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Tully De'Ath consultants

Job: KIDDERPORE AVENUE - Job No: 11316

By: SFK Date: 8/6/15 Sheet No: HAND/03

VOLUMES OF RUN-OFF - 6 HOUR WINTER STORMS

- SECTION 5 OF LB CAMDEN STORM DRAINAGE POLICY

MICRODRAINAGE 6HR WINTERSTORMS IN LOCAL AREA:

1 IN 1 YR = 18.4 mm

1 IN 30 YR = 40.6 mm

1 IN 100 YR = 52.6 mm

1 IN 100 YR + 30% = 68.4 mm

MICRODRAINAGE ALSO INDICATES THE LOCAL SOIL INDEX TO BE 0.45 - SEE GREENFIELD RUN-OFF CALCULATIONS

RUN-OFF VOLUMES FOR 1.2255Ha GREENFIELD SITE ARE AS FOLLOWS:

1 IN 1 YR = $12255 \times 0.45 \times 18.4 \times 10^{-3} = 101.5 m^3$

1 IN 30 YR = $12255 \times 0.45 \times 40.6 \times 10^{-3} = 223.9 m^3$

1 IN 100 YR = $12255 \times 0.45 \times 52.6 \times 10^{-3} = 290.1 m^3$

1 IN 100 YR + 30% = $12255 \times 0.45 \times 68.4 \times 10^{-3} = 377.2 m^3$

NOTE: SOIL INDEX INDICATES THE PROPORTION OF SURFACE WATER DISCHARGING FROM LANDSCAPED AREAS IN THE LOCALITY. IT IS A TYPICAL VALUE FOR THE AREA.

EXISTING VOLUMES - $4945 m^2$ OF IMPERMEABLE SURFACE

1 IN 1 YR = $((5000 + (12255 - 5000)0.45) \times 18.4 \times 10^{-3} = 152.1 m^3$

1 IN 30 YR = $((5000 + (12255 - 5000)0.45) \times 40.6 \times 10^{-3} = 335.5 m^3$

1 IN 100 YR = $(5000 + (12255 - 5000)0.45) \times 52.6 \times 10^{-3} = 434.7 m^3$

1 IN 100 YR + 30% = $(5000 + (12255 - 5000)0.45) \times 68.4 \times 10^{-3} = 565.3 m^3$

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Tully De'Ath consultants

Job: KIDDERPORE AVENUE Job No: 11316

By: SFK Date: 24/6/15 Sheet No: HAND/04

VOLUMES OF RUN-OFF - 6 HOUR WINTER STORMS - RUN OFF FROM 1790 m² UN-ATTENUATED AREA ASSOCIATED WITH RETAINED BUILDINGS IN CENTRAL SITE AREA.

RAINFALL FIGURES FOR 6 HR WINTER STORM AS STATED ON HAND/03.

1 IN 1 YR = 1605 × 18.4 × 10^{-3} = 29.5 m^3

1 IN 30 YR = 1605 × 40.6 × 10^{-3} = 65.2 m^3

1 IN 100 YR = 1605 × 52.6 × 10^{-3} = 84.4 m^3

1 IN 100 YR + 30% = 1605 × 68.4 × 10^{-3} = 109.8 m^3

VOLUMES OF RUN-OFF - 6 HOUR WINTER STORMS FROM REMAINING GREENFIELD AREA POST DEVELOPMENT - 12255 - 8180 = 4075 m^2

SOIL INDEX = 0.45

1 IN 1 YR: 4075 × 0.45 × 18.4 × 10^{-3} = 33.7 m^3

1 IN 30 YR 4075 × 0.45 × 40.6 × 10^{-3} = 74.5 m^3

1 IN 100 YR 4075 × 0.45 × 52.6 × 10^{-3} = 96.5 m^3

1 IN 100 YR + 30% 4075 × 0.45 × 68.4 × 10^{-3} = 125.4 m^3

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:

Tully De'Ath consultants
celebrating 25 years of strategic engineering

Job: KIDDERPORE AVENUE Job No: 11316

By: SFK Date: 25/6/15 Sheet No: HAND/05

FLOWS FROM PROPOSED DEVELOPMENT (SEE MD/06-23)

STORM EVENT	UNATTENUATED 1605m²	WEST 4300m	EAST 2175m²	TOTAL 8180m²
1in1	22.3l/s	3.7l/s	4.7l/s	30.7l/s
1in30	50.4l/s	3.7l/s	4.9l/s	59.0l/s
1in100	64.2l/s	4.2l/s	4.9l/s	73.3l/s
1in100+30%	83.5l/s	4.9l/s	5.0l/s	95.4l/s

↑ "PROPOSED RATES" + SECTION 4 - CAMDEN PRO-FORMA

VOLUMES FROM PROPOSED DEVELOPMENT

STORM EVENT	UNATTEN'D 1605m²	GREENFIELD 4075m²	WEST 4300m²	EAST 2175m²	TOTAL 12255m²
1in1	29.5m³	35.7m³	69.6m³	42.2m³	175.0m³
1in30	65.2m³	76.5m³	165.4m³	92.9m³	398.0m³
1in100	86.6m³	96.5m³	215.3m³	120.4m³	516.6m³
1in100+30%	109.8m³	125.4m³	285.7m³	156.6m³	675.5m³

↑ "PROPOSED VOLUMES" - SECTION 5 - CAMDEN PRO-FORMA

GREEN FIELD RUN-OFF RATES MD/01

Tully De'Ath		Page 1
Sheridan House Hartfield Road Forest Row		Micro Drainage
Date 24/06/2015 11:19 File 150605-Greenfield.srcx	Designed by sfk Checked by	
XP Solutions	Source Control 2014.1.1	

IH 124 Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	50.000	Urban	0.000
SAAR (mm)	626	Region Number	Region 6

Results	l/s
QBAR Rural	192.7
QBAR Urban	192.7 *
Q100 years	614.8
Q1 year	163.8 *
Q2 years	169.8
Q5 years	246.7
Q10 years	312.2
Q20 years	386.1
Q25 years	414.0
Q30 years	436.8 *
Q50 years	505.0
Q100 years	614.8 *
Q200 years	722.8
Q250 years	757.5
Q1000 years	994.5

RUN OFF RATES FOR 1.2255Ha:

1 IN 1 YR: 1.2255/50 × 163.8 = 4.01 l/s

QBAR: 1.2255/50 × 192.7 = 4.71 l/s

1 IN 30 YR: 1.2255/50 × 436.8 = 10.71 l/s

1 IN 100 YR: 1.2255/50 × 614.8 = 15.1 l/s

1 IN 100 + 30% STORM DETAILS MD02

Cascade Rainfall Details for 150624-WestStandardImp&Attenuation.srcx

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	21.000	Shortest Storm (mins)	15
Ratio R	0.438	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.275

