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	0.750
2	0.002	5.00	48.500	450	474.704	1725.104	0.964
3	0.002	5.00	48.500	450	469.436	1726.241	1.018
4	0.009	5.00	48.500	260	461.419	1705.912	0.750
5	0.000		48.200	450	456.700	1719.659	0.861
6	0.004	5.00	48.200	450	442.667	1706.490	0.750
7	0.006	5.00	48.200	450	440.207	1713.703	0.826
8	0.001	5.00	48.200	1050	451.766	1717.911	1.086
9	0.000		48.451	450	451.201	1719.545	1.693
10			47.915		448.988	1726.525	3.550

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	47.750	47.536	0.214	100.0	150	5.36	50.0
1.001	2	3	5.389	0.600	47.536	47.482	0.054	100.0	150	5.44	50.0
1.002	3	5	14.336	0.600	47.482	47.339	0.143	100.0	150	5.68	50.0
2.000	4	5	14.534	0.600	47.750	47.339	0.411	35.4	150	5.14	50.0
1.003	5	8	5.234	0.600	47.339	47.114	0.225	23.3	150	5.72	50.0
3.000	6	7	7.621	0.600	47.450	47.374	0.076	100.0	150	5.13	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	1.005	17.8	1.8	0.600	0.814	0.013	0.0	32	0.642
1.001	1.005	17.8	2.0	0.814	0.868	0.015	0.0	34	0.670
1.002	1.005	17.8	2.3	0.868	0.711	0.017	0.0	37	0.696
2.000	1.698	30.0	1.2	0.600	0.711	0.009	0.0	21	0.836
1.003	2.096	37.0	3.5	0.711	0.936	0.026	0.0	31	1.330
3.000	1.005	17.8	0.5	0.600	0.676	0.004	0.0	18	0.446

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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)
3.001	7	8	12.301	0.600	47.374	47.114	0.260	47.3	150	5.27	50.0
1.004	8	9	1.729	0.600	47.114	46.758	0.356	4.9	150	5.73	50.0
1.005	9	10	7.322	0.600	46.758	44.365	2.393	3.1	150	5.75	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)
3.001	1.466	25.9	1.4	0.676	0.936	0.010	0.0	23	0.772
1.004	4.604	81.4	5.0	0.936	1.543	0.037	0.0	25	2.548
1.005	5.803	102.6	5.0	1.543	3.400	0.037	0.0	23	3.023

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	150	Circular_Default Sewer Type	48.500	47.750	0.600	48.500	47.536	0.814
1.001	5.389	100.0	150	Circular_Default Sewer Type	48.500	47.536	0.814	48.500	47.482	0.868
1.002	14.336	100.0	150	Circular_Default Sewer Type	48.500	47.482	0.868	48.200	47.339	0.711
2.000	14.534	35.4	150	Circular_Default Sewer Type	48.500	47.750	0.600	48.200	47.339	0.711
1.003	5.234	23.3	150	Circular_Default Sewer Type	48.200	47.339	0.711	48.200	47.114	0.936
3.000	7.621	100.0	150	Circular_Default Sewer Type	48.200	47.450	0.600	48.200	47.374	0.676
3.001	12.301	47.3	150	Circular_Default Sewer Type	48.200	47.374	0.676	48.200	47.114	0.936
1.004	1.729	4.9	150	Circular_Default Sewer Type	48.200	47.114	0.936	48.451	46.758	1.543
1.005	7.322	3.1	150	Circular_Default Sewer Type	48.451	46.758	1.543	47.915	44.365	3.400

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	

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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	0.750	260				
						0	1.000	47.750	150
2	474.704	1725.104	48.500	0.964	450		1	1.000	47.536	150
									
						0	1.001	47.536	150
3	469.436	1726.241	48.500	1.018	450	1	1.001	47.482	150
									
						0	1.002	47.482	150
4	461.419	1705.912	48.500	0.750	260				
						0	2.000	47.750	150
5	456.700	1719.659	48.200	0.861	450	1	2.000	47.339	150
						2	1.002	47.339	150
									
						0	1.003	47.339	150
6	442.667	1706.490	48.200	0.750	450				
						0	3.000	47.450	150
7	440.207	1713.703	48.200	0.826	450	1	3.000	47.374	150
									
						0	3.001	47.374	150
8	451.766	1717.911	48.200	1.086	1050	1	3.001	47.114	150
						2	1.003	47.114	150
									
						0	1.004	47.114	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	3.550		1	1.005	44.365	150
									

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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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	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)	47.114	Design Flow (l/s)	2.0	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Depth (m)	1.206	Diameter (m)	0.029		

Node 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	47.536
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	0

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	18.0	0.0	0.420	18.0	0.0	0.421	0.0	0.0

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Results for 1 year Critical Storm Duration. Lowest mass balance: 96.81%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	47.784	0.034	1.6	0.0135	0.0000	OK
30 minute winter	2	21	47.561	0.025	1.4	0.4576	0.0000	OK
30 minute winter	3	21	47.508	0.026	1.2	0.0051	0.0000	OK
15 minute winter	4	10	47.770	0.020	1.1	0.0057	0.0000	OK
60 minute winter	5	45	47.472	0.133	1.5	0.0211	0.0000	OK
60 minute winter	6	46	47.472	0.022	0.3	0.0059	0.0000	OK
60 minute winter	7	46	47.472	0.098	0.7	0.0297	0.0000	OK
60 minute winter	8	45	47.472	0.358	1.8	0.3161	0.0000	SURCHARGED
60 minute winter	9	46	46.769	0.011	1.0	0.0017	0.0000	OK
60 minute winter	10	46	44.376	0.011	1.0	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	0.858	0.090	0.0450	
30 minute winter	2	1.001	3	1.0	0.517	0.057	0.0106	
30 minute winter	3	1.002	5	1.1	0.480	0.064	0.1255	
15 minute winter	4	2.000	5	1.1	0.773	0.036	0.0920	
60 minute winter	5	1.003	8	1.1	0.339	0.030	0.0892	
60 minute winter	6	3.000	7	0.3	0.318	0.017	0.0524	
60 minute winter	7	3.001	8	0.7	0.425	0.026	0.1830	
60 minute winter	8	Orifice	9	1.0				
60 minute winter	9	1.005	10	1.0	1.861	0.010	0.0040	3.4

