Kollaard Associates
Engineers
210 Prescott Street, Unit 1
P.O. Box 189
Kemptville, Ontario K0G 1J0

Civil • Geotechnical •
Structural • Environmental •
Hydrogeology •

(613) 860-0923
FAX: (613) 258-0475

SERVICING AND STORMWATER MANAGEMENT REPORT

16-20 HAMILTON AVENUE NORTH OTTAWA, ONTARIO

Prepared For:
Independent Development Group
88 Spadina Ave
Ottawa, Ontario
K1Y 2C1

PROJECT #: 180711

DISTRIBUTION
6 copies – City of Ottawa
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1 INTRODUCTION

Kollaard Associates was retained by Independent Development Group to complete a Site Servicing and Stormwater Management Report for a new residential development in the City of Ottawa, Ontario.

This report will address the serviceability of the proposed site, specifically relating to the adequacy of the existing municipal storm sewer, sanitary sewer, and watermains to hydraulically convey the necessary storm runoff, sanitary sewage and water demands that will be placed on the existing system as a result of the proposed development located at 16 and 20 Hamilton Avenue North, Ottawa, Ontario. The report shall also summarize the stormwater management (SWM) design requirements and proposed works that will address stormwater flows arising from the site under post-development conditions and will identify any stormwater servicing concerns and also describe any measures to be taken during construction to minimize erosion and sedimentation.

The development being proposed by Independent Development Group is located on the west side of Hamilton Avenue North between Armstrong Street and Wellington Street West within the City of Ottawa.

The site has a total area of 0.125 hectares. 16 Hamilton has an area of 0.079 and is currently being utilized as a parking lot. 20 Hamilton has an area of 0.046 and is currently occupied by a single-storey commercial building. It is understood that the owner of the subject property intends to demolish the existing building and combine the two lots into one property. The proposed development is to consist of a mixed-use building with 8 storeys and a basement with a total of 3 commercial units and 73 residential units.

2 STORMWATER DESIGN

2.1 Stormwater Management Design Criteria

Design of the storm sewer system was completed in conformance with the City of Ottawa Design Guidelines. (October 2012). Section 5 “Storm and Combined Sewer Design”.

In accordance with the SWM design criteria provided by the City, 100 year post development flow from the proposed development will be restricted to 5 year pre-development flow assuming a maximum pre-development runoff coefficient of C = 0.5. A time of concentration is to be calculated and to be no less than 10 minutes.

2.1.1 Minor System Design Criteria

The storm sewers have been designed and sized based on the rational formula and the Manning’s Equation under free flow conditions for the 5-year storm using a 10-minute inlet time.

2.1.2 Major System Design Criteria

The major system has been designed to accommodate on-site detention with sufficient capacity to attenuate the runoff generated onsite during a 100-year design storm. Excess runoff above the 100 year event will flow overland to the northeast of the site and ultimately into the roadside catch basins along Hamilton Avenue North.

On site storage is provided and calculated for up to the 100-year design storm. Calculations of the required storage volumes have been prepared based on the Rational Method as identified in Section 8.3.10.3 of the City’s Sewer Guidelines and have been provided in Appendix A.

2.1.3 Quality Control

Quality control for the Site is expected to be provided by conveyance in the City of Ottawa's stormwater system. Best management practices will be incorporated at the site to reduce potential suspended solid contamination. Snow and Ice control management practices will be incorporated to reduce contamination from winter snow and ice removal.

2.2 Stormwater Quantity Control

Peak Flow for runoff quantities for the Pre-Development and Post-Development stages of the project were calculated using the rational method. The rational method is a common and straightforward calculation, which assumes that the entire drainage area is subject to uniformly distributed rainfall. The formula is:

$$Q = \frac{CiA}{360}$$

Where

Q is the Peak runoff measured in ***m^3/s***

C is the Runoff Coefficient, **Dimensionless**

A is the runoff area in ***hectares***

i is the storm intensity measure in ***mm/hr***

All values for intensity, i, for this project were derived from IDF curves provided by the City of Ottawa for data collected at the Ottawa International airport. For this project two return periods were considered, 5 and 100-year events. The formulas for each are:

5-Year Event

$$i = \frac{998.071}{(t_c + 6.053)^{0.814}}$$

100-Year Event

$$i = \frac{1735.071}{(t_c + 6.014)^{0.82}}$$

where t_c is time of concentration

2.2.1 Runoff Coefficients

Runoff coefficients for impervious surfaces (roofs, asphalt, and concrete) were taken as 0.90, permeable paver areas were taken as 0.30 and pervious surfaces (grass) were taken as 0.20.

A 25% increase for the post development 100-year runoff coefficients was used as per City of Ottawa guidelines. Refer to Appendix A for pre-development and post development runoff coefficients.

2.2.2 Time of Concentration

The time of concentration for pre-development was determined using the City of Ottawa Guidelines Appendix 5-D to be about 5 minutes. Therefore, a pre-development time of concentration of 10 minutes was used as per the design criteria provided by the City.

2.2.3 Pre-development Site Conditions

As previously indicated, the site is located west of Hamilton Avenue North between Armstrong Street and Wellington Street West within the City of Ottawa. The site has a total area of about 0.125 hectares which is fully developed. The site is currently occupied by a paved parking lot (16 Hamilton) and a one-storey commercial building (20 Hamilton). The existing building has a foot print of about 325 square metres (0.032 hectares) with the remaining area of 135 square metres (0.014 hectares) in asphalt. The existing asphaltic parking lot on 16 Hamilton has an area of about 630 square metres (0.063 hectares). All remaining areas are grass/landscaped areas. It is understood that pre-development conditions will be considered as the lesser of current conditions or conditions resulting in a runoff coefficient of 0.5.

Based on the existing ground cover the pre-development runoff coefficient was calculated to be 0.81. However, the predevelopment runoff coefficient used for the purpose of this stormwater management design was C = 0.5.

2.2.3.1 Pre-development Site Drainage Patterns

Existing stormwater runoff from the entire site in general consists of uncontrolled sheet flow towards the north side of the property and on to neighbouring properties where it is ultimately directed to catch basins along Hamilton Avenue North.

2.2.3.2 Pre-development Runoff Rate

Using the Rational Method with a time of concentration of 10 minutes, the previously calculated runoff coefficients and a storm intensity of 104.19 mm/hr, The pre-development runoff rate for the 5-year design storm is:

5 year = 0.5 x 104.19 x 0.125 / 360 = 18.1 L/s

2.2.4 Controlled and Uncontrolled Areas

For the purposes of this storm water management design, the site has been divided into uncontrolled and controlled areas as outlined on Figure2. The controlled areas are defined as area CA1 and CA2 and uncontrolled areas are defined as UA1 and UA2. CA1 consists of the upper roof area. CA2 consists of the rear balcony and terrace areas as well as the ground surface area between the building and the rear property line. UA2 consists of the front balcony and terrace areas. UA1 consists of the ground surface between the building and front of the lot.

Controlled and uncontrolled areas for the site are listed in Appendix A.

Run-off from the upper roof will be restricted by means of WATTS Small Area Roof Drains with Adjustable Flow Control which will outlet to a proposed storm sewer. Runoff from the rear balcony and terrace area as well as the rear ground surface will be directed to an underground storage tank at the rear of the property. The runoff from the storage tank will be controlled by means of a HYDROVEX 50SVHV-1 ICD. Runoff from the front landscaped area and front balcony and terrace areas will be directed without restriction to the storm sewer.

Storm flows from the uncontrolled areas collectively referred to as UA will drain or be discharged un-controlled towards Hamilton Avenue North.

Since run-off from these areas UA is uncontrolled, the allowable release rate from the controlled area equals the pre-development runoff rate for the 5 year storm event minus the 5-year and 100-year release rates from the uncontrolled portion of the site.

A post-development time of concentration of 10 minutes corresponds to a storm intensity of 104.19 mm/hr and 178.56 mm/hr on the 5-year and 100-year storm IDF curves respectively. The runoff rate from the uncontrolled areas was therefore calculated to be:

UA1 5 year = 0.3 x 104.19 x 0.007 / 360 = 0.6 L/s
100 year = 0.38 x 178.56 x 0.007 / 360 = 1.3 L/s

UA2 5 year = 0.9 x 104.19 x 0.023 / 360 = 6.0 L/s
100 year = 0.99 x 178.56 x 0.023 / 360 = 11.3 L/s

Total combined uncontrolled flow
5 year = 6.6 L/s
100 year = 12.6 L/s

2.2.5 Allowable Release Rate

As previously indicated, the stormwater management criteria provided by the City of Ottawa requires that maximum runoff rate from the site during a 100 year storm is to be restricted to that of the 5 year predevelopment storm conditions. To control runoff from the site it will be necessary to limit post-development flows for all storm return periods up to the 100-year event using onsite inlet controls. The maximum allowable runoff rate from the site was determined to be 18.1 L/s based on the 5 Year predevelopment flows, as per the design criteria provided by the City of Ottawa.

$\mathbf{Q_{controlled} = Q_{total\ allowable} - Q_{uncontrolled}}$

For the 5-year Storm event

$\mathbf{Q_{controlled}}$ = 18.1 – 6.6 = 11.5 L/s

For the 100-year Storm event

$\mathbf{Q_{controlled}}$ = 18.1 – 12.6 L/s = 5.5 L/s

The allowable controlled area release rate for the site is calculated in the attached spreadsheets provided in Appendix A.

2.2.6 Post Development Restricted Flow and Storage

In order to meet the stormwater quantity control restriction, the post development runoff rate cannot exceed the 5 year predevelopment runoff rate. Runoff generated on site in excess of the allowable release rate will be temporarily stored on the upper roof (catchment CA1) and within underground storage tanks (catchment CA2). The stored water will be released at a controlled rate during and following the storm event.

In order to achieve the allowable controlled area storm water release rate, storm water runoff from the upper roof will be controlled by four roof drains fitted with flow control. The drains will discharge to an uncontrolled stormwater lead which in turn will discharge to the storm service on the north side of the building. The roof drains will consist of WATTS Small Area Roof Drain with Adjustable Flow Control. RD-299-A-ADJ – set at ¼ Weir opening exposure.

During a 5 year storm event, the roof drains will release at a combined discharge rate of 2.9 L/s. During a 100 year storm event, the roof drains will release at a combined discharge rate of 3.3 L/s.

The stormwater runoff originating from the south side of the building below the upper roof including the area of the balconies, terracing over the parking area and ground surface south of the building is to be directed to underground storage tanks along the south side of the building. The runoff from the balconies and terracing can be directed by sheet flow to the ground surface or storm leads combined with eaves troughs to the tanks. The ground surface will be landscaped with permeable pavers set on clear stone above the tanks. Rainfall and runoff will simply infiltrate through the pavers and underlying stone to the tanks. The tanks will discharge to a catch basin in which an inlet control device has been installed to control the discharge rate. The catch basin CB1 will outlet by means of a storm lead to connect to the storm service on the north side of the building.

The inlet control device (ICD) that is to be installed in CB1 was designed to achieve a maximum allowable release rate of 1.5 L/s during a 5 year storm event and 2.0 L/s for the 100 year rainfall event.

The ICD will consist of a Hydrovex 50-SVHV-1 vertical vortex flow regulator or approved alternative. The Hydrovex ICD should be ordered for the following parameters;

- Model number 50-SVHV-1
- Outlet pipe specification: 250mm diameter PVC SDR35
- Discharge: 2.0 L/s
- Upstream Head: 1.1 m
- Catch basin Dimensions: 600 mm x 600 mm

The combined release rate during a 5 year storm event is 4.4 L/s and during a 100 year storm event is 5.3 L/s.

The ICD and Roof Drain Control were selected in order to ensure that the allowable maximum release rate for the 100 year storm events is not exceeded.

The above outlet restrictions from the roof and underground storage tanks result in the storage requirements as summarized the following Table 2.1.

Table 2.1 – Summary of Post-Development Catchment Area Release rates and Storage Requirements.

Return period	Allowable Release Rate	Actual Release rate	Required Storage	Available Storage	Required Storage Depth	Available Storage Depth
(years)	(L/s)	(L/s)	(m^3)	(m^3)	(m)	(m)
Catchment Area CA1 – Upper Roof						
5	--	2.9	9.8	41.5	0.09	0.15
100	--	3.3	22.9	41.5	0.12	0.15
Catchment Area CA2 – Underground Storage Tanks						
5	--	1.8	4.1	13.5	0.29	0.9
100	--	2.0	10.1	13.5	0.69	0.9
Combined						
5	11.5	4.4	--	--	--	--
100	5.5	5.3	--	--	--	--

2.2.7 Roof Top Storage

Roof Top Storage will be provided on the upper roof of the proposed building. The roof will be provided with a low slope towards four roof top drains by means of a Tapered Roofing System Product. The minimum slope on the roof will be 1 percent and will be as much as 2 percent. The roof will be fitted with overflow scuppers 0.15 metres above the lowest point on the roof.

Outlet will be controlled by the roof drains which will discharge to a storm water lead. The maximum flow through the storm water lead during a 100 year event will be 3.3 L/s. A 135 mm diameter storm sewer at a 1 percent slope has a capacity of 11.51 L/s. A storm sewer lead with a minimum diameter of 135 mm is recommended and will have sufficient capacity for the roof discharge. The storm sewer lead will be installed near vertical or with a slope exceeding 1 percent within the building.

2.2.8 Underground Storage Tanks

The underground storage will be provided using Brentwood StormTank Modular Tanks. A Brentwood StormTank Module is a subsurface storage unit load-rated for use under surfaces such as parking lots, athletic fields, and parks as well as landscaped areas. Design information for the Brentwood StormTanks is provided in Appendix C.

The underground tanks proposed for the site are comprised of ST-24 Modular Units. Each unit has a height of 0.609 m, a width of 0.457 m and a length of 0.914 m. The modules will be placed between the proposed building and the rear property line in a single line of 30 units placed end to end. The tanks are placed on a clear stone bed and will have a 0.15 m thick layer of clear stone on both sides. The total tank width including clear stone will be 0.757 m and the total tank length including clear stone will be 27.72 m. The tanks will be wrapped in an impervious geotextile fabric to prevent infiltration into the weeping tile and basement of the building.

2.3 Stormwater Quality Control

Given the distance from the site to the existing storm sewer outlet (approximately 1.5 kilometres) it is expected that quality control will be provided within storm sewer conveyance system.

The following Best Management Practices are incorporated into the design.

- The additional runoff generated on the site during post development conditions originates on the roof of the building and on the entrance way to the covered parking area.
- The runoff from the building is typically not considered to be a source of significant contamination and will be released to the storm sewer without treatment.
- The runoff from surface area of the driveway is limited to a short section not covered by the building. The remainder of the driveway is covered and not subject to precipitation.
- Runoff from the majority of the driveway and parking areas will be directed to the sanitary sewer for treatment. This runoff is the major source of contamination and will not be outlet to the storm sewer.
- The sidewalk areas will be constructed with pavers. The used of pavers allows for infiltration reducing surface water which intern reduces the quantity of salt needed to prevent ice forming on the sidewalk. Reduced salt and sand during winter significantly reduces potential stormwater runoff contamination.
- Proper timing of the application of salt and sand also reduces the quantity of sand and salt required.

These best management practices will provide quality control at the site by either reducing the initial source of potential contamination or by directing potential contaminated water from vehicles to the sanitary sewer where it will be treated.

2.4 Stormwater System Operation and Maintenance

2.4.1 Inlet Control Device (ICD) and Roof Drains

The inlet control device (ICD) and Roof Drains should be inspected on a semi-annual basis and following major storm events. Any blockages, trash or debris should be removed. If surface ponding on the parking area does not recede in a normal manner, the ICD should be inspected and cleaned. The Roof Drains should be inspected before winter to ensure they have not be clogged with leafs.

2.4.2 Catchbasin/ Manhole and Inspection Ports

The catchbasin / manhole and inspection ports (including sediment traps in storm tanks) should be cleaned with a hydrovac excavation truck following completion of construction, paving of the asphaltic concrete surface and establishment of adequate grass cover on the landscaped areas.

Following the initial cleaning these structures should be inspected on a semi-annual basis and following major storm events. Any blockages, trash or debris should be removed. Once the sediment accumulation in the catchbasin / manhole has reached a level equal to 0.15 metres below the outlet invert of the structure, or a thickness of 0.15 metres in the sediment traps, the sediment should be removed by hydro excavation.

2.4.3 Brentwood StormTank Storage Tanks

Detailed installation, operation and maintenance guidelines are provided in the StormTank

Module Design Guide included in Appendix B. In general maintenance procedures consist of Inspection and cleaning as follows:

Inspection:

- Inspect all observation ports, inflow and outflow connections, and the discharge area.
- Identify and log any sediment and debris accumulation, system backup, or discharge rate changes.
- If there is a sufficient need for cleanout, contact a local cleaning company for assistance.

Cleaning:

- If a pretreatment device is installed, follow manufacturer recommendations.
- Using a vacuum pump truck, evacuate debris from the inflow and outflow points.
- Flush the system with clean water, forcing debris from the system.
- Repeat steps 2 and 3 until no debris is evident.

2.5 Storm Sewer Design

The on-site storm sewers were designed to be in general conformance with the City of Ottawa Sewer Design Guidelines (October 2012). Specifically, storm sewers were sized using Manning's Equation, assuming a roughness coefficient N = 0.013, to accommodate the uncontrolled runoff from the 5-year storm, under 'open-channel' conditions. The uncontrolled runoff was determined using the rational method and the City of Ottawa IDF curve for a 10-minute time of concentration. Refer to Storm Sewer Design Sheets in Appendix A.

3 SANITARY SEWER DESIGN

The existing residential sanitary service is connected to the existing 250 mm sanitary sewer along Hamilton Avenue North.

Sewage discharges will be domestic in type and in compliance with the City of Ottawa Sewer Use By-law. The anticipated peak sanitary flow from the building will be a total of approximately 1.58 L/s.

The sanitary sewage flow for the proposed building was calculated based on the City of Ottawa Sewer Design Guidelines (Section 4.4.1.2) and incorporated Technical Bulletin ISTB-2018-01.

3.1 Design Flows

Residential

Total domestic pop:
1 Bedroom units (54) x 1.4 ppu: 75.6
2 Bedroom units (19) x 2.1 ppu: 39.9
Total: 115.5

$Q_{Domestic}$ = 115.5 x 280 L/person/day x (1/86,400 sec/day) = 0.37 L/sec

$$\text{Peaking Factor} = 1 + \frac{115.5}{4 + (115.5/\,1000)^{0.5}} = 4.03 \quad \text{use 4 maximum}$$

$Q_{Peak\ Domestic}$ = 0.37 L/sec x 4.0 = 1.5 L/sec

Commercial
Avg. Flow = 28,000 L/ha/day
Peaking Factor = 1.0
$Q_{Peak\ Comm}$ = 0.060 ha x 28,000 L/ha/day x 1 x (1/86,400 sec/day) = 0.02 L/sec

Infiltration

$Q_{Infiltration}$ = 0.33 L/ha/sec x 0.060 ha = 0.02 L/sec

Total Peak Sanitary Flow = 1.54 + 0.02 + 0.02 = 1.58 L/sec

3.2 Sanitary Service Lateral

The Ontario Building Code specifies minimum pipe size and maximum hydraulic loading for sanitary sewer pipe. OBC 7.4.10.8 (2) states "Horizontal sanitary drainage pipe shall be designed to carry no more than 65% of its full capacity." A 135 mm diameter sanitary service with a minimum slope of 1.0% has a capacity of 11.51 Litres per second.

The maximum peak sanitary flows for the site is 1.5 L/sec. Since 1.5 L/sec is much less than 0.65 x 11.51 = 7.48 L/s, the sanitary service would be properly sized if greater than or equal to 135 mm in diameter.

Table 3.1 Fixture Unit Consideration

Apartment Unit Type	Number of Apartments	Number of fixture units per apartment	Total number of Fixture Units.
• 1 Bedroom	54	10.0	540
• 2 Bedroom	19	10.0	190
• Total fixtures			730

However, from Table 7.4.10.8, the allowable number of fixture units for a 135 mm diameter sanitary service pipe at 1.0% slope is 390. There are approximately 730 fixtures in the building. As such a 135 mm diameter sanitary service is not adequate for the proposed sanitary flow.

Based on the number of fixture units in the building the sanitary service pipe should be increased to a nominal 150 mm (6 inch) diameter service at a 2 percent slope which as an allowable number of fixture units of 840.

The existing sanitary sewer along Hamilton Avenue downstream of the site consists of a 250 mm diameter PVC pipe which has a capacity of 58 Litres per second. This sewer discharges into the 1050 mm diameter trunk sewer along Hinton Street about 150 meters downstream of the site by way of the 300 mm diameter PVC sewer along Armstrong Street. The proposed sanitary demand from the development is 1.58 L/sec. Since the proposed additional sanitary sewer capacity requirement is about 2.7 percent of the capacity of the existing sanitary sewer there will be sufficient capacity within the existing sanitary network for the proposed sanitary demand.

4 WATERMAIN DESIGN

4.1 Water Demand

The water demand for the proposed development was calculated based on the City of Ottawa Water Distribution Design Guidelines as follows:

<u>Residential</u>

Total domestic pop:
1 Bedroom units (54) x 1.4 ppu: 75.6
2 Bedroom units (19) x 2.1 ppu: <u>39.9</u>
Total: 115.5

Residential Average Daily Demand = 350 L/c/d.

