

Simpson Associates

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1 Market Place Mews

Henley-on-Thames

RG9 2AH

Marston's

Shripney Road

Bognor Regis

Date 27/10/2016

File 13174 - Attenuation Tan...

Designed by AdC

Checked by AR

Micro Drainage

Source Control 2016.1.1

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

Half Drain Time : 7 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	1.159	0.609	0.0	42.9	42.9	28.9	O K
30 min Summer	1.202	0.652	0.0	42.9	42.9	31.0	O K
60 min Summer	1.106	0.556	0.0	43.0	43.0	26.4	O K
120 min Summer	0.891	0.341	0.0	42.8	42.8	16.2	O K
180 min Summer	0.796	0.246	0.0	39.8	39.8	11.7	O K
240 min Summer	0.762	0.212	0.0	33.5	33.5	10.1	O K
360 min Summer	0.725	0.175	0.0	25.4	25.4	8.3	O K
480 min Summer	0.703	0.153	0.0	20.7	20.7	7.3	O K
600 min Summer	0.688	0.138	0.0	17.6	17.6	6.6	O K
720 min Summer	0.676	0.126	0.0	15.3	15.3	6.0	O K
960 min Summer	0.661	0.111	0.0	12.3	12.3	5.3	O K
1440 min Summer	0.642	0.092	0.0	9.0	9.0	4.4	O K
2160 min Summer	0.626	0.076	0.0	6.6	6.6	3.6	O K
2880 min Summer	0.616	0.066	0.0	5.3	5.3	3.1	O K
4320 min Summer	0.605	0.055	0.0	3.9	3.9	2.6	O K
5760 min Summer	0.597	0.047	0.0	3.0	3.0	2.2	O K
7200 min Summer	0.592	0.042	0.0	2.6	2.6	2.0	O K
8640 min Summer	0.589	0.039	0.0	2.2	2.2	1.8	O K
10080 min Summer	0.586	0.036	0.0	2.0	2.0	1.7	O K
15 min Winter	1.240	0.690	0.0	42.9	42.9	32.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	115.731	0.0	51.0	13
30 min Summer	77.804	0.0	68.5	22
60 min Summer	49.937	0.0	88.0	38
120 min Summer	30.956	0.0	109.1	68
180 min Summer	23.058	0.0	121.9	96
240 min Summer	18.577	0.0	130.9	124
360 min Summer	13.656	0.0	144.4	186
480 min Summer	10.974	0.0	154.7	246
600 min Summer	9.254	0.0	163.1	306
720 min Summer	8.046	0.0	170.2	368
960 min Summer	6.447	0.0	181.8	488
1440 min Summer	4.709	0.0	199.2	734
2160 min Summer	3.432	0.0	217.8	1100
2880 min Summer	2.739	0.0	231.7	1464
4320 min Summer	1.989	0.0	252.3	2160
5760 min Summer	1.583	0.0	267.8	2880
7200 min Summer	1.325	0.0	280.2	3640
8640 min Summer	1.147	0.0	291.0	4376
10080 min Summer	1.015	0.0	300.6	5088
15 min Winter	115.731	0.0	57.1	14

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<u>Summary of Results for 100 year Return Period (+30%)</u>							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	1.258	0.708	0.0	42.9	42.9	33.6	O K
60 min Winter	1.071	0.521	0.0	42.9	42.9	24.7	O K
120 min Winter	0.803	0.253	0.0	40.9	40.9	12.0	O K
180 min Winter	0.752	0.202	0.0	31.4	31.4	9.6	O K
240 min Winter	0.725	0.175	0.0	25.4	25.4	8.3	O K
360 min Winter	0.694	0.144	0.0	18.8	18.8	6.8	O K
480 min Winter	0.676	0.126	0.0	15.2	15.2	6.0	O K
600 min Winter	0.663	0.113	0.0	12.8	12.8	5.4	O K
720 min Winter	0.654	0.104	0.0	11.2	11.2	4.9	O K
960 min Winter	0.641	0.091	0.0	8.9	8.9	4.3	O K
1440 min Winter	0.626	0.076	0.0	6.6	6.6	3.6	O K
2160 min Winter	0.612	0.062	0.0	4.8	4.8	2.9	O K
2880 min Winter	0.604	0.054	0.0	3.8	3.8	2.6	O K
4320 min Winter	0.595	0.045	0.0	2.8	2.8	2.1	O K
5760 min Winter	0.589	0.039	0.0	2.2	2.2	1.8	O K
7200 min Winter	0.584	0.034	0.0	1.9	1.9	1.6	O K
8640 min Winter	0.581	0.031	0.0	1.6	1.6	1.5	O K
10080 min Winter	0.579	0.029	0.0	1.4	1.4	1.4	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
30 min Winter	77.804	0.0	76.8	23			
60 min Winter	49.937	0.0	98.6	40			
120 min Winter	30.956	0.0	122.2	66			
180 min Winter	23.058	0.0	136.5	96			
240 min Winter	18.577	0.0	146.7	126			
360 min Winter	13.656	0.0	161.7	186			
480 min Winter	10.974	0.0	173.3	246			
600 min Winter	9.254	0.0	182.7	308			
720 min Winter	8.046	0.0	190.6	366			
960 min Winter	6.447	0.0	203.6	480			
1440 min Winter	4.709	0.0	223.1	732			
2160 min Winter	3.432	0.0	243.9	1100			
2880 min Winter	2.739	0.0	259.5	1444			
4320 min Winter	1.989	0.0	282.6	2196			
5760 min Winter	1.583	0.0	299.9	2896			
7200 min Winter	1.325	0.0	313.8	3664			
8640 min Winter	1.147	0.0	326.0	4288			
10080 min Winter	1.015	0.0	336.7	4984			
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Date 27/10/2016	Designed by AdC										
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<u>Rainfall Details</u>											
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)	19.000	Shortest Storm (mins) 15									
Ratio R	0.350	Longest Storm (mins) 10080									
Summer Storms	Yes	Climate Change % +30									
<u>Time Area Diagram</u>											
Total Area (ha) 0.235											
<table border="0"> <thead> <tr> <th colspan="2">Time (mins)</th> <th>Area</th> </tr> <tr> <th>From:</th> <th>To:</th> <th>(ha)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>4</td> <td>0.235</td> </tr> </tbody> </table>			Time (mins)		Area	From:	To:	(ha)	0	4	0.235
Time (mins)		Area									
From:	To:	(ha)									
0	4	0.235									
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Model Details

Storage is Online Cover Level (m) 1.300

Cellular Storage Structure

Invert Level (m) 0.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	50.0	50.0	0.751	0.0	74.0
0.750	50.0	74.0			

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0279-4300-0760-4300
Design Head (m) 0.760
Design Flow (l/s) 43.0
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 279
Invert Level (m) 0.540
Minimum Outlet Pipe Diameter (mm) 300
Suggested Manhole Diameter (mm) 1800

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.760	43.0
Flush-Flo™	0.396	43.0
Kick-Flo®	0.630	39.3
Mean Flow over Head Range	-	33.1

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	8.7	1.200	53.6	3.000	83.5	7.000	126.3
0.200	28.7	1.400	57.7	3.500	90.0	7.500	130.6
0.300	42.2	1.600	61.6	4.000	96.1	8.000	133.8
0.400	42.9	1.800	65.2	4.500	101.8	8.500	137.9
0.500	42.3	2.000	68.6	5.000	107.2	9.000	142.0
0.600	40.3	2.200	71.9	5.500	112.3	9.500	146.0
0.800	44.1	2.400	75.0	6.000	117.1		
1.000	49.1	2.600	77.9	6.500	121.8		

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