14 Festoon Rooms
Sunny Bank Mills Town Street
Farsley Leeds LS28 5UJ

Date 26/07/2016 12:08 | Designed by chris
File QUICK CALC SW.SRCX | Checked by
Micro Drainage | Source Control 2015.1

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	0.732	0.732	4.0	97.4	O K
30 min Summer	1.007	1.007	4.0	133.9	O K
60 min Summer	1.299	1.299	4.0	172.8	O K
120 min Summer	1.576	1.576	4.3	209.7	O K
180 min Summer	1.701	1.701	4.5	226.2	O K
240 min Summer	1.768	1.768	4.6	235.1	O K
360 min Summer	1.824	1.824	4.6	242.7	O K
480 min Summer	1.830	1.830	4.6	243.4	O K
600 min Summer	1.824	1.824	4.6	242.6	O K
720 min Summer	1.811	1.811	4.6	240.8	O K
960 min Summer	1.773	1.773	4.6	235.8	O K
1440 min Summer	1.683	1.683	4.5	223.8	O K
2160 min Summer	1.540	1.540	4.3	204.9	O K
2880 min Summer	1.400	1.400	4.1	186.2	O K
4320 min Summer	1.144	1.144	4.0	152.1	O K
5760 min Summer	0.904	0.904	4.0	120.3	O K
7200 min Summer	0.606	0.606	4.0	80.6	O K
8640 min Summer	0.431	0.431	4.0	57.3	O K
10080 min Summer	0.318	0.318	3.9	42.3	O K
15 min Winter	0.825	0.825	4.0	109.7	O K
30 min Winter	1.133	1.133	4.0	150.6	O K
60 min Winter	1.465	1.465	4.2	194.8	O K
120 min Winter	1.786	1.786	4.6	237.6	O K
180 min Winter	1.937	1.937	4.8	257.6	O K
240 min Winter	2.023	2.023	4.9	269.1	O K
360 min Winter	2.108	2.108	4.9	280.4	Flood Risk
480 min Winter	2.128	2.128	5.0	283.0	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	114.824	0.0	101.1	26
30 min Summer	79.374	0.0	139.9	40
60 min Summer	52.391	0.0	185.2	70
120 min Summer	33.240	0.0	235.1	128
180 min Summer	24.972	0.0	264.9	186
240 min Summer	20.308	0.0	287.2	244
360 min Summer	15.158	0.0	321.6	360
480 min Summer	12.293	0.0	347.8	426
600 min Summer	10.437	0.0	369.1	488
720 min Summer	9.125	0.0	387.2	554
960 min Summer	7.372	0.0	417.0	686
1440 min Summer	5.444	0.0	461.8	966
2160 min Summer	4.009	0.0	510.7	1384
2880 min Summer	3.220	0.0	547.1	1792
4320 min Summer	2.367	0.0	602.9	2600
5760 min Summer	1.904	0.0	647.0	3408
7200 min Summer	1.609	0.0	683.4	4040
8640 min Summer	1.403	0.0	714.9	4672
10080 min Summer	1.250	0.0	742.8	5344
15 min Winter	114.824	0.0	113.3	26
30 min Winter	79.374	0.0	156.7	40
60 min Winter	52.391	0.0	207.5	68
120 min Winter	33.240	0.0	263.3	126
180 min Winter	24.972	0.0	296.7	182
240 min Winter	20.308	0.0	321.7	240
360 min Winter	15.158	0.0	360.2	352
480 min Winter	12.293	0.0	389.5	458

©1982-2015 XP Solutions

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
600 min Winter	2.115	2.115	5.0	281.2	Flood Risk
720 min Winter	2.098	2.098	4.9	279.0	O K
960 min Winter	2.049	2.049	4.9	272.5	O K
1440 min Winter	1.913	1.913	4.7	254.4	O K
2160 min Winter	1.691	1.691	4.5	224.9	O K
2880 min Winter	1.476	1.476	4.2	196.4	O K
4320 min Winter	1.087	1.087	4.0	144.5	O K
5760 min Winter	0.604	0.604	4.0	80.4	O K
7200 min Winter	0.331	0.331	3.9	44.0	O K
8640 min Winter	0.208	0.208	3.7	27.6	O K
10080 min Winter	0.146	0.146	3.4	19.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
600 min Winter	10.437	0.0	413.4	554
720 min Winter	9.125	0.0	433.6	578
960 min Winter	7.372	0.0	467.1	732
1440 min Winter	5.444	0.0	517.1	1042
2160 min Winter	4.009	0.0	572.0	1492
2880 min Winter	3.220	0.0	612.7	1932
4320 min Winter	2.367	0.0	675.3	2776
5760 min Winter	1.904	0.0	724.6	3464
7200 min Winter	1.609	0.0	765.4	4032
8640 min Winter	1.403	0.0	800.7	4592
10080 min Winter	1.250	0.0	832.0	5248

©1982-2015 XP Solutions

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)	19.900	Shortest Storm (mins)	15
Ratio R	0.296	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.472

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.157	4	8	0.157	8	12	0.157

©1982-2015 XP Solutions

Model Details

Storage is Online Cover Level (m) 2.400

Tank or Pond Structure

Invert Level (m) 0.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	133.0	2.150	133.0	4.800	0.0	7.200	0.0	9.600	0.0
0.400	133.0	2.151	0.0	5.200	0.0	7.600	0.0	10.000	0.0
0.800	133.0	3.200	0.0	5.600	0.0	8.000	0.0		
1.200	133.0	3.600	0.0	6.000	0.0	8.400	0.0		
1.600	133.0	4.000	0.0	6.400	0.0	8.800	0.0		
2.000	133.0	4.400	0.0	6.800	0.0	9.200	0.0		

Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0090-5000-2150-5000
Design Head (m)	2.150
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	90
Invert Level (m)	0.000
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)	2.150	5.0	Kick-Flo®	0.805	3.2
Flush-Flo™	0.394	4.0	Mean Flow over Head Range	-	3.9

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)	Depth (m)	Flow (l/s)
0.100	2.8	0.800	3.2	2.000	4.8	4.000	6.7	7.000	8.7
0.200	3.7	1.000	3.5	2.200	5.0	4.500	7.1	7.500	9.0
0.300	3.9	1.200	3.8	2.400	5.3	5.000	7.4	8.000	9.3
0.400	4.0	1.400	4.1	2.600	5.5	5.500	7.8	8.500	9.5
0.500	3.9	1.600	4.4	3.000	5.8	6.000	8.1	9.000	9.8
0.600	3.8	1.800	4.6	3.500	6.3	6.500	8.4	9.500	10.1

©1982-2015 XP Solutions