

BROWNFIELD RUNOFF RATES

Design Rainfall

The rainfall used to derive the surface water runoff rates and volumes was obtained from the Flood Estimation Handbook (FEH) Web Service, depth-duration-frequency model. This provides design rainfall intensities for a range of return periods and storm durations, which are presented in Table A.

Table A. Design rainfall intensities

Intensity (mm/hr)									
	0.25	0.5	1	2	3	5	12	24	48
1	24.32	15.9	9.88	7.10	5.67	4.17	2.32	1.40	0.84
2	29.6	19.2	12	8.30	6.53	4.72	2.59	1.55	0.92
5	47.44	30.8	19.24	12.29	9.34	6.53	3.45	2.03	1.20
10	59.92	39.06	24.5	15.13	11.33	7.81	4.06	2.38	1.40
30	79.64	52.44	33.01	19.75	14.58	9.92	5.11	3.00	1.75
50	88.68	58.8	37.16	22.02	16.19	10.99	5.66	3.34	1.94
100	102.04	67.82	43.13	25.34	18.59	12.61	6.53	3.86	2.23
100+5%	107.142	71.211	45.2865	26.61	19.52	13.24	6.86	4.06	2.34
100+10%	112.244	74.602	47.443	27.87	20.45	13.88	7.19	4.25	2.45
100+20%	122.448	81.384	51.756	30.41	22.30	15.14	7.84	4.64	2.68
100+30%	132.652	88.166	56.069	32.94	24.16	16.40	8.49	5.02	2.90
100+40%	142.856	94.948	60.382	35.48	26.02	17.66	9.15	5.41	3.12

Surface Water Runoff Rates

The Wallingford Modified Rational Method has been used to estimate the surface water runoff generated during peak rainfall events based on the nature of the ground surface (hard standing, vegetation, etc) and rainfall depth, duration and frequency information for the immediate area. A runoff coefficient of 1 was applied for the impermeable area, in line with best practise for surface water runoff estimation.

The installation is entirely impermeable and as such, the area used for the calculations is 2.9ha.

The results of this calculation for a range of return periods, including climate change, are presented in Table B.

Table B. Brownfield runoff rates

Surface Water Runoff Rates (l/s)									
	0.25	0.5	1	2	3	5	12	24	48
1	197.5	129.1	80.2	57.6	46.0	33.9	18.8	11.4	6.8
2	240.4	155.9	97.4	67.4	53.0	38.3	21.0	12.6	7.5
5	385.2	250.1	156.2	99.8	75.8	53.0	28.0	16.5	9.7
10	486.6	317.2	198.9	122.8	92.0	63.4	33.0	19.4	11.3
30	646.7	425.8	268.0	160.3	118.4	80.6	41.5	24.4	14.2
50	720.1	477.5	301.7	178.8	131.5	89.2	46.0	27.1	15.7
100	828.6	550.7	350.2	205.8	150.9	102.4	53.0	31.4	18.1
100+5%	870.0	578.2	367.7	216.0	158.5	107.5	55.7	32.9	19.0
100+10%	911.4	605.8	385.2	226.3	166.0	112.7	58.3	34.5	19.9
100+20%	994.3	660.8	420.3	246.9	181.1	122.9	63.7	37.6	21.7
100+30%	1077.1	715.9	455.3	267.5	196.2	133.2	69.0	40.8	23.5
100+40%	1160.0	771.0	490.3	288.1	211.3	143.4	74.3	43.9	25.3