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Results for 2 year Critical Storm Duration. Lowest mass balance: 96.81%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	47.788	0.038	2.1	0.0151	0.0000	OK
15 minute winter	2	13	47.566	0.030	2.4	0.5437	0.0000	OK
60 minute winter	3	47	47.551	0.069	1.3	0.0137	0.0000	OK
15 minute summer	4	10	47.772	0.022	1.4	0.0064	0.0000	OK
60 minute winter	5	47	47.551	0.212	2.0	0.0336	0.0000	SURCHARGED
60 minute winter	6	47	47.551	0.101	0.5	0.0268	0.0000	OK
60 minute winter	7	47	47.551	0.177	0.9	0.0537	0.0000	SURCHARGED
60 minute winter	8	47	47.550	0.436	2.0	0.3858	0.0000	SURCHARGED
60 minute winter	9	47	46.769	0.011	1.1	0.0018	0.0000	OK
60 minute winter	10	47	44.376	0.011	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	2.1	0.887	0.116	0.0562	
15 minute winter	2	1.001	3	1.4	0.567	0.080	0.0135	
60 minute winter	3	1.002	5	1.3	0.479	0.073	0.1829	
15 minute summer	4	2.000	5	1.4	0.838	0.046	0.1217	
60 minute winter	5	1.003	8	1.8	0.339	0.047	0.0921	
60 minute winter	6	3.000	7	-0.3	0.319	-0.017	0.1151	
60 minute winter	7	3.001	8	0.8	0.425	0.029	0.2166	
60 minute winter	8	Orifice	9	1.1				
60 minute winter	9	1.005	10	1.1	1.921	0.011	0.0043	4.4

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Results for 30 year Critical Storm Duration. Lowest mass balance: 96.81%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	47.801	0.051	3.9	0.0202	0.0000	OK
60 minute winter	2	50	47.672	0.136	4.5	2.4693	0.0000	OK
60 minute winter	3	50	47.672	0.190	2.2	0.0375	0.0000	SURCHARGED
15 minute winter	4	10	47.780	0.030	2.7	0.0089	0.0000	OK
60 minute winter	5	49	47.671	0.332	3.0	0.0529	0.0000	SURCHARGED
60 minute winter	6	49	47.671	0.221	1.1	0.0589	0.0000	SURCHARGED
60 minute winter	7	49	47.671	0.297	1.4	0.0904	0.0000	SURCHARGED
60 minute winter	8	49	47.671	0.557	2.0	0.4926	0.0000	SURCHARGED
60 minute winter	9	49	46.770	0.012	1.3	0.0019	0.0000	OK
60 minute winter	10	49	44.377	0.012	1.3	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	0.976	0.219	0.1287	
60 minute winter	2	1.001	3	-2.1	0.566	-0.119	0.0926	
60 minute winter	3	1.002	5	-1.8	0.466	-0.102	0.2524	
15 minute winter	4	2.000	5	2.7	0.933	0.089	0.1457	
60 minute winter	5	1.003	8	1.8	0.465	0.049	0.0921	
60 minute winter	6	3.000	7	0.5	0.322	0.028	0.1342	
60 minute winter	7	3.001	8	1.3	0.423	0.049	0.2166	
60 minute winter	8	Orifice	9	1.3				
60 minute winter	9	1.005	10	1.3	1.998	0.013	0.0047	8.6

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Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 96.81%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	1	94	48.025	0.275	2.6	0.1194	0.0000	SURCHARGED
120 minute winter	2	94	48.025	0.489	4.7	7.6692	0.0000	SURCHARGED
120 minute winter	3	94	48.025	0.543	1.9	0.1096	0.0000	SURCHARGED
120 minute winter	4	94	48.025	0.275	1.8	0.0871	0.0000	SURCHARGED
120 minute winter	5	94	48.024	0.685	2.0	0.1090	0.0000	FLOOD RISK
120 minute winter	6	94	48.024	0.574	0.8	0.1585	0.0000	FLOOD RISK
120 minute winter	7	94	48.024	0.650	1.8	0.2075	0.0000	FLOOD RISK
120 minute winter	8	94	48.024	0.910	2.0	0.8064	0.0000	FLOOD RISK
120 minute winter	9	94	46.772	0.014	1.7	0.0022	0.0000	OK
120 minute winter	10	94	44.378	0.013	1.7	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	2.6	0.655	0.146	0.3770	
120 minute winter	2	1.001	3	-1.7	0.510	-0.094	0.0949	
120 minute winter	3	1.002	5	-1.5	0.515	-0.086	0.2524	
120 minute winter	4	2.000	5	1.8	0.574	0.060	0.2559	
120 minute winter	5	1.003	8	1.5	0.516	0.042	0.0921	
120 minute winter	6	3.000	7	0.6	0.299	0.035	0.1342	
120 minute winter	7	3.001	8	1.6	0.343	0.063	0.2166	
120 minute winter	8	Orifice	9	1.7				
120 minute winter	9	1.005	10	1.7	2.161	0.016	0.0056	21.4

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