PROPOSED THREE STOREY

RESIDENTIAL APARTMENT BUILDING SITE

PART OF LOT 31

R-PLAN 294

1062 AND 1066 SILVER STREET

CITY OF OTTAWA

STORM DRAINAGE REPORT

REPORT R-821-10

T.L. MAK ENGINEERING CONSULTANTS LTD.

JULY 2021

REFERENCE FILE NUMBER 821-10

Introduction

The proposed three storey apartment building site is located at the northwest corner of Silver Street and Summerville Avenue. The said re-development property is an amalgamation of (2) lots known as 1062 and 1066 Silver Street. Total area of the site is 1,114.81 m^2 or 0.1115 ha. Presently, there are (2) one-storey stucco siding dwelling units currently occupying the residential lots.

The site under consideration is situated on the north side of Summerville Avenue, west of Silver Street and is south of Dorchester Avenue. Its legal property description is Part of Lot 31 Registered Plan 294 City of Ottawa located in Ward 16 (River).

The proposed building is a 23 unit – (3) storey residential apartment building with underground parking. Front entrance of this building will face onto Summerville Avenue. See site plan details in Appendix A.

The ±11.0m high apartment building contains six 1-bedroom + den units and seventeen 2-bedroom units. Each floor covers an area of 6,926 ft^2 (±643 m^2) for a gross floor area of 20,778.0 ft^2 (1,929 m^2). Stormwater outlet for this site is the existing 300mm diameter Summerville Avenue storm sewer located within the Summerville Avenue road right of way. Stormwater from this sewer is then routed north to the existing 375mm diameter Silver Street storm sewer which in turn further routes flow to the north into the existing 750mm diameter storm sewer on Shillington Avenue.

From storm drainage criteria set by the staff at the City of Ottawa's Engineering Department, the allowable post-development runoff release rates shall not exceed the two (2)-year pre-development conditions. The allowable pre-development runoff coefficient is the lesser of the calculated "C" existing value or C = 0.5 maximum. If the uncontrolled stormwater runoff exceeds the specified requirements, the on-site stormwater management (SWM) control measures are necessary. The post-development runoff coefficient for this site is estimated at C = 0.75, which exceeds the pre-development allowable C_{pre} = 0.42 criteria for the Summerville Avenue storm sewer without on-site SWM control. Therefore, SWM measures are required. Refer to the attached Drainage Area Plan (Figure 1) as detailed in Appendix B.

This report will address and detail the grading, drainage, and stormwater management control measures required to develop this property. Based on the Proposed Site Grading and Servicing Plan (Dwg. No. 821-10 G-1) and the Proposed Rooftop Stormwater Management Plan (Dwg. No. 821-10 SWM-1), the stormwater of this lot will be controlled on-site by means of building rooftop only.

The stormwater management calculations that follow will detail the extent of on-site SWM control to be implemented and the storage volume required on-site to attain the appropriate runoff release that will conform to the City's established drainage criteria.

Because the site will be connecting to and outletting into the separated Silver Street storm sewer, therefore, the approval exemption under Ontario Regulations 525/98 would apply since storm water discharges from this site will outlet flow into a downstream storm sewer. Thus, an Environmental Compliance Application (ECA) application will not be required to be submitted to the Ministry.

Site Data

1. Development Property Area

Post-Development Site Area Characteristics

Development Lot Area	=	1,114.81 m^2
Roof Surface Area	=	639.50 m^2
Concrete/Interlock Area	=	160.60 m^2
Grass Area	=	225.70 m^2
Riverstone Area	=	89.01 m^2

$$C = \frac{(639.50 \times 0.9) + (160.60 \times 0.9) + (89.01 \times 0.7) + (225.70 \times 0.2)}{1{,}114.81}$$

$$C = \frac{827.537}{1{,}114.81}$$

$$C = 0.742$$

Say "C" $= 0.75$

Therefore, the average post-development "C" for this site is 0.75.

2. Controlled Area Data (NODE #1, NODE #2, and NODE #3)

Roof Surface Area	=	639.50 m^2
Total Storm-water Controlled Area	=	639.50 m^2

$$C = \frac{(639.50 \times 0.9)}{639.50}$$

$$C = \frac{575.55}{639.50}$$

$$C = 0.9$$

Say "C" $= 0.9$

Therefore, the post-development "C" for the controlled storm-water drainage area (roof top) is 0.90.

3. Uncontrolled Area Data (NODE #4)

PROPOSED SITE

Grass Area	=	225.70 m^2
Concrete/Interlock Area	=	160.60 m^2
Riverstone Area	=	89.01 m^2
Total Storm-water Uncontrolled Area	=	475.31 m^2

$$C = \frac{(160.60 \times 0.9) + (225.70 \times 0.2) + (89.01 \times 0.7)}{475.31}$$

$$C = \frac{251.987}{475.31}$$

$$C = 0.5302$$

$$\text{Say } \text{“C”} = 0.53$$

Therefore, the average post-development “C” for the uncontrolled storm-water drainage area of 475.31 m^2 from this site is 0.53.

The total tributary area consisting of approximately 475.31 square metres will be out-letting off site uncontrolled from the residential apartment building site which is also the surface area draining to the front of the lot and outletting to the Summerville Avenue and Silver Street road right of way.

The uncontrolled drainage area draining to the front of the lot is 475.31 m^2 and the controlled drainage area from the available flat roof top is 639.50 m^2 which totals to 1,114.81 m^2.

The SWM area to be controlled is 639.50 m^2. Refer to the attached “Drainage Area Plan” in Figure 1 of Appendix B for further details.

Pre-Development Flow Estimation

Maximum allowable off-site flow: two (2)-year storm

Node #101

Pre-Development Site Area Characteristics

Development Lot Area	=	1,114.81 m^2
Asphalt Area	=	38.28 m^2
Concrete Area	=	7.05 m^2
Roof Area	=	191.00 m^2
Grass Area	=	821.30 m^2
Gravel Area	=	57.18 m^2

$$C_{2pre} = \frac{(191.00 \times 0.9) + (38.28 \times 0.9) + (7.05 \times 0.9) + (821.30 \times 0.25) + (57.18 \times 0.8)}{1{,}114.81}$$

$$C_{2pre} = \frac{463.766}{1{,}114.81}$$

$$C_{2pre} = 0.416$$

$$\text{Say } C_{2pre} = 0.42$$

Use C_{allow} = 0.42 allowable for redevelopment

T_c = D/V where D = 47.5 m, ΔH = 2.26 m, S = 4.76%, and V = 1.5 feet/second = 0.46 m/s
Therefore,

$$T_c = \frac{47.5 \text{ m}}{0.46 \text{m/s}}$$

T_c = 1.72 minutes
Use T_c = 10 minutes
I_2 = 77.10 mm/hr [City of Ottawa, two (2)-year storm]

Using the Rational Method

Q = 2.78 (0.42) (77.10) (0.1115)

Q = 10.04 L/s

Therefore, the total allowable flow off-site is 10.04 L/s.

