E. Attenuation Schedules & Supporting Micro Drainage Quick Storage Estimates

Lancashire Central Attenuation Details Rev 3

Below Ground Attenuation (Tanks or similar)

Unit Ref	Attenuation Ref	Impermeable Area being drained to Attenuation structure	Allowable Flow from structure (based on greenfield rate of 6.45 l/sec/ha)	Area (m2)	Height of structure (m)	Volume of structure (m3)
Zone B Unit 1	UG1 (1) & (2)	2.448	15.79	1471	1.20	1765
Zone B Unit 2	UG2 (1) & (2)	5.319	34.31	3097	1.20	3716
Zone B Unit 3	UG3	1.070	6.90	632.5	1.20	759
Zone B Unit 4	UG4	0.621	4.01	380.9	1.20	457
Zone A Unit 9	UG5 (1) & (2)	1.284	8.28	741	1.20	889
Zone A Unit 8	UG6	0.927	5.98	550	1.20	660
Zone A Unit 5 & 6	UG17	0.265	2.00	200	1.00	200
Zone A Unit 4	UG7	0.540	3.48	315	1.20	378
Zone A Unit 3	UG8	0.444	2.86	264	1.20	317
Zone A Unit 2	UG9	0.585	3.77	361	1.20	433
Zone A Unit 1	UG10	1.000	6.45	576	1.20	691
Zone D Unit 1	UG11	1.230	7.93	625	1.20	750
Zone D Unit 2	UG12	0.726	4.68	420	1.20	504
Zone D Unit 3	UG13	0.576	3.72	400	1.20	480
Zone D Unit 4	UG14	1.041	6.71	625	1.20	750
Zone D Unit 5	UG15	1.330	8.58	841	1.20	1009
Zone D Unit 6	UG16	0.592	3.82	841	1.20	1009

Above Ground Attenuation (Ponds)

Unit / Highway Ref	Attenuation Ref	Impermeable Area being drained to Attenuation structure	Allowable Flow from structure (based on greenfield rate of 6.45 l/sec/ha)	Area (m2)	Pond Depth (m)	Pond Side Slopes	Pond Volume (m3)
Zone A Unit 7	Pond 4	0.363	2.34	399	1.2	1in3	342
Zone C Unit 4	Pond 1	0.876	5.65	1028	1.2	1in3	1001
Zone C Unit 3	Pond 6	0.52	3.35	534	1.2	1in3	1001
	Pond 7	0.52	3.35	534	1.2	1in3	1001
Zone C Unit 1 & 2	Pond 8	1.033	6.66	978.5	1.2	1in3	951
Adoptable Highway from Zone A Unit 9 to internal roundabout	Pond 2	1.152	7.43	2240	1.2	1in3	2346
Adoptable Highway from internal roundabout to end of highway (Zone C Unit 3).	Pond 3	0.306	1.97	399	1.5	1in3	391
Adoptable Highway serving Zone D.	Pond 10	0.663	4.28	544	1.6	1in3	592
Residential Zone	Pond 9	1.926	12.42	1282	1.2	1in3	1407

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	45.170	0.370	8.9	544.1	O K
30 min Summer	45.297	0.497	10.3	730.6	O K
60 min Summer	45.433	0.633	11.5	931.8	O K
120 min Summer	45.573	0.773	12.7	1137.1	O K
180 min Summer	45.649	0.849	13.2	1249.5	O K
240 min Summer	45.697	0.897	13.6	1319.3	O K
360 min Summer	45.753	0.953	14.0	1401.6	O K
480 min Summer	45.785	0.985	14.2	1448.6	O K
600 min Summer	45.801	1.001	14.3	1473.2	O K
720 min Summer	45.808	1.008	14.4	1483.2	O K
960 min Summer	45.813	1.013	14.4	1489.9	O K
1440 min Summer	45.808	1.008	14.4	1483.1	O K
2160 min Summer	45.782	0.982	14.2	1444.8	O K
2880 min Summer	45.745	0.945	13.9	1390.6	O K
4320 min Summer	45.666	0.866	13.4	1273.7	O K
5760 min Summer	45.592	0.792	12.8	1164.4	O K
7200 min Summer	45.525	0.725	12.3	1066.0	O K
8640 min Summer	45.466	0.666	11.8	980.2	O K
10080 min Summer	45.415	0.615	11.4	904.8	O K
15 min Winter	45.215	0.415	9.4	610.0	O K
30 min Winter	45.357	0.557	10.8	819.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	482.0	26
30 min Summer	81.146	0.0	631.3	41
60 min Summer	52.299	0.0	924.6	70
120 min Summer	32.580	0.0	1150.5	130
180 min Summer	24.347	0.0	1285.9	188
240 min Summer	19.663	0.0	1379.8	248
360 min Summer	14.471	0.0	1509.8	366
480 min Summer	11.644	0.0	1600.3	484
600 min Summer	9.829	0.0	1661.3	602
720 min Summer	8.553	0.0	1700.2	714
960 min Summer	6.862	0.0	1743.7	816
1440 min Summer	5.020	0.0	1769.4	1064
2160 min Summer	3.665	0.0	2395.0	1472
2880 min Summer	2.928	0.0	2543.6	1880
4320 min Summer	2.129	0.0	2724.0	2720
5760 min Summer	1.697	0.0	2981.8	3512
7200 min Summer	1.421	0.0	3121.0	4320
8640 min Summer	1.231	0.0	3239.7	5096
10080 min Summer	1.090	0.0	3337.6	5848
15 min Winter	120.305	0.0	536.8	26
30 min Winter	81.146	0.0	688.2	41

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	45.511	0.711	12.2	1045.6	O K
120 min Winter	45.669	0.869	13.4	1278.2	O K
180 min Winter	45.756	0.956	14.0	1406.8	O K
240 min Winter	45.811	1.011	14.4	1487.8	O K
360 min Winter	45.878	1.078	14.8	1585.5	O K
480 min Winter	45.918	1.118	15.1	1643.9	O K
600 min Winter	45.940	1.140	15.2	1677.6	O K
720 min Winter	45.953	1.153	15.3	1695.6	O K
960 min Winter	45.958	1.158	15.3	1702.8	O K
1440 min Winter	45.944	1.144	15.3	1683.4	O K
2160 min Winter	45.904	1.104	15.0	1624.4	O K
2880 min Winter	45.849	1.049	14.6	1543.2	O K
4320 min Winter	45.732	0.932	13.8	1370.6	O K
5760 min Winter	45.624	0.824	13.0	1211.7	O K
7200 min Winter	45.529	0.729	12.3	1072.9	O K
8640 min Winter	45.449	0.649	11.7	954.7	O K
10080 min Winter	45.380	0.580	11.1	853.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	1035.7	70
120 min Winter	32.580	0.0	1286.1	126
180 min Winter	24.347	0.0	1434.5	184
240 min Winter	19.663	0.0	1535.5	242
360 min Winter	14.471	0.0	1669.2	358
480 min Winter	11.644	0.0	1752.8	472
600 min Winter	9.829	0.0	1803.0	584
720 min Winter	8.553	0.0	1840.3	694
960 min Winter	6.862	0.0	1888.3	904
1440 min Winter	5.020	0.0	1909.8	1124
2160 min Winter	3.665	0.0	2681.5	1584
2880 min Winter	2.928	0.0	2845.5	2044
4320 min Winter	2.129	0.0	3014.2	2904
5760 min Winter	1.697	0.0	3340.4	3752
7200 min Winter	1.421	0.0	3496.4	4544
8640 min Winter	1.231	0.0	3629.9	5360
10080 min Winter	1.090	0.0	3742.3	6144

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 2.449

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.816	4	8	0.816	8	12	0.816

Model Details

Storage is Online Cover Level (m) 47.000

Tank or Pond Structure

Invert Level (m) 44.800

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1471.0	1.200	1471.0	1.201	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SCU-0119-1560-1200-1560
Design Head (m)	1.200
Design Flow (l/s)	15.6
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	119
Invert Level (m)	44.800
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	15.6
Flush-Flo™	0.149	6.4
Kick-Flo®	0.178	6.4
Mean Flow over Head Range	-	10.5

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	4.6	1.200	15.6	3.000	24.2	7.000	36.4
0.200	6.7	1.400	16.8	3.500	26.1	7.500	37.7
0.300	8.1	1.600	17.9	4.000	27.8	8.000	38.9
0.400	9.3	1.800	18.9	4.500	29.4	8.500	40.0
0.500	10.3	2.000	19.9	5.000	30.9	9.000	41.1
0.600	11.2	2.200	20.8	5.500	32.4	9.500	42.2
0.800	12.9	2.400	21.7	6.000	33.8		
1.000	14.3	2.600	22.6	6.500	35.1		

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	48.381	0.381	19.9	1181.9	O K
30 min Summer	48.512	0.512	22.9	1586.9	O K
60 min Summer	48.653	0.653	25.7	2024.1	O K
120 min Summer	48.797	0.797	28.3	2469.8	O K
180 min Summer	48.875	0.875	29.6	2713.5	O K
240 min Summer	48.924	0.924	30.4	2864.5	O K
360 min Summer	48.981	0.981	31.2	3041.5	O K
480 min Summer	49.013	1.013	31.7	3141.4	O K
600 min Summer	49.030	1.030	32.0	3192.4	O K
720 min Summer	49.036	1.036	32.1	3212.6	O K
960 min Summer	49.042	1.042	32.1	3229.1	O K
1440 min Summer	49.037	1.037	32.1	3215.9	O K
2160 min Summer	49.010	1.010	31.7	3132.2	O K
2880 min Summer	48.972	0.972	31.1	3014.0	O K
4320 min Summer	48.889	0.889	29.8	2757.3	O K
5760 min Summer	48.811	0.811	28.5	2514.0	O K
7200 min Summer	48.741	0.741	27.3	2296.3	O K
8640 min Summer	48.679	0.679	26.2	2105.9	O K
10080 min Summer	48.625	0.625	25.2	1937.1	O K
15 min Winter	48.427	0.427	21.0	1325.1	O K
30 min Winter	48.574	0.574	24.2	1779.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	1011.5	26
30 min Summer	81.146	0.0	1352.9	41
60 min Summer	52.299	0.0	1978.0	70
120 min Summer	32.580	0.0	2466.6	130
180 min Summer	24.347	0.0	2760.7	188
240 min Summer	19.663	0.0	2966.0	246
360 min Summer	14.471	0.0	3254.8	364
480 min Summer	11.644	0.0	3464.9	482
600 min Summer	9.829	0.0	3620.2	602
720 min Summer	8.553	0.0	3734.2	700
960 min Summer	6.862	0.0	3860.7	806
1440 min Summer	5.020	0.0	3897.5	1054
2160 min Summer	3.665	0.0	5176.8	1468
2880 min Summer	2.928	0.0	5496.4	1876
4320 min Summer	2.129	0.0	5898.6	2688
5760 min Summer	1.697	0.0	6465.3	3512
7200 min Summer	1.421	0.0	6765.5	4256
8640 min Summer	1.231	0.0	7017.9	5024
10080 min Summer	1.090	0.0	7220.6	5768
15 min Winter	120.305	0.0	1133.5	26
30 min Winter	81.146	0.0	1496.6	41

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	48.733	0.733	27.2	2270.9	O K
120 min Winter	48.895	0.895	29.9	2775.6	O K
180 min Winter	48.985	0.985	31.3	3054.1	O K
240 min Winter	49.042	1.042	32.1	3229.1	O K
360 min Winter	49.109	1.109	33.1	3439.1	O K
480 min Winter	49.149	1.149	33.7	3563.3	O K
600 min Winter	49.172	1.172	34.0	3634.2	O K
720 min Winter	49.184	1.184	34.2	3670.9	O K
960 min Winter	49.188	1.188	34.2	3682.1	O K
1440 min Winter	49.175	1.175	34.1	3642.0	O K
2160 min Winter	49.132	1.132	33.5	3508.9	O K
2880 min Winter	49.074	1.074	32.6	3328.2	O K
4320 min Winter	48.950	0.950	30.8	2946.1	O K
5760 min Winter	48.837	0.837	28.9	2594.6	O K
7200 min Winter	48.738	0.738	27.3	2288.8	O K
8640 min Winter	48.654	0.654	25.7	2028.0	O K
10080 min Winter	48.582	0.582	24.3	1805.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	2218.2	70
120 min Winter	32.580	0.0	2761.3	126
180 min Winter	24.347	0.0	3085.8	184
240 min Winter	19.663	0.0	3310.2	242
360 min Winter	14.471	0.0	3619.8	358
480 min Winter	11.644	0.0	3835.2	472
600 min Winter	9.829	0.0	3982.0	584
720 min Winter	8.553	0.0	4075.7	694
960 min Winter	6.862	0.0	4163.0	900
1440 min Winter	5.020	0.0	4214.0	1116
2160 min Winter	3.665	0.0	5797.9	1580
2880 min Winter	2.928	0.0	6151.9	2024
4320 min Winter	2.129	0.0	6564.2	2900
5760 min Winter	1.697	0.0	7243.8	3744
7200 min Winter	1.421	0.0	7580.4	4544
8640 min Winter	1.231	0.0	7866.5	5288
10080 min Winter	1.090	0.0	8100.5	6056

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 5.320

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	1.773	4	8	1.773	8	12	1.773

Model Details

Storage is Online Cover Level (m) 50.300

Tank or Pond Structure

Invert Level (m) 48.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	3100.0	1.200	3100.0	1.201	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SCU-0178-3300-1100-3300
Design Head (m)	1.100
Design Flow (l/s)	33.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	178
Invert Level (m)	48.000
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.100	33.0
Flush-Flo™	0.211	17.3
Kick-Flo®	0.267	16.8
Mean Flow over Head Range	-	22.0

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)
0.100	6.9	1.200	34.4	3.000	53.5	7.000	80.9
0.200	17.2	1.400	37.1	3.500	57.7	7.500	83.6
0.300	17.8	1.600	39.5	4.000	61.6	8.000	86.3
0.400	20.4	1.800	41.8	4.500	65.2	8.500	88.9
0.500	22.6	2.000	44.0	5.000	68.6	9.000	91.4
0.600	24.7	2.200	46.1	5.500	71.9	9.500	93.9
0.800	28.3	2.400	48.1	6.000	75.0		
1.000	31.5	2.600	50.0	6.500	78.0		

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	47.577	0.377	3.7	238.4	O K
30 min Summer	47.706	0.506	4.3	319.9	O K
60 min Summer	47.845	0.645	4.8	407.8	O K
120 min Summer	47.987	0.787	5.3	498.1	O K
180 min Summer	48.066	0.866	5.5	547.6	O K
240 min Summer	48.115	0.915	5.6	578.6	O K
360 min Summer	48.173	0.973	5.8	615.6	O K
480 min Summer	48.207	1.007	5.9	637.2	O K
600 min Summer	48.226	1.026	5.9	649.0	O K
720 min Summer	48.235	1.035	6.0	654.5	O K
960 min Summer	48.239	1.039	6.0	657.3	O K
1440 min Summer	48.236	1.036	6.0	655.0	O K
2160 min Summer	48.211	1.011	5.9	639.6	O K
2880 min Summer	48.176	0.976	5.8	617.2	O K
4320 min Summer	48.098	0.898	5.6	567.8	O K
5760 min Summer	48.023	0.823	5.4	520.8	O K
7200 min Summer	47.957	0.757	5.2	478.8	O K
8640 min Summer	47.899	0.699	5.0	441.9	O K
10080 min Summer	47.847	0.647	4.8	409.4	O K
15 min Winter	47.622	0.422	3.9	267.1	O K
30 min Winter	47.767	0.567	4.5	358.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	214.9	23
30 min Summer	81.146	0.0	270.1	37
60 min Summer	52.299	0.0	408.8	66
120 min Summer	32.580	0.0	507.4	126
180 min Summer	24.347	0.0	565.7	186
240 min Summer	19.663	0.0	605.1	244
360 min Summer	14.471	0.0	655.8	364
480 min Summer	11.644	0.0	686.2	482
600 min Summer	9.829	0.0	707.2	602
720 min Summer	8.553	0.0	722.7	720
960 min Summer	6.862	0.0	741.6	832
1440 min Summer	5.020	0.0	750.0	1082
2160 min Summer	3.665	0.0	1050.3	1480
2880 min Summer	2.928	0.0	1115.3	1904
4320 min Summer	2.129	0.0	1179.5	2724
5760 min Summer	1.697	0.0	1304.6	3520
7200 min Summer	1.421	0.0	1365.8	4320
8640 min Summer	1.231	0.0	1418.4	5096
10080 min Summer	1.090	0.0	1463.0	5848
15 min Winter	120.305	0.0	236.8	23
30 min Winter	81.146	0.0	290.1	37

