Design Settings

Rainfall Methodology	FSR	CV	0.750	Minimum Backdrop Height (m)	1.000
Return Period (years)	2	Time of Entry (mins)	5.00	Preferred Cover Depth (m)	0.600
Additional Flow (%)	0	Maximum Time of Concentration (mins)	30.00	Include Intermediate Ground	✓
FSR Region	England and Wales	Maximum Rainfall (mm/hr)	50.0	Enforce best practice design rules	✓
M5-60 (mm)	18.000	Minimum Velocity (m/s)	1.00		
Ratio-R	0.360	Connection Type	Level Soffits		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.013	5.00	48.500	260	469.809	1704.257	0.825
2	0.002	5.00	48.500	450	474.704	1725.104	1.039
3	0.002	5.00	48.500	450	469.436	1726.241	1.093
4	0.009	5.00	48.500	260	461.419	1705.912	1.091
5	0.000		48.200	450	456.700	1719.659	0.936
6	0.004	5.00	48.200	450	442.667	1706.490	1.292
7	0.006	5.00	48.200	450	440.207	1713.703	1.343
8	0.001	5.00	48.200	1050	451.766	1717.911	1.425
9	0.000		48.451	450	451.201	1719.545	1.693
10			47.915		448.988	1726.525	1.401

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	1	2	21.414	0.600	47.675	47.461	0.214	100.0	225	5.27	50.0
1.001	2	3	5.389	0.600	47.461	47.407	0.054	100.0	225	5.34	50.0
1.002	3	5	14.336	0.600	47.407	47.264	0.143	100.0	225	5.52	50.0
2.000	4	5	14.534	0.600	47.409	47.264	0.145	100.0	225	5.19	50.0
1.003	5	8	5.234	0.600	47.264	46.775	0.489	10.7	225	5.55	50.0
3.000	6	7	7.621	0.600	46.908	46.857	0.051	150.0	225	5.12	50.0
3.001	7	8	12.301	0.600	46.857	46.775	0.082	150.0	225	5.31	50.0
1.004	8	9	1.729	0.600	46.775	46.758	0.017	100.0	150	5.57	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	1.307	52.0	1.8	0.600	0.814	0.013	0.0	29	0.614
1.001	1.307	52.0	2.0	0.814	0.868	0.015	0.0	30	0.638
1.002	1.307	52.0	2.3	0.868	0.711	0.017	0.0	32	0.661
2.000	1.307	52.0	1.2	0.866	0.711	0.009	0.0	23	0.539
1.003	4.022	159.9	3.5	0.711	1.200	0.026	0.0	23	1.672
3.000	1.065	42.3	0.5	1.067	1.118	0.004	0.0	18	0.369
3.001	1.065	42.3	1.4	1.118	1.200	0.010	0.0	28	0.489
1.004	1.005	17.8	5.0	1.275	1.543	0.037	0.0	54	0.863

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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)
1.005	9	10	7.322	0.600	46.758	46.514	0.244	30.0	150	5.64	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)
1.005	1.845	32.6	5.0	1.543	1.251	0.037	0.0	40	1.338

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	21.414	100.0	225	Circular_Default Sewer Type	48.500	47.675	0.600	48.500	47.461	0.814
1.001	5.389	100.0	225	Circular_Default Sewer Type	48.500	47.461	0.814	48.500	47.407	0.868
1.002	14.336	100.0	225	Circular_Default Sewer Type	48.500	47.407	0.868	48.200	47.264	0.711
2.000	14.534	100.0	225	Circular_Default Sewer Type	48.500	47.409	0.866	48.200	47.264	0.711
1.003	5.234	10.7	225	Circular_Default Sewer Type	48.200	47.264	0.711	48.200	46.775	1.200
3.000	7.621	150.0	225	Circular_Default Sewer Type	48.200	46.908	1.067	48.200	46.857	1.118
3.001	12.301	150.0	225	Circular_Default Sewer Type	48.200	46.857	1.118	48.200	46.775	1.200
1.004	1.729	100.0	150	Circular_Default Sewer Type	48.200	46.775	1.275	48.451	46.758	1.543
1.005	7.322	30.0	150	Circular_Default Sewer Type	48.451	46.758	1.543	47.915	46.514	1.251

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	260	Manhole	Adoptable	2	450	Manhole	Adoptable
1.001	2	450	Manhole	Adoptable	3	450	Manhole	Adoptable
1.002	3	450	Manhole	Adoptable	5	450	Manhole	Adoptable
2.000	4	260	Manhole	Adoptable	5	450	Manhole	Adoptable
1.003	5	450	Manhole	Adoptable	8	1050	Manhole	Adoptable
3.000	6	450	Manhole	Adoptable	7	450	Manhole	Adoptable
3.001	7	450	Manhole	Adoptable	8	1050	Manhole	Adoptable
1.004	8	1050	Manhole	Adoptable	9	450	Manhole	Adoptable
1.005	9	450	Manhole	Adoptable	10		Junction	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	469.809	1704.257	48.500	0.825	260				
						0	1.000	47.675	225
2	474.704	1725.104	48.500	1.039	450	1	1.000	47.461	225
									