The pre-development flow of the five (5)-year and 100-year storm event all draining to the **front** of the lot (Silver Street and Summerville Avenue road right of way) is as follows:

Where, Tc = 10 min.

$$Q_{5pre} = 2.78 \text{ CIA}$$

$$C_{5pre} = \frac{463.766}{1{,}114.81}$$

$$C_{5pre} = 0.416$$

Say, $C_{5pre} = 0.42$ all draining to the Silver Street road right of way

$$Q_{5pre} = 2.78\ (0.42)\ (104.2)\ (0.1115)$$

$$= 13.57 \text{ L/s}$$

$$C_{100pre} = \frac{(191.0 \times 1.0)+(38.28 \times 1.0)+(7.05 \times 1.0)+(57.18 \times 1.0)+(821.30 \times 0.2 \times 1.25)}{1{,}114.81}$$

$$C_{100pre} = \frac{498.84}{1{,}114.81}$$

$$C_{100pre} = 0.448$$

Say, $C_{100pre} = 0.45$ all draining to the front of lot

$$Q_{100pre} = 2.78\ (0.45)\ (178.6)\ (0.1115)$$

$$= 24.91\ \text{L/s}$$

Therefore under current site conditions the 5 year pre-development flow is estimated at 13.57 L/s and the 100 year pre-development flow is estimated at 24.91 L/s.

A coloured Google image and aerial photography of these current pre-development conditions of the site is provided in Appendix C of this report for reference.

Post-Development Flow Estimation

Uncontrolled Drainage Areas

The post-development flow of the five (5)-year and 100-year storm event all draining to the existing road right of way uncontrolled is as follows:

Where, Tc = 10 min.

Node #2

Q_{5post} = 2.78 CIA

Post Development Area Draining to the **front** uncontrolled is:

Concrete/Interlock Area	=	160.60 m^2
Grass Area	=	225.70 m^2
Riverstone Area	=	89.01 m^2

A_{Total} = 475.31 m^2

$$C_{5post} = \frac{(89.01 \times 0.7) + (225.70 \times 0.2) + (160.60 \times 0.9)}{475.31}$$

$$C_{5post} = \frac{251.987}{475.31}$$

$$C_{5post} = 0.5302$$

Say, $C_{5post} = 0.53$ draining to the Silver Street road right of way uncontrolled.

$$Q_{5post} = 2.78\ (0.53)\ (104.2)\ (0.0475)$$

$$= 7.29\ \text{L/s}$$

$$C_{100post} = \frac{(89.01 \times 1.0) + (225.70 \times 0.2 \times 1.25) + (160.60 \times 1.0)}{475.31}$$

$$C_{100post} = \frac{306.035}{475.31}$$

$$C_{100post} = 0.644$$

Say, $C_{100post} = 0.64$ draining to the front of lot uncontrolled

$$Q_{100post} = 2.78\ (0.64)\ (178.6)\ (0.0475)$$

$$= 15.09\ \text{L/s}$$

Therefore under post development condition, the 5 year uncontrolled flow off-site is estimated at 7.29 L/s and the 100 year uncontrolled flow is 15.09 L/s.

For this site, because 475.31 square meters of the site area is drained uncontrolled off site, the net allowable discharge for this site into the existing sewer system using the two (2)-year storm event criteria at C_{allow} = 0.4 is calculated as follow: Q = {2.78 (0.42) (77.10) (0.1115) – [2.78 (0.64) (178.6) (0.0475)]} = 10.04 L/s – 15.09 L/s = -5.05 L/s. Therefore, according to this approach, the maximum allowable flow rate off site is 10.04 L/s and the new allowable controlled flow rate off-site is -5.05 L/s. Discussions held with City, it was agreed that controlling flow to a net rate of -5.05 L/s is not practical and that an exceedance of -7.90 L/s off-site will be considered by the City of Ottawa due to the small lot size.

Storm-Water Management Analysis

Based on the above calculation from site information provided and given the small area size of the lot under consideration (1,114.81 m^2) therefore to limit the maximum allowable flow off-site to the 2-year development flow of 10.04 L/s the City of Ottawa Engineering Department recognized that this is not achievable.

For this proposed development, the building flat roof top will be used to provide Stormwater Management (SWM) attenuation for this site. Three (3) controlled roof drains are proposed to regulate flow off-site for on-site SWM measures to be incorporated with this proposed development.

The roof drain flow rate proposed is set at 0.95 L/s (15.0 U.S. gal/min.) for Roof Drain #1, for Roof Drain #2 and for Roof Drain #3 under a head of 150mm at the drain. Therefore, the total controlled roof drain flow off-site is 2.85 L/s (45.0 U.S. gal/min.).

Thus for this site, the 5 year maximum post development flow rate draining off-site is the uncontrolled flow from the lot plus controlled rooftop flow which equals to 10.14 L/s (7.29 L/s + 2.85 L/s) which is

approximately equal to 10.04 L/s set by the SWM criteria for this site. During the 100 year event, the maximum post development flow rate off-site is estimated at 17.94 L/s (15.09 L/s + 2.85 L/s) which exceeds the allowable site flow of 10.04 L/s by 7.90 L/s.

Therefore for this proposed development site, the total maximum allowable five (5) year release rate of 10.04 L/s is approximately equal to the 5-year post development flow of 10.14 L/s.

For storm events up to and including the 100 year event the total maximum allowable release rate of 10.04 L/s will be exceeded by 7.90 L/s (estimated at 17.94 L/s) where the flow exceedance is approximately 7.90 L/s for this site.

To the controlled drainage area (flat roof top of proposed building) the post-development inflow rate during the five (5)-year and 100-year storms for the (3) three flat rooftop areas can be calculated as follows.

Design Discharge Computation

Flat Rooftop Areas

To Calculate Roof Storage Requirements

The proposed flat roof of the apartment building on the property will incorporate three (3) roof drains to control flow off-site for this development property. The roof drain flow rate proposed is at 0.95 L/s (15.0 U.S. gal./min.) for roof drain #1, for roof drain #2 and for roof drain #3. The specified roof drain is the Watts "Adjustable Accutrol Weir" (Model # RD-100-A-ADJ) with weir opening in the ¼ open position, which will allow a maximum flow of 0.95 L/s under a head of 150 mm water above the drain for each of roof drain #1, roof drain #2 and roof drain #3. See Appendix D for Roof Drain details. Therefore, the storm-water flow that can be controlled from this rooftop and outletted off site is (0.95 L/s x 3) = 2.85 L/s. Refer to the Proposed Rooftop Stormwater Management Plan Dwg. 821-10 SWM-1 for roof drain details.

