

Tier Consult				Page 1	
Richmond House Chester Bus. Park CH4 9QZ		Thames Quarter- Reading Surface Water Storage 100 Year + 40% CC			
Date 05/02/2018 13:38 File 100 Year Storage + 40% ...		Designed by MCH Checked by			
Micro Drainage		Source Control 2015.1			
<u>Summary of Results for 100 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	97.401	0.401	5.0	115.5	O K
30 min Summer	97.523	0.523	5.0	150.5	O K
60 min Summer	97.641	0.641	5.0	184.5	O K
120 min Summer	97.745	0.745	5.0	214.5	O K
180 min Summer	97.791	0.791	5.0	227.9	O K
240 min Summer	97.812	0.812	5.0	233.9	O K
360 min Summer	97.815	0.815	5.0	234.7	O K
480 min Summer	97.798	0.798	5.0	229.8	O K
600 min Summer	97.777	0.777	5.0	223.9	O K
720 min Summer	97.756	0.756	5.0	217.8	O K
960 min Summer	97.714	0.714	5.0	205.8	O K
1440 min Summer	97.633	0.633	5.0	182.4	O K
2160 min Summer	97.524	0.524	5.0	150.8	O K
2880 min Summer	97.430	0.430	5.0	123.9	O K
4320 min Summer	97.292	0.292	4.9	84.2	O K
5760 min Summer	97.208	0.208	4.6	59.8	O K
7200 min Summer	97.156	0.156	4.3	45.0	O K
8640 min Summer	97.126	0.126	4.1	36.3	O K
10080 min Summer	97.112	0.112	3.7	32.2	O K
15 min Winter	97.451	0.451	5.0	129.9	O K
30 min Winter	97.588	0.588	5.0	169.5	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	128.336	0.0	118.4	26	
30 min Summer	84.360	0.0	156.1	40	
60 min Summer	52.892	0.0	197.7	68	
120 min Summer	32.091	0.0	240.0	128	
180 min Summer	23.662	0.0	265.5	186	
240 min Summer	18.958	0.0	283.7	244	
360 min Summer	13.760	0.0	308.9	362	
480 min Summer	10.974	0.0	328.5	448	
600 min Summer	9.199	0.0	344.2	494	
720 min Summer	7.961	0.0	357.4	550	
960 min Summer	6.333	0.0	379.0	672	
1440 min Summer	4.580	0.0	411.0	934	
2160 min Summer	3.307	0.0	446.7	1324	
2880 min Summer	2.622	0.0	472.1	1704	
4320 min Summer	1.888	0.0	509.3	2420	
5760 min Summer	1.494	0.0	538.6	3112	
7200 min Summer	1.245	0.0	561.1	3752	
8640 min Summer	1.073	0.0	579.8	4416	
10080 min Summer	0.946	0.0	595.6	5144	
15 min Winter	128.336	0.0	132.8	26	
30 min Winter	84.360	0.0	174.9	40	
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Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	97.724	0.724	5.0	208.5	O K
120 min Winter	97.848	0.848	5.0	244.1	O K
180 min Winter	97.904	0.904	5.0	260.3	O K
240 min Winter	97.930	0.930	5.0	268.0	O K
360 min Winter	97.941	0.941	5.0	271.0	O K
480 min Winter	97.931	0.931	5.0	268.2	O K
600 min Winter	97.909	0.909	5.0	261.9	O K
720 min Winter	97.881	0.881	5.0	253.9	O K
960 min Winter	97.829	0.829	5.0	238.7	O K
1440 min Winter	97.701	0.701	5.0	201.9	O K
2160 min Winter	97.530	0.530	5.0	152.7	O K
2880 min Winter	97.392	0.392	5.0	113.0	O K
4320 min Winter	97.218	0.218	4.7	62.9	O K
5760 min Winter	97.136	0.136	4.2	39.2	O K
7200 min Winter	97.109	0.109	3.6	31.3	O K
8640 min Winter	97.094	0.094	3.1	27.2	O K
10080 min Winter	97.085	0.085	2.8	24.5	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Winter	52.892	0.0	221.5	68	
120 min Winter	32.091	0.0	268.9	126	
180 min Winter	23.662	0.0	297.5	182	
240 min Winter	18.958	0.0	317.8	240	
360 min Winter	13.760	0.0	346.0	354	
480 min Winter	10.974	0.0	367.9	464	
600 min Winter	9.199	0.0	385.5	568	
720 min Winter	7.961	0.0	400.3	648	
960 min Winter	6.333	0.0	424.5	748	
1440 min Winter	4.580	0.0	460.3	1028	
2160 min Winter	3.307	0.0	500.3	1428	
2880 min Winter	2.622	0.0	528.9	1792	
4320 min Winter	1.888	0.0	570.7	2468	
5760 min Winter	1.494	0.0	603.3	3072	
7200 min Winter	1.245	0.0	628.5	3744	
8640 min Winter	1.073	0.0	649.5	4424	
10080 min Winter	0.946	0.0	667.3	5144	
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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	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.501

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From: To: (ha)		From: To: (ha)		From: To: (ha)	
0 4 0.167		4 8 0.167		8 12 0.167	

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Chester Bus. Park
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Micro Drainage

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Surface Water Storage
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Model Details

Storage is Online Cover Level (m) 100.000

Tank or Pond Structure

Invert Level (m) 97.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	288.0	1.320	288.0	1.321	0.0

Hydro-Brake Optimum® Outflow Control

Unit Reference MD-SHE-0101-5000-1320-5000

Design Head (m) 1.320

Design Flow (l/s) 5.0

Flush-Flo™ Calculated

Objective Minimise upstream storage

Diameter (mm) 101

Invert Level (m) 97.000

Minimum Outlet Pipe Diameter (mm) 150

Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.320	5.0
Flush-Flo™	0.395	5.0
Kick-Flo®	0.815	4.0
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	3.3	1.200	4.8	3.000	7.3	7.000	10.9
0.200	4.6	1.400	5.1	3.500	7.9	7.500	11.3
0.300	4.9	1.600	5.5	4.000	8.4	8.000	11.7
0.400	5.0	1.800	5.8	4.500	8.9	8.500	12.0
0.500	4.9	2.000	6.1	5.000	9.3	9.000	12.3
0.600	4.8	2.200	6.3	5.500	9.7	9.500	12.6
0.800	4.1	2.400	6.6	6.000	10.2		
1.000	4.4	2.600	6.8	6.500	10.6		

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