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20 East Sands Burbage Marlborough Wiltshire SN8 3AN	Ageas Bowl Southampton Character Area 4	
Date 01/08/2022 File 19320 CHARACTER AREA 4 PCP.SRCX	Designed by JE Checked by AC	
Micro Drainage		Source Control 2018.1

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

Half Drain Time : 587 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	53.862	0.212	0.0	2.0	2.0	47.7	O K
30 min Summer	53.935	0.285	0.0	2.0	2.0	64.2	O K
60 min Summer	54.012	0.362	0.0	2.0	2.0	81.3	O K
120 min Summer	54.086	0.436	0.0	2.0	2.0	98.0	O K
180 min Summer	54.123	0.473	0.0	2.0	2.0	106.5	O K
240 min Summer	54.145	0.495	0.0	2.0	2.0	111.4	O K
360 min Summer	54.170	0.520	0.0	2.0	2.0	117.0	O K
480 min Summer	54.179	0.529	0.0	2.0	2.0	119.1	O K
600 min Summer	54.179	0.529	0.0	2.0	2.0	119.1	O K
720 min Summer	54.177	0.527	0.0	2.0	2.0	118.7	O K
960 min Summer	54.168	0.518	0.0	2.0	2.0	116.6	O K
1440 min Summer	54.140	0.490	0.0	2.0	2.0	110.3	O K
2160 min Summer	54.090	0.440	0.0	2.0	2.0	99.1	O K
2880 min Summer	54.041	0.391	0.0	2.0	2.0	88.0	O K
4320 min Summer	53.954	0.304	0.0	2.0	2.0	68.3	O K
5760 min Summer	53.886	0.236	0.0	2.0	2.0	53.1	O K
7200 min Summer	53.836	0.186	0.0	2.0	2.0	42.0	O K
8640 min Summer	53.802	0.152	0.0	1.9	1.9	34.2	O K
10080 min Summer	53.777	0.127	0.0	1.8	1.8	28.6	O K
15 min Winter	53.890	0.240	0.0	2.0	2.0	54.0	O K
30 min Winter	53.973	0.323	0.0	2.0	2.0	72.6	O K
60 min Winter	54.059	0.409	0.0	2.0	2.0	92.1	O K
120 min Winter	54.145	0.495	0.0	2.0	2.0	111.3	O K
180 min Winter	54.190	0.540	0.0	2.0	2.0	121.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	100.677	0.0	45.7	26
30 min Summer	66.999	0.0	63.0	40
60 min Summer	42.696	0.0	83.4	70
120 min Summer	26.394	0.0	104.6	128
180 min Summer	19.686	0.0	117.7	186
240 min Summer	15.902	0.0	127.2	244
360 min Summer	11.782	0.0	141.9	362
480 min Summer	9.510	0.0	153.0	480
600 min Summer	8.048	0.0	162.0	556
720 min Summer	7.019	0.0	169.6	608
960 min Summer	5.653	0.0	182.2	728
1440 min Summer	4.161	0.0	200.9	986
2160 min Summer	3.058	0.0	222.9	1384
2880 min Summer	2.456	0.0	238.2	1768
4320 min Summer	1.801	0.0	260.4	2516
5760 min Summer	1.444	0.0	277.8	3232
7200 min Summer	1.216	0.0	291.1	3904
8640 min Summer	1.058	0.0	302.2	4592
10080 min Summer	0.940	0.0	311.4	5256
15 min Winter	100.677	0.0	52.0	26
30 min Winter	66.999	0.0	71.4	40
60 min Winter	42.696	0.0	94.2	68
120 min Winter	26.394	0.0	117.9	126
180 min Winter	19.686	0.0	132.6	184

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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	54.218	0.568	0.0	2.0	2.0	127.8	O K
360 min Winter	54.250	0.600	0.0	2.0	2.0	135.0	O K
480 min Winter	54.263	0.613	0.0	2.0	2.0	137.9	O K
600 min Winter	54.266	0.616	0.0	2.0	2.0	138.7	O K
720 min Winter	54.263	0.613	0.0	2.0	2.0	138.0	O K
960 min Winter	54.248	0.598	0.0	2.0	2.0	134.6	O K
1440 min Winter	54.211	0.561	0.0	2.0	2.0	126.3	O K
2160 min Winter	54.129	0.479	0.0	2.0	2.0	107.8	O K
2880 min Winter	54.049	0.399	0.0	2.0	2.0	89.8	O K
4320 min Winter	53.917	0.267	0.0	2.0	2.0	60.2	O K
5760 min Winter	53.830	0.180	0.0	1.9	1.9	40.5	O K
7200 min Winter	53.778	0.128	0.0	1.8	1.8	28.9	O K
8640 min Winter	53.752	0.102	0.0	1.7	1.7	22.8	O K
10080 min Winter	53.740	0.090	0.0	1.5	1.5	20.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
240 min Winter	15.902	0.0	143.2	242
360 min Winter	11.782	0.0	159.7	356
480 min Winter	9.510	0.0	172.1	468
600 min Winter	8.048	0.0	182.2	578
720 min Winter	7.019	0.0	190.8	684
960 min Winter	5.653	0.0	204.8	786
1440 min Winter	4.161	0.0	225.4	1090
2160 min Winter	3.058	0.0	250.8	1516
2880 min Winter	2.456	0.0	268.1	1912
4320 min Winter	1.801	0.0	293.3	2644
5760 min Winter	1.444	0.0	313.0	3304
7200 min Winter	1.216	0.0	328.2	3960
8640 min Winter	1.058	0.0	340.9	4496
10080 min Winter	0.940	0.0	351.7	5248

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

Time Area Diagram

Total Area (ha) 0.282

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From:	To:	(ha)	From:	To:	(ha)
0	4	0.094	4	8	0.094
				8	12
					0.094

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Model Details

Storage is Online Cover Level (m) 54.500

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	15.0
Membrane Percolation (mm/hr)	1000	Length (m)	50.0
Max Percolation (l/s)	208.3	Slope (1:X)	0.0
Safety Factor	1.5	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	53.650	Membrane Depth (m)	0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0069-2000-0850-2000
Design Head (m)	0.850
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	69
Invert Level (m)	53.660
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)	0.850	2.0	Kick-Flo®	0.535	1.6
Flush-Flo™	0.257	2.0	Mean Flow over Head Range	-	1.8

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)	Depth (m)	Flow (l/s)
0.100	1.7	0.800	1.9	2.000	3.0	4.000	4.1	7.000	5.3
0.200	2.0	1.000	2.2	2.200	3.1	4.500	4.3	7.500	5.5
0.300	2.0	1.200	2.3	2.400	3.2	5.000	4.5	8.000	5.7
0.400	1.9	1.400	2.5	2.600	3.3	5.500	4.7	8.500	5.8
0.500	1.7	1.600	2.7	3.000	3.6	6.000	4.9	9.000	6.0
0.600	1.7	1.800	2.8	3.500	3.8	6.500	5.1	9.500	6.1