Time (mins) From:	To:	Area (ha)
0	4	0.275

1 IN 100 YR STORM DETAILS MD/03

Cascade Rainfall Details for 150624-WestStandardImp&Attenuation.srcx

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	21.000	Shortest Storm (mins)	15
Ratio R	0.438	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.275

Time From:	(mins) To:	Area (ha)
0	4	0.275

1 IN 30 +R STORM DETAILS MD/04

Cascade Rainfall Details for 150624-WestStandardImp&Attenuation.srcx

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	21.000	Shortest Storm (mins)	15
Ratio R	0.438	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.275

Time (mins) From:	To:	Area (ha)
0	4	0.275

1 in 1 yr Storm Details MD/05

Sheridan House
Hartfield Road
Forest Row

Date 24/06/2015 13:05 | Designed by sfk
File 150624-WestGreenRoofCas... | Checked by
XP Solutions | Source Control 2014.1.1

Cascade Rainfall Details for 150624-WestStandardImp&Attenuation.srcx

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	21.000	Shortest Storm (mins)	15
Ratio R	0.438	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.275

Time (mins) From:	To:	Area (ha)
0	4	0.275

WEST ATTENUATION - MODEL DETAILS MD06

Cascade Model Details for 150624-WestStandardImp&Attenuation.srcx

Storage is Online Cover Level (m) 97.000

Tank or Pond Structure

Invert Level (m) 91.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	91.2	1.400	91.2	2.800	0.0	4.200	0.0
0.200	91.2	1.600	91.2	3.000	0.0	4.400	0.0
0.400	91.2	1.800	91.2	3.200	0.0	4.600	0.0
0.600	91.2	2.000	91.2	3.400	0.0	4.800	0.0
0.800	91.2	2.200	91.2	3.600	0.0	5.000	0.0
1.000	91.2	2.400	45.6	3.800	0.0		
1.200	91.2	2.600	0.0	4.000	0.0		

Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0088-5000-2400-5000
Design Head (m)	2.400
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	88
Invert Level (m)	91.500
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.400	5.0
Flush-Flo™	0.381	3.7
Kick-Flo®	0.784	3.0
Mean Flow over Head Range	-	3.8

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.7	1.200	3.6	3.000	5.5	7.000	8.3
0.200	3.5	1.400	3.9	3.500	6.0	7.500	8.5
0.300	3.7	1.600	4.1	4.000	6.4	8.000	8.8
0.400	3.7	1.800	4.4	4.500	6.7	8.500	9.1
0.500	3.7	2.000	4.6	5.000	7.1	9.000	9.3
0.600	3.6	2.200	4.8	5.500	7.4	9.500	9.6
0.800	3.0	2.400	5.0	6.000	7.7		
1.000	3.3	2.600	5.2	6.500	8.0		

WEST ATTENUATION 1:100 + 30% SUMMER MD/07

Tully De'Ath		Page 1
Sheridan House Hartfield Road Forest Row		Micro Drainage
Date 24/06/2015 12:20	Designed by sfk	
File 150624-WestGreenRoofCas...	Checked by	
XP Solutions	Source Control 2014.1.1	

Cascade Summary of Results for 150624-WestStandardImp&Attenuation.srcx

Upstream Structures	Outflow To	Overflow To
150624-WestGreenRoof.srcx	150624-WestOutfallTank.srcx	(None)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	92.498	0.998	3.7	91.0	O K
30 min Summer	92.823	1.323	3.8	120.7	O K
60 min Summer	93.127	1.627	4.2	148.4	O K
120 min Summer	93.409	1.909	4.5	174.1	O K
180 min Summer	93.478	1.978	4.6	180.4	O K
240 min Summer	93.505	2.005	4.6	182.9	O K
360 min Summer	93.460	1.960	4.5	178.8	O K
480 min Summer	93.415	1.915	4.5	174.6	O K
600 min Summer	93.365	1.865	4.4	170.1	O K
720 min Summer	93.305	1.805	4.4	164.6	O K
960 min Summer	93.202	1.702	4.3	155.2	O K
1440 min Summer	93.002	1.502	4.0	137.0	O K
2160 min Summer	92.737	1.237	3.7	112.8	O K
2880 min Summer	92.550	1.050	3.7	95.7	O K
4320 min Summer	92.110	0.610	3.7	55.6	O K
5760 min Summer	91.840	0.340	3.7	31.0	O K
7200 min Summer	91.713	0.213	3.5	19.5	O K
8640 min Summer	91.648	0.148	3.2	13.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	139.672	0.0	104.0	50
30 min Summer	90.181	0.0	136.7	62
60 min Summer	55.351	0.0	169.3	86
120 min Summer	32.803	0.0	203.6	130
180 min Summer	23.841	0.0	219.8	182
240 min Summer	18.904	0.0	233.7	242
360 min Summer	13.629	0.0	252.3	332
480 min Summer	10.798	0.0	267.1	390
600 min Summer	9.007	0.0	278.6	454
720 min Summer	7.764	0.0	287.3	520
960 min Summer	6.137	0.0	302.7	656
1440 min Summer	4.401	0.0	324.0	936
2160 min Summer	3.151	0.0	345.3	1344
2880 min Summer	2.484	0.0	365.1	1744
4320 min Summer	1.775	0.0	390.1	2460
5760 min Summer	1.397	0.0	406.0	3088
7200 min Summer	1.160	0.0	417.6	3752
8640 min Summer	0.996	0.0	426.6	4416

WEST ATTENUATION 1IN100+30% WINTER. MD/08

Tully De'Ath		Page 2
Sheridan House Hartfield Road Forest Row		Micro Drainage
Date 24/06/2015 12:20	Designed by sfk	
File 150624-WestGreenRoofCas...	Checked by	
XP Solutions	Source Control 2014.1.1	