C = 0.9 will be used for sizing roof storage volume in this case.

Inflow rate (Q_A) = 2.78 CIA, where C = 0.9, A = surface area of roof, I = mm/hr

For Roof Area 1, Q_{A1} = 2.78 CIA (NODE #1)

Five (5)-Year Event
C_5 = 0.90
A = 240.06 m^2
I = mm/hr

Q_1 = 2.78 (0.90) (0.024 ha.) I = 0.060 I

100-Year Event
C_{100} = 1.0
A = 240.06 m^2
I = mm/hr

Q_1 = 2.78 (1.0) (0.024 ha.) I = 0.0667 I

For Roof Area 2, Q = 2.78 CIA (NODE #2)

Five (5)-Year Event
C_5 = 0.90
A = 215.12 m^2
I = mm/hr

Q_2 = 2.78 (0.90) (0.0215 ha.) I = 0.0538 I

100-Year Event
C_{100} = 1.0
A = 215.12 m^2
I = mm/hr

Q_2 = 2.78 (1.0) (0.0215 ha.) I = 0.0598 I

For Roof Area 3, Q = 2.78 CIA (NODE #3)

Five (5)-Year Event
C_5 = 0.90
A = 184.32 m^2
I = mm/hr

Q_3 = 2.78 (0.90) (0.0184 ha.) I = 0.0461 I

100-Year Event
C_{100} = 1.0
A = 184.32 m^2
I = mm/hr

Q_3 = 2.78 (1.0) (0.0184 ha.) I = 0.0512 I

The summary results of the calculated inflow and the storage volume of the site and building's flat rooftop to store the five (5)-year and 100-year storm events are shown in **Tables 1 to 6** inclusive.

Table 5 summarizes the post-development design flows from the building roof top area as well as the type of roof drains, the maximum anticipated ponding depths, storage volumes required, and storage volumes provided for the five (5)-year, and 100-year design events.

Table 5: Design Flow and Roof Drain Table

Roof Drain ID & Drainage Area (ha)	Number of Roof Drains	Watts Roof Drain Model ID (Weir Opening)	Controlled Flow per Drain (L/s)		Approximate Ponding Depth Above Drains (m)		Storage Volume Required (m^3)		Max. Storage Available (m^3)
			5 YR	100 YR	5 YR	100 YR	5 YR	100 YR	
RD-1 (0.024 ha)	1	RD-100-A-ADJ (1/4 OPENING EXPOSED)	0.87	0.95	0.12	0.15	4.28	10.01	12.09
RD-2 (0.0215 ha)	1	RD-100-A-ADJ (1/4 OPENING EXPOSED)	0.87	0.95	0.12	0.15	3.66	8.65	10.98
RD-3 (0.0184 ha)	1	RD-100-A-ADJ (1/4 OPENING EXPOSED)	0.87	0.95	0.12	0.15	2.92	6.99	8.88
Total Roof (0.0639 ha)	3	-	**2.61**	**2.85**	-	-	**10.86**	**25.65**	**31.95**

Water Quality

For this proposed development site, the local conservation authority (RVCA) was pre-consulted regarding the issue of water quality treatment on-site.

On July 14, 2021, RVCA confirmed that for this site of ±0.1115ha (±1,114.81 m^2) no water quality controls are required based on the current development proposal. Best management practices are encouraged to be implemented, where possible (Refer to RVCA's review comments in Appendix E).

Erosion and Sediment Control

The contractor shall implement Best Management Practices to provide for protection of the receiving storm sewer during construction activities. These practices are required to ensure no sediment and/or associated pollutants are released to the receiving watercourse. These practices include installation of a "siltsack" catch basin sediment control device or equal in catch basins as recommended by manufacturer on-site and off-site within the Silver Street and Summerville Avenue road right of way adjacent to this property. Siltsack shall be inspected every 2 to 3 weeks and after every major storm. The deposits will be disposed of as per the requirements of the contract. See Dwg. #821-10 ESC-1 for details.

Conclusion

At this proposed residential site and to develop this lot to house a 23 unit apartment building on a 0.1115 ha. parcel of land, the estimated allowable flow off-site is calculated at 10.04 L/s based on City of Ottawa drainage and Stormwater Management (SWM) criteria. For on-site SWM attenuation, the flat roof top of the proposed apartment building will be utilized and (3) controlled roof drains are incorporated each with a controlled release rate of 0.95 L/s (15.0 U.S. gal/min.). The controlled flow from this site totals to 2.85 L/s for the post development condition. The uncontrolled 5 year post-development flow from the remainder of the site is estimated at 7.29 L/s and 15.09 L/s for the 100 year event.

During the five (5)-year storm event for the flat rooftop storage, the ponding depth of rooftop area 1, 2 and 3 is estimated at 120 mm at the drain and 0mm at the roof perimeter, assuming a 1.4% minimum

roof pitch to the drain. The rooftop storage available at Roof Area 1 is 5.34 m^3, at Roof Area 2 is 4.90 m^3 and the rooftop storage available at Roof Area 3 is 4.01 m^3, for a total of 14.25 m^3, which is greater than the required volume of 10.86 m^3.

During the 100-year storm event for the flat rooftop storage, the ponding depth of Roof Area 1, 2 and 3 is estimated at 150 mm at the drain and 0mm at the roof perimeter, assuming a 1.4% minimum roof pitch to the drain. The rooftop storage available at Roof Area 1 is 12.09 m^3, Roof Area 2 is 10.98 m^3 and the rooftop storage available at Roof Area 3 is 8.88 m^3, for a total of 31.95 m^3, which is greater than the required volume of 25.65 m^3.

Therefore, by means of flat building rooftop storage and grading the site to the proposed grades as shown on the Proposed Grading and Servicing Plan and Proposed Rooftop Stormwater Management Plan Dwg. 821-10 G-1 and 821-10 SWM-1 respectively, the desirable five (5)-year storm and 100-year storm event detention volume of 14.25 m^3 and 31.95 m^3 respectively will be available on site. Refer to Appendix F for detailed calculations of available storage volumes.

Thus for this development site, the 5 year maximum post development flow draining off-site is the controlled roof top flow plus the uncontrolled flow from the remainder of the site totals to 10.14 L/s (2.85 L/s + 7.29 L /s) which is approximately equal to the allowable flow of 10.04 L/s. For event up to and including 100 year, the estimated maximum post development flow draining off-site is 17.94 L/s (2.85 L/s + 15.09 L/s) which exceeds the site allowable of 10.04 L/s by 7.90 L/s which is for this site equals to 3.95 L/s per each of the (2) amalgamated residential lots that comprises the proposed new development site.