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	47.924	0.724	5.1	457.8	O K
120 min Winter	48.085	0.885	5.5	559.8	O K
180 min Winter	48.175	0.975	5.8	616.5	O K
240 min Winter	48.231	1.031	6.0	652.3	O K
360 min Winter	48.301	1.101	6.1	696.1	O K
480 min Winter	48.343	1.143	6.3	722.8	O K
600 min Winter	48.368	1.168	6.3	738.8	O K
720 min Winter	48.382	1.182	6.4	747.8	O K
960 min Winter	48.391	1.191	6.4	753.1	O K
1440 min Winter	48.378	1.178	6.3	745.0	O K
2160 min Winter	48.341	1.141	6.3	721.9	O K
2880 min Winter	48.289	1.089	6.1	688.6	O K
4320 min Winter	48.173	0.973	5.8	615.6	O K
5760 min Winter	48.065	0.865	5.5	547.4	O K
7200 min Winter	47.971	0.771	5.2	487.6	O K
8640 min Winter	47.890	0.690	4.9	436.2	O K
10080 min Winter	47.820	0.620	4.7	391.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	457.4	66
120 min Winter	32.580	0.0	565.9	124
180 min Winter	24.347	0.0	628.1	182
240 min Winter	19.663	0.0	667.5	240
360 min Winter	14.471	0.0	714.0	356
480 min Winter	11.644	0.0	745.1	472
600 min Winter	9.829	0.0	766.9	584
720 min Winter	8.553	0.0	782.4	696
960 min Winter	6.862	0.0	800.9	908
1440 min Winter	5.020	0.0	807.5	1138
2160 min Winter	3.665	0.0	1175.5	1600
2880 min Winter	2.928	0.0	1246.4	2052
4320 min Winter	2.129	0.0	1291.9	2940
5760 min Winter	1.697	0.0	1461.3	3752
7200 min Winter	1.421	0.0	1529.8	4608
8640 min Winter	1.231	0.0	1588.7	5368
10080 min Winter	1.090	0.0	1639.3	6152

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.070

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.535	4	8	0.535

Model Details

Storage is Online Cover Level (m) 49.400

Tank or Pond Structure

Invert Level (m) 47.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	632.5	1.200	632.5	1.201	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SCU-0075-6400-1200-6400
Design Head (m)	1.200
Design Flow (l/s)	6.4
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	75
Invert Level (m)	47.200
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	6.4
Flush-Flo™	0.100	2.2
Kick-Flo®	0.113	2.2
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	2.2	1.200	6.4	3.000	9.9	7.000	14.8
0.200	2.8	1.400	6.9	3.500	10.6	7.500	15.3
0.300	3.4	1.600	7.3	4.000	11.3	8.000	15.8
0.400	3.8	1.800	7.7	4.500	12.0	8.500	16.3
0.500	4.3	2.000	8.1	5.000	12.6	9.000	16.7
0.600	4.6	2.200	8.5	5.500	13.2	9.500	17.2
0.800	5.3	2.400	8.9	6.000	13.7		
1.000	5.9	2.600	9.2	6.500	14.3		

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	46.365	0.365	2.3	138.5	O K
30 min Summer	46.489	0.489	2.6	185.7	O K
60 min Summer	46.623	0.623	3.0	236.6	O K
120 min Summer	46.759	0.759	3.2	288.3	O K
180 min Summer	46.833	0.833	3.4	316.6	O K
240 min Summer	46.879	0.879	3.5	334.1	O K
360 min Summer	46.933	0.933	3.6	354.5	O K
480 min Summer	46.963	0.963	3.6	365.9	O K
600 min Summer	46.978	0.978	3.6	371.8	O K
720 min Summer	46.984	0.984	3.6	374.0	O K
960 min Summer	46.988	0.988	3.7	375.3	O K
1440 min Summer	46.981	0.981	3.6	372.9	O K
2160 min Summer	46.954	0.954	3.6	362.6	O K
2880 min Summer	46.917	0.917	3.5	348.5	O K
4320 min Summer	46.837	0.837	3.4	318.2	O K
5760 min Summer	46.764	0.764	3.2	290.2	O K
7200 min Summer	46.698	0.698	3.1	265.3	O K
8640 min Summer	46.641	0.641	3.0	243.7	O K
10080 min Summer	46.592	0.592	2.9	224.8	O K
15 min Winter	46.409	0.409	2.4	155.2	O K
30 min Winter	46.548	0.548	2.8	208.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	128.3	19
30 min Summer	81.146	0.0	163.0	34
60 min Summer	52.299	0.0	239.2	64
120 min Summer	32.580	0.0	297.3	124
180 min Summer	24.347	0.0	332.2	182
240 min Summer	19.663	0.0	356.3	242
360 min Summer	14.471	0.0	388.9	362
480 min Summer	11.644	0.0	409.9	482
600 min Summer	9.829	0.0	423.5	600
720 min Summer	8.553	0.0	433.6	712
960 min Summer	6.862	0.0	446.2	810
1440 min Summer	5.020	0.0	453.0	1056
2160 min Summer	3.665	0.0	611.3	1468
2880 min Summer	2.928	0.0	649.9	1876
4320 min Summer	2.129	0.0	697.0	2720
5760 min Summer	1.697	0.0	757.6	3512
7200 min Summer	1.421	0.0	793.2	4320
8640 min Summer	1.231	0.0	823.9	5096
10080 min Summer	1.090	0.0	850.2	5848
15 min Winter	120.305	0.0	141.7	19
30 min Winter	81.146	0.0	175.6	33

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	46.698	0.698	3.1	265.4	O K
120 min Winter	46.853	0.853	3.4	324.1	O K
180 min Winter	46.938	0.938	3.6	356.5	O K
240 min Winter	46.991	0.991	3.7	376.7	O K
360 min Winter	47.055	1.055	3.8	401.0	O K
480 min Winter	47.093	1.093	3.8	415.5	O K
600 min Winter	47.115	1.115	3.9	423.8	O K
720 min Winter	47.127	1.127	3.9	428.2	O K
960 min Winter	47.131	1.131	3.9	429.6	O K
1440 min Winter	47.116	1.116	3.9	424.1	O K
2160 min Winter	47.075	1.075	3.8	408.6	O K
2880 min Winter	47.020	1.020	3.7	387.5	O K
4320 min Winter	46.903	0.903	3.5	343.1	O K
5760 min Winter	46.796	0.796	3.3	302.6	O K
7200 min Winter	46.704	0.704	3.1	267.4	O K
8640 min Winter	46.625	0.625	3.0	237.6	O K
10080 min Winter	46.558	0.558	2.8	212.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	267.7	62
120 min Winter	32.580	0.0	332.2	122
180 min Winter	24.347	0.0	370.2	180
240 min Winter	19.663	0.0	395.5	238
360 min Winter	14.471	0.0	426.8	354
480 min Winter	11.644	0.0	446.4	468
600 min Winter	9.829	0.0	460.3	582
720 min Winter	8.553	0.0	470.4	692
960 min Winter	6.862	0.0	482.7	902
1440 min Winter	5.020	0.0	488.3	1124
2160 min Winter	3.665	0.0	684.4	1580
2880 min Winter	2.928	0.0	727.2	2044
4320 min Winter	2.129	0.0	767.5	2900
5760 min Winter	1.697	0.0	848.6	3744
7200 min Winter	1.421	0.0	888.5	4544
8640 min Winter	1.231	0.0	922.9	5360
10080 min Winter	1.090	0.0	952.7	6144

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.621

Time (mins) From:	To:	Area (ha)
0	4	0.621

Model Details

Storage is Online Cover Level (m) 48.200

Tank or Pond Structure

Invert Level (m) 46.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	380.0	1.200	380.0	1.201	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SCU-0059-4000-1200-4000
Design Head (m)	1.200
Design Flow (l/s)	4.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	59
Invert Level (m)	46.000
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	4.0
Flush-Flo™	0.089	1.2
Kick-Flo®	0.089	1.2
Mean Flow over Head Range	-	2.7

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	1.3	1.200	4.0	3.000	6.1	7.000	9.2
0.200	1.8	1.400	4.3	3.500	6.6	7.500	9.5
0.300	2.1	1.600	4.6	4.000	7.0	8.000	9.8
0.400	2.4	1.800	4.8	4.500	7.5	8.500	10.1
0.500	2.7	2.000	5.1	5.000	7.8	9.000	10.4
0.600	2.9	2.200	5.3	5.500	8.2	9.500	10.7
0.800	3.3	2.400	5.5	6.000	8.5		
1.000	3.7	2.600	5.7	6.500	8.9		

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	42.384	0.384	4.8	284.9	O K
30 min Summer	42.516	0.516	5.5	382.4	O K
60 min Summer	42.658	0.658	6.2	487.5	O K
120 min Summer	42.802	0.802	6.8	594.4	O K
180 min Summer	42.881	0.881	7.1	652.7	O K
240 min Summer	42.929	0.929	7.3	688.7	O K
360 min Summer	42.986	0.986	7.5	730.7	O K
480 min Summer	43.018	1.018	7.6	754.3	O K
600 min Summer	43.034	1.034	7.6	766.2	O K
720 min Summer	43.040	1.040	7.7	770.6	O K
960 min Summer	43.044	1.044	7.7	773.5	O K
1440 min Summer	43.037	1.037	7.7	768.6	O K
2160 min Summer	43.008	1.008	7.6	746.7	O K
2880 min Summer	42.968	0.968	7.4	717.0	O K
4320 min Summer	42.883	0.883	7.1	654.0	O K
5760 min Summer	42.804	0.804	6.8	596.1	O K
7200 min Summer	42.735	0.735	6.5	544.7	O K
8640 min Summer	42.675	0.675	6.3	500.0	O K
10080 min Summer	42.622	0.622	6.0	460.6	O K
15 min Winter	42.431	0.431	5.1	319.4	O K
30 min Winter	42.579	0.579	5.8	428.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	261.4	26
30 min Summer	81.146	0.0	338.0	41
60 min Summer	52.299	0.0	491.0	70
120 min Summer	32.580	0.0	610.8	130
180 min Summer	24.347	0.0	682.8	188
240 min Summer	19.663	0.0	732.8	246
360 min Summer	14.471	0.0	802.0	364
480 min Summer	11.644	0.0	849.4	482
600 min Summer	9.829	0.0	880.4	602
720 min Summer	8.553	0.0	900.4	704
960 min Summer	6.862	0.0	927.3	808
1440 min Summer	5.020	0.0	942.7	1056
2160 min Summer	3.665	0.0	1260.4	1472
2880 min Summer	2.928	0.0	1339.9	1880
4320 min Summer	2.129	0.0	1439.9	2688
5760 min Summer	1.697	0.0	1564.3	3512
7200 min Summer	1.421	0.0	1637.6	4264
8640 min Summer	1.231	0.0	1700.6	5024
10080 min Summer	1.090	0.0	1753.8	5848
15 min Winter	120.305	0.0	290.1	26
30 min Winter	81.146	0.0	365.4	41

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	42.738	0.738	6.5	547.1	O K
120 min Winter	42.902	0.902	7.2	668.4	O K
180 min Winter	42.992	0.992	7.5	735.2	O K
240 min Winter	43.049	1.049	7.7	777.1	O K
360 min Winter	43.116	1.116	7.9	827.2	O K
480 min Winter	43.156	1.156	8.1	856.8	O K
600 min Winter	43.179	1.179	8.1	873.5	O K
720 min Winter	43.190	1.190	8.2	882.1	O K
960 min Winter	43.193	1.193	8.2	884.3	O K
1440 min Winter	43.178	1.178	8.1	873.1	O K
2160 min Winter	43.134	1.134	8.0	840.0	O K
2880 min Winter	43.074	1.074	7.8	795.7	O K
4320 min Winter	42.949	0.949	7.3	703.3	O K
5760 min Winter	42.836	0.836	6.9	619.4	O K
7200 min Winter	42.738	0.738	6.5	546.9	O K
8640 min Winter	42.655	0.655	6.2	485.4	O K
10080 min Winter	42.584	0.584	5.9	432.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	549.8	70
120 min Winter	32.580	0.0	682.7	126
180 min Winter	24.347	0.0	761.7	184
240 min Winter	19.663	0.0	815.3	242
360 min Winter	14.471	0.0	885.3	358
480 min Winter	11.644	0.0	927.9	472
600 min Winter	9.829	0.0	956.5	584
720 min Winter	8.553	0.0	978.0	694
960 min Winter	6.862	0.0	1004.5	902
1440 min Winter	5.020	0.0	1017.5	1118
2160 min Winter	3.665	0.0	1411.3	1584
2880 min Winter	2.928	0.0	1499.3	2028
4320 min Winter	2.129	0.0	1592.8	2900
5760 min Winter	1.697	0.0	1752.2	3744
7200 min Winter	1.421	0.0	1834.4	4544
8640 min Winter	1.231	0.0	1905.1	5352
10080 min Winter	1.090	0.0	1965.7	6064

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.283

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.428	4	8	0.428	8	12	0.428

Model Details

Storage is Online Cover Level (m) 44.200

Tank or Pond Structure

Invert Level (m) 42.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	741.0	1.200	741.0	1.201	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SCU-0085-8200-1200-8200
Design Head (m)	1.200
Design Flow (l/s)	8.2
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	85
Invert Level (m)	42.000
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	8.2
Flush-Flo™	0.112	2.9
Kick-Flo®	0.129	2.9
Mean Flow over Head Range	-	5.6

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	2.8	1.200	8.2	3.000	12.7	7.000	19.0
0.200	3.6	1.400	8.8	3.500	13.6	7.500	19.7
0.300	4.3	1.600	9.4	4.000	14.5	8.000	20.3
0.400	4.9	1.800	9.9	4.500	15.4	8.500	20.9
0.500	5.4	2.000	10.4	5.000	16.2	9.000	21.5
0.600	5.9	2.200	10.9	5.500	16.9	9.500	22.0
0.800	6.8	2.400	11.4	6.000	17.7		
1.000	7.5	2.600	11.8	6.500	18.4		

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	39.874	0.374	3.4	205.6	O K
30 min Summer	40.002	0.502	3.9	276.0	O K
60 min Summer	40.140	0.640	4.4	351.9	O K
120 min Summer	40.280	0.780	4.8	429.2	O K
180 min Summer	40.357	0.857	5.0	471.4	O K
240 min Summer	40.405	0.905	5.2	497.5	O K
360 min Summer	40.460	0.960	5.3	528.2	O K
480 min Summer	40.492	0.992	5.4	545.5	O K
600 min Summer	40.508	1.008	5.4	554.4	O K
720 min Summer	40.514	1.014	5.5	557.9	O K
960 min Summer	40.518	1.018	5.5	559.9	O K
1440 min Summer	40.512	1.012	5.4	556.6	O K
2160 min Summer	40.484	0.984	5.4	541.2	O K
2880 min Summer	40.446	0.946	5.3	520.1	O K
4320 min Summer	40.364	0.864	5.1	475.0	O K
5760 min Summer	40.288	0.788	4.8	433.5	O K
7200 min Summer	40.221	0.721	4.6	396.4	O K
8640 min Summer	40.162	0.662	4.5	364.1	O K
10080 min Summer	40.111	0.611	4.3	335.9	O K
15 min Winter	39.919	0.419	3.6	230.5	O K
30 min Winter	40.063	0.563	4.1	309.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	189.5	26
30 min Summer	81.146	0.0	242.5	41
60 min Summer	52.299	0.0	355.3	70
120 min Summer	32.580	0.0	441.8	130
180 min Summer	24.347	0.0	493.6	188
240 min Summer	19.663	0.0	529.5	246
360 min Summer	14.471	0.0	578.4	364
480 min Summer	11.644	0.0	610.6	484
600 min Summer	9.829	0.0	630.9	602
720 min Summer	8.553	0.0	645.6	710
960 min Summer	6.862	0.0	664.4	816
1440 min Summer	5.020	0.0	674.6	1062
2160 min Summer	3.665	0.0	910.5	1472
2880 min Summer	2.928	0.0	967.8	1880
4320 min Summer	2.129	0.0	1038.0	2692
5760 min Summer	1.697	0.0	1129.3	3512
7200 min Summer	1.421	0.0	1182.3	4320
8640 min Summer	1.231	0.0	1227.9	5032
10080 min Summer	1.090	0.0	1266.7	5848
15 min Winter	120.305	0.0	209.9	26
30 min Winter	81.146	0.0	261.1	41