Cascade Summary of Results for 150624-WestStandardImp&Attenuation.srcx

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
10080 min Summer	91.613	0.113	3.0	10.3	O K
15 min Winter	92.636	1.136	3.7	103.6	O K
30 min Winter	93.000	1.500	4.0	136.8	O K
60 min Winter	93.342	1.842	4.4	168.0	O K
120 min Winter	93.655	2.155	4.8	196.5	O K
180 min Winter	93.786	2.286	4.9	207.6	O K
240 min Winter	93.818	2.318	4.9	209.6	O K
360 min Winter	93.789	2.289	4.9	207.7	O K
480 min Winter	93.707	2.207	4.8	201.3	O K
600 min Winter	93.648	2.148	4.7	195.9	O K
720 min Winter	93.585	2.085	4.7	190.2	O K
960 min Winter	93.437	1.937	4.5	176.6	O K
1440 min Winter	93.112	1.612	4.2	147.0	O K
2160 min Winter	92.820	1.320	3.8	120.3	O K
2880 min Winter	92.520	1.020	3.7	93.0	O K
4320 min Winter	91.866	0.366	3.7	33.4	O K
5760 min Winter	91.667	0.167	3.3	15.3	O K
7200 min Winter	91.608	0.108	2.9	9.9	O K
8640 min Winter	91.592	0.092	2.5	8.3	O K
10080 min Winter	91.581	0.081	2.2	7.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Summer	0.875	0.0	433.6	5136
15 min Winter	139.672	0.0	117.4	51
30 min Winter	90.181	0.0	154.0	64
60 min Winter	55.351	0.0	190.4	88
120 min Winter	32.803	0.0	227.7	132
180 min Winter	23.841	0.0	248.7	180
240 min Winter	18.904	0.0	262.2	236
360 min Winter	13.629	0.0	283.7	346
480 min Winter	10.798	0.0	299.5	432
600 min Winter	9.007	0.0	312.8	478
720 min Winter	7.764	0.0	323.7	554
960 min Winter	6.137	0.0	340.0	706
1440 min Winter	4.401	0.0	358.9	1010
2160 min Winter	3.151	0.0	392.6	1444
2880 min Winter	2.484	0.0	413.6	1872
4320 min Winter	1.775	0.0	439.8	2464
5760 min Winter	1.397	0.0	458.2	3056
7200 min Winter	1.160	0.0	471.9	3672
8640 min Winter	0.996	0.0	482.7	4400
10080 min Winter	0.875	0.0	491.3	5072

WEST ATTENUATION 1IN100YR SUMMER MD/09

Tully De'Ath		Page 1
Sheridan House Hartfield Road Forest Row		
Date 24/06/2015 12:55	Designed by sfk	
File 150624-WestGreenRoofCas...	Checked by	
XP Solutions	Source Control 2014.1.1	

Cascade Summary of Results for 150624-WestStandardImp&Attenuation.srcx

Upstream Structures	Outflow To	Overflow To
150624-WestGreenRoof.srcx	150624-WestOutfallTank.srcx	(None)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	92.220	0.720	3.7	65.7	O K
30 min Summer	92.480	0.980	3.7	89.4	O K
60 min Summer	92.721	1.221	3.7	111.3	O K
120 min Summer	92.906	1.406	3.9	128.2	O K
180 min Summer	92.955	1.455	4.0	132.7	O K
240 min Summer	92.964	1.464	4.0	133.5	O K
360 min Summer	92.924	1.424	3.9	129.8	O K
480 min Summer	92.868	1.368	3.8	124.8	O K
600 min Summer	92.835	1.335	3.8	121.7	O K
720 min Summer	92.788	1.288	3.7	117.4	O K
960 min Summer	92.689	1.189	3.7	108.4	O K
1440 min Summer	92.489	0.989	3.7	90.2	O K
2160 min Summer	92.266	0.766	3.7	69.9	O K
2880 min Summer	92.036	0.536	3.7	48.9	O K
4320 min Summer	91.775	0.275	3.7	25.1	O K
5760 min Summer	91.664	0.164	3.3	15.0	O K
7200 min Summer	91.615	0.115	3.0	10.5	O K
8640 min Summer	91.597	0.097	2.6	8.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	107.440	0.0	77.9	45
30 min Summer	69.370	0.0	103.2	58
60 min Summer	42.578	0.0	129.3	80
120 min Summer	25.233	0.0	153.7	124
180 min Summer	18.339	0.0	167.2	182
240 min Summer	14.542	0.0	177.8	240
360 min Summer	10.484	0.0	192.7	312
480 min Summer	8.306	0.0	202.5	376
600 min Summer	6.928	0.0	212.3	440
720 min Summer	5.972	0.0	219.4	506
960 min Summer	4.721	0.0	230.3	646
1440 min Summer	3.385	0.0	244.3	924
2160 min Summer	2.424	0.0	265.2	1324
2880 min Summer	1.911	0.0	278.6	1648
4320 min Summer	1.365	0.0	295.0	2308
5760 min Summer	1.074	0.0	306.2	3000
7200 min Summer	0.892	0.0	314.1	3672
8640 min Summer	0.766	0.0	319.9	4408

WEST ATTENUATION 1IN100YR WINTER MD/10

Cascade Summary of Results for 150624-WestStandardImp&Attenuation.srcx

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
10080 min Summer	91.585	0.085	2.3	7.8	O K
15 min Winter	92.337	0.837	3.7	76.4	O K
30 min Winter	92.613	1.113	3.7	101.5	O K
60 min Winter	92.887	1.387	3.9	126.5	O K
120 min Winter	93.105	1.605	4.1	146.4	O K
180 min Winter	93.180	1.680	4.2	153.2	O K
240 min Winter	93.183	1.683	4.2	153.5	O K
360 min Winter	93.135	1.635	4.2	149.2	O K
480 min Winter	93.083	1.583	4.1	144.4	O K
600 min Winter	93.029	1.529	4.1	139.4	O K
720 min Winter	92.958	1.458	4.0	133.0	O K
960 min Winter	92.797	1.297	3.8	118.3	O K
1440 min Winter	92.580	1.080	3.7	98.5	O K
2160 min Winter	92.200	0.700	3.7	63.8	O K
2880 min Winter	91.885	0.385	3.7	35.1	O K
4320 min Winter	91.650	0.150	3.3	13.7	O K
5760 min Winter	91.599	0.099	2.7	9.0	O K
7200 min Winter	91.582	0.082	2.2	7.5	O K
8640 min Winter	91.572	0.072	1.9	6.6	O K
10080 min Winter	91.565	0.065	1.6	6.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Summer	0.673	0.0	324.3	5136
15 min Winter	107.440	0.0	88.5	50
30 min Winter	69.370	0.0	116.3	59
60 min Winter	42.578	0.0	145.6	82
120 min Winter	25.233	0.0	173.4	126
180 min Winter	18.339	0.0	189.5	178
240 min Winter	14.542	0.0	199.6	236
360 min Winter	10.484	0.0	215.3	340
480 min Winter	8.306	0.0	228.6	394
600 min Winter	6.928	0.0	238.6	466
720 min Winter	5.972	0.0	245.8	542
960 min Winter	4.721	0.0	255.5	696
1440 min Winter	3.385	0.0	277.8	996
2160 min Winter	2.424	0.0	300.5	1404
2880 min Winter	1.911	0.0	314.3	1700
4320 min Winter	1.365	0.0	333.4	2292
5760 min Winter	1.074	0.0	346.5	2944
7200 min Winter	0.892	0.0	356.0	3672
8640 min Winter	0.766	0.0	363.3	4408
10080 min Winter	0.673	0.0	368.9	5144

