Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
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)	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	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
IC-0101-S	0.050	5.00	51.141	1200	353074.195	237987.885	1.501
IC-0102-S	0.060	5.00	50.866	1200	353092.355	238024.007	1.631
IC-0103-S	0.060	5.00	50.591	1200	353118.914	238010.925	0.991
IC-0104-S	0.120	5.00	50.450	1200	353144.475	237998.356	1.225
IC-0105-S	0.020	5.00	51.141	1200	353126.004	237961.694	0.801
IC-0106-S	0.055	5.00	51.141	1200	353099.452	237974.624	1.141
IC-0107-S	0.055	5.00	50.696	1200	353114.260	238042.061	1.666
IC-0108-S	0.120	5.00	50.460	1200	353143.469	238027.129	1.655
Soakaway	0.010	5.00	49.030	1800	353164.587	238006.689	1.830
Dummy Soakaway	0.005	5.00	49.030	1200	353168.037	238005.491	1.831

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)
PN-001-S	IC-0101-S	IC-0102-S	40.430	0.600	49.640	49.235	0.405	99.8	300	6.10	50.0
PN-002-S	IC-0102-S	IC-0107-S	28.386	0.600	49.235	49.030	0.205	138.5	300	6.46	50.0
PN-003-S	IC-0107-S	IC-0108-S	32.804	0.600	49.030	48.805	0.225	145.8	300	6.88	50.0
PN-004-S	IC-0108-S	Soakaway	29.390	0.600	48.805	48.500	0.305	96.4	300	7.18	50.0
PN-005-S	IC-0104-S	Soakaway	21.770	0.600	49.225	48.500	0.725	30.0	300	5.44	50.0
PN-006-S	IC-0103-S	IC-0104-S	28.484	0.600	49.600	49.225	0.375	76.0	225	5.32	50.0
PN-007-S	IC-0105-S	IC-0106-S	29.533	0.600	50.340	50.000	0.340	86.9	225	5.35	50.0
PN-008-S	IC-0106-S	IC-0101-S	28.527	0.600	50.000	49.640	0.360	79.2	225	5.67	50.0
PN-009-S	Soakaway	Dummy Soakaway	3.652	0.600	47.200	47.199	0.001	3652.1	900	7.30	50.0

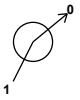
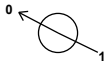
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
PN-001-S	1.573	111.2	23.7	1.201	1.331	0.125	0.0	93	1.257
PN-002-S	1.334	94.3	35.1	1.331	1.366	0.185	0.0	126	1.238
PN-003-S	1.300	91.9	45.5	1.366	1.355	0.240	0.0	149	1.297
PN-004-S	1.602	113.2	68.3	1.355	0.230	0.360	0.0	168	1.674
PN-005-S	2.879	203.5	34.2	0.925	0.230	0.180	0.0	83	2.161
PN-006-S	1.502	59.7	11.4	0.766	1.000	0.060	0.0	66	1.163
PN-007-S	1.403	55.8	3.8	0.576	0.916	0.020	0.0	39	0.802
PN-008-S	1.470	58.4	14.2	0.916	1.276	0.075	0.0	75	1.216
PN-009-S	0.508	323.5	104.4	0.930	0.931	0.550	0.0	350	0.455

Pipeline Schedule

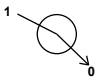
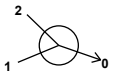
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
PN-001-S	40.430	99.8	300	Circular	51.141	49.640	1.201	50.866	49.235	1.331
PN-002-S	28.386	138.5	300	Circular	50.866	49.235	1.331	50.696	49.030	1.366
PN-003-S	32.804	145.8	300	Circular	50.696	49.030	1.366	50.460	48.805	1.355
PN-004-S	29.390	96.4	300	Circular	50.460	48.805	1.355	49.030	48.500	0.230
PN-005-S	21.770	30.0	300	Circular	50.450	49.225	0.925	49.030	48.500	0.230
PN-006-S	28.484	76.0	225	Circular	50.591	49.600	0.766	50.450	49.225	1.000
PN-007-S	29.533	86.9	225	Circular	51.141	50.340	0.576	51.141	50.000	0.916
PN-008-S	28.527	79.2	225	Circular	51.141	50.000	0.916	51.141	49.640	1.276
PN-009-S	3.652	3652.1	900	Circular	49.030	47.200	0.930	49.030	47.199	0.931