- Average daily demand of 350 L/c/day x 115.5persons =40425 Litres/day or 0.47 L/s
- Maximum daily demand (factor of 2.5) is 0.47L/s x 2.5 = 1.17 L/s
- Peak hourly demand (factor of 2.2) = 1.17 L/s x 2.2 = 2.57 L/s

<u>Commercial</u>

Avg. Flow = 28,000 L/ha/day
Q_{comm} Average Day = 0.060 ha x 28,000 L/ha/day x (1/86,400 sec/day) = 0.02 L/sec

- Maximum daily demand (factor of 1.5) is 0.02 x 1.5 = 0.03 L/s
- Peak hourly demand (factor of 1.8) is 0.03 x 1.8 = 0.05 L/s

<u>Total Water Demand</u>

Average Daily demand = 2.57 + 0.02 = 0.49 L/s
Maximum Daily demand = 1.17 + 0.03 = 1.20 L/s
Peak Hourly demand = 2.57 + 0.05 = 2.63 L/s

4.2 Fire Flow

Fire flow protection requirements were calculated as per the Fire Underwriter's Survey (FUS) taking into account the methodology provided in Technical Bulletin ISTB-2018-02. Calculations of the fire flow required are provided in Appendix C.

Fire protection will be provided by an existing fire hydrant located on Hamilton Avenue North about 40m south of the property on the east side of the road. In addition, the proposed development will have an automatic sprinkler system. As such, the minimum service diameter required for the proposed development is 150 mm.

4.3 Sufficiency of Existing Services

A previously calculated residential water supply requirement and Fire Fighting Requirement were provided to the City of Ottawa for boundary conditions. The correspondence is attached in Appendix . These requirements consisted of a average daily demand of 0.49 L/sec, a maximum daily demand of 1.2 L/s and a Maximum hourly demand of 2.63 L/sec. The fire flow requirement was 123.3 L/s.

The following are boundary conditions, HGL, for hydraulic analysis at 16-20 Hamilton Ave North (zone 1W) assumed to be connected to the 203mm on Hamilton were based on the above requirements.

Minimum HGL = 108.1m

Maximum HGL = 1115.3m

MaxDay (1.20 L/s) + FireFlow (123.3 L/s) = 107.2 m

Using the above minimum HGL, a 150 mm service diameter would result in a residual pressure during maximum hourly demand on the ground floor of about 424 kPa and about 193 kPa on the top floor of the proposed residential building. It is noted that 193 kPa is below the minimum allowable pressure of 275 kPa. As such a booster pump will likely be required.

Maximum MaxDay + Fireflow using a 150 mm service diameter would result in a residual pressure of 30 kPa on the top floor of the proposed building during a fire flow event. This is below the minimum residual pressure for firefighting purposes of 138 kPa.

5 EROSION AND SEDIMENT CONTROL

The owner (and/or contractor) agrees to prepare and implement an erosion and sediment control plan at least equal to the stated minimum requirements and to the satisfaction of the City of Ottawa, appropriate to the site conditions, prior to undertaking any site alterations (filling, grading, removal of vegetation, etc.) and during all phases of site preparation and construction in accordance with the current best management practices for erosion and sediment control. It is considered to be the owners and/or contractors responsibility to ensure that the erosion control measures are implemented and maintained.

In order to limit the amount of sediment carried in stormwater runoff from the site during construction, it is recommended to install a silt fence along the property, as shown in Kollaard Associates Inc. Drawing #180711-GEC Grading & Erosion Control Plan. The silt fence may be polypropylene, nylon, and polyester or ethylene yarn.

If a standard filter fabric is used, it must be backed by a wire fence supported on posts not over 2.0 m apart. Extra strength filter fabric may be used without a wire fence backing if posts are not over 1.0 m apart. Fabric joints should be lapped at least 150 mm (6") and stapled. The bottom edge of the filter fabric should be anchored in a 300 mm (1 ft) deep trench, to prevent flow under the fence. Sections of fence should be cleaned, if blocked with sediment and replaced if torn.

Filter socks should be installed across existing storm manhole and catch basin lids. As well, filter socks should be installed across the proposed catch basin lids immediately after the catch basins are placed. The filter socks should only be removed once the asphaltic concrete is installed and the site is cleaned.

The proposed landscaping works should be completed as soon as possible. The proposed granular and asphaltic concrete surfaced areas should be surfaced as soon as possible.

The silt fences should only be removed once the site is stabilized and landscaping is completed.

These measures will reduce the amount of sediment carried from the site during storm events that may occur during construction.

6 CONCLUSIONS

This report addresses the adequacy of the existing municipal storm and sanitary sewer system and watermains to service the proposed development of an apartment building on Hamilton Avenue North. Based on the analysis provided in this report, the conclusions are as follows:

SWM for the proposed development will be achieved by restricting the 100 year post development flow to the 5 year pre-development flow.

The peak sewage flow rate from the proposed development will be 1.58 L/sec. The existing municipal sanitary sewer should have adequate capacity to accommodate the minimal increase in peak flow. The City has not identified any capacity issues in the existing sanitary sewer system.

The existing municipal watermain along Hamilton Avenue North will have adequate capacity to service the proposed development for both domestic and fire protection. A booster pump will be needed within the building to ensure sufficient pressure on the upper floors.

During all construction activities, erosion and sedimentation shall be controlled.

We trust that this report provides sufficient information for your present purposes. If you have any questions concerning this report or if we can be of any further assistance to you on this project, please do not hesitate to contact our office.

Sincerely,
Kollaard Associates, Inc.

LICENSED PROFESSIONAL ENGINEER
OCT.24.2018
S.E. deWit
100079612
PROVINCE OF ONTARIO

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Steven deWit, P.Eng.

Appendix A: Storm Design Information

- Allowable Release Rate and SWM Summary
- Uncontrolled Area Runoff Calculations
- Storage Volume Required Catchment Area CA1 – Roof
- Storage Volume Required Catchment Area CA2 – Rear Balconies, Terracing and Pavers
- Storage Volume Provided
- Sewer Design Sheet

APPENDIX A: STORMWATER MANAGEMENT MODEL
ALLOWABLE RELEASE RATE AND SWM SUMMARY

Client: Surface Developments
Job No.: 180711
Location: 16-20 Hamilton Ave, Ottawa, Ontario
Date: October 23, 2018

PRE DEVELOPMENT FLOW

Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$

Pre Dev run-off Coefficient "C"

Area	Surface	Ha	"C"	C_{avg}
Total	Asphalt	0.076	0.90	**0.81**
0.125	Building	0.033	0.90	
	Landscaping	0.016	0.20	

5 Year Event

Pre Dev.	C	Intensity	Area
5 Year	0.50	104.19	0.125
2.78CIA= 18.10			
	18.1 L/s		

**Use a 10 minute time of concentration for 5 year

Total Allowable Release: **18.1 L/s**

Pre Dev Time of Concentration "t_c"

From City of Ottawa Sewer Design Guidelines - Appendix 5 - D

Slope of Site = 1.0%
Distance Across Site = 39 m
Runoff Coefficient = 0.81

Inlet Time = 5 min < 10 min
Therefore use a minimum Time of Concentration of 10 min

STORMWATER MANAGEMENT SUMMARY

Sub Area I.D.	Sub Area (ha)	C	Comp. 'C'	Outlet Location	5 Year Controlled Release (L/s)	Required 5 year Storage (m^3)	100 Year Controlled Release (L/s)	Required 100 year Storage (m^3)
UA1	0.007	0.30		OFFSITE	0.6	0.0	1.3	0.0
UA2	0.023	0.90		CBMH1	6.0	0.0	11.3	0.0
CA1	0.062	0.90		ROOF	2.8	9.8	3.2	22.9
CA2	0.033	0.81		CB1	1.7	4.1	2.0	10.1
TOTAL	**0.092**				**11.1**	**13.9**	**17.8**	**32.9**

APPENDIX A: STORMWATER MANAGEMENT MODEL

Uncontrolled Area Runoff Rate Calculation

Client: Surface Developments
Job No.: 180711
Location: 16-20 Hamilton Ave, Ottawa, Ontario
Date: October 23, 2018

UA1 - UNCONTROLLED AREA

Post Dev run-off Coefficient "C"

			5 Year Event		100 Year Event	
Area	**Surface**	**Ha**	**"C"**	**C_{avg}**	**"C"**	**C_{avg}**
Total	Asphalt	0.000	0.90	**0.30**	0.99	**0.38**
0.007	Pavers	0.007	0.30		0.38	
	Building	0.000	0.90		0.99	

Post Dev Free Flow

5 Year Event

	C	Intensity	Area
5 Year	0.30	104.19	0.007
2.78CIA=	0.61		
0.6	L/S		

**Use a 10 minute time of concentration for 5 year

100 Year Event

	C*	Intensity	Area
100 Year	0.38	178.56	0.007
2.78CIA=	1.30		
1.3	L/S		

**Use a 10 minute time of concentration for 100 year

UA2 - UNCONTROLLED AREA

Post Dev run-off Coefficient "C"

			5 Year Event		100 Year Event	
Area	**Surface**	**Ha**	**"C"**	**C_{avg}**	**"C"**	**C_{avg}**
Total	Asphalt	0.000	0.90	**0.90**	0.99	**0.99**
0.023	Balcony and Terrace	0.023	0.90		0.99	
	Pavers	0.000	0.30		0.38	

Post Dev Free Flow

5 Year Event

	C	Intensity	Area
5 Year	0.90	104.19	0.023
2.78CIA=	6.00		
6.0	L/S		

**Use a 10 minute time of concentration for 5 year

100 Year Event

	C*	Intensity	Area
100 Year	0.99	178.56	0.023
2.78CIA=	11.30		
11.3	L/S		

**Use a 10 minute time of concentration for 100 year

Equations:

Flow Equation

Q = 2.78 x C x I x A

Where:

C is the runoff coefficient

I is the intensity of rainfall, City of Ottawa IDF

A is the total drainage area

Runoff Coefficient Equation

$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$

APPENDIX A: STORMWATER MANAGEMENT MODEL

STORAGE VOLUME REQUIRED

Client: Surface Developments
Job No.: 180711
Location: 16-20 Hamilton Ave, Ottawa, Ontario
Date: October 23, 2018

CA1 - ROOF

Area 100 Post Dev run-off Coefficient "C"

			5 Year Event		100 Year Event	
Area (ha)	**Surface**	**Area (ha)**	**"C"**	**C_{avg}**	**"C" x 1.25**	**$C_{100\ avg}$**
Total	Asphalt	0.000	0.90	**0.90**	0.99	**0.99**
0.062	Roof	0.062	0.90		0.99	
	Pavers	0.000	0.30		0.38	

QUANTITY STORAGE REQUIREMENTS - 5 Year

0.062 = Area(ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Release Rate (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd m^3
	10	104.19	16.2	2.8	13.4	8.0
	15	83.56	13.0	2.8	10.2	9.1
	20	70.25	10.9	2.8	8.1	9.7
5 YEAR	25	60.90	9.4	2.9	6.5	9.8
	30	53.93	8.4	2.9	5.5	9.8
	35	48.52	7.5	2.9	4.6	9.7
	40	44.18	6.9	2.8	4.0	9.6
	45	40.63	6.3	2.8	3.5	9.5
	50	37.65	5.8	2.8	3.0	9.1

QUANTITY STORAGE REQUIREMENTS - 100 Year

0.062 = Area(ha)
0.99 = *C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Release Rate (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd m^3
	10	178.56	30.5	3.2	27.3	16.4
	20	119.95	20.5	3.2	17.3	20.7
100 YEAR	30	91.87	15.7	3.3	12.4	22.3
	40	75.15	12.8	3.3	9.5	22.9
	50	63.95	10.9	3.3	7.6	22.8
	60	55.89	9.5	3.3	6.2	22.5
	70	49.79	8.5	3.3	5.2	22.0
	80	44.99	7.7	3.3	4.4	21.3
	90	41.11	7.0	3.2	3.8	20.4

APPENDIX A: STORMWATER MANAGEMENT MODEL
STORAGE VOLUME REQUIRED

Client: Surface Developments
Job No.: 180711
Location: 16-20 Hamilton Ave, Ottawa, Ontario
Date: October 23, 2018

CA2 - REAR BALCONIES, TERRACING AND PAVERS

Area 100 Post Dev run-off Coefficient "C"

			5 Year Event		100 Year Event	
Area (ha)	**Surface**	**Area (ha)**	**"C"**	**C_{avg}**	**"C" x 1.25**	**$C_{100\ avg}$**
Total	Asphalt	0.0000	0.90	**0.81**	0.99	**0.90**
0.0330	Balcony	0.0280	0.90		0.99	
	Pavers	0.0050	0.30		0.38	

QUANTITY STORAGE REQUIREMENTS - 5 Year

0.033 = Area(ha)
0.81 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Release Rate (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd m^3
	10	104.19	7.7	1.7	6.0	3.6
	15	83.56	6.2	1.8	4.4	4.0
5 YEAR	20	70.25	5.2	1.8	3.4	4.1
	25	60.90	4.5	1.8	2.7	4.1
	30	53.93	4.0	1.8	2.2	4.0
	35	48.52	3.6	1.7	1.9	4.0
	40	44.18	3.3	1.7	1.6	3.8

QUANTITY STORAGE REQUIREMENTS - 100 Year

0.033 = Area(ha)
0.90 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Release Rate (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd m^3
	10	178.56	14.7	1.9	12.8	7.7
100 YEAR	20	119.95	9.9	1.9	8.0	9.6
	30	91.87	7.6	2.0	5.6	10.1
	40	75.15	6.2	2.0	4.2	10.1
	50	63.95	5.3	2.0	3.3	10.0
	60	55.89	4.6	1.9	2.7	9.8
	90	41.11	3.4	1.9	1.5	8.1

***Note - Hydrovex 50SVHV-1 is required**

Equations:

Runoff Coefficient Equation
$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{tot}$

Flow Equation
$Q = 2.78 \times C \times I \times A$
Where:
C is the runoff coefficient
I is the intensity of rainfall, City of Ottawa IDF
A is the total drainage area

APPENDIX A: STORMWATER MANAGEMENT MODEL
STORAGE VOLUME PROVIDED

Client: Surface Developments
Job No.: 180711
Location: 16-20 Hamilton Ave, Ottawa, Ontario
Date: October 23, 2018

Catchment Area 1

Maximum Storage required for the 5 year Storm Event	9.8	(m³)
Maximum Storage required for the 100 year Storm Event	22.9	(m³)

Roof Drain Type - WATTS Small Area Roof Drain with Adjustable Flow Control. RD-200-A-ADJ - 1/4 Weir Opening Exposure.

Storage Provided on Roof Catchment Area 1

		East Side of Roof			West Side of Roof						
Depth	**Layer Thickness**	**Layer Area**	**Layer Volume**	**East Side Volume**	**Layer Area**	**Layer Volume**	**West Side Volume**	**Total Cum. Volume**	**Release Rate per drain**	**Number of Drains**	**Total Release Rate**
m	m	m^2	m^3	m^3	m^2	m^3	m^3	m^3	US gpm		L/s
0.15	0.025	280	7.00	23.25	220	5.50	18.28	41.53	15	4	3.8
0.125	0.025	280	6.98	16.25	220	5.49	12.78	29.03	13.75	4	3.5
0.1	0.025	278	5.36	9.27	219	4.22	7.30	16.57	12.5	4	3.2
0.075	0.025	156	2.75	3.91	123	2.17	3.08	6.99	11.25	4	2.8
0.05	0.025	70	1.01	1.16	55	0.80	0.91	2.07	10	4	2.5
0.025	0.025	17	0.14	0.14	14	0.11	0.11	0.26	5	4	1.3
0	0	0	0.00	0.00	0	0.00	0.00	0.00	0	4	0.0

Catchment Area 2

Maximum Storage required for the 5 year Storm Event	4.1	(m³)
Maximum Storage required for the 100 year Storm Event	10.1	(m³)

Storage Provided in Storage Tanks Catchment 2

Tank Type Brentwood Storage Tanks - ST24

Tank Dimentions	Height	0.609	Total Volume	0.255
	Length	0.914	Storage Volume	0.245
	Width	0.457	Percent Voids	0.96

Proposed Tank Configuration 30 Rows Width by 1 Row Length 0.15 m of Clearstone both sides
30 x 0.914 by 1 x 0.457 - assuming 35% voids in clearstone

Tank Area + Area of Clear Stone 20.94
Inlet Control Device = Hydrovex 50SVHV-1
Invert of Outlet Pipe = 82.35

Elevation	**Tank Depth**	**Layer Thickness**	**Layer Area**	**Layer Volume**	**Cum. Volume**	**Head on ICD**	**Release Rate**
m	m	m	m^2	m^3	m^3	m	L/s
83.85	Surface						
83.65	Clearstone	0.05	20.94	0.75	13.5	1.3	2.1
83.6		0.05	20.94	0.75	12.7	1.25	2.0
83.55		0.05	20.94	0.75	12.0	1.2	2.0
83.5		0.07	20.94	1.05	11.2	1.15	2.0
83.43		0.03	20.94	0.45	10.2	1.08	2.0
83.4	Top Tank	0.05	20.94	0.75	9.7	1.05	1.9
83.35	0.61	0.05	20.94	0.75	9.0	1	1.9
83.3	0.56	0.05	20.94	0.75	8.2	0.95	1.9
83.25	0.51	0.05	20.94	0.75	7.5	0.9	1.9
83.2	0.46	0.05	20.94	0.75	6.7	0.85	1.8
83.15	0.41	0.05	20.94	0.75	6.0	0.8	1.8
83.1	0.36	0.05	20.94	0.75	5.2	0.75	1.8
83.05	0.31	0.05	20.94	0.75	4.5	0.7	1.8
83	0.26	0.05	20.94	0.75	3.7	0.65	1.7
82.95	0.21	0.05	20.94	0.75	3.0	0.6	1.7
82.9	0.16	0.05	20.94	0.75	2.2	0.55	1.7
82.85	0.11	0.05	20.94	0.75	1.5	0.5	1.6
82.8	0.06	0.05	20.94	0.75	0.7	0.45	1.5
82.75	0.01	0	20.94	0.00	0.0	0.4	1.3

APPENDIX A: STORM SEWER DESIGN SHEET

Client: Independemt Development Group
Job No.: 180711
Location: 16-20 Hamilton, Ottawa, Ontario
Date: October 23, 2018

Storm Sewer Design Sheet (5-yr storm)

LOCATION											PROPOSED SEWER								
								TIME	RAINFALL	PEAK	TYPE	PIPE	PIPE			FULL FLOW	TIME OF	EXCESS	
FROM	TO	Total Area	C	C	Actual R	INDIV	ACCUM	OF	INTENSITY	FLOW	OF	SIZE	SLOPE	LENGTH	CAPACITY	VELOCITY	FLOW	CAPACITY	Q/Qfull
		(ha)	0.30	0.90	('C')	2.78 AR	2.78 AR	CONC.	I	Q (l/s)	PIPE	(mm)	(%)	(m)	(l/s)	(m/s)	(min.)	(l/s)	
CB1	STM-MH	0.033	0.005	0.028	0.81	0.07	0.07	10.00	104.19	7.73	PVC	200.00	1.00	45.0	32.83	1.04	0.72	25.10	0.24
ROOF	STM-MH	0.062	0.000	0.062	0.90	0.16	0.16	10.00	104.19	16.16	PVC	150.00	2.00	10.0	21.56	1.22	0.14	5.40	0.75

