

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	5	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	1.500
Ratio-R	0.400	Preferred Cover Depth (m)	0.750
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)	Easting (m)	Northing (m)	Depth (m)
14	0.020	5.00	41.700	1240	675	470616.546	173422.627	1.300
13	0.049	5.00	41.200	475		470616.260	173473.877	1.220
11D	0.045	5.00	41.300	700	700	470622.268	173481.486	0.780
11			41.200	1200		470626.427	173481.366	0.730
12	0.004	5.00	41.200	1200		470632.577	173476.527	1.265
Permeable Paving		5.00	41.200	50		470655.525	173504.435	0.310
TANK 1	0.267	5.00	41.200	50		470654.885	173503.581	1.240
2			41.200	1200		470651.372	173503.727	1.260
8		5.00	41.200	1200		470623.902	173515.446	1.305
TANK 2	0.030	5.00	41.200	50		470636.709	173507.667	1.330
1	0.013	5.00	41.200	1200		470638.261	173527.880	1.336
6552			41.160	1200		470638.679	173537.529	1.340

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	41.997	100.0	150	Circular	41.700	40.400	1.150	41.200	39.980	1.070
1.001	16.445	365.4	150	Circular	41.200	39.980	1.070	41.200	39.935	1.115
2.000	4.161	83.2	150	Circular	41.300	40.520	0.630	41.200	40.470	0.580
2.001	7.825	14.6	150	Circular	41.200	40.470	0.580	41.200	39.935	1.115
1.002	10.075	155.0	225	Circular	41.200	39.935	1.040	41.200	39.870	1.105
3.001	3.516	175.8	225	Circular	41.200	39.960	1.015	41.200	39.940	1.035
3.002	15.183	216.9	225	Circular	41.200	39.940	1.035	41.200	39.870	1.105
4.000	14.984	599.4	225	Circular	41.200	39.895	1.080	41.200	39.870	1.105
1.003	20.272	3378.7	225	Circular	41.200	39.870	1.105	41.200	39.864	1.111
1.004	9.658	219.5	225	Circular	41.200	39.864	1.111	41.160	39.820	1.115

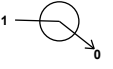
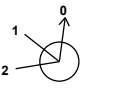
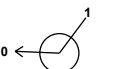
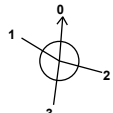
Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	14	1240	675	Manhole	Adoptable	13	475	Manhole	Adoptable
1.001	13	475		Manhole	Adoptable	12	1200	Manhole	Adoptable
2.000	11D	700	700	Manhole	Adoptable	11	1200	Manhole	Adoptable
2.001	11	1200		Manhole	Adoptable	12	1200	Manhole	Adoptable
1.002	12	1200		Manhole	Adoptable	TANK 2	50	Manhole	Adoptable
3.001	TANK 1	50		Manhole	Adoptable	2	1200	Manhole	Adoptable
3.002	2	1200		Manhole	Adoptable	TANK 2	50	Manhole	Adoptable
4.000	8	1200		Junction	Adoptable	TANK 2	50	Manhole	Adoptable
1.003	TANK 2	50		Manhole	Adoptable	1	1200	Manhole	Adoptable
1.004	1	1200		Manhole	Adoptable	6552	1200	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
3.000	1.067	2.0	150	Circular	41.200	40.890	0.160	41.200	40.360	0.690

Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
3.000	Permeable Paving	50		Manhole	Adoptable	TANK 1	50	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	MH Type	Connections
14	470616.546	173422.627	41.700	1.300	1240	675	Adoptable	
								0
13	470616.260	173473.877	41.200	1.220	475		Adoptable	
								0
11D	470622.268	173481.486	41.300	0.780	700	700	Adoptable	
								0
11	470626.427	173481.366	41.200	0.730	1200		Adoptable	
								0
12	470632.577	173476.527	41.200	1.265	1200		Adoptable	
								1 2
Permeable Paving	470655.525	173504.435	41.200	0.310	50		Adoptable	
								0
TANK 1	470654.885	173503.581	41.200	1.240	50		Adoptable	
								0
2	470651.372	173503.727	41.200	1.260	1200		Adoptable	
								0
8	470623.902	173515.446	41.200	1.305	1200			
								0
TANK 2	470636.709	173507.667	41.200	1.330	50		Adoptable	
								1 2 3 0

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	MH Type	Connections
1	470638.261	173527.880	41.200	1.336	1200		Adoptable	 1
6552	470638.679	173537.529	41.160	1.340	1200		Adoptable	 1

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	17.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	40	0	0

Node 1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	39.864	Product Number	CTL-SHE-0073-2500-1150-2500
Design Depth (m)	1.150	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.5	Min Node Diameter (mm)	1200

