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)	18.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.450	Preferred Cover Depth (m)	0.500
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)	Width (mm)	Easting (m)	Northing (m)	Depth (m)
SW01	0.004	5.00	65.350	450	450	341609.461	339610.438	0.650
SW02	0.002	5.00	65.350	450	450	341599.308	339618.230	0.735
SW03	0.003	5.00	65.350	450	450	341601.384	339602.493	0.650
SW04	0.001	5.00	65.350	450	450	341592.477	339609.330	0.725
SW05			65.350	450	450	341595.157	339612.821	0.782
Private SW Soakaway			65.350	500	1000	341591.388	339615.713	0.814
SW06			65.350	450	450	341590.002	339616.782	0.826

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	SW01	SW02	12.798	0.600	64.700	64.615	0.085	150.0	150	5.26	50.0
1.001	SW02	SW05	6.818	0.600	64.615	64.570	0.045	150.0	150	5.40	50.0
1.002	SW05	Private SW Soakaway	4.751	0.600	64.568	64.536	0.032	150.0	150	5.50	50.0
2.000	SW03	SW04	11.229	0.600	64.700	64.625	0.075	150.0	150	5.23	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	0.5	0.500	0.585	0.004	0.0	20	0.393
1.001	0.818	14.5	0.8	0.585	0.630	0.006	0.0	24	0.442
1.002	0.818	14.5	1.4	0.632	0.664	0.010	0.0	31	0.511
2.000	0.818	14.5	0.4	0.500	0.575	0.003	0.0	17	0.355

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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)
2.001	SW04	SW05	4.401	0.600	64.625	64.568	0.057	77.2	150	5.29	50.0
1.003	Private SW Soakaway	SW06	1.750	0.600	64.536	64.524	0.012	150.0	150	5.53	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)
2.001	1.145	20.2	0.5	0.575	0.632	0.004	0.0	17	0.487
1.003	0.818	14.5	1.4	0.664	0.676	0.010	0.0	31	0.511

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	12.798	150.0	150	Circular	65.350	64.700	0.500	65.350	64.615	0.585
1.001	6.818	150.0	150	Circular	65.350	64.615	0.585	65.350	64.570	0.630
1.002	4.751	150.0	150	Circular	65.350	64.568	0.632	65.350	64.536	0.664
2.000	11.229	150.0	150	Circular	65.350	64.700	0.500	65.350	64.625	0.575
2.001	4.401	77.2	150	Circular	65.350	64.625	0.575	65.350	64.568	0.632
1.003	1.750	150.0	150	Circular	65.350	64.536	0.664	65.350	64.524	0.676

Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Width (mm)	Node Type	MH Type
1.000	SW01	450	450	Manhole	450mm Plastic Inspection Chamber	SW02	450	450	Manhole	450mm Plastic Inspection Chamber
1.001	SW02	450	450	Manhole	450mm Plastic Inspection Chamber	SW05	450	450	Manhole	450mm Plastic Inspection Chamber
1.002	SW05	450	450	Manhole	450mm Plastic Inspection Chamber	Private SW Soakaway	500	1000	Manhole	450mm Plastic Inspection Chamber
2.000	SW03	450	450	Manhole	450mm Plastic Inspection Chamber	SW04	450	450	Manhole	450mm Plastic Inspection Chamber
2.001	SW04	450	450	Manhole	450mm Plastic Inspection Chamber	SW05	450	450	Manhole	450mm Plastic Inspection Chamber
1.003	Private SW Soakaway	500	1000	Manhole	450mm Plastic Inspection Chamber	SW06	450	450	Manhole	450mm Plastic Inspection Chamber

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
SW01	341609.461	339610.438	65.350	0.650	450	450				
							0	1.000	64.700	150
SW02	341599.308	339618.230	65.350	0.735	450	450	1	1.000	64.615	150
										
							0	1.001	64.615	150
SW03	341601.384	339602.493	65.350	0.650	450	450				
							0	2.000	64.700	150
SW04	341592.477	339609.330	65.350	0.725	450	450	1	2.000	64.625	150
										
							0	2.001	64.625	150
SW05	341595.157	339612.821	65.350	0.782	450	450	1	2.001	64.568	150
							2	1.001	64.570	150
										
							0	1.002	64.568	150
Private SW Soakaway	341591.388	339615.713	65.350	0.814	500	1000	1	1.002	64.536	150
										