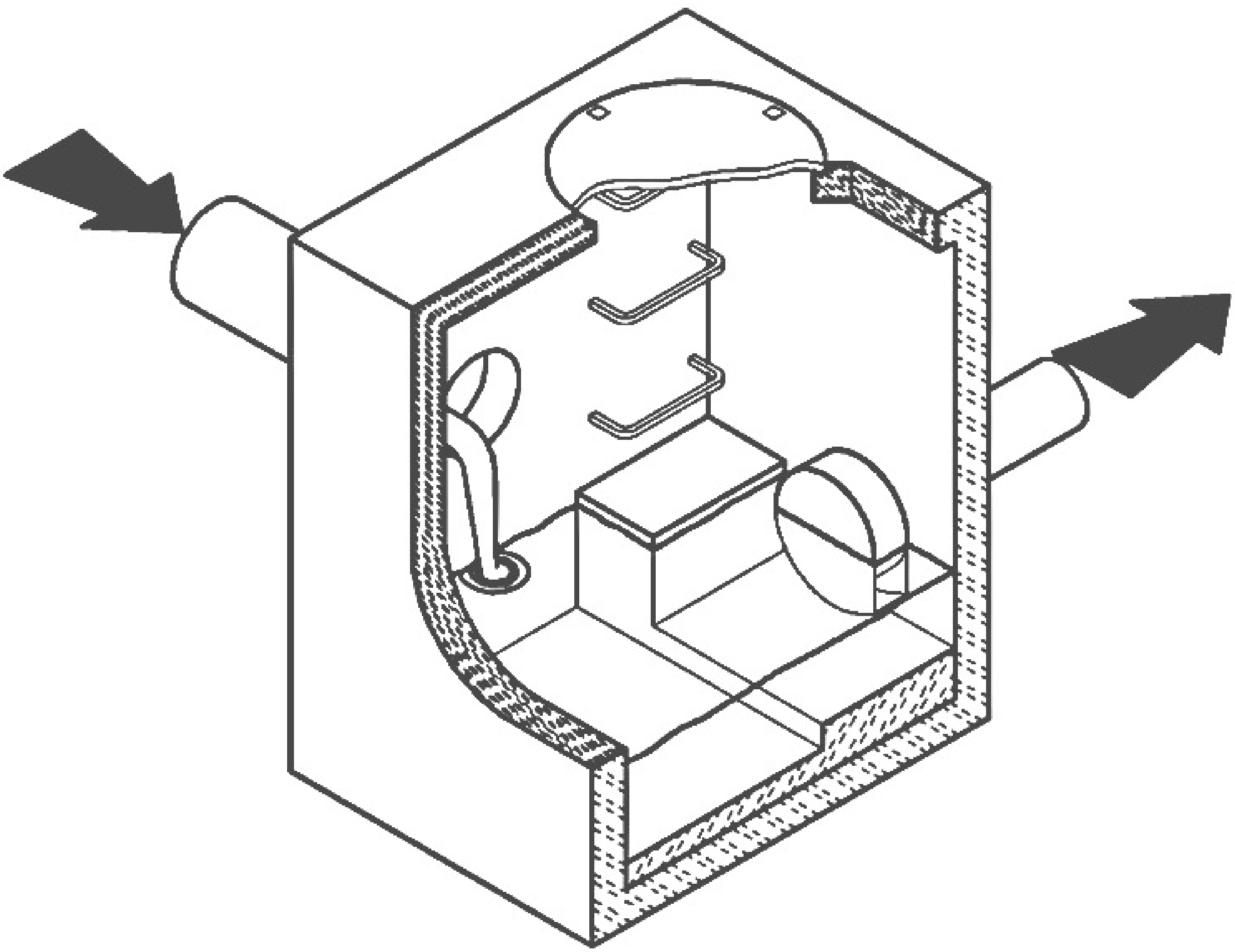
Rainfall Intensity = $998.071/(T+6.053)^{-0.814}$ T= time in minutes
(City of Ottawa, 5 year storm)

Appendix B: Product Information

- Hydrovex Selection Chart
- Roof Drain Selection
- Brentwood Storage Tanks

CSO/STORMWATER MANAGEMENT

® HYDROVEX® VHV / SVHV
Vertical Vortex Flow Regulator



JOHN MEUNIER

APPLICATIONS

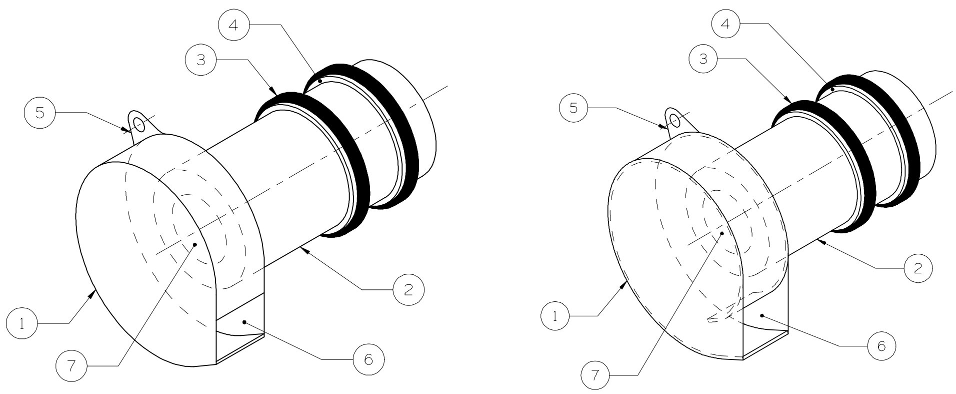
One of the major problems of urban wet weather flow management is the runoff generated after a heavy rainfall. During a storm, uncontrolled flows may overload the drainage system and cause flooding. Due to increased velocities, sewer pipe wear is increased dramatically and results in network deterioration. In a combined sewer system, the wastewater treatment plant may also experience significant increases in flows during storms, thereby losing its treatment efficiency.

A simple means of controlling excessive water runoff is by controlling excessive flows at their origin (manholes). **John Meunier Inc.** manufactures the **HYDROVEX® VHV / SVHV** line of vortex flow regulators to control stormwater flows in sewer networks, as well as manholes.

The vortex flow regulator design is based on the fluid mechanics principle of the forced vortex. This grants flow regulation without any moving parts, thus reducing maintenance. The operation of the regulator, depending on the upstream head and discharge, switches between orifice flow (gravity flow) and vortex flow. Although the concept is quite simple, over 12 years of research have been carried out in order to get a high performance.

The **HYDROVEX® VHV / SVHV** Vertical Vortex Flow Regulators **(refer to Figure 1)** are manufactured entirely of stainless steel, and consist of a hollow body (**1**) (in which flow control takes place) and an outlet orifice (**7**). Two rubber "O" rings (**3**) seal and retain the unit inside the outlet pipe. Two stainless steel retaining rings (**4**) are welded on the outlet sleeve to ensure that there is no shifting of the "O" rings during installation and use.

1. **BODY**
2. **SLEEVE**
3. **O-RING**
4. **RETAINING RINGS (SQUARE BAR)**
5. **ANCHOR PLATE**
6. **INLET**
7. **OUTLET ORIFICE**



VHV ***SVHV***

FIGURE 1: HYDROVEX® VHV-SVHV VERTICAL VORTREX FLOW REGULATORS

ADVANTAGES

- The **HYDROVEX® VHV / SVHV** line of flow regulators are manufactured entirely of stainless steel, making them durable and corrosion resistant.
- Having no moving parts, they require minimal maintenance.
- The geometry of the **HYDROVEX® VHV / SVHV** flow regulators allows a control equal to an orifice plate, having a cross section area 4 to 6 times smaller. This decreases the chance of blockage of the regulator, due to sediments and debris found in stormwater flows. **Figure 2** illustrates the comparison between a regulator model 100 SVHV-2 and an equivalent orifice plate. One can see that for the same height of water, the regulator controls a flow approximately four times smaller than an equivalent orifice plate.
- Installation of the **HYDROVEX® VHV / SVHV** flow regulators is quick and straightforward and is performed after all civil works are completed.
- Installation requires no special tools or equipment and may be carried out by any contractor.
- Installation may be carried out in existing structures.

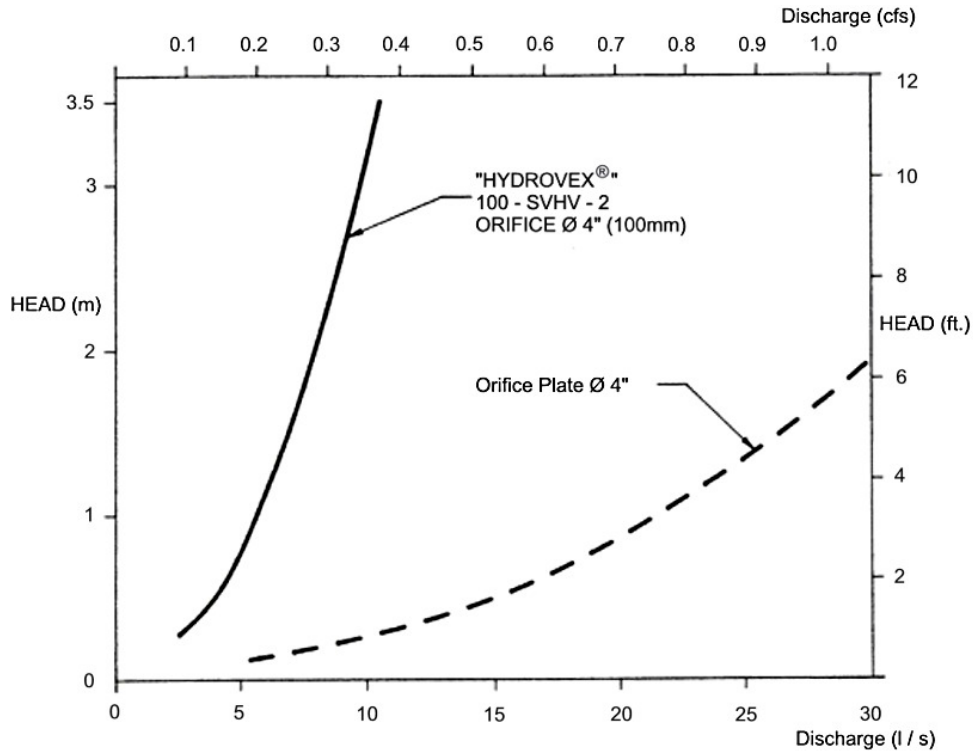


FIGURE 2: DISCHARGE CURVE SHOWING A HYDROVEX® FLOW REGULATOR VS AN ORIFICE PLATE

SELECTION

Selection of a **VHV or SVHV** regulator can be easily made using the selection charts found at the back of this brochure (see **Figure 3**). These charts are a graphical representation of the maximum upstream water pressure (head) and the maximum discharge at the manhole outlet. The maximum design head is the difference between the maximum upstream water level and the invert of the outlet pipe. All selections should be verified by John Meunier Inc. personnel prior to fabrication.

Example:

✓ Maximum design head	2m (6.56 ft.)
✓ Maximum discharge	6 L/s (0.2 cfs)
✓ Using **Figure 3** - VHV	model required is a **75 VHV-1**

INSTALLATION REQUIREMENTS

All **HYDROVEX® VHV / SVHV** flow regulators can be installed in circular or square manholes. **Figure 4** gives the various minimum dimensions required for a given regulator. ***It is imperative to respect the minimum clearances shown to ensure easy installation and proper functioning of the regulator.***

SPECIFICATIONS

In order to specify a **HYDROVEX®** regulator, the following parameters must be defined:

- The model number (ex: 75-VHV-1)
- The diameter and type of outlet pipe (ex: 6" diam. SDR 35)
- The desired discharge (ex: 6 l/s or 0.21 CFS)
- The upstream head (ex: 2 m or 6.56 ft.) *
- The manhole diameter (ex: 36" diam.)
- The minimum clearance "H" (ex: 10 inches)
- The material type (ex: 304 s/s, 11 Ga. standard)

***** *Upstream head is defined as the difference in elevation between the maximum upstream water level and the invert of the outlet pipe where the HYDROVEX® flow regulator is to be installed.***

PLEASE NOTE THAT WHEN REQUESTING A PROPOSAL, WE SIMPLY REQUIRE THAT YOU PROVIDE US WITH THE FOLLOWING:

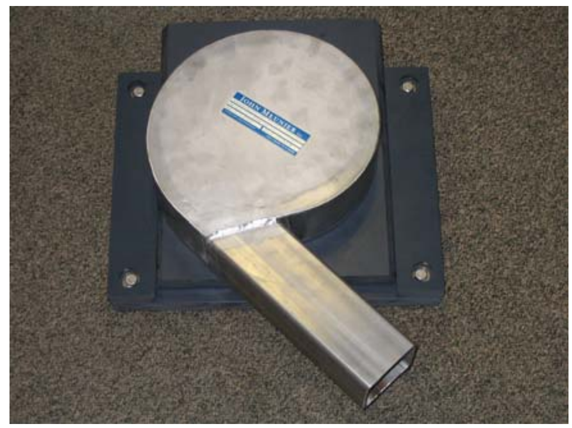
- ***project design flow rate***
- ***pressure head***
- ***chamber's outlet pipe diameter and type***

Typical VHV model in factory

OPTIONS

FV – SVHV (mounted on sliding plate)

VHV-1-O (standard model with odour control inlet)



FV – VHV-O (mounted on sliding plate with odour control inlet)

VHV with Gooseneck assembly in existing chamber without minimum release at the bottom

VHV with air vent for minimal slopes

HYDROVEX®

VHV Vertical Vortex Flow Regulator

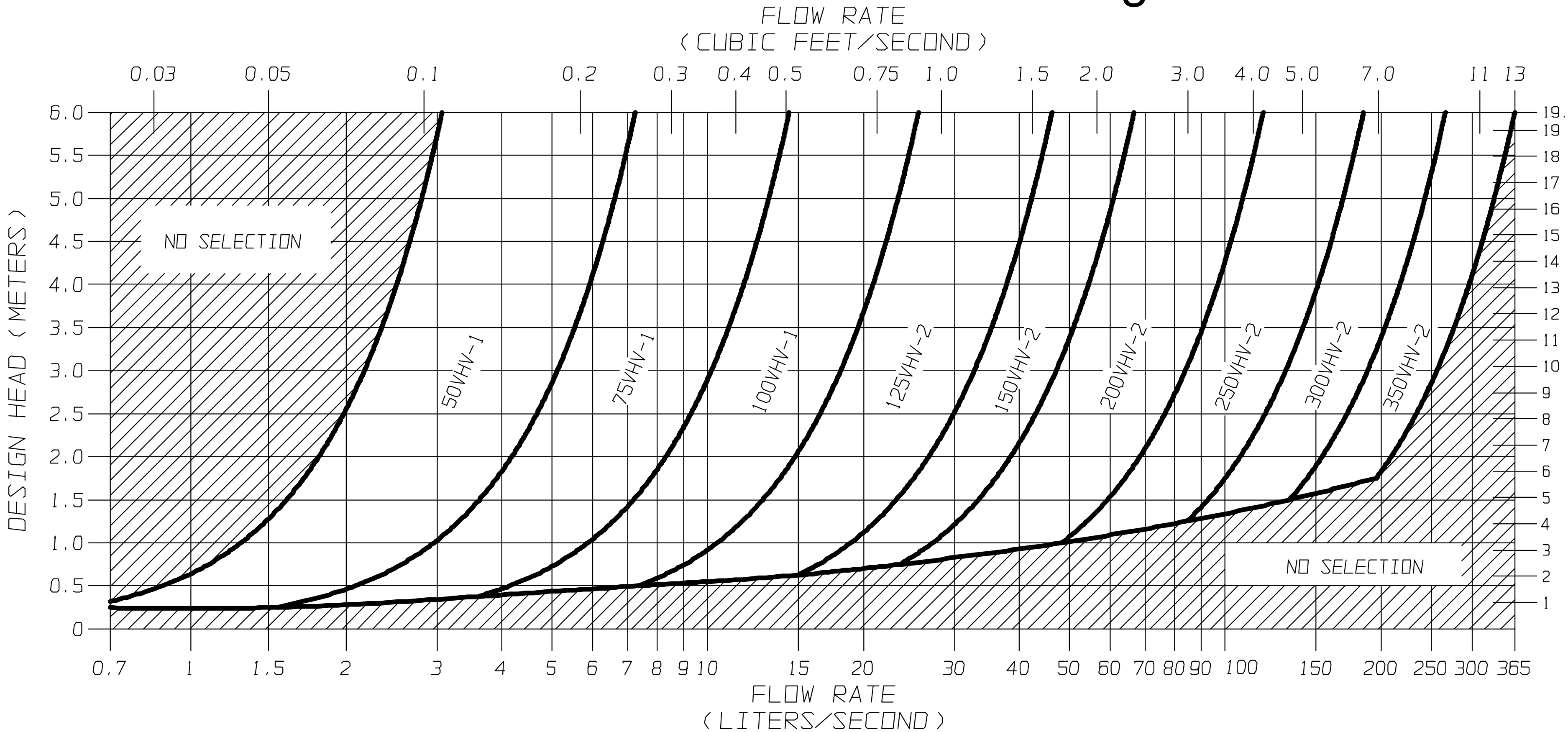


FIGURE 3 - VHV

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SVHV Vertical Vortex Flow Regulator

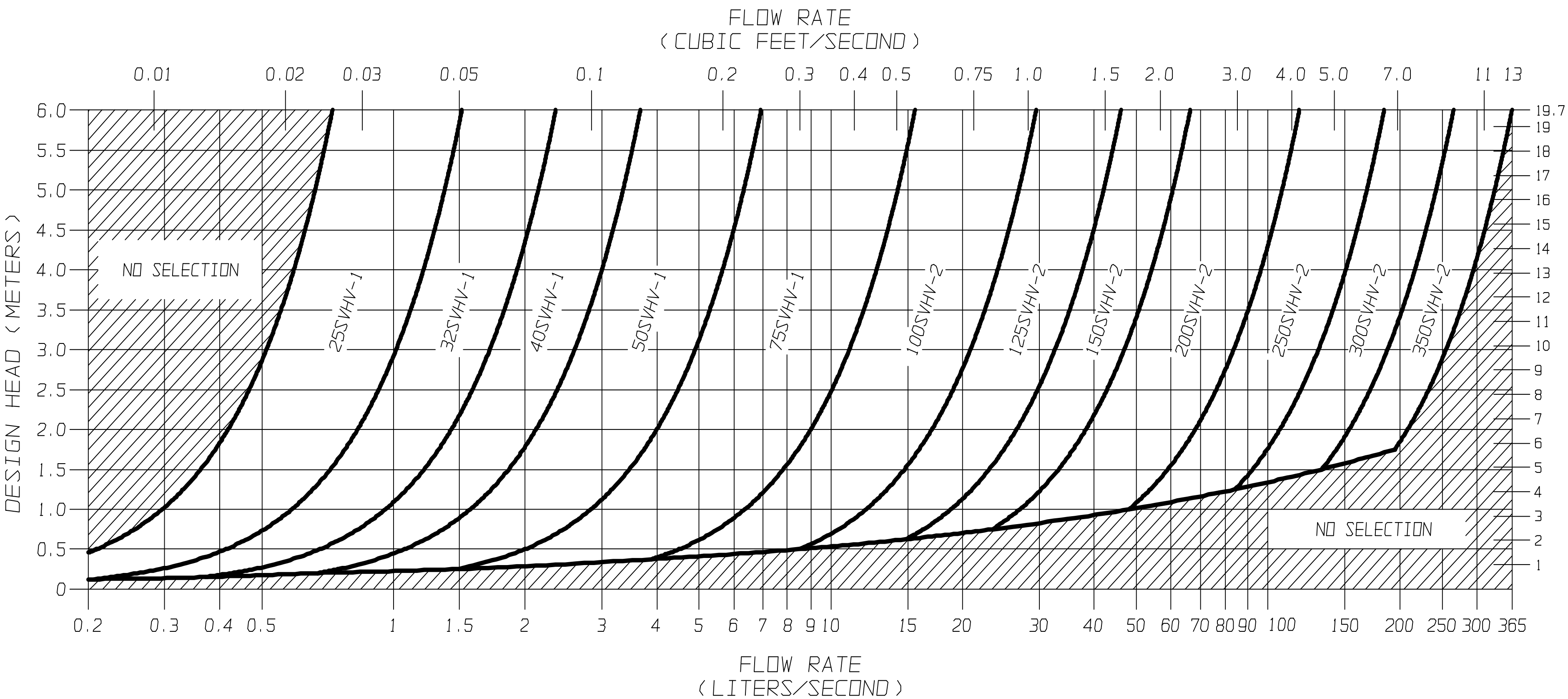
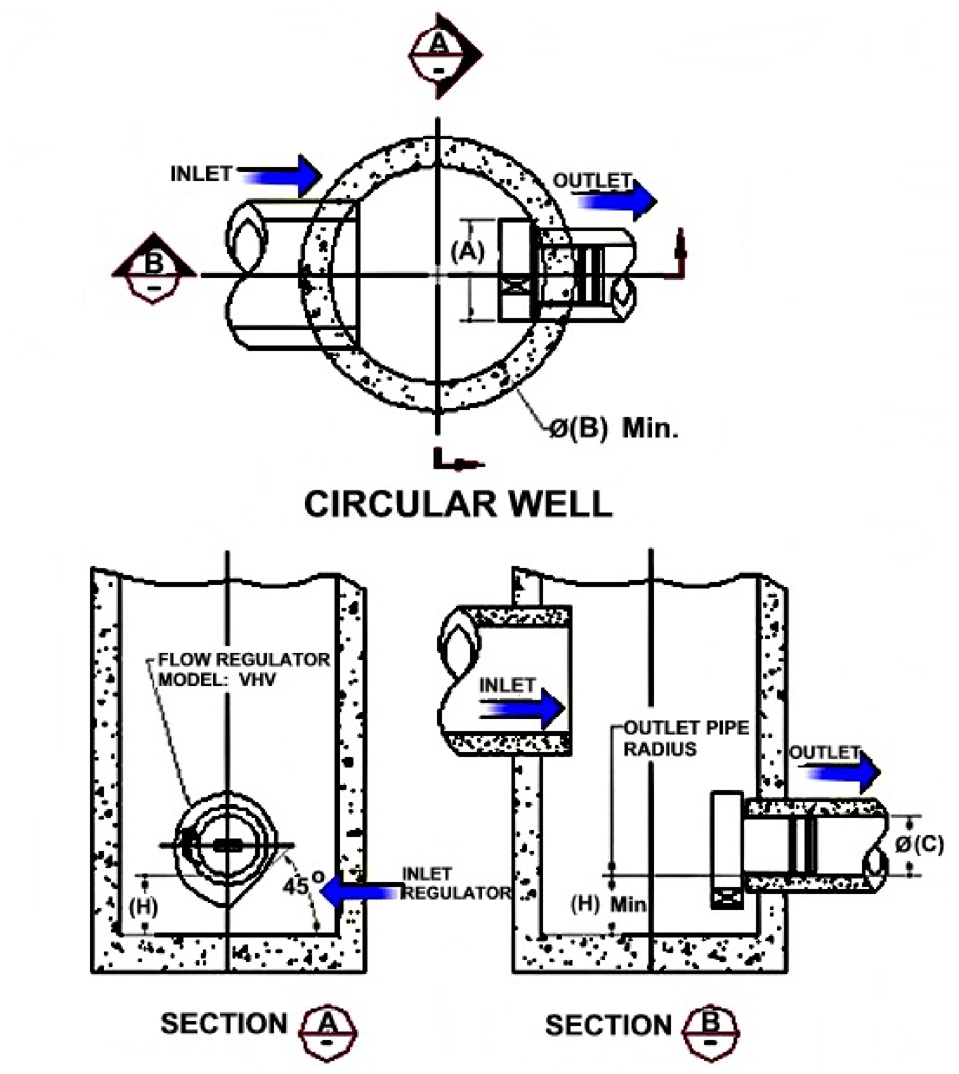


