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20 East Sands Burbage Marlborough Wiltshire SN8 3AN	Ageas Bowl Southampton Character Area 1	
Date 01/08/2022	Designed by JE	
File 19320 CHARACTER AREA 1 PCP.SRCX	Checked by AC	
Micro Drainage		Source Control 2018.1

Summary of Results for 30 year Return Period (+40%)

Half Drain Time : 1201 minutes.

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
15 min Summer	39.558	0.058	0.0	1.3	1.3	87.6	O K
30 min Summer	39.582	0.082	0.0	2.0	2.0	123.8	O K
60 min Summer	39.607	0.107	0.0	2.4	2.4	162.5	O K
120 min Summer	39.634	0.134	0.0	2.4	2.4	202.6	O K
180 min Summer	39.649	0.149	0.0	2.4	2.4	225.5	O K
240 min Summer	39.659	0.159	0.0	2.4	2.4	240.6	O K
360 min Summer	39.673	0.173	0.0	2.4	2.4	261.4	O K
480 min Summer	39.681	0.181	0.0	2.4	2.4	274.5	O K
600 min Summer	39.687	0.187	0.0	2.4	2.4	283.0	O K
720 min Summer	39.690	0.190	0.0	2.4	2.4	288.5	O K
960 min Summer	39.694	0.194	0.0	2.4	2.4	294.1	O K
1440 min Summer	39.698	0.198	0.0	2.4	2.4	299.5	O K
2160 min Summer	39.698	0.198	0.0	2.4	2.4	299.8	O K
2880 min Summer	39.695	0.195	0.0	2.4	2.4	294.7	O K
4320 min Summer	39.683	0.183	0.0	2.4	2.4	277.2	O K
5760 min Summer	39.669	0.169	0.0	2.4	2.4	256.0	O K
7200 min Summer	39.655	0.155	0.0	2.4	2.4	234.9	O K
8640 min Summer	39.642	0.142	0.0	2.4	2.4	215.3	O K
10080 min Summer	39.630	0.130	0.0	2.4	2.4	197.6	O K
15 min Winter	39.567	0.067	0.0	1.6	1.6	101.0	O K
30 min Winter	39.594	0.094	0.0	2.2	2.2	141.7	O K
60 min Winter	39.622	0.122	0.0	2.4	2.4	185.5	O K
120 min Winter	39.652	0.152	0.0	2.4	2.4	231.0	O K
180 min Winter	39.670	0.170	0.0	2.4	2.4	257.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	101.215	0.0	52.3	27
30 min Summer	67.354	0.0	82.3	41
60 min Summer	42.916	0.0	140.1	70
120 min Summer	26.522	0.0	181.4	130
180 min Summer	19.777	0.0	206.3	188
240 min Summer	15.980	0.0	223.8	248
360 min Summer	11.837	0.0	249.8	366
480 min Summer	9.553	0.0	268.1	484
600 min Summer	8.084	0.0	281.9	602
720 min Summer	7.051	0.0	292.4	722
960 min Summer	5.678	0.0	306.5	892
1440 min Summer	4.179	0.0	313.8	1126
2160 min Summer	3.071	0.0	423.1	1516
2880 min Summer	2.466	0.0	445.8	1932
4320 min Summer	1.808	0.0	468.9	2732
5760 min Summer	1.450	0.0	528.7	3520
7200 min Summer	1.222	0.0	544.9	4320
8640 min Summer	1.063	0.0	555.3	5024
10080 min Summer	0.944	0.0	559.7	5752
15 min Winter	101.215	0.0	63.2	26
30 min Winter	67.354	0.0	97.0	41
60 min Winter	42.916	0.0	161.7	70
120 min Winter	26.522	0.0	207.6	128
180 min Winter	19.777	0.0	235.0	186

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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
240 min Winter	39.681	0.181	0.0	2.4	2.4	274.6	O K
360 min Winter	39.697	0.197	0.0	2.4	2.4	299.0	O K
480 min Winter	39.708	0.208	0.0	2.4	2.4	314.6	O K
600 min Winter	39.715	0.215	0.0	2.4	2.4	325.3	O K
720 min Winter	39.720	0.220	0.0	2.4	2.4	332.6	O K
960 min Winter	39.725	0.225	0.0	2.4	2.4	340.9	O K
1440 min Winter	39.727	0.227	0.0	2.4	2.4	343.2	O K
2160 min Winter	39.724	0.224	0.0	2.4	2.4	339.0	O K
2880 min Winter	39.717	0.217	0.0	2.4	2.4	328.1	O K
4320 min Winter	39.696	0.196	0.0	2.4	2.4	296.7	O K
5760 min Winter	39.673	0.173	0.0	2.4	2.4	261.7	O K
7200 min Winter	39.651	0.151	0.0	2.4	2.4	228.5	O K
8640 min Winter	39.632	0.132	0.0	2.4	2.4	199.3	O K
10080 min Winter	39.615	0.115	0.0	2.4	2.4	174.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
240 min Winter	15.980	0.0	254.2	244
360 min Winter	11.837	0.0	282.2	360
480 min Winter	9.553	0.0	301.6	474
600 min Winter	8.084	0.0	315.5	590
720 min Winter	7.051	0.0	325.4	702
960 min Winter	5.678	0.0	336.5	924
1440 min Winter	4.179	0.0	332.3	1320
2160 min Winter	3.071	0.0	479.5	1648
2880 min Winter	2.466	0.0	505.1	2108
4320 min Winter	1.808	0.0	529.7	2984
5760 min Winter	1.450	0.0	604.2	3808
7200 min Winter	1.222	0.0	624.8	4544
8640 min Winter	1.063	0.0	639.0	5280
10080 min Winter	0.944	0.0	646.6	5952

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Rainfall Details

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)	19.900	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.600

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From:	To:	(ha)	From:	To:	(ha)
0	4	0.200	4	8	0.200
				8	12
					0.200

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Model Details

Storage is Online Cover Level (m) 40.000

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	50.0
Membrane Percolation (mm/hr)	1000	Length (m)	101.0
Max Percolation (l/s)	1402.8	Slope (1:X)	0.0
Safety Factor	1.5	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	39.500	Membrane Depth (m)	0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0081-2400-0500-2400
Design Head (m)	0.500
Design Flow (l/s)	2.4
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	81
Invert Level (m)	39.500
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.500	2.4	Kick-Flo®	0.349	2.0
Flush-Flo™	0.151	2.4	Mean Flow over Head Range	-	2.0

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)	Depth (m)	Flow (l/s)
0.100	2.3	0.800	3.0	2.000	4.5	4.000	6.3	7.000	8.3
0.200	2.4	1.000	3.3	2.200	4.8	4.500	6.7	7.500	8.5
0.300	2.2	1.200	3.6	2.400	4.9	5.000	7.0	8.000	8.8
0.400	2.2	1.400	3.9	2.600	5.1	5.500	7.3	8.500	9.1
0.500	2.4	1.600	4.1	3.000	5.5	6.000	7.6	9.000	9.4
0.600	2.6	1.800	4.3	3.500	5.9	6.500	7.9	9.500	9.6