

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	5.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	9.000
Ratio-R	0.400	Preferred Cover Depth (m)	1.500
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)	Easting (m)	Northing (m)	Depth (m)
S101	0.091	5.00	127.418	1500	442001.416	305682.959	1.725
S102	0.156	5.00	128.062	1500	441993.979	305709.277	2.605
S103	0.081	5.00	127.192	1500	442082.026	305789.572	1.725
S104	0.023	5.00	127.322	1500	442086.707	305774.997	1.946
S105	0.021	5.00	126.957	1500	442080.734	305741.376	1.857
S106	0.081	5.00	126.895	1500	442076.873	305736.863	1.820
S107	0.062	5.00	126.888	1800	442076.464	305734.382	1.913
S108	0.000		126.600		442075.189	305722.805	1.900
S109	0.201	5.00	126.600		442092.402	305705.435	1.900
S110	0.000		126.850	3000	442097.529	305701.231	2.175
S1604	0.000		125.724	1500	442106.529	305693.851	1.104

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	S101	S102	27.349	0.600	125.693	125.532	0.161	169.9	225	5.00	50.0
1.001	S102	S107	86.221	0.600	125.457	125.050	0.407	211.8	300	5.00	50.0
2.000	S103	S104	15.308	0.600	125.467	125.376	0.091	168.2	225	5.00	50.0
2.001	S104	S105	34.147	0.600	125.376	125.175	0.201	169.9	225	5.00	50.0
2.002	S105	S106	5.939	0.600	125.100	125.075	0.025	237.6	300	5.00	50.0
2.003	S106	S107	2.514	0.600	125.075	125.050	0.025	100.6	300	5.00	50.0
1.002	S107	S108	11.647	0.600	124.975	124.925	0.050	232.9	375	5.00	50.0
1.004	S109	S110	6.630	0.600	124.700	124.675	0.025	265.2	375	5.00	50.0
1.005	S110	S1604	11.639	0.600	124.675	124.620	0.055	211.6	300	5.00	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	1.000	39.8	17.3	1.500	2.305	0.091	0.0	103	0.964
1.001	1.076	76.1	46.9	2.305	1.538	0.247	0.0	171	1.131
2.000	1.005	40.0	15.4	1.500	1.721	0.081	0.0	97	0.942
2.001	1.000	39.8	19.7	1.721	1.557	0.104	0.0	112	0.998
2.002	1.015	71.8	23.7	1.557	1.520	0.125	0.0	119	0.915
2.003	1.567	110.8	39.1	1.520	1.538	0.206	0.0	123	1.435
1.002	1.183	130.6	97.7	1.538	1.300	0.515	0.0	243	1.293
1.004	1.108	122.3	38.1	1.525	1.800	0.201	0.0	143	0.982
1.005	1.077	76.1	38.1	1.875	0.804	0.201	0.0	150	1.078

Simulation Settings

Rainfall Methodology	FEH-99	E (1km)	0.309	Drain Down Time (mins)	1440
Rainfall Events	Singular	F (1km)	2.376	Additional Storage (m³/ha)	0.0
C (1km)	-0.029	Summer CV	0.750	Starting Level (m)	
D1 (1km)	0.362	Winter CV	0.840	Check Discharge Rate(s)	x
D2 (1km)	0.326	Analysis Speed	Detailed	Check Discharge Volume	x
D3 (1km)	0.287	Skip Steady State	x		

Storm Durations

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 %)
2	0	0	0
30	0	0	0
30	35	0	0
100	40	0	0

Node S110 Online Head/Flow Control

Flap Valve	✓	Invert Level (m)	124.675	Design Flow (l/s)	5.7
Replaces Downstream Link	✓	Design Depth (m)	1.325		

Head (m)	Flow (l/s)	Head (m)	Flow (l/s)	Head (m)	Flow (l/s)	Head (m)	Flow (l/s)	Head (m)	Flow (l/s)	Head (m)	Flow (l/s)
0.001	0.000	0.400	4.758	0.800	4.428	1.200	5.418	1.600	6.257	2.000	6.997
0.100	2.779	0.500	4.408	0.900	4.698	1.300	5.648	1.700	6.457	2.100	7.177
0.200	4.668	0.600	4.238	1.000	4.948	1.400	5.857	1.800	6.637	2.200	7.337
0.300	5.058	0.700	4.138	1.100	5.188	1.500	6.057	1.900	6.827		

Node S109 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	21.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	124.700	Main Channel Slope (1:X)	100000.0
Safety Factor	2.0	Time to half empty (mins)	0	Main Channel n	0.030