MD/11

WEST ATTENUATION 1 IN 30 YR SUMMER

Tully De'Ath		Page 1
Sheridan House Hartfield Road Forest Row		Micro Drainage
Date 24/06/2015 13:02	Designed by sfk	
File 150624-WestGreenRoofCas...	Checked by	
XP Solutions	Source Control 2014.1.1	

Cascade Summary of Results for 150624-WestStandardImp&Attenuation.srcx

Upstream Structures	Outflow To	Overflow To
150624-WestGreenRoof.srcx	150624-WestOutfallTank.srcx	(None)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	92.009	0.509	3.7	46.4	O K
30 min Summer	92.194	0.694	3.7	63.3	O K
60 min Summer	92.378	0.878	3.7	80.0	O K
120 min Summer	92.516	1.016	3.7	92.7	O K
180 min Summer	92.548	1.048	3.7	95.6	O K
240 min Summer	92.547	1.047	3.7	95.5	O K
360 min Summer	92.518	1.018	3.7	92.9	O K
480 min Summer	92.480	0.980	3.7	89.4	O K
600 min Summer	92.442	0.942	3.7	85.9	O K
720 min Summer	92.404	0.904	3.7	82.5	O K
960 min Summer	92.307	0.807	3.7	73.6	O K
1440 min Summer	92.123	0.623	3.7	56.8	O K
2160 min Summer	91.933	0.433	3.7	39.5	O K
2880 min Summer	91.796	0.296	3.7	27.0	O K
4320 min Summer	91.659	0.159	3.3	14.5	O K
5760 min Summer	91.609	0.109	2.9	10.0	O K
7200 min Summer	91.591	0.091	2.5	8.3	O K
8640 min Summer	91.579	0.079	2.1	7.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	82.549	0.0	57.9	38
30 min Summer	52.907	0.0	76.4	51
60 min Summer	32.372	0.0	95.8	74
120 min Summer	19.217	0.0	114.8	124
180 min Summer	14.018	0.0	125.6	182
240 min Summer	11.161	0.0	134.0	240
360 min Summer	8.089	0.0	146.4	298
480 min Summer	6.431	0.0	155.1	362
600 min Summer	5.381	0.0	162.1	428
720 min Summer	4.649	0.0	168.3	498
960 min Summer	3.690	0.0	177.0	636
1440 min Summer	2.662	0.0	191.7	880
2160 min Summer	1.919	0.0	207.9	1236
2880 min Summer	1.520	0.0	218.1	1584
4320 min Summer	1.094	0.0	232.0	2252
5760 min Summer	0.865	0.0	241.5	2944
7200 min Summer	0.722	0.0	248.2	3672
8640 min Summer	0.622	0.0	253.1	4400

MD/12

WEST ATTENUATION 1 IN 30 WINTER

Tully De'Ath		Page 2
Sheridan House Hartfield Road Forest Row		Micro Drainage
Date 24/06/2015 13:02	Designed by sfk	
File 150624-WestGreenRoofCas...	Checked by	
XP Solutions	Source Control 2014.1.1	

Cascade Summary of Results for 150624-WestStandardImp&Attenuation.srcx

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
10080 min Summer	91.571	0.071	1.9	6.5	O K
15 min Winter	92.092	0.592	3.7	53.9	O K
30 min Winter	92.308	0.808	3.7	73.7	O K
60 min Winter	92.506	1.006	3.7	91.8	O K
120 min Winter	92.673	1.173	3.7	107.0	O K
180 min Winter	92.712	1.212	3.7	110.5	O K
240 min Winter	92.706	1.206	3.7	110.0	O K
360 min Winter	92.678	1.178	3.7	107.4	O K
480 min Winter	92.619	1.119	3.7	102.1	O K
600 min Winter	92.558	1.058	3.7	96.5	O K
720 min Winter	92.472	0.972	3.7	88.6	O K
960 min Winter	92.374	0.874	3.7	79.7	O K
1440 min Winter	92.122	0.622	3.7	56.8	O K
2160 min Winter	91.830	0.330	3.7	30.1	O K
2880 min Winter	91.688	0.188	3.4	17.1	O K
4320 min Winter	91.600	0.100	2.7	9.2	O K
5760 min Winter	91.580	0.080	2.1	7.3	O K
7200 min Winter	91.569	0.069	1.8	6.3	O K
8640 min Winter	91.562	0.062	1.5	5.6	O K
10080 min Winter	91.557	0.057	1.4	5.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Summer	0.548	0.0	256.6	5136
15 min Winter	82.549	0.0	65.9	40
30 min Winter	52.907	0.0	86.8	57
60 min Winter	32.372	0.0	108.4	78
120 min Winter	19.217	0.0	130.6	122
180 min Winter	14.018	0.0	142.3	180
240 min Winter	11.161	0.0	150.4	234
360 min Winter	8.089	0.0	165.4	330
480 min Winter	6.431	0.0	174.5	382
600 min Winter	5.381	0.0	181.6	458
720 min Winter	4.649	0.0	185.4	536
960 min Winter	3.690	0.0	198.9	690
1440 min Winter	2.662	0.0	218.2	942
2160 min Winter	1.919	0.0	234.8	1276
2880 min Winter	1.520	0.0	246.5	1588
4320 min Winter	1.094	0.0	262.8	2216
5760 min Winter	0.865	0.0	274.1	2936
7200 min Winter	0.722	0.0	282.3	3640
8640 min Winter	0.622	0.0	288.6	4408
10080 min Winter	0.548	0.0	293.4	5128

WEST ATTENUATION 1IN1YR SUMMER MD/13

Tully De'Ath		Page 1
Sheridan House Hartfield Road Forest Row		Micro Drainage
Date 24/06/2015 13:05 File 150624-WestGreenRoofCas...	Designed by sfk Checked by	
XP Solutions	Source Control 2014.1.1	

