.75		61	2.57	209	3.5	2.38		0.00		0.00		0.00	0.00	0.75	2.57	0.85	3.23	102.5	250	0.30	32.57	0.10	0.66	0.42
	46A	49A	2.48		200	5.05	409	3.4	4.53		0.00		0.00		0.00	0.00	2.48	5.05	1.67	6.19	70.5	250	0.30	32.57	0.19	0.66	0.51
	49A	53A	1.14		93	6.19	502	3.4	5.50		0.00		0.00		0.00	0.00	1.14	6.19	2.04	7.54	103.0	250	0.30	32.57	0.23	0.66	0.54
Contribution From Trunk5 - 05, Pipe 35A - 53A						14.53	1511				2.38		0.00		0.53		17.44	23.63									
Contribution From Trunk5 - 05, Pipe 52A - 53A						1.36	68				29.91		0.00		0.00		31.27	54.90									
	53A	54A	0.25		0	22.33	2081	3.1	20.62	1.85	34.14		0.00		0.53	16.68	2.10	57.00	18.81	56.11	96.5	375	0.30	96.03	0.58	0.87	0.90
	54A	55A	0.23		0	22.56	2081	3.1	20.62		34.14		0.00		0.53	16.68	0.23	57.23	18.89	56.19	81.5	375	0.30	96.03	0.59	0.87	0.90
	55A	56A	0.24		0	22.80	2081	3.1	20.62		34.14		0.00		0.53	16.68	0.24	57.47	18.97	56.27	60.5	375	0.30	96.03	0.59	0.87	0.90
			1.74		0	24.54	2081			0.66	34.80		0.00		0.53		2.40	59.87									
	56A	57A				24.54	2081	3.1	20.62	0.91	35.71		0.00		0.53	17.44	0.91	60.78	20.06	58.12	31.0	375	1.38	205.97	0.28	1.86	1.60

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha
Average Daily Flow =	280	l/p/day		
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha
Industrial Flow =	28000	L/ha/da	0.32407	l/s/Ha
Max Res. Peak Factor =	4.00			
Commercial/Inst./Park Peak Factor =	1.50			
Institutional =	0.32	l/s/Ha		

Industrial Peak Factor = as per MOE Graph

Extraneous Flow =	0.330	L/s/ha	
Minimum Velocity =	0.600	m/s	
Manning's n =	(Conc) 0.013	(Pvc) 0.013	
Townhouse coeff=	2.7		
Single house coeff=	3.4		

Designed: A.K.	PROJECT: Kanata West - 195 Huntmar Drive		
Checked: W.L.	LOCATION: City of Ottawa		
Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 4	File Ref: 12-624	Date: April, 2019	Sheet No. 1 of 2

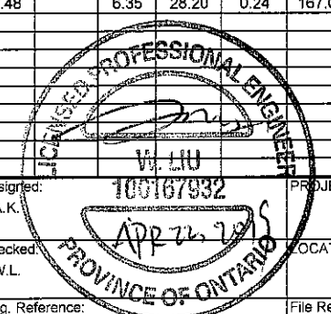
SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION				RESIDENTIAL AREA AND POPULATION							COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE					VEL.	
STREET		FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	(FULL) (m/s)	(ACT.) (m/s)
		57A	58A	0.16		0	24.70	2081	3.1	20.62		35.71		0.00		0.53	17.44	0.16	60.94	20.11	58.18	59.5	375	0.30	96.03	0.61	0.87	0.91
		58A	59A	0.14		0	24.84	2081	3.1	20.62		35.71		0.00		0.53	17.44	0.14	61.08	20.16	58.22	57.5	375	0.30	96.03	0.61	0.87	0.91
		59A	60A	0.25		0	25.09	2081	3.1	20.62		35.71		0.00		0.53	17.44	0.25	61.33	20.24	58.30	92.0	375	0.30	96.03	0.61	0.87	0.91
		60A	61A	0.43		0	25.52	2081	3.1	20.62		35.71		0.00		0.53	17.44	0.43	61.76	20.38	58.45	93.5	375	0.30	96.03	0.61	0.87	0.91
To Trunk1 - 01, Pipe 61A - 62A							25.52	2081				35.71		0.00		0.53			61.76									
Trunk1 - 01																												
				0.20		0	0.20	0				0.00		0.00		0.00		0.20	0.20									
		82A	83A	73.25		4900	73.45	4900	2.8	44.50		0.00		0.00		0.00	0.00	73.25	73.45	24.24	68.74	108.5	375	0.30	96.03	0.72	0.87	0.94
		83A	84A	0.21		0	73.66	4900	2.8	44.50		0.00		0.00		0.00	0.00	0.21	73.66	24.31	68.81	138.5	375	0.30	96.03	0.72	0.87	0.94
		84A	85A	0.21		0	73.87	4900	2.8	44.50		0.00		0.00		0.00	0.00	0.21	73.87	24.38	68.88	138.0	375	0.30	96.03	0.72	0.87	0.94
		85A	86A	0.21		0	74.08	4900	2.8	44.50		0.00		0.00		0.00	0.00	0.21	74.08	24.45	68.95	139.5	375	0.30	96.03	0.72	0.87	0.94
		86A	87A	0.23		0	74.31	4900	2.8	44.50		0.00		0.00		0.00	0.00	0.23	74.31	24.52	69.02	140.0	375	0.30	96.03	0.72	0.87	0.94
		87A	61A	0.35		0	74.66	4900	2.8	44.50		0.00		0.00		0.00	0.00	0.35	74.66	24.64	69.14	107.0	375	0.30	96.03	0.72	0.87	0.94
Contribution From Trunk3 - 03, Pipe 60A - 61A							25.52	2081				35.71		0.00		0.53		61.76	136.42									
		61A	62A	0.20		0	100.38	6981	2.7	60.77		35.71		0.00		0.53	17.44	0.20	136.62	45.08	123.30	64.0	450	0.30	156.16	0.79	0.98	1.09
		62A	63A	0.15		0	100.53	6981	2.7	60.77		35.71		0.00		0.53	17.44	0.15	136.77	45.13	123.35	65.5	450	0.30	156.16	0.79	0.98	1.09
		63A	64A	0.69		0	101.22	6981	2.7	60.77		35.71	7.48	7.48		0.53	21.08	8.17	144.94	47.83	129.68	91.0	450	0.31	158.74	0.82	1.00	1.11
		64A	65A	0.23		0	101.45	6981	2.7	60.77		35.71		7.48		0.53	21.08	0.23	145.17	47.91	129.76	93.5	450	0.31	158.74	0.82	1.00	1.11
		65A	66A	0.24		0	101.69	6981	2.7	60.77		35.71		7.48		0.53	21.08	0.24	145.41	47.98	129.84	93.5	450	0.31	158.74	0.82	1.00	1.11
		66A	67A	0.24		0	101.93	6981	2.7	60.77		35.71		7.48		0.53	21.08	0.24	145.65	48.06	129.92	93.5	450	0.32	161.28	0.81	1.01	1.13
		67A	78A	0.24		0	102.17	6981	2.7	60.77		35.71		7.48		0.53	21.08	0.24	145.89	48.14	129.99	93.5	450	0.32	161.28	0.81	1.01	1.13
To Trunk6 - 06, Pipe 78A - 79A							102.17	6981				35.71		7.48		0.53			145.89									
Trunk6 - 06																												
		70A	71A				0.00				6.83	6.83		0.00	5.82	5.82	4.26	12.65	12.65	4.17	8.43	148.5	200	0.73	28.02	0.30	0.89	0.78
		71A	72A	1.27		0	1.27	0				6.83		0.00		5.82	4.26	1.27	13.92	4.59	8.85	86.0	200	0.34	19.12	0.46	0.61	0.60
		72A	76A	0.31		0	1.58	0				6.83		0.00		5.82	4.26	0.31	14.23	4.70	8.96	86.0	250	0.30	32.57	0.27	0.66	0.56
		76A	77A	0.19		0	1.77	0			5.88	12.71		0.00		5.82	7.12	6.07	20.30	6.70	13.82	66.5	300	0.34	56.39	0.25	0.80	0.66
		77A	78A	0.18		0	1.95	0				12.71		0.00		5.82	7.12	0.18	20.48	6.76	13.88	66.5	300	0.34	56.39	0.25	0.80	0.66
Contribution From Trunk1 - 01, Pipe 67A - 78A							102.17	6981				35.71		7.48		0.53		145.89	166.37									
		78A	79A	0.22		0	104.34	6981	2.7	60.77		48.42		7.48		6.35	28.20	0.22	166.59	54.97	143.94	106.0	525	0.30	235.55	0.61	1.09	1.14
		79A	80A	0.24		0	104.58	6981	2.7	60.77		48.42		7.48		6.35	28.20	0.24	166.83	55.05	144.02	106.0	525	0.30	235.55	0.61	1.09	1.14
		80A	81A	0.24		0	104.82	6981	2.7	60.77		48.42		7.48		6.35	28.20	0.24	167.07	55.13	144.10	106.0	525	0.30	235.55	0.61	1.09	1.14

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	l/s/Ha			
Average Daily Flow =	280	l/p/day			Industrial Peak Factor = as per MOE Graph		
Comm/Inst Flow =	28000	L/ha/da	0.3241	l/s/Ha	Extraneous Flow =	0.330	L/s/ha
Industrial Flow =	28000	L/ha/da	0.32407	l/s/Ha	Minimum Velocity =	0.600	m/s
Max Res. Peak Factor =	4.00				Manning's n = (Conc)	0.013 (Pvc)	0.013
Commercial/Inst./Park Peak Factor =	1.50				Townhouse coeff=	2.7	
Institutional =	0.32	l/s/Ha			Single house coeff=	3.4	



Designed: A.K.	PROJECT: Kanata West - 195 Huntmar Drive		
Checked: W.L.	LOCATION: City of Ottawa		
Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 4	File Ref: 12-624	Date: April, 2019	Sheet No. 2 of 2

SANMH 301

SANMH 78A

EX. SANMH 95

LEGEND

- 0.63ha / 10 / 40 — SANITARY DRAINAGE SUB AREA; POPULATION EQUIVALENT; NUMBER OF UNITS IN SUB AREA
- DRAINAGE AREA BOUNDARY
- PROPOSED SANITARY SEWER
- EXISTING SANITARY SEWER
- OUTSIDE PROPOSED DEVELOPMENT
- NW=93.94 / SE=93.94 / SW=96.18 — PROPOSED OBVERT ELEVATION
- 348 — PROPOSED MANHOLE NUMBER

PALLADIUM DRIVE

STREET No. 1

STREET No. 2

STREET No. 3

STREET No. 4

STREET No. 5

STREET No. 6

STREET No. 7

STREET No. 8

STREET No. 9

MAPLE GROVE ROAD

HUNTMAR DRIVE

GALLEON LANE

HARMATTAN AVENUE

ROSEHILL AVENUE

HELM CIRCLE

KOHILO CRESCENT

MONCAO LANE

GREGALE LANE

NE=
SW=90.45
EX.98A

W=93.15
EX.95

NE=94.24
NW=94.78
SE=94.60
SW=94.18
312

NW=93.84
SE=93.84
SW=95.41
330

NW=93.52
SE=93.52
SW=95.63
348

SW=94.72
311

SE=96.09
325

NW=96.86
343

SE=96.35
340

NE=95.57
NW=95.67
SW=95.57
327

NW=97.11
SE=96.05
SW=96.08
341

NE=95.83
NW=95.89
SE=96.43
345

NE=97.09
308

NW=96.15
SE=96.15
SW=96.75
321

SE=96.46
316

NE=95.73
NW=95.79
SW=96.04
324

NE=97.37
NW=97.43
SW=97.71
338

SE=97.71
337

NE=96.47
NW=96.25
SW=96.85
323

NE=97.99
NW=98.05
SW=97.99
335

SE=98.33
332

N=97.59
SE=96.65
318

NE=97.17
301

NE=96.97
78A

NE=98.11
334

0.63ha 10 40 — 300mm⌀ SAN 11.0m @ 0.20%

0.42ha 12 33

0.52ha 16 47

0.56ha 17 51

1.17ha 83 175

1.21ha 88 185

2.07ha 00 00

1.77ha 129 271

1.01ha Pop.101 COMMERCIAL

675mm⌀ SAN 28.5m @ 0.20%

15.36ha Pop.590 GREEN SPACE

255.29ha Pop.7482 RESIDENTIAL

4.99ha Pop.499 INSTITUTIONAL

71.38ha Pop.738 COMMERCIAL

0.22ha 4 11

0.37ha 11 30

0.60ha 19 57

0.33ha 9 25

0.27ha 6 17

0.54ha 20 54

0.11ha 1 3

0.27ha 00 00

0.49ha 12 36

0.36ha 8 28

2.34ha Pop.234 INSTITUTIONAL

0.54ha 18 54

0.24ha 4 14

0.39ha 7 24

0.99ha 29 79

0.26ha 00 00

0.71ha Pop.24 GREEN SPACE

0.67ha 24 65

0.45ha 9 31

0.46ha 9 31

0.26ha 00 00

0.13ha 00 00

0.73ha Pop.73 INSTITUTIONAL

0.79ha 26 71

0.79ha 25 74

0.15ha 00 00

0.20ha 5 17

0.36ha 8 28

0.67ha 24 65

0.71ha 26 71

0.54ha 18 54

1.03ha 33 90

4.04ha Pop.655 RESIDENTIAL

5.81ha Pop.968 RESIDENTIAL

69.67ha Pop.6968 COMMERCIAL

TO EX. SAN MH 98A

5.82ha Pop.194 GREEN SPACE

1.58ha Pop.0 RESIDENTIAL

6.83ha Pop.683 COMMERCIAL

103.00ha Pop.6867 RESIDENTIAL

41.59ha Pop.4159 COMMERCIAL

7.48ha Pop.748 INSTITUTIONAL

0.53ha Pop.47.6 GREEN SPACE

Trees

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.

STREET MAP

No.	REVISION △-APPLIES WHEN DRAWING MODIFIED	DATE	BY

SCALE 1:1500 (15m 0 45m)

DESIGN	AGS
CHECKED	JMD
DRAWN	CED
CHECKED	AGS
APPROVED	JMD

LICENSED PROFESSIONAL ENGINEER — A. G. Y. SAUVE — 100142393 — Feb 12, 2020 — PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER — J.M.J DECOEUR — Feb 12, 2020 — PROVINCE OF ONTARIO

ATREL Engineering Ltd.
Engineers - Ingénieurs
1-2884 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6
TEL.: (613) 446-7423

CITY OF OTTAWA
130 HUNTMAR DR.

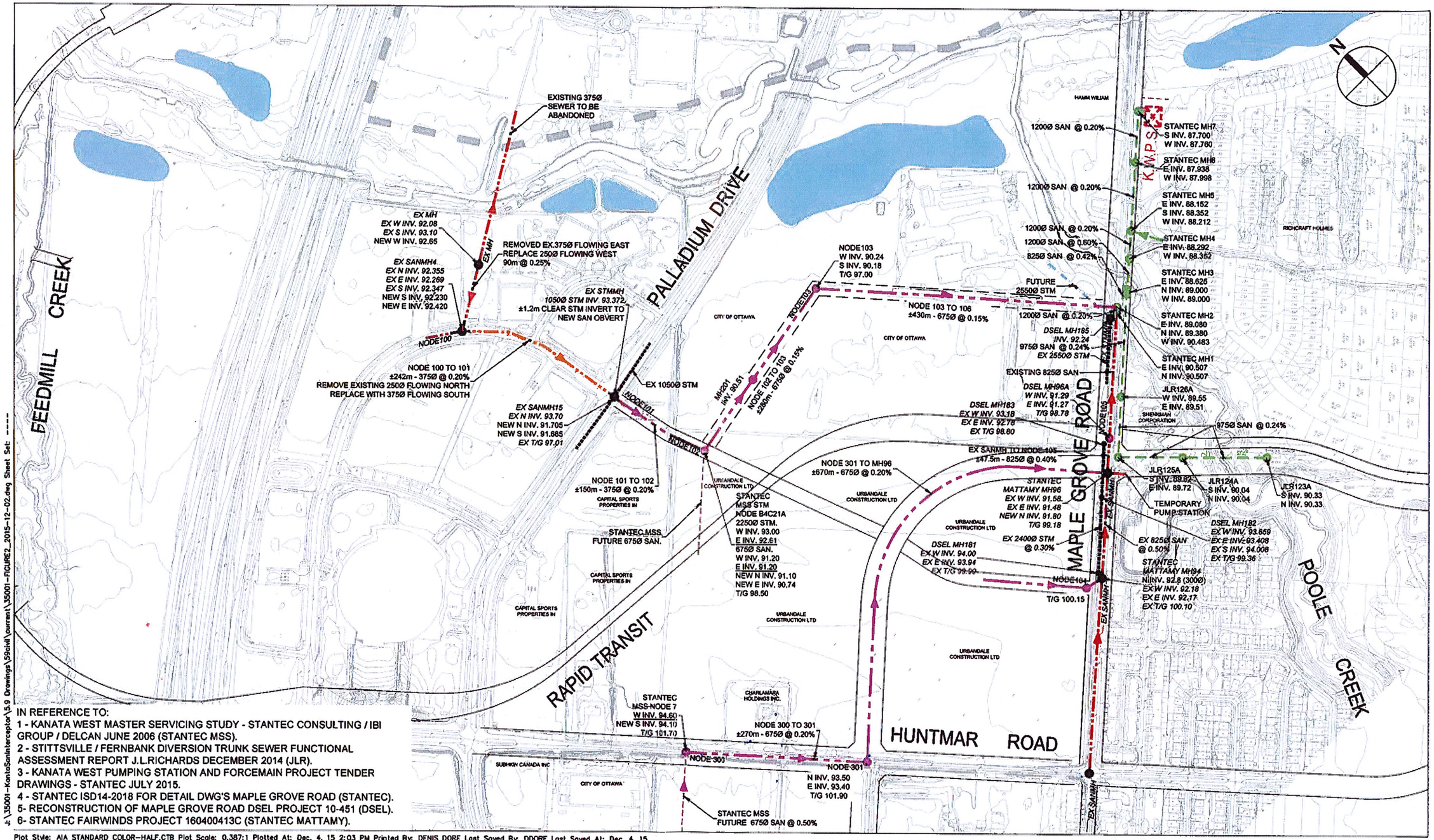
LIONESS DEVELOPMENT INC.

