

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	250.0
Additional Flow (%)	10	Minimum Velocity (m/s)	0.75
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	0.600
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Width (mm)	Depth (m)
5	0.086	5.00	6.100	1200		0.818
4			6.120	1200	900	0.869
3			6.075	1200	900	1.311
2			5.750	1200	900	1.063
1			5.680	1200	900	1.135

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.003	42.699	300.0	225	5.750	4.687	0.838	5.680	4.545	0.910
1.002	22.985	300.0	225	6.075	4.764	1.086	5.750	4.687	0.838
1.001	73.389	178.0	150	6.120	5.251	0.719	6.075	4.839	1.086
1.000	5.499	178.0	150	6.100	5.282	0.668	6.120	5.251	0.719

Link	US Node	DS Node
1.003	2	1
1.002	3	2
1.001	4	3
1.000	5	4

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
5	6.100	0.818	1200					
					0	1.000	5.282	150
4	6.120	0.869	1200	900		1	1.000	5.251
					0	1.001	5.251	150
3	6.075	1.311	1200	900		1	1.001	4.839
					0	1.002	4.764	225

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)	
2	5.750	1.063	1200	900		1	1.002	4.687	225
						0	1.003	4.687	225
1	5.680	1.135	1200	900		1	1.003	4.545	225

Node 5 Time-Area Diagram

Overrides Design Area	x	Depression Storage Depth (mm)	5
Overrides Design Additional Inflow	x	Evapo-transpiration (mm/day)	3
Depression Storage Area (m ²)	858		
Applies to All storms			

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-2	0.020	4-6	0.020	8-10	0.020	12-14	0.020	16-18	0.020	20-22	0.020
2-4	0.020	6-8	0.020	10-12	0.020	14-16	0.020	18-20	0.020	22-24	0.010

Node 4 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	5.251	Product Number	CTL-SHE-0077-2500-0865-2500
Design Depth (m)	0.865	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.5	Min Node Diameter (mm)	1200

Node 5 Online Orifice Control

Flap Valve	x	Invert Level (m)	5.282	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.225		

Node 5 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	5.282	Slope (1:X)	5000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.625
Safety Factor	2.0	Width (m)	10.460	Inf Depth (m)	
Porosity	0.32	Length (m)	82.000		

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	92.521	26.180
1 year 15 minute winter	64.927	26.180
1 year 30 minute summer	60.022	16.984
1 year 30 minute winter	42.121	16.984
1 year 60 minute summer	40.398	10.676
1 year 60 minute winter	26.839	10.676
1 year 120 minute summer	24.980	6.602

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 120 minute winter	16.596	6.602
1 year 180 minute summer	19.271	4.959
1 year 180 minute winter	12.527	4.959
1 year 240 minute summer	15.301	4.043
1 year 240 minute winter	10.165	4.043
1 year 360 minute summer	11.775	3.030
1 year 360 minute winter	7.654	3.030
1 year 480 minute summer	9.342	2.469
1 year 480 minute winter	6.207	2.469
1 year 600 minute summer	7.682	2.101
1 year 600 minute winter	5.249	2.101
1 year 720 minute summer	6.859	1.838
1 year 720 minute winter	4.609	1.838
1 year 960 minute summer	5.653	1.489
1 year 960 minute winter	3.745	1.489
1 year 1440 minute summer	4.127	1.106
1 year 1440 minute winter	2.773	1.106
30 year 15 minute summer	226.195	64.005
30 year 15 minute winter	158.733	64.005
30 year 30 minute summer	147.452	41.724
30 year 30 minute winter	103.475	41.724
30 year 60 minute summer	98.615	26.061
30 year 60 minute winter	65.517	26.061
30 year 120 minute summer	59.946	15.842
30 year 120 minute winter	39.827	15.842
30 year 180 minute summer	45.598	11.734
30 year 180 minute winter	29.640	11.734
30 year 240 minute summer	35.759	9.450
30 year 240 minute winter	23.758	9.450
30 year 360 minute summer	26.939	6.932
30 year 360 minute winter	17.511	6.932
30 year 480 minute summer	20.981	5.545
30 year 480 minute winter	13.940	5.545
30 year 600 minute summer	17.039	4.661
30 year 600 minute winter	11.642	4.661
30 year 720 minute summer	15.093	4.045
30 year 720 minute winter	10.143	4.045
30 year 960 minute summer	12.278	3.233
30 year 960 minute winter	8.133	3.233
30 year 1440 minute summer	8.788	2.355
30 year 1440 minute winter	5.906	2.355
100 year +40% CC 15 minute summer	408.473	115.584
100 year +40% CC 15 minute winter	286.647	115.584
100 year +40% CC 30 minute summer	268.775	76.054
100 year +40% CC 30 minute winter	188.614	76.054
100 year +40% CC 60 minute summer	180.954	47.821
100 year +40% CC 60 minute winter	120.222	47.821
100 year +40% CC 120 minute summer	110.370	29.168
100 year +40% CC 120 minute winter	73.327	29.168
100 year +40% CC 180 minute summer	83.953	21.604
100 year +40% CC 180 minute winter	54.572	21.604
100 year +40% CC 240 minute summer	65.765	17.380