In comparing the magnitude of the 5-year and 100-year pre and post development flow, the 5-year post development flow of 10.14 L/s is less than the 5-year pre-development flow of 13.57 L/s. As for the 100-year post development flow of 17.94 L/s is less than the 100-year pre-development flow of 24.91 L/s. Therefore, drainage from this proposed site development with roof top SWM attenuation will reduce current stormwater loading to the existing municipal storm sewer system.

The building weeping tile drainage will outlet via its separate 150mm diameter PVC storm lateral. The roof drains will be outletted also via a separate 150mm PVC storm lateral, where upon both laterals are connected directly to the existing Summerville Avenue 300mm diameter storm sewer. The City of Ottawa recommends that pressurized drain pipe material be used in the building for the roof drain leader pipe in the event of surcharging in the City Storm sewer system. Refer to the proposed site grading and servicing plan Dwg. 821-10 G-1 for details. The proposed reversed sloped down ramp to the underground garage parking level will have a trench drain with a 200mm diameter storm pipe to drain the ramp area. Stormwater outlet for this reversed slope ramp area is the existing 375mm diameter Silver Street storm sewer.

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PROPOSED 1062 AND 1066 SILVER STREET THREE STOREY

APARTMENT BUILDING DEVELOPMENT SITE

TABLE 1

FIVE (5)-YEAR EVENT

REQUIRED BUILDING ROOF AREA 1 STORAGE VOLUME (NODE #1)

t_c TIME (minutes)	**I 5-YEAR** (mm/hr)	**Q ACTUAL** (L/s)	**Q ALLOW** (L/s)	**Q STORED** (L/s)	**VOLUME STORED** (m^3)
5	141.20	8.47	0.87	7.60	2.28
10	104.20	6.25	0.87	5.38	3.23
15	83.50	5.01	0.87	4.14	3.73
20	70.30	4.22	0.87	3.35	4.02
25	60.90	3.65	0.87	2.78	4.17
30	53.93	3.24	0.87	2.37	4.27
35	48.50	2.91	0.87	2.04	4.28
40	44.20	2.65	0.87	1.78	4.27
45	40.60	2.44	0.87	1.57	4.24
50	37.70	2.26	0.87	1.39	4.17

Therefore, the required rooftop storage volume is 4.28 m^3.

PROPOSED 1062 AND 1066 SILVER STREET THREE STOREY

APARTMENT BUILDING DEVELOPMENT SITE

TABLE 2

FIVE (5)-YEAR EVENT

REQUIRED BUILDING ROOF AREA 2 STORAGE VOLUME (NODE #2)

t_c TIME (minutes)	**I 100-YEAR** (mm/hr)	**Q ACTUAL** (L/s)	**Q ALLOW** (L/s)	**Q STORED** (L/s)	**VOLUME STORED** (m^3)
5	141.20	7.60	0.87	6.73	2.02
10	104.20	5.61	0.87	4.74	2.84
15	83.50	4.49	0.87	3.62	3.26
20	70.30	3.78	0.87	2.91	3.49
25	60.90	3.28	0.87	2.41	3.62
30	53.93	2.90	0.87	2.03	3.65
35	48.50	2.61	0.87	1.74	3.654
40	44.20	2.38	0.87	1.51	3.62
45	40.60	2.18	0.87	1.31	3.54

Therefore, the required storage volume is 3.66 m^3.

PROPOSED 1062 AND 1066 SILVER STREET THREE STOREY

APARTMENT BUILDING DEVELOPMENT SITE

TABLE 3

FIVE (5)-YEAR EVENT

REQUIRED BUILDING ROOF AREA 3 STORAGE VOLUME (NODE #3)

t_c TIME (minutes)	**I 100-YEAR** (mm/hr)	**Q ACTUAL** (L/s)	**Q ALLOW** (L/s)	**Q STORED** (L/s)	**VOLUME STORED** (m^3)
5	141.20	6.51	0.87	5.64	1.69
10	104.20	4.80	0.87	3.93	2.36
15	83.50	3.85	0.87	2.98	2.68
20	70.30	3.24	0.87	2.37	2.84
25	60.90	2.81	0.87	1.94	2.91
30	53.93	2.49	0.87	1.62	2.92
35	48.50	2.24	0.87	1.37	2.88
40	44.20	2.04	0.87	1.17	2.81

Therefore, the required storage volume is 2.92 m^3.

PROPOSED 1062 AND 1066 SILVER STREET THREE STOREY

APARTMENT BUILDING DEVELOPMENT SITE

TABLE 4

100-YEAR EVENT

REQUIRED BUILDING ROOF AREA 1 STORAGE VOLUME (NODE #1)

t_c **TIME** (minutes)	**I 100-YEAR** (mm/hr)	**Q ACTUAL** (L/s)	**Q ALLOW** (L/s)	**Q STORED** (L/s)	**VOLUME STORED** (m^3)
10	178.6	11.91	0.95	10.96	6.58
15	142.9	9.53	0.95	8.58	7.72
20	120.0	8.00	0.95	7.05	8.46
25	103.9	6.93	0.95	5.98	8.97
30	91.9	6.13	0.95	5.18	9.32
35	82.6	5.51	0.95	4.56	9.58
40	75.1	5.01	0.95	4.06	9.74
45	69.1	4.61	0.95	3.66	9.88
50	63.9	4.26	0.95	3.31	9.93
55	59.6	3.98	0.95	3.03	10.00
60	55.9	3.73	0.95	2.78	10.01
65	52.6	3.51	0.95	2.56	9.98
70	49.8	3.32	0.95	2.37	9.95

Therefore, the required storage volume is 10.01 m^3.

PROPOSED 1062 AND 1066 SILVER STREET THREE STOREY

APARTMENT BUILDING DEVELOPMENT SITE

TABLE 5

100-YEAR EVENT

REQUIRED BUILDING ROOF AREA 2 STORAGE VOLUME (NODE #2)

t_c **TIME** (minutes)	**I 100-YEAR** (mm/hr)	**Q ACTUAL** (L/s)	**Q ALLOW** (L/s)	**Q STORED** (L/s)	**VOLUME STORED** (m^3)
10	178.6	10.68	0.95	9.73	5.84
15	142.9	8.55	0.95	7.60	6.84
20	120.0	7.18	0.95	6.23	7.48
25	103.9	6.21	0.95	5.26	7.89
30	91.9	5.50	0.95	4.55	8.19
35	82.6	4.94	0.95	3.99	8.38
40	75.1	4.49	0.95	3.54	8.50
45	69.1	4.13	0.95	3.18	8.59
50	63.9	3.82	0.95	2.87	8.61
55	59.6	3.57	0.95	2.62	8.65
60	55.9	3.34	0.95	2.39	8.61
65	52.6	3.15	0.95	2.20	8.58
70	49.8	2.98	0.95	2.03	8.53

Therefore, the required rooftop storage volume is 8.65 m^3.