FIGURE 3 - SVHV

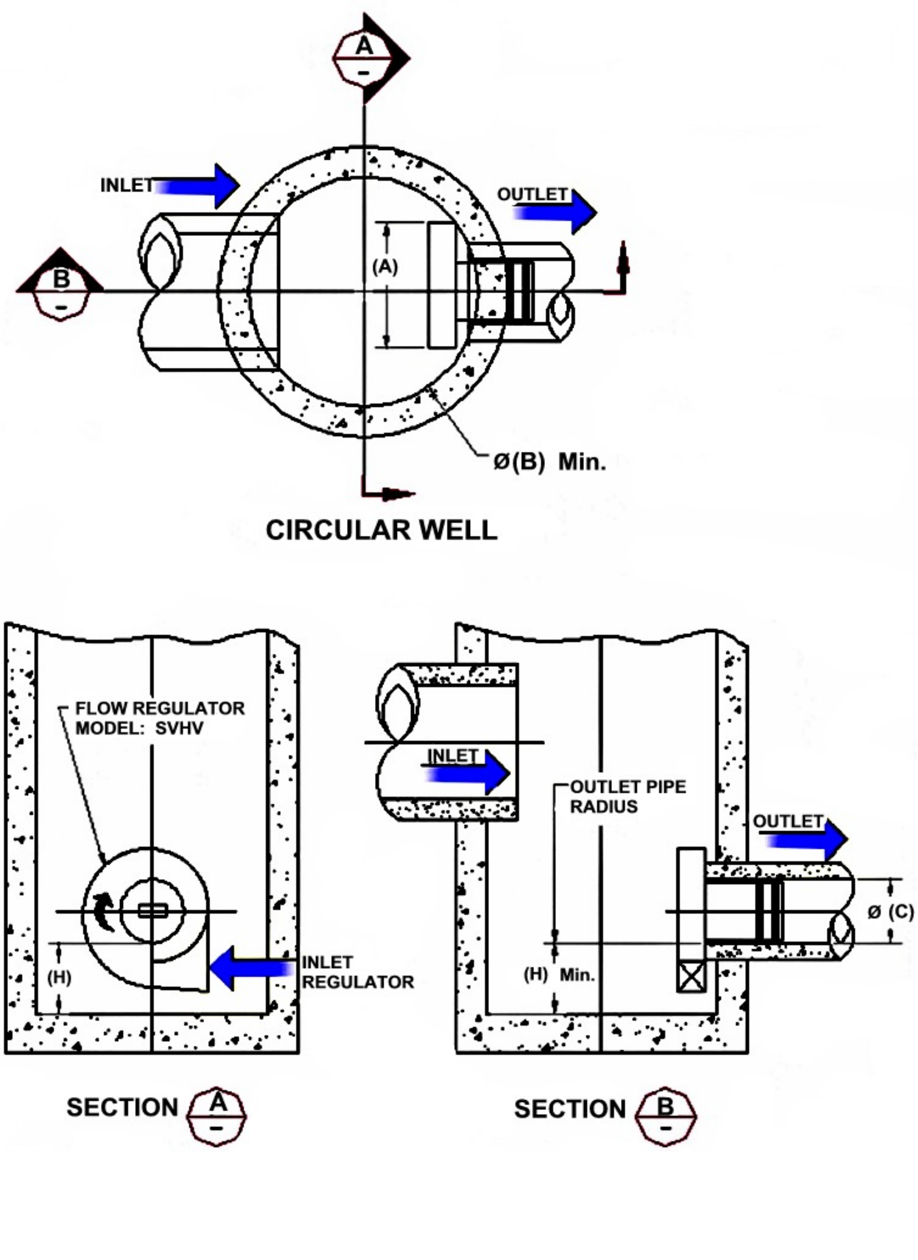
FLOW REGULATOR TYPICAL INSTALLATION IN CIRCULAR MANHOLE
FIGURE 4 (MODEL VHV)

Model Number	Regulator Diameter		Minimum Manhole Diameter		Minimum Outlet Pipe Diameter		Minimum Clearance	
	A (mm)	**A** (in.)	**B** (mm)	**B** (in.)	**C** (mm)	**C** (in.)	**H** (mm)	**H** (in.)
50VHV-1	150	6	600	24	150	6	150	6
75VHV-1	250	10	600	24	150	6	150	6
100VHV-1	325	13	900	36	150	6	200	8
125VHV-2	275	11	900	36	150	6	200	8
150VHV-2	350	14	900	36	150	6	225	9
200VHV-2	450	18	1200	48	200	8	300	12
250VHV-2	575	23	1200	48	250	10	350	14
300VHV-2	675	27	1600	64	250	10	400	16
350VHV-2	800	32	1800	72	300	12	500	20



FLOW REGULATOR TYPICAL INSTALLATION IN CIRCULAR MANHOLE
FIGURE 4 (MODEL SVHV)

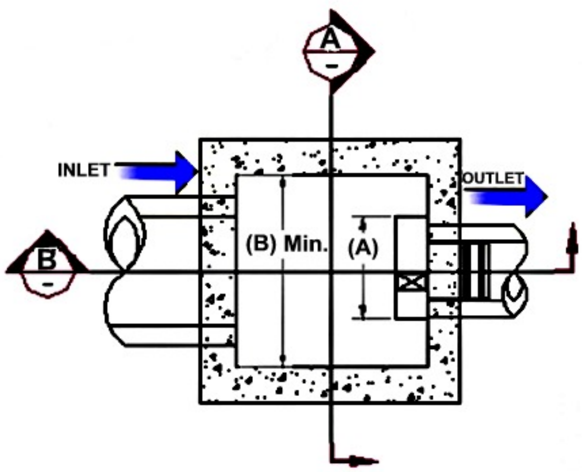
Model Number	Regulator Diameter		Minimum Manhole Diameter		Minimum Outlet Pipe Diameter		Minimum Clearance	
	A (mm)	**A** (in.)	**B** (mm)	**B** (in.)	**C** (mm)	**C** (in.)	**H** (mm)	**H** (in.)
25 SVHV-1	125	5	600	24	150	6	150	6
32 SVHV-1	150	6	600	24	150	6	150	6
40 SVHV-1	200	8	600	24	150	6	150	6
50 SVHV-1	250	10	600	24	150	6	150	6
75 SVHV-1	375	15	900	36	150	6	275	11
100 SVHV-2	275	11	900	36	150	6	250	10
125 SVHV-2	350	14	900	36	150	6	300	12
150 SVHV-2	425	17	1200	48	150	6	350	14
200 SVHV-2	575	23	1600	64	200	8	450	18
250 SVHV-2	700	28	1800	72	250	10	550	22
300 SVHV-2	850	34	2400	96	250	10	650	26
350 SVHV-2	1000	40	2400	96	250	10	700	28



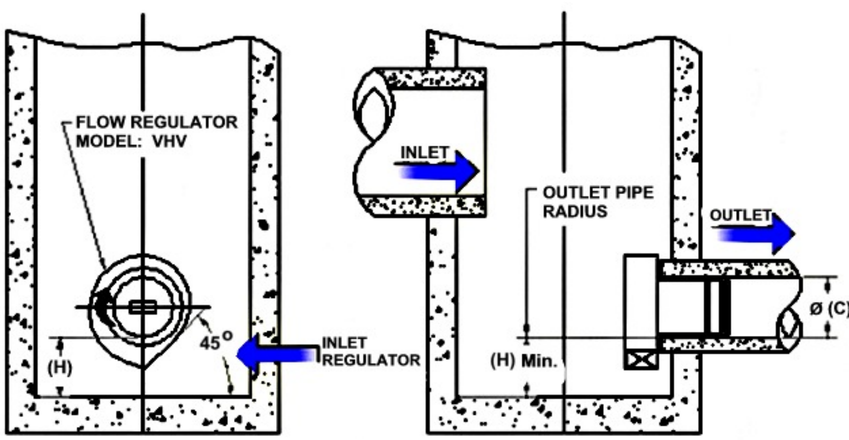
FLOW REGULATOR TYPICAL INSTALLATION IN SQUARE MANHOLE
FIGURE 4 (MODEL VHV)

Model Number	Regulator Diameter		Minimum Chamber Width		Minimum Outlet Pipe Diameter		Minimum Clearance	
	A (mm)	**A** (in.)	**B** (mm)	**B** (in.)	**C** (mm)	**C** (in.)	**H** (mm)	**H** (in.)
50VHV-1	150	6	600	24	150	6	150	6
75VHV-1	250	10	600	24	150	6	150	6
100VHV-1	325	13	600	24	150	6	200	8
125VHV-2	275	11	600	24	150	6	200	8
150VHV-2	350	14	600	24	150	6	225	9
200VHV-2	450	18	900	36	200	8	300	12
250VHV-2	575	23	900	36	250	10	350	14
300VHV-2	675	27	1200	48	250	10	400	16
350VHV-2	800	32	1200	48	300	12	500	20

NOTE: ***In the case of a square manhole, the outlet flow pipe must be centered on the wall to ensure enough clearance for the unit.***



SQUARE / RECTANGULAR WELL



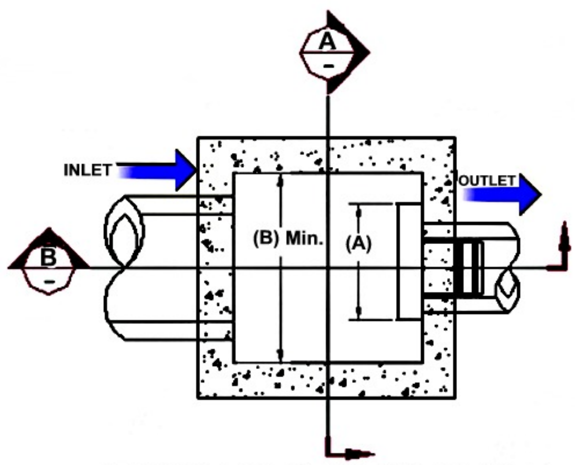
SECTION A

SECTION B

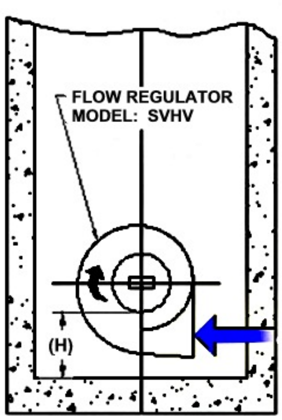
FLOW REGULATOR TYPICAL INSTALLATION IN SQUARE MANHOLE
FIGURE 4 (MODEL SVHV)

Model Number	Regulator Diameter		Minimum Chamber Width		Minimum Outlet Pipe Diameter		Minimum Clearance	
	A (mm)	**A** (in.)	**B** (mm)	**B** (in.)	**C** (mm)	**C** (in.)	**H** (mm)	**H** (in.)
25 SVHV-1	125	5	600	24	150	6	150	6
32 SVHV-1	150	6	600	24	150	6	150	6
40 SVHV-1	200	8	600	24	150	6	150	6
50 SVHV-1	250	10	600	24	150	6	150	6
75 SVHV-1	375	15	600	24	150	6	275	11
100 SVHV-2	275	11	600	24	150	6	250	10
125 SVHV-2	350	14	600	24	150	6	300	12
150 SVHV-2	425	17	600	24	150	6	350	14
200 SVHV-2	575	23	900	36	200	8	450	18
250 SVHV-2	700	28	900	36	250	10	550	22
300 SVHV-2	850	34	1200	48	250	10	650	26
350 SVHV-2	1000	40	1200	48	250	10	700	28

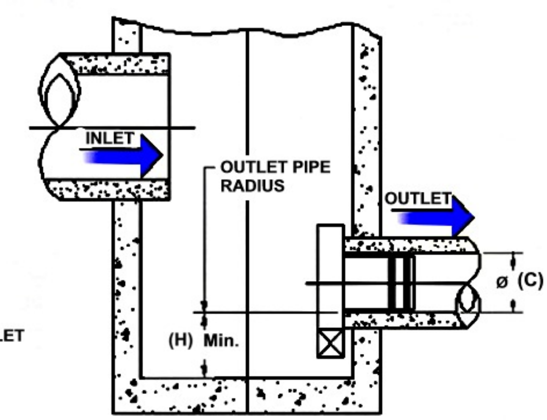
NOTE: *In the case of a square manhole, the outlet flow pipe must be centered on the wall to ensure enough clearance for the unit.*



SQUARE / RECTANGULAR WELL



SECTION A



SECTION B

INSTALLATION

The installation of a **HYDROVEX®** regulator may be undertaken once the manhole and piping is in place. Installation consists of simply fitting the regulator into the outlet pipe of the manhole. **John Meunier Inc.** recommends the use of a lubricant on the outlet pipe, in order to facilitate the insertion and orientation of the flow controller.

MAINTENANCE

HYDROVEX® regulators are manufactured in such a way as to be maintenance free; however, a periodic inspection (every 3-6 months) is suggested in order to ensure that neither the inlet nor the outlet has become blocked with debris. The manhole should undergo periodically, particularly after major storms, inspection and cleaning as established by the municipality

GUARANTY

The **HYDROVEX®** line of **VHV / SVHV** regulators are guaranteed against both design and manufacturing defects for a period of 5 years. Should a unit be defective, **John Meunier Inc.** is solely responsible for either modification or replacement of the unit.

John Meunier Inc.
ISO 9001 : 2008

Head Office
4105 Sartelon
Saint-Laurent (Quebec) Canada H4S 2B3
Tel.: 514-334-7230 www.johnmeunier.com
Fax: 514-334-5070 cso@johnmeunier.com

Ontario Office
2000 Argentia Road, Plaza 4, Unit 430
Mississauga (Ontario) Canada L5N 1W1
Tel.: 905-286-4846 www.johnmeunier.com
Fax: 905-286-0488 ontario@johnmeunier.com

USA Office
2209 Menlo Avenue
Glenside, PA USA 19038
Tel.: 412- 417-6614 www.johnmeunier.com
Fax: 215-885-4741 asteele@johnmeunier.com

VEOLIA WATER Solutions & Technologies

WATTS®

Adjustable Accutrol Weir

Tag: ____________________

Adjustable Flow Control for Roof Drains

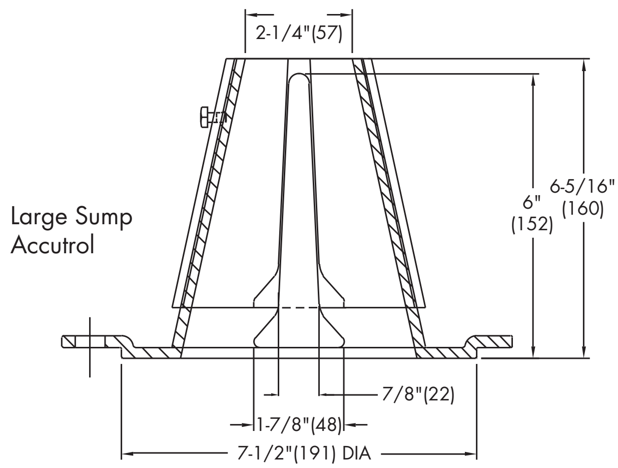
ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

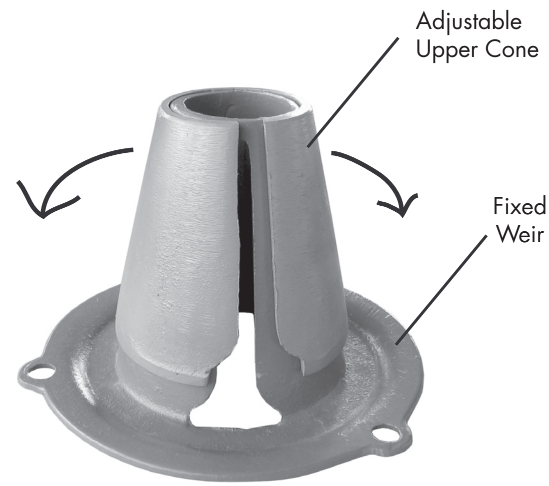
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the flow rate for depths over 2" of head, set the slot in the adjustable upper cone according to the flow rate required. Refer to Table 1 below.
Note: Flow rates are directly proportional to the amount of weir opening that is exposed.

EXAMPLE:

For example, if the adjustable upper cone is set to cover 1/2 of the weir opening, flow rates above 2"of head will be restricted to 2-1/2 gpm per inch of head.

Therefore, at 3"of head, the flow rate through the Accutrol Weir that has 1/2 the slot exposed will be:
[5 gpm (per inch of head) x 2 inches of head] + 2-1/2 gpm (for the third inch of head) = 12-1/2 gpm.





1/2 Weir Opening Exposed Shown Above

TABLE 1. Adjustable Accutrol Flow Rate Settings

Weir Opening Exposed	1"	2"	3"	4"	5"	6"
	Flow Rate (gallons per minute)					
Fully Exposed	5	10	15	20	25	30
3/4	5	10	13.75	17.5	21.25	25
1/2	5	10	12.5	15	17.5	20
1/4	5	10	11.25	12.5	13.75	15
Closed	5	5	5	5	5	5

Job Name ____________________ Contractor ____________________

Job Location ____________________ Contractor's P.O. No. ____________________

Engineer ____________________ Representative ____________________

WATTS®
A Watts Water Technologies Company

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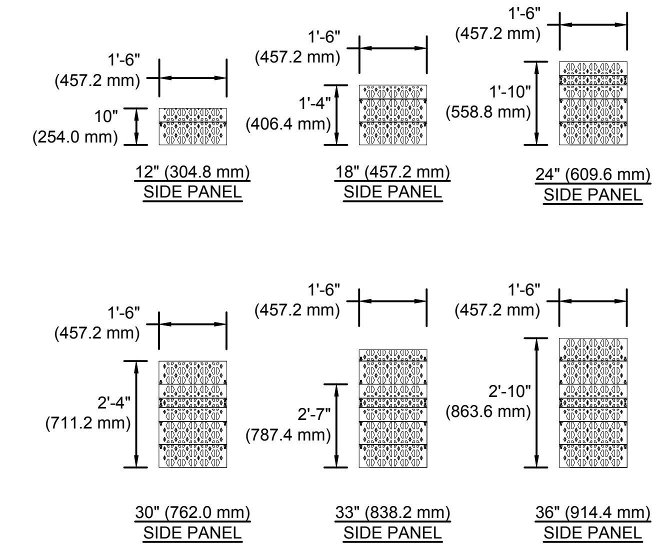
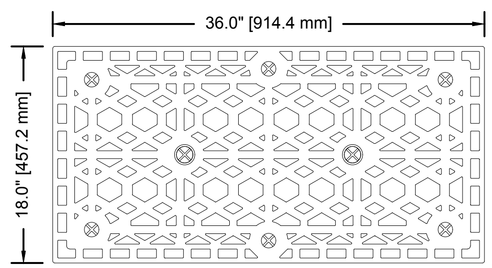
Canada: Tel: (905) 332-4090 • Fax: (905) 332-7068 • Watts.ca
Latin America: Tel: (52) 81-1001-8600 • Fax: (52) 81-8000-7091 • Watts.com

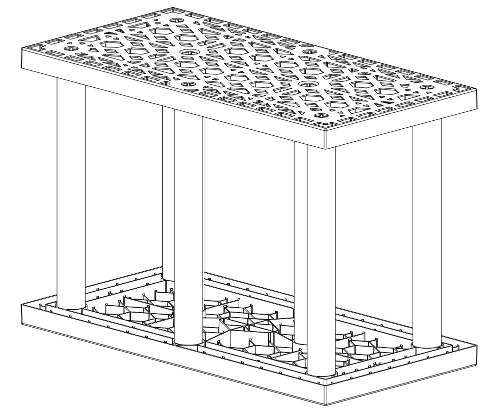


NOTES:
1. SIDE PANELS TO BE INSTALLED ALONG SYSTEM PERIMETER, UNLESS OTHERWISE SPECIFIED.
2. ALL HEIGHTS TO BE CUT FROM A 36" (914.4 mm) SIDE PANEL AT PRE-SCRIBED LOCATIONS, EXCEPT 33" (838.2 mm) & 12" (304.8 mm) SIDE PANEL.