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	40.218	0.718	4.6	395.0	O K
120 min Winter	40.378	0.878	5.1	482.6	O K
180 min Winter	40.465	0.965	5.3	531.0	O K
240 min Winter	40.521	1.021	5.5	561.4	O K
360 min Winter	40.587	1.087	5.6	597.9	O K
480 min Winter	40.627	1.127	5.7	619.6	O K
600 min Winter	40.649	1.149	5.8	632.0	O K
720 min Winter	40.661	1.161	5.8	638.5	O K
960 min Winter	40.665	1.165	5.8	640.7	O K
1440 min Winter	40.650	1.150	5.8	632.7	O K
2160 min Winter	40.608	1.108	5.7	609.5	O K
2880 min Winter	40.551	1.051	5.5	578.1	O K
4320 min Winter	40.431	0.931	5.2	511.9	O K
5760 min Winter	40.321	0.821	4.9	451.6	O K
7200 min Winter	40.226	0.726	4.7	399.3	O K
8640 min Winter	40.145	0.645	4.4	354.9	O K
10080 min Winter	40.076	0.576	4.2	316.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	397.8	70
120 min Winter	32.580	0.0	493.6	126
180 min Winter	24.347	0.0	550.2	184
240 min Winter	19.663	0.0	588.2	242
360 min Winter	14.471	0.0	635.9	358
480 min Winter	11.644	0.0	664.9	472
600 min Winter	9.829	0.0	685.7	584
720 min Winter	8.553	0.0	700.7	694
960 min Winter	6.862	0.0	719.1	904
1440 min Winter	5.020	0.0	727.5	1124
2160 min Winter	3.665	0.0	1019.4	1584
2880 min Winter	2.928	0.0	1082.8	2044
4320 min Winter	2.129	0.0	1144.1	2904
5760 min Winter	1.697	0.0	1265.0	3752
7200 min Winter	1.421	0.0	1324.4	4544
8640 min Winter	1.231	0.0	1375.5	5360
10080 min Winter	1.090	0.0	1419.6	6144

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.926

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.309	4	8	0.309	8	12	0.309

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	36.894	0.294	1.3	58.9	O K
30 min Summer	36.994	0.394	1.5	78.8	O K
60 min Summer	37.100	0.500	1.7	99.9	O K
120 min Summer	37.205	0.605	1.8	120.9	O K
180 min Summer	37.259	0.659	1.9	131.9	O K
240 min Summer	37.291	0.691	1.9	138.2	O K
360 min Summer	37.323	0.723	2.0	144.6	O K
480 min Summer	37.336	0.736	2.0	147.2	O K
600 min Summer	37.340	0.740	2.0	147.9	O K
720 min Summer	37.341	0.741	2.0	148.3	O K
960 min Summer	37.340	0.740	2.0	147.9	O K
1440 min Summer	37.324	0.724	2.0	144.8	O K
2160 min Summer	37.287	0.687	1.9	137.4	O K
2880 min Summer	37.246	0.646	1.9	129.3	O K
4320 min Summer	37.170	0.570	1.8	114.0	O K
5760 min Summer	37.105	0.505	1.7	101.0	O K
7200 min Summer	37.049	0.449	1.6	89.9	O K
8640 min Summer	37.003	0.403	1.5	80.5	O K
10080 min Summer	36.963	0.363	1.4	72.6	O K
15 min Winter	36.930	0.330	1.4	66.0	O K
30 min Winter	37.042	0.442	1.6	88.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	57.3	19
30 min Summer	81.146	0.0	76.8	34
60 min Summer	52.299	0.0	102.9	64
120 min Summer	32.580	0.0	128.3	122
180 min Summer	24.347	0.0	143.8	182
240 min Summer	19.663	0.0	154.8	242
360 min Summer	14.471	0.0	170.7	360
480 min Summer	11.644	0.0	183.0	480
600 min Summer	9.829	0.0	192.8	546
720 min Summer	8.553	0.0	200.9	600
960 min Summer	6.862	0.0	213.5	722
1440 min Summer	5.020	0.0	225.7	994
2160 min Summer	3.665	0.0	261.6	1404
2880 min Summer	2.928	0.0	278.5	1816
4320 min Summer	2.129	0.0	303.2	2632
5760 min Summer	1.697	0.0	323.5	3400
7200 min Summer	1.421	0.0	338.7	4176
8640 min Summer	1.231	0.0	351.8	4928
10080 min Summer	1.090	0.0	363.1	5648
15 min Winter	120.305	0.0	64.1	19
30 min Winter	81.146	0.0	85.4	33

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	37.161	0.561	1.8	112.3	O K
120 min Winter	37.281	0.681	1.9	136.1	O K
180 min Winter	37.344	0.744	2.0	148.7	O K
240 min Winter	37.381	0.781	2.1	156.2	O K
360 min Winter	37.421	0.821	2.1	164.3	O K
480 min Winter	37.441	0.841	2.1	168.2	O K
600 min Winter	37.448	0.848	2.1	169.7	O K
720 min Winter	37.448	0.848	2.1	169.6	O K
960 min Winter	37.442	0.842	2.1	168.4	O K
1440 min Winter	37.418	0.818	2.1	163.6	O K
2160 min Winter	37.362	0.762	2.0	152.5	O K
2880 min Winter	37.302	0.702	2.0	140.4	O K
4320 min Winter	37.191	0.591	1.8	118.2	O K
5760 min Winter	37.099	0.499	1.7	99.8	O K
7200 min Winter	37.024	0.424	1.6	84.8	O K
8640 min Winter	36.964	0.364	1.5	72.7	O K
10080 min Winter	36.914	0.314	1.4	62.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	115.3	62
120 min Winter	32.580	0.0	143.7	120
180 min Winter	24.347	0.0	161.0	180
240 min Winter	19.663	0.0	173.3	238
360 min Winter	14.471	0.0	191.1	352
480 min Winter	11.644	0.0	204.6	462
600 min Winter	9.829	0.0	215.3	572
720 min Winter	8.553	0.0	224.1	672
960 min Winter	6.862	0.0	236.6	760
1440 min Winter	5.020	0.0	246.0	1068
2160 min Winter	3.665	0.0	293.0	1516
2880 min Winter	2.928	0.0	311.9	1960
4320 min Winter	2.129	0.0	339.4	2808
5760 min Winter	1.697	0.0	362.3	3584
7200 min Winter	1.421	0.0	379.4	4392
8640 min Winter	1.231	0.0	394.1	5104
10080 min Winter	1.090	0.0	406.9	5848

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.265

Time (mins) From:	To:	Area (ha)
0	4	0.265

Model Details

Storage is Online Cover Level (m) 38.600

Tank or Pond Structure

Invert Level (m) 36.600

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	200.0	1.000	200.0	1.001	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SCU-0046-2500-1200-2500
Design Head (m)	1.200
Design Flow (l/s)	2.5
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	46
Invert Level (m)	36.600
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	2.5
Flush-Flo™	0.069	0.7
Kick-Flo®	0.069	0.7
Mean Flow over Head Range	-	1.7

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	0.8	1.200	2.5	3.000	3.8	7.000	5.7
0.200	1.1	1.400	2.7	3.500	4.1	7.500	5.9
0.300	1.3	1.600	2.9	4.000	4.4	8.000	6.1
0.400	1.5	1.800	3.0	4.500	4.6	8.500	6.3
0.500	1.7	2.000	3.2	5.000	4.9	9.000	6.4
0.600	1.8	2.200	3.3	5.500	5.1	9.500	6.6
0.800	2.1	2.400	3.4	6.000	5.3		
1.000	2.3	2.600	3.6	6.500	5.5		

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	36.782	0.382	2.1	120.4	O K
30 min Summer	36.912	0.512	2.4	161.4	O K
60 min Summer	37.052	0.652	2.6	205.5	O K
120 min Summer	37.194	0.794	2.9	250.3	O K
180 min Summer	37.272	0.872	3.0	274.6	O K
240 min Summer	37.319	0.919	3.1	289.6	O K
360 min Summer	37.374	0.974	3.2	306.9	O K
480 min Summer	37.404	1.004	3.2	316.4	O K
600 min Summer	37.419	1.019	3.2	321.1	O K
720 min Summer	37.424	1.024	3.3	322.7	O K
960 min Summer	37.428	1.028	3.3	323.7	O K
1440 min Summer	37.420	1.020	3.2	321.2	O K
2160 min Summer	37.389	0.989	3.2	311.6	O K
2880 min Summer	37.349	0.949	3.1	298.8	O K
4320 min Summer	37.263	0.863	3.0	272.0	O K
5760 min Summer	37.185	0.785	2.9	247.3	O K
7200 min Summer	37.116	0.716	2.8	225.6	O K
8640 min Summer	37.056	0.656	2.6	206.8	O K
10080 min Summer	37.004	0.604	2.5	190.2	O K
15 min Winter	36.828	0.428	2.2	134.9	O K
30 min Winter	36.974	0.574	2.5	181.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	113.0	19
30 min Summer	81.146	0.0	144.1	34
60 min Summer	52.299	0.0	208.7	64
120 min Summer	32.580	0.0	259.6	124
180 min Summer	24.347	0.0	290.2	182
240 min Summer	19.663	0.0	311.6	242
360 min Summer	14.471	0.0	341.0	362
480 min Summer	11.644	0.0	360.6	480
600 min Summer	9.829	0.0	373.3	600
720 min Summer	8.553	0.0	382.5	700
960 min Summer	6.862	0.0	394.2	800
1440 min Summer	5.020	0.0	401.1	1052
2160 min Summer	3.665	0.0	532.1	1468
2880 min Summer	2.928	0.0	566.0	1872
4320 min Summer	2.129	0.0	609.9	2684
5760 min Summer	1.697	0.0	659.0	3512
7200 min Summer	1.421	0.0	690.0	4256
8640 min Summer	1.231	0.0	716.7	5024
10080 min Summer	1.090	0.0	739.7	5840
15 min Winter	120.305	0.0	125.0	19
30 min Winter	81.146	0.0	155.5	33

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	37.132	0.732	2.8	230.6	O K
120 min Winter	37.293	0.893	3.1	281.4	O K
180 min Winter	37.382	0.982	3.2	309.3	O K
240 min Winter	37.437	1.037	3.3	326.7	O K
360 min Winter	37.503	1.103	3.4	347.4	O K
480 min Winter	37.541	1.141	3.4	359.5	O K
600 min Winter	37.563	1.163	3.4	366.3	O K
720 min Winter	37.574	1.174	3.5	369.7	O K
960 min Winter	37.576	1.176	3.5	370.3	O K
1440 min Winter	37.560	1.160	3.4	365.3	O K
2160 min Winter	37.514	1.114	3.4	350.8	O K
2880 min Winter	37.453	1.053	3.3	331.8	O K
4320 min Winter	37.328	0.928	3.1	292.4	O K
5760 min Winter	37.215	0.815	2.9	256.8	O K
7200 min Winter	37.118	0.718	2.8	226.2	O K
8640 min Winter	37.036	0.636	2.6	200.2	O K
10080 min Winter	36.966	0.566	2.5	178.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	233.6	62
120 min Winter	32.580	0.0	290.2	122
180 min Winter	24.347	0.0	323.8	180
240 min Winter	19.663	0.0	346.6	238
360 min Winter	14.471	0.0	375.6	354
480 min Winter	11.644	0.0	393.6	468
600 min Winter	9.829	0.0	406.3	580
720 min Winter	8.553	0.0	415.5	690
960 min Winter	6.862	0.0	426.9	896
1440 min Winter	5.020	0.0	432.7	1112
2160 min Winter	3.665	0.0	595.8	1576
2880 min Winter	2.928	0.0	633.5	2020
4320 min Winter	2.129	0.0	674.0	2896
5760 min Winter	1.697	0.0	738.1	3744
7200 min Winter	1.421	0.0	772.8	4536
8640 min Winter	1.231	0.0	802.8	5280
10080 min Winter	1.090	0.0	828.8	6056

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.540

Time (mins) From:	To:	Area (ha)
0	4	0.540

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	37.075	0.375	1.6	99.0	O K
30 min Summer	37.203	0.503	1.9	132.8	O K
60 min Summer	37.341	0.641	2.1	169.1	O K
120 min Summer	37.481	0.781	2.3	206.1	O K
180 min Summer	37.557	0.857	2.4	226.3	O K
240 min Summer	37.605	0.905	2.5	238.9	O K
360 min Summer	37.660	0.960	2.5	253.5	O K
480 min Summer	37.691	0.991	2.6	261.7	O K
600 min Summer	37.707	1.007	2.6	265.9	O K
720 min Summer	37.714	1.014	2.6	267.6	O K
960 min Summer	37.717	1.017	2.6	268.5	O K
1440 min Summer	37.711	1.011	2.6	266.8	O K
2160 min Summer	37.683	0.983	2.6	259.4	O K
2880 min Summer	37.645	0.945	2.5	249.3	O K
4320 min Summer	37.563	0.863	2.4	227.8	O K
5760 min Summer	37.487	0.787	2.3	207.8	O K
7200 min Summer	37.420	0.720	2.2	190.1	O K
8640 min Summer	37.361	0.661	2.1	174.6	O K
10080 min Summer	37.310	0.610	2.1	161.1	O K
15 min Winter	37.120	0.420	1.7	111.0	O K
30 min Winter	37.264	0.564	2.0	148.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	92.4	19
30 min Summer	81.146	0.0	116.3	34
60 min Summer	52.299	0.0	171.6	64
120 min Summer	32.580	0.0	213.3	124
180 min Summer	24.347	0.0	238.3	182
240 min Summer	19.663	0.0	255.5	242
360 min Summer	14.471	0.0	278.2	362
480 min Summer	11.644	0.0	292.6	482
600 min Summer	9.829	0.0	302.3	600
720 min Summer	8.553	0.0	309.4	714
960 min Summer	6.862	0.0	318.2	816
1440 min Summer	5.020	0.0	322.9	1066
2160 min Summer	3.665	0.0	437.5	1472
2880 min Summer	2.928	0.0	465.3	1876
4320 min Summer	2.129	0.0	498.3	2720
5760 min Summer	1.697	0.0	541.9	3512
7200 min Summer	1.421	0.0	567.3	4320
8640 min Summer	1.231	0.0	589.4	5096
10080 min Summer	1.090	0.0	608.3	5848
15 min Winter	120.305	0.0	101.8	19
30 min Winter	81.146	0.0	125.4	33

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	37.419	0.719	2.2	189.8	O K
120 min Winter	37.578	0.878	2.4	231.8	O K
180 min Winter	37.665	0.965	2.5	254.9	O K
240 min Winter	37.720	1.020	2.6	269.4	O K
360 min Winter	37.786	1.086	2.7	286.8	O K
480 min Winter	37.826	1.126	2.7	297.2	O K
600 min Winter	37.849	1.149	2.7	303.2	O K
720 min Winter	37.861	1.161	2.8	306.4	O K
960 min Winter	37.865	1.165	2.8	307.5	O K
1440 min Winter	37.850	1.150	2.7	303.6	O K
2160 min Winter	37.808	1.108	2.7	292.6	O K
2880 min Winter	37.752	1.052	2.6	277.6	O K
4320 min Winter	37.632	0.932	2.5	246.0	O K
5760 min Winter	37.522	0.822	2.4	217.0	O K
7200 min Winter	37.427	0.727	2.2	191.8	O K
8640 min Winter	37.346	0.646	2.1	170.5	O K
10080 min Winter	37.277	0.577	2.0	152.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	192.1	62
120 min Winter	32.580	0.0	238.3	122
180 min Winter	24.347	0.0	265.3	180
240 min Winter	19.663	0.0	283.0	238
360 min Winter	14.471	0.0	304.5	354
480 min Winter	11.644	0.0	318.5	468
600 min Winter	9.829	0.0	328.3	582
720 min Winter	8.553	0.0	335.4	692
960 min Winter	6.862	0.0	344.0	902
1440 min Winter	5.020	0.0	347.8	1124
2160 min Winter	3.665	0.0	489.9	1580
2880 min Winter	2.928	0.0	520.6	2044
4320 min Winter	2.129	0.0	548.0	2900
5760 min Winter	1.697	0.0	606.9	3752
7200 min Winter	1.421	0.0	635.5	4544
8640 min Winter	1.231	0.0	660.1	5360
10080 min Winter	1.090	0.0	681.6	6144

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.444

Time (mins) From:	To:	Area (ha)
0	4	0.444

Model Details

Storage is Online Cover Level (m) 38.900

Tank or Pond Structure

Invert Level (m) 36.700

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	264.0	1.200	264.0	1.201	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SCU-0049-2800-1200-2800
Design Head (m)	1.200
Design Flow (l/s)	2.8
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	49
Invert Level (m)	36.700
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	2.8
Flush-Flo™	0.073	0.8
Kick-Flo®	0.073	0.8
Mean Flow over Head Range	-	1.9

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	0.9	1.200	2.8	3.000	4.3	7.000	6.4
0.200	1.2	1.400	3.0	3.500	4.6	7.500	6.6
0.300	1.5	1.600	3.2	4.000	4.9	8.000	6.8
0.400	1.7	1.800	3.4	4.500	5.2	8.500	7.0
0.500	1.9	2.000	3.6	5.000	5.5	9.000	7.2
0.600	2.0	2.200	3.7	5.500	5.7	9.500	7.4
0.800	2.3	2.400	3.9	6.000	6.0		
1.000	2.6	2.600	4.0	6.500	6.2		

