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February 13th, 2020
Our File: 23405-003.1

Mr. Santhosh Kuruvilla
Project Manager, Infrastructure Approvals,
Planning, Infrastructure and Economic Development
City of Ottawa
110 Laurier Avenue West
Ottawa, ON K1P 1J1

Dear Mr. Kuruvilla,

Re: Urbandale's Kanata Lakes Plaza
Urbandale Corporation
5100 Kanata Avenue
City File Number: D07-12-18-0063
Stormwater Management Memo

Purpose:

The purpose of this letter is to confirm that the stormwater management (SWM) for the proposed January 22nd, 2020 revision (Rev. 4) to the Kanata Lakes Commercial Plaza (5100 Kanata Avenue) site remains in general conformance with the SWM design of the previously approved submission (i.e. Site Servicing Report Revision 3 (Rev. 3) dated November 7th, 2019 and drawings Revision 3 (Rev. 3) dated October 31st, 2019).

The changes as part of this revision (Rev. 4) are largely pertaining to the substitution of a hard surface for another hard surface (i.e. rooftop to parking). The rooftop restrictors amd parking lot Inlet Control Devices (ICDs) have remained the same. Therefore, the release rates to the major/minor system are the same from the November 7th, 2019 (Rev. 3) to the January 22nd, 2020 (Rev. 4) submission. The following sections provide updates to the stormwater management calculations presented in the November 7th, 2019 Site Servicing Report Revision 3 (Rev. 3).

Background:

In general, the January 22nd, 2020 revision (Rev. 4) includes:

- the substitution of a portion of the footprint of building D (2 commercial bays removed) for 9 parking stalls
- the substitution of a portion of the footprint of building E (1 commercial bay removed) for 8 parking stalls,
- the minor increase in size of the footprint for building C.
- the substitution of a playground area for 8 parking stalls near building C.

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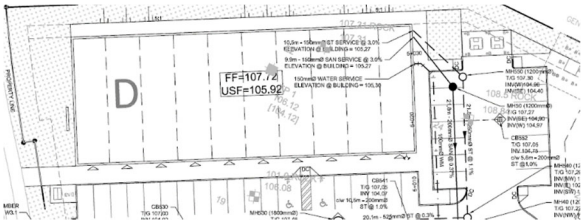
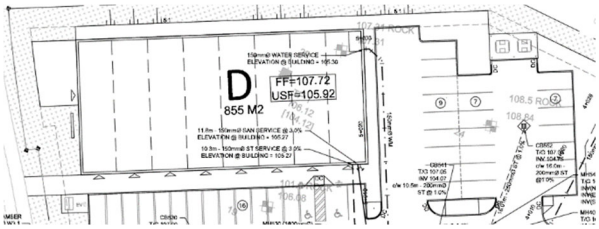
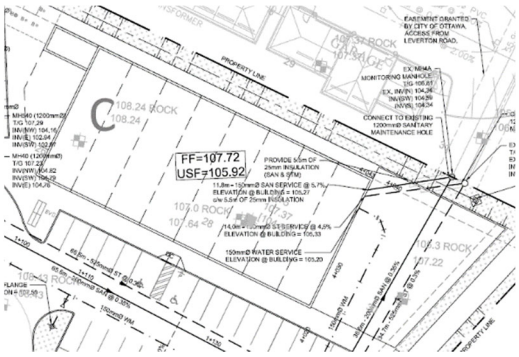
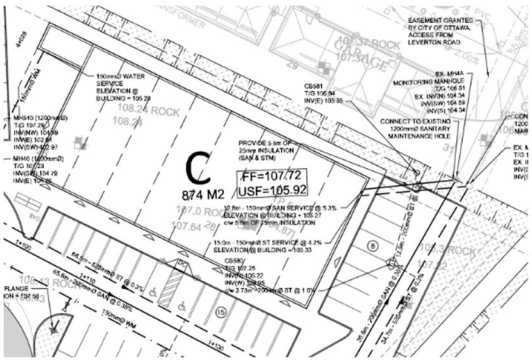
Revision 3 (Nov. 7/19)

Revision 4 (Jan. 22/20)









A summary of changes are as presented below:

