

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	10	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.300	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)
S1	0.026	5.00	73.600	1200	415218.534	133929.926	1.130
S2	0.027	5.00	73.200	1200	415186.294	133914.916	1.080
S3			73.350	1200	415175.230	133924.631	1.300
S4	0.007	5.00	73.250	1200	415167.911	133924.416	1.325
S5	0.013	5.00	73.680	1200	415182.912	133936.535	1.130
S6	0.070	5.00	74.440	1200	415130.340	133992.378	2.230
S7	0.030	5.00	73.980	1200	415116.178	133980.345	2.310
HEADWALL 1			73.730	1200	415099.178	133990.874	2.330
S8	0.008	5.00	74.380	1200	415098.964	134025.862	1.050
S9	0.017	5.00	74.320	1200	415091.157	134016.131	1.130
HEADWALL 2			73.730	1200	415093.074	133997.161	2.330
POND			73.730	1200	415095.055	133994.471	2.330
OUTFALL			73.730	1200	415092.428	133992.164	2.330

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)
PN1	S1	S2	35.563	0.600	72.470	72.120	0.350	101.6	225	5.46	50.0
PN2	S2	S3	14.724	0.600	72.120	72.050	0.070	210.3	225	5.73	50.0
PN3	S3	S4	7.322	0.600	72.050	72.000	0.050	146.4	225	5.84	50.0
PN4	S4	S7	76.186	0.600	71.925	71.670	0.255	298.8	300	7.25	50.0
PN5	S5	S6	76.696	0.600	72.550	72.210	0.340	225.6	225	6.48	50.0
PN6	S6	S7	18.584	0.600	72.210	71.745	0.465	40.0	225	6.62	50.0
PN7	S7	HEADWALL 1	19.996	0.600	71.670	71.400	0.270	74.1	300	7.43	50.0
NA	HEADWALL 1	POND	5.472	0.600	71.400	71.400	0.000	0.0	300	7.52	50.0
PN8	S8	S9	12.476	0.600	73.330	73.265	0.065	191.9	225	5.22	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)
PN1	1.297	51.6	3.9	0.905	0.855	0.026	0.0	42	0.770
PN2	0.897	35.7	7.9	0.855	1.075	0.053	0.0	72	0.723
PN3	1.078	42.9	7.9	1.075	1.025	0.053	0.0	65	0.828
PN4	0.904	63.9	8.9	1.025	2.010	0.060	0.0	75	0.641
PN5	0.866	34.4	1.9	0.905	2.005	0.013	0.0	36	0.472
PN6	2.075	82.5	12.4	2.005	2.010	0.083	0.0	58	1.500
PN7	1.829	129.3	25.8	2.010	2.030	0.173	0.0	91	1.437
NA	1.000	70.7	25.8	2.030	2.030	0.173	0.0	0	∞
PN8	0.940	37.4	1.2	0.825	0.830	0.008	0.0	28	0.431



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)
PN9	S9	HEADWALL 2	19.067	0.600	73.190	71.400	1.790	10.7	225	5.30	50.0
NA1	HEADWALL 2	POND	3.341	0.600	71.400	71.400	0.000	0.0	225	5.36	50.0
NA2	POND	OUTFALL	3.496	0.600	71.400	71.400	0.000	0.0	300	7.58	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)
PN9	4.032	160.3	3.7	0.905	2.105	0.025	0.0	23	1.676
NA1	1.000	39.8	3.7	2.105	2.105	0.025	0.0	0	∞
NA2	1.000	70.7	29.5	2.030	2.030	0.198	0.0	0	∞

Pipeline Schedule

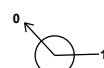
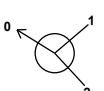
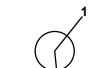
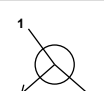
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
PN1	35.563	101.6	225	Circular	73.600	72.470	0.905	73.200	72.120	0.855
PN2	14.724	210.3	225	Circular	73.200	72.120	0.855	73.350	72.050	1.075
PN3	7.322	146.4	225	Circular	73.350	72.050	1.075	73.250	72.000	1.025
PN4	76.186	298.8	300	Circular	73.250	71.925	1.025	73.980	71.670	2.010
PN5	76.696	225.6	225	Circular	73.680	72.550	0.905	74.440	72.210	2.005
PN6	18.584	40.0	225	Circular	74.440	72.210	2.005	73.980	71.745	2.010
PN7	19.996	74.1	300	Circular	73.980	71.670	2.010	73.730	71.400	2.030
NA	5.472	0.0	300	Circular	73.730	71.400	2.030	73.730	71.400	2.030
PN8	12.476	191.9	225	Circular	74.380	73.330	0.825	74.320	73.265	0.830
PN9	19.067	10.7	225	Circular	74.320	73.190	0.905	73.730	71.400	2.105
NA1	3.341	0.0	225	Circular	73.730	71.400	2.105	73.730	71.400	2.105
NA2	3.496	0.0	300	Circular	73.730	71.400	2.030	73.730	71.400	2.030