Node 11 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	0.5		
Invert Level (m)	40.470	Diameter (m)	0.019		

Node TANK 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	39.960
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	286.0	0.0	0.400	286.0	0.0	0.401	0.0	0.0

Node 12 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	39.935
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	75.0	0.0	0.400	75.0	0.0	0.401	0.0	0.0

Node TANK 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	39.870
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	105.0	0.0	0.400	105.0	0.0	0.401	0.0	0.0

Node 11D Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	40.520
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	730.0	0.0	0.200	730.0	0.0	0.201	0.0	0.0

Node Permeable Paving Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	40.890
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	112

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	590.0	0.0	0.200	590.0	0.0	0.201	0.0	0.0

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
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

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
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
1 year 2160 minute summer	2.975	0.822
1 year 2160 minute winter	2.050	0.822
1 year 2880 minute summer	2.487	0.666
1 year 2880 minute winter	1.671	0.666
1 year 4320 minute summer	1.898	0.496
1 year 4320 minute winter	1.250	0.496
1 year 5760 minute summer	1.570	0.402
1 year 5760 minute winter	1.016	0.402
1 year 7200 minute summer	1.338	0.341
1 year 7200 minute winter	0.864	0.341
1 year 8640 minute summer	1.171	0.299
1 year 8640 minute winter	0.756	0.299
1 year 10080 minute summer	1.047	0.267
1 year 10080 minute winter	0.676	0.267
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
30 year 2160 minute summer	6.201	1.714
30 year 2160 minute winter	4.273	1.714
30 year 2880 minute summer	5.100	1.367
30 year 2880 minute winter	3.428	1.367
30 year 4320 minute summer	3.798	0.993
30 year 4320 minute winter	2.501	0.993

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year 5760 minute summer	3.090	0.791
30 year 5760 minute winter	2.000	0.791
30 year 7200 minute summer	2.598	0.663
30 year 7200 minute winter	1.677	0.663
30 year 8640 minute summer	2.248	0.574
30 year 8640 minute winter	1.451	0.574
30 year 10080 minute summer	1.989	0.507
30 year 10080 minute winter	1.284	0.507
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
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 2160 minute summer	11.070	3.059
100 year +40% CC 2160 minute winter	7.628	3.059
100 year +40% CC 2880 minute summer	9.060	2.428
100 year +40% CC 2880 minute winter	6.089	2.428
100 year +40% CC 4320 minute summer	6.697	1.751
100 year +40% CC 4320 minute winter	4.410	1.751
100 year +40% CC 5760 minute summer	5.418	1.387
100 year +40% CC 5760 minute winter	3.507	1.387
100 year +40% CC 7200 minute summer	4.536	1.157
100 year +40% CC 7200 minute winter	2.928	1.157
100 year +40% CC 8640 minute summer	3.910	0.998
100 year +40% CC 8640 minute winter	2.524	0.998
100 year +40% CC 10080 minute summer	3.448	0.880
100 year +40% CC 10080 minute winter	2.226	0.880

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.48%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	14	10	40.436	0.036	2.4	0.0415	0.0000	OK
15 minute winter	13	9	40.094	0.114	8.1	0.1116	0.0000	OK
480 minute winter	11D	368	40.541	0.021	0.7	4.7223	0.0000	OK
480 minute winter	11	376	40.546	0.076	0.7	0.0857	0.0000	OK
360 minute winter	12	264	40.016	0.081	1.5	5.8614	0.0000	OK
15 minute summer	Permeable Paving	1	40.890	0.000	0.0	0.0000	0.0000	OK
120 minute winter	TANK 1	82	40.021	0.061	10.2	16.9323	0.0000	OK
360 minute winter	2	264	40.016	0.076	3.6	0.0860	0.0000	OK
360 minute winter	8	264	40.016	0.121	0.1	0.0000	0.0000	OK
360 minute winter	TANK 2	264	40.016	0.146	4.9	14.6185	0.0000	OK
360 minute winter	1	264	40.015	0.151	2.2	0.2005	0.0000	OK
15 minute summer	6552	1	39.820	0.000	1.4	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	14	1.000	13	2.3	0.275	0.128	0.3664	
15 minute winter	13	1.001	12	8.4	1.130	0.910	0.1266	
600 minute winter	11D	2.000	11	0.7	0.152	0.036	0.0214	
480 minute winter	11	Orifice	12	0.2				
60 minute winter	12	1.002	TANK 2	3.2	0.578	0.076	0.1493	
15 minute summer	Permeable Paving	3.000	TANK 1	0.0	0.000	0.000	0.0000	
120 minute winter	TANK 1	3.001	2	5.2	0.619	0.133	0.0305	
120 minute winter	2	3.002	TANK 2	5.2	0.520	0.148	0.2787	
30 minute winter	8	4.000	TANK 2	-0.2	-0.080	-0.010	0.2046	
360 minute winter	TANK 2	1.003	1	2.2	0.140	0.254	0.5637	
360 minute winter	1	Hydro-Brake®	6552	2.2				53.4