Cascade Summary of Results for 150624-WestStandardImp&Attenuation.srcx

Upstream Structures	Outflow To	Overflow To
150624-WestGreenRoof.srcx	150624-WestOutfallTank.srcx	(None)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	91.669	0.169	3.4	15.4	O K
30 min Summer	91.704	0.204	3.5	18.6	O K
60 min Summer	91.760	0.260	3.6	23.7	O K
120 min Summer	91.797	0.297	3.7	27.1	O K
180 min Summer	91.804	0.304	3.7	27.7	O K
240 min Summer	91.802	0.302	3.7	27.6	O K
360 min Summer	91.784	0.284	3.7	25.9	O K
480 min Summer	91.772	0.272	3.7	24.8	O K
600 min Summer	91.758	0.258	3.6	23.5	O K
720 min Summer	91.740	0.240	3.6	21.9	O K
960 min Summer	91.705	0.205	3.5	18.7	O K
1440 min Summer	91.652	0.152	3.3	13.9	O K
2160 min Summer	91.609	0.109	2.9	10.0	O K
2880 min Summer	91.590	0.090	2.4	8.3	O K
4320 min Summer	91.572	0.072	1.9	6.5	O K
5760 min Summer	91.562	0.062	1.5	5.6	O K
7200 min Summer	91.555	0.055	1.3	5.0	O K
8640 min Summer	91.551	0.051	1.1	4.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	33.607	0.0	18.8	17
30 min Summer	21.695	0.0	26.4	31
60 min Summer	13.524	0.0	35.0	62
120 min Summer	8.249	0.0	44.6	110
180 min Summer	6.145	0.0	50.6	140
240 min Summer	4.980	0.0	55.0	172
360 min Summer	3.676	0.0	60.9	238
480 min Summer	2.958	0.0	66.2	304
600 min Summer	2.498	0.0	70.5	368
720 min Summer	2.177	0.0	73.9	430
960 min Summer	1.751	0.0	79.3	550
1440 min Summer	1.289	0.0	87.1	784
2160 min Summer	0.949	0.0	95.3	1128
2880 min Summer	0.764	0.0	101.1	1480
4320 min Summer	0.562	0.0	108.6	2204
5760 min Summer	0.452	0.0	113.7	2936
7200 min Summer	0.382	0.0	118.0	3672
8640 min Summer	0.333	0.0	121.6	4400

MD/14

WEST ATTENUATION 1IN1YR WINTER

Tully De'Ath		Page 2
Sheridan House Hartfield Road Forest Row		Micro Drainage
Date 24/06/2015 13:05 File 150624-WestGreenRoofCas...	Designed by sfk Checked by	
XP Solutions	Source Control 2014.1.1	

Cascade Summary of Results for 150624-WestStandardImp&Attenuation.srcx

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
10080 min Summer	91.547	0.047	1.0	4.3	O K
15 min Winter	91.691	0.191	3.5	17.4	O K
30 min Winter	91.736	0.236	3.6	21.5	O K
60 min Winter	91.803	0.303	3.7	27.7	O K
120 min Winter	91.856	0.356	3.7	32.5	O K
180 min Winter	91.853	0.353	3.7	32.2	O K
240 min Winter	91.836	0.336	3.7	30.6	O K
360 min Winter	91.818	0.318	3.7	29.0	O K
480 min Winter	91.793	0.293	3.7	26.8	O K
600 min Winter	91.760	0.260	3.6	23.7	O K
720 min Winter	91.729	0.229	3.6	20.9	O K
960 min Winter	91.677	0.177	3.4	16.2	O K
1440 min Winter	91.615	0.115	3.0	10.4	O K
2160 min Winter	91.585	0.085	2.3	7.8	O K
2880 min Winter	91.571	0.071	1.9	6.5	O K
4320 min Winter	91.558	0.058	1.4	5.2	O K
5760 min Winter	91.550	0.050	1.1	4.6	O K
7200 min Winter	91.545	0.045	0.9	4.1	O K
8640 min Winter	91.542	0.042	0.8	3.8	O K
10080 min Winter	91.539	0.039	0.7	3.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Summer	0.296	0.0	124.8	5136
15 min Winter	33.607	0.0	22.0	17
30 min Winter	21.695	0.0	30.7	37
60 min Winter	13.524	0.0	39.9	62
120 min Winter	8.249	0.0	51.1	118
180 min Winter	6.145	0.0	57.4	150
240 min Winter	4.980	0.0	61.5	184
360 min Winter	3.676	0.0	69.6	256
480 min Winter	2.958	0.0	76.0	324
600 min Winter	2.498	0.0	80.4	390
720 min Winter	2.177	0.0	84.1	452
960 min Winter	1.751	0.0	90.2	570
1440 min Winter	1.289	0.0	99.2	780
2160 min Winter	0.949	0.0	108.7	1128
2880 min Winter	0.764	0.0	115.5	1472
4320 min Winter	0.562	0.0	124.7	2232
5760 min Winter	0.452	0.0	131.0	2936
7200 min Winter	0.382	0.0	135.6	3672
8640 min Winter	0.333	0.0	139.2	4400
10080 min Winter	0.296	0.0	142.6	5144

MD/15

EAST ATTENUATION - MODEL DETAILS

Tully De'Ath		Page 3
Sheridan House Hartfield Road Forest Row		Micro Drainage
Date 25/06/2015 09:02	Designed by sfk	
File 150624-EastImp&Attenuat...	Checked by	
XP Solutions	Source Control 2014.1.1	

Model Details

Storage is Online Cover Level (m) 92.300

Tank or Pond Structure

Invert Level (m) 89.175

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	64.8	0.700	64.8	1.400	64.8	2.100	0.0
0.100	64.8	0.800	64.8	1.500	64.8	2.200	0.0
0.200	64.8	0.900	64.8	1.600	0.0	2.300	0.0
0.300	64.8	1.000	64.8	1.700	0.0	2.400	0.0
0.400	64.8	1.100	64.8	1.800	0.0	2.500	0.0
0.500	64.8	1.200	64.8	1.900	0.0		
0.600	64.8	1.300	64.8	2.000	0.0		

Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0098-5000-1500-5000
Design Head (m)	1.500
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	98
Invert Level (m)	89.175
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	5.0
Flush-Flo™	0.431	4.9
Kick-Flo®	0.878	3.9
Mean Flow over Head Range	-	4.3

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.2	1.200	4.5	3.000	6.9	7.000	10.3
0.200	4.4	1.400	4.8	3.500	7.4	7.500	10.7
0.300	4.8	1.600	5.1	4.000	7.9	8.000	11.0
0.400	4.9	1.800	5.4	4.500	8.4	8.500	11.3
0.500	4.9	2.000	5.7	5.000	8.8	9.000	11.6
0.600	4.8	2.200	6.0	5.500	9.2	9.500	11.9
0.800	4.3	2.400	6.2	6.000	9.6		
1.000	4.1	2.600	6.5	6.500	10.0		