Table 1.1: Summary of Changes per Revised Site Plan

	Approved Site Plan (Nov. 7th, 2019)			**Revised Site Plan (Jan 22nd, 2020)**		
	Rooftop Area	Rooftop Storage Required	Rooftop Storage Provided	Rooftop Area	Rooftop Storage Required	Rooftop Storage Provided
Building C	0.0850 ha	27.47 m^3	28.79 m^3	0.0874 ha	28.59 m^3	29.60 m^3
Building D	0.1060 ha	34.85 m^3	35.90 m^3	0.0855 ha	25.42 m^3	28.96 m^3
Building E	0.0530 ha	n/a	n/a	0.0430 ha	n/a	n/a

The stormwater management calculations were reviewed to ensure that the revised site plan remained in conformance with the criteria outlined in the City of Ottawa Sewer Design Guidelines and Section 4.2 of the Kanata Lakes Commercial Plaza (5100 Kanata Avenue) Site Servicing Report (Rev. 3).

Assessment:

The on-site storage and release characteristics were assessed and are summarized below:

Table 1.2: Flow and Storage Results (Site Plan Revision 4, dated January 22nd, 2020))

Flow Component	Flow Rate (L/s)	Max. Storage Requirement (m^3)	Storage Provided (m^3)
All Rooftop (controlled)	21.9	83.75	90.73
All ICDs	113.0	399.97	452.62
Uncontrolled	2.1	N/A	N/A
Total	137.0	483.72	543.35

- Due to the reduction in building size for building D, there has been a net decrease in the maximum rooftop storage requirement. The total rooftop storage provided in Revision 4 (dated January 22nd, 2020), assuming 80% of the total area, is in excess of the minimum storage requirement (28.96 m^3 provided – 25.42 m^3 required = 3.54 m^3 excess storage).
- Due to the increase in building size for building C, there has been a net increase in the maximum rooftop storage requirement. The total rooftop storage provided in Revision 4 (dated January 22nd, 2020), assuming 80% of the total area, in in excess of the minimum storage requirement (29.60 m^3 provided – 28.59 m^3 required = 1.01 m^3 excess storage).
- The addition of nine (9) parking spaces near building D (CB 552) resulted in an increase of required surface storage, while still being less than the surface storage volume provided. The total storage required due to the increase in catchment area is 40.5 m^3, and the surface storage provided is 40.71 m^3 (see attached calculations).
- The addition of eight (8) parking spaces near building C (CB580) resulted in a net increase in required surface storage, while still being less than the surface storage volume provided. The storage required due to the increase in catchment area is 3.74 m^3, and the surface storage provided is 13.16 m^3 (see attached calculations).
- The addition of eight (8) parking spaces near building E (CBMH 522) resulted in a net increase in required surface storage, while still being less than the surface storage volume provided. The storage required based on the revised site plan is 211.90 m^3, and the surface storage provided for this catchment is 250.47 m^3 (see attached calculations).
- All ponding depth in the parking areas remain below the design guideline maximum of 0.35 m.
- The site maintains its design to have adequate surface and underground pipe storage to contain the 1:100 year storm event at the allocated release rate. Underground storage provided on-site remains unchanged from the previous design.
- Release rates to minor/major system remain unchanged.

Conclusion:

The stormwater management solution presented herein was found to fulfill the water quantity requirements in Section 4.2 of the the Kanata lakes Plaza Site Servicing Report (Rev. 3, dated November 7th, 2019). The changes in building footprints resulted in a net decrease of rooftop storage provided, while still being in excess of the minimum rooftop storage requirement. The addition of parking stalls resulted in a net increase of surface storage provided, while still being in excess of the minimum surface storage requirement. Overall, there has been a net increase of storage provided on site, and the storage volume up

to the 1:100 year storm event is contained on-site. All surface ponding areas are in conformance with the City of Ottawa Sewer Design Guidelines, and the site revisions have not impacted the minor/major system flow allocation .

We trust that this document is satisfactory to the City and that the stormwater management for the revised site plan (Rev. 4, dated January 22nd, 2020) is in general conformance with the Kanata Lakes Commercial Plaza (5100 Kanata Avenue) Site Servicing Report.

Yours very truly,

J.L. RICHARDS & ASSOCIATES LIMITED

Prepared by:

Tyler Cassidy, EIT

Reviewed by:

Lucie Dalrymple, P. Eng

Encl.
cc: Marcel Dénommé, Urbandale Corporation

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

Urbandale Commercial Plaza
5100 Kanata Ave.

