



Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	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)	2.000
Ratio-R	0.300	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 Default Sewer Type Link Type

Shape	Circular	Follow Ground	x
Barrels	1	Velocity	Colebrook-White
Auto Increment (mm)	75	ks (mm) / n	0.600

Available Diameters (mm)

100 | 150

Nodes

Name	Area (ha)	T of E (mins)	Add Inflow (l/s)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
7	0.000	5.00	5.0	105.875	1350	387913.326	404214.917	2.055
6	0.000			105.457	1350	387937.973	404199.144	1.734
5	0.000			104.984	1350	387961.446	404235.847	1.413
3	0.000			105.400	1350	387930.065	404256.574	1.973
2	0.000			105.076	1500	387934.064	404262.696	1.676
1				104.733	1350	387939.421	404270.854	1.373

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	7	6	29.262	0.600	103.820	103.723	0.097	301.7	300	5.54	49.7
1.001	6	5	43.567	0.600	103.723	103.571	0.152	286.6	300	6.33	47.2
1.002	5	3	37.608	0.600	103.571	103.427	0.144	261.2	300	6.98	45.3
1.003	3	2	7.313	0.600	103.427	103.400	0.027	270.9	300	7.10	47.4
1.005	2	1	9.758	0.600	103.400	103.360	0.040	244.0	300	7.27	45.4

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	0.900	63.6	5.0	1.755	1.434	0.000	5.0	57	0.541
1.001	0.923	65.3	5.0	1.434	1.113	0.000	5.0	56	0.551
1.002	0.968	68.4	5.0	1.113	1.673	0.000	5.0	55	0.571
1.003	0.950	67.2	5.0	1.673	1.376	0.000	5.0	55	0.560
1.005	1.002	70.8	5.0	1.376	1.073	0.000	5.0	54	0.584

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	29.262	301.7	300	Circular_Default Sewer Type	105.875	103.820	1.755	105.457	103.723	1.434
1.001	43.567	286.6	300	Circular_Default Sewer Type	105.457	103.723	1.434	104.984	103.571	1.113
1.002	37.608	261.2	300	Circular_Default Sewer Type	104.984	103.571	1.113	105.400	103.427	1.673
1.003	7.313	270.9	300	Circular_Default Sewer Type	105.400	103.427	1.673	105.076	103.400	1.376
1.005	9.758	244.0	300	Circular_Default Sewer Type	105.076	103.400	1.376	104.733	103.360	1.073

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	7	1350	Manhole	Adoptable	6	1350	Manhole	Adoptable
1.001	6	1350	Manhole	Adoptable	5	1350	Manhole	Adoptable
1.002	5	1350	Manhole	Adoptable	3	1350	Manhole	Adoptable
1.003	3	1350	Manhole	Adoptable	2	1500	Manhole	Adoptable
1.005	2	1500	Manhole	Adoptable	1	1350	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
7	387913.326	404214.917	105.875	2.055	1350		0	1.000	103.820	300
6	387937.973	404199.144	105.457	1.734	1350		1	1.000	103.723	300
5	387961.446	404235.847	104.984	1.413	1350		0	1.001	103.723	300
3	387930.065	404256.574	105.400	1.973	1350		1	1.001	103.571	300
							0	1.002	103.571	300
							1	1.002	103.427	300
							0	1.003	103.427	300

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
2	387934.064	404262.696	105.076	1.676	1500	 1	1.003	103.400	300
1	387939.421	404270.854	104.733	1.373	1350	 1	1.005	103.360	300

Simulation Settings

Rainfall Methodology	FSR	Drain Down Time (mins)	240
FSR Region	England and Wales	Additional Storage (m³/ha)	20.0
M5-60 (mm)	17.000	Check Discharge Rate(s)	✓
Ratio-R	0.300	1 year (l/s)	5.0
Summer CV	0.750	30 year (l/s)	5.0
Winter CV	0.840	100 year (l/s)	5.0
Analysis Speed	Normal	Check Discharge Volume	x
Skip Steady State	✓		

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	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.70
Greenfield Method	IH124	Growth Factor 100 year	2.08
Positively Drained Area (ha)	0.766	Betterment (%)	0
SAAR (mm)	999	QBar	0.2
Soil Index	1	Q 1 year (l/s)	0.2
SPR	0.10	Q 30 year (l/s)	0.3
Region	10	Q 100 year (l/s)	0.4
Growth Factor 1 year	0.87		

Other (defaults)

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

Approval Results

The network has been designed for a 1 in 2 year storm using FSR rainfall
It contains 6 nodes (1 outfall) and 5 links
The total impermeable area is 0.000 ha
Additional inflow of 5.0 also enters the network
No additional storage is present
Simulations have been completed using FSR summer and winter storms from 15 to 1440 minute duration

No manholes are smaller than that required by the library

The node losses test has not been completed

No circular links have diameters < 150mm

No links have lengths > 100.000m

No links have lengths that differ from their coordinated length by more than 1.000m

