

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	30	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)	1.000
Ratio-R	0.400	Preferred Cover Depth (m)	0.450
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Links (Results)

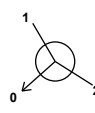
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.003	17.7	3.6	0.450	0.498	0.026	0.0	45	0.784
1.001	1.368	24.2	3.6	0.498	0.450	0.026	0.0	39	0.984
1.002	1.001	17.7	5.5	0.450	0.627	0.040	0.0	57	0.882
1.003	1.002	17.7	6.7	0.627	0.983	0.049	0.0	64	0.931
2.000	1.002	17.7	2.1	0.450	0.686	0.016	0.0	35	0.675
2.001	2.435	43.0	3.5	0.686	0.983	0.026	0.0	29	1.475
1.004	1.002	17.7	10.1	0.983	0.905	0.075	0.0	81	1.035
1.005	1.003	7.9	10.1	0.955	0.716	0.075	0.0	100	1.030

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	9.832	100.3	150	Circular	64.650	64.050	0.450	64.600	63.952	0.498
1.001	5.535	54.3	150	Circular	64.600	63.952	0.498	64.450	63.850	0.450
1.002	22.882	100.8	150	Circular	64.450	63.850	0.450	64.400	63.623	0.627
1.003	15.690	100.6	150	Circular	64.400	63.623	0.627	64.600	63.467	0.983
2.000	23.724	100.5	150	Circular	64.750	64.150	0.450	64.750	63.914	0.686
2.001	7.723	17.3	150	Circular	64.750	63.914	0.686	64.600	63.467	0.983
1.004	12.251	100.4	150	Circular	64.600	63.467	0.983	64.400	63.345	0.905
1.005	9.526	59.2	100	Circular	64.400	63.345	0.955	64.000	63.184	0.716

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	450	Manhole	Adoptable	2	450	Manhole	Adoptable
1.001	2	450	Manhole	Adoptable	3	450	Manhole	Adoptable
1.002	3	450	Manhole	Adoptable	4	450	Manhole	Adoptable
1.003	4	450	Manhole	Adoptable	7	450	Manhole	Adoptable
2.000	5	450	Manhole	Adoptable	6	450	Manhole	Adoptable
2.001	6	450	Manhole	Adoptable	7	450	Manhole	Adoptable
1.004	7	450	Manhole	Adoptable	8	600	Manhole	Adoptable
1.005	8	600	Manhole	Adoptable	8_OUT		Junction	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
1	474649.863	170518.957	64.650	0.600	450		0	1.000	64.050	150
2	474641.583	170513.655	64.600	0.648	450		1	1.000	63.952	150
							0	1.001	63.952	150
3	474644.115	170508.733	64.450	0.600	450		1	1.001	63.850	150
							0	1.002	63.850	150
4	474628.651	170491.868	64.400	0.777	450		1	1.002	63.623	150
							0	1.003	63.623	150
5	474627.100	170524.755	64.750	0.600	450		0	2.000	64.150	150
6	474611.473	170506.905	64.750	0.836	450		1	2.000	63.914	150
							0	2.001	63.914	150
7	474615.384	170500.245	64.600	1.133	450		1	2.001	63.467	150
							2	1.003	63.467	150
							0	1.004	63.467	150
8	474606.234	170492.098	64.400	1.055	600		1	1.004	63.345	150
							0	1.005	63.345	100
8_OUT	474599.120	170485.763	64.000	0.816			1	1.005	63.184	100

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.400	Starting Level (m)	
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

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

Node 8 Online Orifice Control

Flap Valve	x	Design Depth (m)	1.200	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	2.0		
Invert Level (m)	63.345	Diameter (m)	0.032		

Node 2 Online Orifice Control

Flap Valve	x	Invert Level (m)	63.952	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.025		

Node 8 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	63.345
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	228

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	25.0	25.0	0.800	25.0	39.2	0.801	0.0	39.2

Node 2 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	64.150	Slope (1:X)	60.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	186	Depth (m)	0.250
Safety Factor	2.0	Width (m)	10.800	Inf Depth (m)	0.250
Porosity	0.30	Length (m)	24.500		