JLR No. 23405-003.1

STORMWATER MANAGEMENT CALCULATIONS

Summary of allocated areas outletting uncontrolled offsite:

Uncontrolled Outlet	Total Area (ha.)	C factor 2-Yr/5-Yr	C factor 100-Yr	Allocated Peak Flow Q_2 with T_c 10 min (L/s)	Allocated Peak Flow Q_5 with T_c 10 min (L/s)	Allocated Peak Flow Q_{100} with T_c 10 min (L/s)
Retirement Residence (1)	0.03	0.62	0.78	3.97	5.39	11.54
Kanata Avenue	0.07	0.20	0.25	2.99	4.06	8.69
Walden Village Residential Rear Yards (2)	0.12	0.55	0.69	14.09	19.12	40.95
Total	**0.22**			**21.05**	**28.56**	**61.18**

Notes:
(1) As per August 2016 retirement residence design prepared by SCS Consulting Group.
(2) As per 2001 Walden Village subdivision design prepared by IBI (Formerly CCL).

Summary of proposed areas outletting uncontrolled offsite:

Uncontrolled Outlet	Total Area (ha.)	C factor 2-Yr/5-Yr	C factor 100-Yr	Proposed Peak Flow Q_2 with T_c 10 min (L/s)	Proposed Peak Flow Q_5 with T_c 10 min (L/s)	Proposed Peak Flow Q_{100} with T_c 10 min (L/s)
Retirement Residence	0.034	0.44	0.51	3.15	4.27	8.44
Kanata Avenue	0.022	0.36	0.42	1.69	2.29	4.59
Goulbourn Forced Road	0.028	0.36	0.42	2.12	2.88	5.78
Walden Village Residential Rear Yards	0.062	0.32	0.38	4.23	5.73	11.62
Total	**0.146**			**11.18**	**15.17**	**30.43**

Minor system allocation for proposed Commercial Plaza = 139.70 L/s
(As per September 2016 Servicing report prepared by JLR)
Uncontrolled Peak Flow to Goulbourn Forced Road = 2.88 L/s

Revised Release Rate for Commercial Plaza = 136.82 L/s

Summary: Areas outletting to proposed minor system:

Area No.	Type or ID. No.	Drainage Area Total Area	C factor 2-Yr	C factor 100-Yr	Design Flow Q_2 with T_c 10 min (L/s)	Design Flow Q_{100} with T_c 10 min (L/s)	1:100 Yr Rest. Restricted Flow (L/s)	ICD Type
1	MH 530 - ICD 53	0.687	0.85	0.95	124.54	322.41	74.0	Custom ICD 131 mm Ø
2	Building D	0.086	0.90	1.00	16.43	42.44	7.7	Zurn Control-Flo Roof Drain
3	CB 552 - ICD 52	0.106	0.83	0.92	18.80	48.72	4.0	50 VHV-1
4	CBMH 571 - ICD 71	0.316	0.82	0.92	55.57	144.03	18.0	Custom ICD 66 mm Ø
5	CB 572 - ICD 72	0.053	0.41	0.48	4.65	12.53	4.0	50 VHV-1
6	Building B	0.095	0.90	1.00	18.26	47.16	7.7	Zurn Control-Flo Roof Drain
7	Building C	0.087	0.90	1.00	16.80	43.38	6.5	Zurn Control-Flo Roof Drain
8	CB 580 - ICD 80	0.065	0.52	0.60	7.26	19.24	13.0	100 VHV-1
9	CB 573	0.008	0.46	0.53	0.79	2.11	2.11	*Uncontrolled flow
	Total	**1.504**			**263.10**	**682.02**	**137.04**	

1

MH 530 - ICD 53

Area	**0.687**
C-Factor 1:2Yr	**0.85**

Release Rate: 74.0 L/s

Minimum storage volume requirement = **211.90 m3** (refer to Model M1 in Appendix 'D7' for SWMHYMO results)

Surface Storage:	CB 521	1.61 m3
	CBMH 522	51.25 m3
	CB 530	23.57 m3
	CB 531	5.85 m3
	CB 540	2.23 m3
	CB 541	15.42 m3
Underground Pipe Storage (including MHs): (MH520-530, CB531-1050øST, CB541-540, CB540-1050øST, CBMH522-MH520, CB521-CBMH522, MH511-520, CBMH510-MH511, MH510-511)		150.54 m3
Total Storage Volume:		**250.47 m3**

(refer to Model M1 in Appendix 'D7' for stage - storage calculations)

***Minimum storage volume requirement met by the design**

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Urbandale Commercial Plaza
5100 Kanata Ave.

