

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	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)	20.000	Minimum Backdrop Height (m)	1.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
F10			110.000	1200	2.210
S50			110.250	1200	2.300
S4	0.004	5.00	110.250	1200	1.270
S3	0.003	5.00	110.350	1200	0.960
S2	0.005	5.00	110.000	1200	0.470
S1	0.005	5.00	110.100	1200	0.500
S5	0.011	5.00	110.000	1200	0.980
S6	0.010	5.00	110.000	1200	0.710
S7	0.005	5.00	110.400	1200	0.800
S8	0.019	5.00	110.750	1200	0.860

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	10.490	0.600	109.600	109.530	0.070	149.9	150	5.21	50.0
1.001	S2	S3	20.070	0.600	109.530	109.390	0.140	143.4	150	5.61	50.0
1.002	S3	S4	10.960	0.600	109.390	108.980	0.410	26.7	150	5.71	50.0
1.003	S4	S50	8.071	0.600	108.980	107.950	1.030	7.8	150	5.74	50.0
1.004	S50	F10	11.000	0.600	107.950	107.790	0.160	68.8	150	5.89	50.0
2.000	S6	S5	8.100	0.600	109.290	109.020	0.270	30.0	150	5.07	50.0
2.001	S5	S4	3.900	0.600	109.020	108.980	0.040	97.5	150	5.14	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	0.818	14.5	0.7	0.350	0.320	0.005	0.0	22	0.414
1.001	0.837	14.8	1.4	0.320	0.810	0.010	0.0	31	0.523
1.002	1.955	34.5	4.3	0.810	1.120	0.032	0.0	36	1.345
1.003	3.622	64.0	8.4	1.120	2.150	0.062	0.0	37	2.519
1.004	1.214	21.5	8.4	2.150	2.060	0.062	0.0	65	1.143
2.000	1.845	32.6	1.4	0.560	0.830	0.010	0.0	21	0.909
2.001	1.018	18.0	2.8	0.830	1.120	0.021	0.0	40	0.743

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)
3.000	S7	S4	20.690	0.600	109.600	108.980	0.620	33.4	150	5.20	50.0
4.000	S8	S3	9.600	0.600	109.890	109.390	0.500	19.2	150	5.07	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)
3.000	1.748	30.9	0.7	0.650	1.120	0.005	0.0	16	0.713
4.000	2.309	40.8	2.6	0.710	0.810	0.019	0.0	25	1.293

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	10.490	149.9	150	Circular	110.100	109.600	0.350	110.000	109.530	0.320
1.001	20.070	143.4	150	Circular	110.000	109.530	0.320	110.350	109.390	0.810
1.002	10.960	26.7	150	Circular	110.350	109.390	0.810	110.250	108.980	1.120
1.003	8.071	7.8	150	Circular	110.250	108.980	1.120	110.250	107.950	2.150
1.004	11.000	68.8	150	Circular	110.250	107.950	2.150	110.000	107.790	2.060
2.000	8.100	30.0	150	Circular	110.000	109.290	0.560	110.000	109.020	0.830
2.001	3.900	97.5	150	Circular	110.000	109.020	0.830	110.250	108.980	1.120
3.000	20.690	33.4	150	Circular	110.400	109.600	0.650	110.250	108.980	1.120
4.000	9.600	19.2	150	Circular	110.750	109.890	0.710	110.350	109.390	0.810

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	1200	Manhole	Adoptable	S2	1200	Manhole	Adoptable
1.001	S2	1200	Manhole	Adoptable	S3	1200	Manhole	Adoptable
1.002	S3	1200	Manhole	Adoptable	S4	1200	Manhole	Adoptable
1.003	S4	1200	Manhole	Adoptable	S50	1200	Manhole	Adoptable
1.004	S50	1200	Manhole	Adoptable	F10	1200	Manhole	Adoptable
2.000	S6	1200	Manhole	Adoptable	S5	1200	Manhole	Adoptable
2.001	S5	1200	Manhole	Adoptable	S4	1200	Manhole	Adoptable
3.000	S7	1200	Manhole	Adoptable	S4	1200	Manhole	Adoptable
4.000	S8	1200	Manhole	Adoptable	S3	1200	Manhole	Adoptable

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
F10	110.000	2.210	1200	1	1.004	107.790	150



Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S50	110.250	2.300	1200	1	1.003	107.950	150
				0	1.004	107.950	150
S4	110.250	1.270	1200	1	3.000	108.980	150
				2	2.001	108.980	150
				3	1.002	108.980	150
				0	1.003	108.980	150
S3	110.350	0.960	1200	1	4.000	109.390	150
				2	1.001	109.390	150
				0	1.002	109.390	150
S2	110.000	0.470	1200	1	1.000	109.530	150
				0	1.001	109.530	150
S1	110.100	0.500	1200	0	1.000	109.600	150
S5	110.000	0.980	1200	1	2.000	109.020	150
				0	2.001	109.020	150
S6	110.000	0.710	1200	0	2.000	109.290	150
S7	110.400	0.800	1200	0	3.000	109.600	150
S8	110.750	0.860	1200	0	4.000	109.890	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
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)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 | 2160

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 S50 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	107.950	Product Number	CTL-SHE-0061-2300-2000-2300
Design Depth (m)	2.000	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	2.3	Min Node Diameter (mm)	1200