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EAST ATTENUATION 1IN100+30% SUMMER

Tully De'Ath		Page 1
Sheridan House Hartfield Road Forest Row		Micro Drainage
Date 25/06/2015 09:02	Designed by sfk	
File 150624-EastImp&Attenuat...	Checked by	
XP Solutions	Source Control 2014.1.1	

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	90.041	0.866	4.9	56.1	O K
30 min Summer	90.260	1.085	4.9	70.3	O K
60 min Summer	90.423	1.248	4.9	80.9	O K
120 min Summer	90.479	1.304	4.9	84.5	O K
180 min Summer	90.442	1.267	4.9	82.1	O K
240 min Summer	90.394	1.219	4.9	79.0	O K
360 min Summer	90.304	1.129	4.9	73.2	O K
480 min Summer	90.220	1.045	4.9	67.7	O K
600 min Summer	90.137	0.962	4.9	62.4	O K
720 min Summer	90.049	0.874	4.9	56.6	O K
960 min Summer	89.871	0.696	4.9	45.1	O K
1440 min Summer	89.624	0.449	4.9	29.1	O K
2160 min Summer	89.425	0.250	4.6	16.2	O K
2880 min Summer	89.334	0.159	4.2	10.3	O K
4320 min Summer	89.277	0.102	3.3	6.6	O K
5760 min Summer	89.258	0.083	2.6	5.3	O K
7200 min Summer	89.247	0.072	2.2	4.7	O K
8640 min Summer	89.240	0.065	1.8	4.2	O K
10080 min Summer	89.235	0.060	1.6	3.9	O K
15 min Winter	90.151	0.976	4.9	63.3	O K
30 min Winter	90.400	1.225	4.9	79.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	139.672	0.0	59.6	18
30 min Summer	90.181	0.0	77.0	33
60 min Summer	55.351	0.0	94.6	62
120 min Summer	32.803	0.0	112.2	120
180 min Summer	23.841	0.0	122.3	154
240 min Summer	18.904	0.0	129.3	186
360 min Summer	13.629	0.0	139.8	252
480 min Summer	10.798	0.0	147.7	322
600 min Summer	9.007	0.0	154.0	392
720 min Summer	7.764	0.0	159.3	462
960 min Summer	6.137	0.0	167.9	578
1440 min Summer	4.401	0.0	180.5	810
2160 min Summer	3.151	0.0	194.0	1148
2880 min Summer	2.484	0.0	203.9	1496
4320 min Summer	1.775	0.0	218.4	2200
5760 min Summer	1.397	0.0	229.3	2920
7200 min Summer	1.160	0.0	237.9	3672
8640 min Summer	0.996	0.0	245.1	4400
10080 min Summer	0.875	0.0	251.3	5136
15 min Winter	139.672	0.0	66.8	18
30 min Winter	90.181	0.0	86.3	32

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EAST ATTENUATION 1in100+30% WINTER

Tully De'Ath		Page 2
Sheridan House Hartfield Road Forest Row		Micro Drainage
Date 25/06/2015 09:02 File 150624-EastImp&Attenuat...	Designed by sfk Checked by	
XP Solutions	Source Control 2014.1.1	

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	90.592	1.417	4.9	91.8	O K
120 min Winter	90.677	1.502	5.0	97.3	O K
180 min Winter	90.643	1.468	4.9	95.1	O K
240 min Winter	90.580	1.405	4.9	91.1	O K
360 min Winter	90.465	1.290	4.9	83.6	O K
480 min Winter	90.346	1.171	4.9	75.9	O K
600 min Winter	90.227	1.052	4.9	68.2	O K
720 min Winter	90.103	0.928	4.9	60.1	O K
960 min Winter	89.826	0.651	4.9	42.2	O K
1440 min Winter	89.502	0.327	4.8	21.2	O K
2160 min Winter	89.320	0.145	4.1	9.4	O K
2880 min Winter	89.279	0.104	3.3	6.7	O K
4320 min Winter	89.253	0.078	2.4	5.0	O K
5760 min Winter	89.241	0.066	1.9	4.3	O K
7200 min Winter	89.234	0.059	1.6	3.8	O K
8640 min Winter	89.229	0.054	1.3	3.5	O K
10080 min Winter	89.225	0.050	1.2	3.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	55.351	0.0	106.0	60
120 min Winter	32.803	0.0	125.6	118
180 min Winter	23.841	0.0	136.9	170
240 min Winter	18.904	0.0	144.8	194
360 min Winter	13.629	0.0	156.6	270
480 min Winter	10.798	0.0	165.4	348
600 min Winter	9.007	0.0	172.5	424
720 min Winter	7.764	0.0	178.4	500
960 min Winter	6.137	0.0	188.0	616
1440 min Winter	4.401	0.0	202.2	836
2160 min Winter	3.151	0.0	217.2	1148
2880 min Winter	2.484	0.0	228.3	1468
4320 min Winter	1.775	0.0	244.6	2188
5760 min Winter	1.397	0.0	256.8	2936
7200 min Winter	1.160	0.0	266.5	3576
8640 min Winter	0.996	0.0	274.5	4304
10080 min Winter	0.875	0.0	281.5	5136

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EAST ATTENUATION 1IN100YR SUMMER

Tully De'Ath		Page 1
Sheridan House Hartfield Road Forest Row		Micro Drainage
Date 25/06/2015 09:02	Designed by sfk	
File 150624-EastImp&Attenuat...	Checked by	
XP Solutions	Source Control 2014.1.1	

