Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 2 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	68.292	0.352	0.0	9.1	9.1	1.3	O K
30 min Summer	68.194	0.254	0.0	9.1	9.1	1.0	O K
60 min Summer	68.074	0.134	0.0	7.9	7.9	0.5	O K
120 min Summer	68.039	0.099	0.0	5.2	5.2	0.4	O K
180 min Summer	68.023	0.083	0.0	3.9	3.9	0.3	O K
240 min Summer	68.013	0.073	0.0	3.1	3.1	0.3	O K
360 min Summer	68.001	0.061	0.0	2.3	2.3	0.2	O K
480 min Summer	67.994	0.054	0.0	1.8	1.8	0.2	O K
600 min Summer	67.989	0.049	0.0	1.5	1.5	0.2	O K
720 min Summer	67.985	0.045	0.0	1.3	1.3	0.2	O K
960 min Summer	67.980	0.040	0.0	1.0	1.0	0.2	O K
1440 min Summer	67.974	0.034	0.0	0.8	0.8	0.1	O K
2160 min Summer	67.968	0.028	0.0	0.5	0.5	0.1	O K
2880 min Summer	67.965	0.025	0.0	0.4	0.4	0.1	O K
4320 min Summer	67.961	0.021	0.0	0.3	0.3	0.1	O K
5760 min Summer	67.959	0.019	0.0	0.2	0.2	0.1	O K
7200 min Summer	67.957	0.017	0.0	0.2	0.2	0.1	O K
8640 min Summer	67.956	0.016	0.0	0.2	0.2	0.1	O K
10080 min Summer	67.955	0.015	0.0	0.2	0.2	0.1	O K
15 min Winter	68.323	0.383	0.0	9.1	9.1	1.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	143.506	0.0	5.4	12
30 min Summer	92.482	0.0	6.9	19
60 min Summer	56.713	0.0	8.5	32
120 min Summer	33.633	0.0	10.1	62
180 min Summer	24.479	0.0	11.0	92
240 min Summer	19.441	0.0	11.7	124
360 min Summer	13.973	0.0	12.6	184
480 min Summer	11.062	0.0	13.3	242
600 min Summer	9.223	0.0	13.8	300
720 min Summer	7.947	0.0	14.3	362
960 min Summer	6.278	0.0	15.1	482
1440 min Summer	4.498	0.0	16.2	718
2160 min Summer	3.218	0.0	17.4	1100
2880 min Summer	2.536	0.0	18.3	1420
4320 min Summer	1.811	0.0	19.6	2156
5760 min Summer	1.424	0.0	20.5	2840
7200 min Summer	1.182	0.0	21.3	3544
8640 min Summer	1.015	0.0	21.9	4344
10080 min Summer	0.892	0.0	22.5	5136
15 min Winter	143.506	0.0	6.0	12

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Summary of Results for 100 year Return Period (+40%)

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	68.135	0.195	0.0	9.1	9.1	0.7	O K
60 min Winter	68.055	0.115	0.0	6.5	6.5	0.4	O K
120 min Winter	68.023	0.083	0.0	3.9	3.9	0.3	O K
180 min Winter	68.010	0.070	0.0	2.9	2.9	0.3	O K
240 min Winter	68.001	0.061	0.0	2.3	2.3	0.2	O K
360 min Winter	67.991	0.051	0.0	1.7	1.7	0.2	O K
480 min Winter	67.985	0.045	0.0	1.3	1.3	0.2	O K
600 min Winter	67.981	0.041	0.0	1.1	1.1	0.2	O K
720 min Winter	67.978	0.038	0.0	1.0	1.0	0.1	O K
960 min Winter	67.974	0.034	0.0	0.8	0.8	0.1	O K
1440 min Winter	67.968	0.028	0.0	0.5	0.5	0.1	O K
2160 min Winter	67.964	0.024	0.0	0.4	0.4	0.1	O K
2880 min Winter	67.961	0.021	0.0	0.3	0.3	0.1	O K
4320 min Winter	67.958	0.018	0.0	0.2	0.2	0.1	O K
5760 min Winter	67.956	0.016	0.0	0.2	0.2	0.1	O K
7200 min Winter	67.954	0.014	0.0	0.1	0.1	0.1	O K
8640 min Winter	67.953	0.013	0.0	0.1	0.1	0.1	O K
10080 min Winter	67.953	0.013	0.0	0.1	0.1	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	92.482	0.0	7.8	19
60 min Winter	56.713	0.0	9.5	32
120 min Winter	33.633	0.0	11.3	64
180 min Winter	24.479	0.0	12.3	92
240 min Winter	19.441	0.0	13.1	124
360 min Winter	13.973	0.0	14.1	182
480 min Winter	11.062	0.0	14.9	240
600 min Winter	9.223	0.0	15.5	298
720 min Winter	7.947	0.0	16.0	358
960 min Winter	6.278	0.0	16.9	482
1440 min Winter	4.498	0.0	18.1	732
2160 min Winter	3.218	0.0	19.5	1080
2880 min Winter	2.536	0.0	20.4	1428
4320 min Winter	1.811	0.0	21.9	2132
5760 min Winter	1.424	0.0	23.0	2920
7200 min Winter	1.182	0.0	23.8	3624
8640 min Winter	1.015	0.0	24.5	4344
10080 min Winter	0.892	0.0	25.2	5080

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Rainfall Details

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)	20.000	Shortest Storm (mins)	15
Ratio R	0.446	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.020

Time (mins) From:	To:	Area (ha)
0	4	0.020

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Model Details

Storage is Online Cover Level (m) 69.200

Cellular Storage Structure

Invert Level (m) 67.940 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	4.0	4.0	1.300	4.0	14.4
0.100	4.0	4.8	1.400	4.0	15.2
0.200	4.0	5.6	1.500	4.0	16.0
0.300	4.0	6.4	1.600	4.0	16.8
0.400	4.0	7.2	1.700	4.0	17.6
0.500	4.0	8.0	1.800	4.0	18.4
0.600	4.0	8.8	1.900	4.0	19.2
0.700	4.0	9.6	2.000	4.0	20.0
0.800	4.0	10.4	2.100	4.0	20.8
0.900	4.0	11.2	2.200	4.0	21.6
1.000	4.0	12.0	2.300	4.0	22.4
1.100	4.0	12.8	2.400	4.0	23.2
1.200	4.0	13.6	2.500	4.0	24.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0147-9100-0420-9100
Design Head (m)	0.420
Design Flow (l/s)	9.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	147
Invert Level (m)	67.940
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.420	9.1
Flush-Flo™	0.211	9.1
Kick-Flo®	0.345	8.3
Mean Flow over Head Range	-	7.0

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

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Hydro-Brake® Optimum Outflow Control

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.3	1.200	14.9	3.000	23.2	7.000	35.0
0.200	9.1	1.400	16.1	3.500	24.9	7.500	36.2
0.300	8.8	1.600	17.1	4.000	26.6	8.000	37.4
0.400	8.9	1.800	18.1	4.500	28.0	8.500	38.6
0.500	9.9	2.000	19.1	5.000	29.5	9.000	39.7
0.600	10.8	2.200	19.9	5.500	31.0	9.500	40.8
0.800	12.3	2.400	20.8	6.000	32.3		
1.000	13.7	2.600	21.6	6.500	33.7		

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