Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.600
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Circular Link Type

Shape	Circular	Auto Increment (mm)	75
Barrels	1	Follow Ground	x

Available Diameters (mm)

100 | 150

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.008	5.00	65.620	450	435263.837	403717.899	0.720
S2	0.005	5.00	65.550	450	435259.722	403706.379	0.861
S3	0.002	5.00	65.500	450	435263.965	403704.328	0.944
S4	0.004	5.00	64.700	450	435271.623	403691.507	0.700
S5	0.007	5.00	64.700	450	435256.444	403683.463	0.700
S6	0.019	5.00	64.700	450	435261.050	403695.563	1.000
S7	0.008	5.00	65.000	450	435250.371	403696.977	0.800
S8	0.008	5.00	65.050	450	435240.384	403700.240	0.850
S9	0.004	5.00	65.900	450	435245.509	403711.575	0.992
S10	0.000		65.500	1200	435240.213	403703.642	2.062
C1	0.000		64.450	450	435232.097	403681.280	1.310
TANK	0.000		65.000		435241.224	403703.277	1.500

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S1	S2	12.233	0.600	64.900	64.689	0.211	58.0	100	5.20	50.0
1.001	S2	S3	4.713	0.600	64.689	64.606	0.083	56.8	100	5.28	50.0
1.002	S3	S6	9.237	0.600	64.556	63.700	0.856	10.8	150	5.44	50.0
3.000	S4	S6	11.324	0.600	64.000	63.750	0.250	45.3	100	5.19	50.0
2.000	S5	S6	12.947	0.600	64.000	63.750	0.250	51.8	100	5.23	50.0
1.003	S6	TANK	21.274	0.600	63.700	63.500	0.200	106.4	150	5.61	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.013	8.0	2.0	0.620	0.761	0.008	0.0	35	0.851
1.001	1.024	8.0	3.3	0.761	0.794	0.013	0.0	44	0.969
1.002	3.084	54.5	3.8	0.794	0.850	0.015	0.0	27	1.778
3.000	1.148	9.0	1.0	0.600	0.850	0.004	0.0	23	0.765
2.000	1.073	8.4	1.8	0.600	0.850	0.007	0.0	31	0.845
1.003	0.974	17.2	11.4	0.850	1.350	0.045	0.0	89	1.040

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
5.000	S7	TANK	11.107	0.600	64.200	64.000	0.200	55.5	100	5.01	50.0
4.000	S8	TANK	3.151	0.600	64.200	64.000	0.200	15.8	100	5.10	50.0
1.004	TANK	S10	1.075	0.600	63.500	63.488	0.012	89.6	150	5.81	50.0
6.000	S9	S10	9.538	0.600	64.908	63.538	1.370	7.0	100	5.16	50.0
1.005	S10	C1	23.789	0.600	63.438	63.140	0.298	79.8	100	6.20	50.0

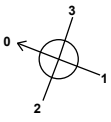
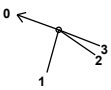
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
5.000	1.036	8.1	2.0	0.700	0.900	0.008	0.0	34	0.859
4.000	1.956	15.4	2.0	0.750	0.900	0.008	0.0	25	1.357
1.004	1.062	18.8	15.4	1.350	1.862	0.061	0.0	104	1.184
6.000	2.948	23.2	1.0	0.892	1.862	0.004	0.0	14	1.478
1.005	0.862	6.8	16.4	1.962	1.210	0.065	0.0	100	0.885

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	12.233	58.0	100	Circular	65.620	64.900	0.620	65.550	64.689	0.761
1.001	4.713	56.8	100	Circular	65.550	64.689	0.761	65.500	64.606	0.794
1.002	9.237	10.8	150	Circular	65.500	64.556	0.794	64.700	63.700	0.850
3.000	11.324	45.3	100	Circular	64.700	64.000	0.600	64.700	63.750	0.850
2.000	12.947	51.8	100	Circular	64.700	64.000	0.600	64.700	63.750	0.850
1.003	21.274	106.4	150	Circular	64.700	63.700	0.850	65.000	63.500	1.350
5.000	11.107	55.5	100	Circular	65.000	64.200	0.700	65.000	64.000	0.900
4.000	3.151	15.8	100	Circular	65.050	64.200	0.750	65.000	64.000	0.900
1.004	1.075	89.6	150	Circular	65.000	63.500	1.350	65.500	63.488	1.862
6.000	9.538	7.0	100	Circular	65.900	64.908	0.892	65.500	63.538	1.862
1.005	23.789	79.8	100	Circular	65.500	63.438	1.962	64.450	63.140	1.210