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	1 year 720 minute summer	8.203	2.199
1 year 15 minute winter	76.857	30.991	1 year 720 minute winter	5.513	2.199
1 year 30 minute summer	71.439	20.215	1 year 960 minute summer	6.768	1.782
1 year 30 minute winter	50.133	20.215	1 year 960 minute winter	4.483	1.782
1 year 60 minute summer	48.435	12.800	1 year 1440 minute summer	4.949	1.326
1 year 60 minute winter	32.179	12.800	1 year 1440 minute winter	3.326	1.326
1 year 120 minute summer	30.053	7.942	30 year 15 minute summer	268.706	76.035
1 year 120 minute winter	19.966	7.942	30 year 15 minute winter	188.566	76.035
1 year 180 minute summer	23.233	5.979	30 year 30 minute summer	174.929	49.499
1 year 180 minute winter	15.102	5.979	30 year 30 minute winter	122.757	49.499
1 year 240 minute summer	18.475	4.882	30 year 60 minute summer	116.589	30.811
1 year 240 minute winter	12.274	4.882	30 year 60 minute winter	77.459	30.811
1 year 360 minute summer	14.169	3.646	30 year 120 minute summer	70.438	18.615
1 year 360 minute winter	9.210	3.646	30 year 120 minute winter	46.797	18.615
1 year 480 minute summer	11.185	2.956	30 year 180 minute summer	53.298	13.715
1 year 480 minute winter	7.431	2.956	30 year 180 minute winter	34.645	13.715
1 year 600 minute summer	9.182	2.511	30 year 240 minute summer	41.604	10.995
1 year 600 minute winter	6.274	2.511	30 year 240 minute winter	27.641	10.995

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year 360 minute summer	31.221	8.034	100 year 720 minute summer	22.452	6.017
30 year 360 minute winter	20.295	8.034	100 year 720 minute winter	15.089	6.017
30 year 480 minute summer	24.324	6.428	100 year 960 minute summer	18.166	4.784
30 year 480 minute winter	16.160	6.428	100 year 960 minute winter	12.033	4.784
30 year 600 minute summer	19.756	5.404	100 year 1440 minute summer	12.896	3.456
30 year 600 minute winter	13.498	5.404	100 year 1440 minute winter	8.667	3.456
30 year 720 minute summer	17.490	4.687	100 year +40% CC 15 minute summer	488.233	138.153
30 year 720 minute winter	11.754	4.687	100 year +40% CC 15 minute winter	342.620	138.153
30 year 960 minute summer	14.215	3.743	100 year +40% CC 30 minute summer	320.551	90.705
30 year 960 minute winter	9.416	3.743	100 year +40% CC 30 minute winter	224.948	90.705
30 year 1440 minute summer	10.161	2.723	100 year +40% CC 60 minute summer	214.603	56.713
30 year 1440 minute winter	6.829	2.723	100 year +40% CC 60 minute winter	142.577	56.713
100 year 15 minute summer	348.738	98.681	100 year +40% CC 120 minute summer	129.587	34.246
100 year 15 minute winter	244.728	98.681	100 year +40% CC 120 minute winter	86.094	34.246
100 year 30 minute summer	228.965	64.789	100 year +40% CC 180 minute summer	97.729	25.149
100 year 30 minute winter	160.677	64.789	100 year +40% CC 180 minute winter	63.526	25.149
100 year 60 minute summer	153.288	40.510	100 year +40% CC 240 minute summer	75.977	20.078
100 year 60 minute winter	101.841	40.510	100 year +40% CC 240 minute winter	50.477	20.078
100 year 120 minute summer	92.562	24.461	100 year +40% CC 360 minute summer	56.677	14.585
100 year 120 minute winter	61.496	24.461	100 year +40% CC 360 minute winter	36.841	14.585
100 year 180 minute summer	69.806	17.964	100 year +40% CC 480 minute summer	43.979	11.622
100 year 180 minute winter	45.376	17.964	100 year +40% CC 480 minute winter	29.219	11.622
100 year 240 minute summer	54.269	14.342	100 year +40% CC 600 minute summer	35.604	9.738
100 year 240 minute winter	36.055	14.342	100 year +40% CC 600 minute winter	24.327	9.738
100 year 360 minute summer	40.484	10.418	100 year +40% CC 720 minute summer	31.433	8.424
100 year 360 minute winter	26.315	10.418	100 year +40% CC 720 minute winter	21.125	8.424
100 year 480 minute summer	31.414	8.302	100 year +40% CC 960 minute summer	25.432	6.697
100 year 480 minute winter	20.871	8.302	100 year +40% CC 960 minute winter	16.847	6.697
100 year 600 minute summer	25.431	6.956	100 year +40% CC 1440 minute summer	18.055	4.839
100 year 600 minute winter	17.376	6.956	100 year +40% CC 1440 minute winter	12.134	4.839