						0	1.001	47.461	225

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
3	469.436	1726.241	48.500	1.093	450	1	1.001	47.407	225
						0	1.002	47.407	225
4	461.419	1705.912	48.500	1.091	260	0	2.000	47.409	225
5	456.700	1719.659	48.200	0.936	450	1	2.000	47.264	225
						2	1.002	47.264	225
						0	1.003	47.264	225
6	442.667	1706.490	48.200	1.292	450	0	3.000	46.908	225
7	440.207	1713.703	48.200	1.343	450	1	3.000	46.857	225
						0	3.001	46.857	225
8	451.766	1717.911	48.200	1.425	1050	1	3.001	46.775	225
						2	1.003	46.775	225
						0	1.004	46.775	150
9	451.201	1719.545	48.451	1.693	450	1	1.004	46.758	150
						0	1.005	46.758	150
10	448.988	1726.525	47.915	1.401		1	1.005	46.514	150

Simulation Settings

Rainfall Methodology	FSR	Summer CV	0.750	Additional Storage (m³/ha)	20.0	30 year (l/s)	2.0
Rainfall Events	Singular	Winter CV	0.840	Starting Level (m)		100 year (l/s)	2.0
FSR Region	England and Wales	Analysis Speed	Normal	Check Discharge Rate(s)	✓	Check Discharge Volume	✓
M5-60 (mm)	18.000	Skip Steady State	✓	1 year (l/s)	2.0	100 year 360 minute (m³)	
Ratio-R	0.360	Drain Down Time (mins)	240	2 year (l/s)	2.0		

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	45	10	0

Pre-development Discharge Rate

Site Makeup	Greenfield	SAAR (mm)		Region	1	Growth Factor 100 year	2.48	Q 1 year (l/s)
Greenfield Method	IH124	Soil Index	1	Growth Factor 1 year	0.85	Betterment (%)	0	Q 30 year (l/s)
Positively Drained Area (ha)		SPR	0.10	Growth Factor 30 year	1.95	QBar		Q 100 year (l/s)

Pre-development Discharge Volume

Site Makeup	Greenfield	Soil Index	1	Return Period (years)	100	Betterment (%)	0
Greenfield Method	FSR/FEH	SPR	0.10	Climate Change (%)	0	PR	
Positively Drained Area (ha)		CWI		Storm Duration (mins)	360	Runoff Volume (m³)	

Node 8 Online Orifice Control

Flap Valve	x	Invert Level (m)	46.775	Design Flow (l/s)	2.0	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Depth (m)	1.206	Diameter (m)	0.029		

Node 6 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	Side Inf Coefficient (m/hr)	Safety Factor	Porosity	Invert Level (m)	Time to half empty (mins)
0.00000	0.00000	2.0	1.00	46.908	0

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	13.0	0.0	0.420	13.0	0.0	0.421	0.0	0.0

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Results for 1 year Critical Storm Duration. Lowest mass balance: 96.58%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)		Status
15 minute winter	1	10	47.702	0.027	1.6	0.0099	0.0000	OK	
15 minute winter	2	11	47.490	0.029	1.8	0.0058	0.0000	OK	
15 minute winter	3	11	47.439	0.032	2.0	0.0062	0.0000	OK	
15 minute winter	4	10	47.432	0.023	1.1	0.0050	0.0000	OK	
15 minute winter	5	11	47.285	0.021	3.0	0.0034	0.0000	OK	
60 minute winter	6	46	46.976	0.068	1.4	0.8986	0.0000	OK	
60 minute winter	7	47	46.976	0.119	1.3	0.0295	0.0000	OK	
60 minute winter	8	47	46.976	0.201	1.7	0.1769	0.0000	SURCHARGED	
60 minute winter	9	47	46.774	0.016	0.8	0.0025	0.0000	OK	
60 minute winter	10	47	46.530	0.016	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)
15 minute winter	1	1.000	2	1.6	0.557	0.030	0.0603	
15 minute winter	2	1.001	3	1.8	0.548	0.034	0.0173	
15 minute winter	3	1.002	5	2.0	0.746	0.038	0.0380	
15 minute winter	4	2.000	5	1.1	0.542	0.021	0.0287	
15 minute winter	5	1.003	8	3.0	0.419	0.019	0.0939	
60 minute winter	6	3.000	7	-1.1	-0.165	-0.026	0.1196	
60 minute winter	7	3.001	8	-0.9	0.253	-0.020	0.3614	
60 minute winter	8	Orifice	9	0.8				
60 minute winter	9	1.005	10	0.8	0.761	0.023	0.0073	3.4