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	36.362	0.362	2.1	130.5	O K
30 min Summer	36.485	0.485	2.4	175.0	O K
60 min Summer	36.618	0.618	2.7	223.0	O K
120 min Summer	36.753	0.753	3.0	271.9	O K
180 min Summer	36.827	0.827	3.1	298.7	O K
240 min Summer	36.873	0.873	3.2	315.3	O K
360 min Summer	36.928	0.928	3.3	334.9	O K
480 min Summer	36.958	0.958	3.3	346.0	O K
600 min Summer	36.975	0.975	3.4	351.8	O K
720 min Summer	36.981	0.981	3.4	354.2	O K
960 min Summer	36.985	0.985	3.4	355.5	O K
1440 min Summer	36.979	0.979	3.4	353.6	O K
2160 min Summer	36.954	0.954	3.3	344.3	O K
2880 min Summer	36.918	0.918	3.3	331.3	O K
4320 min Summer	36.840	0.840	3.1	303.3	O K
5760 min Summer	36.768	0.768	3.0	277.2	O K
7200 min Summer	36.703	0.703	2.9	253.9	O K
8640 min Summer	36.647	0.647	2.8	233.5	O K
10080 min Summer	36.598	0.598	2.7	215.7	O K
15 min Winter	36.405	0.405	2.2	146.3	O K
30 min Winter	36.544	0.544	2.6	196.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	120.3	19
30 min Summer	81.146	0.0	151.6	34
60 min Summer	52.299	0.0	225.2	64
120 min Summer	32.580	0.0	279.8	124
180 min Summer	24.347	0.0	312.4	182
240 min Summer	19.663	0.0	334.8	242
360 min Summer	14.471	0.0	364.2	362
480 min Summer	11.644	0.0	382.6	482
600 min Summer	9.829	0.0	395.0	600
720 min Summer	8.553	0.0	404.0	716
960 min Summer	6.862	0.0	415.2	818
1440 min Summer	5.020	0.0	420.9	1068
2160 min Summer	3.665	0.0	575.7	1472
2880 min Summer	2.928	0.0	612.0	1876
4320 min Summer	2.129	0.0	653.3	2720
5760 min Summer	1.697	0.0	713.7	3520
7200 min Summer	1.421	0.0	747.2	4320
8640 min Summer	1.231	0.0	776.1	5096
10080 min Summer	1.090	0.0	800.9	5848
15 min Winter	120.305	0.0	132.6	19
30 min Winter	81.146	0.0	163.3	33

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	36.693	0.693	2.9	250.2	O K
120 min Winter	36.847	0.847	3.1	305.6	O K
180 min Winter	36.931	0.931	3.3	336.3	O K
240 min Winter	36.985	0.985	3.4	355.5	O K
360 min Winter	37.049	1.049	3.5	378.8	O K
480 min Winter	37.088	1.088	3.5	392.7	O K
600 min Winter	37.110	1.110	3.6	400.9	O K
720 min Winter	37.123	1.123	3.6	405.3	O K
960 min Winter	37.128	1.128	3.6	407.2	O K
1440 min Winter	37.114	1.114	3.6	402.2	O K
2160 min Winter	37.076	1.076	3.5	388.3	O K
2880 min Winter	37.022	1.022	3.4	369.0	O K
4320 min Winter	36.908	0.908	3.3	327.8	O K
5760 min Winter	36.803	0.803	3.1	289.9	O K
7200 min Winter	36.711	0.711	2.9	256.8	O K
8640 min Winter	36.634	0.634	2.8	228.8	O K
10080 min Winter	36.567	0.567	2.6	204.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	252.0	62
120 min Winter	32.580	0.0	312.4	122
180 min Winter	24.347	0.0	347.6	180
240 min Winter	19.663	0.0	370.5	238
360 min Winter	14.471	0.0	398.1	354
480 min Winter	11.644	0.0	416.2	468
600 min Winter	9.829	0.0	428.8	582
720 min Winter	8.553	0.0	437.8	692
960 min Winter	6.862	0.0	448.8	904
1440 min Winter	5.020	0.0	453.4	1126
2160 min Winter	3.665	0.0	644.5	1584
2880 min Winter	2.928	0.0	684.5	2044
4320 min Winter	2.129	0.0	717.6	2900
5760 min Winter	1.697	0.0	799.4	3752
7200 min Winter	1.421	0.0	837.0	4544
8640 min Winter	1.231	0.0	869.4	5360
10080 min Winter	1.090	0.0	897.4	6152

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.585

Time (mins) From:	To:	Area (ha)
0	4	0.585

Model Details

Storage is Online Cover Level (m) 38.200

Tank or Pond Structure

Invert Level (m) 36.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	361.0	1.200	361.0	1.201	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SCU-0057-3700-1200-3700
Design Head (m)	1.200
Design Flow (l/s)	3.7
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	57
Invert Level (m)	36.000
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	3.7
Flush-Flo™	0.078	1.1
Kick-Flo®	0.085	1.1
Mean Flow over Head Range	-	2.5

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	1.2	1.200	3.7	3.000	5.7	7.000	8.5
0.200	1.6	1.400	4.0	3.500	6.1	7.500	8.8
0.300	2.0	1.600	4.2	4.000	6.5	8.000	9.1
0.400	2.2	1.800	4.5	4.500	6.9	8.500	9.3
0.500	2.5	2.000	4.7	5.000	7.2	9.000	9.6
0.600	2.7	2.200	4.9	5.500	7.6	9.500	9.8
0.800	3.1	2.400	5.1	6.000	7.9		
1.000	3.4	2.600	5.3	6.500	8.2		

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	37.186	0.386	3.8	222.5	O K
30 min Summer	37.318	0.518	4.3	298.5	O K
60 min Summer	37.460	0.660	4.8	380.2	O K
120 min Summer	37.605	0.805	5.3	463.6	O K
180 min Summer	37.683	0.883	5.5	508.8	O K
240 min Summer	37.732	0.932	5.7	536.8	O K
360 min Summer	37.788	0.988	5.8	569.3	O K
480 min Summer	37.820	1.020	5.9	587.4	O K
600 min Summer	37.835	1.035	6.0	596.4	O K
720 min Summer	37.841	1.041	6.0	599.7	O K
960 min Summer	37.845	1.045	6.0	601.8	O K
1440 min Summer	37.838	1.038	6.0	597.8	O K
2160 min Summer	37.808	1.008	5.9	580.6	O K
2880 min Summer	37.767	0.967	5.8	557.2	O K
4320 min Summer	37.682	0.882	5.5	507.9	O K
5760 min Summer	37.603	0.803	5.3	462.7	O K
7200 min Summer	37.534	0.734	5.1	422.5	O K
8640 min Summer	37.473	0.673	4.9	387.7	O K
10080 min Summer	37.420	0.620	4.7	357.1	O K
15 min Winter	37.233	0.433	4.0	249.4	O K
30 min Winter	37.381	0.581	4.6	334.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	205.6	23
30 min Summer	81.146	0.0	264.5	37
60 min Summer	52.299	0.0	384.0	66
120 min Summer	32.580	0.0	477.6	126
180 min Summer	24.347	0.0	534.0	186
240 min Summer	19.663	0.0	573.1	244
360 min Summer	14.471	0.0	627.1	364
480 min Summer	11.644	0.0	663.8	482
600 min Summer	9.829	0.0	687.6	600
720 min Summer	8.553	0.0	703.6	702
960 min Summer	6.862	0.0	724.9	806
1440 min Summer	5.020	0.0	737.2	1054
2160 min Summer	3.665	0.0	983.5	1468
2880 min Summer	2.928	0.0	1045.7	1876
4320 min Summer	2.129	0.0	1124.6	2688
5760 min Summer	1.697	0.0	1219.6	3512
7200 min Summer	1.421	0.0	1276.9	4256
8640 min Summer	1.231	0.0	1326.1	5024
10080 min Summer	1.090	0.0	1368.0	5840
15 min Winter	120.305	0.0	227.9	23
30 min Winter	81.146	0.0	285.4	37

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	37.541	0.741	5.1	426.9	O K
120 min Winter	37.705	0.905	5.6	521.3	O K
180 min Winter	37.795	0.995	5.9	573.1	O K
240 min Winter	37.851	1.051	6.0	605.6	O K
360 min Winter	37.919	1.119	6.2	644.4	O K
480 min Winter	37.958	1.158	6.3	667.2	O K
600 min Winter	37.981	1.181	6.4	680.1	O K
720 min Winter	37.992	1.192	6.4	686.7	O K
960 min Winter	37.995	1.195	6.4	688.2	O K
1440 min Winter	37.979	1.179	6.3	679.3	O K
2160 min Winter	37.934	1.134	6.2	653.2	O K
2880 min Winter	37.874	1.074	6.1	618.5	O K
4320 min Winter	37.748	0.948	5.7	546.2	O K
5760 min Winter	37.635	0.835	5.4	480.7	O K
7200 min Winter	37.536	0.736	5.1	424.2	O K
8640 min Winter	37.453	0.653	4.8	376.2	O K
10080 min Winter	37.382	0.582	4.6	335.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	430.0	66
120 min Winter	32.580	0.0	533.9	124
180 min Winter	24.347	0.0	595.6	182
240 min Winter	19.663	0.0	637.6	240
360 min Winter	14.471	0.0	691.7	356
480 min Winter	11.644	0.0	724.5	470
600 min Winter	9.829	0.0	747.6	582
720 min Winter	8.553	0.0	764.4	692
960 min Winter	6.862	0.0	785.2	898
1440 min Winter	5.020	0.0	795.5	1116
2160 min Winter	3.665	0.0	1101.2	1580
2880 min Winter	2.928	0.0	1170.2	2024
4320 min Winter	2.129	0.0	1243.4	2900
5760 min Winter	1.697	0.0	1366.1	3744
7200 min Winter	1.421	0.0	1430.3	4536
8640 min Winter	1.231	0.0	1485.5	5352
10080 min Winter	1.090	0.0	1533.1	6056

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.000

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.500	4	8	0.500

Model Details

Storage is Online Cover Level (m) 39.000

Tank or Pond Structure

Invert Level (m) 36.800

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	576.0	1.200	576.0	1.201	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SCU-0075-6400-1200-6400
Design Head (m)	1.200
Design Flow (l/s)	6.4
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	75
Invert Level (m)	36.800
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	6.4
Flush-Flo™	0.100	2.2
Kick-Flo®	0.113	2.2
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	2.2	1.200	6.4	3.000	9.9	7.000	14.8
0.200	2.8	1.400	6.9	3.500	10.6	7.500	15.3
0.300	3.4	1.600	7.3	4.000	11.3	8.000	15.8
0.400	3.8	1.800	7.7	4.500	12.0	8.500	16.3
0.500	4.3	2.000	8.1	5.000	12.6	9.000	16.7
0.600	4.6	2.200	8.5	5.500	13.2	9.500	17.2
0.800	5.3	2.400	8.9	6.000	13.7		
1.000	5.9	2.600	9.2	6.500	14.3		

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	38.237	0.437	4.6	272.8	O K
30 min Summer	38.386	0.586	5.3	366.2	O K
60 min Summer	38.547	0.747	5.9	466.8	O K
120 min Summer	38.711	0.911	6.5	569.2	O K
180 min Summer	38.800	1.000	6.8	624.9	O K
240 min Summer	38.855	1.055	7.0	659.3	O K
360 min Summer	38.919	1.119	7.2	699.5	O K
480 min Summer	38.955	1.155	7.3	722.0	O K
600 min Summer	38.973	1.173	7.3	733.3	O K
720 min Summer	38.980	1.180	7.3	737.4	O K
960 min Summer	38.984	1.184	7.4	740.0	O K
1440 min Summer	38.976	1.176	7.3	735.2	O K
2160 min Summer	38.943	1.143	7.2	714.1	O K
2880 min Summer	38.897	1.097	7.1	685.6	O K
4320 min Summer	38.800	1.000	6.8	625.1	O K
5760 min Summer	38.711	0.911	6.5	569.6	O K
7200 min Summer	38.633	0.833	6.2	520.4	O K
8640 min Summer	38.564	0.764	6.0	477.8	O K
10080 min Summer	38.504	0.704	5.8	440.2	O K
15 min Winter	38.289	0.489	4.9	305.9	O K
30 min Winter	38.457	0.657	5.6	410.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	253.1	26
30 min Summer	81.146	0.0	324.0	41
60 min Summer	52.299	0.0	472.5	70
120 min Summer	32.580	0.0	587.6	130
180 min Summer	24.347	0.0	656.8	188
240 min Summer	19.663	0.0	704.8	246
360 min Summer	14.471	0.0	770.7	364
480 min Summer	11.644	0.0	814.7	482
600 min Summer	9.829	0.0	842.6	602
720 min Summer	8.553	0.0	862.6	704
960 min Summer	6.862	0.0	888.7	808
1440 min Summer	5.020	0.0	903.7	1058
2160 min Summer	3.665	0.0	1209.1	1472
2880 min Summer	2.928	0.0	1285.6	1880
4320 min Summer	2.129	0.0	1381.8	2688
5760 min Summer	1.697	0.0	1499.1	3512
7200 min Summer	1.421	0.0	1569.5	4264
8640 min Summer	1.231	0.0	1630.1	5024
10080 min Summer	1.090	0.0	1681.8	5848
15 min Winter	120.305	0.0	280.3	26
30 min Winter	81.146	0.0	349.0	41

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	38.638	0.838	6.3	524.0	O K
120 min Winter	38.824	1.024	6.9	640.1	O K
180 min Winter	38.926	1.126	7.2	704.0	O K
240 min Winter	38.990	1.190	7.4	744.0	O K
360 min Winter	39.067	1.267	7.6	792.0	O K
480 min Winter	39.112	1.312	7.7	820.2	O K
600 min Winter	39.138	1.338	7.8	836.2	O K
720 min Winter	39.151	1.351	7.8	844.4	O K
960 min Winter	39.154	1.354	7.8	846.4	O K
1440 min Winter	39.137	1.337	7.8	835.6	O K
2160 min Winter	39.086	1.286	7.6	803.7	O K
2880 min Winter	39.018	1.218	7.5	761.3	O K
4320 min Winter	38.876	1.076	7.0	672.6	O K
5760 min Winter	38.748	0.948	6.6	592.2	O K
7200 min Winter	38.637	0.837	6.2	523.0	O K
8640 min Winter	38.543	0.743	5.9	464.2	O K
10080 min Winter	38.463	0.663	5.6	414.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	529.0	70
120 min Winter	32.580	0.0	656.7	126
180 min Winter	24.347	0.0	732.5	184
240 min Winter	19.663	0.0	783.6	242
360 min Winter	14.471	0.0	848.7	358
480 min Winter	11.644	0.0	888.1	472
600 min Winter	9.829	0.0	916.5	584
720 min Winter	8.553	0.0	937.1	694
960 min Winter	6.862	0.0	962.6	902
1440 min Winter	5.020	0.0	975.2	1118
2160 min Winter	3.665	0.0	1353.9	1584
2880 min Winter	2.928	0.0	1438.6	2028
4320 min Winter	2.129	0.0	1525.7	2900
5760 min Winter	1.697	0.0	1679.1	3744
7200 min Winter	1.421	0.0	1758.0	4544
8640 min Winter	1.231	0.0	1826.0	5352
10080 min Winter	1.090	0.0	1884.7	6064

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.229

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.410	4	8	0.410	8	12	0.410

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	39.486	0.386	2.7	162.0	O K
30 min Summer	39.617	0.517	3.0	217.2	O K
60 min Summer	39.759	0.659	3.4	276.7	O K
120 min Summer	39.903	0.803	3.7	337.3	O K
180 min Summer	39.982	0.882	3.9	370.4	O K
240 min Summer	40.031	0.931	4.0	391.0	O K
360 min Summer	40.088	0.988	4.1	415.1	O K
480 min Summer	40.121	1.021	4.2	428.7	O K
600 min Summer	40.138	1.038	4.2	435.8	O K
720 min Summer	40.144	1.044	4.2	438.6	O K
960 min Summer	40.148	1.048	4.2	440.2	O K
1440 min Summer	40.142	1.042	4.2	437.7	O K
2160 min Summer	40.114	1.014	4.2	426.0	O K
2880 min Summer	40.076	0.976	4.1	409.7	O K
4320 min Summer	39.992	0.892	3.9	374.7	O K
5760 min Summer	39.915	0.815	3.8	342.2	O K
7200 min Summer	39.846	0.746	3.6	313.3	O K
8640 min Summer	39.786	0.686	3.5	288.0	O K
10080 min Summer	39.733	0.633	3.3	266.0	O K
15 min Winter	39.532	0.432	2.8	181.5	O K
30 min Winter	39.680	0.580	3.2	243.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	149.4	19
30 min Summer	81.146	0.0	188.9	34
60 min Summer	52.299	0.0	279.4	64
120 min Summer	32.580	0.0	347.3	124
180 min Summer	24.347	0.0	387.9	182
240 min Summer	19.663	0.0	415.8	242
360 min Summer	14.471	0.0	453.0	362
480 min Summer	11.644	0.0	476.5	482
600 min Summer	9.829	0.0	491.9	600
720 min Summer	8.553	0.0	503.4	714
960 min Summer	6.862	0.0	517.7	818
1440 min Summer	5.020	0.0	525.2	1066
2160 min Summer	3.665	0.0	714.5	1472
2880 min Summer	2.928	0.0	759.6	1876
4320 min Summer	2.129	0.0	812.3	2720
5760 min Summer	1.697	0.0	885.7	3512
7200 min Summer	1.421	0.0	927.3	4320
8640 min Summer	1.231	0.0	963.2	5096
10080 min Summer	1.090	0.0	993.9	5848
15 min Winter	120.305	0.0	164.9	19
30 min Winter	81.146	0.0	203.5	33

