

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	5	Maximum Rainfall (mm/hr)	150.0
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	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
S5			39.184	1800	-177254.168	478521.833	1.901	37.283
S4			39.158	1350	-177258.176	478521.883	1.925	37.233
S3	0.035	5.00	39.190	1350	-177229.807	478519.442	1.601	37.589
S2	0.006	5.00	39.173	1350	-177217.552	478519.376	1.430	37.743
S1	0.003	5.00	39.261	1350	-177204.092	478519.310	1.350	37.911

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)
S1-S2	S1	S2	13.460	0.600	37.911	37.743	0.168	80.1	150	5.20	89.7
S2-S3	S2	S3	12.255	0.600	37.743	37.589	0.154	79.6	150	5.38	88.4
S3-S5	S3	S5	24.478	0.600	37.589	37.283	0.306	80.0	150	5.74	85.9
S5-S4	S5	S4	4.008	0.600	37.283	37.233	0.050	80.2	150	5.80	85.5

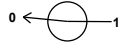
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
S1-S2	1.124	19.9	0.7	1.200	1.280	0.003	0.0	20	0.531
S2-S3	1.128	19.9	2.2	1.280	1.451	0.009	0.0	33	0.737
S3-S5	1.125	19.9	10.2	1.451	1.751	0.044	0.0	76	1.134
S5-S4	1.124	19.9	10.2	1.751	1.775	0.044	0.0	76	1.133

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)
S1-S2	13.460	80.1	150	Circular	39.261	37.911	1.200	39.173	37.743	1.280
S2-S3	12.255	79.6	150	Circular	39.173	37.743	1.280	39.190	37.589	1.451
S3-S5	24.478	80.0	150	Circular	39.190	37.589	1.451	39.184	37.283	1.751
S5-S4	4.008	80.2	150	Circular	39.184	37.283	1.751	39.158	37.233	1.775

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
S1-S2	S1	1350	Manhole	Adoptable	S2	1350	Manhole	Adoptable
S2-S3	S2	1350	Manhole	Adoptable	S3	1350	Manhole	Adoptable
S3-S5	S3	1350	Manhole	Adoptable	S5	1800	Manhole	Adoptable
S5-S4	S5	1800	Manhole	Adoptable	S4	1350	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S5	-177254.168	478521.833	39.184	1.901	1800		1 S3-S5	37.283	150
							0 S5-S4	37.283	150
S4	-177258.176	478521.883	39.158	1.925	1350		1 S5-S4	37.233	150
							0 S3-S5	37.589	150
S3	-177229.807	478519.442	39.190	1.601	1350		1 S2-S3	37.589	150
							0 S3-S5	37.589	150
S2	-177217.552	478519.376	39.173	1.430	1350		1 S1-S2	37.743	150
							0 S2-S3	37.743	150
S1	-177204.092	478519.310	39.261	1.350	1350		0 S1-S2	37.911	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	1440
M5-60 (mm)	20.000	Additional Storage (m³/ha)	0.0
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	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

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

Node S5 Online Depth/Flow Control

Flap Valve	x	Invert Level (m)	37.283	Design Flow (l/s)	1.0
Replaces Downstream Link	✓	Design Depth (m)	1.000		

Depth (m)	Flow (l/s)
2.000	0.000

Node S5 Lined Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00972	Invert Level (m)	36.500	Pit Length (m)	2.200
Side Inf Coefficient (m/hr)	0.00972	Time to half empty (mins)		Depth (m)	
Safety Factor	5.0	Ring Diameter (m)	1.800	Inf Depth (m)	
Porosity	0.30	Pit Width (m)	2.200	Number Required	1

Node S3 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	38.700	Slope (1:X)	350.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.350
Safety Factor	5.0	Width (m)	18.700	Inf Depth (m)	
Porosity	0.30	Length (m)	18.700		

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year 15 minute summer	268.706	76.035
30 year 15 minute winter	188.566	76.035
30 year 30 minute summer	174.929	49.499
30 year 30 minute winter	122.757	49.499
30 year 60 minute summer	116.589	30.811
30 year 60 minute winter	77.459	30.811
30 year 120 minute summer	70.438	18.615
30 year 120 minute winter	46.797	18.615
30 year 180 minute summer	53.298	13.715
30 year 180 minute winter	34.645	13.715
30 year 240 minute summer	41.604	10.995
30 year 240 minute winter	27.641	10.995
30 year 360 minute summer	31.221	8.034
30 year 360 minute winter	20.295	8.034
30 year 480 minute summer	24.324	6.428
30 year 480 minute winter	16.160	6.428
30 year 600 minute summer	19.756	5.404
30 year 600 minute winter	13.498	5.404
30 year 720 minute summer	17.490	4.687
30 year 720 minute winter	11.754	4.687
30 year 960 minute summer	14.215	3.743
30 year 960 minute winter	9.416	3.743
30 year 1440 minute summer	10.161	2.723
30 year 1440 minute winter	6.829	2.723
30 year 2160 minute summer	7.160	1.979
30 year 2160 minute winter	4.933	1.979
30 year 2880 minute summer	5.883	1.577
30 year 2880 minute winter	3.953	1.577
30 year 4320 minute summer	4.374	1.143
30 year 4320 minute winter	2.880	1.143
30 year 5760 minute summer	3.554	0.910
30 year 5760 minute winter	2.301	0.910
30 year 7200 minute summer	2.987	0.762
30 year 7200 minute winter	1.928	0.762
30 year 8640 minute summer	2.583	0.659
30 year 8640 minute winter	1.667	0.659
30 year 10080 minute summer	2.284	0.583
30 year 10080 minute winter	1.474	0.583