Summary of Results for 100 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	89.828	0.653	4.9	42.3	O K
30 min Summer	89.987	0.812	4.9	52.6	O K
60 min Summer	90.104	0.929	4.9	60.2	O K
120 min Summer	90.123	0.948	4.9	61.5	O K
180 min Summer	90.083	0.908	4.9	58.8	O K
240 min Summer	90.029	0.854	4.9	55.4	O K
360 min Summer	89.930	0.755	4.9	48.9	O K
480 min Summer	89.842	0.667	4.9	43.2	O K
600 min Summer	89.762	0.587	4.9	38.1	O K
720 min Summer	89.691	0.516	4.9	33.4	O K
960 min Summer	89.573	0.398	4.9	25.8	O K
1440 min Summer	89.422	0.247	4.6	16.0	O K
2160 min Summer	89.318	0.143	4.0	9.3	O K
2880 min Summer	89.283	0.108	3.5	7.0	O K
4320 min Summer	89.256	0.081	2.5	5.2	O K
5760 min Summer	89.244	0.069	2.0	4.4	O K
7200 min Summer	89.236	0.061	1.7	4.0	O K
8640 min Summer	89.231	0.056	1.4	3.6	O K
10080 min Summer	89.227	0.052	1.3	3.3	O K
15 min Winter	89.913	0.738	4.9	47.8	O K
30 min Winter	90.099	0.924	4.9	59.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	107.440	0.0	45.8	18
30 min Summer	69.370	0.0	59.2	32
60 min Summer	42.578	0.0	72.8	62
120 min Summer	25.233	0.0	86.3	118
180 min Summer	18.339	0.0	94.0	146
240 min Summer	14.542	0.0	99.4	176
360 min Summer	10.484	0.0	107.5	238
480 min Summer	8.306	0.0	113.6	304
600 min Summer	6.928	0.0	118.4	368
720 min Summer	5.972	0.0	122.5	430
960 min Summer	4.721	0.0	129.1	550
1440 min Summer	3.385	0.0	138.9	780
2160 min Summer	2.424	0.0	149.2	1124
2880 min Summer	1.911	0.0	156.8	1468
4320 min Summer	1.365	0.0	168.0	2200
5760 min Summer	1.074	0.0	176.4	2912
7200 min Summer	0.892	0.0	183.0	3664
8640 min Summer	0.766	0.0	188.6	4328
10080 min Summer	0.673	0.0	193.3	5024
15 min Winter	107.440	0.0	51.4	18
30 min Winter	69.370	0.0	66.3	32

MD/19

EAST ATTENUATION 1IN100YR WINTER

Tully De'Ath		Page 2
Sheridan House Hartfield Road Forest Row		Micro Drainage
Date 25/06/2015 09:02	Designed by sfk	
File 150624-EastImp&Attenuat...	Checked by	
XP Solutions	Source Control 2014.1.1	

Summary of Results for 100 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	90.234	1.059	4.9	68.6	O K
120 min Winter	90.272	1.097	4.9	71.1	O K
180 min Winter	90.223	1.048	4.9	67.9	O K
240 min Winter	90.164	0.989	4.9	64.1	O K
360 min Winter	90.029	0.854	4.9	55.3	O K
480 min Winter	89.886	0.711	4.9	46.1	O K
600 min Winter	89.763	0.588	4.9	38.1	O K
720 min Winter	89.658	0.483	4.9	31.3	O K
960 min Winter	89.499	0.324	4.8	21.0	O K
1440 min Winter	89.338	0.163	4.2	10.5	O K
2160 min Winter	89.276	0.101	3.2	6.5	O K
2880 min Winter	89.257	0.082	2.6	5.3	O K
4320 min Winter	89.240	0.065	1.8	4.2	O K
5760 min Winter	89.231	0.056	1.5	3.6	O K
7200 min Winter	89.225	0.050	1.2	3.3	O K
8640 min Winter	89.221	0.046	1.0	3.0	O K
10080 min Winter	89.218	0.043	0.9	2.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	42.578	0.0	81.5	60
120 min Winter	25.233	0.0	96.6	116
180 min Winter	18.339	0.0	105.3	166
240 min Winter	14.542	0.0	111.4	188
360 min Winter	10.484	0.0	120.4	264
480 min Winter	8.306	0.0	127.2	330
600 min Winter	6.928	0.0	132.7	394
720 min Winter	5.972	0.0	137.2	456
960 min Winter	4.721	0.0	144.6	568
1440 min Winter	3.385	0.0	155.5	782
2160 min Winter	2.424	0.0	167.1	1104
2880 min Winter	1.911	0.0	175.6	1468
4320 min Winter	1.365	0.0	188.2	2176
5760 min Winter	1.074	0.0	197.5	2888
7200 min Winter	0.892	0.0	205.0	3672
8640 min Winter	0.766	0.0	211.2	4280
10080 min Winter	0.673	0.0	216.5	5080

MD/20

EAST ATTENUATION 1IN30 SUMMER

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Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	89.666	0.491	4.9	31.8	O K
30 min Summer	89.772	0.597	4.9	38.7	O K
60 min Summer	89.832	0.657	4.9	42.6	O K
120 min Summer	89.825	0.650	4.9	42.1	O K
180 min Summer	89.792	0.617	4.9	40.0	O K
240 min Summer	89.752	0.577	4.9	37.4	O K
360 min Summer	89.676	0.501	4.9	32.4	O K
480 min Summer	89.607	0.432	4.9	28.0	O K
600 min Summer	89.547	0.372	4.9	24.1	O K
720 min Summer	89.496	0.321	4.8	20.8	O K
960 min Summer	89.419	0.244	4.6	15.8	O K
1440 min Summer	89.330	0.155	4.1	10.0	O K
2160 min Summer	89.282	0.107	3.4	6.9	O K
2880 min Summer	89.262	0.087	2.8	5.7	O K
4320 min Summer	89.244	0.069	2.0	4.5	O K
5760 min Summer	89.235	0.060	1.6	3.9	O K
7200 min Summer	89.229	0.054	1.3	3.5	O K
8640 min Summer	89.224	0.049	1.2	3.2	O K
10080 min Summer	89.221	0.046	1.0	3.0	O K
15 min Winter	89.730	0.555	4.9	36.0	O K
30 min Winter	89.855	0.680	4.9	44.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	82.549	0.0	35.2	18
30 min Summer	52.907	0.0	45.1	32
60 min Summer	32.372	0.0	55.3	60
120 min Summer	19.217	0.0	65.7	94
180 min Summer	14.018	0.0	71.9	126
240 min Summer	11.161	0.0	76.3	160
360 min Summer	8.089	0.0	83.0	226
480 min Summer	6.431	0.0	87.9	290
600 min Summer	5.381	0.0	92.0	352
720 min Summer	4.649	0.0	95.4	412
960 min Summer	3.690	0.0	100.9	530
1440 min Summer	2.662	0.0	109.2	762
2160 min Summer	1.919	0.0	118.1	1104
2880 min Summer	1.520	0.0	124.7	1468
4320 min Summer	1.094	0.0	134.6	2200
5760 min Summer	0.865	0.0	142.0	2936
7200 min Summer	0.722	0.0	148.0	3640
8640 min Summer	0.622	0.0	153.1	4400
10080 min Summer	0.548	0.0	157.4	5128
15 min Winter	82.549	0.0	39.4	18
30 min Winter	52.907	0.0	50.6	32

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EAST ATTENUATION 1 IN 30 WINTER