PROJECT No. 191002

DATE JANUARY 2020

PLAN
MACRO SANITARY DRAINAGE AREA PLAN

DRAWING No. 191002-SANM



IN REFERENCE TO:
1 - KANATA WEST MASTER SERVICING STUDY - STANTEC CONSULTING / IBI GROUP / DELCAN JUNE 2006 (STANTEC MSS).
2 - STITTSVILLE / FERNBANK DIVERSION TRUNK SEWER FUNCTIONAL ASSESSMENT REPORT J.L.RICHARDS DECEMBER 2014 (JLR).
3 - KANATA WEST PUMPING STATION AND FORCEMAIN PROJECT TENDER DRAWINGS - STANTEC JULY 2015.
4 - STANTEC ISD14-2018 FOR DETAIL DWG'S MAPLE GROVE ROAD (STANTEC).
5- RECONSTRUCTION OF MAPLE GROVE ROAD DSEL PROJECT 10-451 (DSEL).
6- STANTEC FAIRWINDS PROJECT 160400413C (STANTEC MATTAMY).

J:\35001-KantoSanInterceptor\5.9 Drawings\59civil\current\35001-FIGURE2_2015-12-02.dwg Sheet Set: ----
Plot Style: AIA STANDARD COLOR-HALF.CTB Plot Scale: 0.387:1 Plotted At: Dec. 4, 15 2:03 PM Printed By: DENIS DORE Last Saved By: DDORE Last Saved At: Dec. 4, 15

IBI GROUP

Scale: N.T.S.

Project Title: KANATA WEST NORTH SOUTH SANITARY INTERCEPTOR

Drawing Title: PROPOSED ALIGNMENTS FOR KANATA WEST DEVELOPMENT NORTH-SOUTH SANITARY COLLECTOR SEWERS FUNCTIONAL DESIGN STUDY

Sheet No.: FIGURE 1 (2015-12-02)

Maple Grove San Sewer Capacity Analysis (10/MH91 - SAMH 3)
DSEL, May 2019

Area consistent w/ KWMSS.

Area updated per attached as-builts.

Area redirected per attached IBI North-South Sanitary Interceptor. Demands consistent w/ KMSS.

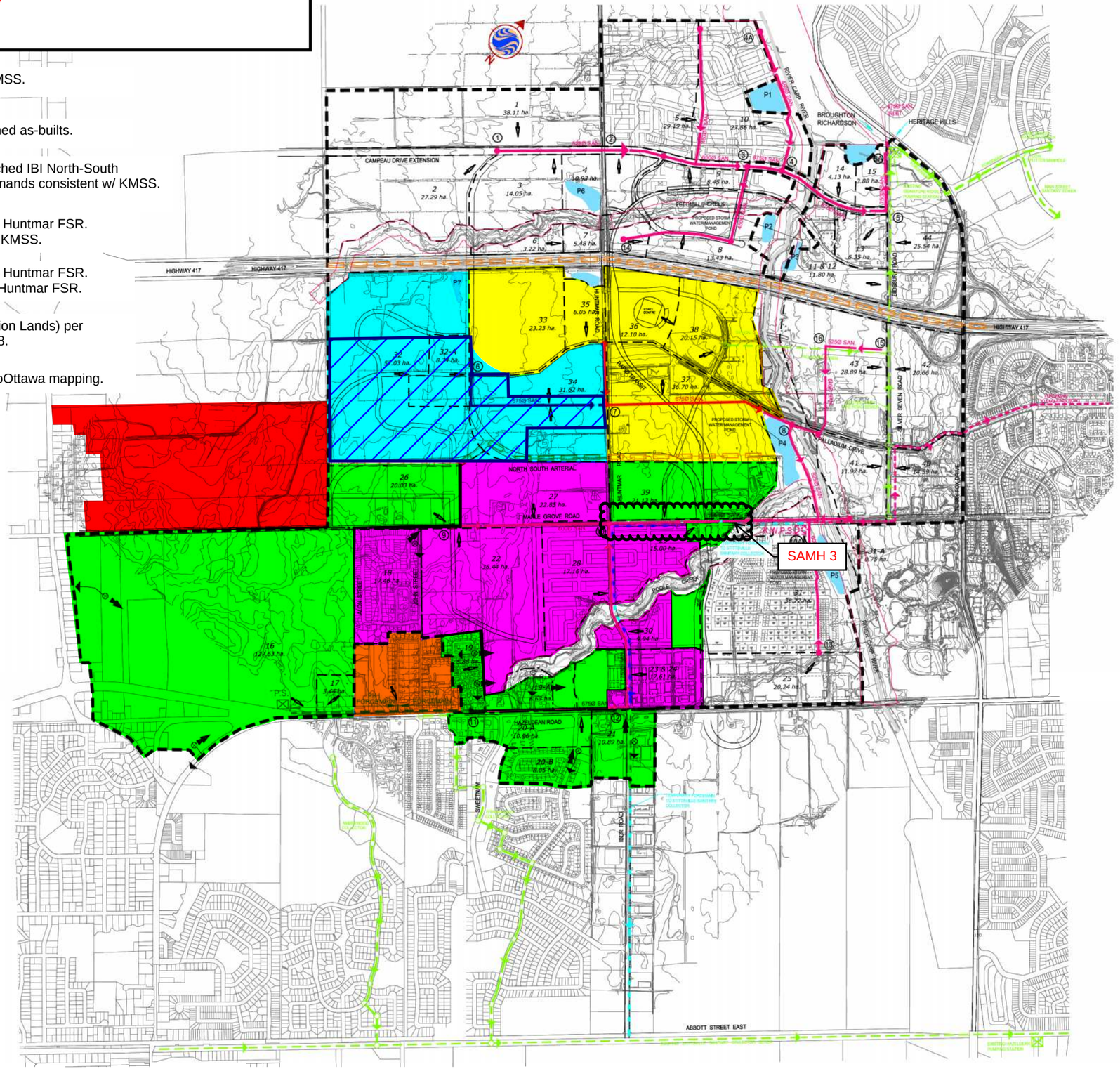
Area redirected per 195 Huntmar FSR. Demands consistent w/ KMSS.

Area redirected per 195 Huntmar FSR. Demands also per 195 Huntmar FSR.

Future development (Mion Lands) per attached Novatech 2018.

Additional Area per GeoOttawa mapping.

Analysis location.



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CCL/IBI
Cumming Cockburn Limited

Legend

- ULTIMATE MAJOR DRAINAGE LIMIT
- SUBCATCHMENT AREAS
- PROPOSED TRUNK SEWER
- PROPOSED FORCEMAIN
- TEMPORARY FORCEMAIN
- PROPOSED STITTSVILLE PUMPING STATION AND FORCEMAIN
- EXISTING TRUNK SEWER
- MAJOR DRAINAGE SPLIT
- NODES
- EXISTING PUMPING STATION AND FORCEMAIN (TO BE DECOMMISSIONED)
- 44 / 25.54 ha. — INPUT POINT AND AREA IN HECTARES
- EXISTING PUMPING STATION GRAVITY OUTLET

	Revision	By	Appd.	Date
5	REVISED FOR DEC.21/20 SUBMISSION	G.B.U.	Sup'r.	05-12-21
4	REVISED TRUNK SEWER FROM 16 TO KWPS	R.M.M.	R.M.M.	05-10-05
3	ARROWS FOR EXIST. PUMP STATIONS ADDED	R.M.M.	R.M.M.	05-08-09
2	REPORT JUNE 2005	R.M.M.	R.M.M.	05-06-07
1	REPORT APR. 2005	R.M.M.	R.M.M.	05-04-20

File Name: Dwn. Chkd. Dsgn. Date

Seals

Client/Project
Kanata West Concept Plan
Master Servicing Study
Ottawa, Ontario

Title
Preferred Waste-Water Option

Project No. 60400406
Scale 1:7500 (0, 75, 225, 375m)
Drawing No. S-I
Sheet 7 of 7
Revision 5

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION				RESIDENTIAL AREA AND POPULATION							COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET		FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
195 Huntmar FSR	Areas 32, 32A, 34 & Portion of 33		10	104.82		6981	104.82	6981	2.69	60.77	48.42	48.42	7.48	7.48	6.35	6.35	28.20	167.07	167.07	55.13	144.10							
	Area 33 Mod						0.00	0			22.37	22.37		0.00		0.00	10.87	22.37	22.37	7.38	18.25							
Corel Cente Etc (Existing Sewer)	Area 35 HP Employment						0.00	0			6.05	28.42		0.00		0.00	13.82	6.05	28.42	9.38	23.20							
	Area 36 (Corel Centre)																				30.00							
	Area 37 Mixed Use			15.60		2340	15.60	2340	3.03	22.98	21.10	49.52		0.00		0.00	24.07	36.70	65.12	21.49	68.54							
	Area 38 Extend. Employment		10				15.60	2340	3.03	22.98	20.15	69.67		0.00		0.00	33.87	20.15	85.27	28.14	114.99							
Maple Grove Road Trunk Sewer	Area 18			17.46		1129	17.46	1129	3.21	11.74		0.00		0.00		0.00	0.00	17.46	17.46	5.76	17.50							
	Area 19			5.88	112	336	23.34	1465	3.15	14.96		0.00		0.00		0.00	0.00	5.88	23.34	7.70	22.66							
	Area 27			20.83		2025	44.17	3490	2.91	32.91		0.00	2.52	2.52		0.00	1.22	23.35	46.69	15.41	49.54							
	Area 26			20.03	601	1803	64.20	5293	2.78	47.69		0.00		2.52		0.00	1.22	20.03	66.72	22.02	70.93							
	Area 22	9	10	32.33		2122	96.53	7415	2.67	64.16		0.00	2.47	4.99	1.23	1.23	2.62	36.03	102.75	33.91	100.69							
Hazeldean/Huntmar Trunk Sewer	Area 16/20 Residential			99.01		5644	99.01	5644	2.76	50.48	33.50	33.50		0.00	14.13	14.13	18.57	146.64	146.64	48.39	117.44							
	Area 17 Ex. Commercial	11	12				99.01	5644	2.76	50.48	3.44	36.94		0.00		14.13	20.24	3.44	150.08	49.53	120.25							
	Additional Area*			10.80	86	292	109.81	5936	2.74	52.71	6.70	43.64		0.00		14.13	23.50	17.50	167.58	55.30	131.51							
	Area 21 Exist. Employment						109.81	5936	2.74	52.71	10.89	54.53		0.00		14.13	28.79	10.89	178.47	58.90	140.40							
	Area 19A Exist. Residential			6.63		378	116.44	6314	2.72	55.66		54.53		0.00		14.13	28.79	6.63	185.10	61.08	145.53							
	5075 Hazeldean Rd						116.44	6314	2.72	55.66	8.45	62.98		0.00		14.13	32.90	8.45	193.55	63.87	152.43							
	15 Huntmar Restaurant			0.76		381	117.20	6695	2.70	58.58		62.98		0.00		14.13	32.90	0.76	194.31	64.12	155.60							
	Area 23/24 Mod						117.20	6695	2.70	58.58	8.40	71.38		0.00		14.13	36.98	8.40	202.71	66.89	162.45							
	Area 29 Mod			7.12	214	642	124.32	7337	2.67	63.49		71.38		0.00		14.13	36.98	7.12	209.83	69.24	169.71							
	Area 30 Mod			3.87	116	348	128.19	7685	2.65	66.00		71.38		0.00		14.13	36.98	3.87	213.70	70.52	173.50							
	Area 28 & Portions of 29 & 30	12	10	30.33		2325	158.52	10010	2.56	83.05		71.38		0.00		14.13	36.98	30.33	244.03	80.53	200.56							
Maple Grove Road Trunk Sewer	Area 39 Mixed Use		10	8.98		1347	8.98	1347	3.17	13.84	12.15	12.15		0.00		0.00	5.91	21.13	21.13	6.97	26.72							
		10/MH91	MH92				384.45	28093	2.20	200.29		201.62		12.47		21.71	107.58	0.00	620.25	204.68	542.55	96.10	825	0.28	759.56	0.71	1.42	1.53
		MH92	MH93																			88.90	825	0.51	1025.11	0.53	1.92	1.94
		MH94	MH94																			96.00	825	0.30	786.22	0.69	1.47	1.59
		MH94	MH95																			41.50	825	0.46	973.56	0.56	1.82	1.87
		MH95	MH96																			107.20	825	0.39	896.43	0.61	1.68	1.76
		MH96	MH96A																			47.50	825**	0.44	952.16	0.57	1.78	1.83
		MH96A	MH97A																			120.00	825**	0.44	952.16	0.57	1.78	1.83
		MH97A	MH98A/SAMH1																			65.00	825**	0.38	884.86	0.61	1.66	1.74
		MH98A/SAMH1	SAMH2																			6.70	825	0.36	861.26	0.63	1.61	1.71
		SAMH2	SAMH3																			18.90	825	0.42	930.27	0.58	1.74	1.81

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.108		Harmon Correction Factor =	0.800		
Average Daily Flow =	280	l/p/day			Industrial Peak Factor = as per MOE Graph			
Comm/Inst Flow =	28000	L/ha/da	0.405		Extraneous Flow =	0.330	L/s/ha	
Industrial Flow =	28000	L/ha/da	0.405		Minimum Velocity =	0.600	m/s	
Max Res. Peak Factor =	4.00				Manning's n = (Conc)	0.013	(Pvc)	0.013
Commercial/Inst./Park Peak Factor =	1.50	if ICI >20%	1.00	if ICI <20%				
Mixed Use	28000.00	L/ha/da						
Institutional =	0.324	l/s/Ha						

Designed: B.K.

Checked:

Dwg. Reference:

PROJECT: **195 Huntmar Drive**

LOCATION: **City of Ottawa**

File Ref: 14-624 | Date: May-19 | Sheet No. 1 of 1

*Additional area outside of MSS study area but directing wastewater to Maple Grove Road trunk sewer via Hazeldean Road. Areas and unit count taken from GeoOttawa mapping. 3.4 pop/unit applied.

**825mm dia. per Stantec Kanata West Pump Station and Forcemain Nov 2015 Issued for Construction drawings. 900mm dia. per DSEL Reconstruction of Maple Grove Road Sept 2013 As-built drawings.

EX. SANMH 95

SANITARY SEWER COMPUTATION FORM

Table 7

PROJECT: **130 Huntmar Drive**
DATE: **February 2020** CLIENT: Urbandale Corporation
DESIGNED BY: CED PROJECT #: 191002
CHECKED BY: AGS BY: Atrel Engineering Ltd

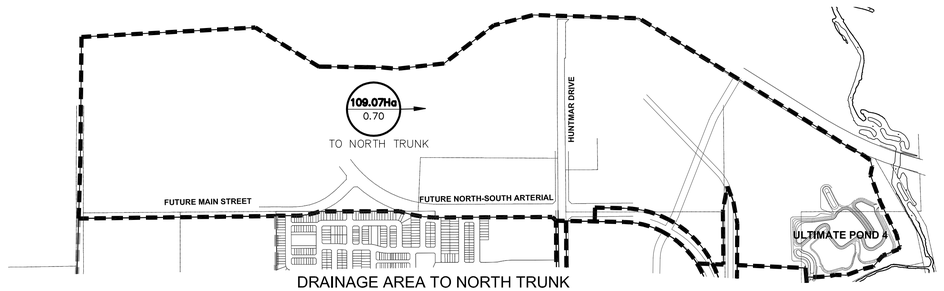
q= 280 l/cap.day
I= 0.33 l/ha.s
PVC/CONC N= 0.013
OTHER N= 0.024