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +40% CC 15 minute summer	488.233	138.153
100 year +40% CC 15 minute winter	342.620	138.153
100 year +40% CC 30 minute summer	320.551	90.705
100 year +40% CC 30 minute winter	224.948	90.705
100 year +40% CC 60 minute summer	214.603	56.713
100 year +40% CC 60 minute winter	142.577	56.713
100 year +40% CC 120 minute summer	129.587	34.246
100 year +40% CC 120 minute winter	86.094	34.246
100 year +40% CC 180 minute summer	97.729	25.149
100 year +40% CC 180 minute winter	63.526	25.149
100 year +40% CC 240 minute summer	75.977	20.078
100 year +40% CC 240 minute winter	50.477	20.078
100 year +40% CC 360 minute summer	56.677	14.585
100 year +40% CC 360 minute winter	36.841	14.585
100 year +40% CC 480 minute summer	43.979	11.622
100 year +40% CC 480 minute winter	29.219	11.622
100 year +40% CC 600 minute summer	35.604	9.738
100 year +40% CC 600 minute winter	24.327	9.738
100 year +40% CC 720 minute summer	31.433	8.424
100 year +40% CC 720 minute winter	21.125	8.424
100 year +40% CC 960 minute summer	25.432	6.697
100 year +40% CC 960 minute winter	16.847	6.697
100 year +40% CC 1440 minute summer	18.055	4.839
100 year +40% CC 1440 minute winter	12.134	4.839
100 year +40% CC 2160 minute summer	12.630	3.490
100 year +40% CC 2160 minute winter	8.702	3.490
100 year +40% CC 2880 minute summer	10.319	2.766
100 year +40% CC 2880 minute winter	6.935	2.766
100 year +40% CC 4320 minute summer	7.609	1.989
100 year +40% CC 4320 minute winter	5.011	1.989
100 year +40% CC 5760 minute summer	6.145	1.573
100 year +40% CC 5760 minute winter	3.978	1.573
100 year +40% CC 7200 minute summer	5.137	1.311
100 year +40% CC 7200 minute winter	3.316	1.311
100 year +40% CC 8640 minute summer	4.424	1.129
100 year +40% CC 8640 minute winter	2.855	1.129
100 year +40% CC 10080 minute summer	3.897	0.994
100 year +40% CC 10080 minute winter	2.515	0.994

Results for 30 year Critical Storm Duration. Lowest mass balance: 96.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2880 minute winter	S5	2760	38.791	1.508	0.2	11.2459	0.0000	SURCHARGED
15 minute summer	S4	1	37.233	0.000	0.0	0.0000	0.0000	OK
2880 minute winter	S3	2760	38.791	1.202	0.3	8.4358	0.0000	SURCHARGED
2880 minute winter	S2	2760	38.791	1.048	0.1	1.4997	0.0000	SURCHARGED
2880 minute winter	S1	2760	38.791	0.880	0.1	1.2593	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)
2880 minute winter	S5	Depth/Flow	S4	0.0				0.0
2880 minute winter	S5	Infiltration		0.0				
2880 minute winter	S3	S3-S5	S5	0.2	0.292	0.012	0.4309	
2880 minute winter	S2	S2-S3	S3	-0.1	-0.006	-0.005	0.2157	
2880 minute winter	S1	S1-S2	S2	-0.1	-0.004	-0.003	0.2370	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
5760 minute winter	S5	5460	39.000	1.717	0.2	12.4527	0.0000	SURCHARGED
15 minute summer	S4	1	37.233	0.000	0.0	0.0000	0.0000	OK
5760 minute winter	S3	5460	39.000	1.411	0.4	30.5559	0.0000	SURCHARGED
5760 minute winter	S2	5460	39.000	1.257	0.1	1.7986	0.0000	SURCHARGED
5760 minute winter	S1	5460	39.000	1.089	0.0	1.5582	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)
5760 minute winter	S5	Depth/Flow	S4	0.0				0.0
5760 minute winter	S5	Infiltration		0.0				
5760 minute winter	S3	S3-S5	S5	0.2	0.292	0.009	0.4309	
5760 minute winter	S2	S2-S3	S3	0.1	0.008	0.007	0.2157	
5760 minute winter	S1	S1-S2	S2	0.0	-0.002	-0.002	0.2370	