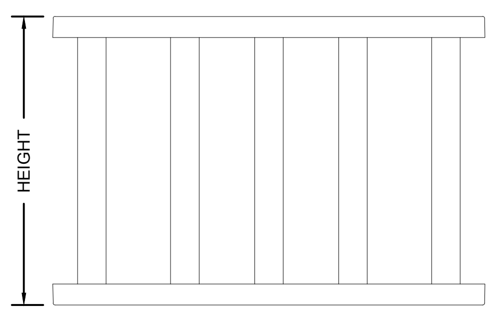
SIDE PANEL DETAIL



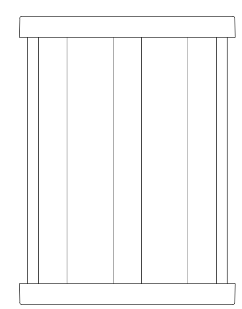
TOP



ISOMETRIC VIEW



FRONT



SIDE

MODULE DETAIL

STORMTANK® MODULE				
NAME	HEIGHT (mm)	CAPACITY (m^3)	VOID RATIO	NOMINAL WEIGHT (kg)
ST-12	12" (304.8)	4.22 cf (0.1194)	93.70%	17.56 lbs. (7.965)
ST-18	18" (457.2)	6.44 cf (0.1824)	95.50%	22.70 lbs. (10.29)
ST-24	24" (609.6)	8.66 cf (0.2452)	96.00%	26.30 lbs. (11.92)
ST-30	30" (762.0)	10.88 cf (0.3081)	96.50%	29.50 lbs. (13.38)
ST-33	33" (838.2)	11.99 cf (0.3395)	96.90%	29.82 lbs. (13.53)
ST-36	36" (914.4)	13.10 cf (0.3710)	97.00%	33.10 lbs. (15.01)

NOTES:
a. REFERENCE CURRENT INSTALLATION INSTRUCTIONS FOR PROPER ASSEMBLY AND INSTALLATION PRACTICES.
b. SIDE PANELS REQUIRED AROUND THE PERIMETER OF THE INSTALLATION ONLY, UNLESS OTHERWISE NOTED.
c. SIDE PANELS ARE TO BE CUT FROM A 36" PANEL AT THE PRE-SCRIBED LOCATIONS.

REV.	DATE	RECORD OF CHANGES	BY	APPRV.
D	2/17/17	ST-12 MODULE ADDED, METRIC DIMENSIONS UPDATED	CGB	
C	9/12/13	NOTE REVISION, FORMATTING UPDATE & DWG. NO. UPDATE	JKB	JKB
B	9/11/12	FORMATTING & DWG. NO. UPDATE	JKB	FK
A	4/5/12	INITIAL RELEASE	BLL	FK

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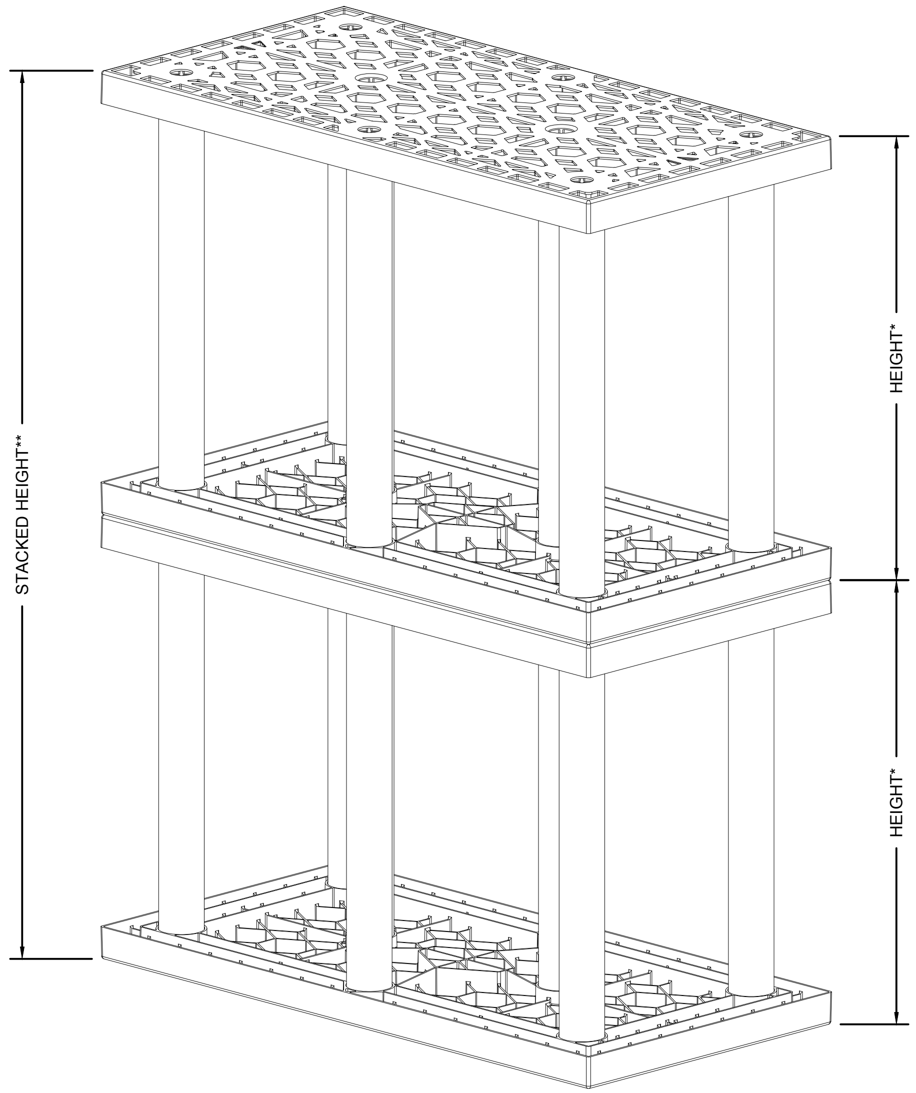
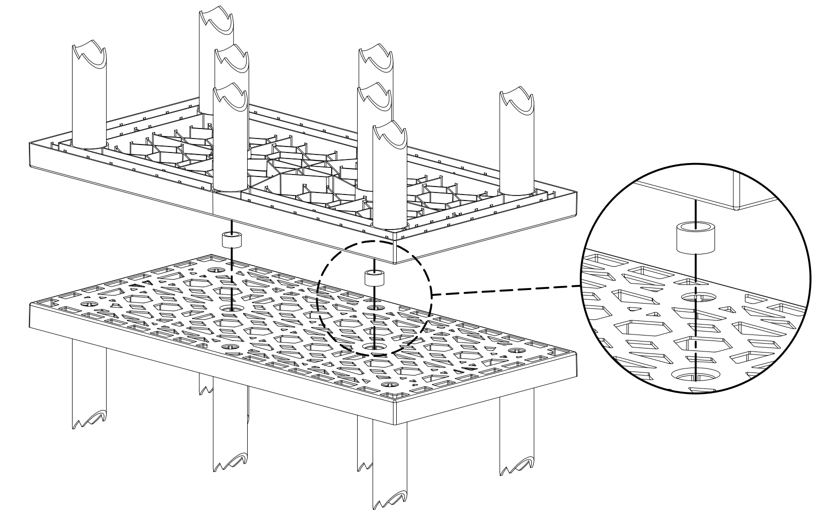
Project Name
MODULE DETAIL

Title
STORMTANK®
MODULE

Drawn By		Date
B.LINE		4/5/12
Drawing No.	Sheet	Scale
STM-000-00	1 of 2	NTS



MODULE DOUBLE STACK DETAIL



STACKING PIN DETAIL

DOUBLE STACK CONFIGURATIONS:

SYSTEM HEIGHT (mm)	ST-18	ST-24	ST-30	ST-33	ST-36	CAPACITY (m^3)
42" (1,067)	1	1	-	-	-	15.08 cf (0.4270)
48" (1,219)	1	-	1	-	-	17.30 cf (0.4899)
51" (1,295)	1	-	-	1	-	18.42 cf (0.5216)
54" (1,372)	1	-	-	-	1	19.50 cf (0.5522)
57" (1,448)	-	1	-	1	-	20.64 cf (0.5845)
60" (1,524)	-	1	-	-	1	21.75 cf (0.6159)
63" (1,600)	-	-	1	1	-	22.86 cf (0.6473)
66" (1,676)	-	-	-	2	-	23.97 cf (0.6788)
69" (1,753)	-	-	-	1	1	25.08 cf (0.7101)
72" (1,829)	-	-	-	-	2	26.20 cf (0.7419)

NOTES:

a. REFERENCE CURRENT INSTALLATION INSTRUCTIONS FOR PROPER ASSEMBLY AND INSTALLATION PRACTICES.

b. STACKING PINS REQUIRED BETWEEN MODULE LAYERS, FOR ALL STACKED SYSTEMS (SEE DETAIL).

REV.	DATE	RECORD OF CHANGES	BY	APPRV.
D	2/17/17	ST-12 MODULE ADDED, METRIC DIMENSIONS UPDATED	CGB	
C	9/12/13	NOTE REVISION, FORMATTING UPDATE & DWG. NO. UPDATE	JKB	JKB
B	9/11/12	FORMATTING & DWG. NO. UPDATE	JKB	FK
A	4/5/12	INITIAL RELEASE	BLL	FK

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Project Name
MODULE DOUBLE STACK DETAIL

Title
STORMTANK®
MODULE

Drawn By		Date
B.LINE		4/5/12
Drawing No.	Sheet	Scale
STM-000-00	2 of 2	NTS

STEP 1:

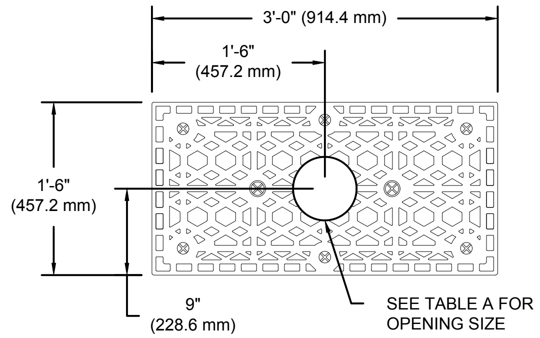
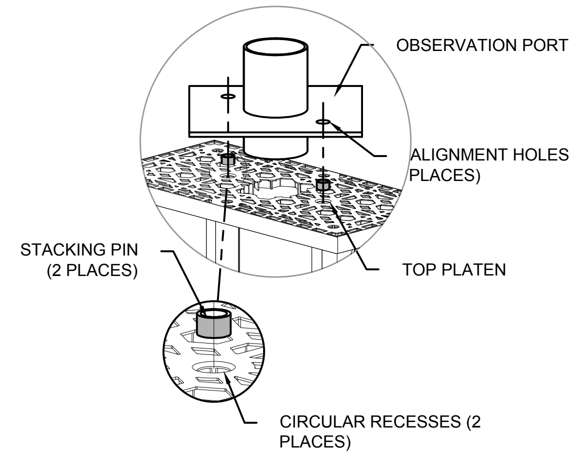


TABLE A: OBSERVATION PORT DIMENSION		
PORT SIZE	OPEN SIZE	RISER PIPE DIA.
6" (152.4 mm)	7" (177.8 mm)	6" (152.4 mm)
8" (203.2 mm)	9" (228.6 mm)	8" (203.2 mm)
10" (254.0 mm)	11" (279.4 mm)	10" (254.0 mm)

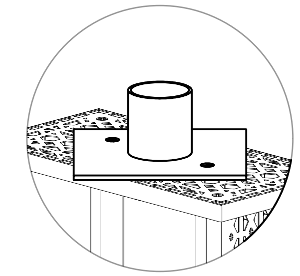
LAYOUT & CUT OPENING INTO THE CENTER OF THE TOP PLATEN FOR BRENTWOOD OBSERVATION PORT.

STEP 2:



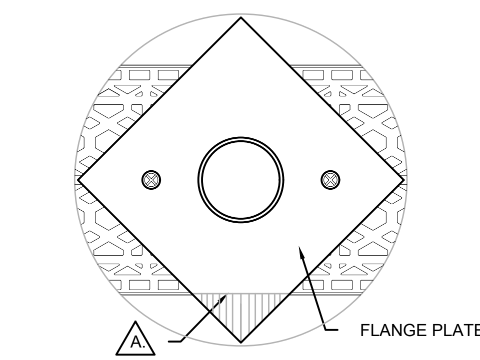
ALIGN PORT PLATE WITH TOP PANEL:
INSERT TWO STORMTANK MODULE STACKING PINS INTO THE CIRCULAR RECESSES IN THE TOP PLATEN OF THE STORMTANK MODULE. INSERT THE SHORT SIDE OF THE PORT PIPE STUB INTO THE PLATEN ALIGNING THE PORT PLATE ALIGNMENT HOLES WITH THE STACKING PINS.

STEP 3:



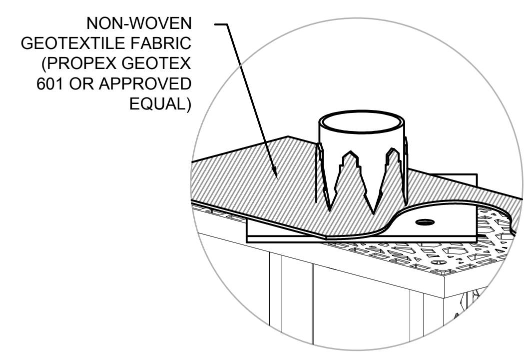
INSTALL OBSERVATION PORT

STEP 4:



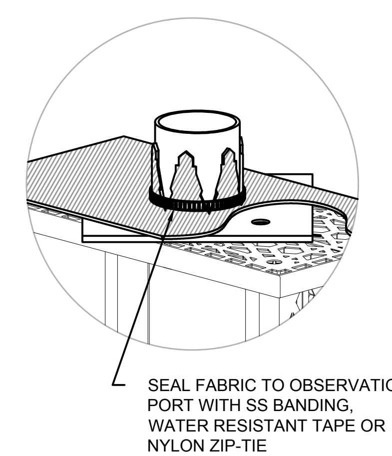
A MARK & CUT FLANGE PLATE FLUSH WITH MODULE SIDE "WHEN MODULE IS ON THE PERIMETER OF THE SYSTEM."

STEP 5:



INSTALL GEOTEXTILE:
WRAP SPECIFIED GEOTEXTILE FABRIC AROUND ENTIRE INSTALLATION OF STORMTANK MODULES. CUT "X" PATTERN INTO GEOTEXTILE FABRIC AT OBSERVATION PORT AND PEEL EDGES OUT.

STEP 6:



NOTES:

a. REFERENCE CURRENT INSTALLATION INSTRUCTIONS FOR PROPER INSTALLATION PRACTICES.

REV.	DATE	RECORD OF CHANGES	BY	APPRV.
F	2/17/17	METRIC DIMENSIONS UPDATED	CGB	
E	11/10/14	GEOTEXTILE PRODUCT SPECIFIED	CGB	
D	9/9/13	UPDATED DRAWING FORMAT	JKB	JKB
C	9/7/12	UPDATED DRAWING FORMAT	BLL	FK
B	3/27/12	REMOVE 6" DIA. PORT CALLOUT	BLL	FK
A	1/11/12	INITIAL RELEASE	BLL	FK

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Project Name
OBSERVATION PORT INSTALLATION DETAIL

Title
STORMTANK
MODULE

Drawn By		Date
B.LINE		1/11/12
Drawing No.	Sheet	Scale
STM-002-00	1 of 1	NTS

Appendix C: Fire Flow Calculations

- Fire Flow Requirements – FUS (Technical Bulletin ISTB-2018-02)

Kollaard Associates
Engineers
210 Prescott Street, Unit 1
P.O. Box 189
Kemptville, Ontario K0G 1J0

Civil • Geotechnical •
Structural • Environmental •
Hydrogeology

(613) 860-0923
FAX: (613) 258-0475

APPENDIX C: CALCULATION OF FIRE FLOW REQURIEMENTS - 16 Hamilton

Calculation Based on Fire Underwriters Survey, 1999

1) An estimate of the Fire Flow required for a given fire area may be estimated by:

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

where F = required fire flow in litres per minute

A = Fire-Resistive Buildings with 1hr fire rating. Consider only area of the largest floor plus 25 percent of each of the two immedately adjoining floors. Largest floor is the 3rd floor. Therefore consider 3rd floor area with 25% of 2nd and 25% of 4thfloor areas.

C = coefficient related to the type of construction:

1.5	for wood construction (structure essentially combustible)
1.0	for ordinary construction (brick or other masonry walls, combustible floor and interior)
0.8	for noncombustible construction (unprotected metal structural components, masonary or metal walls)
0.6	for fire-resistive construction (fully protected frame, floors, roof)

Area of floor 3 = 897 m^2

25% of 2ndFloor = 217 m^2

25% of 4th Floor = 215 m^2

A = 1329 m^2 (Fire Resistive Construction)

C = 0.8

F = 6,416 L/min -----------------------> Rounded to nearest 1000 = **6,000**

2) The value obtained in 1. may be reduced by as much as 25% for occupancies having a low

Non-combustible =	-25%
Limited Combustible =	-15%
Combustible =	0%
Free Burning =	15%
Rapid Burning =	25%

L/min

Reduction due to low occupancy hazard = -15% x 6,000 = **= 5,100** L/min

3) The value above my be reduced by up to 50% for automatic sprinlker system

Reduction due to automatic sprinker system = -30% x 5,100 = **-1,530**

4) The value obtained in 2. may be increased for structures exposed within 45 metres by the fire

Separation (metres)	Condtion	Charge
0m to 3.0m	1	25%
3.1m to 10.0m	2	20%
10.1m to 20.0m	3	15%
20.1m to 30.0m	4	10%
30.1m to 45.0m	5	5%
45.1m to	6	0%

Exposures	Distance(m)	Condtion		Charge
Side 1	11.0	3	-------->	15%
Side 2	0.0	1	-------->	25%
Front	0.0	1	-------->	25%
Back	1.4	1	-------->	25%
				75%

Increase due to separation = 75% x 5,100 = **3,825** L/min

The fire flow requirement is = **5,100**

Reduction due to Sprinkler = **-1,530**

Increase due to Separation = 3,825

The Total fire flow requirement is = 7,395

or **123.3** **L/sec**

Appendix D: Boundary Conditions

Kollaard Associates
Engineers
210 Prescott Street, Unit 1
P.O. Box 189
Kemptville, Ontario K0G 1J0

Civil • Geotechnical •
Structural • Environmental •
Materials Testing •

(613) 860-0923

FAX: (613) 258-0475

October 03, 2018

Shawn Wessel
Project Manager Infrastructure Approvals
Planning Infrastructure & Economic Development Department
Planning Services.

Re: Boundary Conditions 16-20 Hamilton Avenue North

Kollaard Associates Inc has been retained by Surface Developments Inc. to complete the Site Servicing Plan and Site Servicing Report for the proposed residential development at 16-20 Hamilton Avenue North

Could you provide us with the boundary conditions for the property based on the following information.