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	450	Manhole	Adoptable	S2	450	Manhole	Adoptable
1.001	S2	450	Manhole	Adoptable	S3	450	Manhole	Adoptable
1.002	S3	450	Manhole	Adoptable	S6	450	Manhole	Adoptable
3.000	S4	450	Manhole	Adoptable	S6	450	Manhole	Adoptable
2.000	S5	450	Manhole	Adoptable	S6	450	Manhole	Adoptable
1.003	S6	450	Manhole	Adoptable	TANK		Junction	
5.000	S7	450	Manhole	Adoptable	TANK		Junction	
4.000	S8	450	Manhole	Adoptable	TANK		Junction	
1.004	TANK		Junction		S10	1200	Manhole	Adoptable
6.000	S9	450	Manhole	Adoptable	S10	1200	Manhole	Adoptable
1.005	S10	1200	Manhole	Adoptable	C1	450	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1	435263.837	403717.899	65.620	0.720	450				
						0	1.000	64.900	100
S2	435259.722	403706.379	65.550	0.861	450		1	1.000	64.689	100
							0	1.001	64.689	100
S3	435263.965	403704.328	65.500	0.944	450		1	1.001	64.606	100
							0	1.002	64.556	150
S4	435271.623	403691.507	64.700	0.700	450					
						0	3.000	64.000	100
S5	435256.444	403683.463	64.700	0.700	450				
						0	2.000	64.000	100
S6	435261.050	403695.563	64.700	1.000	450		1	3.000	63.750	100
							2	2.000	63.750	100
							3	1.002	63.700	150
							0	1.003	63.700	150
S7	435250.371	403696.977	65.000	0.800	450					
						0	5.000	64.200	100
S8	435240.384	403700.240	65.050	0.850	450				
						0	4.000	64.200	100
S9	435245.509	403711.575	65.900	0.992	450				
						0	6.000	64.908	100
S10	435240.213	403703.642	65.500	2.062	1200		1	6.000	63.538	100
							2	1.004	63.488	150
							0	1.005	63.438	100
C1	435232.097	403681.280	64.450	1.310	450		1	1.005	63.140	100
TANK	435241.224	403703.277	65.000	1.500			1	4.000	64.000	100
							2	5.000	64.000	100
							3	1.003	63.500	150
							0	1.004	63.500	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	0.0
Summer CV	1.000	Check Discharge Rate(s)	x
Winter CV	1.000	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	40	10	0

Node S10 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	63.438	Product Number	CTL-SHE-0072-2500-1250-2500
Design Depth (m)	1.250	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.5	Min Node Diameter (mm)	1200

Node TANK Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	63.500
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	196

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	35.0	0.0	0.800	35.0	0.0	0.801	0.0	0.0

Approval Settings

Node Size	✓	Minimum Full Bore Velocity (m/s)	
Node Losses	✓	Maximum Full Bore Velocity (m/s)	3.000
Link Size	✓	Proportional Velocity	✓
Minimum Diameter (mm)	150	Return Period (years)	
Link Length	✓	Minimum Proportional Velocity (m/s)	0.750
Maximum Length (m)	100.000	Maximum Proportional Velocity (m/s)	3.000
Coordinates	✓	Surcharged Depth	✓
Accuracy (m)	1.000	Return Period (years)	
Crossings	✓	Maximum Surcharged Depth (m)	0.100
Cover Depth	✓	Flooding	✓
Minimum Cover Depth (m)		Return Period (years)	30
Maximum Cover Depth (m)	3.000	Time to Half Empty	x
Backdrops	✓	Discharge Rates	✓
Minimum Backdrop Height (m)		Discharge Volume	✓
Maximum Backdrop Height (m)	1.500	100 year 360 minute (m³)	
Full Bore Velocity	✓		