LOCATION				RESIDENTIAL						COMMERCIAL , INSTITUTIONAL						GREEN SPACE						PEAK	PEAK	SEWER DATA							UpStream		DwnStream	
				INDIVIDUAL		CUMULATIVE		PEAKING	FLOW	INDIVIDUAL		CUMULATIVE		PEAKING	FLOW	INDIVIDUAL		CUMULATIVE		PEAKING	FLOW	EXT.FLOW	DES.											
FROM (Up)		TO (Down)		AREA (ha.)	POP.	AREA (ha.)	POP.	FACTOR M	Q(p) (L/S)	AREA (ha.)	POP.	AREA (ha.)	POP.	FACTOR M	Q(p) (L/S)	AREA (ha.)	POP.	AREA (ha.)	POP.	FACTOR M	Q(p) (L/S)	Q(i) (L/S)	Q(d) (L/S)	TYPE PIPE	DIA. (N0M) (mm)	SLOPE (%)	LENGTH (M)	CAP. (L/S)	Remaining Capacity (%)	VEL. (M/S)	Obv. (M)	Inv. (M)	Obv. (M)	Inv. (M)
MH	301	MH	302	2.37	71.0	2.37	71	3.63	0.83	6.83	683.0	6.83	683	1.50	3.32	5.82	194.0	5.82	194	1.50	0.94	4.96	10.05	PVC	250	0.24	100.5	29.59	66%	0.60	97.17	96.92	96.93	96.68
MH	302	MH	303	0.99	79.0	3.36	150	3.55	1.73			6.83	683	1.50	3.32			5.82	194	1.50	0.94	5.28	11.27	PVC	250	0.24	102.0	29.59	62%	0.60	96.93	96.68	96.69	96.44
MH	303	MH	304	5.07	745.0	8.43	895	3.26	9.47			6.83	683	1.50	3.32			5.82	194	1.50	0.94	6.96	20.69	PVC	300	0.20	97.0	42.94	52%	0.61	96.34	96.04	96.15	95.85
MH	304	MH	305			8.43	895	3.26	9.47			6.83	683	1.50	3.32			5.82	194	1.50	0.94	6.96	20.69	PVC	300	0.20	11.0	42.94	52%	0.61	95.55	95.25	95.53	95.23
MH	305	MH	312	0.42	33.0	8.85	928	3.26	9.79			6.83	683	1.50	3.32			5.82	194	1.50	0.94	7.10	21.15	PVC	300	0.20	74.5	42.94	51%	0.61	94.93	94.63	94.78	94.48
MH	308	MH	309	0.54	54.0	0.54	54	3.65	0.64													0.18	0.82	PVC	200	0.32	68.0	18.93	96%	0.60	97.09	96.89	96.87	96.67
MH	309	MH	312	0.54	54.0	1.08	108	3.59	1.26													0.36	1.61	PVC	200	0.32	80.5	18.93	91%	0.60	96.87	96.67	96.61	96.41
MH	311	MH	312	3.26	360.0	3.26	360	3.43	4.01													1.08	5.08	PVC	200	0.32	149.5	18.93	73%	0.60	94.72	94.52	94.24	94.04
MH	312	MH	313	0.52	47.0	13.71	1443	3.15	14.75			6.83	683	1.50	3.32			5.82	194	1.50	0.94	8.70	27.71	PVC	375	0.20	83.0	73.72	62%	0.70	94.18	93.81	94.01	93.64
MH	313	MH	330	0.56	51.0	14.27	1494	3.14	15.23			6.83	683	1.50	3.32			5.82	194	1.50	0.94	8.88	28.37	PVC	375	0.20	84.5	73.72	62%	0.70	94.01	93.64	93.84	93.47
MH	316	MH	321	0.46	31.0	0.46	31	3.68	0.37													0.15	0.52	PVC	200	0.32	96.5	18.93	97%	0.60	96.46	96.26	96.15	95.95
MH	318	MH	319																					PVC	200	0.32	11.0	18.93	100%	0.60	97.59	97.39	97.55	97.35
MH	319	MH	321	0.13		0.13				0.73	73.0	0.73	73	1.50	0.35							0.28	0.64	PVC	200	0.32	71.5	18.93	97%	0.60	96.98	96.78	96.75	96.55
MH	10318	MH	323	0.79	74.0	0.79	74	3.62	0.87													0.26	1.13	PVC	200	0.32	104.0	18.93	94%	0.60	96.65	96.45	96.31	96.11
MH	78A	MH	323	103.15	6981.0	103.15	6981	2.69	60.77	49.07	4907.0	49.07	4907	1.50	23.85	0.53	17.6	0.53	18	1.50	0.09	50.41	135.12	CONC	600	0.20	59.0	286.47	53%	0.98	96.97	96.37	96.85	96.25
MH	321	MH	324	0.45	31.0	1.04	62	3.64	0.73			0.73	73	1.50	0.35							0.58	1.67	PVC	200	0.32	112.5	18.93	91%	0.60	96.15	95.95	95.79	95.59
MH	323	MH	324	0.26		104.20	7055	2.68	61.33			49.07	4907	1.50	23.85			0.53	18	1.50	0.09	50.75	136.03	CONC	600	0.20	78.5	286.47	53%	0.98	96.25	95.65	96.09	95.49
MH	324	MH	327	0.26		105.50	7117	2.68	61.81			49.80	4980	1.50	24.21	0.71	24.0	1.24	42	1.50	0.20	51.66	137.87	CONC	600	0.20	82.0	286.47	52%	0.98	95.73	95.13	95.57	94.97
MH	325	MH	326	0.39	24.0	0.39	24	3.70	0.29													0.13	0.42	PVC	200	0.32	63.5	18.93	98%	0.60	96.09	95.89	95.88	95.68
MH	326	MH	327	0.24	14.0	0.63	38	3.67	0.45													0.21	0.66	PVC	200	0.32	63.5	18.93	97%	0.60	95.88	95.68	95.67	95.47
MH	327	MH	330	0.27		106.40	7155	2.68	62.09			49.80	4980	1.50	24.21			1.24	42	1.50	0.20	51.96	138.46	CONC	600	0.20	82.0	286.47	52%	0.98	95.57	94.97	95.41	94.81
MH	330	MH	331	2.40	25.0	123.07	8674	2.61	73.44			56.63	5663	1.50	27.53			7.06	236	1.50	1.15	61.63	163.75	CONC	675	0.20	78.5	392.18	58%	1.06	93.84	93.17	93.68	93.01
MH	331	MH	348	2.04	288.0	125.11	8962	2.60	75.56			56.63	5663	1.50	27.53			7.06	236	1.50	1.15	62.30	166.53	CONC	675	0.20	78.5	392.18	58%	1.06	93.68	93.01	93.52	92.85
MH	332	MH	335	0.67	65.0	0.67	65	3.63	0.77													0.22	0.99	PVC	200	0.32	85.5	18.93	95%	0.60	98.33	98.13	98.05	97.85
MH	334	MH	335	0.20	17.0	0.20	17	3.71	0.20													0.07	0.27	PVC	200	0.32	37.5	18.93	99%	0.60	98.11	97.91	97.99	97.79
MH	335	MH	338	0.36	28.0	1.23	110	3.59	1.28													0.41	1.68	PVC	200	0.32	85.5	18.93	91%	0.60	97.99	97.79	97.71	97.51
MH	337	MH	338	0.67	65.0	0.67	65	3.63	0.77													0.22	0.99	PVC	200	0.32	85.5	18.93	95%	0.60	97.71	97.51	97.43	97.23
MH	338	MH	341	0.36	28.0	2.26	203	3.52	2.31													0.75	3.06	PVC	200	0.32	82.0	18.93	84%	0.60	97.37	97.17	97.11	96.91
MH	340	MH	341	0.71	71.0	0.71	71	3.63	0.83													0.23	1.07	PVC	200	0.32	84.0	18.93	94%	0.60	96.35	96.15	96.08	95.88
MH	341	MH	345	0.11	3.0	3.08	277	3.47	3.12													1.02	4.14	PVC	200	0.32	51.0	18.93	78%	0.60	96.05	95.85	95.89	95.69
MH	343	MH	344	0.60	57.0	0.60	57	3.64	0.67													0.20	0.87	PVC	200	0.32	64.5	18.93	95%	0.60	96.86	96.66	96.65	96.45
MH	344	MH	345	0.49	38.0	1.09	95	3.60	1.11	2.34	234.0	2.34	234	1.50	1.14							1.13	3.38	PVC	200	0.32	67.5	18.93	82%	0.60	96.65	96.45	96.43	96.23
MH	345	MH	348	0.54	54.0	4.71	426	3.41	4.70			2.34	234	1.50	1.14							2.33	8.17	PVC	250	0.24	83.0	29.59	72%	0.60	95.83	95.58	95.63	95.38
MH	348	MH	349	0.22	11.0	130.04	9399	2.59	78.74			58.97	5897	1.50	28.67			7.06	236	1.50	1.15	64.70	173.26	CONC	675	0.20	67.5	392.18	56%	1.06	93.52	92.85	93.38	92.71
MH	349	MH	350	0.37	30.0	130.41	9429	2.58	78.96	1.01	101.0	59.98	5998	1.50	29.16			7.06	236	1.50	1.15	65.16	174.42	CONC	675	0.20	67.5	392.18	56%	1.06	93.38	92.71	93.24	92.57
MH	350	EX.MH	95			130.41	9429	2.58	78.96			59.98	5998	1.50	29.16			7.06	236	1.50	1.15	65.16	174.42	CONC	675	0.20	28.5	392.18	56%	1.06	93.21	92.54	93.15	92.48
EX.MH	95	EX.MH	96	260.86	18297.0	391.27	27726	2.21	198.46	146.04	14604.0	206.02	20602	1.50	100.15	15.36	510.0	22.42	746	1.50	3.62	204.50	506.74	CONC	825	0.36	107.2	898.50	44%	1.63	92.82	92.00		

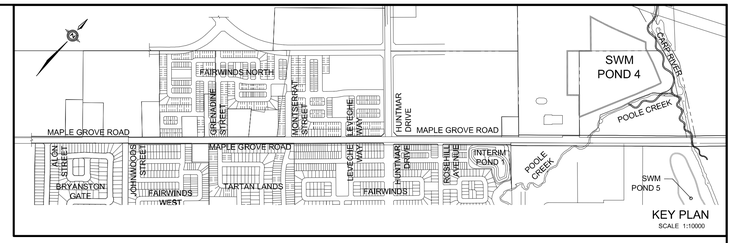
Proposed 130 Huntmar Drive
Existing

APPENDIX "E"

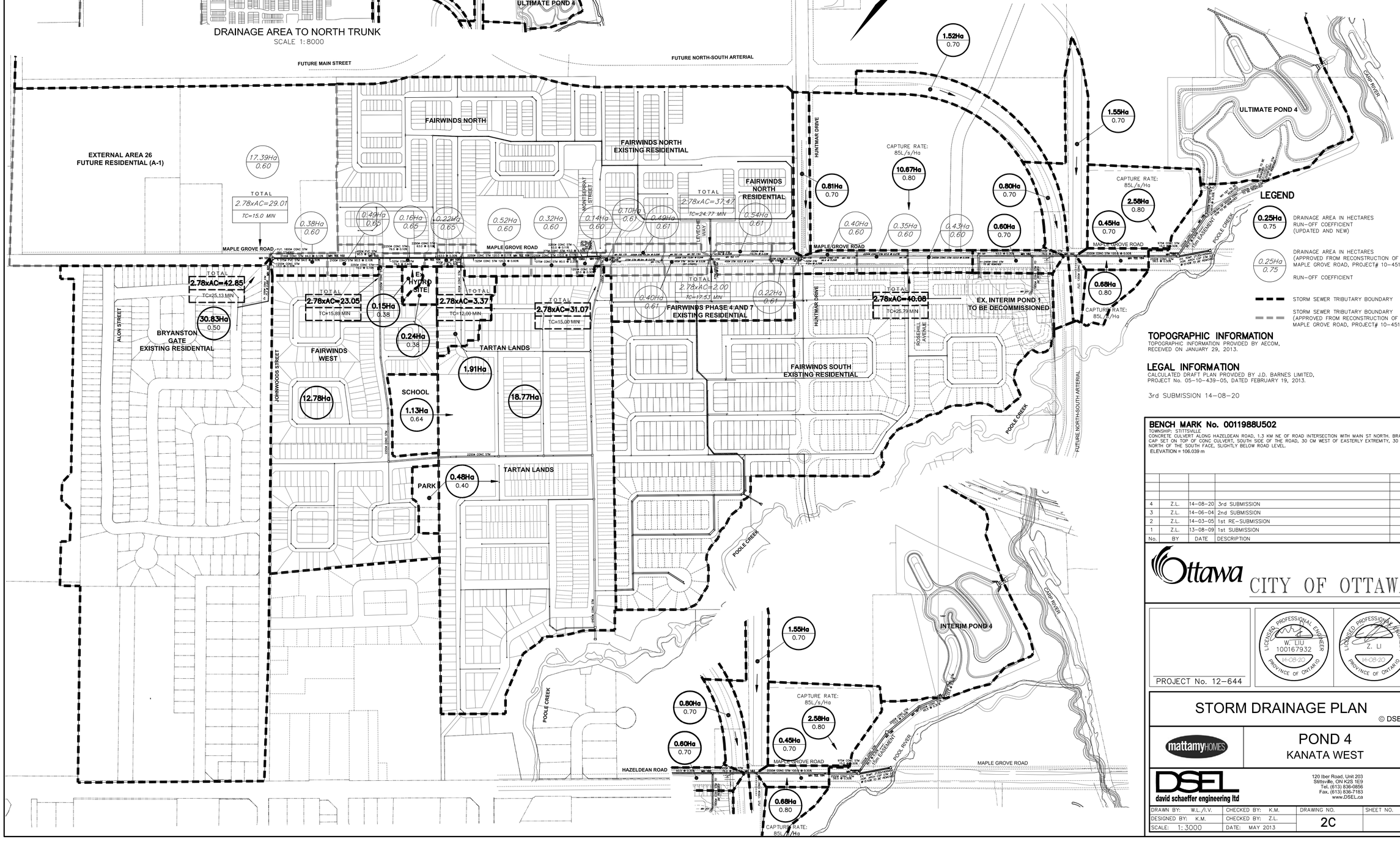
- Storm Drainage Plan – Pond 4 Kanata West (DSEL)
- 191002-STMM - Macro Storm Drainage Area Plan
- Storm Sewer Calculation Sheet (DSEL)
- Table 8 - Storm Sewer Design Sheet (Rational Method)
- Table 9 - Storm Sewer Design Sheet (Restricted)
- 130 Huntmar Drive / Preliminary Kanata West Pond 4 Sizing (JFSA)



DRAINAGE AREA TO NORTH TRUNK
SCALE 1:8000



KEY PLAN
SCALE 1:10000



LEGEND

- 0.25Ha / 0.75 — DRAINAGE AREA IN HECTARES RUN-OFF COEFFICIENT (UPDATED AND NEW)
- 0.25Ha / 0.75 — DRAINAGE AREA IN HECTARES (APPROVED FROM RECONSTRUCTION OF MAPLE GROVE ROAD, PROJECT# 10-451) RUN-OFF COEFFICIENT
- STORM SEWER TRIBUTARY BOUNDARY
- STORM SEWER TRIBUTARY BOUNDARY (APPROVED FROM RECONSTRUCTION OF MAPLE GROVE ROAD, PROJECT# 10-451)

TOPOGRAPHIC INFORMATION

TOPOGRAPHIC INFORMATION PROVIDED BY AECOM, RECEIVED ON JANUARY 29, 2013.

LEGAL INFORMATION

CALCULATED DRAFT PLAN PROVIDED BY J.D. BARNES LIMITED, PROJECT No. 05-10-439-05, DATED FEBRUARY 19, 2013.

3rd SUBMISSION 14-08-20

BENCH MARK No. 0011988U502

TOWNSHIP: STITTSVILLE
CONCRETE CULVERT ALONG HAZELDEAN ROAD, 1.3 KM NE OF ROAD INTERSECTION WITH MAIN ST NORTH. BRASS CAP SET ON TOP OF CONC CULVERT, SOUTH SIDE OF THE ROAD, 30 CM WEST OF EASTERLY EXTREMITY, 30 CM NORTH OF THE SOUTH FACE, SLIGHTLY BELOW ROAD LEVEL.
ELEVATION = 106.039 m

No.	BY	DATE	DESCRIPTION	BY
4	Z.L.	14-08-20	3rd SUBMISSION	
3	Z.L.	14-06-04	2nd SUBMISSION	
2	Z.L.	14-03-05	1st RE-SUBMISSION	
1	Z.L.	13-08-09	1st SUBMISSION	

CITY OF OTTAWA

PROJECT No. 12-644

LICENSED PROFESSIONAL ENGINEER W. LIU 100167932 14-08-20 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER Z. LI 14-08-20 PROVINCE OF ONTARIO

STORM DRAINAGE PLAN

© DSEL

mattamyHOMES

POND 4
KANATA WEST

DSEL
david schaeffer engineering ltd
120 Iber Road, Unit 203
Stittsville, ON K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

DRAWN BY: W.L./I.V.	CHECKED BY: K.M.	DRAWING NO.	SHEET NO.
DESIGNED BY: K.M.	CHECKED BY: Z.L.	2C	
SCALE: 1: 3000	DATE: MAY 2013		

M:\12644\Subm_3\Drawings\02C_644_Stm_Drainage.dwg, vyao

LEGEND

- 5 YEAR, 0.70ha, R=0.20 — MINOR SYSTEM CAPTURE RATE
- FUTURE STORM DRAINAGE AREA
- RUNOFF COEFFICIENT
- PROPOSED STORM SEWER
- DRAINAGE AREA BOUNDARY
- MAJOR DRAINAGE SYSTEM
- EXISTING STORM SEWER
- OUTSIDE PROPOSED DEVELOPMENT
- NW=98.00, SE=97.40, SW=97.66 — PROPOSED OBVERT ELEVATION
- 146 — PROPOSED MANHOLE NUMBER

PALLADIUM DRIVE
EXISTING DITCH
MAJOR FLOW ROUTE TO POND
POND 4
HUNTMAR DRIVE
MAPLE GROVE ROAD
STREET No. 1
STREET No. 2
STREET No. 3
STREET No. 4
STREET No. 5
STREET No. 6
MONCAO LANE
GALLEON LANE
HARMATTAN AVENUE
ROSSNEL AVENUE
KOHLO CRESCENT
HEMA CIRCLE
CASCADE LANE

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.

STREET MAP

No.	REVISION △-APPLIES WHEN DRAWING MODIFIED	DATE	BY

SCALE
1 : 2 500
40m 0 60m
HORIZONTAL

DESIGN	AGS
CHECKED	JMD
DRAWN	CED
CHECKED	AGS
APPROVED	JMD

LICENSED PROFESSIONAL ENGINEER
A. G. Y. SAUVE
100142393
Feb 12, 2020
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
J.M.J. DECOEUR
Feb 12, 2020
PROVINCE OF ONTARIO

ATREL Engineering Ltd.
Engineers - Ingénieurs
1-2884 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6
TEL.: (613) 446-7423

CITY OF OTTAWA
130 HUNTMAR DR.

LIONESS DEVELOPMENT INC.