JLR No. 23405-003.1

STORMWATER MANAGEMENT CALCULATIONS

2 **Building D** **Assumed Rooftop Properties:**

Total Area Roof = 0.0855 ha
Unusable roof (20%) = 0.0171 ha
Usable roof (80%) = 0.0684 ha
Depth of Storage = 0.127 m

Rooftop Volume Assuming Sloped Roof (m^3) = Usable rooftop area (m^2) x storage depth (m)/3
Rooftop Volume (m^3) = 680 m^2 x 0.127 m / 3
Rooftop Volume (m^3) = 29.0 m^3

Controlled roof release rate = 1.29 l/s roof drain x 6 Zurn Control-Flo units (102 mm Rise)
Total controlled roof release rate = 7.74 L/s

Rooftop Area =	**0.086**
C-Factor (1:2 year) =	**0.90**
C-Factor (1:100 year) =	**1.00**

Time (min)	Intensity 1:2 Yr (mm/hr)	Qp (L/s)	Qp roof drain (L/s)	Qp stored (L/s)	Max Volume Requirement (m3)	Intensity 1:100 Yr (mm/hr)	Qp (L/s)	Qp roof drain (L/s)	Qp stored (L/s)	Max Volume Requirement (m3)
10	76.81	16.43	7.74	8.69	5.21	178.56	42.44	7.74	34.70	20.82
15	61.77	13.21	7.74	5.47	4.93	142.89	33.96	7.74	26.22	23.60
20	52.03	11.13	7.74	3.39	4.07	119.95	28.51	7.74	20.77	24.93
25	45.17	9.66	7.74	1.92	2.88	103.85	24.68	7.74	16.94	25.42
30	40.04	8.57	7.74	0.83	1.49	91.87	21.84	7.74	14.10	25.37
35	36.06	7.71	7.74	N/A	N/A	82.58	19.63	7.74	11.89	24.97
40	32.86	7.03	7.74	N/A	N/A	75.15	17.86	7.74	10.12	24.29
45	30.24	6.47	7.74	N/A	N/A	69.05	16.41	7.74	8.67	23.42
50	28.04	6.00	7.74	N/A	N/A	63.95	15.20	7.74	7.46	22.38

Minimum roof storage volume requirement = **25.42 m3**

Roof storage volume provided by design = **28.96 m3**

***Minimum storage volume requirement met by the design**

3 **CB 552 - ICD 52**

Area	**0.1064**
C-Factor 1:2Yr	**0.83**
C-Factor 1:100 Yr	**0.92**

Release Rate: 4.0 L/s

Time (min)	Intensity 1:2 Yr (mm/hr)	Qp 1:2 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m3)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m3)
10	76.81	18.80	4.00	14.80	8.88	178.56	48.72	4.00	44.72	26.83
15	61.77	15.12	4.00	11.12	10.01	142.89	38.99	4.00	34.99	31.49
20	52.03	12.74	4.00	8.74	10.49	119.95	32.73	4.00	28.73	34.48
25	45.17	11.06	4.00	7.06	10.59	103.85	28.34	4.00	24.34	36.50
30	40.04	9.80	4.00	5.80	10.45	91.87	25.07	4.00	21.07	37.92
35	36.06	8.83	4.00	4.83	10.14	82.58	22.53	4.00	18.53	38.92
40	32.86	8.05	4.00	4.05	9.71	75.15	20.50	4.00	16.50	39.61
45	30.24	7.40	4.00	3.40	9.19	69.05	18.84	4.00	14.84	40.07
50	28.04	6.86	4.00	2.86	8.59	63.95	17.45	4.00	13.45	40.35
55	26.17	6.41	4.00	2.41	7.94	59.62	16.27	4.00	12.27	40.49
60	24.56	6.01	4.00	2.01	7.24	55.89	15.25	4.00	11.25	40.50

Minimum storage volume requirement = **40.50 m3**

Surface Storage: CB 552 **40.71 m3**

***Minimum storage volume requirement met by the design**

4 **CBMH 571 - ICD 71**

Area	**0.3164**
C-Factor 1:2Yr	**0.82**

Release Rate: 18.0 L/s

Minimum storage volume requirement = **138.40 m3** (refer to Model M3 in Appendix 'D7' for SWMHYMO results)

Surface Storage:	CBMH571	64.08 m3	
	CBMH570	26.44 m3	
Underground Pipe Storage (including MHs):	CBMH570 - CBMH571	48.48 m3	(refer to Model M3 in Appendix 'D7' for stage - storage calculations)
Total Storage Volume:		**139.00 m3**	

***Minimum storage volume requirement met by the design**

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Urbandale Commercial Plaza
5100 Kanata Ave.