PROPOSED 1062 AND 1066 SILVER STREET THREE STOREY

APARTMENT BUILDING DEVELOPMENT SITE

TABLE 6

100-YEAR EVENT

REQUIRED BUILDING ROOF AREA 3 STORAGE VOLUME (NODE #3)

t_c **TIME** (minutes)	**I 100-YEAR** (mm/hr)	**Q ACTUAL** (L/s)	**Q ALLOW** (L/s)	**Q STORED** (L/s)	**VOLUME STORED** (m^3)
10	178.6	9.14	0.95	8.19	4.91
15	142.9	7.32	0.95	6.37	5.73
20	120.0	6.14	0.95	5.19	6.23
25	103.9	5.32	0.95	4.37	6.56
30	91.9	4.71	0.95	3.76	6.77
35	82.6	4.23	0.95	3.28	6.89
40	75.1	3.85	0.95	2.90	6.96
45	69.1	3.54	0.95	2.59	6.99
50	63.9	3.27	0.95	2.32	6.96
55	59.6	3.05	0.95	2.10	6.93

Therefore, the required rooftop storage volume is 6.99 m^3.

PROPOSED THREE STOREY

RESIDENTIAL APARTMENT BUILDING SITE

PART OF LOT 31

R-PLAN 294

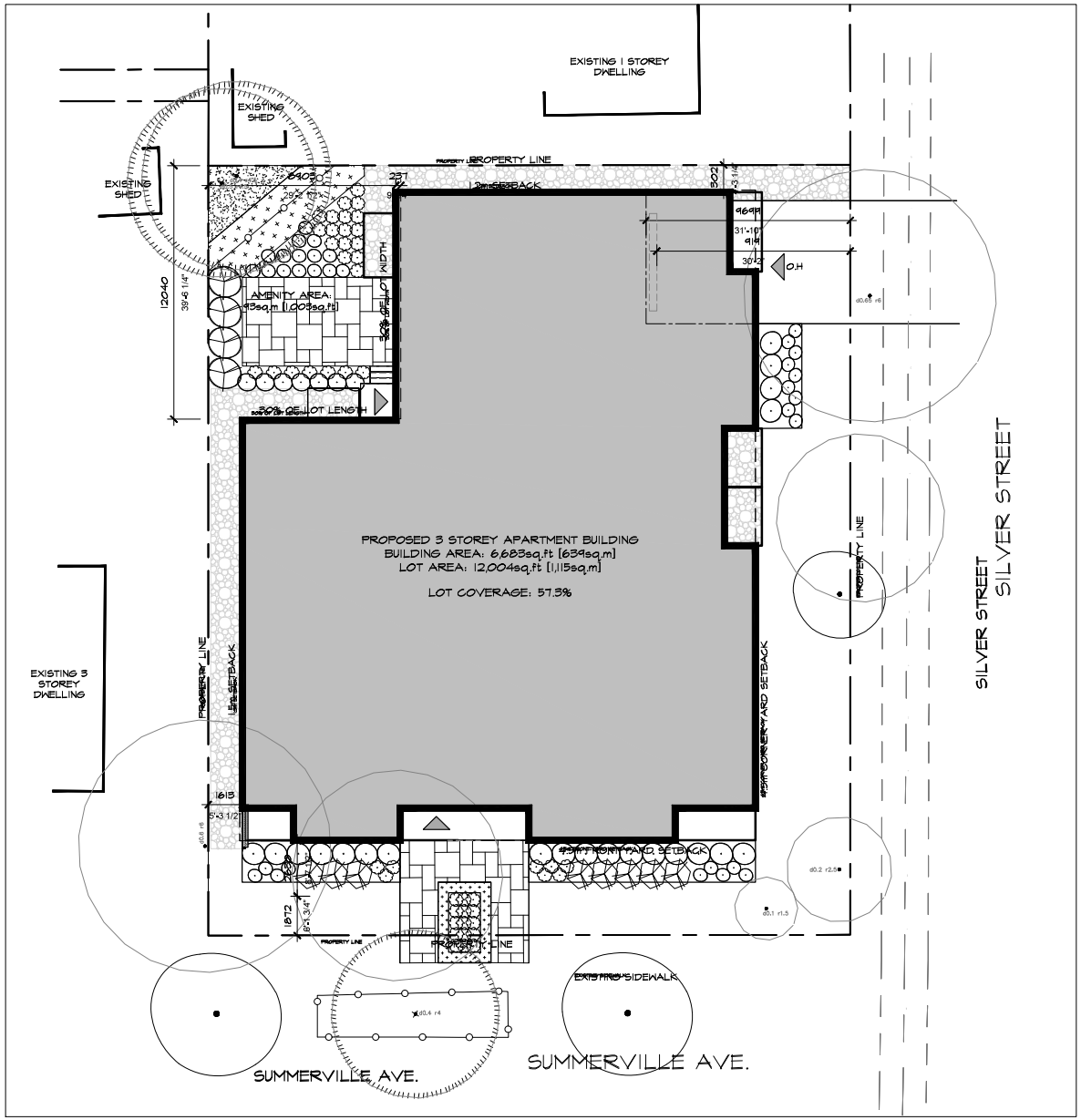
1062 AND 1066 SILVER STREET

CITY OF OTTAWA

APPENDIX A

SITE PLAN

DWG. No. A1.0



01 CONCEPT SITE PLAN
A100 SCALE: 1:100

KEY PLAN

BUILDING AREAS

	CONSTRUCTION AREA [SQ.M]	CONSTRUCTION AREA [SQ.FT]
LOWER LEVEL		
GROUND FLOOR AREA	654sq.m	6,883sq.ft
SECOND FLOOR AREA	654sq.m	6,883sq.ft
THIRD FLOOR AREA	621sq.m	6,686sq.ft
TOTAL	1,849sq.m	20,452sq.ft

BUILDING FLOOR STATISTICS - RENTAL APARTMENT:

FLOOR	SUITES	1 BEDROOM + DEN	2 BEDROOM
LOWER LEVEL	0		
GROUND FLOOR	7	2	5
SECOND FLOOR	8	2	6
THIRD FLOOR	8	2	6
TOTAL	23	6	17
SUITE MIX		26%	74%