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Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	89.935	0.760	4.9	49.2	O K
120 min Winter	89.926	0.751	4.9	48.7	O K
180 min Winter	89.879	0.704	4.9	45.6	O K
240 min Winter	89.820	0.645	4.9	41.8	O K
360 min Winter	89.703	0.528	4.9	34.2	O K
480 min Winter	89.599	0.424	4.9	27.5	O K
600 min Winter	89.513	0.338	4.8	21.9	O K
720 min Winter	89.446	0.271	4.7	17.6	O K
960 min Winter	89.356	0.181	4.3	11.7	O K
1440 min Winter	89.285	0.110	3.5	7.1	O K
2160 min Winter	89.257	0.082	2.6	5.3	O K
2880 min Winter	89.245	0.070	2.0	4.5	O K
4320 min Winter	89.232	0.057	1.5	3.7	O K
5760 min Winter	89.225	0.050	1.2	3.2	O K
7200 min Winter	89.220	0.045	1.0	2.9	O K
8640 min Winter	89.216	0.041	0.8	2.7	O K
10080 min Winter	89.213	0.038	0.7	2.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	32.372	0.0	62.0	60
120 min Winter	19.217	0.0	73.6	110
180 min Winter	14.018	0.0	80.5	138
240 min Winter	11.161	0.0	85.5	174
360 min Winter	8.089	0.0	92.9	244
480 min Winter	6.431	0.0	98.5	310
600 min Winter	5.381	0.0	103.0	370
720 min Winter	4.649	0.0	106.8	428
960 min Winter	3.690	0.0	113.0	540
1440 min Winter	2.662	0.0	122.3	750
2160 min Winter	1.919	0.0	132.3	1104
2880 min Winter	1.520	0.0	139.7	1456
4320 min Winter	1.094	0.0	150.7	2200
5760 min Winter	0.865	0.0	159.1	2920
7200 min Winter	0.722	0.0	165.8	3640
8640 min Winter	0.622	0.0	171.5	4400
10080 min Winter	0.548	0.0	176.4	5136

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EAST ATTENUATION 1IN1YR SUMMER

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Summary of Results for 1 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	89.360	0.185	4.3	12.0	O K
30 min Summer	89.390	0.215	4.5	13.9	O K
60 min Summer	89.406	0.231	4.6	14.9	O K
120 min Summer	89.399	0.224	4.5	14.5	O K
180 min Summer	89.382	0.207	4.5	13.4	O K
240 min Summer	89.363	0.188	4.4	12.2	O K
360 min Summer	89.331	0.156	4.1	10.1	O K
480 min Summer	89.307	0.132	3.9	8.5	O K
600 min Summer	89.291	0.116	3.7	7.5	O K
720 min Summer	89.280	0.105	3.4	6.8	O K
960 min Summer	89.266	0.091	2.9	5.9	O K
1440 min Summer	89.250	0.075	2.3	4.8	O K
2160 min Summer	89.237	0.062	1.7	4.0	O K
2880 min Summer	89.230	0.055	1.4	3.6	O K
4320 min Summer	89.221	0.046	1.0	3.0	O K
5760 min Summer	89.216	0.041	0.8	2.7	O K
7200 min Summer	89.213	0.038	0.7	2.4	O K
8640 min Summer	89.210	0.035	0.6	2.2	O K
10080 min Summer	89.208	0.033	0.6	2.1	O K
15 min Winter	89.384	0.209	4.5	13.6	O K
30 min Winter	89.419	0.244	4.6	15.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	33.607	0.0	14.3	16
30 min Summer	21.695	0.0	18.5	27
60 min Summer	13.524	0.0	23.1	44
120 min Summer	8.249	0.0	28.2	78
180 min Summer	6.145	0.0	31.5	110
240 min Summer	4.980	0.0	34.0	144
360 min Summer	3.676	0.0	37.7	204
480 min Summer	2.958	0.0	40.4	262
600 min Summer	2.498	0.0	42.7	320
720 min Summer	2.177	0.0	44.6	382
960 min Summer	1.751	0.0	47.9	500
1440 min Summer	1.289	0.0	52.8	736
2160 min Summer	0.949	0.0	58.4	1104
2880 min Summer	0.764	0.0	62.7	1468
4320 min Summer	0.562	0.0	69.1	2204
5760 min Summer	0.452	0.0	74.1	2904
7200 min Summer	0.382	0.0	78.3	3632
8640 min Summer	0.333	0.0	81.9	4400
10080 min Summer	0.296	0.0	85.0	5104
15 min Winter	33.607	0.0	16.0	16
30 min Winter	21.695	0.0	20.7	29

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WINTER

EAST ATTENUATION 1IN1YR

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Summary of Results for 1 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	89.432	0.257	4.7	16.7	O K
120 min Winter	89.414	0.239	4.6	15.5	O K
180 min Winter	89.385	0.210	4.5	13.6	O K
240 min Winter	89.357	0.182	4.3	11.8	O K
360 min Winter	89.312	0.137	4.0	8.9	O K
480 min Winter	89.287	0.112	3.6	7.3	O K
600 min Winter	89.273	0.098	3.1	6.3	O K
720 min Winter	89.263	0.088	2.8	5.7	O K
960 min Winter	89.250	0.075	2.3	4.9	O K
1440 min Winter	89.237	0.062	1.7	4.0	O K
2160 min Winter	89.227	0.052	1.3	3.4	O K
2880 min Winter	89.221	0.046	1.0	3.0	O K
4320 min Winter	89.214	0.039	0.8	2.5	O K
5760 min Winter	89.210	0.035	0.6	2.2	O K
7200 min Winter	89.207	0.032	0.5	2.0	O K
8640 min Winter	89.204	0.029	0.4	1.9	O K
10080 min Winter	89.203	0.028	0.4	1.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	13.524	0.0	25.9	46
120 min Winter	8.249	0.0	31.6	84
180 min Winter	6.145	0.0	35.3	118
240 min Winter	4.980	0.0	38.1	150
360 min Winter	3.676	0.0	42.2	210
480 min Winter	2.958	0.0	45.3	266
600 min Winter	2.498	0.0	47.8	326
720 min Winter	2.177	0.0	50.0	384
960 min Winter	1.751	0.0	53.6	502
1440 min Winter	1.289	0.0	59.2	738
2160 min Winter	0.949	0.0	65.4	1104
2880 min Winter	0.764	0.0	70.2	1472
4320 min Winter	0.562	0.0	77.4	2204
5760 min Winter	0.452	0.0	83.0	2912
7200 min Winter	0.382	0.0	87.7	3640
8640 min Winter	0.333	0.0	91.7	4488
10080 min Winter	0.296	0.0	95.2	5240

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