							0	1.003	64.536	150
SW06	341590.002	339616.782	65.350	0.826	450	450	1	1.003	64.524	150
										

Simulation Settings

Rainfall Methodology	FSR	Summer CV	0.750	Drain Down Time (mins)	240
FSR Region	England and Wales	Winter CV	0.840	Additional Storage (m³/ha)	20.0
M5-60 (mm)	20.000	Analysis Speed	Normal	Check Discharge Rate(s)	x
Ratio-R	0.400	Skip Steady State	x	Check Discharge Volume	x

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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 %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0	100	40	0	0
30	0	0	0				

Node SW06 Online Head/Flow Control

Flap Valve	x	Invert Level (m)	64.524	Design Flow (l/s)	0.1
Replaces Downstream Link	✓	Design Depth (m)	0.100		

Head (m)	Flow (l/s)	Head (m)	Flow (l/s)
0.001	0.000	9.999	0.000

Node Private SW Soakaway Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.23660	Safety Factor	4.0	Invert Level (m)	64.536
Side Inf Coefficient (m/hr)	0.23660	Porosity	0.32	Time to half empty (mins)	152

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	20.0	6.0	0.500	20.0	13.8	0.501	0.0	13.8

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 180 minute winter	15.102	5.979
1 year 15 minute winter	76.857	30.991	1 year 240 minute summer	18.475	4.882
1 year 30 minute summer	71.439	20.215	1 year 240 minute winter	12.274	4.882
1 year 30 minute winter	50.133	20.215	1 year 360 minute summer	14.169	3.646
1 year 60 minute summer	48.435	12.800	1 year 360 minute winter	9.210	3.646
1 year 60 minute winter	32.179	12.800	1 year 480 minute summer	11.185	2.956
1 year 120 minute summer	30.053	7.942	1 year 480 minute winter	7.431	2.956
1 year 120 minute winter	19.966	7.942	1 year 600 minute summer	9.182	2.511
1 year 180 minute summer	23.233	5.979	1 year 600 minute winter	6.274	2.511

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Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 720 minute summer	8.203	2.199
1 year 720 minute winter	5.513	2.199
1 year 960 minute summer	6.768	1.782
1 year 960 minute winter	4.483	1.782
1 year 1440 minute summer	4.949	1.326
1 year 1440 minute winter	3.326	1.326
1 year 2160 minute summer	3.574	0.988
1 year 2160 minute winter	2.462	0.988
1 year 2880 minute summer	2.986	0.800
1 year 2880 minute winter	2.007	0.800
1 year 4320 minute summer	2.276	0.595
1 year 4320 minute winter	1.499	0.595
1 year 5760 minute summer	1.885	0.483
1 year 5760 minute winter	1.220	0.483
1 year 7200 minute summer	1.609	0.410
1 year 7200 minute winter	1.038	0.410
1 year 8640 minute summer	1.409	0.359
1 year 8640 minute winter	0.910	0.359
1 year 10080 minute summer	1.260	0.322
1 year 10080 minute winter	0.813	0.322
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
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

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Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +40% CC 480 minute summer	43.979	11.622	100 year +40% CC 2880 minute summer	10.319	2.766
100 year +40% CC 480 minute winter	29.219	11.622	100 year +40% CC 2880 minute winter	6.935	2.766
100 year +40% CC 600 minute summer	35.604	9.738	100 year +40% CC 4320 minute summer	7.609	1.989
100 year +40% CC 600 minute winter	24.327	9.738	100 year +40% CC 4320 minute winter	5.011	1.989
100 year +40% CC 720 minute summer	31.433	8.424	100 year +40% CC 5760 minute summer	6.145	1.573
100 year +40% CC 720 minute winter	21.125	8.424	100 year +40% CC 5760 minute winter	3.978	1.573
100 year +40% CC 960 minute summer	25.432	6.697	100 year +40% CC 7200 minute summer	5.137	1.311
100 year +40% CC 960 minute winter	16.847	6.697	100 year +40% CC 7200 minute winter	3.316	1.311
100 year +40% CC 1440 minute summer	18.055	4.839	100 year +40% CC 8640 minute summer	4.424	1.129
100 year +40% CC 1440 minute winter	12.134	4.839	100 year +40% CC 8640 minute winter	2.855	1.129
100 year +40% CC 2160 minute summer	12.630	3.490	100 year +40% CC 10080 minute summer	3.897	0.994
100 year +40% CC 2160 minute winter	8.702	3.490	100 year +40% CC 10080 minute winter	2.515	0.994