PROJECT No. 191002
DATE JANUARY 2020
DRAWING No. 191002-STMM

PLAN
MACRO STORM DRAINAGE AREA PLAN

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Manning 0.013 Arterial Roads Return Frequency = 10 years

Ottawa

	LOCATION		AREA (Ha)														FLOW						SEWER DATA								
			2 YEAR				5 YEAR				10 YEAR				100 YEAR				Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Conc.	2 Year	5 Year	10 Year	100 Year										
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(min)	(mm/h)	(mm/h)	(mm/h)	(mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
Trunk 1																																
					0.00	0.00	0.21	0.70	0.41	0.41			0.00	0.00			0.00	0.00														
					0.00	0.00	0.24	0.70	0.47	0.88			0.00	0.00			0.00	0.00														
	1	2			0.00	0.00	0.50	0.70	0.97	1.85			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	193	600	600	CONC	0.18	82.0	260.5030	0.9213	1.4833	0.739
					0.00	0.00	0.19	0.70	0.37	2.22			0.00	0.00			0.00	0.00														
	2	3			0.00	0.00	0.20	0.70	0.39	2.61			0.00	0.00			0.00	0.00	11.48	71.54	96.96	113.62	166.05	253	675	675	CONC	0.17	82.0	346.5834	0.9685	1.4111	0.730
					0.00	0.00	0.01	0.70	0.02	2.63			0.00	0.00			0.00	0.00														
	3	4			0.00	0.00	0.05	0.70	0.10	2.72			0.00	0.00			0.00	0.00	12.89	67.23	91.04	106.66	155.82	248	675	675	CONC	0.16	26.5	336.2353	0.9396	0.4701	0.738
	4	5	0.16	0.70	0.31	0.31			0.00	2.72			0.00	0.00			0.00	0.00	13.36	65.92	89.24	104.54	152.71	264	750	750	CONC	0.11	43.5	369.2322	0.8358	0.8675	0.714
	5	8	0.14	0.70	0.27	0.58			0.00	2.72			0.00	0.00			0.00	0.00	14.23	63.64	86.12	100.87	147.32	272	750	750	CONC	0.11	28.0	369.2322	0.8358	0.5584	0.736
					0.00	0.58	0.00	0.00	0.00	2.72			0.00	0.00			0.00	0.00	12.91													
	8	11	1.40	0.70	2.72	3.31			0.00	2.72			0.00	0.00			0.00	0.00	14.79	62.27	84.24	98.66	144.07	435	900	900	CONC	0.11	63.0	600.4123	0.9438	1.1125	0.725
					0.00	3.31	0.00	0.00	0.00	2.72			0.00	0.00			0.00	0.00	12.85													
	11	14	1.37	0.70	2.67	5.97			0.00	2.72			0.00	0.00			0.00	0.00	15.90	59.72	80.75	94.55	138.05	577	975	975	CONC	0.12	70.5	776.3236	1.0398	1.1300	0.743
					0.00	5.97	0.00	0.00	0.00	2.72			0.00	0.00			0.00	0.00	13.37													
	14	17	1.19	0.70	2.32	8.29			0.00	2.72			0.00	0.00			0.00	0.00	17.03	57.35	77.52	90.75	132.47	687	1200	1200	CONC	0.10	77.5	1232.8868	1.0901	1.1849	0.557
	17	20			0.00	8.29			0.00	2.72			0.00	0.00			0.00	0.00	18.22	55.09	74.42	87.11	127.14	659	1200	1200	CONC	0.10	46.0	1232.8868	1.0901	0.7033	0.535
					0.00	8.29	0.00	0.00	0.00	2.72			0.00	0.00			0.00	0.00	18.69													
			0.53	0.40	0.59	8.88			0.00	2.72			0.00	0.00			0.00	0.00														
			1.18	0.70	2.30	11.18			0.00	2.72			0.00	0.00			0.00	0.00														
	20	31	1.22	0.70	2.37	13.55			0.00	2.72			0.00	0.00			0.00	0.00	18.92	53.83	72.71	85.10	124.19	928	1200	1200	CONC	0.10	76.0	1232.8868	1.0901	1.1620	0.752
					0.00	13.55	0.00	0.00	0.00	2.72			0.00	0.00			0.00	0.00	16.65													
					0.00	13.55	0.01	0.70	0.02	2.74			0.00	0.00			0.00	0.00														
					0.00	13.55	0.41	0.70	0.80	3.54			0.00	0.00			0.00	0.00														
					0.00	13.55	0.86	0.70	1.67	5.22			0.00	0.00			0.00	0.00														
			1.35	0.70	2.63	16.18			0.00	5.22			0.00	0.00			0.00	0.00														
	31	32	1.83	0.70	3.56	19.74			0.00	5.22			0.00	0.00			0.00	0.00	20.08	51.90	70.07	82.00	119.64	1390	1350	1350	CONC	0.13	59.5	1924.4277	1.3444	0.7376	0.722
	32	36	0.22	0.70	0.43	20.17			0.00	5.22			0.00	0.00			0.00	0.00	20.82	50.75	68.50	80.15	116.93	1381	1350	1350	CONC	0.12	12.0	1848.9303	1.2917	0.1548	0.747
					0.00	20.17	0.00	0.00	0.00	5.22			0.00	0.00			0.00	0.00	14.03													
	36	37	1.58	0.70	3.07	23.24			0.00	5.22			0.00	0.00			0.00	0.00	20.98	50.51	68.18	79.78	116.38	1530	1350	1350	CONC	0.15	58.5	2067.1669	1.4442	0.6751	0.740
	37	HW			0.00	23.24			0.00	5.22			0.00	0.00			0.00	0.00	21.65	49.52	66.82	78.19	114.05	1499	1350	1350	CONC	0.14	30.0	1997.0730	1.3952	0.3584	0.751
Trunk 3																																
	56	57			0.00	0.00	0.48	0.70	0.93	0.93			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	97	450	450	PVC	0.21	80.5	130.6520	0.8215	1.6332	0.745
	57	58			0.00	0.00	0.24	0.70	0.47	1.40			0.00	0.00			0.00	0.00	11.63	71.06	96.29	112.84	164.89	135	600	600	CONC	0.14	98.5	229.7421	0.8125	2.0204	0.587
To Trunk 2, Pipe 58 - 61						0.00				1.40				0.00				0.00	13.65													
Trunk 2																																
			0.49	0.70	0.95	0.95			0.00	0.00			0.00	0.00			0.00	0.00														
	46	47	2.38	0.80	5.29	6.25			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	480	825	825	CONC	0.20	70.5	641.9463	1.2009	0.9784	0.747
	47	50	0.36	0.70	0.70	6.95			0.00	0.00			0.00	0.00			0.00	0.00	10.98	73.24	99.29	116.37	170.08	509	825	825	CONC	0.23	73.5	688.4108	1.2878	0.9512	0.739
					0.00	6.95	0.00	0.00	0.00	0.00			0.00	0.00			0.00	0.00	12.19													
					0.00	6.95	0.24	0.70	0.47	0.47			0.00	0.00			0.00	0.00														
					0.00	6.95	0.26	0.70	0.51	0.97			0.00	0.00			0.00	0.00														
			0.70	0.70	1.36	8.31			0.00	0.97			0.00	0.00			0.00	0.00														
	50	51	1.75	0.80	3.89	12.20			0.00	0.97			0.00	0.00			0.00	0.00	12.19	69.30	93.88	109.99	160.72	937	1050	1050	CONC	0.21	45.0	1251.3755	1.4452	0.5190	0.749
					0.00	12.20	0.00	0.00	0.00	0.97			0.00	0.00			0.00	0.00	15.92													
					0.00	12.20	0.12	0.70	0.23	1.21			0.00	0.00			0.00	0.00														
					0.00	12.20	0.16	0.70	0.31	1.52			0.00	0.00			0.00	0.00														
	51	54	2.88	0.70	5.60	17.81			0.00	1.52			0.00	0.00			0.00	0.00	15.92	59.68	80.70	94.49	137.96	1185	1200	1200	CONC	0.17	45.5	1607.4877	1.4213	0.5335	0.737
					0.00	17.81	0.00	0.00	0.00	1.52			0.00	0.00			0.00	0.00	12.48													
			0.79	0.80	1.76	19.56			0.00	1.52			0.00	0.00			0.00	0.00														
			0.86	0.70	1.67	21.24			0.00	1.52			0.00	0.00			0.00	0.00														
	54	55	1.06	0.80	2.36	23.59			0.00	1.52			0.00	0.00			0.00	0.00	16.45	58.53	79.13	92.65	135.26	1501	1350	1350	CONC	0.15	26.5	2067.1669	1.4442	0.3058	0.726
	55	58	0.13	0.70	0.25	23.85			0.00	1.52			0.00	0.00			0.00	0.00	16.76	57.90	78.27	91.63	133.77	1500	1500	1500	CONC	0.10	75.5	2235.3724	1.2650	0.9948	0.671

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/s

LICENSED PROFESSIONAL ENGINEER
W. LIU
100167932
APR 22, 2019
PROVINCE OF ONTARIO

Designed: A.K.	PROJECT: Kanata West - 195 Huntmar Drive	
Checked: W.L.	LOCATION: City of Ottawa	
Dwg. Reference: Storm Drainage plan, Dwgs. No. 2	File Ref: 12-624	Date: April, 2019
		Sheet No. SHEET 1 OF 3

624_STM3.xlsx

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Manning 0.013 Arterial Roads Return Frequency = 10 years

LOCATION			AREA (Ha)															FLOW						SEWER DATA								
			2 YEAR				5 YEAR				10 YEAR				100 YEAR				Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Conc.	2 Year	5 Year	10 Year	100 Year									FLOW	
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(min)	(mm/h)	(mm/h)	(mm/h)	(mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
Contribution From Trunk 3, Pipe 57 - 58						0.00				1.40				0.00				0.00	13.65														
			0.28	0.70	0.54	24.39			0.00	2.92			0.00	0.00			0.00	0.00															
	58	61	2.73	0.80	6.07	30.46			0.00	2.92			0.00	0.00			0.00	0.00	17.76	55.95	75.60	88.49	129.16	1925	1500	1500	CONC	0.14	111.0	2644.9283	1.4967	1.2360	0.728
					0.00	30.46	0.00	0.00	0.00	2.92			0.00	0.00			0.00	0.00	12.17														
			0.47	0.70	0.91	31.38			0.00	2.92			0.00	0.00			0.00	0.00															
	61	62	3.19	0.80	7.09	38.47			0.00	2.92			0.00	0.00			0.00	0.00	18.99	53.71	72.55	84.91	123.90	2278	1650	1650	CONC	0.10	74.0	2882.2416	1.3479	0.9150	0.790
	62	63	0.06	0.70	0.12	38.59			0.00	2.92			0.00	0.00			0.00	0.00	19.91	52.18	70.46	82.45	120.31	2219	1650	1650	CONC	0.10	74.5	2882.2416	1.3479	0.9212	0.770
	63	HW	2.00	0.80	4.45	43.04			0.00	2.92			0.00	0.00			0.00	0.00	20.83	50.74	68.49	80.14	116.91	2384	1650	1650	CONC	0.11	65.5	3022.9205	1.4137	0.7722	0.788
Trunk 6																																	
					0.00	0.00			0.00	0.00	0.43	0.70	0.84	0.84			0.00	0.00															
	419	420	0.66	0.80	1.46	1.46			0.00	0.00			0.00	0.84			0.00	0.00	10.00	76.81	104.19	122.14	178.56	215	675	675	CONC	0.12	100.5	291.1883	0.8137	2.0584	0.737
					0.00	1.46			0.00	0.00	0.39	0.70	0.76	1.60			0.00	0.00															
	420	421	0.93	0.80	2.07	3.53			0.00	0.00			0.00	1.60			0.00	0.00	12.06	69.71	94.45	110.67	161.70	423	900	900	CONC	0.10	119.0	572.4707	0.8999	2.2040	0.739
	421	422			0.00	3.53			0.00	0.00	1.34	0.70	2.61	4.20			0.00	0.00	14.26	63.56	86.02	100.75	147.14	648	900	900	CONC	0.21	42.5	829.5888	1.3040	0.5432	0.781
	422	423			0.00	3.53			0.00	0.00	0.33	0.70	0.64	4.85			0.00	0.00	14.81	62.23	84.19	98.60	143.99	698	975	975	CONC	0.14	118.5	838.5253	1.1231	1.7585	0.832
	423	424			0.00	3.53			0.00	0.00	0.26	0.70	0.51	5.35			0.00	0.00	16.56	58.31	78.82	92.28	134.72	700	975	975	CONC	0.14	93.0	838.5253	1.1231	1.3801	0.835
	424	403			0.00	3.53			0.00	0.00	0.32	0.70	0.62	5.97			0.00	0.00	17.94	55.59	75.11	87.92	128.33	722	975	975	CONC	0.15	69.0	867.9562	1.1625	0.9892	0.831
To Trunk 5, Pipe 403 - 404						3.53				0.00				5.97				0.00	18.93														
Trunk 5																																	
					0.00	0.00			0.00	0.00	0.11	0.70	0.21	0.21			0.00	0.00															
					0.00	0.00			0.00	0.00	0.26	0.70	0.51	0.72			0.00	0.00															
	401	402			0.00	0.00			0.00	0.00	0.31	0.70	0.60	1.32			0.00	0.00	10.00	76.81	104.19	122.14	178.56	162	450	450	PVC	0.93	111.5	274.9464	1.7288	1.0750	0.588
					0.00	0.00	-0.09	0.70	-0.18	-0.18			0.00	1.32			0.00	0.00															
	402	403			0.00	0.00			0.00	-0.18	0.09	0.70	0.18	1.50			0.00	0.00	11.07	72.91	98.84	115.84	169.30	156	450	450	PVC	0.86	84.5	264.3966	1.6624	0.8472	0.591
Contribution From Trunk 6, Pipe 424 - 403						3.53				0.00				5.97				0.00	18.93														
	403	404			0.00	3.53			0.00	-0.18	0.58	0.70	1.13	8.60			0.00	0.00	18.93	53.81	72.68	85.07	124.14	909	1050	1050	CONC	0.17	64.0	1125.9068	1.3003	0.8203	0.807
	404	405			0.00	3.53			0.00	-0.18	0.21	0.70	0.41	9.01			0.00	0.00	19.75	52.43	70.80	82.85	120.89	919	1050	1050	CONC	0.18	82.5	1158.5486	1.3380	1.0277	0.793
					0.00	3.53			0.00	-0.18	0.11	0.70	0.21	9.22			0.00	0.00															
	405	406			0.00	3.53	7.49	0.60	12.49	12.32			0.00	9.22			0.00	0.00	20.78	50.81	68.58	80.25	117.07	1764	1200	1200	CONC	0.35	78.5	2306.5199	2.0394	0.6415	0.765
					0.00	3.53	0.19	0.70	0.37	12.69			0.00	9.22			0.00	0.00															
	406	407			0.00	3.53	0.46	0.70	0.90	13.58			0.00	9.22			0.00	0.00	21.42	49.85	67.27	78.71	114.82	1816	1200	1200	CONC	0.36	64.0	2339.2382	2.0683	0.5157	0.776
	407	408			0.00	3.53			0.00	13.58			0.00	9.22			0.00	0.00	21.94	49.11	66.26	77.53	113.08	1789	1200	1200	CONC	0.35	64.0	2306.5199	2.0394	0.5230	0.775
	408	409			0.00	3.53			0.00	13.58			0.00	9.22			0.00	0.00	22.46	48.38	65.27	76.36	111.38	1762	1350	1350	CONC	0.18	92.0	2264.4679	1.5820	0.9692	0.778
	409	410			0.00	3.53			0.00	13.58			0.00	9.22			0.00	0.00	23.43	47.09	63.52	74.31	108.36	1715	1350	1350	CONC	0.17	92.0	2200.6672	1.5374	0.9973	0.779
	410	411			0.00	3.53			0.00	13.58			0.00	9.22			0.00	0.00	24.43	45.85	61.82	72.31	105.44	1669	1500	1500	CONC	0.11	92.0	2344.4784	1.3267	1.1557	0.712
					0.00	3.53			0.00	13.58	0.51	0.80	1.13	10.36			0.00	0.00															
					0.00	3.53	1.62	0.80	3.60	17.19			0.00	10.36			0.00	0.00															
					0.00	3.53			0.00	17.19	2.29	0.70	4.46	14.81			0.00	0.00															
	411	412	5.88	0.80	13.08	16.61			0.00	17.19			0.00	14.81			0.00	0.00	25.58	44.49	59.98	70.15	102.27	2809	1500	1500	CONC	0.27	97.5	3673.0917	2.0785	0.7818	0.765
	412	430			0.00	16.61			0.00	17.19			0.00	14.81			0.00	0.00	26.37	43.63	58.80	68.76	100.24	2754	1500	1500	CONC	0.26	23.0	3604.4298	2.0397	0.1879	0.764
	430	413			0.00	16.61			0.00	17.19			0.00	14.81			0.00	0.00	26.55	43.42	58.52	68.44	99.77	2741	1800	1800	CONC	0.26	74.5	5861.2002	2.3033	0.5391	0.468
	413	4C10			0.00	16.61			0.00	17.19			0.00	14.81			0.00	0.00	27.09	42.85	57.75	67.53	98.43	2705	1800	1800	CONC	0.25	97.5	5747.3797	2.2586	0.7195	0.471
To Trunk 4, Pipe 418 - 230						16.61				17.19				14.81				0.00	27.81														
Trunk 4																																	
	416	417			0.00	0.00	4.57	0.40	5.08	5.08			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	529	675	675	CONC	0.76	58.0	732.8078	2.0478	0.4720	0.723
					0.00	0.00	1.21	0.40	1.35	6.43			0.00	0.00			0.00	0.00															
	417	4C10	6.83	0.80	15.19	15.19			0.00	6.43			0.00	0.00			0.00	0.00	10.47	75.04	101.76	119.28	174.36	1794	1050	1050	CONC	0.77	100.0	2396.2016	2.7673	0.6023	0.749
Contribution From Trunk 5, Pipe 413 - 418						16.61				17.19				14.81				0.00	27.81														
					0.00	31.80			0.00	23.61	1.03	0.70	2.00	16.82			0.00	0.00															
	4C10	4C11			0.00	31.80	5.04	0.80	11.21	34.82			0.00	16.82			0.00	0.00	27.81	42.12	56.75	66.35	96.71	4431	1950	1950	CONC	0.40	259.0	8999.7165	3.0135	1.4324	0.492
					0.00	31.80	0.71	0.70	1.38	36.20			0.00	16.82			0.00	0.00															
	4C11	4C21a			0.00	31.80	6.46	0.80	14.37	50.57			0.00	16.82			0.00	0.00	29.24	40.73	54.86	64.15	93.48	5149	2250	2250	CONC	0.20	198.0	9320.5509	2.3442	1.4078	0.552

Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/s

LICENSED PROFESSIONAL ENGINEER
W. LIU
100167932
APR 22, 2019
PROVINCE OF ONTARIO

Designed: A.K.
Checked: W.L.
Dwg. Reference: Storm Drainage plan, Dwgs. No. 2

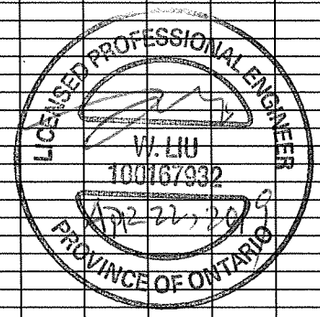
PROJECT: **Kanata West - 195 Huntmar Drive**
LOCATION: **City of Ottawa**
File Ref: **12-624** Date: **April, 2019** Sheet No. SHEET 2 OF 3

624_STM3.xlsx

STORM SEWER CALCULATION SHEET (RATIONAL METHOD)

Local Roads Return Frequency = 2 years
Collector Roads Return Frequency = 5 years
Manning 0.013 Arterial Roads Return Frequency = 10 years

