

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	133.417	1.533	11.6	398.2	O K
30 min Summer	133.760	1.876	11.6	530.8	O K
60 min Summer	134.114	2.230	12.2	667.7	O K
120 min Summer	134.459	2.575	13.0	796.0	O K
180 min Summer	134.633	2.749	13.4	856.4	O K
240 min Summer	134.723	2.839	13.6	886.4	O K
360 min Summer	134.792	2.908	13.7	908.6	O K
480 min Summer	134.785	2.901	13.7	906.5	O K
600 min Summer	134.744	2.860	13.6	893.3	O K
720 min Summer	134.700	2.816	13.5	879.1	O K
960 min Summer	134.616	2.732	13.4	850.9	O K
1440 min Summer	134.479	2.595	13.0	802.9	O K
2160 min Summer	134.294	2.410	12.6	735.5	O K
2880 min Summer	134.121	2.237	12.2	670.4	O K
4320 min Summer	133.806	1.922	11.6	548.9	O K
5760 min Summer	133.526	1.642	11.6	440.0	O K
7200 min Summer	133.260	1.376	11.6	339.2	O K
8640 min Summer	132.910	1.026	11.6	214.3	O K
10080 min Summer	132.650	0.766	11.6	131.3	O K
15 min Winter	133.546	1.662	11.6	447.9	O K
30 min Winter	133.932	2.048	11.7	597.7	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	124.758	0.0	414.1	26
30 min Summer	83.832	0.0	556.4	41
60 min Summer	53.779	0.0	713.8	70
120 min Summer	33.321	0.0	884.8	128
180 min Summer	24.814	0.0	988.3	186
240 min Summer	19.989	0.0	1061.5	246
360 min Summer	14.690	0.0	1170.1	362
480 min Summer	11.803	0.0	1253.5	480
600 min Summer	9.952	0.0	1321.2	544
720 min Summer	8.652	0.0	1378.4	604
960 min Summer	6.932	0.0	1472.3	730
1440 min Summer	5.062	0.0	1612.6	1000
2160 min Summer	3.688	0.0	1763.0	1412
2880 min Summer	2.943	0.0	1875.3	1824
4320 min Summer	2.137	0.0	2042.1	2640
5760 min Summer	1.700	0.0	2166.9	3456
7200 min Summer	1.423	0.0	2267.1	4248
8640 min Summer	1.232	0.0	2353.9	4848
10080 min Summer	1.090	0.0	2430.9	5456
15 min Winter	124.758	0.0	463.8	26
30 min Winter	83.832	0.0	623.2	40

19-20 Brenkley Way  
Newcastle upon Tyne  
NE13 6DS



Date 08/08/2023 14:53  
File y22018.002-based on 15L...

Designed by RikB  
Checked by

Innovyze

Source Control 2020.1.3

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
60 min Winter	134.342	2.458	12.7	753.5	O K
120 min Winter	134.774	2.890	13.7	903.1	O K
180 min Winter	135.021	3.137	14.2	976.2	O K
240 min Winter	135.174	3.290	14.6	1015.1	O K
360 min Winter	135.348	3.464	14.9	1050.0	O K
480 min Winter	135.400	3.516	15.0	1057.8	O K
600 min Winter	135.350	3.466	14.9	1050.3	O K
720 min Winter	135.264	3.380	14.8	1034.4	O K
960 min Winter	135.112	3.228	14.4	1000.0	O K
1440 min Winter	134.869	2.985	13.9	932.5	O K
2160 min Winter	134.567	2.683	13.2	833.8	O K
2880 min Winter	134.295	2.411	12.6	736.0	O K
4320 min Winter	133.823	1.939	11.6	555.3	O K
5760 min Winter	133.400	1.516	11.6	391.9	O K
7200 min Winter	132.813	0.929	11.6	182.0	O K
8640 min Winter	132.416	0.532	11.6	67.4	O K
10080 min Winter	132.200	0.316	11.1	22.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	53.779	0.0	799.7	68
120 min Winter	33.321	0.0	990.9	126
180 min Winter	24.814	0.0	1106.9	184
240 min Winter	19.989	0.0	1188.8	240
360 min Winter	14.690	0.0	1310.4	354
480 min Winter	11.803	0.0	1404.0	466
600 min Winter	9.952	0.0	1479.7	572
720 min Winter	8.652	0.0	1543.8	672
960 min Winter	6.932	0.0	1649.1	762
1440 min Winter	5.062	0.0	1806.3	1074
2160 min Winter	3.688	0.0	1974.5	1536
2880 min Winter	2.943	0.0	2100.4	1972
4320 min Winter	2.137	0.0	2287.4	2848
5760 min Winter	1.700	0.0	2426.8	3688
7200 min Winter	1.423	0.0	2539.1	4320
8640 min Winter	1.232	0.0	2636.8	4760
10080 min Winter	1.090	0.0	2722.9	5256

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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)	19.000	Shortest Storm (mins)	15
Ratio R	0.351	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.770

Time (mins) Area			Time (mins) Area			Time (mins) Area		
From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)
0	4	0.590	4	8	0.590	8	12	0.590

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Model Details

Storage is Online Cover Level (m) 136.584

Pipe Structure

Diameter (m) 3.500          Length (m) 111.000  
Slope (1:X) 400.000      Invert Level (m) 131.884

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0140-1500-3550-1500  
Design Head (m) 3.550  
Design Flow (l/s) 15.0  
Flush-Flo™ Calculated  
Objective Minimise upstream storage  
Application Surface  
Sump Available Yes  
Diameter (mm) 140  
Invert Level (m) 131.834  
Minimum Outlet Pipe Diameter (mm) 225  
Suggested Manhole Diameter (mm) 1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	3.550	15.0
Flush-Flo™	0.610	11.6
Kick-Flo®	1.249	9.1
Mean Flow over Head Range	-	11.5

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)						
0.100	5.1	1.200	9.6	3.000	13.8	7.000	20.7
0.200	9.5	1.400	9.7	3.500	14.9	7.500	21.4
0.300	10.6	1.600	10.3	4.000	15.9	8.000	22.1
0.400	11.2	1.800	10.9	4.500	16.8	8.500	22.8
0.500	11.5	2.000	11.4	5.000	17.7	9.000	23.4
0.600	11.6	2.200	11.9	5.500	18.5	9.500	24.0
0.800	11.4	2.400	12.5	6.000	19.3		
1.000	10.9	2.600	12.9	6.500	20.0		