Type of Development: Residential (8 storey, 73 unit apartment building), with 592m^2 of commercial space.
Location of Services: Hamilton Avenue North (See attached location drawing)
Amount of Fire Flow: 123.3 L/s (See attached fire flow requirements)
Average daily water demand: 0.49 L/s
Maximum daily water demand: 1.20 L/s
Maximum Hourly water demand: 2.63 L/s
Peak sanitary flow: 1.58 L/s

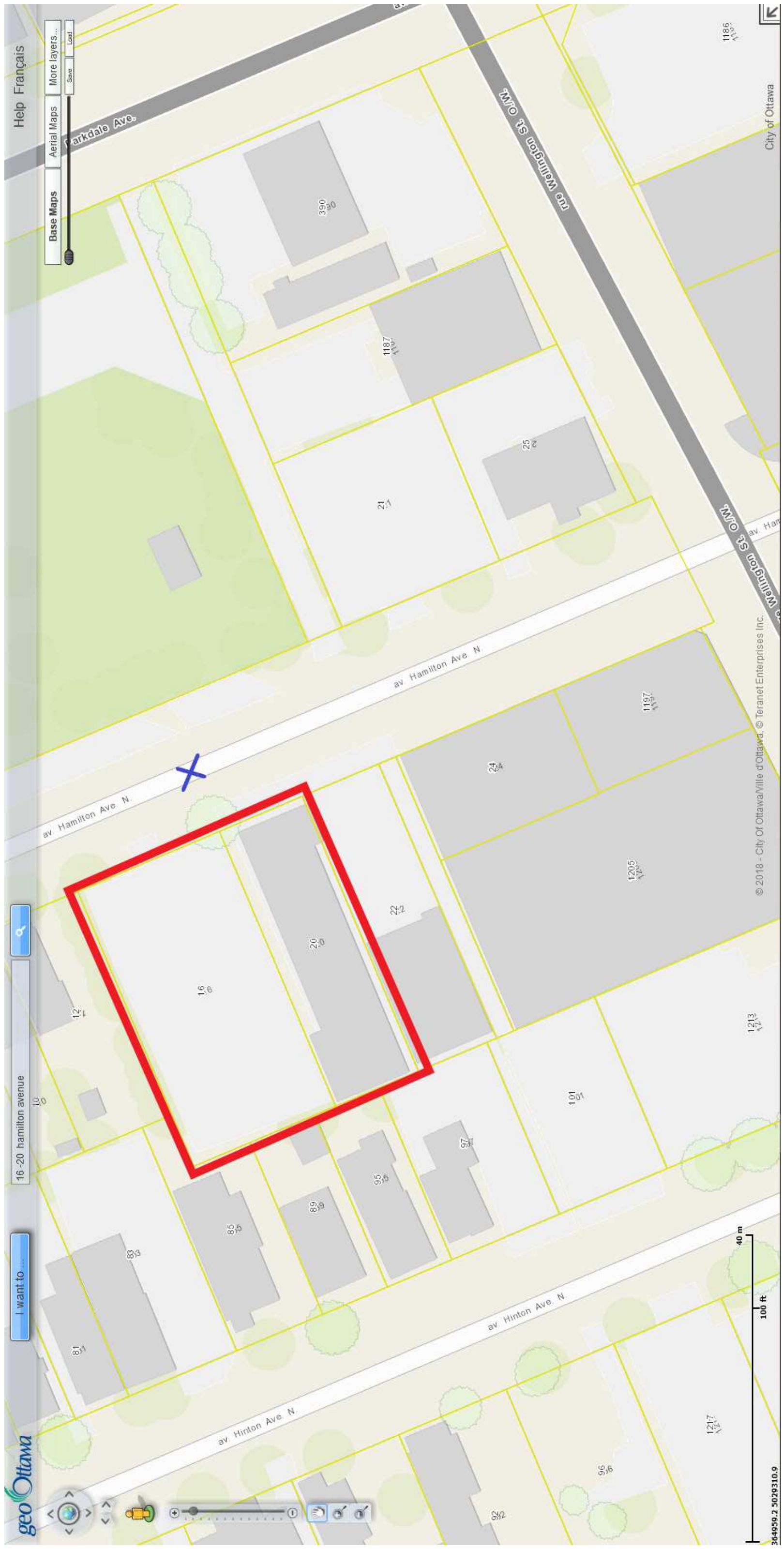
Please note:

- The sanitary calculations have been completed using Technical Bulletin ISTB-2018-01. The water demand calculations have not been updated to reflect the changes in sanitary demand calculations.
- Fire flow is based on FUS calculations and takes into account the methodology provided in Technical Bulletin ISTB-2018-02
- Design calculation spread sheets for FUS, Water and Sanitary are attached
- Servicing Sketch is attached showing proposed connection location

If there are any questions related to the above please contact the undersigned.

Sincerely,
KOLLAARD ASSOCIATES INC.

Steven deWit, P.Eng.



Help Français
Base Maps
Aerial Maps
More layers...
Parkdale Ave.
av. Hamilton Ave. N.
av. Hinton Ave. N.
16 -20 hamilton avenue
I want to ...
City of Ottawa
© 2018 - City of Ottawa/Ville d'Ottawa, © Teranet Enterprises Inc.
40 m
100 ft
geoOttawa

Subject: Fwd: 16-20 Hamilton Ave
From: Amanda VanBruggen <amanda@kollaard.ca>
Date: 09/10/2018 2:56 PM
To: Malou Leblanc <malou@kollaard.ca>

Hello Malou,
We have boundary conditions for Hamilton. See below.
Kind Regards,
Amanda

Kollaard Associates
Engineers
210 Prescott Street, Unit 1
P.O. Box 189
Kemptville, Ontario
K0G 1J0
tel: 613-860-0923
www.kollaard.ca

-------- Forwarded Message --------
Subject:16-20 Hamilton Ave
Date: Tue, 9 Oct 2018 15:20:55 +0000
From: Wessel, Shawn <shawn.wessel@ottawa.ca>
To:'Amanda VanBruggen' <amanda@kollaard.ca>
CC: Gauthier, Steve <Steve.Gauthier@ottawa.ca>

Good morning Ms. VanBruggen.

Please find requested boundary conditions for 16-20 Hamilton below and attached:

The following are boundary conditions, HGL, for hydraulic analysis at 16-20 Hamilton Ave North (zone 1W) assumed to be connected to the 203 mm on Hamilton Ave North (see attached PDF for location).

Minimum HGL = 108.1 m

Maximum HGL = 115.3 m

Max Day (1.20 L/s) + Fire Flow (123.3 L/s) = 107.2 m

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

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

Out Of Office Alert:
I will be away from the office October 17 returning November 5, 2018

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

Thank you

-
Regards,

Shawn Wessel, A.Sc.T.,rcji
Project Manager - Infrastructure Approvals
Gestionnaire de projet – Approbation des demandes d'infrastructures

Development Review Central Branch | Direction de l'examen des projets d'aménagement, Centrale
Planning, Infrastructure and Economic Development Department | Direction générale de la planification de l'infrastructure et du développement économique
City of Ottawa | Ville d'Ottawa
110 Laurier Ave. W. | 110, avenue Laurier Ouest, Ottawa ON K1P 1J1
(613) 580 2424 Ext. | Poste 33017
shawn.wessel@ottawa.ca

Attachments:

16-20 Hamilton Ave N Oct 2018.pdf	108 KB

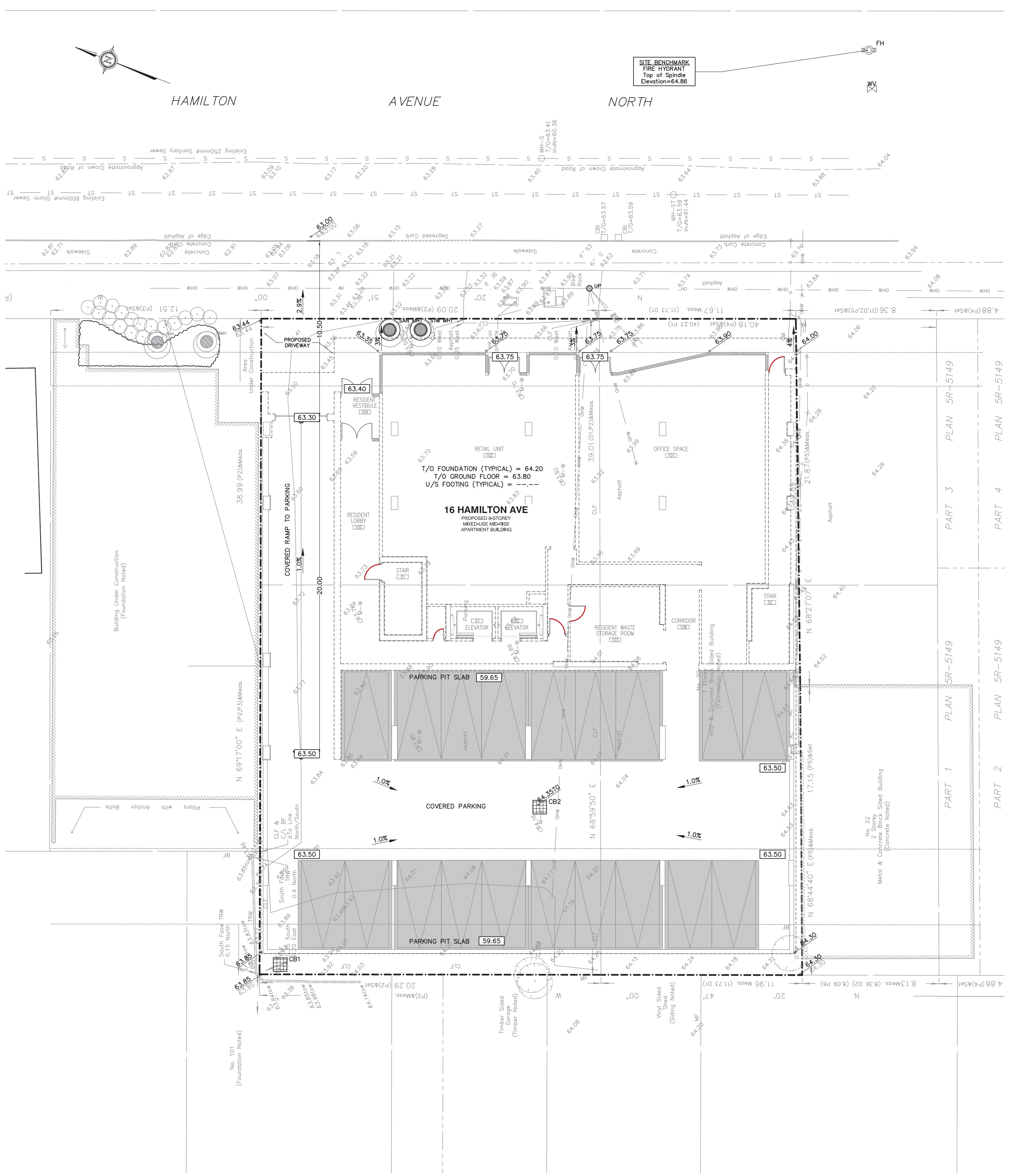
Boundary Condition for 16-20 Hamilton Ave N

Appendix E: Drawings

- 180711– Figure 1 – PRE-DEVELOPMENT CATCHMENT AREAS
- 180711– Figure 2 – POST-DEVELOPMENT CATCHMENT AREAS
- 180711– SER – Site Servicing Plan
- 180711– GEC – Grading & Erosion Control Plan
- 180711– Figure 3 – Roof SWM Storage Plan

LEGEND

- EXISTING ELEVATION
- PROPOSED/EXISTING ELEVATIONS
- PROPOSED ELEVATION
- DRAINAGE SLOPE
- EXISTING DRAINAGE
- WATERMAIN
- STORM SEWER
- SANITARY SEWER
- CENTRELINE OF ROAD
- EXISTING FENCE
- TOP OF SLOPE
- PROPERTY LINE
- SILT FENCE
- OVERHEAD WIRE
- TEMPORARY BENCHMARK
- EXISTING UTILITY POLE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- PROPOSED FIRE DEPARTMENT CONNECTION
- WATER METER
- REMOTE WATER METER
- PROPOSED WATER VALVE
- EXISTING STORM MANHOLE
- EXISTING SANITARY MANHOLE
- EXISTING CATCH BASIN
- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED CATCH BASIN
- PROPOSED SCUPPER LOCATION
- PROPOSED WEIR CONTROL ROOF DRAIN



SITE GRADING PLAN

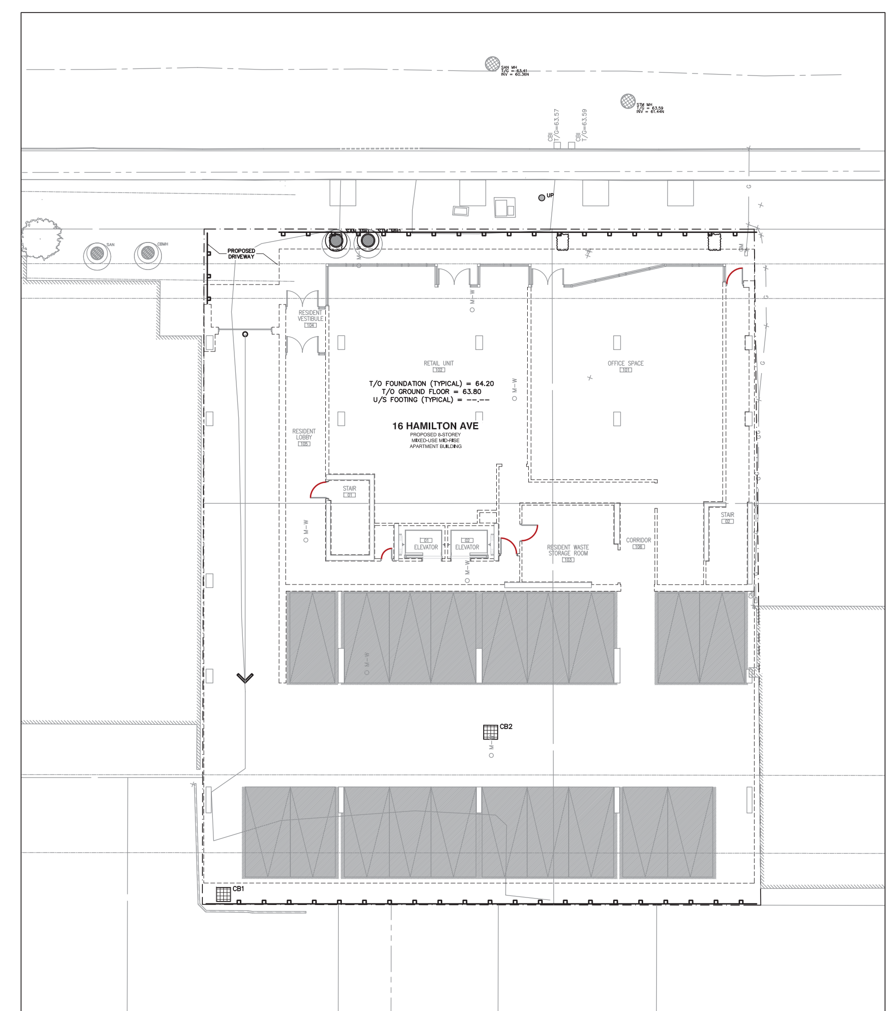
SCALE = 1:150

EROSION AND SEDIMENT CONTROL NOTES:

1. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
2. THE OWNER (AND/OR CONTRACTOR) AGREES TO PREPARE AND IMPLEMENT AN EROSION AND SEDIMENT CONTROL PLAN AT LEAST EQUAL TO THE STATED MINIMUM REQUIREMENTS AND TO THE SATISFACTION OF THE CITY OF OTTAWA, APPROPRIATE TO THE SITE CONDITIONS, PRIOR TO UNDERTAKING ANY SITE ALTERATIONS (FILLING, GRADING, REMOVAL OF VEGETATION, ETC.) AND DURING ALL PHASES OF SITE PREPARATION AND CONSTRUCTION IN ACCORDANCE WITH THE CURRENT BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL.
3. THE SEDIMENT AND EROSION CONTROL PLAN IS A LIVING DOCUMENT WHICH MAY BE AMENDED BY ONSITE REQUIREMENTS AT THE APPROVAL OF THE MUNICIPALITY AND THE CONSERVATION AUTHORITY.

MINIMUM EROSION AND SEDIMENT CONTROL PLAN REQUIREMENTS:

- TIME THE DEMOLITION AND EXCAVATION ACTIVITIES SO THAT THEY OCCUR NO SOONER THAN IS NECESSARY FOR SUBSEQUENT CONSTRUCTION ACTIVITIES.
- PRIOR TO CONSTRUCTION, SILT FENCE BARRIERS (OPSD 219.110) WILL BE PLACED ALONG THE PROPERTY LINES AS SHOWN.
- USE SILT FENCES AROUND ANY STOCKPILES OF SOIL.
- THE SILT FENCE SHOULD BE REMOVED ONLY WHEN THE SITE IS STABILIZED.
- EVERY EFFORT WILL BE MADE TO ENSURE THAT ALL DISTURBED AREAS ARE TOPSOILED AND SEEDED AS SOON AS REASONABLY POSSIBLE.
- INSTALL FILTER SOCKS ACROSS ALL EXISTING AND PROPOSED CATCH BASINS AND CATCH BASIN MANHOLES PRIOR TO CONSTRUCTION.
- THE CONTRACTOR IS TO ENSURE THAT THE SITE ACCESS POINTS AND ADJACENT STREETS TO THE ACCESS POINTS ARE MAINTAINED AND KEPT CLEAN OF CONSTRUCTION MATERIALS SUCH AS, BUT NOT LIMITED TO MUD, DIRT, CLAY AND GRANULARS ON A DAILY BASIS OR AS NECESSARY, TO THE SATISFACTION OF THE CITY OF OTTAWA.

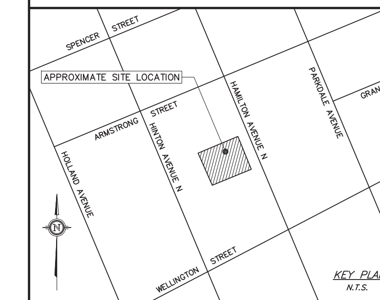


EROSION AND SEDIMENT CONTROL PLAN

SCALE = 1:200

DRAWING NUMBER:

180711-GEC



DRAWING:

GRADING AND EROSION CONTROL PLAN

GENERAL NOTES:

1. All dimensions are in metres; all elevations are in metres and are geodetic.
2. TBM=Top of spindle of existing fire hydrant. Elevation=64.86.
3. This is not a legal survey. Boundary and topographic information was derived from FARLEY, SMITH & DENIS SURVEYING LTD. File No. J1205.
4. Client is responsible for acquiring all necessary permits. This drawing is not for construction until a building permit has been granted.
5. Contractor is responsible for location and protection of utilities.
6. All dimensions to be verified on site by contractor prior to construction.
7. Existing watermain and sewer information shown is based on best available information. Contractor to verify exact location of mains and report any discrepancies to Kollaard Associates.
8. Any changes made to this plan must be verified and approved by Kollaard Associates Inc.
9. The proposed grades have been set and verified for site grading control only. The grade raise at the building location should be verified with regard to subsurface conditions by qualified geotechnical personnel after completion of the excavation.
10. The underside of footing elevation has been set based on the information available and may not have accounted for actual ground water conditions at the exact building location and should be verified by qualified geotechnical personnel upon completion of the excavation.
11. A geotechnical engineer should be retained to provide recommendations with respect to the sub-grade conditions prior to footing installation.
12. The owner agrees to prepare and implement an erosion and sediment control plan to the satisfaction of the City of Ottawa, appropriate to the site conditions, prior to undertaking any site alterations (filling, grading, removal of vegetation, etc.) and during all phases of site preparation and construction in accordance with the current Best Management Practices for Erosion and Sediment Control such as, and not limited to installing filter cloths across manhole/catchbasin lids to prevent sediments from entering structures and install and maintain a light duty silt fence barrier as required.
13. All materials and construction to be in accordance with City of Ottawa standards and Ontario Provincial Standards and Specifications; sewer and watermain material types; disinfection, provide minimum 2.4 metres of cover for water services, cathodic protection, City of Ottawa insulation specifications for watermain, pipe bedding, reinstatement of disturbed areas and leakage testing.
14. This drawing is part of Kollaard Associates File No. 180711.
15. Shop drawings for items such as (but not limited to) storm catch basins and underground storm water storage chambers to be reviewed and approved by Kollaard Associates Inc. prior to fabrication.

REV	BY	DATE	DESCRIPTION
1	ML	2018/10/24	ISSUED FOR SPA SUBMISSION
0	ML	2018/10/23	ISSUED FOR CLIENT REVIEW

Kollaard Associates
Engineers

P.O. BOX 189, 210 PRESCOTT ST. (613) 860-0923
KEMPTVILLE, ONTARIO info@kollaard.ca
K0G 1J0 FAX (613) 258-0475
http://www.kollaard.ca

CONSULTANTS:

CLIENT:

INDEPENDENT DEVELOPMENT GROUP
88 SPADINA AVENUE
OTTAWA, ON K1Y 2C1

PROJECT:

PROPOSED MIXED-USE BUILDING

LOCATION:

16-20 HAMILTON AVENUE N
OTTAWA ON K1Y 1B6

LICENSED PROFESSIONAL ENGINEER
OCT. 24, 2018
S.E. deWit
100079612
PROVINCE OF ONTARIO

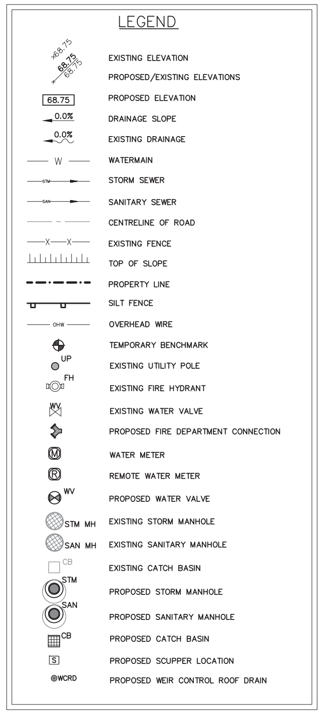
DESIGNED BY:	CHECKED BY:
ML/SD	SD
DRAWN BY:	APPROVED BY:
ML	SD
DATE:	
OCTOBER 01, 2018	
SCALE:	
AS SHOWN	
PROJECT NUMBER:	
180711	

ARCH D

180711-SER

DRAWING NUMBER: 180711-SER

LEGEND



WATERMAIN NOTES:

1. CITY TO SUPPLY, INSTALL & DISINFECT THE WATER SERVICE; CONTRACTOR TO EXCAVATE, BACKFILL AND REINSTATE THE ROADWAY AS PER STD DWG R10.
2. SPECIFICATIONS:

ITEM	SPEC. No.	City Std Dwg No.
WATERMAIN BEDDING AND BACKFILL	OPSD 802.010/802.031	W17
CATHODIC PROTECTION	OPSD 1109.010	W40
PRESSURE TESTING	AWWA C-605-5	
CHLORINATION	AWWA C-651-05	

3. WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE UNLESS OTHERWISE INDICATED. WHERE LESS THAN 2.4m COVER, THERMAL INSULATION IS TO BE PROVIDED AS PER CITY STD DWG W22 (In shallow trenches), W23 (At open structures).
4. A MINIMUM OF 0.5m VERTICAL CLEARANCE IS REQUIRED BETWEEN THE WATERMAINS AND ALL UTILITIES AND SEWERS. IN LOCATIONS WHERE THIS IS NOT ACHIEVABLE, MUST FOLLOW PROCEDURE F-6-1 SEC. 5.2 OF THE ONTARIO DRINKING WATER RESOURCES ACT.
5. METALLIC WARNING TAPE SHALL BE USED OVER ALL WATERMAINS.
6. INSTALL AND TEST TRACER WIRE FOR ALL PROPOSED WATERMAIN IN ACCORDANCE WITH THE CITY OF OTTAWA DESIGN STANDARDS AS SPECIFIED IN SECTION 8.28.
7. EXISTING WATERMAIN INFORMATION SHOWN IS BASED ON BEST CURRENT INFORMATION. CONTRACTOR TO VERIFY EXACT LOCATION OF WATERMAIN AND REPORT ANY DISCREPANCIES TO KOLLAARD ASSOCIATES INC.
8. CONNECTIONS AT ELBOWS AND TEEs IN WATER MAINS SHOULD BE MADE WITH THE USE OF JOINT RESTRAINERS DESIGNED FOR WATERMAIN APPLICATION. JOINT AND PIPE RESTRAINERS SHOULD MEET THE REQUIREMENTS OF AWWA C900, C905 AND C907 AND ASTM F1674-11. JOINT RETRAINERS SHOULD BE INSTALLED AS PER MANUFACTURERS RECOMMENDATIONS.
9. ALL CONNECTORS, RODS AND VALVE BOLTS SHALL BE STAINLESS STEEL.
10. VALVES ARE TO BE OPERATED BY CITY OF OTTAWA STAFF ONLY.
11. NO CONNECTION TO EXISTING WATER NETWORK SHALL BE COMPLETED UNTIL A WATER PERMIT IS OBTAINED FROM THE CITY OF OTTAWA AND CITY OF OTTAWA FORCES ARE ON HAND TO MAKE THE CONNECTION.