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	11	64.928	0.028	1.4	0.0045	0.0000	OK
15 minute summer	S2	11	64.728	0.039	2.3	0.0062	0.0000	OK
15 minute summer	S3	10	64.579	0.023	2.7	0.0036	0.0000	OK
15 minute summer	S4	11	64.019	0.019	0.7	0.0030	0.0000	OK
15 minute summer	S5	10	64.027	0.027	1.3	0.0042	0.0000	OK
15 minute summer	S6	10	63.776	0.076	8.0	0.0120	0.0000	OK
15 minute summer	S7	11	64.228	0.028	1.4	0.0045	0.0000	OK
15 minute summer	S8	10	64.221	0.021	1.4	0.0033	0.0000	OK
15 minute summer	S9	10	64.920	0.012	0.7	0.0019	0.0000	OK
60 minute summer	S10	43	63.613	0.175	2.7	0.1984	0.0000	SURCHARGED
15 minute summer	C1	1	63.140	0.000	2.1	0.0000	0.0000	OK
60 minute summer	TANK	43	63.614	0.114	7.4	3.9755	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)
15 minute summer	S1	1.000	S2	1.4	0.607	0.176	0.0285	
15 minute summer	S2	1.001	S3	2.3	0.847	0.286	0.0128	
15 minute summer	S3	1.002	S6	2.7	0.544	0.049	0.0489	
15 minute summer	S4	3.000	S6	0.7	0.654	0.078	0.0148	
15 minute summer	S5	2.000	S6	1.3	0.762	0.149	0.0214	
15 minute summer	S6	1.003	TANK	8.0	1.268	0.462	0.1750	
15 minute summer	S7	5.000	TANK	1.4	0.771	0.172	0.0202	
15 minute summer	S8	4.000	TANK	1.4	1.193	0.091	0.0037	
15 minute summer	S9	6.000	S10	0.7	1.309	0.030	0.0229	
60 minute summer	S10	Hydro-Brake®	C1	2.2				8.2
60 minute summer	TANK	1.004	S10	2.2	0.614	0.119	0.0161	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	64.946	0.046	3.5	0.0073	0.0000	OK
15 minute summer	S2	10	64.757	0.068	5.7	0.0109	0.0000	OK
15 minute summer	S3	10	64.591	0.035	6.5	0.0055	0.0000	OK
15 minute summer	S4	10	64.030	0.030	1.8	0.0048	0.0000	OK
15 minute summer	S5	10	64.042	0.042	3.1	0.0066	0.0000	OK
15 minute summer	S6	12	63.906	0.206	19.6	0.0327	0.0000	SURCHARGED
15 minute summer	S7	10	64.246	0.046	3.5	0.0074	0.0000	OK
15 minute summer	S8	10	64.234	0.034	3.5	0.0054	0.0000	OK
15 minute summer	S9	10	64.927	0.019	1.8	0.0030	0.0000	OK
60 minute winter	S10	58	63.852	0.414	2.7	0.4688	0.0000	SURCHARGED
15 minute summer	C1	1	63.140	0.000	2.3	0.0000	0.0000	OK
60 minute winter	TANK	58	63.853	0.353	12.8	12.3491	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	3.5	0.746	0.435	0.0565	
15 minute summer	S2	1.001	S3	5.6	1.037	0.691	0.0253	
15 minute summer	S3	1.002	S6	6.4	0.613	0.118	0.0955	
15 minute summer	S4	3.000	S6	1.8	0.592	0.197	0.0553	
15 minute summer	S5	2.000	S6	3.1	0.754	0.363	0.0701	
15 minute summer	S6	1.003	TANK	18.3	1.341	1.066	0.3745	
15 minute summer	S7	5.000	TANK	3.4	0.982	0.423	0.0390	
15 minute summer	S8	4.000	TANK	3.5	1.529	0.226	0.0072	
15 minute summer	S9	6.000	S10	1.8	1.566	0.077	0.0420	
60 minute winter	S10	Hydro-Brake®	C1	2.3				19.9
60 minute winter	TANK	1.004	S10	2.2	0.602	0.117	0.0189	

Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	11	65.058	0.158	7.0	0.0251	0.0000	SURCHARGED
15 minute summer	S2	11	64.893	0.204	10.6	0.0324	0.0000	SURCHARGED
120 minute winter	S3	116	64.697	0.141	3.9	0.0224	0.0000	OK
120 minute winter	S4	116	64.697	0.697	1.0	0.1109	0.0000	FLOOD RISK
120 minute winter	S5	116	64.698	0.698	1.8	0.1109	0.0000	FLOOD RISK
120 minute winter	S6	116	64.697	0.997	11.4	0.1586	0.0000	FLOOD RISK
120 minute winter	S7	116	64.695	0.495	2.1	0.0788	0.0000	SURCHARGED
120 minute winter	S8	116	64.695	0.495	2.1	0.0787	0.0000	SURCHARGED
15 minute summer	S9	10	64.934	0.026	3.5	0.0042	0.0000	OK
120 minute winter	S10	114	64.693	1.255	4.3	1.4193	0.0000	SURCHARGED
15 minute summer	C1	1	63.140	0.000	2.3	0.0000	0.0000	OK
120 minute winter	TANK	116	64.702	1.202	15.0	28.0175	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	6.4	0.818	0.802	0.0957	
15 minute summer	S2	1.001	S3	10.4	1.333	1.296	0.0365	
120 minute winter	S3	1.002	S6	3.9	0.567	0.072	0.1607	
120 minute winter	S4	3.000	S6	1.0	0.669	0.111	0.0886	
120 minute winter	S5	2.000	S6	1.8	0.783	0.212	0.1013	
120 minute winter	S6	1.003	TANK	10.8	0.942	0.629	0.3745	
120 minute winter	S7	5.000	TANK	2.1	0.863	0.258	0.0869	
120 minute winter	S8	4.000	TANK	2.1	1.336	0.137	0.0247	
15 minute summer	S9	6.000	S10	3.5	1.472	0.150	0.0451	
120 minute winter	S10	Hydro-Brake®	C1	2.5				44.5
120 minute winter	TANK	1.004	S10	4.1	0.592	0.220	0.0189	