Inlets S108

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	275.5	0.0	1.000	489.4	0.0	1.500	617.6	0.0
0.500	375.4	0.0	1.300	564.6	0.0	1.900	730.2	0.0

Other (defaults)

Entry Loss (manhole)	0.250	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.250	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Approval Settings

Node Size	✓	Maximum Length (m)	100.000
Node Losses	✓	Coordinates	✓
Link Size	✓	Accuracy (m)	1.000
Minimum Diameter (mm)	150	Crossings	✓
Link Length	✓	Cover Depth	✓

Approval Settings

Minimum Cover Depth (m)		Maximum Proportional Velocity (m/s)	3.000
Maximum Cover Depth (m)	3.000	Surcharged Depth	✓
Backdrops	✓	Return Period (years)	
Minimum Backdrop Height (m)		Maximum Surcharged Depth (m)	0.100
Maximum Backdrop Height (m)	1.500	Flooding	✓
Full Bore Velocity	✓	Return Period (years)	30
Minimum Full Bore Velocity (m/s)		Time to Half Empty	x
Maximum Full Bore Velocity (m/s)	3.000	Discharge Rates	✓
Proportional Velocity	✓	Discharge Volume	✓
Return Period (years)		100 year 360 minute (m ³)	
Minimum Proportional Velocity (m/s)	0.750		

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.69%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	S101	33	125.762	0.069	7.8	0.1215	0.0000	OK
60 minute summer	S102	34	125.564	0.107	21.1	0.1886	0.0000	OK
60 minute summer	S103	33	125.532	0.065	6.9	0.1152	0.0000	OK
60 minute summer	S104	33	125.449	0.073	8.9	0.1291	0.0000	OK
60 minute summer	S105	33	125.189	0.089	10.6	0.1576	0.0000	OK
60 minute summer	S106	33	125.169	0.094	17.4	0.1658	0.0000	OK
60 minute summer	S107	34	125.127	0.152	42.7	0.3871	0.0000	OK
360 minute winter	S108	264	124.950	0.249	11.5	0.0000	0.0000	OK
360 minute winter	S109	264	124.949	0.249	10.3	0.0000	0.0000	OK
360 minute winter	S110	264	124.949	0.274	5.0	1.9386	0.0000	OK
60 minute summer	S1604	1	124.620	0.000	4.7	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)
60 minute summer	S101	1.000	S102	7.8	0.772	0.195	0.2753	
60 minute summer	S102	1.001	S107	20.5	0.922	0.269	1.9157	
60 minute summer	S103	2.000	S104	6.9	0.673	0.173	0.1583	
60 minute summer	S104	2.001	S105	8.8	0.802	0.221	0.3744	
60 minute summer	S105	2.002	S106	10.5	0.584	0.147	0.1079	
60 minute summer	S106	2.003	S107	17.4	1.031	0.157	0.0424	
60 minute summer	S107	1.002	S108	42.9	1.054	0.328	0.4736	
360 minute winter	S108	Flow through pond	S109	6.0	0.008	0.002	74.9172	
360 minute winter	S109	1.004	S110	5.0	0.323	0.041	0.5442	
360 minute winter	S110	Head/Flow	S1604	5.0				135.7

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.69%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	S101	33	125.809	0.116	19.7	0.2048	0.0000	OK
60 minute summer	S102	33	125.645	0.188	53.5	0.3314	0.0000	OK
60 minute summer	S103	33	125.579	0.112	17.5	0.1973	0.0000	OK
60 minute summer	S104	33	125.501	0.125	22.5	0.2200	0.0000	OK
360 minute winter	S105	352	125.315	0.215	6.0	0.3798	0.0000	OK
360 minute winter	S106	352	125.315	0.240	9.9	0.4239	0.0000	OK
360 minute winter	S107	352	125.315	0.340	24.7	0.8651	0.0000	OK
360 minute winter	S108	352	125.315	0.615	24.6	0.0000	0.0000	OK
360 minute winter	S109	352	125.315	0.615	19.7	0.0000	0.0000	SURCHARGED
360 minute winter	S110	352	125.315	0.640	5.7	4.5232	0.0000	SURCHARGED
60 minute summer	S1604	1	124.620	0.000	5.1	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)
60 minute summer	S101	1.000	S102	19.7	0.975	0.496	0.5531	
60 minute summer	S102	1.001	S107	53.4	1.138	0.702	4.0433	
60 minute summer	S103	2.000	S104	17.5	0.835	0.438	0.3228	
60 minute summer	S104	2.001	S105	22.3	1.018	0.562	0.7496	
360 minute winter	S105	2.002	S106	6.0	0.514	0.083	0.3398	
360 minute winter	S106	2.003	S107	9.9	0.889	0.089	0.1587	
360 minute winter	S107	1.002	S108	24.6	0.899	0.189	1.2541	
360 minute winter	S108	Flow through pond	S109	10.1	0.010	0.003	207.5845	
360 minute winter	S109	1.004	S110	5.7	0.370	0.046	0.7313	
360 minute winter	S110	Head/Flow	S1604	5.0				293.5

Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 99.69%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	S101	33	125.833	0.140	26.6	0.2479	0.0000	OK
60 minute summer	S102	33	125.691	0.234	72.2	0.4142	0.0000	OK
60 minute summer	S103	33	125.604	0.137	23.7	0.2417	0.0000	OK
480 minute winter	S104	464	125.540	0.164	5.5	0.2892	0.0000	OK
480 minute winter	S105	464	125.540	0.440	6.6	0.7769	0.0000	SURCHARGED
480 minute winter	S106	464	125.540	0.465	10.7	0.8210	0.0000	SURCHARGED
480 minute winter	S107	464	125.540	0.565	26.8	1.4370	0.0000	SURCHARGED
480 minute winter	S108	464	125.540	0.840	25.3	0.0000	0.0000	OK
480 minute winter	S109	464	125.540	0.840	20.3	0.0000	0.0000	SURCHARGED
480 minute winter	S110	464	125.540	0.865	5.6	6.1116	0.0000	SURCHARGED
60 minute summer	S1604	1	124.620	0.000	5.1	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)
60 minute summer	S101	1.000	S102	26.6	0.979	0.670	0.7673	
60 minute summer	S102	1.001	S107	71.7	1.171	0.943	5.2747	
60 minute summer	S103	2.000	S104	23.7	0.879	0.593	0.4126	
480 minute winter	S104	2.001	S105	5.5	0.704	0.138	1.2073	
480 minute winter	S105	2.002	S106	6.4	0.513	0.089	0.4182	
480 minute winter	S106	2.003	S107	10.5	0.893	0.094	0.1770	
480 minute winter	S107	1.002	S108	25.3	0.877	0.194	1.2846	
480 minute winter	S108	Flow through pond	S109	9.9	0.009	0.003	303.5526	
480 minute winter	S109	1.004	S110	5.6	0.361	0.045	0.7313	
480 minute winter	S110	Head/Flow	S1604	5.1				427.2

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.69%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	S101	34	126.510	0.817	40.2	1.4430	0.0000	SURCHARGED
60 minute summer	S102	34	126.323	0.866	106.4	1.5300	0.0000	SURCHARGED
60 minute summer	S103	34	125.920	0.453	35.8	0.8001	0.0000	SURCHARGED
600 minute winter	S104	585	125.847	0.471	6.4	0.8320	0.0000	SURCHARGED
600 minute winter	S105	585	125.847	0.747	7.7	1.3196	0.0000	SURCHARGED
600 minute winter	S106	585	125.847	0.772	12.1	1.3637	0.0000	SURCHARGED
600 minute winter	S107	585	125.847	0.872	30.9	2.2187	0.0000	SURCHARGED
600 minute winter	S108	585	125.847	1.147	30.1	0.0000	0.0000	OK
600 minute winter	S109	585	125.847	1.147	23.6	0.0000	0.0000	SURCHARGED
600 minute winter	S110	585	125.847	1.172	5.5	8.2824	0.0000	SURCHARGED
60 minute summer	S1604	1	124.620	0.000	5.1	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)
60 minute summer	S101	1.000	S102	39.1	0.982	0.982	1.0877	
60 minute summer	S102	1.001	S107	105.4	1.498	1.386	6.0716	
60 minute summer	S103	2.000	S104	34.3	0.918	0.857	0.6088	
600 minute winter	S104	2.001	S105	6.4	0.702	0.160	1.3581	
600 minute winter	S105	2.002	S106	7.1	0.499	0.099	0.4182	
600 minute winter	S106	2.003	S107	11.9	0.858	0.108	0.1770	
600 minute winter	S107	1.002	S108	30.1	0.833	0.230	1.2846	
600 minute winter	S108	Flow through pond	S109	11.2	0.010	0.003	453.4712	
600 minute winter	S109	1.004	S110	5.5	0.340	0.045	0.7313	
600 minute winter	S110	Head/Flow	S1604	5.4				551.4