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
PN1	S1	1200	Manhole	Adoptable	S2	1200	Manhole	Adoptable
PN2	S2	1200	Manhole	Adoptable	S3	1200	Manhole	Adoptable
PN3	S3	1200	Manhole	Adoptable	S4	1200	Manhole	Adoptable
PN4	S4	1200	Manhole	Adoptable	S7	1200	Manhole	Adoptable
PN5	S5	1200	Manhole	Adoptable	S6	1200	Manhole	Adoptable
PN6	S6	1200	Manhole	Adoptable	S7	1200	Manhole	Adoptable
PN7	S7	1200	Manhole	Adoptable	HEADWALL 1	1200	Manhole	Adoptable
NA	HEADWALL 1	1200	Manhole	Adoptable	POND	1200	Manhole	Adoptable
PN8	S8	1200	Manhole	Adoptable	S9	1200	Manhole	Adoptable
PN9	S9	1200	Manhole	Adoptable	HEADWALL 2	1200	Manhole	Adoptable
NA1	HEADWALL 2	1200	Manhole	Adoptable	POND	1200	Manhole	Adoptable
NA2	POND	1200	Manhole	Adoptable	OUTFALL	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S1	415218.534	133929.926	73.600	1.130	1200		0	PN1	72.470	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S2	415186.294	133914.916	73.200	1.080	1200	 1	PN1	72.120	225
						0	PN2	72.120	225
S3	415175.230	133924.631	73.350	1.300	1200	 1	PN2	72.050	225
						0	PN3	72.050	225
S4	415167.911	133924.416	73.250	1.325	1200	 1	PN3	72.000	225
						0	PN4	71.925	300
S5	415182.912	133936.535	73.680	1.130	1200	 1			
						0	PN5	72.550	225
S6	415130.340	133992.378	74.440	2.230	1200	 1	PN5	72.210	225
						0	PN6	72.210	225
S7	415116.178	133980.345	73.980	2.310	1200	 1	PN6	71.745	225
						2	PN4	71.670	300
						0	PN7	71.670	300
HEADWALL 1	415099.178	133990.874	73.730	2.330	1200	 1	PN7	71.400	300
						0	NA	71.400	300
S8	415098.964	134025.862	74.380	1.050	1200	 1			
						0	PN8	73.330	225
S9	415091.157	134016.131	74.320	1.130	1200	 1	PN8	73.265	225
						0	PN9	73.190	225
HEADWALL 2	415093.074	133997.161	73.730	2.330	1200	 1	PN9	71.400	225
						0	NA1	71.400	225
POND	415095.055	133994.471	73.730	2.330	1200	 1	NA1	71.400	225
						2	NA	71.400	300
						0	NA2	71.400	300
OUTFALL	415092.428	133992.164	73.730	2.330	1200	 1	NA2	71.400	300

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	17.000	Drain Down Time (mins)	1440
Ratio-R	0.300	Additional Storage (m³/ha)	0.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

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 %)
1	0	0	0
30	0	0	0
100	45	0	0

Node OUTFALL Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.04570	Safety Factor	2.0	Invert Level (m)	71.400
Side Inf Coefficient (m/hr)	0.04570	Porosity	1.00	Time to half empty (mins)	2495

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	21.9	21.9	2.330	341.9	377.3