JLR No. 23405-003.1

STORMWATER MANAGEMENT CALCULATIONS

5 **CB 572 - ICD 72**

Area	**0.053**
C-Factor 1:2Yr	**0.41**
C-Factor 1:100 Yr	**0.48**

Release Rate: 4.0 L/s

Time (min)	Intensity 1:2 Yr (mm/hr)	Qp 1:2 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m3)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m3)
10	76.81	4.65	4.00	0.65	0.39	178.56	12.53	4.00	8.53	5.12
15	61.77	3.74	4.00	N/A	N/A	142.89	10.03	4.00	6.03	5.43
20	52.03	3.15	4.00	N/A	N/A	119.95	8.42	4.00	4.42	5.30
25	45.17	2.74	4.00	N/A	N/A	103.85	7.29	4.00	3.29	4.93
30	40.04	2.43	4.00	N/A	N/A	91.87	6.45	4.00	2.45	4.41
35	36.06	2.19	4.00	N/A	N/A	82.58	5.80	4.00	1.80	3.77
40	32.86	1.99	4.00	N/A	N/A	75.15	5.27	4.00	1.27	3.06
45	30.24	1.83	4.00	N/A	N/A	69.05	4.85	4.00	0.85	2.29
50	28.04	1.70	4.00	N/A	N/A	63.95	4.49	4.00	0.49	1.47
55	26.17	1.59	4.00	N/A	N/A	59.62	4.19	4.00	0.19	0.61

Minimum storage volume requirement = **5.43 m3**

Surface Storage: CB572 **9.28 m3**

***Minimum storage volume requirement met by the design**

6 **Building B** **Assumed Rooftop Properties:**

Total Area Roof = 0.0950 ha
Unusable roof (20%) = 0.0190 ha
Usable roof (80%) = 0.0760 ha
Depth of Storage = 0.127 m

Rooftop Volume Assuming Sloped Roof (m^3) = Usable rooftop area (m^2) x storage depth (m)/3
Rooftop Volume (m^3) = 760 m^2 x 0.127 m / 3
Rooftop Volume (m^3) = 32.2 m^3

Controlled roof release rate = 1.29 l/s roof drain x 6 Zurn Control-Flo units (102 mm Rise)
Total controlled roof release rate = 7.74 L/s

Rooftop Area =	**0.095**
C-Factor (1:2 year) =	**0.90**
C-Factor (1:100 year) =	**1.00**

Time (min)	Intensity 1:2 Yr (mm/hr)	Qp (L/s)	Qp roof drain (L/s)	Qp stored (L/s)	Max Volume Requirement (m3)	Intensity 1:100 Yr (mm/hr)	Qp (L/s)	Qp roof drain (L/s)	Qp stored (L/s)	Max Volume Requirement (m3)
10	76.81	18.26	7.74	10.52	6.31	178.56	47.16	7.74	39.42	23.65
15	61.77	14.68	7.74	6.94	6.25	142.89	37.74	7.74	30.00	27.00
20	52.03	12.37	7.74	4.63	5.55	119.95	31.68	7.74	23.94	28.73
25	45.17	10.74	7.74	3.00	4.49	103.85	27.43	7.74	19.69	29.53
30	40.04	9.52	7.74	1.78	3.20	91.87	24.26	7.74	16.52	29.74
35	36.06	8.57	7.74	0.83	1.74	82.58	21.81	7.74	14.07	29.54
40	32.86	7.81	7.74	0.07	0.17	75.15	19.85	7.74	12.11	29.05
45	30.24	7.19	7.74	N/A	N/A	69.05	18.24	7.74	10.50	28.34
50	28.04	6.67	7.74	N/A	N/A	63.95	16.89	7.74	9.15	27.45
55	26.17	6.22	7.74	N/A	N/A	59.62	15.75	7.74	8.01	26.42

Minimum roof storage volume requirement = **29.74 m3**

Roof storage volume provided by design = **32.17 m3**

***Minimum storage volume requirement met by the design**

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

Urbandale Commercial Plaza
5100 Kanata Ave.