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	39.839	0.739	3.6	310.4	O K
120 min Winter	40.003	0.903	3.9	379.2	O K
180 min Winter	40.093	0.993	4.1	417.1	O K
240 min Winter	40.150	1.050	4.2	440.9	O K
360 min Winter	40.218	1.118	4.4	469.6	O K
480 min Winter	40.259	1.159	4.4	486.7	O K
600 min Winter	40.283	1.183	4.5	496.7	O K
720 min Winter	40.295	1.195	4.5	502.0	O K
960 min Winter	40.300	1.200	4.5	504.1	O K
1440 min Winter	40.285	1.185	4.5	497.9	O K
2160 min Winter	40.243	1.143	4.4	480.2	O K
2880 min Winter	40.186	1.086	4.3	456.1	O K
4320 min Winter	40.063	0.963	4.1	404.6	O K
5760 min Winter	39.951	0.851	3.8	357.5	O K
7200 min Winter	39.854	0.754	3.6	316.5	O K
8640 min Winter	39.771	0.671	3.4	281.7	O K
10080 min Winter	39.700	0.600	3.3	251.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	312.8	62
120 min Winter	32.580	0.0	387.9	122
180 min Winter	24.347	0.0	431.8	180
240 min Winter	19.663	0.0	460.8	238
360 min Winter	14.471	0.0	495.9	354
480 min Winter	11.644	0.0	518.5	468
600 min Winter	9.829	0.0	534.4	582
720 min Winter	8.553	0.0	545.9	692
960 min Winter	6.862	0.0	559.9	902
1440 min Winter	5.020	0.0	566.0	1124
2160 min Winter	3.665	0.0	799.9	1580
2880 min Winter	2.928	0.0	849.7	2044
4320 min Winter	2.129	0.0	893.0	2900
5760 min Winter	1.697	0.0	992.1	3752
7200 min Winter	1.421	0.0	1038.7	4544
8640 min Winter	1.231	0.0	1078.9	5360
10080 min Winter	1.090	0.0	1113.7	6144

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	39.122	0.322	1.9	128.7	O K
30 min Summer	39.231	0.431	2.2	172.6	O K
60 min Summer	39.350	0.550	2.4	220.1	O K
120 min Summer	39.472	0.672	2.7	269.0	O K
180 min Summer	39.540	0.740	2.8	296.0	O K
240 min Summer	39.583	0.783	2.9	313.1	O K
360 min Summer	39.634	0.834	3.0	333.7	O K
480 min Summer	39.665	0.865	3.0	346.0	O K
600 min Summer	39.683	0.883	3.0	353.1	O K
720 min Summer	39.692	0.892	3.0	356.7	O K
960 min Summer	39.696	0.896	3.1	358.6	O K
1440 min Summer	39.695	0.895	3.1	357.9	O K
2160 min Summer	39.677	0.877	3.0	350.6	O K
2880 min Summer	39.649	0.849	3.0	339.5	O K
4320 min Summer	39.585	0.785	2.9	314.1	O K
5760 min Summer	39.523	0.723	2.8	289.3	O K
7200 min Summer	39.467	0.667	2.7	267.0	O K
8640 min Summer	39.418	0.618	2.6	247.3	O K
10080 min Summer	39.374	0.574	2.5	229.7	O K
15 min Winter	39.160	0.360	2.0	144.2	O K
30 min Winter	39.284	0.484	2.3	193.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	114.3	19
30 min Summer	81.146	0.0	140.9	34
60 min Summer	52.299	0.0	220.0	64
120 min Summer	32.580	0.0	272.4	124
180 min Summer	24.347	0.0	302.5	182
240 min Summer	19.663	0.0	321.9	242
360 min Summer	14.471	0.0	345.0	362
480 min Summer	11.644	0.0	360.0	482
600 min Summer	9.829	0.0	370.4	600
720 min Summer	8.553	0.0	377.8	720
960 min Summer	6.862	0.0	386.6	858
1440 min Summer	5.020	0.0	389.6	1108
2160 min Summer	3.665	0.0	565.1	1496
2880 min Summer	2.928	0.0	599.4	1904
4320 min Summer	2.129	0.0	622.5	2728
5760 min Summer	1.697	0.0	702.4	3528
7200 min Summer	1.421	0.0	735.3	4328
8640 min Summer	1.231	0.0	763.6	5104
10080 min Summer	1.090	0.0	787.8	5856
15 min Winter	120.305	0.0	124.9	19
30 min Winter	81.146	0.0	151.4	33

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	39.417	0.617	2.6	246.9	O K
120 min Winter	39.556	0.756	2.8	302.2	O K
180 min Winter	39.633	0.833	3.0	333.1	O K
240 min Winter	39.682	0.882	3.0	352.7	O K
360 min Winter	39.743	0.943	3.1	377.0	O K
480 min Winter	39.780	0.980	3.2	392.1	O K
600 min Winter	39.804	1.004	3.2	401.5	O K
720 min Winter	39.818	1.018	3.2	407.1	O K
960 min Winter	39.828	1.028	3.3	411.2	O K
1440 min Winter	39.819	1.019	3.2	407.4	O K
2160 min Winter	39.792	0.992	3.2	396.7	O K
2880 min Winter	39.750	0.950	3.1	380.1	O K
4320 min Winter	39.656	0.856	3.0	342.6	O K
5760 min Winter	39.567	0.767	2.8	306.6	O K
7200 min Winter	39.486	0.686	2.7	274.6	O K
8640 min Winter	39.417	0.617	2.6	246.9	O K
10080 min Winter	39.357	0.557	2.5	222.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	245.9	62
120 min Winter	32.580	0.0	302.8	122
180 min Winter	24.347	0.0	333.3	180
240 min Winter	19.663	0.0	351.5	238
360 min Winter	14.471	0.0	374.5	356
480 min Winter	11.644	0.0	389.8	470
600 min Winter	9.829	0.0	400.4	584
720 min Winter	8.553	0.0	407.9	694
960 min Winter	6.862	0.0	416.5	912
1440 min Winter	5.020	0.0	418.5	1154
2160 min Winter	3.665	0.0	632.1	1604
2880 min Winter	2.928	0.0	668.3	2072
4320 min Winter	2.129	0.0	680.2	2944
5760 min Winter	1.697	0.0	786.8	3808
7200 min Winter	1.421	0.0	823.6	4616
8640 min Winter	1.231	0.0	855.3	5440
10080 min Winter	1.090	0.0	882.5	6248

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.576

Time (mins) From:	To:	Area (ha)
0	4	0.576

Model Details

Storage is Online Cover Level (m) 41.000

Tank or Pond Structure

Invert Level (m) 38.800

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	400.0	1.200	400.0	1.201	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SCU-0055-3500-1200-3500
Design Head (m)	1.200
Design Flow (l/s)	3.5
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	55
Invert Level (m)	38.800
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	3.5
Flush-Flo™	0.078	1.1
Kick-Flo®	0.083	1.1
Mean Flow over Head Range	-	2.4

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	1.1	1.200	3.5	3.000	5.4	7.000	8.0
0.200	1.5	1.400	3.8	3.500	5.8	7.500	8.3
0.300	1.9	1.600	4.0	4.000	6.2	8.000	8.6
0.400	2.1	1.800	4.2	4.500	6.5	8.500	8.8
0.500	2.3	2.000	4.4	5.000	6.8	9.000	9.1
0.600	2.5	2.200	4.6	5.500	7.2	9.500	9.3
0.800	2.9	2.400	4.8	6.000	7.5		
1.000	3.2	2.600	5.0	6.500	7.8		

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	39.171	0.371	3.7	231.8	O K
30 min Summer	39.298	0.498	4.2	311.1	O K
60 min Summer	39.434	0.634	4.8	396.5	O K
120 min Summer	39.575	0.775	5.2	484.1	O K
180 min Summer	39.651	0.851	5.4	532.0	O K
240 min Summer	39.699	0.899	5.6	561.9	O K
360 min Summer	39.756	0.956	5.8	597.4	O K
480 min Summer	39.789	0.989	5.8	617.9	O K
600 min Summer	39.806	1.006	5.9	628.9	O K
720 min Summer	39.814	1.014	5.9	633.7	O K
960 min Summer	39.818	1.018	5.9	636.3	O K
1440 min Summer	39.814	1.014	5.9	633.6	O K
2160 min Summer	39.789	0.989	5.8	617.9	O K
2880 min Summer	39.753	0.953	5.7	595.4	O K
4320 min Summer	39.674	0.874	5.5	546.5	O K
5760 min Summer	39.601	0.801	5.3	500.5	O K
7200 min Summer	39.535	0.735	5.1	459.4	O K
8640 min Summer	39.477	0.677	4.9	423.4	O K
10080 min Summer	39.427	0.627	4.7	391.6	O K
15 min Winter	39.216	0.416	3.9	259.8	O K
30 min Winter	39.358	0.558	4.5	348.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	210.2	23
30 min Summer	81.146	0.0	266.3	37
60 min Summer	52.299	0.0	398.1	66
120 min Summer	32.580	0.0	494.4	126
180 min Summer	24.347	0.0	551.7	186
240 min Summer	19.663	0.0	590.8	244
360 min Summer	14.471	0.0	642.5	364
480 min Summer	11.644	0.0	674.5	482
600 min Summer	9.829	0.0	695.2	602
720 min Summer	8.553	0.0	710.8	720
960 min Summer	6.862	0.0	730.0	828
1440 min Summer	5.020	0.0	739.2	1072
2160 min Summer	3.665	0.0	1022.2	1476
2880 min Summer	2.928	0.0	1085.9	1900
4320 min Summer	2.129	0.0	1155.0	2724
5760 min Summer	1.697	0.0	1269.3	3520
7200 min Summer	1.421	0.0	1328.8	4320
8640 min Summer	1.231	0.0	1380.0	5096
10080 min Summer	1.090	0.0	1423.3	5848
15 min Winter	120.305	0.0	232.1	23
30 min Winter	81.146	0.0	286.0	37

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	39.512	0.712	5.0	445.1	O K
120 min Winter	39.671	0.871	5.5	544.2	O K
180 min Winter	39.758	0.958	5.8	599.0	O K
240 min Winter	39.814	1.014	5.9	633.7	O K
360 min Winter	39.881	1.081	6.1	675.7	O K
480 min Winter	39.922	1.122	6.2	701.1	O K
600 min Winter	39.946	1.146	6.3	716.1	O K
720 min Winter	39.959	1.159	6.3	724.4	O K
960 min Winter	39.966	1.166	6.3	728.7	O K
1440 min Winter	39.953	1.153	6.3	720.4	O K
2160 min Winter	39.915	1.115	6.2	696.8	O K
2880 min Winter	39.862	1.062	6.0	663.5	O K
4320 min Winter	39.746	0.946	5.7	591.3	O K
5760 min Winter	39.639	0.839	5.4	524.6	O K
7200 min Winter	39.546	0.746	5.1	466.0	O K
8640 min Winter	39.466	0.666	4.9	416.1	O K
10080 min Winter	39.397	0.597	4.6	373.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	445.5	66
120 min Winter	32.580	0.0	551.8	124
180 min Winter	24.347	0.0	613.5	182
240 min Winter	19.663	0.0	653.7	240
360 min Winter	14.471	0.0	701.9	356
480 min Winter	11.644	0.0	732.6	470
600 min Winter	9.829	0.0	754.5	584
720 min Winter	8.553	0.0	770.1	694
960 min Winter	6.862	0.0	789.0	906
1440 min Winter	5.020	0.0	796.4	1130
2160 min Winter	3.665	0.0	1144.2	1596
2880 min Winter	2.928	0.0	1214.1	2048
4320 min Winter	2.129	0.0	1266.8	2936
5760 min Winter	1.697	0.0	1421.8	3752
7200 min Winter	1.421	0.0	1488.4	4544
8640 min Winter	1.231	0.0	1545.8	5360
10080 min Winter	1.090	0.0	1595.0	6152

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.041

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.541	4	8	0.500

Model Details

Storage is Online Cover Level (m) 41.000

Tank or Pond Structure

Invert Level (m) 38.800

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	625.0	1.200	625.0	1.201	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SCU-0075-6400-1200-6400
Design Head (m)	1.200
Design Flow (l/s)	6.4
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	75
Invert Level (m)	38.800
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	6.4
Flush-Flo™	0.100	2.2
Kick-Flo®	0.113	2.2
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	2.2	1.200	6.4	3.000	9.9	7.000	14.8
0.200	2.8	1.400	6.9	3.500	10.6	7.500	15.3
0.300	3.4	1.600	7.3	4.000	11.3	8.000	15.8
0.400	3.8	1.800	7.7	4.500	12.0	8.500	16.3
0.500	4.3	2.000	8.1	5.000	12.6	9.000	16.7
0.600	4.6	2.200	8.5	5.500	13.2	9.500	17.2
0.800	5.3	2.400	8.9	6.000	13.7		
1.000	5.9	2.600	9.2	6.500	14.3		

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	44.852	0.352	4.8	296.2	O K
30 min Summer	44.973	0.473	5.5	397.4	O K
60 min Summer	45.102	0.602	6.1	506.6	O K
120 min Summer	45.235	0.735	6.8	618.4	O K
180 min Summer	45.308	0.808	7.1	679.5	O K
240 min Summer	45.353	0.853	7.2	717.5	O K
360 min Summer	45.407	0.907	7.4	762.5	O K
480 min Summer	45.437	0.937	7.6	788.4	O K
600 min Summer	45.454	0.954	7.6	802.0	O K
720 min Summer	45.461	0.961	7.7	807.9	O K
960 min Summer	45.465	0.965	7.7	811.3	O K
1440 min Summer	45.460	0.960	7.7	807.7	O K
2160 min Summer	45.436	0.936	7.6	787.3	O K
2880 min Summer	45.402	0.902	7.4	758.2	O K
4320 min Summer	45.327	0.827	7.1	695.3	O K
5760 min Summer	45.257	0.757	6.8	636.3	O K
7200 min Summer	45.194	0.694	6.6	583.4	O K
8640 min Summer	45.139	0.639	6.3	537.1	O K
10080 min Summer	45.090	0.590	6.1	496.5	O K
15 min Winter	44.895	0.395	5.1	332.0	O K
30 min Winter	45.030	0.530	5.8	445.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	266.0	23
30 min Summer	81.146	0.0	342.4	37
60 min Summer	52.299	0.0	506.0	66
120 min Summer	32.580	0.0	629.0	126
180 min Summer	24.347	0.0	702.4	186
240 min Summer	19.663	0.0	753.0	244
360 min Summer	14.471	0.0	821.5	364
480 min Summer	11.644	0.0	866.4	482
600 min Summer	9.829	0.0	894.5	602
720 min Summer	8.553	0.0	913.7	718
960 min Summer	6.862	0.0	939.0	822
1440 min Summer	5.020	0.0	951.7	1070
2160 min Summer	3.665	0.0	1303.9	1472
2880 min Summer	2.928	0.0	1385.0	1880
4320 min Summer	2.129	0.0	1478.8	2724
5760 min Summer	1.697	0.0	1620.8	3520
7200 min Summer	1.421	0.0	1696.7	4320
8640 min Summer	1.231	0.0	1761.7	5096
10080 min Summer	1.090	0.0	1816.2	5848
15 min Winter	120.305	0.0	295.0	23
30 min Winter	81.146	0.0	369.4	37

