

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)	0.200
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	✓

Adoptable Manhole Type

Max Width (mm)	Diameter (mm)	Max Width (mm)	Diameter (mm)
374	1200	749	1500
499	1350	900	1800

>900 Link+900 mm

Max Depth (m)	Diameter (mm)	Max Depth (m)	Diameter (mm)
1.500	1050	99.999	1200

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)
RE	0.005	5.00	29.700	450	489486.029	135588.687	0.690
S1	0.005	5.00	29.700	450	489479.715	135588.696	0.760
PP	0.005	5.00	29.700	450	489479.681	135602.661	0.920
S2			29.700	450	489486.553	135602.651	0.990
S3			29.700	450	489486.609	135579.413	1.220
S4			29.700	600	489484.511	135579.416	1.250
5703			29.470	1200	489484.521	135575.233	1.070

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	RE	S1	6.314	0.600	29.010	28.940	0.070	90.2	150	5.10	50.0
1.001	S1	PP	13.965	0.600	28.940	28.780	0.160	87.3	150	5.32	50.0
1.002	PP	S2	6.872	0.600	28.780	28.710	0.070	98.2	150	5.43	50.0
1.003	S2	S3	23.238	0.600	28.710	28.480	0.230	101.0	150	5.82	50.0
1.004	S3	S4	2.098	0.600	28.480	28.450	0.030	69.9	150	5.85	50.0
1.005	S4	5703	4.183	0.600	28.450	28.400	0.050	83.7	150	5.91	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	1.058	18.7	0.7	0.540	0.610	0.005	0.0	20	0.500
1.001	1.076	19.0	1.4	0.610	0.770	0.010	0.0	27	0.625
1.002	1.014	17.9	2.0	0.770	0.840	0.015	0.0	34	0.676
1.003	0.999	17.7	2.0	0.840	1.070	0.015	0.0	34	0.666
1.004	1.204	21.3	2.0	1.070	1.100	0.015	0.0	31	0.762
1.005	1.099	19.4	2.0	1.100	0.920	0.015	0.0	33	0.711

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	6.314	90.2	150	Circular	29.700	29.010	0.540	29.700	28.940	0.610
1.001	13.965	87.3	150	Circular	29.700	28.940	0.610	29.700	28.780	0.770
1.002	6.872	98.2	150	Circular	29.700	28.780	0.770	29.700	28.710	0.840
1.003	23.238	101.0	150	Circular	29.700	28.710	0.840	29.700	28.480	1.070
1.004	2.098	69.9	150	Circular	29.700	28.480	1.070	29.700	28.450	1.100
1.005	4.183	83.7	150	Circular	29.700	28.450	1.100	29.470	28.400	0.920

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	RE	450	Manhole	Adoptable	S1	450	Manhole	Adoptable
1.001	S1	450	Manhole	Adoptable	PP	450	Manhole	Adoptable
1.002	PP	450	Manhole	Adoptable	S2	450	Manhole	Adoptable
1.003	S2	450	Manhole	Adoptable	S3	450	Manhole	Adoptable
1.004	S3	450	Manhole	Adoptable	S4	600	Manhole	Adoptable
1.005	S4	600	Manhole	Adoptable	5703	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
RE	489486.029	135588.687	29.700	0.690	450				
						0	1.000	29.010	150
S1	489479.715	135588.696	29.700	0.760	450		1	1.000	28.940
						0	1.001	28.940	150
PP	489479.681	135602.661	29.700	0.920	450		1	1.001	28.780
						0	1.002	28.780	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S2	489486.553	135602.651	29.700	0.990	450		1.002	28.710	150
S3	489486.609	135579.413	29.700	1.220	450		1.003	28.710	150
S4	489484.511	135579.416	29.700	1.250	600		1.004	28.480	150
5703	489484.521	135575.233	29.470	1.070	1200		1.005	28.450	150

Simulation Settings

Rainfall Methodology	FSR	Drain Down Time (mins)	240
FSR Region	England and Wales	Additional Storage (m³/ha)	20.0
M5-60 (mm)	20.000	Check Discharge Rate(s)	✓
Ratio-R	0.400	1 year (l/s)	0.1
Summer CV	0.750	30 year (l/s)	0.2
Winter CV	0.840	100 year (l/s)	0.3
Analysis Speed	Detailed	Check Discharge Volume	x
Skip Steady State	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	0	0	0
100	40	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	2.40
Greenfield Method	IH124	Growth Factor 100 year	3.19
Positively Drained Area (ha)	0.021	Betterment (%)	0
SAAR (mm)	617	QBar	0.1
Soil Index	4	Q 1 year (l/s)	0.1
SPR	0.47	Q 30 year (l/s)	0.2
Region	6	Q 100 year (l/s)	0.3
Growth Factor 1 year	0.85		

Node S4 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.800	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	1.0		
Invert Level (m)	28.450	Diameter (m)	0.023		