JLR No. 23405-003.1

STORMWATER MANAGEMENT CALCULATIONS

7 **Building C** **Assumed Rooftop Properties:**

Total Area Roof = 0.0874 ha
Unusable roof (20%) = 0.0175 ha
Usable roof (80%) = 0.0699 ha
Depth of Storage = 0.127 m

Rooftop Volume Assuming Sloped Roof (m^3) = Usable rooftop area (m^2) x storage depth (m)/3
Rooftop Volume (m^3) = 680 m^2 x 0.127 m / 3
Rooftop Volume (m^3) = 29.6 m^3

Controlled roof release rate = 1.29 l/s roof drain x 5 Zurn Control-Flo units (102 mm Rise)
Total controlled roof release rate 6.45 L/s

Rooftop Area =	**0.087**
C-Factor (1:2 year) =	**0.90**
C-Factor (1:100 year) =	**1.00**

Time (min)	Intensity 1:2 Yr (mm/hr)	Qp (L/s)	Qp roof drain (L/s)	Qp stored (L/s)	Max Volume Requirement (m3)	Intensity 1:100 Yr (mm/hr)	Qp (L/s)	Qp roof drain (L/s)	Qp stored (L/s)	Max Volume Requirement (m3)
10	76.81	16.80	6.45	10.35	6.21	178.56	43.38	6.45	36.93	22.16
15	61.77	13.51	6.45	7.06	6.35	142.89	34.72	6.45	28.27	25.44
20	52.03	11.38	6.45	4.93	5.91	119.95	29.14	6.45	22.69	27.23
25	45.17	9.88	6.45	3.43	5.14	103.85	25.23	6.45	18.78	28.17
30	40.04	8.76	6.45	2.31	4.15	91.87	22.32	6.45	15.87	28.57
35	36.06	7.89	6.45	1.44	3.01	82.58	20.06	6.45	13.61	28.59
40	32.86	7.19	6.45	0.74	1.77	75.15	18.26	6.45	11.81	28.34
45	30.24	6.61	6.45	0.16	0.44	69.05	16.78	6.45	10.33	27.88
50	28.04	6.13	6.45	N/A	N/A	63.95	15.54	6.45	9.09	27.27

Minimum roof storage volume requirement = **28.59 m3**

Roof storage volume provided by design = **29.60 m3**

***Minimum storage volume requirement met by the design**

8 **CB 580 - ICD 80**

Area	**0.065**
C-Factor 1:2Yr	**0.52**
C-Factor 1:100 Yr	**0.60**

Release Rate: 13.0 L/s

Time (min)	Intensity 1:2 Yr (mm/hr)	Qp (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m3)	Intensity 1:100 Yr (mm/hr)	Qp (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m3)
10	76.81	7.26	13.00	N/A	N/A	178.56	19.24	13.00	6.24	3.74
15	61.77	5.84	13.00	N/A	N/A	142.89	15.39	13.00	2.39	2.15
20	52.03	4.92	13.00	N/A	N/A	119.95	12.92	13.00	N/A	N/A
25	45.17	4.27	13.00	N/A	N/A	103.85	11.19	13.00	N/A	N/A
30	40.04	3.78	13.00	N/A	N/A	91.87	9.90	13.00	N/A	N/A
35	36.06	3.41	13.00	N/A	N/A	82.58	8.90	13.00	N/A	N/A
40	32.86	3.11	13.00	N/A	N/A	75.15	8.10	13.00	N/A	N/A

Minimum storage volume requirement = **3.74 m3**

Surface Storage: CB 580 **13.16 m3**

***Minimum storage volume requirement met by the design**

9 **CB 573**

Area	**0.008**
C-Factor 1:2Yr	**0.46**
C-Factor 1:100 Yr	**0.53**

Uncontrolled Release Rate: 2.1 L/s

Time (min)	Intensity 1:2 Yr (mm/hr)	Qp (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m3)	Intensity 1:100 Yr (mm/hr)	Qp (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m3)
10	76.81	0.79	N/A	N/A	N/A	178.56	2.11	N/A	N/A	N/A
15	61.77	0.64	N/A	N/A	N/A	142.89	1.69	N/A	N/A	N/A
20	52.03	0.54	N/A	N/A	N/A	119.95	1.42	N/A	N/A	N/A
25	45.17	0.46	N/A	N/A	N/A	103.85	1.23	N/A	N/A	N/A
30	40.04	0.41	N/A	N/A	N/A	91.87	1.09	N/A	N/A	N/A
35	36.06	0.37	N/A	N/A	N/A	82.58	0.98	N/A	N/A	N/A
40	32.86	0.34	N/A	N/A	N/A	75.15	0.89	N/A	N/A	N/A