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	45.176	0.676	6.5	568.6	O K
120 min Winter	45.326	0.826	7.1	695.1	O K
180 min Winter	45.410	0.910	7.5	765.0	O K
240 min Winter	45.462	0.962	7.7	809.1	O K
360 min Winter	45.525	1.025	7.9	862.4	O K
480 min Winter	45.564	1.064	8.0	894.5	O K
600 min Winter	45.586	1.086	8.1	913.3	O K
720 min Winter	45.598	1.098	8.2	923.6	O K
960 min Winter	45.604	1.104	8.2	928.4	O K
1440 min Winter	45.591	1.091	8.1	917.8	O K
2160 min Winter	45.554	1.054	8.0	886.7	O K
2880 min Winter	45.503	1.003	7.8	843.5	O K
4320 min Winter	45.393	0.893	7.4	750.6	O K
5760 min Winter	45.291	0.791	7.0	665.0	O K
7200 min Winter	45.201	0.701	6.6	589.9	O K
8640 min Winter	45.126	0.626	6.3	526.1	O K
10080 min Winter	45.060	0.560	5.9	471.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	566.5	66
120 min Winter	32.580	0.0	702.5	124
180 min Winter	24.347	0.0	782.3	182
240 min Winter	19.663	0.0	835.6	240
360 min Winter	14.471	0.0	902.5	356
480 min Winter	11.644	0.0	941.9	470
600 min Winter	9.829	0.0	970.2	584
720 min Winter	8.553	0.0	990.7	694
960 min Winter	6.862	0.0	1015.6	904
1440 min Winter	5.020	0.0	1025.9	1128
2160 min Winter	3.665	0.0	1459.7	1584
2880 min Winter	2.928	0.0	1548.9	2048
4320 min Winter	2.129	0.0	1626.9	2904
5760 min Winter	1.697	0.0	1815.6	3752
7200 min Winter	1.421	0.0	1900.6	4544
8640 min Winter	1.231	0.0	1973.5	5360
10080 min Winter	1.090	0.0	2035.8	6152

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.330

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.665	4	8	0.665

Model Details

Storage is Online Cover Level (m) 46.700

Tank or Pond Structure

Invert Level (m) 44.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	841.0	1.200	841.0	1.201	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SCU-0087-8500-1200-8500
Design Head (m)	1.200
Design Flow (l/s)	8.5
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	87
Invert Level (m)	44.500
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	8.5
Flush-Flo™	0.113	3.1
Kick-Flo®	0.130	3.0
Mean Flow over Head Range	-	5.8

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	2.9	1.200	8.5	3.000	13.1	7.000	19.7
0.200	3.7	1.400	9.1	3.500	14.1	7.500	20.4
0.300	4.5	1.600	9.7	4.000	15.1	8.000	21.0
0.400	5.1	1.800	10.3	4.500	15.9	8.500	21.7
0.500	5.6	2.000	10.8	5.000	16.8	9.000	22.3
0.600	6.1	2.200	11.3	5.500	17.6	9.500	22.9
0.800	7.0	2.400	11.8	6.000	18.3		
1.000	7.8	2.600	12.3	6.500	19.0		

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	38.530	0.330	2.1	132.1	O K
30 min Summer	38.643	0.443	2.4	177.2	O K
60 min Summer	38.765	0.565	2.7	225.8	O K
120 min Summer	38.889	0.689	2.9	275.6	O K
180 min Summer	38.957	0.757	3.1	302.9	O K
240 min Summer	39.000	0.800	3.1	319.9	O K
360 min Summer	39.050	0.850	3.2	340.2	O K
480 min Summer	39.080	0.880	3.3	351.8	O K
600 min Summer	39.095	0.895	3.3	358.2	O K
720 min Summer	39.102	0.902	3.3	361.0	O K
960 min Summer	39.106	0.906	3.3	362.4	O K
1440 min Summer	39.102	0.902	3.3	360.9	O K
2160 min Summer	39.080	0.880	3.3	352.1	O K
2880 min Summer	39.049	0.849	3.2	339.4	O K
4320 min Summer	38.979	0.779	3.1	311.8	O K
5760 min Summer	38.914	0.714	3.0	285.6	O K
7200 min Summer	38.856	0.656	2.9	262.2	O K
8640 min Summer	38.804	0.604	2.8	241.7	O K
10080 min Summer	38.759	0.559	2.7	223.6	O K
15 min Winter	38.570	0.370	2.2	148.1	O K
30 min Winter	38.697	0.497	2.5	198.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	120.2	19
30 min Summer	81.146	0.0	151.0	34
60 min Summer	52.299	0.0	227.0	64
120 min Summer	32.580	0.0	281.9	124
180 min Summer	24.347	0.0	314.4	182
240 min Summer	19.663	0.0	336.5	242
360 min Summer	14.471	0.0	365.0	362
480 min Summer	11.644	0.0	382.4	482
600 min Summer	9.829	0.0	394.4	600
720 min Summer	8.553	0.0	403.0	720
960 min Summer	6.862	0.0	413.7	828
1440 min Summer	5.020	0.0	418.5	1080
2160 min Summer	3.665	0.0	581.8	1472
2880 min Summer	2.928	0.0	618.2	1900
4320 min Summer	2.129	0.0	655.7	2724
5760 min Summer	1.697	0.0	722.0	3520
7200 min Summer	1.421	0.0	755.9	4320
8640 min Summer	1.231	0.0	785.1	5096
10080 min Summer	1.090	0.0	810.0	5848
15 min Winter	120.305	0.0	132.3	19
30 min Winter	81.146	0.0	162.5	33

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	38.833	0.633	2.8	253.4	O K
120 min Winter	38.974	0.774	3.1	309.7	O K
180 min Winter	39.052	0.852	3.2	340.9	O K
240 min Winter	39.102	0.902	3.3	360.6	O K
360 min Winter	39.162	0.962	3.4	384.6	O K
480 min Winter	39.198	0.998	3.5	399.2	O K
600 min Winter	39.220	1.020	3.5	407.8	O K
720 min Winter	39.232	1.032	3.5	412.7	O K
960 min Winter	39.238	1.038	3.6	415.3	O K
1440 min Winter	39.226	1.026	3.5	410.6	O K
2160 min Winter	39.194	0.994	3.5	397.4	O K
2880 min Winter	39.147	0.947	3.4	378.6	O K
4320 min Winter	39.045	0.845	3.2	337.8	O K
5760 min Winter	38.949	0.749	3.1	299.8	O K
7200 min Winter	38.866	0.666	2.9	266.5	O K
8640 min Winter	38.795	0.595	2.7	238.0	O K
10080 min Winter	38.734	0.534	2.6	213.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	254.0	62
120 min Winter	32.580	0.0	314.5	122
180 min Winter	24.347	0.0	349.3	180
240 min Winter	19.663	0.0	371.4	238
360 min Winter	14.471	0.0	397.9	354
480 min Winter	11.644	0.0	415.4	470
600 min Winter	9.829	0.0	427.6	582
720 min Winter	8.553	0.0	436.3	692
960 min Winter	6.862	0.0	446.7	904
1440 min Winter	5.020	0.0	450.4	1128
2160 min Winter	3.665	0.0	651.3	1600
2880 min Winter	2.928	0.0	691.0	2048
4320 min Winter	2.129	0.0	718.8	2936
5760 min Winter	1.697	0.0	808.8	3752
7200 min Winter	1.421	0.0	846.7	4608
8640 min Winter	1.231	0.0	879.4	5360
10080 min Winter	1.090	0.0	907.6	6152

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.592

Time (mins) From:	To:	Area (ha)
0	4	0.592

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	39.578	0.378	1.5	80.9	O K
30 min Summer	39.687	0.487	1.7	108.3	O K
60 min Summer	39.796	0.596	1.8	137.9	O K
120 min Summer	39.899	0.699	1.9	167.8	O K
180 min Summer	39.952	0.752	2.0	184.1	O K
240 min Summer	39.984	0.784	2.1	194.1	O K
360 min Summer	40.020	0.820	2.1	205.6	O K
480 min Summer	40.040	0.840	2.1	211.9	O K
600 min Summer	40.049	0.849	2.1	215.0	O K
720 min Summer	40.052	0.852	2.1	216.0	O K
960 min Summer	40.053	0.853	2.1	216.1	O K
1440 min Summer	40.045	0.845	2.1	213.7	O K
2160 min Summer	40.022	0.822	2.1	206.3	O K
2880 min Summer	39.993	0.793	2.1	197.0	O K
4320 min Summer	39.932	0.732	2.0	178.0	O K
5760 min Summer	39.875	0.675	1.9	160.8	O K
7200 min Summer	39.823	0.623	1.9	145.6	O K
8640 min Summer	39.776	0.576	1.8	132.5	O K
10080 min Summer	39.734	0.534	1.7	120.9	O K
15 min Winter	39.618	0.418	1.5	90.6	O K
30 min Winter	39.736	0.536	1.7	121.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	78.3	19
30 min Summer	81.146	0.0	101.2	34
60 min Summer	52.299	0.0	141.2	64
120 min Summer	32.580	0.0	175.8	124
180 min Summer	24.347	0.0	196.8	182
240 min Summer	19.663	0.0	211.5	242
360 min Summer	14.471	0.0	232.2	362
480 min Summer	11.644	0.0	246.7	480
600 min Summer	9.829	0.0	256.0	600
720 min Summer	8.553	0.0	262.3	704
960 min Summer	6.862	0.0	270.0	810
1440 min Summer	5.020	0.0	273.9	1056
2160 min Summer	3.665	0.0	358.4	1468
2880 min Summer	2.928	0.0	381.5	1876
4320 min Summer	2.129	0.0	413.5	2684
5760 min Summer	1.697	0.0	443.2	3512
7200 min Summer	1.421	0.0	464.1	4256
8640 min Summer	1.231	0.0	482.1	5024
10080 min Summer	1.090	0.0	497.8	5760
15 min Winter	120.305	0.0	86.9	19
30 min Winter	81.146	0.0	109.3	33

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	39.855	0.655	1.9	154.8	O K
120 min Winter	39.967	0.767	2.0	188.8	O K
180 min Winter	40.026	0.826	2.1	207.5	O K
240 min Winter	40.062	0.862	2.1	219.2	O K
360 min Winter	40.103	0.903	2.2	233.1	Flood Risk
480 min Winter	40.127	0.927	2.2	241.2	Flood Risk
600 min Winter	40.141	0.941	2.2	245.8	Flood Risk
720 min Winter	40.147	0.947	2.2	248.1	Flood Risk
960 min Winter	40.148	0.948	2.2	248.5	Flood Risk
1440 min Winter	40.136	0.936	2.2	244.1	Flood Risk
2160 min Winter	40.105	0.905	2.2	233.5	Flood Risk
2880 min Winter	40.064	0.864	2.1	220.0	O K
4320 min Winter	39.977	0.777	2.0	192.0	O K
5760 min Winter	39.895	0.695	1.9	166.8	O K
7200 min Winter	39.822	0.622	1.8	145.2	O K
8640 min Winter	39.757	0.557	1.8	127.0	O K
10080 min Winter	39.699	0.499	1.7	111.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	158.1	62
120 min Winter	32.580	0.0	196.6	122
180 min Winter	24.347	0.0	219.8	180
240 min Winter	19.663	0.0	235.8	238
360 min Winter	14.471	0.0	256.8	354
480 min Winter	11.644	0.0	269.3	468
600 min Winter	9.829	0.0	277.7	582
720 min Winter	8.553	0.0	283.6	692
960 min Winter	6.862	0.0	290.5	904
1440 min Winter	5.020	0.0	292.9	1124
2160 min Winter	3.665	0.0	401.3	1580
2880 min Winter	2.928	0.0	427.1	2044
4320 min Winter	2.129	0.0	458.9	2900
5760 min Winter	1.697	0.0	496.4	3744
7200 min Winter	1.421	0.0	519.8	4536
8640 min Winter	1.231	0.0	540.0	5280
10080 min Winter	1.090	0.0	557.7	6056

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.363

Time (mins) From:	To:	Area (ha)
0	4	0.363

Model Details

Storage is Online Cover Level (m) 40.400

Tank or Pond Structure

Invert Level (m) 39.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	185.0	1.200	399.3

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SCU-0046-2500-1200-2500
Design Head (m)	1.200
Design Flow (l/s)	2.5
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	46
Invert Level (m)	39.200
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	2.5
Flush-Flo™	0.069	0.7
Kick-Flo®	0.069	0.7
Mean Flow over Head Range	-	1.7

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	0.8	1.200	2.5	3.000	3.8	7.000	5.7
0.200	1.1	1.400	2.7	3.500	4.1	7.500	5.9
0.300	1.3	1.600	2.9	4.000	4.4	8.000	6.1
0.400	1.5	1.800	3.0	4.500	4.6	8.500	6.3
0.500	1.7	2.000	3.2	5.000	4.9	9.000	6.4
0.600	1.8	2.200	3.3	5.500	5.1	9.500	6.6
0.800	2.1	2.400	3.4	6.000	5.3		
1.000	2.3	2.600	3.6	6.500	5.5		

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	36.478	0.278	3.9	194.3	O K
30 min Summer	36.567	0.367	4.0	260.8	O K
60 min Summer	36.659	0.459	4.0	332.7	O K
120 min Summer	36.751	0.551	4.0	406.7	O K
180 min Summer	36.801	0.601	4.0	447.9	O K
240 min Summer	36.832	0.632	4.0	474.2	O K
360 min Summer	36.871	0.671	4.0	507.0	O K
480 min Summer	36.895	0.695	4.0	527.8	O K
600 min Summer	36.910	0.710	4.0	541.0	O K
720 min Summer	36.920	0.720	4.0	549.2	O K
960 min Summer	36.927	0.727	4.0	555.4	O K
1440 min Summer	36.915	0.715	4.0	545.3	O K
2160 min Summer	36.887	0.687	4.0	520.6	O K
2880 min Summer	36.856	0.656	4.0	494.2	O K
4320 min Summer	36.793	0.593	4.0	441.2	O K
5760 min Summer	36.732	0.532	4.0	391.0	O K
7200 min Summer	36.674	0.474	4.0	344.7	O K
8640 min Summer	36.622	0.422	4.0	303.5	O K
10080 min Summer	36.575	0.375	4.0	266.9	O K
15 min Winter	36.510	0.310	4.0	217.9	O K
30 min Winter	36.608	0.408	4.0	292.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	182.5	23
30 min Summer	81.146	0.0	244.9	37
60 min Summer	52.299	0.0	335.6	66
120 min Summer	32.580	0.0	417.9	126
180 min Summer	24.347	0.0	467.5	186
240 min Summer	19.663	0.0	502.0	246
360 min Summer	14.471	0.0	550.1	364
480 min Summer	11.644	0.0	583.3	484
600 min Summer	9.829	0.0	603.7	604
720 min Summer	8.553	0.0	611.6	722
960 min Summer	6.862	0.0	604.5	962
1440 min Summer	5.020	0.0	577.8	1312
2160 min Summer	3.665	0.0	859.3	1628
2880 min Summer	2.928	0.0	913.6	2016
4320 min Summer	2.129	0.0	987.1	2808
5760 min Summer	1.697	0.0	1067.8	3584
7200 min Summer	1.421	0.0	1117.8	4392
8640 min Summer	1.231	0.0	1160.5	5104
10080 min Summer	1.090	0.0	1196.4	5848
15 min Winter	120.305	0.0	204.5	22
30 min Winter	81.146	0.0	271.8	37

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	36.711	0.511	4.0	373.8	O K
120 min Winter	36.813	0.613	4.0	458.0	O K
180 min Winter	36.869	0.669	4.0	505.5	O K
240 min Winter	36.905	0.705	4.0	536.6	O K
360 min Winter	36.951	0.751	4.0	576.7	O K
480 min Winter	36.981	0.781	4.0	602.9	O K
600 min Winter	37.000	0.800	4.0	620.0	O K
720 min Winter	37.012	0.812	4.0	631.2	O K
960 min Winter	37.025	0.825	4.0	642.4	O K
1440 min Winter	37.022	0.822	4.0	639.9	O K
2160 min Winter	36.987	0.787	4.0	609.0	O K
2880 min Winter	36.948	0.748	4.0	574.5	O K
4320 min Winter	36.851	0.651	4.0	490.6	O K
5760 min Winter	36.756	0.556	4.0	410.7	O K
7200 min Winter	36.667	0.467	4.0	339.2	O K
8640 min Winter	36.589	0.389	4.0	277.7	O K
10080 min Winter	36.522	0.322	4.0	226.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	376.0	66
120 min Winter	32.580	0.0	467.2	124
180 min Winter	24.347	0.0	521.4	184
240 min Winter	19.663	0.0	557.9	242
360 min Winter	14.471	0.0	602.4	360
480 min Winter	11.644	0.0	617.7	476
600 min Winter	9.829	0.0	614.4	592
720 min Winter	8.553	0.0	607.7	708
960 min Winter	6.862	0.0	592.2	936
1440 min Winter	5.020	0.0	562.9	1376
2160 min Winter	3.665	0.0	960.3	1952
2880 min Winter	2.928	0.0	1018.5	2228
4320 min Winter	2.129	0.0	1085.6	3072
5760 min Winter	1.697	0.0	1196.0	3912
7200 min Winter	1.421	0.0	1252.2	4680
8640 min Winter	1.231	0.0	1300.4	5368
10080 min Winter	1.090	0.0	1341.3	6056