CITY OF OTTAWA ZONING BY-LAW

ZONING PROVISIONS	REQUIRED	PROPOSED
R4UC		
MIN. LOT AREA	450sq.m	1,115.2sq.m
MAX. LOT AREA	1,070sq.m	1,115.2sq.m
MIN. LOT WIDTH	15m	30.5m
MAX. LOT WIDTH	38m	30.5m
MIN. FRONT YARD SETBACK	4.5m	4.5m
MIN. CORNER SIDE YARD SETBACK	4.5m	4.5m
MIN. INTERIOR SIDE YARD SETBACK	1.5m	1.6m
MIN. REAR YARD SETBACK	1.2m	1.24m
MIN. INTERIOR YARD SETBACK	9.14m X 12.04m	8.9m x 12.09m
MAX. BUILDING HEIGHT	11m	11m
AMENITY AREA	40% OF FRONT AND CORNER YARDS, 50% OF LOT AREA, 50% OF REAR YARD WITH A 2.5sq.m STRIP.	
LOT COVERAGE	N/A	57.6%

AUTOMOBILE PARKING SUMMARY

REQUIRED PARKING	REQUIRED	PROPOSED
RESIDENT PARKING	0.5/UNIT (AFTER 12) X 11 = 5.5 SPACES	15
VISITOR PARKING	0.1/UNIT (AFTER 12) X 11 = 1 SPACES	1
TOTAL PROVIDED	7 SPACES	16 SPACES
PROVIDED PARKING		
		UNDERGROUND
REGULAR SPACES	MIN. 2.6m x 5.2m	15
ACCESSIBLE SPACES	TYPE B 2.4mX5.2m	1
TOTAL	= 16 PROVIDED PARKING SPACES	

BICYCLE PARKING SUMMARY

REQUIRED PARKING	REQUIRED	PROPOSED
BIKE PARKING	0.5/UNIT X 23 = 12 SPACES	32

LEGEND

- NEW OVERHEAD DOOR
- NEW DOOR/ENTRANCE
- PROPOSED RIVERSTONE MULCH
- EXISTING VEGETATION REFER TO LANDSCAPE DWGS
- BICYCLE PARKING SPACE (1.8mX0.6m)
- NO PARKING LINES
- PROPOSED PRECAST CONCRETE PAVERS
- PROPOSED SOD - REFER TO LANDSCAPE DWGS
- NEW BANGUT CONCRETE SIDEWALK
- PARKING STALL COUNT PER ROW
- NEW SIGN, REFER TO SIGN LEGEND
- STREET LIGHT
- HYDRO POST
- DESIGNATED ACCESSIBLE PARKING SPACE AS PER AODA STANDARDS
- TWO WAY TRAFFIC
- DEPRESSED CURB (DC)
- PROPERTY LINE
- EXISTING FENCE
- MINIMUM SETBACKS (ZONING)
- NEW CONSTRUCTION
- EXISTING BUILDINGS
- *REFER TO LANDSCAPE DWGS

POWER-TEK GROUP

NOTES:

1) ALL WORK TO BE IN COMPLIANCE WITH LOCAL BUILDING CODES, REGULATIONS AND BY-LAWS.

2) ADDITIONAL DRAWINGS MAY BE ISSUED FOR CLARIFICATION AS TO THE CONSIDERATION OF WORK. SUCH DRAWINGS FALL WITHIN THE SAME MEANING AND INTENT AS IF THEY WERE INCLUDED WITH PLANS IN CONTRACT DOCUMENTS.

3) DO NOT SCALE DRAWINGS.

4) ALL SUBCONTRACTORS TO TAKE THEIR OWN ON-SITE MEASUREMENTS AND BE RESPONSIBLE FOR THEIR ACCURACY.

5) NOTIFY SHANE J. LAWRENCE ARCHITECT FOR ANY DRAWING AND/OR DIMENSIONS PRIOR TO START OF WORK.

SEAL:

NORTH ARROW

No.	DATE	REVISION
04	2021.09.09	ISSUED FOR COORDINATION
03	2021.08.09	ISSUED FOR REVIEW
02	2021.06.17	ISSUED FOR REVIEW
01	2021.05.03	ISSUED FOR DRAFT REVIEW

S.J. LAWRENCE ARCHITECT INCORPORATED
18 DERBY STREET
SUITE 200
OTTAWA, ONTARIO
K2E 8S7
T (613) 733-2700
F (613) 733-7700
sjl@sjlarchitect.com

PROJECT:
SILVER STREET DEVELOPMENT
1982 & 1200 SILVER STREET, OTTAWA ON

SHEET TITLE:
CONCEPT SITE PLAN

DRAWN BY: AJ. CHECKED BY: S.J.L.
PLOT DATE: 2021.07.29 PROJECT DATE: 2021.JO.09
JOB NUMBER: SL-1046-21 SCALE: AS SHOWN
SHEET NUMBER: A1.0
PLAN #
APPLICATION #