	LOCATION		AREA (Ha)														FLOW						SEWER DATA								
			2 YEAR				5 YEAR				10 YEAR				100 YEAR				Time of	Intensity	Intensity	Intensity	Intensity	Peak Flow	DIA. (mm)	DIA. (mm)	TYPE	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF	RATIO
			AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	AREA	R	Indiv.	Accum.	Conc.	2 Year	5 Year	10 Year	100 Year										
Location	From Node	To Node	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(Ha)		2.78 AC	2.78 AC	(min)	(mm/h)	(mm/h)	(mm/h)	(mm/h)	Q (l/s)	(actual)	(nominal)		(%)	(m)	(l/s)	(m/s)	LOW (min	Q/Q full
					0.00	31.80	0.48	0.70	0.93	51.51			0.00	16.82			0.00	0.00															
					0.00	31.80	0.96	0.80	2.14	53.64			0.00	16.82			0.00	0.00															
	4C21a	4C21b			0.00	31.80	7.19	0.80	15.99	69.63			0.00	16.82			0.00	0.00	30.65	39.47	53.15	62.13	90.53	6001	2250	2250	CONC	0.30	116.0	11415.2969	2.8710	0.6734	0.526
	4C21b	4C26a(HW)			0.00	31.80	15.57	0.80	34.63	104.26			0.00	16.82			0.00	0.00	31.33	38.89	52.37	61.21	89.18	7726	2250	2250	CONC	0.40	259.0	13181.2494	3.3151	1.3021	0.586
SWM POND 7 OUTFALL																																	
					0.00	0.00			0.00	0.00			0.00	0.00			0.00	0.00						277									
	100	101			0.00	0.00			0.00	0.00			0.00	0.00			0.00	0.00	10.00	76.81	104.19	122.14	178.56	277	750	750	CONC	0.10	25.0	352.0491	0.7969	0.5229	0.787
	101	102			0.00	0.00			0.00	0.00			0.00	0.00			0.00	0.00	10.52	74.85	101.51	118.98	173.92	277	750	750	CONC	0.10	97.5	352.0491	0.7969	2.0392	0.787
	102	103			0.00	0.00			0.00	0.00			0.00	0.00			0.00	0.00	12.56	68.19	92.36	108.21	158.10	277	750	750	CONC	0.10	97.5	352.0491	0.7969	2.0392	0.787
	103	104			0.00	0.00			0.00	0.00			0.00	0.00			0.00	0.00	14.60	62.72	84.87	99.39	145.16	277	750	750	CONC	0.10	97.5	352.0491	0.7969	2.0392	0.787
	104	105			0.00	0.00			0.00	0.00			0.00	0.00			0.00	0.00	16.64	58.15	78.61	92.03	134.35	277	750	750	CONC	0.10	97.5	352.0491	0.7969	2.0392	0.787
	105	106			0.00	0.00			0.00	0.00			0.00	0.00			0.00	0.00	18.68	54.26	73.29	85.78	125.18	277	750	750	CONC	0.10	97.5	352.0491	0.7969	2.0392	0.787
	106	107			0.00	0.00			0.00	0.00			0.00	0.00			0.00	0.00	20.72	50.90	68.71	80.40	117.30	277	750	750	CONC	0.10	57.0	352.0491	0.7969	1.1922	0.787
	107	108			0.00	0.00			0.00	0.00			0.00	0.00			0.00	0.00	21.91	49.15	66.32	77.59	113.18	277	750	750	CONC	0.10	45.0	352.0491	0.7969	0.9412	0.787
	108	109			0.00	0.00			0.00	0.00			0.00	0.00			0.00	0.00	22.85	47.85	64.55	75.52	110.14	277	750	750	CONC	0.10	75.5	352.0491	0.7969	1.5791	0.787
	109	HW	(CULVERT)		0.00	0.00			0.00	0.00			0.00	0.00			0.00	0.00	24.43	45.84	61.82	72.31	105.43	277	750	750	CONC	0.10	77.0	352.0491	0.7969	1.6105	0.787



Definitions:
Q = 2.78 AIR, where
Q = Peak Flow in Litres per second (L/s)
A = Areas in hectares (ha)
I = Rainfall Intensity (mm/h)
R = Runoff Coefficient

Notes:
1) Ottawa Rainfall-Intensity Curve
2) Min. Velocity = 0.80 m/s

Designed: A.K.
Checked: W.L.
Dwg. Reference: Storm Drainage plan, Dwgs. No. 2

PROJECT: **Kanata West - 195 Huntmar Drive**
LOCATION: **City of Ottawa**
File Ref: **12-624** Date: **April, 2019** Sheet No. SHEET 3 OF 3

624_STM3.xlsx

STORM SEWER COMPUTATION FORM

DESIGNED BY: AGS
CHECKED BY: AGS

LOCAL ROADS STORM FREQUENCY : 2 YEAR
COLECTOR ROADS STORM FREQUENCY : 5 YEAR
ARTERIAL ROADS STORM FREQUENCY :10 YEAR

130 Huntmar Drive
Lioness Development Inc.
191002
Atrel Engineering Ltd
February, 2020

RATIONAL METHOD Q= 2.78 AIR
PVC/CONC N= 0.013
CSP N= 0.024
CORR N= 0.021

Table 8

LOCATION				Rational Method																											
				2 Year				5 Year				10 Year		TIME	RAINF.	RAINF.	RAINF.				**ACTUAL**	PIPE SEWER DATA									UpStream		DwStream	
				INDIV.	ACCUM.	INDIV.	ACCUM.	INDIV.	ACCUM.																								
FROM		TO		2 Year			5 Year				10 Year			CONC.	INTENS.	INTENS.	INTENS.	2 Year	5 Year	10 Year	**PIPE**	TYPE	DIA.		SLOPE	LENGTH	CAP.	Remaining	VEL.	TIME OF	Obv.	Inv.	Obv.	Inv.
				2.78AR	2.78AR	2.78AR	2.78AR	2.78AR	2.78AR						2 Year	5 Year	10 Year	Flow	Flow	Flow	**FLOW**		(N0M)	(ACT)	(%)	(M)	(L/S)	Capacity	(M/S)	FLOW	(M)	(M)	(M)	(M)
(Up)		(Down)		0.65	0.70	0.80	0.40	0.60	0.70	0.80	0.70	0.80		(MIN)	(MM/HR)	(MM/HR)	(MM/HR)	(L/S)	(L/S)	(L/S)	**(L/S)**		(mm)					(%)		(MIN)				
MH	416	MH	101			7.60	5.78						16.90	16.90	6.43	6.43			10.00	76.81	104.19	122.14	1298.27	669.67		1967.94	CONC	1200	1219.2	0.30	350.0	2227.75	12%	1.91	3.06	100.04	98.84	98.99	97.79
																			13.06																	
MH	101	MH	102		0.77								1.50	18.40		6.43			13.06	66.77	90.41	105.91	1228.62	581.10		1809.72	CONC	1350	1371.6	0.30	102.0	3049.82	41%	2.06	0.82	98.99	97.64	98.68	97.33
MH	102	MH	103		0.94								1.83	20.23		6.43			13.88	64.54	87.36	102.32	1305.65	561.49		1867.14	CONC	1350	1371.6	0.30	102.0	3049.82	39%	2.06	0.82	98.58	97.23	98.27	96.92
MH	103	MH	104		1.05					4.04			2.04	22.27	8.98	15.41			14.70	62.47	84.53	98.99	1391.42	1302.80		2694.22	CONC	1650	1676.4	0.30	100.0	5208.04	48%	2.36	0.71	97.84	96.19	97.54	95.89
MH	104	MH	105											22.27		15.41			15.41	60.82	82.25	96.32	1354.67	1267.66		2622.33	CONC	1650	1676.4	0.30	13.0	5208.04	50%	2.36	0.09	96.83	95.18	96.79	95.14
MH	105	MH	132		0.42								0.82	23.09		15.41			15.50	60.61	81.97	95.98	1399.53	1263.35		2662.87	CONC	1650	1676.4	0.30	74.0	5208.04	49%	2.36	0.52	96.76	95.11	96.54	94.89
																			16.03																	
MH	110	MH	111		0.78								1.52	1.52					10.00	76.81	104.19	122.14	116.59			116.59	CONC	600	609.6	0.30	87.0	350.85	67%	1.20	1.21	98.48	97.88	98.22	97.62
MH	111	MH	112		0.13			0.74					0.25	1.77	1.23	1.23			11.21	72.46	98.23	115.11	128.32	121.25		249.56	CONC	750	762.0	0.30	11.0	636.13	61%	1.39	0.13	98.22	97.47	98.19	97.44
MH	112	MH	116											1.77		1.23			11.34	72.02	97.62	114.40	127.54	120.49		248.03	CONC	750	762.0	0.30	71.5	636.13	61%	1.39	0.85	98.16	97.41	97.95	97.20
																			12.19																	
MH	115	MH	116		0.45								0.88	0.88					10.00	76.81	104.19	122.14	67.26			67.26	CONC	450	457.2	0.30	95.0	162.91	59%	0.99	1.60	98.40	97.95	98.11	97.66
																			11.60																	
MH	116	MH	121		0.24								0.47	3.11		1.23			12.19	69.30	93.88	110.00	215.77	115.88		331.65	CONC	825	838.2	0.30	54.5	820.21	60%	1.49	0.61	97.95	97.13	97.79	96.97
																			12.80																	
MH	120	MH	121		0.25								0.49	0.49					10.00	76.81	104.19	122.14	37.37			37.37	PVC	375	366.4	0.35	64.5	97.52	62%	0.92	1.16	98.37	98.00	98.14	97.77
																			11.16																	
MH	121	MH	127		0.55								1.07	4.67		1.23			12.80	67.49	91.40	107.08	315.21	112.82		428.02	CONC	900	914.4	0.30	82.0	1034.42	59%	1.58	0.87	97.79	96.89	97.54	96.64
																			13.67																	
MH	125	MH	126		0.62		0.71						1.21	1.21	0.79	0.79			10.00	76.81	104.19	122.14	92.67	82.26		174.93	CONC	600	609.6	0.30	109.5	350.85	50%	1.20	1.52	98.32	97.72	97.99	97.39
MH	126	MH	127											1.21		0.79			11.52	71.43	96.80	113.44	86.18	76.43		162.61	CONC	600	609.6	0.30	40.0	350.85	54%	1.20	0.55	97.99	97.39	97.87	97.27
																			12.07																	
MH	127	MH	132		0.56								1.09	6.97		2.02			13.67	65.09	88.11	103.21	453.46	178.32		631.78	CONC	1050	1066.8	0.30	85.0	1560.35	60%	1.75	0.81	97.54	96.49	97.28	96.23
																			14.48																	
MH	130	MH	131		0.57								1.11	1.11					10.00	76.81	104.19	122.14	85.20			85.20	CONC	525	533.4	0.30	67.5	245.74	65%	1.10	1.02	98.07	97.55	97.87	97.35
MH	131	MH	132		0.51								0.99	2.10					11.02	73.09	99.08	116.12	153.61			153.61	CONC	675	685.8	0.30	83.0	480.32	68%	1.30	1.06	97.58	96.91	97.33	96.66
																			12.09																	
MH	132	MH	133		0.23								0.45	32.61		17.44			16.03	59.45	80.39	94.12	1938.46	1401.69		3340.16	CONC	1800	1828.8	0.30	76.0	6568.16	49%	2.50	0.51	96.54	94.74	96.31	94.51
MH	133	MH	170											32.61		17.44			16.53	58.37	78.91	92.39	1903.25	1375.89		3279.14	CONC	1800	1828.8	0.30	67.5	6568.16	50%	2.50	0.45	96.05	94.25	95.85	94.05
																			16.98																	
MH	135	MH	170			1.21					0.40		2.69	2.69			0.78	0.78	10.00	76.81	104.19	122.14	206.70		95.07	301.77	CONC	675	685.8	0.30	120.0	480.32	37%	1.30	1.54	96.10	95.43	95.74	95.07
																			11.54																	
MH	419	MH	420			0.66					0.43		1.47	1.47			0.84	0.84	10.00	76.81	104.19	122.14	112.74		102.20	214.95	CONC	675	685.8	0.12	100.5	303.78	29%	0.82	2.04	101.53	100.86	101.41	100.74
MH	420	MH	421			0.93					0.39		2.07	3.54			0.76	1.60	12.04	69.78	94.54	110.77	246.75		176.76	423.51	CONC	900	914.4	0.10	119.0	597.22	29%	0.91	2.18	101.41	100.51	101.29	100.39
MH	421	MH	422								1.34			3.54			2.61	4.20	14.22	63.68	86.17	100.93	225.18		424.25	649.43	CONC	900	914.4	0.21	42.5	865.46	25%	1.32	0.54	101.26	100.36	101.17	100.27
MH	422	MH	423								0.33			3.54			0.64	4.85	14.76	62.35	84.36	98.79	220.48		478.69	699.17	CONC	975	990.6	0.14	118.5	874.78	20%	1.14	1.74	101.17	100.20	101.00	100.03
MH	423	MH	424								0.26			3.54			0.51	5.35	16.50	58.45	79.02	92.51	206.69		495.07	701.76	CONC	975	990.6	0.14	93.0	874.78	20%	1.14	1.37	100.97	100.00	100.84	99.87
MH	424	MH	403								0.32			3.54			0.62	5.97	17.86	55.75	75.33	88.17	197.14		526.75	723.89	CONC	975	990.6	0.15	69.0	905.48	20%	1.17	0.98	100.81	99.84	100.71	99.74
																			18.84																	
MH	401	MH	402								0.68						1.32	1.32	10.00	76.81	104.19	122.14			161.63	161.63	CONC	450	457.2	0.93	111.5	286.83	44%	1.75	1.06	105.73	105.28	104.69	104.24
MH	402	MH	403								0.09						0.18	1.50	11.06	72.95	98.89	115.90			173.67	173.67	CONC	450	457.2	0.86	84.5	275.83	37%	1.68	0.84	104.66	104.21	103.93	103.48
																			11.90																	
MH	403	MH	404								0.58			3.54			1.13	8.60	18.84	53.98	72.91	85.33	190.88		733.95	924.83	CONC	1050	1066.8	0.17	64.0	1174.59	21%	1.31	0.81	100.71	99.66	100.60	99.55
MH	404	MH	405								0.21			3.54			0.41	9.01	19.65	52.60	71.03	83.12	186.00		748.91	934.91	CONC	1050	1066.8	0.18	82.5	1208.64	23%	1.35	1.02	100.57	99.52	100.42	99.37
MH	405	MH	406					7.49			0.11			3.54	12.49	12.49	0.21	9.22	20.67	50.98	68.82	80.53	180.27	859.79	742.81	1782.88	CONC	1200	1219.2	0.35	78.5	2406.25	26%	2.06	0.63	100.42	99.22	100.15	98.95
MH	406	MH	407						0.65		1.11			3.54	1.26	13.76	2.16	11.38	21.30	50.03	67.52	79.00	176.91	928.96	899.34	2005.21	CONC	1200	1219.2	0.36	64.0	2440.38	18%	2.09	0.51	100.12	98.92	99.89	98.69
MH	407	MH	408											3.54		13.76		11.38	21.81	49.29	66.51	77.81	174.30	915.06	885.80	1975.15	CONC	1200	1219.2	0.35	64.0	2406.25	18%	2.06	0.52	99.86	98.66	99.64	98.44
MH	408	MH	409											3.54		13.76		11.38	22.33	48.56	65.52	76.65	171.72	901.44	872.59	1945.75	CONC	1350	1371.6	0.18	92.0	2362.38	18%	1.60	0.96	99.64	98.29	99.47	98.12
MH	409	MH	410											3.54		13.76		11.38	23.29	47.28	63.77	74.60	167.19	877.36	849.25	1893.81	CONC	1350	1371.6	0.17	92.0	2295.82	18%	1.55	0.99	99.46	98.11	99.30	97.95
MH	410	MH	140			5.88							13.08	16.61		13.76		11.38	24.28	46.03	62.08	72.61	764.71	854.11	826.60	2445.42	CONC	1500	1524.0	0.15	92.0	2856.14	14%	1.57	0.98	99.29	97.79	99.15	97.65
																			25.26																	