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.05%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	1	26	64.248	0.198	1.1	0.0315	0.0000	SURCHARGED
30 minute winter	1.000:50%	26	64.248	0.247	2.9	0.0000	0.0000	SURCHARGED
30 minute winter	2	26	64.248	0.296	2.3	0.6265	0.0000	SURCHARGED
15 minute winter	3	10	63.888	0.038	2.6	0.0235	0.0000	OK
15 minute winter	4	11	63.669	0.046	3.7	0.0178	0.0000	OK
15 minute winter	5	10	64.187	0.037	2.2	0.0251	0.0000	OK
15 minute winter	6	11	63.943	0.029	3.6	0.0118	0.0000	OK
180 minute winter	7	144	63.563	0.096	2.3	0.0153	0.0000	OK
180 minute winter	8	144	63.563	0.218	2.3	5.2348	0.0000	SURCHARGED
180 minute winter	8_OUT	144	63.207	0.023	0.9	0.0000	0.0000	OK

Link Event (Velocity)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	1.000:50%	-2.0	-0.201	-0.114	0.0865	
15 minute summer	1	1.000	2	2.4	0.473	0.136	0.0865	
30 minute winter	2	1.001	3	0.7	0.533	0.028	0.0115	
15 minute winter	3	1.002	4	2.5	0.620	0.140	0.0926	
15 minute winter	4	1.003	7	3.7	0.578	0.208	0.1006	
15 minute winter	5	2.000	6	2.2	0.751	0.122	0.0685	
15 minute winter	6	2.001	7	3.6	0.831	0.083	0.0410	
15 minute summer	7	1.004	8	7.1	1.248	0.399	0.0998	
180 minute winter	8	1.005	8_OUT	0.9	0.673	0.120	0.0133	11.4

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.05%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	1	55	64.390	0.340	0.5	0.0541	0.0000	FLOOD RISK
60 minute winter	1.000:50%	52	64.390	0.389	4.7	0.0000	0.0000	SURCHARGED
60 minute winter	2	54	64.390	0.438	4.3	3.5197	0.0000	FLOOD RISK
15 minute winter	3	10	63.907	0.057	5.5	0.0354	0.0000	OK
240 minute winter	4	188	63.836	0.213	2.2	0.0819	0.0000	SURCHARGED
15 minute winter	5	10	64.209	0.059	5.4	0.0402	0.0000	OK
15 minute winter	6	10	63.960	0.046	8.8	0.0185	0.0000	OK
240 minute winter	7	188	63.835	0.368	3.9	0.0585	0.0000	SURCHARGED
240 minute winter	8	188	63.834	0.489	3.7	11.7542	0.0000	SURCHARGED
240 minute winter	8_OUT	188	63.213	0.029	1.4	0.0000	0.0000	OK