PROPOSED THREE STOREY

RESIDENTIAL APARTMENT BUILDING SITE

PART OF LOT 31

R-PLAN 294

1062 AND 1066 SILVER STREET

CITY OF OTTAWA

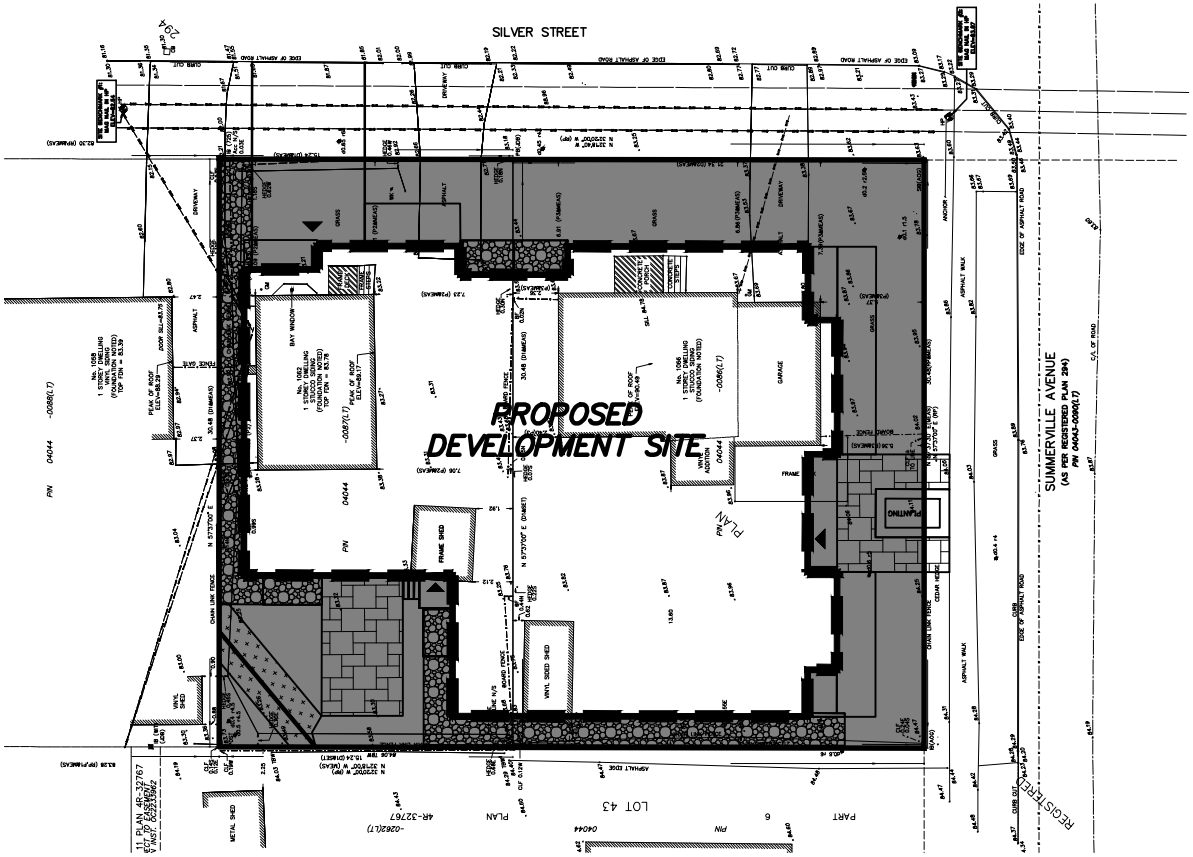
APPENDIX B

STORM DRAINAGE AREA PLAN

FIGURE 1

PROPOSED 1066 SILVER STREET
SITE DEVELOPMENT
DRAINAGE AREA PLAN

N.T.S.



LEGEND

LIMIT OF CONTROLLED STORM
DRAINAGE AREA = 639.50 SQ. M

UNCONTROLLED STORM
DRAINAGE AREA = 475.31 SQ. M

TOTAL AREA = 1,114.81 SQ. M

POST-DEVELOPMENT SITE
AVERAGE "C" = 0.75

T.L. MAK ENGINEERING CONSULTANTS LTD.
CONSULTING ENGINEERS

PROJECT No.	DATE	DRAWING No.
821-10	JULY 2021	FIGURE 1

PROPOSED THREE STOREY

RESIDENTIAL APARTMENT BUILDING SITE

PART OF LOT 31

R-PLAN 294

1062 AND 1066 SILVER STREET

CITY OF OTTAWA

APPENDIX C

SITE PRE-DEVELOPMENT CONDITION

GOOGLE IMAGE 2019

AND

AERIAL PHOTOGRAPHY 2019 (GEOOTTAWA)


1280
1058
1062
PROPOSED
DEVELOPMENT
SITE
1066
1291
1295
rue Silver St.
av. Summerville Ave.
av. Summerville Ave.
rue Silver St.
1061
1063
1065
1267
1269
1271

2019


1280
1267
1061
1063
1269
1058
1271
1062
1065
PROPOSED
DEVELOPMENT
SITE
1066
rue Silver St.
av. Summerville
av. Summerville Ave
rue Silver St
av. Summerville Ave.
rue Silver St.
1291
1295

2019

2019

2019

2019

PROPOSED THREE STOREY

RESIDENTIAL APARTMENT BUILDING SITE

PART OF LOT 31

R-PLAN 294

1062 AND 1066 SILVER STREET

CITY OF OTTAWA

APPENDIX D

PROPOSED ROOF DRAIN

DETAILS

WATTS®	Adjustable Accutrol Weir Tag: _____	Adjustable Flow Control for Roof Drains

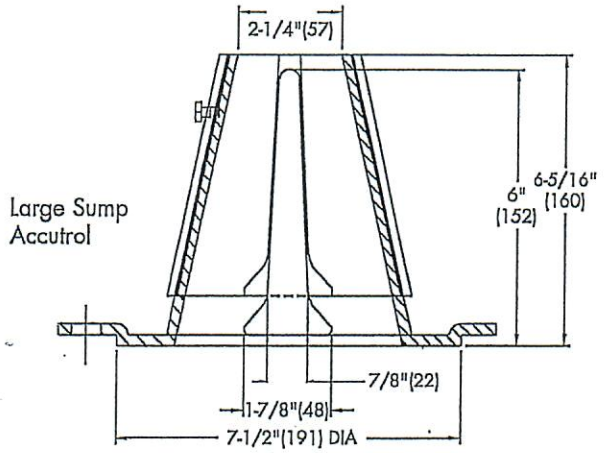
ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

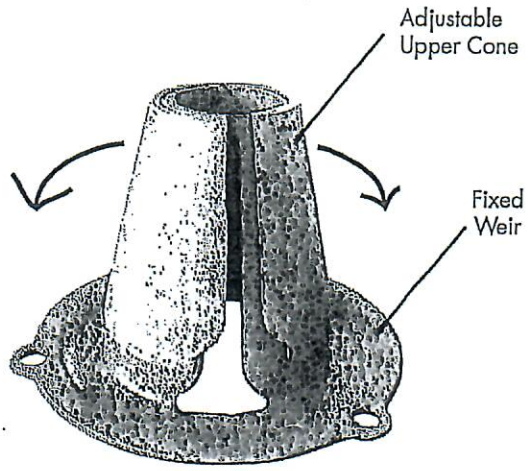
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the 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

PROPOSED THREE STOREY

RESIDENTIAL APARTMENT BUILDING SITE

PART OF LOT 31

R-PLAN 294

1062 AND 1066 SILVER STREET

CITY OF OTTAWA

APPENDIX E

RIDEAU VALLEY CONSERVATION AUTHORITY

REVIEW COMMENTS

OF

JULY 14, 2021

TL MaK

From: Eric Lalande [eric.lalande@rvca.ca]
Sent: July 14, 2021 10:24 AM
To: TL MaK
Subject: RE: 1066 Silver Street

Hi Tony,

Based on the provided Site plan, the RVCA would require no additional water quality protection be provided on-site.

Thank you,

Eric Lalande, MCIP, RPP
Planner, RVCA
613-692-3571 x1137

From: TL MaK <tlmakecl@bellnet.ca>
Sent: Monday, July 12, 2021 3:26 PM
To: Eric Lalande <eric.lalande@rvca.ca>
Subject: 1066 Silver Street

Hi Eric,

Presently we are contacting the RVCA for pre-consultation regarding our project at 1066 Silver Street.

Could you please review and let us know whether there are any water quality requirements for the proposed development at 1066 Silver Street. We will be implementing storm water management regarding quantity control as required by the City of Ottawa (by means of flat rooftop SWM attenuation only).