STORM SEWER COMPUTATION FORM

LOCAL ROADS STORM FREQUENCY : 2 YEAR
COLECTOR ROADS STORM FREQUENCY : 5 YEAR
ARTERIAL ROADS STORM FREQUENCY :10 YEAR

DESIGNED BY: AGS
CHECKED BY: AGS

130 Huntmar Drive
Lioness Development Inc.
191002
Atrel Engineering Ltd
February, 2020

Table 8

RATIONAL METHOD Q= 2.78 AIR
PVC/CONC N= 0.013
CSP N= 0.024
CORR N= 0.021

LOCATION FROM (Up)		TO (Down)		2 Year 0.65	2 Year 0.70	2 Year 0.80	5 Year 0.40	5 Year 0.60	5 Year 0.70	5 Year 0.80	10 Year 0.70	10 Year 0.80	Rational Method 2 Year INDIV. 2.78AR	2 Year ACCUM. 2.78AR	5 Year INDIV. 2.78AR	5 Year ACCUM. 2.78AR	10 Year INDIV. 2.78AR	10 Year ACCUM. 2.78AR	TIME CONC. (MIN)	RAINF. INTENS. 2 Year (MM/HR)	RAINF. INTENS. 5 Year (MM/HR)	RAINF. INTENS. 10 Year (MM/HR)	2 Year Flow (L/S)	5 Year Flow (L/S)	10 Year Flow (L/S)	ACTUAL PIPE FLOW (L/S)	PIPE SEWER DATA TYPE	DIA. (N0M) (mm)	(ACT)	SLOPE (%)	LENGTH (M)	CAP. (L/S)	Remaining Capacity (%)	VEL. (M/S)	TIME OF FLOW (MIN)	UpStream Obv. (M)	UpStream Inv. (M)	DwStream Obv. (M)	DwStream Inv. (M)
MH	140	MH	142								0.15			16.61		13.76	0.29	11.68	25.26	44.87	60.49	70.75	745.44	832.23	826.08	2403.75	CONC	1500	1524.0	0.30	61.5	4039.18	40%	2.21	0.46	99.15	97.65	98.97	97.47
																			25.72																				
MH	141	MH	142		0.65								1.26	1.26					10.00	76.81	104.19	122.14	97.16			97.16	CONC	525	533.4	0.30	100.5	245.74	60%	1.10	1.52	98.59	98.07	98.29	97.77
																			11.52																				
MH	142	MH	144								0.26			17.88		13.76	0.51	12.18	25.72	44.34	59.77	69.90	792.72	822.33	851.52	2466.57	CONC	1500	1524.0	0.30	77.5	4039.18	39%	2.21	0.58	98.29	96.79	98.06	96.56
																			26.30																				
MH	143	MH	144		0.65								1.26	1.26					10.00	76.81	104.19	122.14	97.16			97.16	CONC	600	609.6	0.30	99.5	350.85	72%	1.20	1.38	98.51	97.91	98.21	97.61
																			11.38																				
MH	144	MH	152								0.27			19.14		13.76	0.53	12.71	26.30	43.70	58.89	68.87	836.55	810.22	875.16	2521.93	CONC	1500	1524.0	0.30	82.0	4039.18	38%	2.21	0.62	98.06	96.56	97.81	96.31
																			26.92																				
MH	145	MH	146		0.57								1.11	1.11					10.00	76.80	104.19	122.14	85.19			85.19	CONC	525	533.4	0.30	112.0	245.74	65%	1.10	1.70	98.97	98.45	98.63	98.11
MH	146	MH	151		0.42								0.82	1.93					11.70	70.85	96.01	112.50	136.50			136.50	CONC	675	685.8	0.30	82.0	480.32	72%	1.30	1.05	98.51	97.84	98.26	97.59
																			12.75																				
MH	150	MH	151																10.00	76.81	104.19	122.14					PVC	300	299.2	0.30	40.5	52.60	100%	0.75	0.90	98.48	98.18	98.36	98.06
																			10.90																				
MH	151	MH	152		0.88								1.71	3.64					12.75	67.65	91.61	107.33	246.18			246.18	CONC	825	838.2	0.30	106.0	820.21	70%	1.49	1.19	98.26	97.44	97.94	97.12
																			13.94																				
MH	152	MH	156								0.28			22.78		13.76	0.54	13.25	26.92	43.03	57.99	67.82	980.31	797.84	898.77	2676.92	CONC	1650	1676.4	0.30	86.0	5208.04	49%	2.36	0.61	97.81	96.16	97.55	95.90
																			27.53																				
MH	155	MH	156		0.66	1.77							5.22	5.22					10.00	76.81	104.19	122.14	401.01			401.01	CONC	825	838.2	0.30	117.5	820.21	51%	1.49	1.32	98.36	97.54	98.01	97.19
																			11.32																				
MH	156	MH	157								0.47			28.00		13.76	0.91	14.17	27.53	42.41	57.14	66.81	1187.60	786.14	946.49	2920.24	CONC	1650	1676.4	0.30	70.0	5208.04	44%	2.36	0.49	97.55	95.90	97.34	95.69
MH	157	MH	165											28.00		13.76		14.17	28.02	41.91	56.46	66.02	1173.60	776.79	935.30	2885.69	CONC	1650	1676.4	0.30	74.0	5208.04	45%	2.36	0.52	96.88	95.23	96.66	95.01
																			28.54																				
MH	160	MH	161			1.01					0.50		2.25	2.25			0.97	0.97	10.00	76.81	104.19	122.14	172.53		118.84	291.38	CONC	750	762.0	0.30	105.0	636.13	54%	1.39	1.25	96.76	96.01	96.44	95.69
MH	161	MH	162								0.57			2.25			1.11	2.08	11.25	72.30	98.00	114.85	162.40		239.14	401.55	CONC	825	838.2	0.30	120.0	820.21	51%	1.49	1.35	96.44	95.62	96.08	95.26
MH	162	MH	165								0.32			2.25			0.62	2.70	12.60	68.08	92.21	108.03	152.92		292.21	445.14	CONC	825	838.2	0.30	72.0	820.21	46%	1.49	0.81	96.08	95.26	95.86	95.04
																			13.41																				
MH	165	MH	166			1.17					0.23		2.60	32.85		13.76	0.45	17.32	28.54	41.40	55.77	65.21	1360.04	767.30	1129.40	3256.74	CONC	1800	1828.8	0.30	83.5	6568.16	50%	2.50	0.56	95.86	94.06	95.61	93.81
MH	166	MH	170								0.24			32.85		13.76	0.47	17.79	29.10	40.87	55.05	64.36	1342.63	757.39	1144.74	3244.76	CONC	1800	1828.8	0.30	85.0	6568.16	51%	2.50	0.57	95.61	93.81	95.35	93.55
																			29.67																				
MH	170	MH	171											68.15		31.19		18.56	29.67	40.34	54.34	63.53	2749.13	1695.10	1179.42	5623.65	CONC	2400	2438.4	0.30	113.5	14145.35	60%	3.03	0.62	95.05	92.65	94.71	92.31
MH	171	MH	172											68.15		31.19		18.56	30.29	39.78	53.58	62.63	2710.96	1671.39	1162.72	5545.07	CONC	2400	2438.4	0.30	96.0	14145.35	61%	3.03	0.53	94.68	92.28	94.39	91.99
MH	172	MH	173											68.15		31.19		18.56	30.82	39.32	52.95	61.90	2679.62	1651.74	1149.16	5480.52	CONC	2400	2438.4	0.30	96.0	14145.35	61%	3.03	0.53	94.39	91.99	94.10	91.70
MH	173	MH	174											68.15		31.19		18.56	31.35	38.87	52.34	61.18	2648.95	1632.71	1135.80	5417.46	CONC	2400	2438.4	0.30	24.0	14145.35	62%	3.03	0.13	94.07	91.67	94.00	91.60
																			31.48																				
MH	60	MH	61		0.62								1.21	1.21					10.00	76.81	104.19	122.14	92.67			92.67	CONC	525	533.4	0.30	67.5	245.74	62%	1.10	1.02	97.45	96.93	97.25	96.73
MH	61	MH	62		0.41								0.80	2.00					11.02	73.09	99.08	116.12	146.50			146.50	CONC	675	685.8	0.30	67.5	480.32	69%	1.30	0.87	97.25	96.58	97.05	96.38
MH	62	MH	63		0.44								0.86	2.86					11.89	70.24	95.18	111.52	200.93			200.93	CONC	750	762.0	0.30	86.0	636.13	68%	1.39	1.03	97.05	96.30	96.79	96.04
MH	63	MH	64		0.21								0.41	3.27					12.92	67.17	90.96	106.56	219.60			219.60	CONC	825	838.2	0.30	67.0	820.21	73%	1.49	0.75	96.79	95.97	96.59	95.77
MH	64	MH	65		0.38								0.74	4.01					13.67	65.10	88.13	103.23	260.97			260.97	CONC	825	838.2	0.30	67.0	820.21	68%	1.49	0.75	96.59	95.77	96.39	95.57
MH	65	MH	181											4.01					14.42	63.18	85.49	100.12	253.27			253.27	CONC	825	838.2	0.30	17.5	820.21	69%	1.49	0.20	96.39	95.57	96.34	95.52
																			14.61																				

FUTURE STORM SEWERS FOR 195 HUNTMAR DRIVE

PROPOSED STORM SEWERS TO NORTH FOREBAY

PROPOSED STORM SEWERS TO SOUTH FOREBAY

STORM SEWER COMPUTATION FORM

DESIGNED BY: AGS
CHECKED BY: AGS

130 Huntmar Drive
Lioness Development Inc.
191002
Atrel Engineering Ltd
February, 2020

Restricted Flow
RATIONAL METHOD Q= 2.78 AIR
PVC/CONC N= 0.013
CSP N= 0.024
CORR N= 0.021

Table 9

LOCATION															PIPE SEWER DATA									UpStream		DwStream	
FROM (Up)		TO (Down)		2 Year			5 Year				10 Year		Restricted Flow (L/S)	**ACTUAL PIPE FLOW (L/S)**	TYPE	DIA. (N0M) (mm)	(ACT)	SLOPE (%)	LENGTH (M)	CAP. (L/S)	Remaining Capacity (%)	VEL. (M/S)	TIME OF FLOW (MIN)	Obv. (M)	Inv. (M)	Obv. (M)	Inv. (M)
				0.65	0.70	0.80	0.40	0.60	0.70	0.80	0.70	0.80																
MH	416	MH	101			7.60	5.78						1967.94	1967.94	CONC	1200	1219.2	0.30	350.0	2227.75	12%	1.91	3.06	100.04	98.84	98.99	97.79
MH	101	MH	102		0.77								261.80	2229.74	CONC	1350	1371.6	0.30	102.0	3049.82	27%	2.06	0.82	98.99	97.64	98.68	97.33
MH	102	MH	103		0.94								319.60	2549.34	CONC	1350	1371.6	0.30	102.0	3049.82	16%	2.06	0.82	98.58	97.23	98.27	96.92
MH	103	MH	104		1.05					4.04			1293.14	3842.48	CONC	1650	1676.4	0.30	100.0	5208.04	26%	2.36	0.71	97.84	96.19	97.54	95.89
MH	104	MH	105											3842.48	CONC	1650	1676.4	0.30	13.0	5208.04	26%	2.36	0.09	96.83	95.18	96.79	95.14
MH	105	MH	132		0.42								142.80	3985.28	CONC	1650	1676.4	0.30	74.0	5208.04	23%	2.36	0.52	96.76	95.11	96.54	94.89
MH	110	MH	111		0.78								265.20	265.20	CONC	600	609.6	0.30	87.0	350.85	24%	1.20	1.21	98.48	97.88	98.22	97.62
MH	111	MH	112		0.13			0.74					172.80	438.00	CONC	750	762.0	0.30	11.0	636.13	31%	1.39	0.13	98.22	97.47	98.19	97.44
MH	112	MH	116											438.00	CONC	750	762.0	0.30	71.5	636.13	31%	1.39	0.85	98.16	97.41	97.95	97.20
MH	115	MH	116		0.45								153.00	153.00	CONC	450	457.2	0.30	95.0	162.91	6%	0.99	1.60	98.40	97.95	98.11	97.66
MH	116	MH	121		0.24								81.60	672.60	CONC	825	838.2	0.30	54.5	820.21	18%	1.49	0.61	97.95	97.13	97.79	96.97
MH	120	MH	121		0.25								85.00	85.00	PVC	375	366.4	0.35	64.5	97.52	13%	0.92	1.16	98.37	98.00	98.14	97.77
MH	121	MH	127		0.55								187.00	944.60	CONC	900	914.4	0.30	82.0	1034.42	9%	1.58	0.87	97.79	96.89	97.54	96.64
MH	125	MH	126		0.62		0.71						271.15	271.15	CONC	600	609.6	0.30	109.5	350.85	23%	1.20	1.52	98.32	97.72	97.99	97.39
MH	126	MH	127											271.15	CONC	600	609.6	0.30	40.0	350.85	23%	1.20	0.55	97.99	97.39	97.87	97.27
MH	127	MH	132		0.56								190.40	1406.15	CONC	1050	1066.8	0.30	85.0	1560.35	10%	1.75	0.81	97.54	96.49	97.28	96.23
MH	130	MH	131		0.57								193.80	193.80	CONC	525	533.4	0.30	67.5	245.74	21%	1.10	1.02	98.07	97.55	97.87	97.35
MH	131	MH	132		0.51								173.40	367.20	CONC	675	685.8	0.30	83.0	480.32	24%	1.30	1.06	97.58	96.91	97.33	96.66
MH	132	MH	133		0.23								78.20	5836.84	CONC	1800	1828.8	0.30	76.0	6568.16	11%	2.50	0.51	96.54	94.74	96.31	94.51
MH	133	MH	170											5836.84	CONC	1800	1828.8	0.30	67.5	6568.16	11%	2.50	0.45	96.05	94.25	95.85	94.05
MH	135	MH	170			1.21					0.40		438.50	438.50	CONC	675	685.8	0.30	120.0	480.32	9%	1.30	1.54	96.10	95.43	95.74	95.07
MH	410	MH	140			5.88							2445.42	2445.42	CONC	1500	1524.0	0.15	92.0	2856.14	14%	1.57	0.98	99.29	97.79	99.15	97.65

STORM SEWER COMPUTATION FORM

130 Huntmar Drive — Restricted Flow — Table 9

DESIGNED BY: AGS
CHECKED BY: AGS

Lioness Development Inc.
191002
Atrel Engineering Ltd
February, 2020

RATIONAL METHOD Q= 2.78 AIR
PVC/CONC N= 0.013
CSP N= 0.024
CORR N= 0.021

LOCATION															PIPE SEWER DATA									UpStream		DwStream	
FROM		TO		2 Year			5 Year				10 Year		Restricted	**ACTUAL PIPE**	TYPE	DIA.		SLOPE	LENGTH	CAP.	Remaining	VEL.	TIME OF	Obv.	Inv.	Obv.	Inv.
(Up)		(Down)		0.65	0.70	0.80	0.40	0.60	0.70	0.80	0.70	0.80	Flow (L/S)	**FLOW (L/S)**		(N0M)	(ACT)	(%)	(M)	(L/S)	Capacity (%)	(M/S)	FLOW (MIN)	(M)	(M)	(M)	(M)
MH	140	MH	142								0.15		51.00	2496.42	CONC	1500	1524.0	0.30	61.5	4039.18	38%	2.21	0.46	99.15	97.65	98.97	97.47
MH	141	MH	142		0.65								221.00	221.00	CONC	525	533.4	0.30	100.5	245.74	10%	1.10	1.52	98.59	98.07	98.29	97.77
MH	142	MH	144								0.26		88.40	2805.82	CONC	1500	1524.0	0.30	77.5	4039.18	31%	2.21	0.58	98.29	96.79	98.06	96.56
MH	143	MH	144		0.65								221.00	221.00	CONC	600	609.6	0.30	99.5	350.85	37%	1.20	1.38	98.51	97.91	98.21	97.61
MH	144	MH	152								0.27		91.80	3118.62	CONC	1500	1524.0	0.30	82.0	4039.18	23%	2.21	0.62	98.06	96.56	97.81	96.31
MH	145	MH	146		0.57								193.80	193.80	CONC	525	533.4	0.30	112.0	245.74	21%	1.10	1.70	98.97	98.45	98.63	98.11
MH	146	MH	151		0.42								142.80	336.60	CONC	675	685.8	0.30	82.0	480.32	30%	1.30	1.05	98.51	97.84	98.26	97.59
MH	150	MH	151												PVC	300	299.2	0.30	40.5	52.60	100%	0.75	0.90	98.48	98.18	98.36	98.06
MH	151	MH	152		0.88								299.20	635.80	CONC	825	838.2	0.30	106.0	820.21	22%	1.49	1.19	98.26	97.44	97.94	97.12
MH	152	MH	156								0.28		95.20	3849.62	CONC	1650	1676.4	0.30	86.0	5208.04	26%	2.36	0.61	97.81	96.16	97.55	95.90
MH	155	MH	156		0.66	1.77							666.90	666.90	CONC	825	838.2	0.30	117.5	820.21	19%	1.49	1.32	98.36	97.54	98.01	97.19
MH	156	MH	157								0.47		159.80	4676.32	CONC	1650	1676.4	0.30	70.0	5208.04	10%	2.36	0.49	97.55	95.90	97.34	95.69
MH	157	MH	165											4676.32	CONC	1650	1676.4	0.30	74.0	5208.04	10%	2.36	0.52	96.88	95.23	96.66	95.01
MH	160	MH	161			1.01					0.50		422.50	422.50	CONC	750	762.0	0.30	105.0	636.13	34%	1.39	1.25	96.76	96.01	96.44	95.69
MH	161	MH	162								0.57		193.80	616.30	CONC	825	838.2	0.30	120.0	820.21	25%	1.49	1.35	96.44	95.62	96.08	95.26
MH	162	MH	165								0.32		108.80	725.10	CONC	825	838.2	0.30	72.0	820.21	12%	1.49	0.81	96.08	95.26	95.86	95.04
MH	165	MH	166			1.17					0.23		370.70	5772.12	CONC	1800	1828.8	0.30	83.5	6568.16	12%	2.50	0.56	95.86	94.06	95.61	93.81
MH	166	MH	170								0.24		81.60	5853.72	CONC	1800	1828.8	0.30	85.0	6568.16	11%	2.50	0.57	95.61	93.81	95.35	93.55
MH	170	MH	171											12129.06	CONC	2400	2438.4	0.30	113.5	14145.35	14%	3.03	0.62	95.05	92.65	94.71	92.31
MH	171	MH	172											12129.06	CONC	2400	2438.4	0.30	96.0	14145.35	14%	3.03	0.53	94.68	92.28	94.39	91.99
MH	172	MH	173											12129.06	CONC	2400	2438.4	0.30	96.0	14145.35	14%	3.03	0.53	94.39	91.99	94.10	91.70
MH	173	MH	174											12129.06	CONC	2400	2438.4	0.30	24.0	14145.35	14%	3.03	0.13	94.07	91.67	94.00	91.60
MH	60	MH	61		0.62								210.80	210.80	CONC	525	533.4	0.30	67.5	245.74	14%	1.10	1.02	97.45	96.93	97.25	96.73
MH	61	MH	62		0.41								139.40	350.20	CONC	675	685.8	0.30	67.5	480.32	27%	1.30	0.87	97.25	96.58	97.05	96.38
MH	62	MH	63		0.44								149.60	499.80	CONC	750	762.0	0.30	86.0	636.13	21%	1.39	1.03	97.05	96.30	96.79	96.04
MH	63	MH	64		0.21								71.40	571.20	CONC	825	838.2	0.30	67.0	820.21	30%	1.49	0.75	96.79	95.97	96.59	95.77
MH	64	MH	65		0.38								129.20	700.40	CONC	825	838.2	0.30	67.0	820.21	15%	1.49	0.75	96.59	95.77	96.39	95.57
MH	65	MH	181											700.40	CONC	825	838.2	0.30	17.5	820.21	15%	1.49	0.20	96.39	95.57	96.34	95.52

FUTURE STORM SEWERS FOR 195 HUNTMAR DRIVE

PROPOSED STORM SEWERS TO NORTH FOREBAY

PROPOSED STORM SEWERS TO SOUTH FOREBAY

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February 11, 2020 Project Number: P1801

Atrel Engineering Ltd
1-2884 Chamberland Street
Rockland, ON
K4K 1M6

Attention: **Jean Décoeur, P.Eng**

Subject: **130 Huntmar Drive / Preliminary Kanata West Pond 4 Sizing**

Introduction

J.F. Sabourin and Associates Inc. (JFSA) were retained by Atrel Engineering Ltd. (Atrel) to complete a preliminary stormwater analysis for the 26 ha proposed residential/commercial development, located at 130 Huntmar Drive, Stittsville Ontario. The proposed development will discharge to an existing Stormwater Management (SWM) pond located on the west bank of the Carp River just south of Palladium Drive, which is referred to as Pond 4. Runoff from the proposed development will be conveyed to Pond 4 though a proposed stormwater trunk sewer, in conjunction with major system flow routes directly from the development to the SWM pond. The proposed trunk sewer will also convey minor system flow from the approximately 33.8 ha future residential and commercial developments west of Huntmar Drive. As these lands will also discharge to Pond 4, they have also been included in this analysis. The intention of this memo is to quantify the impacts that the proposed developments (both east and west of Huntmar Drive) will have on the operations of Pond 4 and on the greater Carp River watershed. It is expected that the abovementioned developments will require that the current Pond 4 SWM facility will have to be upsized and the proposed outlet configuration adjusted to ensure no adverse impacts to the surrounding area. The following memo details this analysis and proposed upgrading of the Pond 4.