SERVICING NOTES:

1. A 0.3-METRE CLEARANCE BETWEEN WATERMAIN AND THE SANITARY AND STORM LATERALS IS TO BE PROVIDED.
2. ALL SERVICES ARE TO BE INSTALLED AT CURRENT CITY OF OTTAWA STANDARDS.
3. SERVICE LATERALS ARE TO HAVE A MINIMUM CLEARANCE OF 2 METRES FROM EXISTING UTILITIES POLES.
4. ALL BENDS IN THE SERVICE LATERALS ARE TO BE A MAXIMUM OF 2 @ 22.5° AND WITHIN THE PROPERTY.
5. ELEVATIONS AND STATUS OF EXISTING LATERALS ARE ANTICIPATED. IF SERVICE LATERALS ARE TO BE RE-USED, IT IS RECOMMENDED THAT THEY BE EXCAVATED AND INSPECTED PRIOR TO BUILDING EXCAVATION. IF NOT BEING RE-USED, EXISTING SEWER SERVICES ARE TO BE CAPPED AT THE PROPERTY LINE TO THE SATISFACTION OF THE CITY'S SEWER OPERATIONS. WATERMAINS TO BE TO BE BLANKED AT THE MAIN TO THE SATISFACTION OF CITY'S WATER OPERATIONS.

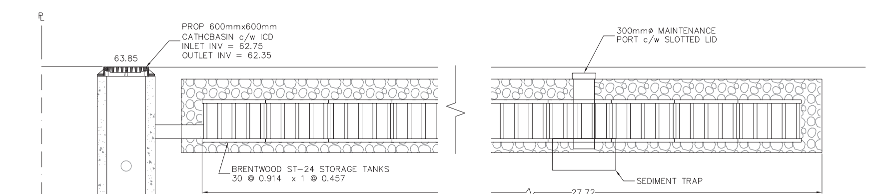
SEWER NOTES:

1. SUPPLY AND CONSTRUCT ALL SEWERS AND APPURTENANCES IN ACCORDANCE WITH THE CITY OF OTTAWA STANDARDS AND SPECIFICATIONS AND ONTARIO PROVINCIAL STANDARDS FOR ROADS AND PUBLIC WORKS.
2. SPECIFICATIONS:

ITEM	SPEC. NO.	CITY STD DWG No.
SEWER SERVICE CONNECTION		S11 & S11.1
SEWER TRENCH		S6 & S7
SANITARY BENCHING	OPSD 701.021	
INSULATION	OPSD 1109.030	

3. INSULATE SEWER SERVICE CONNECTIONS THAT HAVE LESS THAN 2m COVER WITH THERMAL INSULATION. PROVIDE 150mm CLEARANCE BETWEEN PIPE AND INSULATION.
4. PIPE BEDDING, COVER AND BACKFILL ARE TO BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY.
5. FLEXIBLE CONNECTIONS ARE REQUIRED FOR CONNECTION PIPES TO MANHOLES (FOR EXAMPLE KOR-N-SEAL, PSX: POSITIVE SEAL AND DURASEAL). SANITARY RUBBER GASKET TYPE JOINTS SHALL CONFORM TO CSA (B-182.2,3,4).
6. THE OWNER SHALL REQUIRE THAT THE SITE SERVICING CONTRACTOR PERFORM FIELD TESTS FOR QUALITY CONTROL OF ALL SANITARY SEWERS. LEAKAGE TESTING SHALL BE COMPLETED IN ACCORDANCE WITH OPSS 410.07.16, 410.07.16.04 AND 407.07.24. DYE TESTING IS TO BE COMPLETED ON ALL SANITARY SERVICES TO CONFIRM PROPER CONNECTION TO THE SANITARY SEWER MAIN. THE FIELD TESTS SHALL BE PERFORMED IN THE PRESENCE OF A CERTIFIED PROFESSIONAL ENGINEER WHO SHALL SUBMIT A CERTIFIED COPY OF THE TEST RESULTS.
7. CONTRACTOR TO TELEVISE (CCTV) ALL PROPOSED SEWERS, 200mmø OR GREATER PRIOR TO BASE COURSE ASPHALT. UPON COMPLETION OF CONTRACT, THE CONTRACTOR IS RESPONSIBLE TO FLUSH AND CLEAN ALL SEWERS & APPURTENANCES TO MUNICIPAL SATISFACTION.
8. WHERE THE SANITARY SEWER CROSSES ABOVE THE WATERMAIN, THE CONTRACTOR IS TO PROVIDE A MINIMUM OF 0.50m VERTICAL SEPARATION, ADEQUATE STRUCTURAL SUPPORT OF THE SEWER TO PREVENT SETTLING AND EXCESSIVE JOINT DEFLECTION AND ENSURE THAT THE LENGTH OF THE WATER PIPE BE CENTERED AT THE POINT OF CROSSING SO THAT THE JOINTS ARE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE SEWER.

STORMTANK MODULES TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. SHOP DRAWINGS TO BE REVIEWED BY ENGINEER PRIOR TO MANUFACTURING.



SECTION A-A

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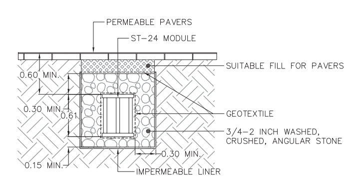

SECTION B-B

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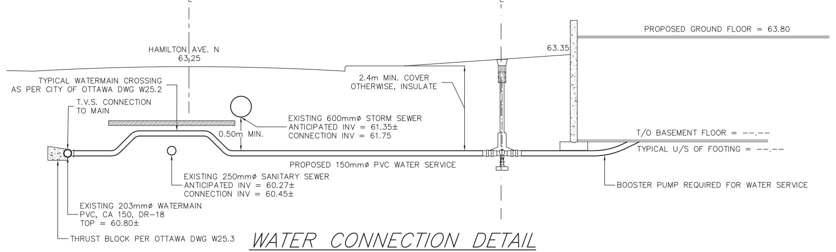
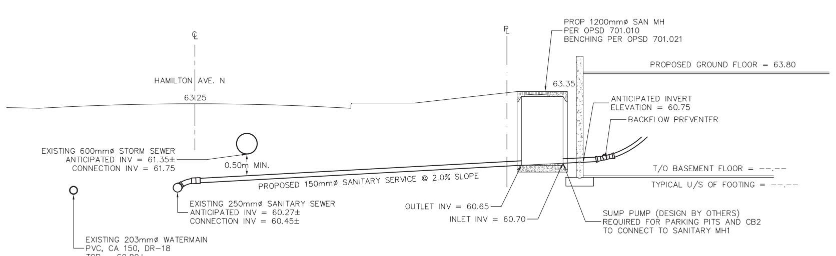


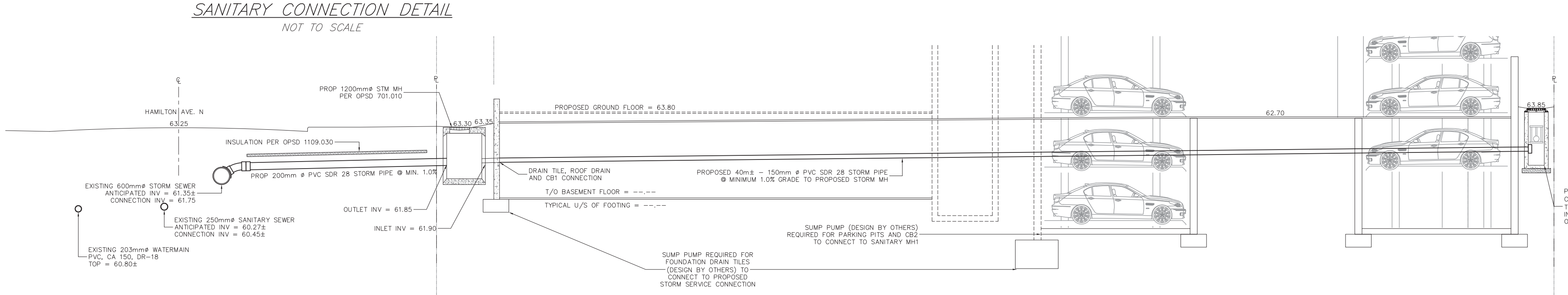
WATER CONNECTION DETAIL

NOT TO SCALE



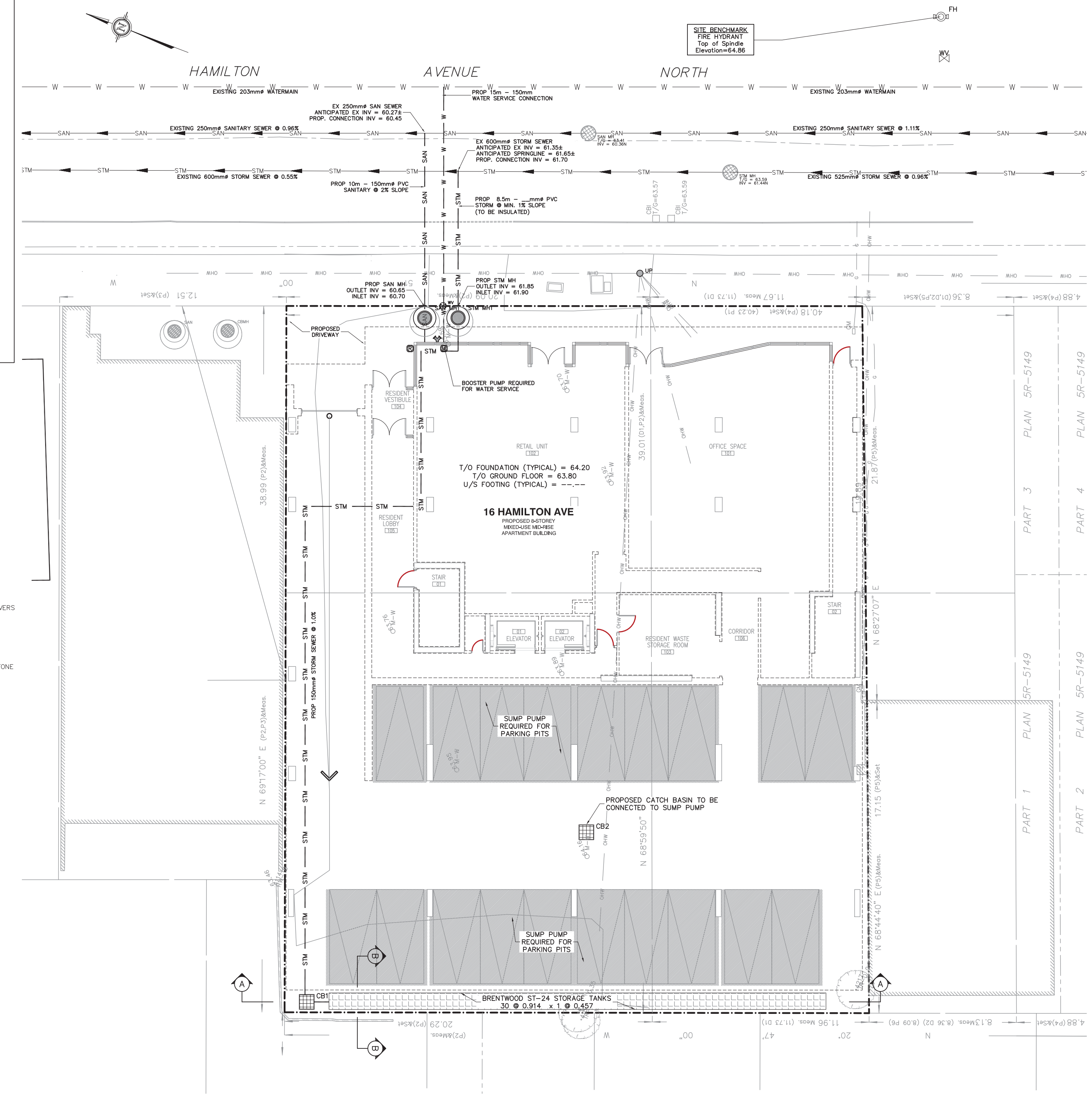
SANITARY CONNECTION DETAIL

NOT TO SCALE



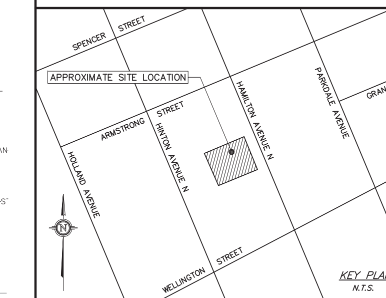
STORM CONNECTION DETAIL

NOT TO SCALE



SITE SERVICING PLAN

SCALE = 1:150



KEY PLAN:
N.T.S.

DRAWING: SITE SERVICING PLAN

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14. This drawing is part of Kollaard Associates File No. 180711.
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1	ML	2018/10/24	ISSUED FOR SPA SUBMISSION
0	ML	2018/10/23	ISSUED FOR CLIENT REVIEW

Kollaard Associates Engineers

P.O. BOX 189, 210 PRESCOTT ST. (613) 860-0923
KEMPTVILLE, ONTARIO info@kollaard.ca
K0G 1J0 FAX (613) 258-0475
http://www.kollaard.ca

CONSULTANTS:

CLIENT:
INDEPENDENT DEVELOPMENT GROUP
88 SPADINA AVENUE
OTTAWA, ON K1Y 2C1

PROJECT:
PROPOSED MIXED-USE BUILDING

LOCATION:
16-20 HAMILTON AVENUE N
OTTAWA ON K1Y 1B6

LICENSED PROFESSIONAL ENGINEER
OCT. 24, 2018
S.E. deWit
100079612
PROVINCE OF ONTARIO

DESIGNED BY: ML/SD	CHECKED BY: SD
DRAWN BY: ML	APPROVED BY: SD
DATE: OCTOBER 01, 2018	
SCALE: AS SHOWN	
PROJECT NUMBER: 180711	

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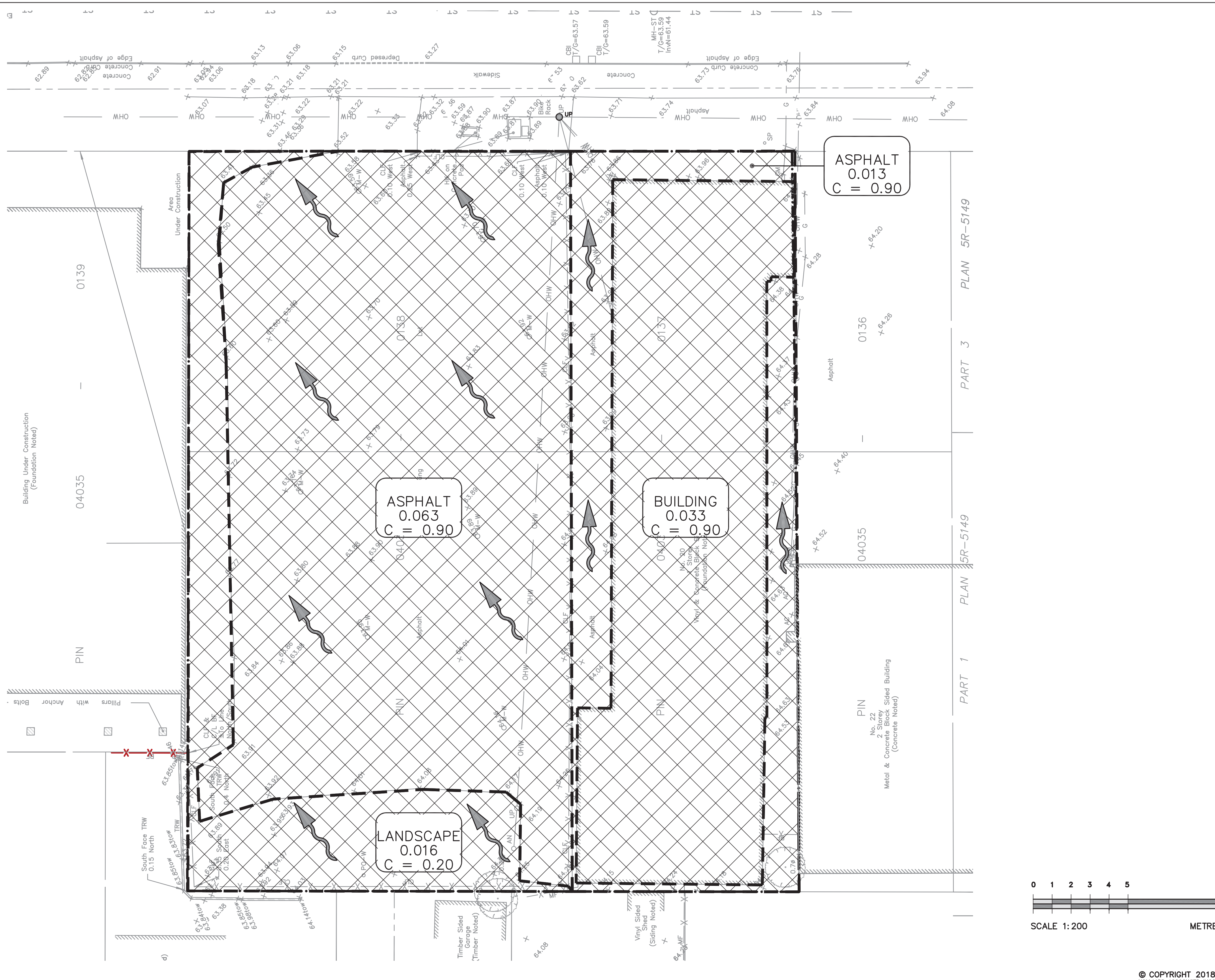
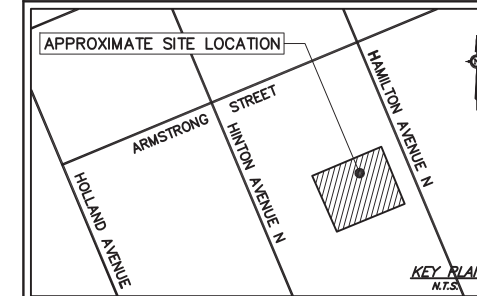


FIGURE 1

DRAWING NUMBER: FIGURE 1

PRE-DEVELOPMENT
CATCHMENT AREAS



LEGEND (STORM WATER MANAGEMENT)

CA1 ROOF 0.010 C = 0.90	AREA ID SURFACE TOTAL AREA (HECTARES) RUN-OFF COEFFICIENT
	CATCHMENT AREA BOUNDARY
	DIRECTION OF FLOW
	PROPERTY LINE
	TOP OF SLOPE
	CONTROLLED AREA
	UNCONTROLLED AREA
	PRE-DEVELOPMENT DRAINAGE PATTERN