Other (defaults)

Entry Loss (manhole)	0.250	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.250	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	109.521	30.991	30 year 600 minute winter	13.498	5.404
1 year 15 minute winter	76.857	30.991	30 year 720 minute summer	17.490	4.687
1 year 30 minute summer	71.439	20.215	30 year 720 minute winter	11.754	4.687
1 year 30 minute winter	50.133	20.215	30 year 960 minute summer	14.215	3.743
1 year 60 minute summer	48.435	12.800	30 year 960 minute winter	9.416	3.743
1 year 60 minute winter	32.179	12.800	30 year 1440 minute summer	10.161	2.723
1 year 120 minute summer	30.053	7.942	30 year 1440 minute winter	6.829	2.723
1 year 120 minute winter	19.966	7.942	100 year 15 minute summer	348.738	98.681
1 year 180 minute summer	23.233	5.979	100 year 15 minute winter	244.728	98.681
1 year 180 minute winter	15.102	5.979	100 year 30 minute summer	228.965	64.789
1 year 240 minute summer	18.475	4.882	100 year 30 minute winter	160.677	64.789
1 year 240 minute winter	12.274	4.882	100 year 60 minute summer	153.288	40.510
1 year 360 minute summer	14.169	3.646	100 year 60 minute winter	101.841	40.510
1 year 360 minute winter	9.210	3.646	100 year 120 minute summer	92.562	24.461
1 year 480 minute summer	11.185	2.956	100 year 120 minute winter	61.496	24.461
1 year 480 minute winter	7.431	2.956	100 year 180 minute summer	69.806	17.964
1 year 600 minute summer	9.182	2.511	100 year 180 minute winter	45.376	17.964
1 year 600 minute winter	6.274	2.511	100 year 240 minute summer	54.269	14.342
1 year 720 minute summer	8.203	2.199	100 year 240 minute winter	36.055	14.342
1 year 720 minute winter	5.513	2.199	100 year 360 minute summer	40.484	10.418
1 year 960 minute summer	6.768	1.782	100 year 360 minute winter	26.315	10.418
1 year 960 minute winter	4.483	1.782	100 year 480 minute summer	31.414	8.302
1 year 1440 minute summer	4.949	1.326	100 year 480 minute winter	20.871	8.302
1 year 1440 minute winter	3.326	1.326	100 year 600 minute summer	25.431	6.956
30 year 15 minute summer	268.706	76.035	100 year 600 minute winter	17.376	6.956
30 year 15 minute winter	188.566	76.035	100 year 720 minute summer	22.452	6.017
30 year 30 minute summer	174.929	49.499	100 year 720 minute winter	15.089	6.017
30 year 30 minute winter	122.757	49.499	100 year 960 minute summer	18.166	4.784
30 year 60 minute summer	116.589	30.811	100 year 960 minute winter	12.033	4.784
30 year 60 minute winter	77.459	30.811	100 year 1440 minute summer	12.896	3.456
30 year 120 minute summer	70.438	18.615	100 year 1440 minute winter	8.667	3.456
30 year 120 minute winter	46.797	18.615	100 year +40% CC 15 minute summer	488.233	138.153
30 year 180 minute summer	53.298	13.715	100 year +40% CC 15 minute winter	342.620	138.153
30 year 180 minute winter	34.645	13.715	100 year +40% CC 30 minute summer	320.551	90.705
30 year 240 minute summer	41.604	10.995	100 year +40% CC 30 minute winter	224.948	90.705
30 year 240 minute winter	27.641	10.995	100 year +40% CC 60 minute summer	214.603	56.713
30 year 360 minute summer	31.221	8.034	100 year +40% CC 60 minute winter	142.577	56.713
30 year 360 minute winter	20.295	8.034	100 year +40% CC 120 minute summer	129.587	34.246
30 year 480 minute summer	24.324	6.428	100 year +40% CC 120 minute winter	86.094	34.246
30 year 480 minute winter	16.160	6.428	100 year +40% CC 180 minute summer	97.729	25.149
30 year 600 minute summer	19.756	5.404	100 year +40% CC 180 minute winter	63.526	25.149

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +40% CC 240 minute summer	75.977	20.078	100 year +40% CC 600 minute winter	24.327	9.738
100 year +40% CC 240 minute winter	50.477	20.078	100 year +40% CC 720 minute summer	31.433	8.424
100 year +40% CC 360 minute summer	56.677	14.585	100 year +40% CC 720 minute winter	21.125	8.424
100 year +40% CC 360 minute winter	36.841	14.585	100 year +40% CC 960 minute summer	25.432	6.697
100 year +40% CC 480 minute summer	43.979	11.622	100 year +40% CC 960 minute winter	16.847	6.697
100 year +40% CC 480 minute winter	29.219	11.622	100 year +40% CC 1440 minute summer	18.055	4.839
100 year +40% CC 600 minute summer	35.604	9.738	100 year +40% CC 1440 minute winter	12.134	4.839