Model Overview

Base Model

The proposed development sites are within the Carp River watershed and are captured in the City of Ottawa's existing PCSWMM models of the Carp River; these models were provided to JFSA by the City on May 11, 2017. It has been confirmed by City staff that these models have not been officially updated by the City since February 24, 2017. On February 6, 2019, JFSA updated the City's Ultimate conditions model as a part of a study for Kanata West Pond 7, full details of this analysis and changes made to the City's original PCSWMM model are documented in JFSA's report title "Preliminary Kanata West Pond 7 Sizing". As this study proposed diverting a portion of the runoff from the developments west of Huntmar Drive, originally earmarked to all to discharge to pond 4, to pond 7, the PCSWMM Model updated by JFSA in February 2019 (CarpUltimate_FullRestoration_D2) has been used as the base for developing the proposed conditions for the following study.

Subcatchments

The proposed development is contained within existing model subcatchments areas PS201, PS202 and PS20. These catchments were clipped and replaced with the smaller more refined subcatchments as outlined in Atrel's drawing titled "Macro Storm Drainage Area Plan" and David Schaeffer Engineering Limited (DSEL) drawing titled "Kanata West – 195 Huntmar Drive Conceptual Storm Servicing Plan", both figures have been provided in Attachment A. Small refinements had to be made to neighbouring subcatchments within the PCSWMM model to ensure that the existing and proposed drainage boundaries conformed. The parameters of both the new and the existing subcatchments were updated accordingly. Attachment B provides figures outlining the PCSWMM model as per the CarpUltimate_FullRestoration_D2 model developed by JFSA in Feb 2019, and the updated model discussed in this report.

In reviewing and updating the subcatchments in the PCSWMM model it was noted that approximately 5.7 ha of the existing Canadian Tire Centre Carpark located southeast of the intersection of Huntmar Drive and Palladium Drive, was miss identified as draining to Pond 4 under the City's Ultimate conditions model. Based on the storm sewer data provided on GeoOttawa, this carpark discharges to the existing storm sewer that runs west to east along Palladium Drive. It was also noted that the GIS area for this catchment (PS207) was approximately 5.58 ha smaller than what had been applied in the city's model. Indicating that the City may have already identified that this carpark area drains to the storm sewer running along Palladium Drive but did not bother updating the GIS area in the model. As all the neighbouring GIS and modelled subcatchment areas match up well, this disconnect between GIS and modelled area for catchment PS207 results in the City's Carp River Ultimate model overestimating the total drainage area at this location by approximately 5.8 ha. Further investigation of the neighbouring catchments also found that the City's Ultimate model under-represented the total drainage area for the lands just south of Pond 4 (subcatchment PS207) by approximately 0.2 ha. Accordingly, all subcatchments surrounding the subject area have been rectified in the latest modelling work to ensure that the GIS and modelled catchment areas align.

Within the proposed development area, the runoff coefficients as indicated in the drawings by Atrel and DSEL were converted to percent impervious values and applied to the latest model. For subcatchments less than 0.5 ha, the subcatchment width was calculated by taking the subcatchment area divided by the average maximum overland flow length. For catchments greater than 0.5 ha, the width was calculated as $\sqrt{(Area/1.5)}$. The depression storage, pervious and impervious manning's values, as well as soil parameters for all these subcatchments were set as per the original parameters specified in the City's Ultimate PCSWMM model at their respective locations.

Minor System

The proposed stormwater trunk sewer that will pass through the proposed development to Pond 4 has been included in the latest modelling. All key pipe parameters such as length, diameter, slope, material, and loss coefficients have been included in this model, as per preliminary designs as provided by Atrel and DSEL. Note that the current plan is a preliminary design and may be subject to future refinements. Locations where the proposed development will connect to the existing trunk sewer along Maple Grove Road, draining to Pond 4, have also been included in the model. Note that based on the Kanata West Master Servicing Study (KWMSS) completed by Stantec in June 2006, it was assumed that 10.67 ha of the proposed Huntmar development would drain to the existing Maple Grove Storm sewer at a rate of 85 L/s/ha (max flow 907 L/s). Under the latest design, a total of 4.40 ha will drain to the existing Maple Road Grove storm sewer. The 2.34 ha school block will have on-site controls and release at 85 L/s/ha (max flow 199 L/s) and the 2.06 ha of residential lands will release at a rate of 340 L/s/ha (max flow 700 L/s) with major system storage represented explicitly in the model road network. The design presented in this report proposes that the total maximum flow to the existing Maple Grove Road storm sewer from these development lands will be 899 L/s, 8 L/s less than that stipulated by the KWMSS. Note that the model used in this report is a simplest lumped model, and a more detailed hydrologic and hydraulic analysis of the Maple Grove Road trunk sewer should be completed at detailed design.

Major System

Major system conveyance routes and storage has been accounted for in this model based on preliminary site grading plans for both developments east and west of Huntmar Drive as per designs by Atrel and DSEL. Generic road cross-section profiles have been applied to the model, based on allowed right of way widths allocated at the various locations. In locations where major system flow occurs through natural ditches, triangular cross-sections with 3:1 slope have been assumed.

Major/Minor Linking

Runoff from the subcatchments was applied directly to the closest applicable major systems node within the model. These nodes would apply a depth/flow rating curve (using an outlet link) connecting the flow from the streets to the minor system. The flow values applied in these rating curves were set based on the level of service provided at each respective location. For the lands east of Huntmar drive the level of service is specified as per Atrel's "Drainage Area Plan" Drawing, with residential lands releasing at 340 L/s/ha, commercial lands releasing at 250 L/s/ha with on-site controls and the proposed school block releasing at 85 L/s/ha. For the lands west of Huntmar Drive these rating curves were set based on the level of service provided at each respective location; with a 2-year minor system level of service provided on local roads, 5-year on collector roads, and 10-year on arterial. For the larger subcatchment areas, the level of service provided in the model was taken as specified in Atrel and DSEL's drawings.

On-Site Storage

The proposed on-site storage for the school, park and commercial lots has been approximated using the PCSWMM model. It was assumed that the commercial lots will be restricted to 250 L/s/ha, and the Park and School blocks restricted to 85 L/s/ha with the subsequent maximum on-site storage volume calculated using the 100 Year 3 Hour Chicago Storm. From this analysis it was found that the school block will require approximately 205 m^3/ha of on-site storage, the commercial lands will require approximately 145 m^3/ha - 165 m^3/ha of on-site storage, and the park block will require approximately 88 m^3/ha of on-site storage. This on-site storage has been included in the Carp River model.

SWM Pond

To ensure that the proposed developments do not have any adverse effect on existing stormwater infrastructure or on the greater Carp River watershed, the Pond 4 stage/storage curve and outlet rating curve have been adjusted to mitigate any impacts. This was completed through an iterative process, of adjusting the pond storage and outlets structure sizes until all events closely match the peak water levels from the City's Carp Ultimate model, at key locations along the watercourse. Note the previous PCSWMM models for the pond outlet used a single rating curve derived from the summation of various weir and orifice calculations. For transparency and ease for future updates, that latest model has been updated to represent each proposed orifice and weir out of Pond 4, through individual links in the model.

The stage/storage curve that is currently physically in place at Pond 4 was developed by JFSA and DSEL, as an interim condition in December 2014, with full details of the design documented in JFSA's December 2014 Pond 4 Pond Design brief. The interim curve outlined in the 2014 report has been taken and applied to the latest PCSWMM model, with the pond stage/storage curve iteratively increased until a working solution was obtained.

From this analysis, it was found that the SWM Pond "Pond 4" currently has a maximum storage capacity of approximately 46,500 m^3 and will need to be upsized by approximately 55% to accommodate the proposed Huntmar developments. This equates to approximately 25,600 m^3 of additional storage volume that needs to be provided to the existing pond, taking the proposed maximum available storage capacity to approximately 72,100 m^3.

A similar analysis was completed by JFSA in February 2019 titled "Preliminary Kanata West Pond 7 Sizing", which indicated that the capacity of Pond 4 needed to be increased by approximately 60% from its existing condition to accommodate the proposed Huntmar developments. Although this study assumed the total drainage area to Pond 4 was 6 ha larger and the total impervious for the full development area was 4% higher than what has been determined in this analysis. Although this analysis used lumped subcatchments did not account for any on-site storage of attenuation provided by the proposed development.

The stage/storage curve at Pond 4 applied in the City's Ultimate conditions model of the Carp River assumed that this pond would need to be approximately 90% larger than the existing pond in place, and provide a maximum storage volume of 88,000 m^3. Although this analysis assumed that approximately 40 ha of land west of the proposed Palladium Drive extension, that will now drain to Pond 7, discharged to Pond 4. It also assumed that the total impervious for all areas draining to the pond was 2% higher than what has been determined in this analysis.

Boundary Conditions and Hotstart Files

For all events, excluding the 100-year, a normal depth boundary condition has been applied at the downstream extent of the model on the Carp River (node CO001). For the 100-year event, a fixed water level of 92.50 m has been applied at the same location. HotStart files have been created and used for all model simulations as per the procedure outlined by the City of Ottawa in the "PCSWMM HotStart File Memo" dated April 17, 2015.

Model Results

Carp River

Tables 1 to 4 outline the peak flows, total volumes and peak water levels on the Carp River presented in the City's Ultimate Conditions and the updated proposed conditions models, at 4 key locations on the Carp River downstream of the Pond 4.

Table 1: Carp River at Palladium Drive
(Node: CJ150 - 2980.56 ha)

Event	City Ultimate [1]			JFSA Proposed Conditions [2]			Difference [2] - [1]		
	Peak Inflow (m^3/s)	Total Inflow ($1000\ m^3$)	Peak WSE (m)	Peak Inflow (m^3/s)	Total Inflow ($1000\ m^3$)	Peak WSE (m)	Peak Inflow (m^3/s)	Total Inflow ($1000\ m^3$)	Peak WSE (m)
25mm Ch 3Hr	5.5	389	93.05	5.5	326	93.05	0.1	-63	0.00
2 Year SCS 12hr	24.0	669	93.37	23.0	670	93.36	-0.9	1	-0.01
5 Year SCS 12hr	42.5	993	93.61	36.1	988	93.60	-6.4	-5	-0.01
10 Year SCS 12hr	47.0	1,220	93.75	41.4	1,213	93.74	-5.7	-7	-0.01
25 Year SCS 12hr	38.6	1,513	93.91	39.3	1,503	93.90	0.7	-11	-0.01
50 Year SCS 12hr	42.1	1,727	94.02	34.9	1,715	94.01	-7.2	-12	-0.01
100 Year SCS 12hr	35.7	1,947	94.14	37.7	1,931	94.13	2.0	-16	-0.01

Table 2: Carp River at Highway 417
(Node: CJ120 - 3083.32 ha)

Event	City Ultimate Conditions [1]			JFSA Proposed Conditions [2]			Difference [2] - [1]		
	Peak Inflow (m^3/s)	Total Inflow ($1000\ m^3$)	Peak WSE (m)	Peak Inflow (m^3/s)	Total Inflow ($1000\ m^3$)	Peak WSE (m)	Peak Inflow (m^3/s)	Total Inflow ($1000\ m^3$)	Peak WSE (m)
25mm Ch 3Hr	5.2	455	92.66	5.2	375	92.66	0.0	-80	0.00
2 Year SCS 12hr	11.4	729	93.10	11.3	730	93.10	-0.1	1	0.00
5 Year SCS 12hr	17.1	1,063	93.39	16.9	1,058	93.39	-0.2	-5	0.00
10 Year SCS 12hr	21.3	1,298	93.55	20.9	1,291	93.54	-0.4	-7	-0.01
25 Year SCS 12hr	26.0	1,606	93.73	25.6	1,595	93.73	-0.4	-11	-0.01
50 Year SCS 12hr	29.3	1,829	93.85	28.8	1,815	93.84	-0.5	-14	-0.01
100 Year SCS 12hr	32.4	2,057	93.98	31.8	2,039	93.96	-0.6	-18	-0.01

Table 3: Carp River at Confluence with Feed Mill Creek
(Node: CJ108 - 4259.23 ha)

Event	City Ultimate Conditions [1]			JFSA Proposed Conditions [2]			Difference [2] - [1]		
	Peak Inflow (m^3/s)	Total Inflow (1000 m^3)	Peak WSE (m)	Peak Inflow (m^3/s)	Total Inflow (1000 m^3)	Peak WSE (m)	Peak Inflow (m^3/s)	Total Inflow (1000 m^3)	Peak WSE (m)
25mm Ch 3Hr	6.0	546	92.46	6.0	459	92.46	0.0	-87	0.00
2 Year SCS 12hr	14.4	925	92.92	14.3	926	92.92	0.0	2	0.00
5 Year SCS 12hr	22.3	1,365	93.21	22.2	1,362	93.21	-0.2	-3	0.00
10 Year SCS 12hr	28.0	1,675	93.36	27.7	1,671	93.36	-0.3	-5	-0.01
25 Year SCS 12hr	34.9	2,080	93.54	34.5	2,072	93.54	-0.4	-8	-0.01
50 Year SCS 12hr	39.5	2,371	93.65	39.1	2,361	93.64	-0.4	-10	-0.01
100 Year SCS 12hr	44.4	2,674	93.78	44.0	2,650	93.78	-0.5	-24	-0.01

Table 4: Carp River at Richardson Side Road
(Node: CJ050 - 4711.54 ha)

Event	City Ultimate Conditions [1]			JFSA Proposed Conditions [2]			Difference [2] - [1]		
	Peak Inflow (m^3/s)	Total Inflow (1000 m^3)	Peak WSE (m)	Peak Inflow (m^3/s)	Total Inflow (1000 m^3)	Peak WSE (m)	Peak Inflow (m^3/s)	Total Inflow (1000 m^3)	Peak WSE (m)
25mm Ch 3Hr	5.7	685	92.12	5.7	556	92.12	0.0	-129	0.00
2 Year SCS 12hr	12.9	1,052	92.57	12.9	1,055	92.57	0.0	2	0.00
5 Year SCS 12hr	20.2	1,518	92.85	20.1	1,516	92.85	-0.1	-2	0.00
10 Year SCS 12hr	25.0	1,851	93.03	24.8	1,846	93.03	-0.2	-4	0.00
25 Year SCS 12hr	32.8	2,287	93.18	32.6	2,279	93.18	-0.2	-8	0.00
50 Year SCS 12hr	37.4	2,601	93.29	37.2	2,591	93.29	-0.2	-10	-0.01
100 Year SCS 12hr	43.5	3,001	93.46	43.2	2,977	93.45	-0.3	-24	-0.01

From this analysis, it is seen that the proposed Pond 4 upgrade detailed in this report results in peak flows on the Carp River to be slightly less than that set by the City's Ultimate condition model, with the proposed developments resulting in slight reductions or no change on the peak water levels on the Carp River. It should be noted that from this analysis it was found that for the 100-Year 12-hour SCS event peak flows out of the Pond 4 occurs at around 6 hours and 10 minutes into the event, while the peak flow on the Carp River at the Pond 4 outlet occurs at around 11 hours and 40 minutes into the event. Due to the 5.5-hour difference in timing of peaks between Pond 4 and the Carp River, there are no peak water level increases observed on the Carp River with the proposed development implemented.

Pond 4

Tables 5 outlines the peak flows, total volumes and peak water levels in Pond 4 presented in the City's ultimate conditions and the currently proposed conditions.

Table 5: SWM Pond 4
(Node: PSto201 - 241.30 ha)

Event	City Ultimate Conditions [1]			JFSA Proposed Conditions [2]			Difference [2] - [1]		
	Peak Inflow (m^3/s)	Total Inflow (1000 m^3)	Peak WSE (m)	Peak Inflow (m^3/s)	Total Inflow (1000 m^3)	Peak WSE (m)	Peak Inflow (m^3/s)	Total Inflow (1000 m^3)	Peak WSE (m)
25mm Ch 3Hr	10.6	42	94.06	14.8	38	94.14	4.2	-4	0.08
2 Year SCS 12hr	15.2	85	94.35	15.8	78	94.36	0.5	-7	0.01
5 Year SCS 12hr	20.8	120	94.48	21.2	108	94.46	0.4	-12	-0.02
10 Year SCS 12hr	23.3	143	94.57	24.5	127	94.52	1.2	-16	-0.05
25 Year SCS 12hr	26.3	172	94.63	28.5	151	94.61	2.3	-21	-0.02
50 Year SCS 12hr	28.1	192	94.66	31.7	167	94.66	3.6	-24	-0.01
100 Year SCS 12hr	31.0	211	94.70	34.8	183	94.70	3.9	-28	0.00

From this analysis, it is seen that the peak flows into the pond are generally slightly higher than that approximated by the City's Ultimate model due to the greater discretization of subcatchment areas, with the total inflow volume less due to the reduction in total drainage area to the pond (approximately 33,000 m^3 less for the 100-year event). The pond has been sized to ensure that the peak proposed 100-Year water level in the pond does not exceed the elevation determined in the City's Ultimate condition. It is noted that there is a minor increase in the pond peak water levels for the 25mm and 2-year events, which can be rectified at detailed design though slight adjustments to the pond stage/area curve or the outlet configuration.

Maple Grove Storm Sewer

The City's Ultimate condition model includes a simplistic representation of the existing stormwater trunk sewer to Pond 4 that runs west to east along Maple Grove Drive. Under the currently proposed design, approximately 4.4 ha of the Huntmar Development will discharge to this sewer and has been represented accordingly in this model.

The City's ultimate conditions model assumed that approximately 14 ha of the proposed development would discharge to this truck sewer. Table 6 below outlines the peak flows, total volumes and peak water levels on the existing storm sewer under the City's Ultimate Conditions and currently proposed conditions at model Node PJ206, which is located near the City of Ottawa's Maple Grove Depot at 1655 Maple Grove Road. Note that the results provided below are simply a comparison between the results outlined in the City's Ultimate condition model against the currently proposed conditions. A more comprehensive analysis of the lands draining to the Maple Grove Road trunk sewer and the truck sewers hydraulic operation under future conditions should be completed at detailed design.