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Results for 2 year Critical Storm Duration. Lowest mass balance: 96.58%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)		Status
15 minute winter	1	10	47.705	0.030	2.1	0.0112	0.0000	OK	
15 minute winter	2	11	47.495	0.034	2.3	0.0067	0.0000	OK	
15 minute winter	3	11	47.444	0.037	2.6	0.0072	0.0000	OK	
15 minute summer	4	10	47.435	0.026	1.4	0.0056	0.0000	OK	
15 minute winter	5	11	47.288	0.024	4.0	0.0039	0.0000	OK	
60 minute winter	6	48	47.014	0.106	1.8	1.4076	0.0000	OK	
60 minute winter	7	48	47.014	0.157	1.8	0.0390	0.0000	OK	
60 minute winter	8	48	47.014	0.239	2.3	0.2106	0.0000	SURCHARGED	
60 minute winter	9	48	46.775	0.017	0.8	0.0027	0.0000	OK	
60 minute winter	10	48	46.531	0.017	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)
15 minute winter	1	1.000	2	2.0	0.595	0.039	0.0733	
15 minute winter	2	1.001	3	2.3	0.587	0.045	0.0213	
15 minute winter	3	1.002	5	2.6	0.817	0.051	0.0467	
15 minute summer	4	2.000	5	1.4	0.583	0.026	0.0345	
15 minute winter	5	1.003	8	4.0	0.481	0.025	0.1044	
60 minute winter	6	3.000	7	-1.5	-0.168	-0.035	0.1835	
60 minute winter	7	3.001	8	-1.3	0.253	-0.031	0.4271	
60 minute winter	8	Orifice	9	0.8				
60 minute winter	9	1.005	10	0.8	0.782	0.026	0.0078	4.4

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Results for 30 year Critical Storm Duration. Lowest mass balance: 96.58%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	47.716	0.041	3.9	0.0152	0.0000	OK
15 minute winter	2	11	47.508	0.047	4.5	0.0094	0.0000	OK
15 minute winter	3	11	47.458	0.051	5.0	0.0099	0.0000	OK
15 minute winter	4	10	47.445	0.036	2.7	0.0077	0.0000	OK
15 minute winter	5	11	47.297	0.033	7.6	0.0053	0.0000	OK
60 minute winter	6	58	47.210	0.302	4.0	3.9907	0.0000	SURCHARGED
60 minute winter	7	58	47.210	0.353	3.9	0.0875	0.0000	SURCHARGED
60 minute winter	8	58	47.210	0.435	4.3	0.3826	0.0000	SURCHARGED
60 minute winter	9	58	46.777	0.019	1.1	0.0031	0.0000	OK
60 minute winter	10	58	46.533	0.019	1.1	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	1	1.000	2	3.9	0.699	0.074	0.1183	
15 minute winter	2	1.001	3	4.4	0.694	0.085	0.0343	
15 minute winter	3	1.002	5	5.0	0.988	0.097	0.0738	
15 minute winter	4	2.000	5	2.7	0.698	0.051	0.0553	
15 minute winter	5	1.003	8	7.6	0.644	0.048	0.1136	
60 minute winter	6	3.000	7	-3.4	-0.174	-0.080	0.3031	
60 minute winter	7	3.001	8	-3.0	0.252	-0.071	0.4892	
60 minute winter	8	Orifice	9	1.1				
60 minute winter	9	1.005	10	1.1	0.859	0.035	0.0097	8.6

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Results for 100 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 96.58%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	1	94	47.913	0.238	2.7	0.0953	0.0000	SURCHARGED
120 minute winter	2	94	47.913	0.452	3.1	0.0908	0.0000	SURCHARGED
120 minute winter	3	94	47.913	0.506	4.6	0.1006	0.0000	SURCHARGED
120 minute winter	4	92	47.912	0.503	3.6	0.1183	0.0000	SURCHARGED
120 minute winter	5	92	47.912	0.648	5.4	0.1031	0.0000	FLOOD RISK
120 minute winter	6	92	47.914	1.006	5.2	5.6948	0.0000	FLOOD RISK
120 minute winter	7	92	47.913	1.056	4.8	0.2715	0.0000	FLOOD RISK
120 minute winter	8	92	47.913	1.138	5.3	1.0023	0.0000	FLOOD RISK
120 minute winter	9	92	46.783	0.025	1.9	0.0039	0.0000	OK
120 minute winter	10	92	46.538	0.024	1.9	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)
120 minute winter	1	1.000	2	2.7	0.652	0.052	0.8517	
120 minute winter	2	1.001	3	4.2	0.668	0.080	0.2143	
120 minute winter	3	1.002	5	3.5	0.875	0.067	0.5702	
120 minute winter	4	2.000	5	2.2	0.622	0.041	0.5780	
120 minute winter	5	1.003	8	5.1	0.346	0.032	0.2082	
120 minute winter	6	3.000	7	-4.4	0.162	-0.104	0.3031	
120 minute winter	7	3.001	8	-3.6	0.178	-0.085	0.4892	
120 minute winter	8	Orifice	9	1.9				
120 minute winter	9	1.005	10	1.9	0.992	0.057	0.0137	22.0

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