1 link crosses one or more other links

US Node	DS Node	Link	Network	Link	Easting (m)	Northing (m)
7	6	1.000	Foul Network 1	1.001	387936.934	404199.809

No links have cover depth outside the range 0.600-3.000m

No nodes have backdrops outside the range 2.000-1.500m

No links have full bore velocity outside the range 0.900-3.000m/s

5 links have peak proportional velocity outside the range 0.750-3.000m/s during the 2 year return period

US Node	DS Node	Link	Velocity (m/s)	Event
7	6	1.000	0.725	2 year 15 minute summer
6	5	1.001	0.651	2 year 15 minute summer
5	3	1.002	0.600	2 year 15 minute summer
3	2	1.003	0.579	2 year 15 minute summer
2	1	1.005	0.580	2 year 15 minute summer

No links have a surcharged depth greater than 0.000m during the 2 year return period

No nodes flood during the 30 year return period

No infiltrating structures failed to half empty in 1440 minutes during the 2 year return period

No outfalls have a discharge rate greater than 5.0l/s during the 1 year return period

No outfalls have a discharge rate greater than 5.0l/s during the 30 year return period

No outfalls have a discharge rate greater than 5.0l/s during the 100 year return period

The discharge volume test has not been completed

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	84.280	23.848	1 year 120 minute summer	26.432	6.985
1 year 15 minute winter	59.144	23.848	1 year 120 minute winter	17.561	6.985
1 year 30 minute summer	57.102	16.158	1 year 180 minute summer	21.115	5.434
1 year 30 minute winter	40.072	16.158	1 year 180 minute winter	13.725	5.434
1 year 60 minute summer	40.398	10.676	1 year 240 minute summer	17.197	4.545
1 year 60 minute winter	26.839	10.676	1 year 240 minute winter	11.425	4.545

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 360 minute summer	13.694	3.524	30 year 120 minute summer	63.038	16.659
1 year 360 minute winter	8.901	3.524	30 year 120 minute winter	41.881	16.659
1 year 480 minute summer	11.066	2.925	30 year 180 minute summer	49.285	12.683
1 year 480 minute winter	7.352	2.925	30 year 180 minute winter	32.037	12.683
1 year 600 minute summer	9.254	2.531	30 year 240 minute summer	39.344	10.398
1 year 600 minute winter	6.323	2.531	30 year 240 minute winter	26.139	10.398
1 year 720 minute summer	8.394	2.250	30 year 360 minute summer	30.343	7.808
1 year 720 minute winter	5.641	2.250	30 year 360 minute winter	19.724	7.808
1 year 960 minute summer	7.097	1.869	30 year 480 minute summer	24.111	6.372
1 year 960 minute winter	4.701	1.869	30 year 480 minute winter	16.019	6.372
1 year 1440 minute summer	5.374	1.440	30 year 600 minute summer	19.882	5.438
1 year 1440 minute winter	3.611	1.440	30 year 600 minute winter	13.585	5.438
2 year 15 minute summer	109.066	30.862	30 year 720 minute summer	17.819	4.776
2 year 15 minute winter	76.538	30.862	30 year 720 minute winter	11.975	4.776
2 year 30 minute summer	73.782	20.878	30 year 960 minute summer	14.763	3.887
2 year 30 minute winter	51.777	20.878	30 year 960 minute winter	9.779	3.887
2 year 60 minute summer	51.720	13.668	30 year 1440 minute summer	10.836	2.904
2 year 60 minute winter	34.361	13.668	30 year 1440 minute winter	7.282	2.904
2 year 120 minute summer	33.252	8.787	100 year +40% CC 15 minute summer	368.854	104.373
2 year 120 minute winter	22.092	8.787	100 year +40% CC 15 minute winter	258.845	104.373
2 year 180 minute summer	26.258	6.757	100 year +40% CC 30 minute summer	255.101	72.185
2 year 180 minute winter	17.069	6.757	100 year +40% CC 30 minute winter	179.018	72.185
2 year 240 minute summer	21.199	5.602	100 year +40% CC 60 minute summer	180.954	47.821
2 year 240 minute winter	14.084	5.602	100 year +40% CC 60 minute winter	120.222	47.821
2 year 360 minute summer	16.686	4.294	100 year +40% CC 120 minute summer	116.088	30.679
2 year 360 minute winter	10.846	4.294	100 year +40% CC 120 minute winter	77.126	30.679
2 year 480 minute summer	13.415	3.545	100 year +40% CC 180 minute summer	90.626	23.321
2 year 480 minute winter	8.912	3.545	100 year +40% CC 180 minute winter	58.909	23.321
2 year 600 minute summer	11.170	3.055	100 year +40% CC 240 minute summer	72.104	19.055
2 year 600 minute winter	7.632	3.055	100 year +40% CC 240 minute winter	47.904	19.055
2 year 720 minute summer	10.095	2.706	100 year +40% CC 360 minute summer	55.175	14.198
2 year 720 minute winter	6.784	2.706	100 year +40% CC 360 minute winter	35.865	14.198
2 year 960 minute summer	8.482	2.233	100 year +40% CC 480 minute summer	43.619	11.527
2 year 960 minute winter	5.619	2.233	100 year +40% CC 480 minute winter	28.979	11.527
2 year 1440 minute summer	6.362	1.705	100 year +40% CC 600 minute summer	35.816	9.797
2 year 1440 minute winter	4.276	1.705	100 year +40% CC 600 minute winter	24.472	9.797
30 year 15 minute summer	205.071	58.028	100 year +40% CC 720 minute summer	31.983	8.572
30 year 15 minute winter	143.910	58.028	100 year +40% CC 720 minute winter	21.495	8.572
30 year 30 minute summer	140.191	39.669	100 year +40% CC 960 minute summer	26.337	6.935
30 year 30 minute winter	98.380	39.669	100 year +40% CC 960 minute winter	17.446	6.935
30 year 60 minute summer	98.615	26.061	100 year +40% CC 1440 minute summer	19.151	5.133
30 year 60 minute winter	65.517	26.061	100 year +40% CC 1440 minute winter	12.870	5.133

