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22 Esher Grove Nottingham NG3 5DR	Jasmin Green Birchwood	
Date 27/02/2020 File Tank reduced imp area.SRCX	Designed by Matthew Genn Checked by Richard Winn	
Innovyze	Source Control 2019.1	

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m <sup>3</sup> )	Status
15 min Summer	15.763	0.363	5.0	290.8	O K
30 min Summer	15.874	0.474	5.0	379.4	O K
60 min Summer	15.987	0.587	5.0	469.8	O K
120 min Summer	16.097	0.697	5.0	557.6	O K
180 min Summer	16.155	0.755	5.0	604.0	O K
240 min Summer	16.191	0.791	5.0	632.5	O K
360 min Summer	16.228	0.828	5.0	662.8	O K
480 min Summer	16.249	0.849	5.0	678.9	O K
600 min Summer	16.258	0.858	5.0	686.2	O K
720 min Summer	16.260	0.860	5.0	688.0	O K
960 min Summer	16.251	0.851	5.0	681.1	O K
1440 min Summer	16.216	0.816	5.0	652.8	O K
2160 min Summer	16.166	0.766	5.0	612.6	O K
2880 min Summer	16.120	0.720	5.0	575.8	O K
4320 min Summer	16.033	0.633	5.0	506.0	O K
5760 min Summer	15.938	0.538	5.0	430.5	O K
7200 min Summer	15.854	0.454	5.0	362.9	O K
8640 min Summer	15.782	0.382	5.0	305.2	O K
10080 min Summer	15.719	0.319	5.0	255.0	O K
15 min Winter	15.808	0.408	5.0	326.3	O K
30 min Winter	15.933	0.533	5.0	426.2	O K
60 min Winter	16.060	0.660	5.0	528.3	O K
120 min Winter	16.185	0.785	5.0	627.7	O K
180 min Winter	16.252	0.852	5.0	681.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Discharge Volume (m <sup>3</sup> )	Time-Peak (mins)
15 min Summer	129.006	0.0	295.7	23
30 min Summer	84.586	0.0	381.5	37
60 min Summer	52.892	0.0	485.2	68
120 min Summer	32.010	0.0	587.3	126
180 min Summer	23.571	0.0	648.8	186
240 min Summer	18.871	0.0	692.6	246
360 min Summer	13.685	0.0	750.5	364
480 min Summer	10.900	0.0	775.8	484
600 min Summer	9.131	0.0	783.2	602
720 min Summer	7.897	0.0	780.8	722
960 min Summer	6.277	0.0	770.4	960
1440 min Summer	4.534	0.0	741.7	1228
2160 min Summer	3.270	0.0	1080.4	1604
2880 min Summer	2.591	0.0	1141.2	2016
4320 min Summer	1.864	0.0	1231.4	2856
5760 min Summer	1.474	0.0	1298.2	3632
7200 min Summer	1.228	0.0	1352.4	4392
8640 min Summer	1.057	0.0	1397.5	5104
10080 min Summer	0.932	0.0	1436.5	5840
15 min Winter	129.006	0.0	331.2	23
30 min Winter	84.586	0.0	404.8	37
60 min Winter	52.892	0.0	543.4	66
120 min Winter	32.010	0.0	657.8	124
180 min Winter	23.571	0.0	726.7	184

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Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m <sup>3</sup> )	Status
240 min Winter	16.294	0.894	5.0	714.9	O K
360 min Winter	16.340	0.940	5.0	752.1	O K
480 min Winter	16.367	0.967	5.0	773.4	O K
600 min Winter	16.381	0.981	5.1	784.8	O K
720 min Winter	16.387	0.987	5.1	789.9	O K
960 min Winter	16.385	0.985	5.1	788.3	O K
1440 min Winter	16.351	0.951	5.0	761.2	O K
2160 min Winter	16.287	0.887	5.0	709.7	O K
2880 min Winter	16.227	0.827	5.0	661.2	O K
4320 min Winter	16.104	0.704	5.0	563.3	O K
5760 min Winter	15.970	0.570	5.0	456.2	O K
7200 min Winter	15.836	0.436	5.0	348.7	O K
8640 min Winter	15.730	0.330	5.0	263.9	O K
10080 min Winter	15.645	0.245	5.0	196.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Discharge Volume (m <sup>3</sup> )	Time-Peak (mins)
240 min Winter	18.871	0.0	767.1	242
360 min Winter	13.685	0.0	793.8	358
480 min Winter	10.900	0.0	794.8	474
600 min Winter	9.131	0.0	791.8	590
720 min Winter	7.897	0.0	787.6	704
960 min Winter	6.277	0.0	778.0	928
1440 min Winter	4.534	0.0	756.6	1356
2160 min Winter	3.270	0.0	1210.0	1688
2880 min Winter	2.591	0.0	1278.4	2164
4320 min Winter	1.864	0.0	1356.5	3076
5760 min Winter	1.474	0.0	1454.2	3976
7200 min Winter	1.228	0.0	1514.8	4680
8640 min Winter	1.057	0.0	1565.6	5360
10080 min Winter	0.932	0.0	1608.9	6048

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.700	Shortest Storm (mins)	15
Ratio R	0.406	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.224

Time (mins)		Area	Time (mins)		Area
From:	To:	(ha)	From:	To:	(ha)
0	4	0.612	4	8	0.612

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Model Details

Storage is Online Cover Level (m) 17.000

Tank or Pond Structure

Invert Level (m) 15.400

Depth (m)	Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )
0.000	800.0	1.000	800.0	1.001	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0105-5000-1000-5000  
 Design Head (m) 1.000  
 Design Flow (l/s) 5.0  
 Flush-Flo™ Calculated  
 Objective Minimise upstream storage  
 Application Surface  
 Sump Available Yes  
 Diameter (mm) 105  
 Invert Level (m) 15.350  
 Minimum Outlet Pipe Diameter (mm) 150  
 Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	5.0	Kick-Flo®	0.637	4.1
Flush-Flo™	0.296	5.0	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	3.6	1.200	5.4	3.000	8.4	7.000	12.5
0.200	4.8	1.400	5.8	3.500	9.0	7.500	12.9
0.300	5.0	1.600	6.2	4.000	9.6	8.000	13.3
0.400	4.9	1.800	6.6	4.500	10.1	8.500	13.7
0.500	4.7	2.000	6.9	5.000	10.6	9.000	14.1
0.600	4.3	2.200	7.2	5.500	11.1	9.500	14.5
0.800	4.5	2.400	7.5	6.000	11.6		
1.000	5.0	2.600	7.8	6.500	12.1		