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE	11	29.030	0.020	0.7	0.0060	0.0000	OK
15 minute winter	S1	11	28.968	0.028	1.4	0.0080	0.0000	OK
15 minute winter	PP	11	28.816	0.036	2.1	0.0097	0.0000	OK
15 minute winter	S2	11	28.745	0.035	2.1	0.0055	0.0000	OK
30 minute winter	S3	27	28.679	0.199	2.1	0.0317	0.0000	SURCHARGED
30 minute winter	S4	27	28.679	0.229	2.0	0.0648	0.0000	SURCHARGED
15 minute summer	5703	1	28.400	0.000	0.4	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)
15 minute winter	RE	1.000	S1	0.7	0.394	0.037	0.0113	
15 minute winter	S1	1.001	PP	1.4	0.514	0.074	0.0382	
15 minute winter	PP	1.002	S2	2.1	0.664	0.117	0.0218	
15 minute winter	S2	1.003	S3	2.1	0.598	0.118	0.2311	
30 minute winter	S3	1.004	S4	2.0	0.437	0.096	0.0369	
30 minute winter	S4	Orifice	5703	0.5				1.3

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE	10	29.041	0.031	1.7	0.0094	0.0000	OK
15 minute winter	S1	10	28.982	0.042	3.4	0.0123	0.0000	OK
60 minute winter	PP	46	28.966	0.186	2.7	0.0497	0.0000	SURCHARGED
60 minute winter	S2	46	28.965	0.255	2.7	0.0406	0.0000	SURCHARGED
60 minute winter	S3	47	28.965	0.485	2.1	0.0771	0.0000	SURCHARGED
60 minute winter	S4	47	28.965	0.515	1.4	0.1457	0.0000	SURCHARGED
15 minute summer	5703	1	28.400	0.000	0.7	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)
15 minute winter	RE	1.000	S1	1.7	0.503	0.090	0.0212	
15 minute winter	S1	1.001	PP	3.3	0.649	0.175	0.1082	
60 minute winter	PP	1.002	S2	2.7	0.681	0.151	0.1210	
60 minute winter	S2	1.003	S3	2.1	0.489	0.122	0.4091	
60 minute winter	S3	1.004	S4	1.4	0.463	0.065	0.0369	
60 minute winter	S4	Orifice	5703	0.8				4.0

Results for 100 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	RE	49	29.084	0.074	1.2	0.0225	0.0000	OK
60 minute winter	S1	48	29.085	0.145	2.4	0.0421	0.0000	OK
60 minute winter	PP	49	29.084	0.304	3.6	0.0815	0.0000	SURCHARGED
60 minute winter	S2	49	29.084	0.374	3.1	0.0595	0.0000	SURCHARGED
60 minute winter	S3	49	29.083	0.603	2.4	0.0959	0.0000	SURCHARGED
60 minute winter	S4	49	29.083	0.633	1.5	0.1792	0.0000	SURCHARGED
15 minute summer	5703	1	28.400	0.000	0.8	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)
60 minute winter	RE	1.000	S1	1.2	0.460	0.064	0.0823	
60 minute winter	S1	1.001	PP	2.4	0.602	0.126	0.2446	
60 minute winter	PP	1.002	S2	3.1	0.701	0.176	0.1210	
60 minute winter	S2	1.003	S3	2.4	0.492	0.136	0.4091	
60 minute winter	S3	1.004	S4	1.5	0.467	0.070	0.0369	
60 minute winter	S4	Orifice	5703	0.9				5.1

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	RE	49	29.351	0.341	1.6	0.1037	0.0000	SURCHARGED
60 minute winter	S1	49	29.351	0.411	3.2	0.1196	0.0000	SURCHARGED
60 minute winter	PP	49	29.351	0.571	4.5	0.1529	0.0000	SURCHARGED
60 minute winter	S2	50	29.350	0.640	3.7	0.1018	0.0000	SURCHARGED
60 minute winter	S3	50	29.350	0.870	2.4	0.1383	0.0000	SURCHARGED
60 minute winter	S4	50	29.350	0.900	1.7	0.2546	0.0000	SURCHARGED
15 minute summer	5703	1	28.400	0.000	0.9	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)
60 minute winter	RE	1.000	S1	1.6	0.488	0.086	0.1112	
60 minute winter	S1	1.001	PP	3.0	0.633	0.158	0.2459	
60 minute winter	PP	1.002	S2	3.7	0.701	0.208	0.1210	
60 minute winter	S2	1.003	S3	2.4	0.549	0.138	0.4091	
60 minute winter	S3	1.004	S4	1.7	0.530	0.082	0.0369	
60 minute winter	S4	Orifice	5703	1.0				7.2