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.876

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.438	4	8	0.438

Model Details

Storage is Online Cover Level (m) 37.400

Tank or Pond Structure

Invert Level (m) 36.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	660.0	1.200	1028.6

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0092-4000-1200-4000
Design Head (m)	1.200
Design Flow (l/s)	4.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	92
Invert Level (m)	36.200
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	4.0
Flush-Flo™	0.359	4.0
Kick-Flo®	0.743	3.2
Mean Flow over Head Range	-	3.5

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	2.9	1.200	4.0	3.000	6.1	7.000	9.1
0.200	3.8	1.400	4.3	3.500	6.6	7.500	9.4
0.300	4.0	1.600	4.6	4.000	7.0	8.000	9.7
0.400	4.0	1.800	4.8	4.500	7.4	8.500	10.0
0.500	3.9	2.000	5.1	5.000	7.8	9.000	10.3
0.600	3.8	2.200	5.3	5.500	8.2	9.500	10.6
0.800	3.3	2.400	5.5	6.000	8.5		
1.000	3.7	2.600	5.7	6.500	8.8		

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	35.969	0.369	1.9	116.0	O K
30 min Summer	36.079	0.479	2.1	155.6	O K
60 min Summer	36.190	0.590	2.3	198.3	O K
120 min Summer	36.298	0.698	2.5	242.0	O K
180 min Summer	36.355	0.755	2.6	266.1	O K
240 min Summer	36.390	0.790	2.6	281.3	O K
360 min Summer	36.431	0.831	2.7	299.4	O K
480 min Summer	36.454	0.854	2.7	310.1	O K
600 min Summer	36.468	0.868	2.8	316.1	O K
720 min Summer	36.474	0.874	2.8	319.0	O K
960 min Summer	36.476	0.876	2.8	320.1	O K
1440 min Summer	36.472	0.872	2.8	318.2	O K
2160 min Summer	36.454	0.854	2.7	310.1	O K
2880 min Summer	36.429	0.829	2.7	298.8	O K
4320 min Summer	36.373	0.773	2.6	274.1	O K
5760 min Summer	36.319	0.719	2.5	250.6	O K
7200 min Summer	36.268	0.668	2.4	229.7	O K
8640 min Summer	36.223	0.623	2.4	211.3	O K
10080 min Summer	36.182	0.582	2.3	194.9	O K
15 min Winter	36.009	0.409	2.0	130.0	O K
30 min Winter	36.129	0.529	2.2	174.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	108.2	19
30 min Summer	81.146	0.0	134.6	34
60 min Summer	52.299	0.0	201.0	64
120 min Summer	32.580	0.0	249.6	124
180 min Summer	24.347	0.0	278.4	182
240 min Summer	19.663	0.0	297.7	242
360 min Summer	14.471	0.0	321.4	362
480 min Summer	11.644	0.0	335.6	482
600 min Summer	9.829	0.0	345.3	600
720 min Summer	8.553	0.0	352.1	720
960 min Summer	6.862	0.0	359.9	858
1440 min Summer	5.020	0.0	361.9	1108
2160 min Summer	3.665	0.0	512.3	1496
2880 min Summer	2.928	0.0	544.5	1904
4320 min Summer	2.129	0.0	575.7	2724
5760 min Summer	1.697	0.0	634.6	3528
7200 min Summer	1.421	0.0	664.5	4328
8640 min Summer	1.231	0.0	690.3	5104
10080 min Summer	1.090	0.0	712.6	5856
15 min Winter	120.305	0.0	118.8	19
30 min Winter	81.146	0.0	144.5	33

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	36.251	0.651	2.4	222.5	O K
120 min Winter	36.369	0.769	2.6	272.1	O K
180 min Winter	36.431	0.831	2.7	299.7	O K
240 min Winter	36.470	0.870	2.8	317.2	O K
360 min Winter	36.517	0.917	2.8	338.8	O K
480 min Winter	36.545	0.945	2.9	352.1	O K
600 min Winter	36.562	0.962	2.9	360.3	O K
720 min Winter	36.572	0.972	2.9	365.0	O K
960 min Winter	36.579	0.979	2.9	368.3	O K
1440 min Winter	36.569	0.969	2.9	363.5	O K
2160 min Winter	36.545	0.945	2.9	352.1	O K
2880 min Winter	36.510	0.910	2.8	335.7	O K
4320 min Winter	36.431	0.831	2.7	299.3	O K
5760 min Winter	36.352	0.752	2.6	265.0	O K
7200 min Winter	36.281	0.681	2.5	234.8	O K
8640 min Winter	36.217	0.617	2.4	208.7	O K
10080 min Winter	36.160	0.560	2.3	186.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	224.9	62
120 min Winter	32.580	0.0	278.4	122
180 min Winter	24.347	0.0	308.7	180
240 min Winter	19.663	0.0	326.9	238
360 min Winter	14.471	0.0	348.5	356
480 min Winter	11.644	0.0	362.5	470
600 min Winter	9.829	0.0	371.9	584
720 min Winter	8.553	0.0	378.3	694
960 min Winter	6.862	0.0	385.5	914
1440 min Winter	5.020	0.0	385.9	1156
2160 min Winter	3.665	0.0	573.4	1620
2880 min Winter	2.928	0.0	608.5	2076
4320 min Winter	2.129	0.0	628.5	2944
5760 min Winter	1.697	0.0	710.8	3808
7200 min Winter	1.421	0.0	744.3	4616
8640 min Winter	1.231	0.0	773.2	5440
10080 min Winter	1.090	0.0	798.3	6160

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.520

Time (mins) From:	To:	Area (ha)
0	4	0.520

Model Details

Storage is Online Cover Level (m) 37.800

Tank or Pond Structure

Invert Level (m) 35.600

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	280.0	1.200	534.3

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SCU-0053-3200-1200-3200
Design Head (m)	1.200
Design Flow (l/s)	3.2
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	53
Invert Level (m)	35.600
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	3.2
Flush-Flo™	0.077	0.9
Kick-Flo®	0.079	0.9
Mean Flow over Head Range	-	2.2

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	1.0	1.200	3.2	3.000	4.9	7.000	7.3
0.200	1.4	1.400	3.4	3.500	5.3	7.500	7.6
0.300	1.7	1.600	3.7	4.000	5.6	8.000	7.8
0.400	1.9	1.800	3.9	4.500	5.9	8.500	8.1
0.500	2.1	2.000	4.1	5.000	6.3	9.000	8.3
0.600	2.3	2.200	4.2	5.500	6.5	9.500	8.5
0.800	2.7	2.400	4.4	6.000	6.8		
1.000	2.9	2.600	4.6	6.500	7.1		

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	35.545	0.345	4.0	229.8	O K
30 min Summer	35.652	0.452	4.5	308.3	O K
60 min Summer	35.763	0.563	5.0	392.8	O K
120 min Summer	35.872	0.672	5.4	479.0	O K
180 min Summer	35.929	0.729	5.6	525.9	O K
240 min Summer	35.964	0.764	5.7	555.0	O K
360 min Summer	36.004	0.804	5.9	589.0	O K
480 min Summer	36.027	0.827	5.9	608.3	O K
600 min Summer	36.038	0.838	6.0	618.1	O K
720 min Summer	36.043	0.843	6.0	622.0	O K
960 min Summer	36.044	0.844	6.0	623.7	O K
1440 min Summer	36.039	0.839	6.0	618.9	O K
2160 min Summer	36.018	0.818	5.9	600.5	O K
2880 min Summer	35.989	0.789	5.8	575.9	O K
4320 min Summer	35.927	0.727	5.6	524.3	O K
5760 min Summer	35.869	0.669	5.4	476.9	O K
7200 min Summer	35.816	0.616	5.2	434.5	O K
8640 min Summer	35.769	0.569	5.0	397.7	O K
10080 min Summer	35.728	0.528	4.8	365.3	O K
15 min Winter	35.583	0.383	4.2	257.6	O K
30 min Winter	35.702	0.502	4.7	345.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	212.6	23
30 min Summer	81.146	0.0	276.3	37
60 min Summer	52.299	0.0	396.3	66
120 min Summer	32.580	0.0	493.0	126
180 min Summer	24.347	0.0	551.3	186
240 min Summer	19.663	0.0	591.8	244
360 min Summer	14.471	0.0	648.1	364
480 min Summer	11.644	0.0	686.9	482
600 min Summer	9.829	0.0	712.2	600
720 min Summer	8.553	0.0	728.0	716
960 min Summer	6.862	0.0	748.3	818
1440 min Summer	5.020	0.0	758.1	1068
2160 min Summer	3.665	0.0	1015.5	1472
2880 min Summer	2.928	0.0	1079.7	1880
4320 min Summer	2.129	0.0	1162.2	2720
5760 min Summer	1.697	0.0	1259.7	3512
7200 min Summer	1.421	0.0	1318.8	4320
8640 min Summer	1.231	0.0	1369.6	5024
10080 min Summer	1.090	0.0	1412.7	5848
15 min Winter	120.305	0.0	236.3	23
30 min Winter	81.146	0.0	299.5	37

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	35.824	0.624	5.2	441.0	O K
120 min Winter	35.944	0.744	5.7	538.6	O K
180 min Winter	36.008	0.808	5.9	592.5	O K
240 min Winter	36.047	0.847	6.0	626.3	O K
360 min Winter	36.094	0.894	6.2	667.0	O K
480 min Winter	36.122	0.922	6.3	691.2	Flood Risk
600 min Winter	36.137	0.937	6.3	705.2	Flood Risk
720 min Winter	36.146	0.946	6.3	712.6	Flood Risk
960 min Winter	36.149	0.949	6.3	715.3	Flood Risk
1440 min Winter	36.137	0.937	6.3	704.9	Flood Risk
2160 min Winter	36.107	0.907	6.2	677.9	Flood Risk
2880 min Winter	36.065	0.865	6.1	641.7	O K
4320 min Winter	35.976	0.776	5.8	565.6	O K
5760 min Winter	35.893	0.693	5.5	496.4	O K
7200 min Winter	35.819	0.619	5.2	436.4	O K
8640 min Winter	35.754	0.554	4.9	385.3	O K
10080 min Winter	35.697	0.497	4.7	341.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	443.8	66
120 min Winter	32.580	0.0	551.2	124
180 min Winter	24.347	0.0	615.1	182
240 min Winter	19.663	0.0	658.7	240
360 min Winter	14.471	0.0	715.6	356
480 min Winter	11.644	0.0	749.6	470
600 min Winter	9.829	0.0	771.5	584
720 min Winter	8.553	0.0	787.6	694
960 min Winter	6.862	0.0	806.8	904
1440 min Winter	5.020	0.0	813.7	1128
2160 min Winter	3.665	0.0	1137.0	1584
2880 min Winter	2.928	0.0	1208.1	2048
4320 min Winter	2.129	0.0	1285.8	2904
5760 min Winter	1.697	0.0	1411.0	3744
7200 min Winter	1.421	0.0	1477.3	4544
8640 min Winter	1.231	0.0	1534.3	5352
10080 min Winter	1.090	0.0	1583.3	6056

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.033

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.516	4	8	0.517

Model Details

Storage is Online Cover Level (m) 36.400

Tank or Pond Structure

Invert Level (m) 35.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	620.0	1.200	978.5

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SCU-0079-6500-1000-6500
Design Head (m)	1.000
Design Flow (l/s)	6.5
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	79
Invert Level (m)	35.200
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	6.5
Flush-Flo™	0.106	2.5
Kick-Flo®	0.119	2.4
Mean Flow over Head Range	-	4.4

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	2.5	1.200	7.1	3.000	10.9	7.000	16.4
0.200	3.1	1.400	7.6	3.500	11.8	7.500	17.0
0.300	3.7	1.600	8.1	4.000	12.5	8.000	17.5
0.400	4.2	1.800	8.6	4.500	13.3	8.500	18.0
0.500	4.7	2.000	9.0	5.000	14.0	9.000	18.5
0.600	5.1	2.200	9.4	5.500	14.6	9.500	19.0
0.800	5.9	2.400	9.8	6.000	15.2		
1.000	6.5	2.600	10.2	6.500	15.8		

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	35.649	0.149	6.5	255.6	O K
30 min Summer	35.699	0.199	6.9	342.4	O K
60 min Summer	35.751	0.251	7.1	435.7	O K
120 min Summer	35.804	0.304	7.3	530.4	O K
180 min Summer	35.832	0.332	7.3	581.6	O K
240 min Summer	35.849	0.349	7.3	613.1	O K
360 min Summer	35.869	0.369	7.3	649.2	O K
480 min Summer	35.879	0.379	7.3	668.9	O K
600 min Summer	35.884	0.384	7.3	678.1	O K
720 min Summer	35.886	0.386	7.3	681.3	O K
960 min Summer	35.887	0.387	7.3	683.3	O K
1440 min Summer	35.883	0.383	7.3	675.7	O K
2160 min Summer	35.868	0.368	7.3	648.7	O K
2880 min Summer	35.849	0.349	7.3	613.8	O K
4320 min Summer	35.809	0.309	7.3	540.0	O K
5760 min Summer	35.771	0.271	7.2	471.8	O K
7200 min Summer	35.738	0.238	7.1	412.8	O K
8640 min Summer	35.711	0.211	7.0	364.7	O K
10080 min Summer	35.689	0.189	6.8	325.2	O K
15 min Winter	35.667	0.167	6.6	286.5	O K
30 min Winter	35.722	0.222	7.0	384.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	208.0	22
30 min Summer	81.146	0.0	289.5	37
60 min Summer	52.299	0.0	420.3	66
120 min Summer	32.580	0.0	527.3	126
180 min Summer	24.347	0.0	592.2	184
240 min Summer	19.663	0.0	637.9	244
360 min Summer	14.471	0.0	703.5	362
480 min Summer	11.644	0.0	753.1	482
600 min Summer	9.829	0.0	792.3	600
720 min Summer	8.553	0.0	824.4	674
960 min Summer	6.862	0.0	873.7	784
1440 min Summer	5.020	0.0	931.2	1038
2160 min Summer	3.665	0.0	1114.9	1448
2880 min Summer	2.928	0.0	1185.0	1848
4320 min Summer	2.129	0.0	1281.9	2640
5760 min Summer	1.697	0.0	1395.7	3408
7200 min Summer	1.421	0.0	1459.3	4176
8640 min Summer	1.231	0.0	1511.9	4848
10080 min Summer	1.090	0.0	1552.5	5552
15 min Winter	120.305	0.0	236.4	22
30 min Winter	81.146	0.0	326.6	37

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	35.781	0.281	7.2	489.3	O K
120 min Winter	35.840	0.340	7.3	596.9	O K
180 min Winter	35.872	0.372	7.3	655.9	O K
240 min Winter	35.892	0.392	7.3	692.6	O K
360 min Winter	35.915	0.415	7.3	736.3	O K
480 min Winter	35.929	0.429	7.3	762.0	O K
600 min Winter	35.937	0.437	7.3	776.1	O K
720 min Winter	35.940	0.440	7.3	782.9	O K
960 min Winter	35.940	0.440	7.3	782.4	O K
1440 min Winter	35.931	0.431	7.3	764.5	O K
2160 min Winter	35.907	0.407	7.3	721.1	O K
2880 min Winter	35.878	0.378	7.3	666.1	O K
4320 min Winter	35.816	0.316	7.3	552.1	O K
5760 min Winter	35.760	0.260	7.2	451.1	O K
7200 min Winter	35.714	0.214	7.0	369.5	O K
8640 min Winter	35.679	0.179	6.7	307.0	O K
10080 min Winter	35.653	0.153	6.5	261.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	472.8	66
120 min Winter	32.580	0.0	592.2	124
180 min Winter	24.347	0.0	664.4	182
240 min Winter	19.663	0.0	715.1	240
360 min Winter	14.471	0.0	787.5	356
480 min Winter	11.644	0.0	841.7	470
600 min Winter	9.829	0.0	884.0	582
720 min Winter	8.553	0.0	918.1	692
960 min Winter	6.862	0.0	968.3	902
1440 min Winter	5.020	0.0	1014.1	1118
2160 min Winter	3.665	0.0	1249.5	1580
2880 min Winter	2.928	0.0	1327.9	2020
4320 min Winter	2.129	0.0	1436.3	2852
5760 min Winter	1.697	0.0	1564.5	3624
7200 min Winter	1.421	0.0	1636.2	4328
8640 min Winter	1.231	0.0	1695.9	5016
10080 min Winter	1.090	0.0	1743.2	5648