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Results for 1 year Critical Storm Duration. Lowest mass balance: 90.91%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW01	10	64.720	0.020	0.6	0.0065	0.0000	OK
15 minute winter	SW02	11	64.640	0.025	0.9	0.0064	0.0000	OK
15 minute summer	SW03	11	64.718	0.018	0.4	0.0052	0.0000	OK
15 minute summer	SW04	11	64.641	0.016	0.5	0.0037	0.0000	OK
60 minute winter	SW05	56	64.616	0.048	0.7	0.0098	0.0000	OK
60 minute winter	Private SW Soakaway	57	64.616	0.080	0.7	0.5530	0.0000	OK
60 minute winter	SW06	58	64.616	0.092	0.1	0.0187	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	SW01	1.000	SW02	0.6	0.345	0.038	0.0208	
15 minute winter	SW02	1.001	SW05	0.9	0.387	0.059	0.0150	
15 minute summer	SW03	2.000	SW04	0.4	0.371	0.028	0.0122	
15 minute summer	SW04	2.001	SW05	0.5	0.275	0.025	0.0082	
60 minute winter	SW05	1.002	Private SW Soakaway	0.7	0.438	0.048	0.0344	
60 minute winter	Private SW Soakaway	1.003	SW06	0.1	0.219	0.009	0.0183	
60 minute winter	Private SW Soakaway	Infiltration		0.1				
60 minute winter	SW06	Head/Flow		0.0				0.0

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Results for 30 year Critical Storm Duration. Lowest mass balance: 90.91%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW01	10	64.731	0.031	1.4	0.0101	0.0000	OK
180 minute winter	SW02	148	64.728	0.113	0.5	0.0290	0.0000	OK
180 minute winter	SW03	148	64.728	0.028	0.2	0.0082	0.0000	OK
180 minute winter	SW04	148	64.728	0.103	0.3	0.0237	0.0000	OK
180 minute winter	SW05	148	64.728	0.160	0.7	0.0325	0.0000	SURCHARGED
180 minute winter	Private SW Soakaway	148	64.728	0.192	0.6	1.3242	0.0000	SURCHARGED
180 minute winter	SW06	148	64.728	0.204	0.1	0.0414	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	SW01	1.000	SW02	1.4	0.438	0.094	0.0401	
180 minute winter	SW02	1.001	SW05	0.5	0.323	0.032	0.1085	
180 minute winter	SW03	2.000	SW04	0.2	0.306	0.014	0.0849	
180 minute winter	SW04	2.001	SW05	0.4	0.214	0.018	0.0671	
180 minute winter	SW05	1.002	Private SW Soakaway	0.6	0.386	0.040	0.0836	
180 minute winter	Private SW Soakaway	1.003	SW06	0.1	0.192	0.004	0.0308	
180 minute winter	Private SW Soakaway	Infiltration		0.1				
180 minute winter	SW06	Head/Flow		0.0				0.0

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 90.91%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	SW01	176	64.898	0.198	0.6	0.0647	0.0000	SURCHARGED
180 minute winter	SW02	176	64.898	0.283	0.9	0.0728	0.0000	SURCHARGED
180 minute winter	SW03	176	64.898	0.198	0.4	0.0585	0.0000	SURCHARGED
180 minute winter	SW04	176	64.898	0.273	0.5	0.0629	0.0000	SURCHARGED
180 minute winter	SW05	176	64.898	0.330	1.0	0.0671	0.0000	SURCHARGED
180 minute winter	Private SW Soakaway	176	64.898	0.362	0.9	2.5009	0.0000	SURCHARGED
180 minute winter	SW06	176	64.898	0.374	0.1	0.0760	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)
180 minute winter	SW01	1.000	SW02	0.6	0.302	0.041	0.2253	
180 minute winter	SW02	1.001	SW05	0.7	0.281	0.050	0.1200	
180 minute winter	SW03	2.000	SW04	0.4	0.302	0.028	0.1977	
180 minute winter	SW04	2.001	SW05	0.5	0.195	0.026	0.0775	
180 minute winter	SW05	1.002	Private SW Soakaway	0.9	0.445	0.059	0.0836	
180 minute winter	Private SW Soakaway	1.003	SW06	0.1	0.271	0.006	0.0308	
180 minute winter	Private SW Soakaway	Infiltration		0.2				
180 minute winter	SW06	Head/Flow		0.0				0.0

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