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +40% CC 240 minute winter	43.693	17.380
100 year +40% CC 360 minute summer	49.370	12.705
100 year +40% CC 360 minute winter	32.092	12.705
100 year +40% CC 480 minute summer	38.291	10.119
100 year +40% CC 480 minute winter	25.439	10.119
100 year +40% CC 600 minute summer	30.992	8.477
100 year +40% CC 600 minute winter	21.176	8.477
100 year +40% CC 720 minute summer	27.387	7.340
100 year +40% CC 720 minute winter	18.406	7.340
100 year +40% CC 960 minute summer	22.191	5.844
100 year +40% CC 960 minute winter	14.700	5.844
100 year +40% CC 1440 minute summer	15.789	4.232
100 year +40% CC 1440 minute winter	10.611	4.232
100 year +40% CC +10% A 15 minute summer	408.473	115.584
100 year +40% CC +10% A 15 minute winter	286.647	115.584
100 year +40% CC +10% A 30 minute summer	268.775	76.054
100 year +40% CC +10% A 30 minute winter	188.614	76.054
100 year +40% CC +10% A 60 minute summer	180.954	47.821
100 year +40% CC +10% A 60 minute winter	120.222	47.821
100 year +40% CC +10% A 120 minute summer	110.370	29.168
100 year +40% CC +10% A 120 minute winter	73.327	29.168
100 year +40% CC +10% A 180 minute summer	83.953	21.604
100 year +40% CC +10% A 180 minute winter	54.572	21.604
100 year +40% CC +10% A 240 minute summer	65.765	17.380
100 year +40% CC +10% A 240 minute winter	43.693	17.380
100 year +40% CC +10% A 360 minute summer	49.370	12.705
100 year +40% CC +10% A 360 minute winter	32.092	12.705
100 year +40% CC +10% A 480 minute summer	38.291	10.119
100 year +40% CC +10% A 480 minute winter	25.439	10.119
100 year +40% CC +10% A 600 minute summer	30.992	8.477
100 year +40% CC +10% A 600 minute winter	21.176	8.477
100 year +40% CC +10% A 720 minute summer	27.387	7.340
100 year +40% CC +10% A 720 minute winter	18.406	7.340
100 year +40% CC +10% A 960 minute summer	22.191	5.844
100 year +40% CC +10% A 960 minute winter	14.700	5.844
100 year +40% CC +10% A 1440 minute summer	15.789	4.232
100 year +40% CC +10% A 1440 minute winter	10.611	4.232



Results for 1 year Critical Storm Duration. Lowest mass balance: 99.37%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	5	184	5.372	0.090	7.2	22.7551	0.0000	OK
240 minute winter	4	184	5.369	0.118	2.3	0.1275	0.0000	OK
240 minute winter	3	184	4.806	0.042	2.3	0.0454	0.0000	OK
240 minute winter	2	184	4.730	0.043	2.3	0.0464	0.0000	OK
240 minute winter	1	184	4.583	0.038	2.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute winter	5	1.000	4	2.3	0.290	0.171	0.0705	
240 minute winter	4	Hydro-Brake®	3	2.3				
240 minute winter	3	1.002	2	2.3	0.436	0.076	0.1193	
240 minute winter	2	1.003	1	2.3	0.468	0.076	0.2071	35.2



Results for 30 year Critical Storm Duration. Lowest mass balance: 99.37%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	5	232	5.543	0.261	17.0	70.4768	0.0000	SURCHARGED
240 minute winter	4	232	5.539	0.288	2.7	0.3109	0.0000	SURCHARGED
240 minute winter	3	160	4.808	0.044	2.5	0.0478	0.0000	OK
120 minute winter	2	100	4.732	0.045	2.5	0.0486	0.0000	OK
120 minute winter	1	100	4.585	0.040	2.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute winter	5	1.000	4	2.7	0.288	0.202	0.0968	
240 minute winter	4	Hydro-Brake®	3	2.5				
240 minute winter	3	1.002	2	2.5	0.449	0.084	0.1280	
120 minute winter	2	1.003	1	2.5	0.480	0.084	0.2226	46.3



Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.37%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	5	360	5.851	0.569	23.1	156.9048	0.0000	FLOOD RISK
360 minute winter	4	360	5.848	0.597	2.6	0.6446	0.0000	FLOOD RISK
60 minute winter	3	40	4.808	0.044	2.5	0.0478	0.0000	OK
15 minute winter	2	74	4.732	0.045	2.5	0.0486	0.0000	OK
15 minute winter	1	75	4.585	0.040	2.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute winter	5	1.000	4	2.6	0.281	0.193	0.0968	
360 minute winter	4	Hydro-Brake®	3	2.5				
60 minute winter	3	1.002	2	2.5	0.450	0.084	0.1280	
15 minute winter	2	1.003	1	2.5	0.480	0.084	0.2226	36.2



Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.37%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
480 minute winter	5	456	6.100	0.818	20.5	175.2721	0.5783	FLOOD
480 minute winter	4	456	6.096	0.845	2.6	0.9122	0.0000	FLOOD RISK
60 minute winter	3	39	4.808	0.044	2.5	0.0478	0.0000	OK
15 minute summer	2	64	4.732	0.045	2.5	0.0486	0.0000	OK
15 minute summer	1	64	4.585	0.040	2.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
480 minute winter	5	1.000	4	2.6	0.283	0.198	0.0968	
480 minute winter	4	Hydro-Brake®	3	2.5				
60 minute winter	3	1.002	2	2.5	0.450	0.084	0.1280	
15 minute summer	2	1.003	1	2.5	0.480	0.084	0.2226	36.1