Results for 1 year Critical Storm Duration. Lowest mass balance: 95.28%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	7	2	103.880	0.060	5.0	0.0864	0.0000	OK
15 minute summer	6	4	103.782	0.059	5.3	0.0837	0.0000	OK
15 minute summer	5	6	103.627	0.056	5.1	0.0803	0.0000	OK
15 minute summer	3	104	103.485	0.058	5.1	0.0825	0.0000	OK
15 minute summer	2	104	103.453	0.053	4.9	0.0940	0.0000	OK
15 minute summer	1	104	103.412	0.052	4.8	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)
15 minute summer	7	1.000	6	5.3	0.725	0.084	0.2794	
15 minute summer	6	1.001	5	5.1	0.651	0.078	0.4032	
15 minute summer	5	1.002	3	5.1	0.600	0.074	0.3477	
15 minute summer	3	1.003	2	4.9	0.579	0.073	0.0653	
15 minute summer	2	1.005	1	4.8	0.580	0.067	0.0802	71.1

Results for 2 year Critical Storm Duration. Lowest mass balance: 95.28%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	7	2	103.880	0.060	5.0	0.0864	0.0000	OK
15 minute summer	6	4	103.782	0.059	5.3	0.0837	0.0000	OK
15 minute summer	5	6	103.627	0.056	5.1	0.0803	0.0000	OK
15 minute summer	3	409	103.485	0.058	5.1	0.0825	0.0000	OK
15 minute summer	2	409	103.453	0.053	4.9	0.0940	0.0000	OK
15 minute summer	1	409	103.412	0.052	4.8	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)
15 minute summer	7	1.000	6	5.3	0.725	0.084	0.2794	
15 minute summer	6	1.001	5	5.1	0.651	0.078	0.4032	
15 minute summer	5	1.002	3	5.1	0.600	0.074	0.3477	
15 minute summer	3	1.003	2	4.9	0.579	0.073	0.0653	
15 minute summer	2	1.005	1	4.8	0.580	0.067	0.0802	412.6



Results for 30 year Critical Storm Duration. Lowest mass balance: 95.28%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	7	2	103.880	0.060	5.0	0.0864	0.0000	OK
15 minute summer	6	4	103.782	0.059	5.3	0.0837	0.0000	OK
15 minute summer	5	6	103.627	0.056	5.1	0.0803	0.0000	OK
15 minute summer	3	104	103.485	0.058	5.1	0.0825	0.0000	OK
15 minute summer	2	104	103.453	0.053	4.9	0.0940	0.0000	OK
15 minute summer	1	104	103.412	0.052	4.8	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)
15 minute summer	7	1.000	6	5.3	0.725	0.084	0.2794	
15 minute summer	6	1.001	5	5.1	0.651	0.078	0.4032	
15 minute summer	5	1.002	3	5.1	0.600	0.074	0.3477	
15 minute summer	3	1.003	2	4.9	0.579	0.073	0.0653	
15 minute summer	2	1.005	1	4.8	0.580	0.067	0.0802	71.1

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 95.28%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	7	2	103.880	0.060	5.0	0.0864	0.0000	OK
15 minute summer	6	4	103.782	0.059	5.3	0.0837	0.0000	OK
15 minute summer	5	6	103.627	0.056	5.1	0.0803	0.0000	OK
15 minute summer	3	104	103.485	0.058	5.1	0.0825	0.0000	OK
15 minute summer	2	104	103.453	0.053	4.9	0.0940	0.0000	OK
15 minute summer	1	104	103.412	0.052	4.8	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)
15 minute summer	7	1.000	6	5.3	0.725	0.084	0.2794	
15 minute summer	6	1.001	5	5.1	0.651	0.078	0.4032	
15 minute summer	5	1.002	3	5.1	0.600	0.074	0.3477	
15 minute summer	3	1.003	2	4.9	0.579	0.073	0.0653	
15 minute summer	2	1.005	1	4.8	0.580	0.067	0.0802	71.1