Link Event (Velocity)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	1.000	1.000:50%	-1.7	-0.208	-0.095	0.0865	
15 minute summer	1	1.000	2	7.6	0.574	0.431	0.0865	
60 minute winter	2	1.001	3	0.8	0.571	0.035	0.0149	
15 minute winter	3	1.002	4	5.4	0.750	0.306	0.1653	
15 minute summer	4	1.003	7	8.0	0.674	0.454	0.1890	
15 minute winter	5	2.000	6	5.3	0.964	0.300	0.1312	
15 minute winter	6	2.001	7	8.7	0.863	0.203	0.0837	
15 minute winter	7	1.004	8	16.3	1.334	0.918	0.2157	
240 minute winter	8	1.005	8_OUT	1.4	0.760	0.184	0.0182	26.7

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.05%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	1	59	64.448	0.398	0.5	0.0632	0.0000	FLOOD RISK
60 minute winter	1.000:50%	59	64.448	0.447	6.1	0.0000	0.0000	SURCHARGED
60 minute winter	2	59	64.447	0.495	5.7	5.3646	0.0000	FLOOD RISK
180 minute winter	3	180	63.989	0.139	2.2	0.0866	0.0000	OK
180 minute winter	4	168	63.989	0.366	3.1	0.1408	0.0000	SURCHARGED
15 minute winter	5	10	64.219	0.069	7.0	0.0465	0.0000	OK
180 minute winter	6	172	63.985	0.071	2.7	0.0285	0.0000	OK
180 minute winter	7	168	63.987	0.520	5.4	0.0826	0.0000	SURCHARGED
180 minute winter	8	172	63.984	0.639	5.2	15.3516	0.0000	SURCHARGED
180 minute winter	8_OUT	172	63.215	0.031	1.7	0.0000	0.0000	OK

Link Event (Velocity)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	1.000	1.000:50%	-2.2	-0.242	-0.124	0.0865	
15 minute winter	1	1.000	2	10.7	0.616	0.605	0.0865	
30 minute winter	2	1.001	3	0.9	0.579	0.037	0.0208	
15 minute summer	3	1.002	4	6.6	0.781	0.372	0.2400	
15 minute summer	4	1.003	7	10.2	0.693	0.577	0.2532	
15 minute winter	5	2.000	6	6.9	1.032	0.390	0.1589	
15 minute summer	6	2.001	7	10.9	0.894	0.252	0.0886	
15 minute winter	7	1.004	8	19.3	1.372	1.090	0.2157	
180 minute winter	8	1.005	8_OUT	1.7	0.790	0.211	0.0201	30.1

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.05%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	1	116	64.537	0.487	0.3	0.0775	0.0000	FLOOD RISK
120 minute winter	1.000:50%	116	64.537	0.536	5.3	0.0000	0.0000	SURCHARGED
120 minute winter	2	118	64.537	0.585	5.0	9.0359	0.0000	FLOOD RISK
240 minute winter	3	184	64.301	0.451	2.5	0.2805	0.0000	FLOOD RISK
240 minute winter	4	184	64.300	0.677	3.4	0.2607	0.0000	FLOOD RISK
240 minute winter	5	184	64.300	0.150	1.8	0.1013	0.0000	OK
240 minute winter	6	184	64.299	0.385	3.0	0.1553	0.0000	SURCHARGED
240 minute winter	7	184	64.299	0.832	6.1	0.1323	0.0000	SURCHARGED
240 minute winter	8	184	64.297	0.952	5.8	19.2813	0.0000	FLOOD RISK
240 minute winter	8_OUT	184	63.219	0.035	2.0	0.0000	0.0000	OK

Link Event (Velocity)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	1.000	1.000:50%	-2.1	-0.209	-0.118	0.0865	
15 minute winter	1	1.000	2	15.2	0.861	0.856	0.0865	
15 minute winter	2	1.001	3	1.9	0.584	0.077	0.0779	
15 minute winter	3	1.002	4	8.6	0.797	0.488	0.4028	
15 minute summer	4	1.003	7	10.5	0.707	0.592	0.2762	
15 minute winter	5	2.000	6	9.7	1.092	0.549	0.2310	
15 minute winter	6	2.001	7	15.2	1.016	0.354	0.1067	
15 minute winter	7	1.004	8	24.3	1.411	1.372	0.2157	
240 minute winter	8	1.005	8_OUT	2.0	0.836	0.260	0.0233	41.3