Attached please find the PDFs of our engineering drawings for your review and comments. They are as follows:

1. Proposed Site Grading and Servicing Plan (Dwg. #821-10, G-1 Rev. 1)
2. Landscape Plan (Dwg. No. 121139-L1, Rev. No. 1)
3. Concept Site Plan (Dwg. No. A1.0, Rev. No. 4)

Let us know if you have any questions.

Regards,

Tony Mak

T.L. Mak Engineering Consultants Ltd.
1455 Youville Drive, Suite 218
Ottawa, ON. K1C 6Z7
Tel. 613-837-5516 | Fax: 613-837-5277
E-mail: tlmakecl@bellnet.ca

PROPOSED THREE STOREY

RESIDENTIAL APARTMENT BUILDING SITE

PART OF LOT 31

R-PLAN 294

1062 AND 1066 SILVER STREET

CITY OF OTTAWA

APPENDIX F

DETAILED CALCULATIONS

FOR FIVE (5)-YEAR AND 100-YEAR

AVAILABLE STORAGE VOLUME

AVAILABLE STORAGE VOLUME CALCULATIONS

Five (5)-Year Event

Roof Storage at Flat Roof Building

The flat Roof Area 1, Roof Area 2 and Roof Area 3 will be used for storm-water detention. Each roof area will be drained by a controlled drain designed for a release rate of 13.75 U.S. gal./min. or 0.87 L/s at a height of 120mm above the drain. Refer to Dwg. 821-10 SWM-1 for roof drain details.

Roof Storage Area 1 (NODE No. 1)

Available flat roof area for storage = 240.06 m^2, C = 0.9, @roof slope of 1.4% minimum or 120mm of water height above the roof drain. Therefore, the available roof area will store a volume as shown below using the reservoir volume equation.

$$V = \frac{(0.12\text{m})[128.82 + 4(34.52) + 0]}{6}$$

$$V = \frac{(0.12)(266.9)}{6}$$

$$V = 5.34\ m^3$$

The available Roof Area 1 storage volume of 5.34 m^3 > required five (5)-year storage volume of 4.28 m^3 from Table 1.

Roof Storage Area 2 (NODE No.2)

Available flat roof area for storage = 215.12 m^2, C = 0.9, @roof slope of 1.4% minimum or 120mm of water height above the roof drain. Therefore, the available roof area will store a volume as shown below using the reservoir volume equation.

$$V = \frac{(0.12\text{m})[119.76 + 4(31.35) + 0]}{6}$$

$$V = \frac{(0.12)(245.16)}{6}$$

$$V = 4.90\ m^3$$

The available Roof Area 2 storage volume of 4.90 m^3 > required five (5)-year storage volume of 3.66 m^3 from Table 2.

Roof Storage Area 3 (NODE No.3)

Available flat roof area for storage = 184.32 m^2, C = 0.9, @roof slope of 1.4% minimum or 120mm of water height above the roof drain. Therefore, the available roof area will store a volume as shown below using the reservoir volume equation.

$$V = \frac{(0.12\text{m})[98.41 + 4(25.57) + 0]}{6}$$

$$V = \frac{(0.12)(200.69)}{6}$$

$$V = 4.01\ m^3$$

The available Roof Area 2 storage volume of 4.01 m^3 > required five (5)-year storage volume of 2.92 m^3 from Table 3.
Therefore, the ponding depth at the Roof Drain 1 and 2 locations is approximately 0.12 m (120 mm), and the five (5)-year level is estimated not to reach the roof perimeter of the building.

Hence, Roof Area 1, Roof Area 2 and Roof Area 3 of the proposed residential building flat rooftop storage are adequate to store the minimum required five (5)-year storm event volume of 10.86 m^3 given it can store up to 14.25 m^3.

AVAILABLE STORAGE VOLUME CALCULATIONS

100-Year Event

Roof Storage at Flat Roof Building

The flat Roof Area 1, Roof Area 2, and Roof Area 3 will be used for storm-water detention. Each roof area will be drained by a controlled drain designed for a release rate of 15.0 U.S. gal./min. or 0.95 L/s at a height of 150mm above the drain. refer to Dwg. 821-10 SWM-1 for roof drain details.

Roof Storage Area 1 (NODE No. 1)

Available flat roof area for storage = 240.06 m^2, C = 1.0, @roof slope of 1.4% minimum or 150mm of fall from roof perimeter to roof drain. Therefore, the available roof area will store a volume as shown below using the reservoir volume equation.

$$V = \frac{(0.15\text{m})[240.06 + 4(60.83) + 0]}{6}$$

$$V = \frac{(0.15)(483.38)}{6}$$

$$V = 12.09\ m^3$$

The available Roof Area 1 storage volume of 12.09 m^3 > required 100-year storage volume of 10.01 m^3 from Table 4.

Roof Storage Area 2 (NODE No. 2)

Available flat roof area for storage = 215.12 m^2, C = 1.0, @roof slope of 1.4% minimum or 150mm of fall from roof perimeter to roof drain. Therefore, the available roof area will store a volume as shown below using the reservoir volume equation.

$$V = \frac{(0.15\text{m})[215.12 + 4(55.99) + 0]}{6}$$

$$V = \frac{(0.15)(439.08)}{6}$$

$$V = 10.98\ m^3$$

The available Roof Area 2 storage volume of 10.98 m^3 > required 100-year storage volume of 8.65 m^3 from Table 5.

Roof Storage Area 3 (NODE No. 3)

Available flat roof area for storage = 184.32 m^2, C = 1.0, @roof slope of 1.4% minimum or 150mm of fall from roof perimeter to roof drain. Therefore, the available roof area will store a volume as shown below using the reservoir volume equation.

$$V = \frac{(0.15\text{m})[184.32 + 4(42.76) + 0]}{6}$$

$$V = \frac{(0.15)(355.36)}{6}$$

$$V = 8.88\ m^3$$

The available Roof Area 3 storage volume of 8.88 m^3 > required 100-year storage volume of 6.99 m^3 from Table 6.

Hence, Roof Area 1, Roof Area 2 and Roof Area 3 of the proposed residential building flat rooftop storage are adequate to store the minimum required 100-year storm event volume of 25.65 m^3 given it can store up to 31.95 m^3.

Therefore, the ponding depth at the Roof Drain 1, 2 and 3 locations is approximately 0.15m (150mm), and at the perimeter of the flat roof area is 0mm above the roof perimeter surface. Accordingly, it is recommended that six (6) roof scuppers as shown on Dwg. 821-10 G-1 and 821-10 SWM-1 and the architect's roof plan be installed at the perimeter height of the rooftop for emergency overflow purposes in case of blockage from debris build up at the roof drain.