REV	BY	DATE	DESCRIPTION
0	ML	2018/10/23	ISSUED FOR SUBMISSION

Kollaard Associates
Engineers

P.O. BOX 189, 210 PRESCOTT ST
KEMPTVILLE, ONTARIO
K0G 1J0 FAX (613) 258-0475
http://www.kollaard.ca
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CLIENT:
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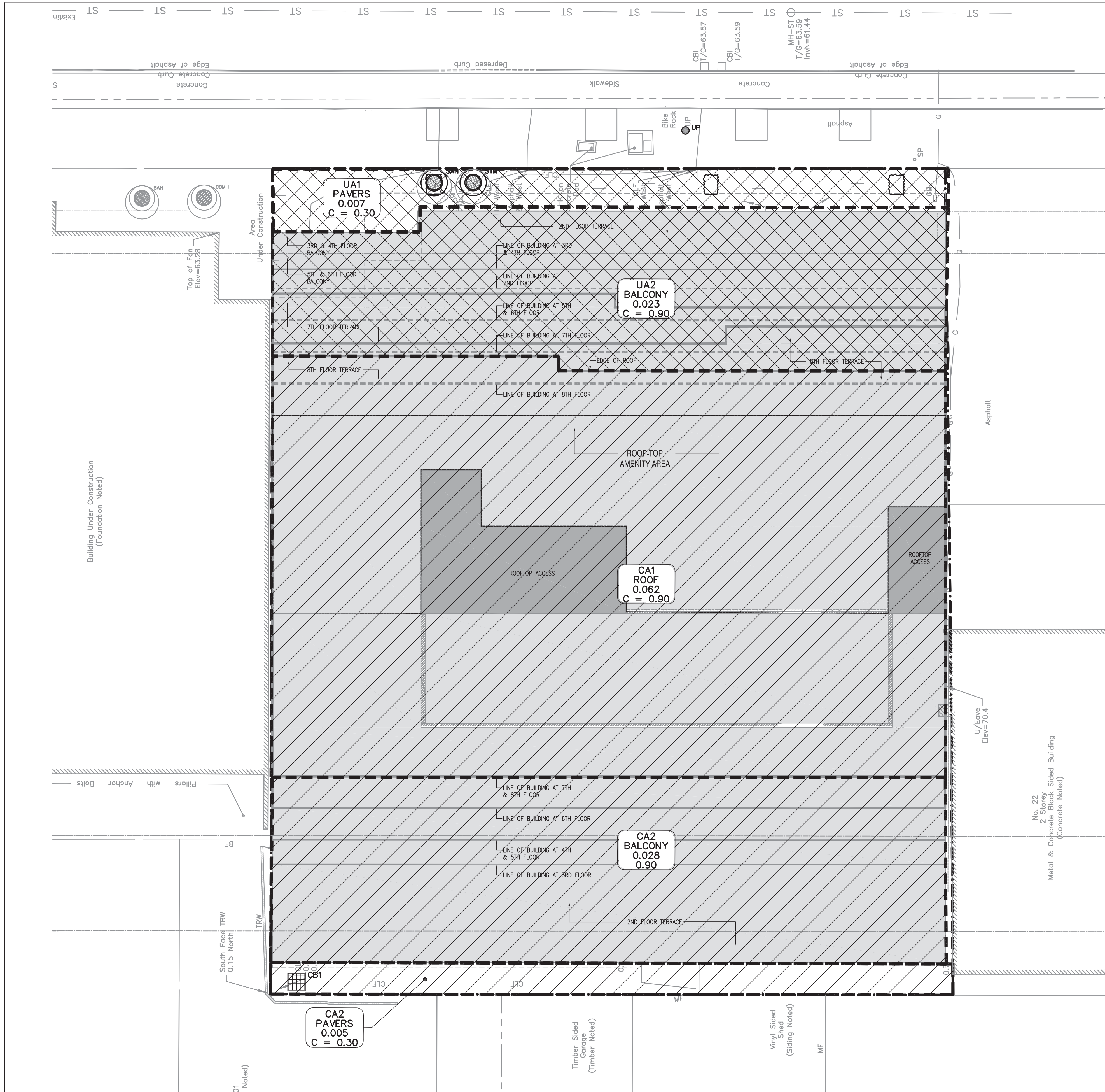
88 SPADINA AVENUE
OTTAWA, ON K1Y 2C1

PROJECT:
PROPOSED MIXED-USE BUILDING

LOCATION:
16-20 HAMILTON AVENUE N
OTTAWA ON K1Y 1B6

DESIGNED BY: SD	DATE: OCT. 01, 2018
DRAWN BY: ML	SCALE: 1:200

KOLLAARD FILE NUMBER:
180711



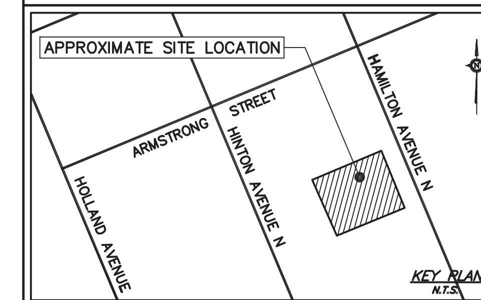
0 1 2 3 4 5 10

SCALE 1:200 METRES

DRAWING NUMBER:

FIGURE 2

POST-DEVELOPMENT CATCHMENT AREAS



LEGEND (STORM WATER MANAGEMENT)

CA1 ROOF 0.010 C = 0.90	AREA ID SURFACE TOTAL AREA (HECTARES) RUN-OFF COEFFICIENT
	CATCHMENT AREA BOUNDARY
	DIRECTION OF FLOW
	PROPERTY LINE
	TOP OF SLOPE
	CONTROLLED AREA
	UNCONTROLLED AREA
	PRE-DEVELOPMENT DRAINAGE PATTERN

REV	BY	DATE	DESCRIPTION
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88 SPADINA AVENUE
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PROJECT:
PROPOSED MIXED-USE BUILDING

LOCATION:
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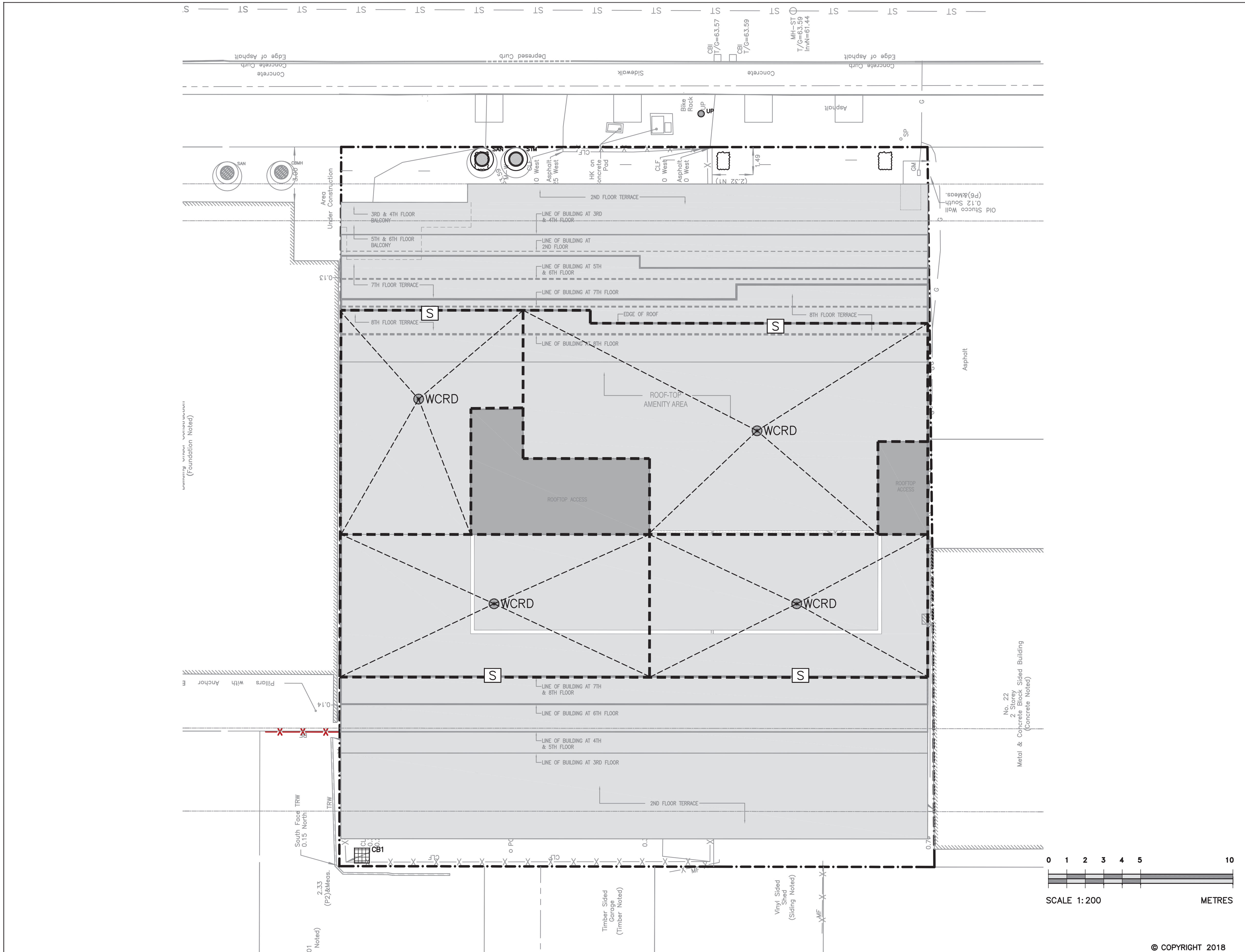
OTTAWA ON K1Y 1B6

DESIGNED BY: SD	DATE: OCT. 01, 2018
DRAWN BY: ML	SCALE: AS SHOWN

KOLLAARD FILE NUMBER:
180711



DRAWING NUMBER:

FIGURE 3

ROOF SWM STORAGE PLAN

APPROXIMATE SITE LOCATION

HAMILTON AVENUE N
ARMSTRONG STREET
HINTON AVENUE N
HOLLAND AVENUE

KEY PLAN N.T.S.

LEGEND (STORM WATER MANAGEMENT)

CA1 ROOF 0.010 C = 0.90	AREA ID SURFACE TOTAL AREA (HECTARES) RUN-OFF COEFFICIENT
	CATCHMENT AREA BOUNDARY
	DIRECTION OF FLOW
	PROPERTY LINE
	TOP OF SLOPE
	CONTROLLED AREA
	UNCONTROLLED AREA
	PRE-DEVELOPMENT DRAINAGE PATTERN

S	PROPOSED SCUPPER LOCATION
WCRD	PROPOSED WEIR CONTROL ROOF DRAIN

REV	BY	DATE	DESCRIPTION
0	ML	2018/10/23	ISSUED FOR SUBMISSION

Kollaard Associates
Engineers

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PROJECT:
PROPOSED MIXED-USE BUILDING

LOCATION:
16-20 HAMILTON AVENUE N
OTTAWA ON K1Y 1B6

DESIGNED BY: SD	*DATE:* OCT. 01, 2018
DRAWN BY: ML	*SCALE:* AS SHOWN

KOLLAARD FILE NUMBER:
180711

Appendix F: Correspondence

- City of Ottawa
- RVCA
- MECP

SURFACE DEVELOPMENTS

MEETING REPORT
Pre-Consultation Meeting

Meeting Date	August 23, 2018		
Meeting Location	110 Laurier Ave, Room 4118E		
Facilitator	Steve Gauthier		
Attendees	Shawn Wessel	City of Ottawa (Infrastructure)	shawn.wessel@ottawa.ca
	Linda Hoad	Hintonburg Community Association	linda.hoad@teksavvy.com
	Wanda Goneau	Hintonburg Community Association	
	Steve Gauthier	City of Ottawa (Planner)	steve.gauthier@ottawa.ca
	Christopher Moise	City of Ottawa (Designer)	christopher.moise@ottawa.ca
	Wally Dubyk	City of Ottawa (Transportation)	wally.dubyk@ottawa.ca
	Brian Casagrande	Fotenn	casagrande@fotenn.com
	Ryan Koolwine	Project1 Studio	koolwine@project1studio.ca
	Jakub Ulak	Surface Developments	jakub@surfacedevelopments.com
	Sloane Weingarden	Surface Developments	sloane@surfacedevelopments.com

Item	Description	Action by
1.0	**Planning & Policy** • Height of building – guidance is unclear for this site in the community development plan (CDP) • To be confirmed if the CDP includes intensification • Copy of zoning plan to be submitted to Fotenn for review • Provide zoning chronology to Fotenn for review • If the proposed building is over 6 storeys in height, an amendment to the secondary plan will be required. Fotenn to submit a response in writing to contest this. Once submitted, City to review and respond.	Linda/Wanda (HCA) Steve (City of Ottawa) Steve (City of Ottawa) Brian (Fotenn)/ Steve (City of Ottawa)
2.0	**Building Design** • Proposed building will be mid-rise height (less than 10 storeys), mixed-use occupancy • Opportunity to provide a response to community feedback from 12 Hamilton construction • Proposed 9 floors with significant step-backs on floors 6 through 9 • Balconies will overlook Parkdale Park, capitalizing on views • Main floor (street level) to contain retail space to support community engagement and maintain the traditional main street character of the neighbourhood	
3.0	**Noise Study** • Rooftop patio may require a barrier to reduce noise impacts • Rooftop terrace may not be feasible based on results of noise study. Terrace could be relocated to another floor if necessary • Wind study will most likely be required • Traffic noise study will be required	
4.0	**Hintonburg Community Association Feedback** • Shadow studies required for impact to neighbouring buildings and/or houses • Preference that terraces be located facing the park • Small scale retail to compliment the Parkdale market services and amenities • Affordable housing options - Linda to discuss options with Ottawa Community Housing • Mix of unit types (ie. 1 bedroom and 2 bedroom options to be provided)	Linda (HCA)

	• Protection of existing trees and landscaping to be taken into consideration • All hazardous substances to be removed and documented in hazardous substances report	
5.0	**Building Services** • Part of the sanitary system connects to the Cave Creek Trunk – tbc with Ministry of Environment if an Environmental Compliance Approval will be required • Storm water management plan and report will be required for City of Ottawa review and records • Permeable surfaces required • Location of waste units to be identified on plans	
	END OF REPORT	

Next Meeting Date: TBC
Next Meeting Location: TBC

Appendix G: Servicing Guidelines Checklist

4.1 General Content

☒ Executive Summary (for larger reports only).

Comments: *N/A*

☒ Date and revision number of the report.

Comments: *Refer to cover page of the Servicing & Stormwater Management Report- Dated Rev 0 October 23, 2018 (SSMR).*

☒ Location map and plan showing municipal address, boundary, and layout of proposed development.

Comments: *Refer to drawings180711-SER and 180711-GR in appendix E of the SSMR*

☒ Plan showing the site and location of all existing services.

Comments: *Refer to drawing 180711-SER in appendix E of the SSMR .*

☒ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.

Comments: *Refer to Architectural Site plan by Project1 Studio Incorporated*

☒ Summary of Pre-consultation Meetings with City and other approval agencies.

Comments: *Pre-Consultation Meeting with City had taken place August 23, 2018 Included in Appendix F of the SSMR*

☒ Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.

Comments: *Conformance to City of Ottawa Guidelines, No higher level studies applicable*

☒ Statement of objectives and servicing criteria.

Comments: *Refer to section 2.0 of the SSMR for Storm, Section 3 for Sanitary and Section 4 for Water.*

☒ Identification of existing and proposed infrastructure available in the immediate area.

Comments: *Refer to drawing 180711-SER for location, size and depth. Drawing located in appendix E of of the SSMR.*

☒ Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).

Comments: *N/A Discharge to City of Ottawa Storm Sewer System*

☒ Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.

Comments: *There is no Master Grading Plan - Refer to grading plan180711-GR located in appendix E of the SSMR.*

☒ Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.

Comments: *N/A*

☒ Proposed phasing of the development, if applicable.

Comments: *N/A*

☒ Reference to geotechnical studies and recommendations concerning servicing.

Comments: *Reference Geotechnical Report Prepared for Surface Developments for the Adjacent Site 12 Hamilton Road dated August 2016*

☒ All preliminary and formal site plan submissions should have the following information:

- ☒ Metric scale
- ☒ North arrow (including construction North)
- ☒ Key plan
- ☒ Name and contact information of applicant and property owner
- ☒ Property limits including bearings and dimensions
- ☒ Existing and proposed structures and parking areas
- ☒ Easements, road widening and rights-of-way
- ☒ Adjacent street names

Comments: *Refer to drawings in appendix E of the SSMR*

4.2 Development Servicing Report: Water

☒ Confirm consistency with Master Servicing Study, if available

Comments: *N/A*

☒ Availability of public infrastructure to service proposed development

Comments: *Refer to Section 3 and 4 of the SSMR .*

☒ Identification of system constraints

Comments: *Yes - boundary conditions were received. Boundary Conditions can be found in appendix F of of the SSMR - Also response from City including System Constraints*

☒ Identify boundary conditions

Comments: *Boundary Conditions can be found in appendix D of the SSMR*

☒ Confirmation of adequate domestic supply and pressure

Comments: *Refer to Section 4.0 - Watermain Design of the SSMR.*

☒ Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.

Comments: *Refer to Appendix C of the SSMR and Section 4.0*

☒ Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.

Comments: *Pressure Reducing Valves not Required. Booster pump required to service top floor. See section 4.0 of the SSMR*

☒ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design

Comments: *No phasing involved with this project*

☒ Address reliability requirements such as appropriate location of shut-off valves

Comments: *N/A*

☒ Check on the necessity of a pressure zone boundary modification.

Comments: *The water pressure available at the site is above the minimum residual pressure at the ground floor level - Section 4.0 of the SSMR*

☒ Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range

Comments: *Refer to Section 4.0 - Watermain Design in the SSMR*

☒ Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.

Comments: *8 storey residential building serviced by 203mm watermain, refer to Drawing 180711-SER in appendix E of the SSMR*

☒ Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.

Comments: *N/A*

☒ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.

Comments: *Refer to Section 4.0 - Watermain Design in the SSMR*

☒ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

Comments: *Refer to appendix D of the SSMR*

4.3 Development Servicing Report: Wastewater

☒ Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).

Comments: *Refer to Section 3.0 of the SSMR .*

☒ Confirm consistency with Master Servicing Study and/or justifications for deviations.

Comments: *No Master Servicing Study, Design Conformance with Ottawa Sewer Design Guidelines.*

☒ Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.

Comments: *There are no local conditions of this nature. Refer to Section 3.0 of the SSWR.*

☒ Description of existing sanitary sewer available for discharge of wastewater from proposed development.

Comments: *Refer to drawing 180711-SER is appendix E of the SSMR.*

☒ Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)

Comments: *Refer to Section 3.0 of the SSMR*

☒ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.

Comments: *N/A*

☒ Special considerations such as contamination, corrosive environment etc.

Comments: *N/A*

4.4 Development Servicing Report: Stormwater

☒ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)

Comments: *Refer to Section 2.0 of the SSMR.*

☒ Analysis of available capacity in existing public infrastructure.

Comments: *Refer to Section 2.0 of the SSMR - Stormwater runoff to be controlled to less than existing predevelopment conditions in accordance with conditions provided by City.*

☒ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.

Comments: *Refer to drawings Figure 1 - Pre-Development and Figure 2 Post Development Catchment Areas in Appendix E of the SSMR.*

☒ Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.

Comments: *Refer to Section 2.0 of the SSMR.*

☒ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.

Comments: *Refer to Section 2.0 of the SSMR.*

☒ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.

Comments: *Refer to Section 2.0 and Appendix A and B of the SSMR*

☒ Set-back from private sewage disposal systems.

Comments: *N/A*

☒ Watercourse and hazard lands setbacks.

Comments: *N/A*

☒ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.

Comments: *Pre-consultation with Ministry of Environment is ongoing*

☒ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.

Comments: N/A - no master servicing study avaiable

☒ Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).

Comments: Refer to Appendix A of the SSMR and Section 2 of SSMR

☒ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.

Comments: N/A

☒ Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.

Comments: Refer to Appendix A of the SSMR and Section 2 of SSMR

☒ Any proposed diversion of drainage catchment areas from one outlet to another.

Comments: N/A

☒ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.

Comments: N/A - Refer to Drawing 180711 - SER - Appendix E of the SSMR

☒ If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.

Comments: Quantity control is provided. Refer to section 2 of the SSMR

☒ Identification of potential impacts to receiving watercourses

Comments: No Potential Impacts

☒ Identification of municipal drains and related approval requirements.

Comments: No municipal drains

☒ Descriptions of how the conveyance and storage capacity will be achieved for the development.

Comments: *Refer to section 2 of the SSMR*

☒ 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.

Comments: *100 year flood levels and major flow routing is shown on drawing180711-GEC in appendix E of the SSMR .*

☒ Inclusion of hydraulic analysis including hydraulic grade line elevations.

Comments: *N/A*

☒ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.

Comments: *Refer to Section 5.0 of the SSMR*

☒ Identification of floodplains - proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.

Comments: *N/A*

☒ Identification of fill constraints related to floodplain and geotechnical investigation.

Comments: *N/A*

4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

☒ Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.

Comments: *Consultation with RVCA is ongoing*

☒ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.

Comments: *Pre-consultation with MECP is ongoing*

☒ Changes to Municipal Drains.

Comments: *N/A*

☒ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

Comments: *N/A*

4.6 Conclusion Checklist

☒ Clearly stated conclusions and recommendations

Comments: *Refer to Section 6.0 of the SSMR*

☒ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.

Comments: *-comments are to be received from review agencies and will be addressed item by item in response letters.*

☒ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario

Comments: *Signed and Stamped.*