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.152

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.576	4	8	0.576

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	35.595	0.395	2.0	67.5	O K
30 min Summer	35.705	0.505	2.0	90.2	O K
60 min Summer	35.814	0.614	2.0	114.6	O K
120 min Summer	35.913	0.713	2.0	138.5	O K
180 min Summer	35.962	0.762	2.0	150.9	O K
240 min Summer	35.989	0.789	2.0	158.0	O K
360 min Summer	36.016	0.816	2.0	165.1	O K
480 min Summer	36.027	0.827	2.0	168.0	O K
600 min Summer	36.028	0.828	2.0	168.3	O K
720 min Summer	36.023	0.823	2.0	167.1	O K
960 min Summer	36.011	0.811	2.0	163.8	O K
1440 min Summer	35.983	0.783	2.0	156.3	O K
2160 min Summer	35.939	0.739	2.0	145.0	O K
2880 min Summer	35.893	0.693	2.0	133.6	O K
4320 min Summer	35.791	0.591	2.0	109.3	O K
5760 min Summer	35.679	0.479	2.0	84.7	O K
7200 min Summer	35.586	0.386	2.0	65.7	O K
8640 min Summer	35.510	0.310	2.0	51.0	O K
10080 min Summer	35.449	0.249	2.0	40.0	O K
15 min Winter	35.636	0.436	2.0	75.7	O K
30 min Winter	35.756	0.556	2.0	101.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	68.2	19
30 min Summer	81.146	0.0	92.1	34
60 min Summer	52.299	0.0	119.6	64
120 min Summer	32.580	0.0	149.1	122
180 min Summer	24.347	0.0	167.1	182
240 min Summer	19.663	0.0	179.9	242
360 min Summer	14.471	0.0	198.6	362
480 min Summer	11.644	0.0	213.0	480
600 min Summer	9.829	0.0	224.7	600
720 min Summer	8.553	0.0	234.5	698
960 min Summer	6.862	0.0	250.6	802
1440 min Summer	5.020	0.0	273.2	1054
2160 min Summer	3.665	0.0	302.5	1472
2880 min Summer	2.928	0.0	322.2	1876
4320 min Summer	2.129	0.0	351.4	2720
5760 min Summer	1.697	0.0	373.7	3408
7200 min Summer	1.421	0.0	391.3	4112
8640 min Summer	1.231	0.0	406.6	4760
10080 min Summer	1.090	0.0	419.9	5448
15 min Winter	120.305	0.0	76.4	19
30 min Winter	81.146	0.0	103.1	33

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	35.874	0.674	2.0	128.9	O K
120 min Winter	35.983	0.783	2.0	156.3	O K
180 min Winter	36.037	0.837	2.0	170.8	O K
240 min Winter	36.068	0.868	2.0	179.3	O K
360 min Winter	36.101	0.901	2.0	188.5	O K
480 min Winter	36.117	0.917	2.0	193.1	O K
600 min Winter	36.123	0.923	2.0	194.7	O K
720 min Winter	36.122	0.922	2.0	194.5	O K
960 min Winter	36.110	0.910	2.0	190.9	O K
1440 min Winter	36.074	0.874	2.0	180.9	O K
2160 min Winter	36.015	0.815	2.0	164.9	O K
2880 min Winter	35.950	0.750	2.0	147.9	O K
4320 min Winter	35.799	0.599	2.0	111.2	O K
5760 min Winter	35.624	0.424	2.0	73.3	O K
7200 min Winter	35.493	0.293	2.0	47.9	O K
8640 min Winter	35.403	0.203	1.9	31.9	O K
10080 min Winter	35.346	0.146	1.8	22.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	134.0	62
120 min Winter	32.580	0.0	167.0	122
180 min Winter	24.347	0.0	187.1	180
240 min Winter	19.663	0.0	201.5	238
360 min Winter	14.471	0.0	222.3	354
480 min Winter	11.644	0.0	238.4	468
600 min Winter	9.829	0.0	251.4	580
720 min Winter	8.553	0.0	262.3	690
960 min Winter	6.862	0.0	279.8	896
1440 min Winter	5.020	0.0	295.9	1124
2160 min Winter	3.665	0.0	338.8	1580
2880 min Winter	2.928	0.0	360.9	2048
4320 min Winter	2.129	0.0	393.5	2940
5760 min Winter	1.697	0.0	418.6	3584
7200 min Winter	1.421	0.0	438.3	4248
8640 min Winter	1.231	0.0	455.4	4840
10080 min Winter	1.090	0.0	470.4	5448

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.306

Time (mins) From:	To:	Area (ha)
0	4	0.306

Model Details

Storage is Online Cover Level (m) 36.700

Tank or Pond Structure

Invert Level (m) 35.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	144.0	1.500	399.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0068-2200-1200-2200
Design Head (m)	1.200
Design Flow (l/s)	2.2
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	68
Invert Level (m)	35.200
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	2.2
Flush-Flo™	0.297	2.0
Kick-Flo®	0.602	1.6
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)
0.100	1.7	1.200	2.2	3.000	3.4	7.000	5.0
0.200	1.9	1.400	2.4	3.500	3.6	7.500	5.1
0.300	2.0	1.600	2.5	4.000	3.8	8.000	5.3
0.400	2.0	1.800	2.6	4.500	4.0	8.500	5.5
0.500	1.9	2.000	2.8	5.000	4.3	9.000	5.6
0.600	1.6	2.200	2.9	5.500	4.4	9.500	5.8
0.800	1.8	2.400	3.0	6.000	4.6		
1.000	2.0	2.600	3.1	6.500	4.8		

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	38.550	0.550	2.8	146.6	O K
30 min Summer	38.702	0.702	3.1	196.6	O K
60 min Summer	38.852	0.852	3.4	250.4	O K
120 min Summer	38.991	0.991	3.7	304.8	O K
180 min Summer	39.063	1.063	3.8	334.1	O K
240 min Summer	39.105	1.105	3.8	352.1	O K
360 min Summer	39.152	1.152	3.9	372.6	O K
480 min Summer	39.177	1.177	4.0	383.7	O K
600 min Summer	39.189	1.189	4.0	388.8	O K
720 min Summer	39.192	1.192	4.0	390.2	O K
960 min Summer	39.192	1.192	4.0	390.2	O K
1440 min Summer	39.180	1.180	4.0	385.0	O K
2160 min Summer	39.148	1.148	3.9	370.6	O K
2880 min Summer	39.107	1.107	3.9	352.9	O K
4320 min Summer	39.022	1.022	3.7	317.4	O K
5760 min Summer	38.943	0.943	3.6	285.4	O K
7200 min Summer	38.871	0.871	3.4	257.5	O K
8640 min Summer	38.806	0.806	3.3	233.4	O K
10080 min Summer	38.747	0.747	3.2	212.3	O K
15 min Winter	38.606	0.606	2.9	164.4	O K
30 min Winter	38.770	0.770	3.3	220.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	144.6	26
30 min Summer	81.146	0.0	188.0	41
60 min Summer	52.299	0.0	258.2	70
120 min Summer	32.580	0.0	321.5	130
180 min Summer	24.347	0.0	360.1	188
240 min Summer	19.663	0.0	387.3	246
360 min Summer	14.471	0.0	426.2	364
480 min Summer	11.644	0.0	454.3	482
600 min Summer	9.829	0.0	473.2	602
720 min Summer	8.553	0.0	485.7	700
960 min Summer	6.862	0.0	501.2	806
1440 min Summer	5.020	0.0	509.7	1056
2160 min Summer	3.665	0.0	654.1	1468
2880 min Summer	2.928	0.0	696.4	1876
4320 min Summer	2.129	0.0	757.0	2688
5760 min Summer	1.697	0.0	808.4	3472
7200 min Summer	1.421	0.0	846.5	4256
8640 min Summer	1.231	0.0	879.5	5016
10080 min Summer	1.090	0.0	908.3	5752
15 min Winter	120.305	0.0	160.9	26
30 min Winter	81.146	0.0	203.3	40

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	38.932	0.932	3.6	281.2	O K
120 min Winter	39.084	1.084	3.8	343.1	O K
180 min Winter	39.162	1.162	3.9	377.0	O K
240 min Winter	39.209	1.209	4.0	398.1	O K
360 min Winter	39.264	1.264	4.1	423.0	O K
480 min Winter	39.294	1.294	4.1	437.4	O K
600 min Winter	39.311	1.311	4.2	445.3	Flood Risk
720 min Winter	39.319	1.319	4.2	449.0	Flood Risk
960 min Winter	39.318	1.318	4.2	448.8	Flood Risk
1440 min Winter	39.300	1.300	4.2	440.0	Flood Risk
2160 min Winter	39.256	1.256	4.1	419.4	O K
2880 min Winter	39.199	1.199	4.0	393.5	O K
4320 min Winter	39.079	1.079	3.8	341.2	O K
5760 min Winter	38.965	0.965	3.6	294.4	O K
7200 min Winter	38.863	0.863	3.4	254.8	O K
8640 min Winter	38.773	0.773	3.3	221.7	O K
10080 min Winter	38.694	0.694	3.1	193.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	289.2	70
120 min Winter	32.580	0.0	359.9	126
180 min Winter	24.347	0.0	402.7	184
240 min Winter	19.663	0.0	432.7	242
360 min Winter	14.471	0.0	473.3	358
480 min Winter	11.644	0.0	498.1	472
600 min Winter	9.829	0.0	514.5	584
720 min Winter	8.553	0.0	526.1	694
960 min Winter	6.862	0.0	539.8	902
1440 min Winter	5.020	0.0	545.1	1122
2160 min Winter	3.665	0.0	732.5	1584
2880 min Winter	2.928	0.0	779.8	2028
4320 min Winter	2.129	0.0	843.5	2900
5760 min Winter	1.697	0.0	905.4	3744
7200 min Winter	1.421	0.0	948.1	4536
8640 min Winter	1.231	0.0	985.1	5280
10080 min Winter	1.090	0.0	1017.6	6056

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.662

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.221	4	8	0.221	8	12	0.221

Model Details

Storage is Online Cover Level (m) 39.600

Tank or Pond Structure

Invert Level (m) 38.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	220.0	1.600	544.8

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SCU-0059-4000-1200-4000
Design Head (m)	1.200
Design Flow (l/s)	4.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	59
Invert Level (m)	38.000
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	4.0
Flush-Flo™	0.089	1.2
Kick-Flo®	0.089	1.2
Mean Flow over Head Range	-	2.7

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	1.3	1.200	4.0	3.000	6.1	7.000	9.2
0.200	1.8	1.400	4.3	3.500	6.6	7.500	9.5
0.300	2.1	1.600	4.6	4.000	7.0	8.000	9.8
0.400	2.4	1.800	4.8	4.500	7.5	8.500	10.1
0.500	2.7	2.000	5.1	5.000	7.8	9.000	10.4
0.600	2.9	2.200	5.3	5.500	8.2	9.500	10.7
0.800	3.3	2.400	5.5	6.000	8.5		
1.000	3.7	2.600	5.7	6.500	8.9		

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	34.227	0.477	7.8	426.8	O K
30 min Summer	34.374	0.624	8.8	572.8	O K
60 min Summer	34.523	0.773	9.7	729.7	O K
120 min Summer	34.668	0.918	10.6	888.7	O K
180 min Summer	34.744	0.994	11.0	974.9	O K
240 min Summer	34.790	1.040	11.2	1027.8	O K
360 min Summer	34.841	1.091	11.5	1088.6	Flood Risk
480 min Summer	34.869	1.119	11.6	1121.9	Flood Risk
600 min Summer	34.883	1.133	11.7	1137.8	Flood Risk
720 min Summer	34.887	1.137	11.7	1142.8	Flood Risk
960 min Summer	34.889	1.139	11.7	1144.9	Flood Risk
1440 min Summer	34.879	1.129	11.7	1133.3	Flood Risk
2160 min Summer	34.846	1.096	11.5	1094.6	Flood Risk
2880 min Summer	34.805	1.055	11.3	1045.4	Flood Risk
4320 min Summer	34.718	0.968	10.8	945.5	O K
5760 min Summer	34.638	0.888	10.4	855.2	O K
7200 min Summer	34.566	0.816	10.0	776.0	O K
8640 min Summer	34.502	0.752	9.6	707.2	O K
10080 min Summer	34.445	0.695	9.3	646.9	O K
15 min Winter	34.280	0.530	8.2	478.6	O K
30 min Winter	34.441	0.691	9.2	642.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.305	0.0	403.0	26
30 min Summer	81.146	0.0	528.2	41
60 min Summer	52.299	0.0	742.0	70
120 min Summer	32.580	0.0	923.7	130
180 min Summer	24.347	0.0	1033.8	188
240 min Summer	19.663	0.0	1111.1	246
360 min Summer	14.471	0.0	1220.3	364
480 min Summer	11.644	0.0	1299.3	482
600 min Summer	9.829	0.0	1355.3	602
720 min Summer	8.553	0.0	1392.1	694
960 min Summer	6.862	0.0	1433.8	802
1440 min Summer	5.020	0.0	1459.6	1052
2160 min Summer	3.665	0.0	1895.4	1460
2880 min Summer	2.928	0.0	2016.4	1876
4320 min Summer	2.129	0.0	2181.6	2688
5760 min Summer	1.697	0.0	2348.3	3472
7200 min Summer	1.421	0.0	2458.7	4256
8640 min Summer	1.231	0.0	2553.5	5024
10080 min Summer	1.090	0.0	2634.5	5760
15 min Winter	120.305	0.0	448.8	26
30 min Winter	81.146	0.0	575.2	41

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	34.606	0.856	10.2	819.2	O K
120 min Winter	34.766	1.016	11.1	1000.0	O K
180 min Winter	34.850	1.100	11.5	1099.0	Flood Risk
240 min Winter	34.902	1.152	11.8	1160.8	Flood Risk
360 min Winter	34.962	1.212	12.1	1234.0	Flood Risk
480 min Winter	34.996	1.246	12.2	1276.6	Flood Risk
600 min Winter	35.015	1.265	12.3	1300.1	Flood Risk
720 min Winter	35.024	1.274	12.3	1311.5	Flood Risk
960 min Winter	35.024	1.274	12.3	1311.9	Flood Risk
1440 min Winter	35.007	1.257	12.3	1290.4	Flood Risk
2160 min Winter	34.962	1.212	12.1	1233.8	Flood Risk
2880 min Winter	34.902	1.152	11.8	1161.4	Flood Risk
4320 min Winter	34.778	1.028	11.2	1014.3	O K
5760 min Winter	34.663	0.913	10.5	883.1	O K
7200 min Winter	34.562	0.812	10.0	771.0	O K
8640 min Winter	34.474	0.724	9.4	676.8	O K
10080 min Winter	34.397	0.647	9.0	597.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	52.299	0.0	831.0	70
120 min Winter	32.580	0.0	1033.4	126
180 min Winter	24.347	0.0	1155.2	184
240 min Winter	19.663	0.0	1239.6	242
360 min Winter	14.471	0.0	1355.0	358
480 min Winter	11.644	0.0	1430.1	472
600 min Winter	9.829	0.0	1475.3	584
720 min Winter	8.553	0.0	1508.5	694
960 min Winter	6.862	0.0	1549.9	900
1440 min Winter	5.020	0.0	1569.2	1118
2160 min Winter	3.665	0.0	2122.5	1580
2880 min Winter	2.928	0.0	2257.2	2024
4320 min Winter	2.129	0.0	2428.3	2900
5760 min Winter	1.697	0.0	2630.3	3744
7200 min Winter	1.421	0.0	2754.0	4536
8640 min Winter	1.231	0.0	2860.7	5280
10080 min Winter	1.090	0.0	2952.5	6056

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)	18.500	Shortest Storm (mins)	15
Ratio R	0.344	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.925

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.642	4	8	0.642	8	12	0.642

Model Details

Storage is Online Cover Level (m) 35.100

Tank or Pond Structure

Invert Level (m) 33.750

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	820.0	1.350	1282.6

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SCU-0104-1200-1200-1200
Design Head (m)	1.200
Design Flow (l/s)	12.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	104
Invert Level (m)	33.750
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	12.0
Flush-Flo™	0.132	4.7
Kick-Flo®	0.156	4.6
Mean Flow over Head Range	-	8.1

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	3.9	1.200	12.0	3.000	18.6	7.000	27.9
0.200	5.2	1.400	12.9	3.500	20.0	7.500	28.9
0.300	6.3	1.600	13.8	4.000	21.3	8.000	29.8
0.400	7.2	1.800	14.6	4.500	22.6	8.500	30.7
0.500	7.9	2.000	15.3	5.000	23.8	9.000	31.6
0.600	8.7	2.200	16.0	5.500	24.9	9.500	32.4
0.800	9.9	2.400	16.7	6.000	25.9		
1.000	11.0	2.600	17.3	6.500	27.0		