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
PN-001-S	IC-0101-S	1200	Manhole	Adoptable	IC-0102-S	1200	Manhole	Adoptable
PN-002-S	IC-0102-S	1200	Manhole	Adoptable	IC-0107-S	1200	Manhole	Adoptable
PN-003-S	IC-0107-S	1200	Manhole	Adoptable	IC-0108-S	1200	Manhole	Adoptable
PN-004-S	IC-0108-S	1200	Manhole	Adoptable	Soakaway	1800	Manhole	Adoptable
PN-005-S	IC-0104-S	1200	Manhole	Adoptable	Soakaway	1800	Manhole	Adoptable
PN-006-S	IC-0103-S	1200	Manhole	Adoptable	IC-0104-S	1200	Manhole	Adoptable
PN-007-S	IC-0105-S	1200	Manhole	Adoptable	IC-0106-S	1200	Manhole	Adoptable
PN-008-S	IC-0106-S	1200	Manhole	Adoptable	IC-0101-S	1200	Manhole	Adoptable
PN-009-S	Soakaway	1800	Manhole	Adoptable	Dummy Soakaway	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections		Link	IL (m)	Dia (mm)
IC-0101-S	353074.195	237987.885	51.141	1.501	1200		1	PN-008-S	49.640	225
							0	PN-001-S	49.640	300
IC-0102-S	353092.355	238024.007	50.866	1.631	1200		1	PN-001-S	49.235	300
							0	PN-002-S	49.235	300
IC-0103-S	353118.914	238010.925	50.591	0.991	1200		0	PN-006-S	49.600	225
IC-0104-S	353144.475	237998.356	50.450	1.225	1200		1	PN-006-S	49.225	225
							0	PN-005-S	49.225	300
IC-0105-S	353126.004	237961.694	51.141	0.801	1200		0	PN-007-S	50.340	225
IC-0106-S	353099.452	237974.624	51.141	1.141	1200		1	PN-007-S	50.000	225
							0	PN-008-S	50.000	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
IC-0107-S	353114.260	238042.061	50.696	1.666	1200	1  0	PN-002-S PN-003-S	49.030 49.030	300 300
IC-0108-S	353143.469	238027.129	50.460	1.655	1200	1  0	PN-003-S PN-004-S	48.805 48.805	300 300
Soakaway	353164.587	238006.689	49.030	1.830	1800	1 2  0	PN-005-S PN-004-S PN-009-S	48.500 48.500 47.200	300 300 900
Dummy Soakaway	353168.037	238005.491	49.030	1.831	1200	1 	PN-009-S	47.199	900

Simulation Settings

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

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 %)
1	0	0	0
10	0	0	0
30	0	0	0
100	0	0	0
100	40	0	0

Node Dummy Soakaway Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.16400	Invert Level (m)	46.600	Depth (m)	1.600
Side Inf Coefficient (m/hr)	0.16400	Time to half empty (mins)	430	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	17.000	Number Required	1
Porosity	0.95	Pit Length (m)	8.000		

Results for 1 year Critical Storm Duration. Lowest mass balance: 67.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	IC-0101-S	11	49.719	0.079	17.3	0.1413	0.0000	OK
15 minute winter	IC-0102-S	11	49.344	0.109	25.1	0.2033	0.0000	OK
15 minute winter	IC-0103-S	10	49.657	0.057	8.5	0.1325	0.0000	OK
15 minute winter	IC-0104-S	10	49.298	0.073	25.2	0.2262	0.0000	OK
15 minute winter	IC-0105-S	10	50.374	0.034	2.8	0.0551	0.0000	OK
15 minute winter	IC-0106-S	10	50.063	0.063	10.5	0.1326	0.0000	OK
15 minute winter	IC-0107-S	11	49.157	0.127	32.5	0.2279	0.0000	OK
15 minute winter	IC-0108-S	11	48.948	0.143	48.4	0.3693	0.0000	OK
15 minute winter	Soakaway	11	47.385	0.185	73.5	0.4899	0.0000	OK
120 minute winter	Dummy Soakaway	120	47.016	-0.183	25.5	53.7758	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute winter	IC-0101-S	PN-001-S	IC-0102-S	17.0	0.908	0.153	0.7634
15 minute winter	IC-0102-S	PN-002-S	IC-0107-S	25.2	0.980	0.268	0.7312
15 minute winter	IC-0103-S	PN-006-S	IC-0104-S	8.3	0.882	0.140	0.2704
15 minute winter	IC-0104-S	PN-005-S	Soakaway	24.8	1.921	0.122	0.2806
15 minute winter	IC-0105-S	PN-007-S	IC-0106-S	2.7	0.437	0.049	0.1900
15 minute winter	IC-0106-S	PN-008-S	IC-0101-S	10.2	0.961	0.175	0.3063
15 minute winter	IC-0107-S	PN-003-S	IC-0108-S	32.5	1.055	0.353	1.0102
15 minute winter	IC-0108-S	PN-004-S	Soakaway	47.8	1.500	0.422	0.9367
15 minute winter	Soakaway	PN-009-S	Dummy Soakaway	73.5	0.892	0.227	0.3014
120 minute winter	Dummy Soakaway	Infiltration		3.6			