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.48%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	14	10	40.458	0.058	5.8	0.0665	0.0000	OK
15 minute winter	13	11	40.316	0.336	20.0	0.3289	0.0000	SURCHARGED
480 minute winter	11D	448	40.576	0.056	1.6	12.3069	0.0000	OK
480 minute winter	11	448	40.578	0.108	0.8	0.1227	0.0000	OK
360 minute winter	12	344	40.153	0.218	3.1	15.8060	0.0000	OK
15 minute summer	Permeable Paving	1	40.890	0.000	0.0	0.0000	0.0000	OK
360 minute winter	TANK 1	344	40.153	0.193	10.9	53.3722	0.0000	OK
360 minute winter	2	344	40.153	0.213	5.4	0.2413	0.0000	OK
360 minute winter	8	344	40.153	0.258	0.1	0.0000	0.0000	SURCHARGED
360 minute winter	TANK 2	344	40.153	0.283	6.3	28.3736	0.0000	SURCHARGED
360 minute winter	1	344	40.153	0.289	2.4	0.3828	0.0000	SURCHARGED
15 minute summer	6552	1	39.820	0.000	2.2	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	14	1.000	13	5.7	0.403	0.319	0.5019	
15 minute winter	13	1.001	12	19.3	1.394	2.104	0.2237	
60 minute winter	11D	2.000	11	0.9	0.216	0.046	0.0329	
480 minute winter	11	Orifice	12	0.2				
30 minute winter	12	1.002	TANK 2	10.8	0.785	0.258	0.3178	
15 minute summer	Permeable Paving	3.000	TANK 1	0.0	0.000	0.000	0.0000	
30 minute winter	TANK 1	3.001	2	16.3	0.764	0.417	0.0789	
30 minute winter	2	3.002	TANK 2	16.2	0.867	0.461	0.4681	
15 minute winter	8	4.000	TANK 2	-1.0	-0.156	-0.049	0.4384	
15 minute winter	TANK 2	1.003	1	2.7	-0.317	0.310	0.6544	
360 minute winter	1	Hydro-Brake®	6552	2.4				69.1

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.48%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	14	272	41.026	0.626	1.5	0.7170	0.0000	SURCHARGED
360 minute winter	13	272	41.027	1.047	5.2	1.0260	0.0000	FLOOD RISK
960 minute winter	11D	960	40.680	0.160	1.8	35.3223	0.0000	SURCHARGED
960 minute winter	11	960	40.680	0.210	0.8	0.2375	0.0000	SURCHARGED
360 minute winter	12	272	41.026	1.091	5.6	29.8385	0.0000	FLOOD RISK
480 minute winter	Permeable Paving	464	40.963	0.073	6.3	12.8886	0.0000	OK
360 minute winter	TANK 1	272	41.025	1.065	20.0	113.4054	0.0000	FLOOD RISK
360 minute winter	2	272	41.026	1.086	5.5	1.2277	0.0000	FLOOD RISK
360 minute winter	8	272	41.026	1.131	1.6	0.0000	0.0000	FLOOD RISK
360 minute winter	TANK 2	272	41.026	1.156	7.4	40.4737	0.0000	FLOOD RISK
360 minute winter	1	272	41.026	1.162	4.1	1.5410	0.0000	FLOOD RISK
15 minute summer	6552	1	39.820	0.000	2.4	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	14	1.000	13	9.9	0.561	0.557	0.7393	
15 minute winter	13	1.001	12	32.0	2.005	3.487	0.2894	
15 minute summer	11D	2.000	11	1.4	0.401	0.070	0.0336	
960 minute winter	11	Orifice	12	0.3				
15 minute winter	12	1.002	TANK 2	18.7	0.853	0.450	0.3835	
600 minute winter	Permeable Paving	3.000	TANK 1	8.9	0.671	0.070	0.0133	
30 minute winter	TANK 1	3.001	2	29.1	0.849	0.744	0.1398	
30 minute winter	2	3.002	TANK 2	28.4	0.940	0.808	0.6038	
360 minute winter	8	4.000	TANK 2	3.3	0.084	0.159	0.5959	
180 minute winter	TANK 2	1.003	1	8.2	0.206	0.956	0.8062	
360 minute winter	1	Hydro-Brake®	6552	2.5				72.8