Node S50 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	108.000
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	118

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	10.0	0.0	1.000	10.0	0.0

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.01%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	F10	55	107.818	0.028	1.6	0.0000	0.0000	OK
30 minute winter	S50	28	108.269	0.319	6.6	3.0507	0.0000	SURCHARGED
15 minute winter	S4	11	109.017	0.037	8.5	0.0441	0.0000	OK
15 minute winter	S3	11	109.427	0.037	4.4	0.0442	0.0000	OK
15 minute winter	S2	11	109.561	0.031	1.4	0.0416	0.0000	OK
15 minute winter	S1	11	109.622	0.022	0.7	0.0298	0.0000	OK
15 minute winter	S5	10	109.064	0.044	3.0	0.0596	0.0000	OK
15 minute winter	S6	10	109.311	0.021	1.4	0.0298	0.0000	OK
15 minute winter	S7	11	109.616	0.016	0.7	0.0197	0.0000	OK
15 minute winter	S8	10	109.916	0.026	2.7	0.0410	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)
30 minute winter	S50	1.004	F10	1.6	0.703	0.074	0.0248	5.2
15 minute winter	S4	1.003	S50	8.5	1.150	0.133	0.0846	
15 minute winter	S3	1.002	S4	4.4	1.294	0.126	0.0369	
15 minute winter	S2	1.001	S3	1.4	0.467	0.094	0.0602	
15 minute winter	S1	1.000	S2	0.7	0.334	0.048	0.0223	
15 minute winter	S5	2.001	S4	2.9	0.764	0.162	0.0149	
15 minute winter	S6	2.000	S5	1.4	0.490	0.042	0.0235	
15 minute winter	S7	3.000	S4	0.7	0.346	0.023	0.0448	
15 minute winter	S8	4.000	S3	2.7	0.995	0.065	0.0259	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.01%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	F10	60	107.818	0.028	1.7	0.0000	0.0000	OK
60 minute winter	S50	59	108.973	1.023	11.0	10.8916	0.0000	SURCHARGED
15 minute winter	S4	11	109.039	0.059	20.9	0.0703	0.0000	OK
15 minute winter	S3	10	109.450	0.060	10.8	0.0720	0.0000	OK
15 minute winter	S2	11	109.578	0.048	3.4	0.0643	0.0000	OK
15 minute winter	S1	10	109.634	0.034	1.7	0.0456	0.0000	OK
15 minute winter	S5	10	109.093	0.073	7.3	0.0984	0.0000	OK
15 minute winter	S6	10	109.323	0.033	3.5	0.0468	0.0000	OK
15 minute winter	S7	10	109.624	0.024	1.7	0.0298	0.0000	OK
15 minute winter	S8	10	109.931	0.041	6.6	0.0641	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)
60 minute winter	S50	1.004	F10	1.7	0.714	0.078	0.0258	16.1
15 minute winter	S4	1.003	S50	20.7	1.472	0.324	0.0969	
15 minute winter	S3	1.002	S4	10.6	1.637	0.308	0.0713	
15 minute winter	S2	1.001	S3	3.3	0.577	0.222	0.1147	
15 minute winter	S1	1.000	S2	1.7	0.428	0.115	0.0410	
15 minute winter	S5	2.001	S4	7.2	0.968	0.399	0.0289	
15 minute winter	S6	2.000	S5	3.5	0.627	0.106	0.0458	
15 minute winter	S7	3.000	S4	1.7	0.425	0.054	0.0846	
15 minute winter	S8	4.000	S3	6.6	1.258	0.161	0.0503	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.01%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	F10	114	107.822	0.032	2.1	0.0000	0.0000	OK
120 minute winter	S50	114	109.679	1.728	11.5	18.7447	0.0000	SURCHARGED
120 minute winter	S4	114	109.680	0.700	12.4	0.8359	0.0000	SURCHARGED
120 minute winter	S3	114	109.681	0.291	6.4	0.3467	0.0000	SURCHARGED
120 minute winter	S2	114	109.681	0.151	2.0	0.2026	0.0000	SURCHARGED
120 minute winter	S1	114	109.681	0.081	1.0	0.1075	0.0000	OK
120 minute winter	S5	114	109.680	0.660	4.2	0.8946	0.0000	SURCHARGED
120 minute winter	S6	114	109.680	0.390	2.0	0.5514	0.0000	SURCHARGED
120 minute winter	S7	114	109.680	0.080	1.0	0.1006	0.0000	OK
15 minute winter	S8	10	109.945	0.055	11.9	0.0871	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)
120 minute winter	S50	1.004	F10	2.1	0.765	0.099	0.0307	35.5
120 minute winter	S4	1.003	S50	11.5	1.080	0.179	0.1421	
120 minute winter	S3	1.002	S4	6.4	1.384	0.185	0.1929	
120 minute winter	S2	1.001	S3	2.0	0.526	0.135	0.3533	
120 minute winter	S1	1.000	S2	1.0	0.366	0.069	0.1430	
120 minute winter	S5	2.001	S4	4.2	0.814	0.233	0.0687	
120 minute winter	S6	2.000	S5	2.0	0.536	0.061	0.1426	
120 minute winter	S7	3.000	S4	1.0	0.361	0.032	0.2811	
15 minute winter	S8	4.000	S3	11.8	1.468	0.290	0.0776	