Results for 10 year Critical Storm Duration. Lowest mass balance: 67.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	IC-0101-S	11	49.751	0.111	33.4	0.1991	0.0000	OK
15 minute winter	IC-0102-S	11	49.397	0.162	49.0	0.3028	0.0000	OK
15 minute winter	IC-0103-S	10	49.679	0.079	16.4	0.1861	0.0000	OK
15 minute winter	IC-0104-S	10	49.330	0.105	48.8	0.3237	0.0000	OK
15 minute winter	IC-0105-S	10	50.387	0.047	5.5	0.0764	0.0000	OK
15 minute winter	IC-0106-S	10	50.091	0.091	20.4	0.1912	0.0000	OK
15 minute winter	IC-0107-S	11	49.224	0.194	63.1	0.3483	0.0000	OK
15 minute winter	IC-0108-S	11	49.031	0.226	94.2	0.5827	0.0000	OK
180 minute winter	Soakaway	176	47.474	0.274	34.1	0.7268	0.0000	OK
180 minute winter	Dummy Soakaway	180	47.474	0.275	34.4	113.2263	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute winter	IC-0101-S	PN-001-S	IC-0102-S	33.0	1.061	0.297	1.2631
15 minute winter	IC-0102-S	PN-002-S	IC-0107-S	49.0	1.124	0.520	1.2374
15 minute winter	IC-0103-S	PN-006-S	IC-0104-S	16.2	1.058	0.271	0.4361
15 minute winter	IC-0104-S	PN-005-S	Soakaway	48.1	2.292	0.236	0.4572
15 minute winter	IC-0105-S	PN-007-S	IC-0106-S	5.4	0.520	0.096	0.3112
15 minute winter	IC-0106-S	PN-008-S	IC-0101-S	19.9	1.153	0.340	0.4913
15 minute winter	IC-0107-S	PN-003-S	IC-0108-S	63.4	1.202	0.690	1.7256
15 minute winter	IC-0108-S	PN-004-S	Soakaway	93.6	1.731	0.827	1.5892
180 minute winter	Soakaway	PN-009-S	Dummy Soakaway	34.1	0.731	0.105	0.5964
180 minute winter	Dummy Soakaway	Infiltration		4.1			

Results for 30 year Critical Storm Duration. Lowest mass balance: 67.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	IC-0101-S	10	49.767	0.127	42.5	0.2290	0.0000	OK
15 minute winter	IC-0102-S	11	49.425	0.190	62.4	0.3553	0.0000	OK
15 minute winter	IC-0103-S	10	49.691	0.091	20.8	0.2128	0.0000	OK
15 minute winter	IC-0104-S	10	49.345	0.120	62.0	0.3710	0.0000	OK
15 minute winter	IC-0105-S	10	50.393	0.053	6.9	0.0858	0.0000	OK
15 minute winter	IC-0106-S	10	50.105	0.105	25.8	0.2202	0.0000	OK
15 minute winter	IC-0107-S	11	49.269	0.239	80.4	0.4287	0.0000	OK
15 minute winter	IC-0108-S	11	49.118	0.313	118.2	0.8071	0.0000	SURCHARGED
240 minute winter	Soakaway	232	47.772	0.572	35.2	1.5183	0.0000	OK
240 minute winter	Dummy Soakaway	236	47.767	0.568	35.5	151.4432	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute winter	IC-0101-S	PN-001-S	IC-0102-S	42.1	1.114	0.378	1.5246
15 minute winter	IC-0102-S	PN-002-S	IC-0107-S	62.5	1.160	0.663	1.5242
15 minute winter	IC-0103-S	PN-006-S	IC-0104-S	20.5	1.123	0.343	0.5204
15 minute winter	IC-0104-S	PN-005-S	Soakaway	61.1	2.435	0.300	0.5466
15 minute winter	IC-0105-S	PN-007-S	IC-0106-S	6.8	0.546	0.121	0.3726
15 minute winter	IC-0106-S	PN-008-S	IC-0101-S	25.2	1.223	0.431	0.5899
15 minute winter	IC-0107-S	PN-003-S	IC-0108-S	79.2	1.219	0.862	2.1435
15 minute winter	IC-0108-S	PN-004-S	Soakaway	113.1	1.784	0.999	1.9827
240 minute winter	Soakaway	PN-009-S	Dummy Soakaway	35.2	0.736	0.109	1.5450
240 minute winter	Dummy Soakaway	Infiltration		4.4			