Table 6: Maple Grove Drive Existing Minor System
(Node: PJ206 - 139.93.96 ha)

Event	City Ultimate Conditions [1]			JFSA Proposed Conditions [2]			Difference [2] - [1]		
	Peak Inflow (m^3/s)	Total Inflow (1000 m^3)	Peak WSE (m)	Peak Inflow (m^3/s)	Total Inflow (1000 m^3)	Peak WSE (m)	Peak Inflow (m^3/s)	Total Inflow (1000 m^3)	Peak WSE (m)
25mm Ch 3Hr	6.8	23	94.17	6.3	21	94.14	-0.5	-2	-0.03
2 Year SCS 12hr	9.1	48	94.55	8.3	45	94.63	-0.8	-4	0.08
5 Year SCS 12hr	12.5	68	94.95	11.2	63	95.07	-1.4	-5	0.12
10 Year SCS 12hr	15.1	81	95.06	12.7	75	95.28	-2.3	-6	0.22
25 Year SCS 12hr	17.8	97	95.31	14.7	90	95.57	-3.1	-7	0.25
50 Year SCS 12hr	19.6	108	95.69	16.5	100	95.81	-3.1	-8	0.12
100 Year SCS 12hr	22.3	119	96.11	18.6	109	96.08	-3.7	-9	-0.02

From this analysis, it was shown that under the proposed conditions for the 100-year event the peak water level at the Maple Grove trunk sewer is approximately 2 cm lower than that approximated from the City's ultimate conditions model. For the lower return periods, the peak water levels are sometimes higher and sometimes lower (which may be due to instabilities in the existing PCSWMM model), although the total volume and peak inflows are lower under proposed conditions for all events simulated. As stated before, this model is a simplistic representation of the Maple Grove trunk sewer and a more comprehensive analysis of the future operations of the Maple Grove trunk sewer will need to be completed at detailed design.

Summary

The city of Ottawa's PCSWMM Ultimate conditions model of the Carp River has been updated to reflect the proposed developments east and west of Huntmar Drive. From this analysis, it was found that the SWM Pond "Pond 4" currently has a maximum storage capacity of approximately 46,500 m³ which will need to be upsized by approximately 55% to accommodate the proposed Huntmar developments. This equates to approximately 25,600 m³ of additional storage volume needed to be provided to the existing pond, taking the proposed maximum available storage capacity to approximately 72,100 m³. To ensure that the proposed development and pond upsizing would not have any adverse impacts on the Carp River or on existing storm sewer infrastructure comparisons were completed against the results obtained from the City's Ultimate condition model and the updated proposed conditions model. This analysis confirmed that downstream of Pond 4 on the Carp River, there will be no increases in peak water levels for all design storms under the latest design.

The updated analysis indicated that the peak flows into pond 4 are slightly higher than that approximated by the City's Ultimate model, with the total inflow volume lower due to the reduction in total drainage area to the pond than previously assumed, due to proposed partial diversion of flows to Pond 7. Pond 4 has been sized to ensure that the peak proposed 100-Year water level in the pond does not exceed the elevation determined in the City's Ultimate conditions model, although it should be noted that there is a minor increase in the pond peak water levels for the 25mm and 2-Year events, which can be rectified at detailed design.

The City's Ultimate condition model includes a simplistic representation of the existing stormwater trunk sewer to Pond 4 that runs west to east along Maple Grove Drive. From this analysis, it was shown that under the proposed conditions for the 100-year event the peak water level at the Maple Grove trunk sewer is approximately 2 cm lower than that approximated from the City's Ultimate conditions model, although for the lower return periods, the peak water levels are higher under the latest proposed conditions, yet the peak flows and total volume are lower for all events. Given the simplistic nature of the representation of this sewer in the model, a more comprehensive analysis of the future operations of the Maple Grove trunk sewer will need to be completed at detailed design, using more detailed hydrologic and hydraulic models.

Respectfully submitted,

J.F Sabourin and Associates Inc.

Jonathon Burnett, P.Eng

Water Resources Engineer, JFSA

cc: J.F Sabourin, M.Eng, P.Eng

Director of Water Resources Projects

Attachment A: Proposed Development Drainage Areas (Atrel & DSEL)

Attachment B: PCSWMM Model Overview

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Attachment A

Proposed Development Drainage Areas (Atrel & DSEL)

LEGEND

- 5 YEAR, 0.70ha, R=0.20 — MINOR SYSTEM CAPTURE RATE
- FUTURE STORM DRAINAGE AREA
- RUNOFF COEFFICIENT
- PROPOSED STORM SEWER
- DRAINAGE AREA BOUNDARY
- MAJOR DRAINAGE SYSTEM
- EXISTING STORM SEWER
- OUTSIDE PROPOSED DEVELOPMENT
- NW=98.00, SE=97.40, SW=97.66 — PROPOSED OBVERT ELEVATION
- 146 — PROPOSED MANHOLE NUMBER

PALLADIUM DRIVE
EXISTING DITCH
MAJOR FLOW ROUTE TO POND
POND 4
HUNTMAR DRIVE
MAPLE GROVE ROAD
STREET No. 1
STREET No. 2
STREET No. 3
STREET No. 4
STREET No. 5
STREET No. 6
MONCAO LANE
GALLEON LANE
HARMATTAN AVENUE
ROSSNEL AVENUE
KOHLO CRESCENT
HEMA CIRCLE
CASCADE LANE

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.

STREET MAP

No.	REVISION △-APPLIES WHEN DRAWING MODIFIED	DATE	BY

SCALE
1 : 2 500
40m 0 60m
HORIZONTAL

DESIGN	AGS
CHECKED	JMD
DRAWN	CED
CHECKED	AGS
APPROVED	JMD

LICENSED PROFESSIONAL ENGINEER
A. G. Y. SAUVE
100142393
Feb 12, 2020
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
J.M.J. DECOEUR
Feb 12, 2020
PROVINCE OF ONTARIO

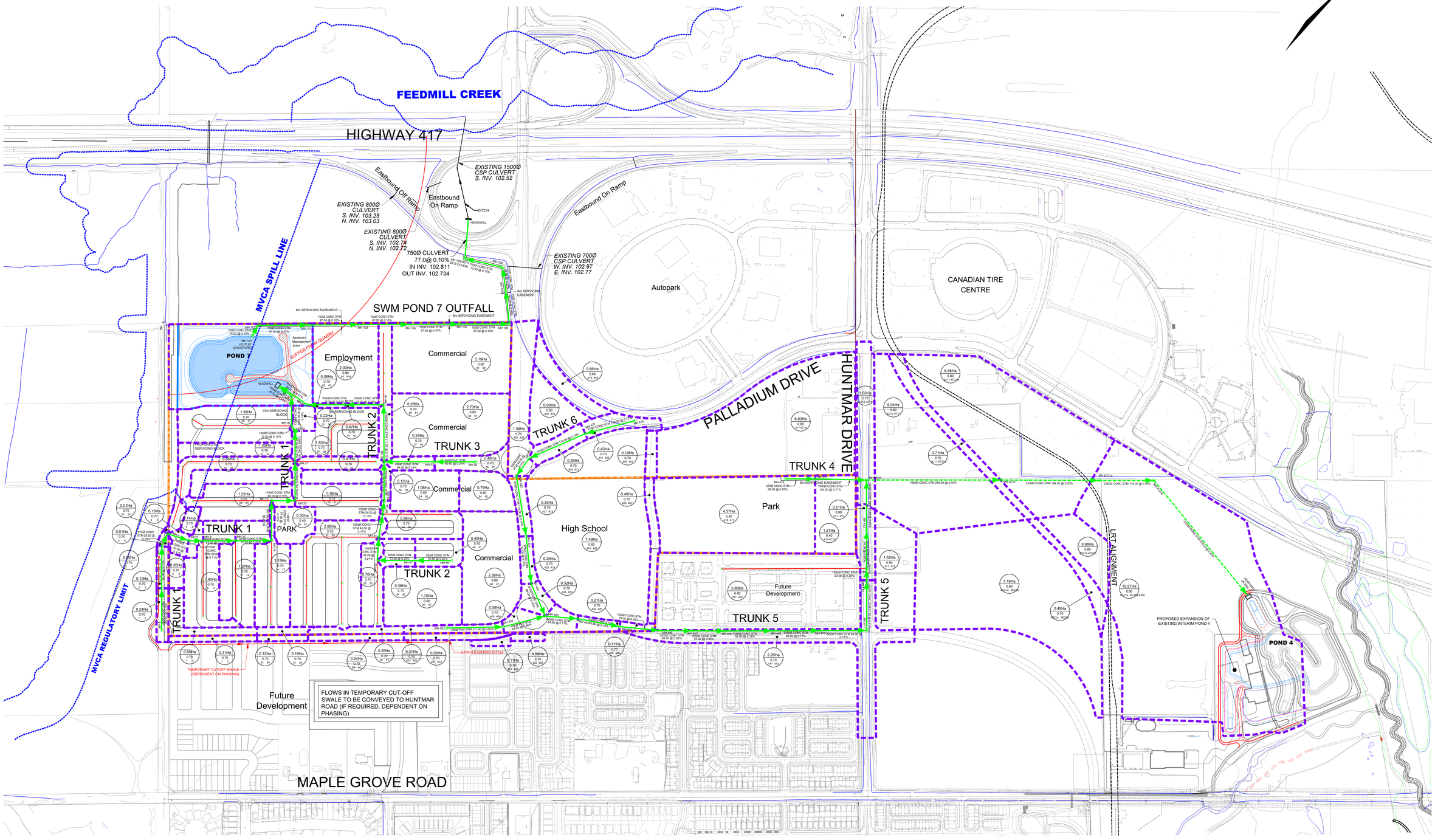
ATREL Engineering Ltd.
Engineers - Ingénieurs
1-2884 CHAMBERLAND STREET, ROCKLAND, ONTARIO K4K 1M6
TEL.: (613) 446-7423

CITY OF OTTAWA
130 HUNTMAR DR.

LIONESS DEVELOPMENT INC.

PROJECT No. 191002
DATE JANUARY 2020
DRAWING No. 191002-STMM

PLAN
MACRO STORM DRAINAGE AREA PLAN



DSEL
david schaeffer engineering ltd

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

LEGEND:

- STUDY LIMIT
- PROPOSED STORM TRUNK
- KWMSS STORM TRUNK
- LOCAL STORM SEWER
- STORM MANHOLE
- STORM TRIBUTARY BOUNDARY
- EXISTING DITCH

DRAINAGE AREAS (HA) / RUNOFF COEFFICIENT / UPSTREAM/DOWNSTREAM MH

KANATA WEST - 195 HUNTMAR DRIVE

CONCEPTUAL STORM SERVICING PLAN

CITY OF OTTAWA

PROJECT No. :	12-624
SCALE	1:2500
DATE:	April 2019
DRAWING No.	2

CITY PLAN No. 17714

CITY FILE No. D07-16-16-0011

J.F. Sabourin and Associates Inc.
52 Springbrook Drive,
Ottawa, ON K2S 1B9
T 613-836-3884 F 613-836-0332

Ottawa. ON
Paris. ON
Gatineau. QC
Montréal. QC
Québec. QC

Attachment B

PCSWMM Model Overview

N

CS063_1
92.8 ha
0%

FS109
49.3 ha
93%

CS267_4
1.9 ha
71%

FS010
9.7 ha
0%

CS113
18.1 ha
88.2%

CS116
7.6 ha
40%

CS129
19.7 ha
95%

CS125
62.5 ha
43.2%

CS127
1 ha
7.1%

CS159
28.3 ha
55.2%

CS247
17 ha
48.2%

CS246_2
15.3 ha
72.6%

CS216
19.7 ha
95%

FS052
5.9 ha
37%

FS019
4.1 ha
70%

FS020
7.3 ha
27%

PS201
3.2 ha
86%

FS111
42.6 ha
92%

FS031
8.1 ha
19.8%

FS022
23.4 ha
95%

CS246
42 ha
20.4%

PS003
3.7 ha
2%

CS177
12.5 ha
0%

FS050_3
49 ha
8.8%

FS043
8.4 ha
15.8%

PS202
106.2 ha
71%

PS207
20.4 ha
81.9%

CS270
61.2 ha
67.7%

CS200_1
4.9 ha
0.9%

FS107
34.5 ha
85%

FS050_1
55.3 ha
6.2%

PS014
8.7 ha
1%

FS058
15.6 ha
10.8%

PS230
26.1 ha
69.4%

PS212
25.2 ha
58.2%

6
1.7 ha
86%

2
4.6 ha
86%

3
1.9 ha
86%

1
11 ha
64%

FS070
7.5 ha
2.6%

FS065_2
28.5 ha
7.6%

CS271
24.3 ha
80.9%

7
3 ha
64%

PS236
1.7 ha
28.3%

PS246
5.1 ha
28.3%

PS223
3.9 ha
58.8%

PS241_1
18.6 ha
57.7%

PS256
4.9 ha
49.9%

FS067_1
40 ha
0%

CS293
3.9 ha
71%

CS251_1
10.5 ha
0%

PS263
4 ha
28.3%

PS259
4 ha
58.1%

PS030
12.6 ha
11%

CS260
76.4 ha
56%

FS067_3
7.7 ha
6.8%

FS081_2
6.9 ha
54%

PS252
17.4 ha
40.9%

FS202_1
4.9 ha
54%

FS081_1
6.7 ha
0%

PS260
5.7 ha
53.9%

CS248_2
59.8 ha
44.6%

FS067_4
6.9 ha
67.8%

FS075_1
58.1 ha
54%

PS241_2
29.3 ha
45.4%

FS206_1
1.7 ha
54%

FS089b
7.1 ha
0%

FS089_1
2.7 ha
0%

FS200_1
4.4 ha
54%

PS043
10.5 ha
52%

FS201_2
13.1 ha
56%

FS202_2
13.3 ha
51%

FS106_1
6.5 ha
45%

FS075_2
21.1 ha
30.3%

PS055
20.8 ha
20%

CS254_2
18.1 ha
40%

CS252
10.5 ha
66%

FS066
70.4 ha
50%

FS089a
7.2 ha
0%

PS067
8 ha
46%

PS056
11.9 ha
41.2%

PS070_2
6.3 ha
47%

FS206_2
8.8 ha
54%

FS201_1
2.8 ha
57%

CS254_1
47.2 ha
46.7%

FS103_2b
9.7 ha
65%

FS203a
4.7 ha
54%

PS117_1
42.8 ha
49%

FS103_2a
7.4 ha
27.9%

FS203b
9 ha
95%

FS200_2
5.5 ha
93%

PS060_1
20.5 ha
9%

PS070_1
1.5 ha
44%

PS057
18.9 ha
49%

Legend

- Junctions
- Conduits
- Outfalls
- Storages

Subcatchments

- Carp River
- Poole Creek
- Pond 4
- Feedmill Creek

J.F. Sabourin and Associates Inc.
WATER RESOURCES AND ENVIRONMENTAL CONSULTANTS
52 Springbrook Drive
Ottawa, ON, K2S 1B9
(613) 836-3884
www.jfsa.com

SCALE : 1:12500

0 250 500 750 m

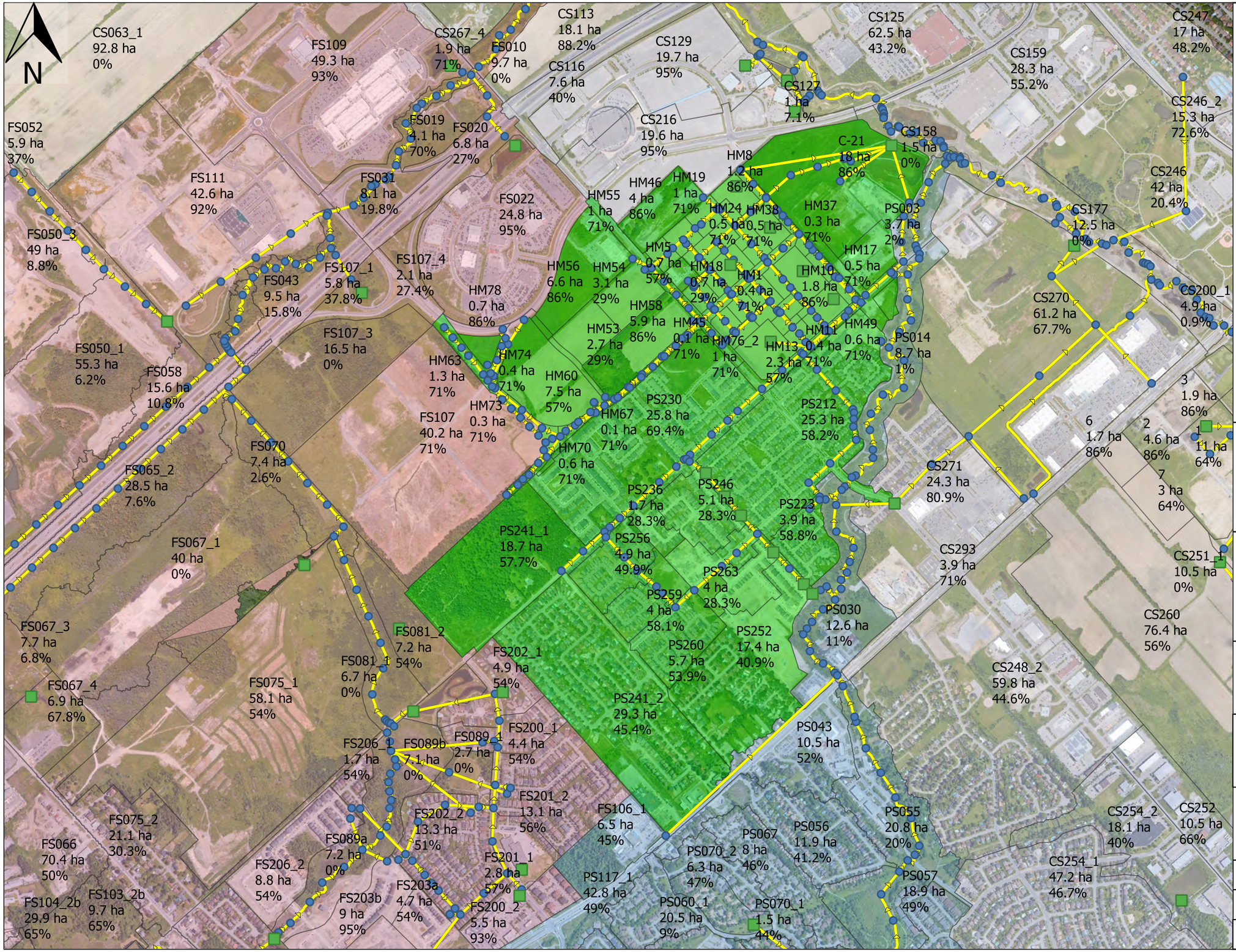
PROJECT :

130 Huntmar Drive /

TITLE :

Figure B1:
City Ultmaite Conditions Model

PROJECT	1801-19
DRAWN:	JB
DATE:	FEB 2020



Legend

- Junctions
- Conduits
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Subcatchments

- Carp River
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SCALE : 1:12500

0 250 500 750 m

PROJECT :

130 Huntmar Drive /

TITLE :

Figure B2:
City Ultmaite Conditions Model

PROJECT	1801-19
DRAWN:	JB
DATE:	FEB 2020