Results for 100 year Critical Storm Duration. Lowest mass balance: 67.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	IC-0101-S	12	49.810	0.170	55.2	0.3054	0.0000	OK
15 minute winter	IC-0102-S	12	49.741	0.506	81.3	0.9451	0.0000	SURCHARGED
15 minute winter	IC-0103-S	10	49.706	0.106	26.9	0.2487	0.0000	OK
15 minute winter	IC-0104-S	10	49.365	0.140	80.4	0.4335	0.0000	OK
15 minute winter	IC-0105-S	10	50.400	0.060	9.0	0.0983	0.0000	OK
15 minute winter	IC-0106-S	10	50.125	0.125	33.5	0.2609	0.0000	OK
15 minute winter	IC-0107-S	11	49.597	0.567	93.0	1.0161	0.0000	SURCHARGED
15 minute winter	IC-0108-S	11	49.326	0.521	140.7	1.3449	0.0000	SURCHARGED
360 minute winter	Soakaway	264	48.241	1.041	33.8	2.7622	0.0000	SURCHARGED
120 minute winter	Dummy Soakaway	118	48.093	0.894	77.9	194.0017	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute winter	IC-0101-S	PN-001-S	IC-0102-S	54.4	1.144	0.489	2.2558
15 minute winter	IC-0102-S	PN-002-S	IC-0107-S	73.1	1.174	0.776	1.9989
15 minute winter	IC-0103-S	PN-006-S	IC-0104-S	26.6	1.194	0.445	0.6330
15 minute winter	IC-0104-S	PN-005-S	Soakaway	79.4	2.594	0.390	0.6667
15 minute winter	IC-0105-S	PN-007-S	IC-0106-S	8.9	0.577	0.159	0.4588
15 minute winter	IC-0106-S	PN-008-S	IC-0101-S	32.8	1.313	0.561	0.7359
15 minute winter	IC-0107-S	PN-003-S	IC-0108-S	92.1	1.308	1.003	2.3100
15 minute winter	IC-0108-S	PN-004-S	Soakaway	137.2	1.949	1.212	2.0306
360 minute winter	Soakaway	PN-009-S	Dummy Soakaway	32.9	0.710	0.102	2.3064
120 minute winter	Dummy Soakaway	Infiltration		4.8			

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 67.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	IC-0101-S	12	50.495	0.855	70.6	1.5365	0.0000	SURCHARGED
15 minute winter	IC-0102-S	12	50.345	1.110	91.4	2.0727	0.0000	SURCHARGED
15 minute winter	IC-0103-S	10	49.733	0.133	37.7	0.3114	0.0000	OK
15 minute winter	IC-0104-S	10	49.399	0.174	112.6	0.5377	0.0000	OK
15 minute winter	IC-0105-S	12	50.635	0.295	16.0	0.4806	0.0000	SURCHARGED
15 minute winter	IC-0106-S	12	50.652	0.652	47.0	1.3659	0.0000	SURCHARGED
15 minute winter	IC-0107-S	12	50.120	1.090	114.6	1.9520	0.0000	SURCHARGED
15 minute winter	IC-0108-S	11	49.708	0.903	181.3	2.3316	0.0000	SURCHARGED
120 minute winter	Soakaway	88	48.528	1.328	109.3	3.5256	0.0000	SURCHARGED
600 minute winter	Dummy Soakaway	420	48.200	1.001	54.8	207.9237	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute winter	IC-0101-S	PN-001-S	IC-0102-S	67.0	1.166	0.603	2.8471
15 minute winter	IC-0102-S	PN-002-S	IC-0107-S	89.8	1.275	0.952	1.9989
15 minute winter	IC-0103-S	PN-006-S	IC-0104-S	37.2	1.289	0.623	0.8171
15 minute winter	IC-0104-S	PN-005-S	Soakaway	111.2	2.796	0.546	0.8659
15 minute winter	IC-0105-S	PN-007-S	IC-0106-S	18.0	0.601	0.322	1.1746
15 minute winter	IC-0106-S	PN-008-S	IC-0101-S	43.3	1.349	0.740	1.1345
15 minute winter	IC-0107-S	PN-003-S	IC-0108-S	115.4	1.639	1.256	2.3100
15 minute winter	IC-0108-S	PN-004-S	Soakaway	178.3	2.532	1.575	2.0487
120 minute winter	Soakaway	PN-009-S	Dummy Soakaway	301.6	0.959	0.933	2.3145
600 minute winter	Dummy Soakaway	Infiltration		4.9			