Results for 1 year Critical Storm Duration. Lowest mass balance: 66.47%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	72.505	0.035	2.8	0.0397	0.0000	OK
15 minute winter	S2	11	72.182	0.062	5.6	0.0699	0.0000	OK
15 minute winter	S3	11	72.108	0.058	5.6	0.0654	0.0000	OK
15 minute winter	S4	12	71.986	0.061	6.2	0.0694	0.0000	OK
15 minute winter	S5	11	72.579	0.029	1.4	0.0329	0.0000	OK
15 minute winter	S6	11	72.260	0.050	8.7	0.0564	0.0000	OK
960 minute winter	S7	720	71.863	0.193	1.9	0.2179	0.0000	OK
960 minute winter	HEADWALL 1	720	71.864	0.464	3.1	0.5248	0.0000	SURCHARGED
15 minute winter	S8	10	73.354	0.024	0.9	0.0267	0.0000	OK
15 minute winter	S9	10	73.210	0.020	2.6	0.0226	0.0000	OK
960 minute winter	HEADWALL 2	720	71.862	0.462	0.5	0.5229	0.0000	SURCHARGED
960 minute winter	POND	750	71.863	0.463	4.2	0.5239	0.0000	SURCHARGED
960 minute winter	OUTFALL	735	71.861	0.461	4.7	25.2391	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	S1	PN1	S2	2.7	0.442	0.053	0.2271
15 minute winter	S2	PN2	S3	5.6	0.660	0.156	0.1244
15 minute winter	S3	PN3	S4	5.5	0.720	0.129	0.0564
15 minute winter	S4	PN4	S7	6.0	0.514	0.094	0.8903
15 minute winter	S5	PN5	S6	1.2	0.274	0.036	0.3650
15 minute winter	S6	PN6	S7	8.5	1.324	0.103	0.1189
960 minute winter	S7	PN7	HEADWALL 1	3.1	0.191	0.024	1.1821
960 minute winter	HEADWALL 1	NA	POND	3.5	0.110	0.049	0.3853
15 minute winter	S8	PN8	S9	0.8	0.392	0.023	0.0268
15 minute winter	S9	PN9	HEADWALL 2	2.6	0.854	0.016	0.3575
960 minute winter	HEADWALL 2	NA1	POND	0.7	-0.029	0.018	0.1329
960 minute winter	POND	NA2	OUTFALL	4.7	0.232	0.066	0.2462
960 minute winter	OUTFALL	Infiltration		0.5			

Results for 30 year Critical Storm Duration. Lowest mass balance: 66.47%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	72.525	0.055	6.9	0.0619	0.0000	OK
15 minute winter	S2	11	72.221	0.101	13.9	0.1140	0.0000	OK
960 minute winter	S3	765	72.175	0.125	1.2	0.1415	0.0000	OK
960 minute winter	S4	765	72.175	0.250	1.4	0.2824	0.0000	OK
15 minute winter	S5	11	72.596	0.046	3.4	0.0519	0.0000	OK
15 minute winter	S6	11	72.291	0.081	21.5	0.0913	0.0000	OK
960 minute winter	S7	795	72.177	0.507	4.0	0.5736	0.0000	SURCHARGED
960 minute winter	HEADWALL 1	795	72.179	0.779	4.9	0.8813	0.0000	SURCHARGED
15 minute winter	S8	10	73.367	0.037	2.1	0.0413	0.0000	OK
15 minute winter	S9	10	73.221	0.031	6.5	0.0349	0.0000	OK
960 minute winter	HEADWALL 2	735	72.175	0.775	1.4	0.8763	0.0000	SURCHARGED
960 minute winter	POND	795	72.176	0.776	4.4	0.8780	0.0000	SURCHARGED
960 minute winter	OUTFALL	750	72.175	0.775	8.3	59.0438	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	S1	PN1	S2	6.8	0.559	0.131	0.4364
15 minute winter	S2	PN2	S3	13.6	0.823	0.380	0.2432
960 minute winter	S3	PN3	S4	1.2	0.468	0.029	0.2041
960 minute winter	S4	PN4	S7	1.8	0.273	0.028	5.0701
15 minute winter	S5	PN5	S6	3.2	0.354	0.093	0.7127
15 minute winter	S6	PN6	S7	21.0	1.692	0.254	0.2301
960 minute winter	S7	PN7	HEADWALL 1	4.9	0.212	0.038	1.4081
960 minute winter	HEADWALL 1	NA	POND	3.9	0.139	0.054	0.3853
15 minute winter	S8	PN8	S9	2.0	0.502	0.055	0.0509
15 minute winter	S9	PN9	HEADWALL 2	6.5	0.987	0.041	0.4095
960 minute winter	HEADWALL 2	NA1	POND	0.8	-0.067	0.021	0.1329
960 minute winter	POND	NA2	OUTFALL	8.3	0.310	0.118	0.2462
960 minute winter	OUTFALL	Infiltration		0.9			

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 66.47%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	S1	1110	72.587	0.117	0.8	0.1325	0.0000	OK
1440 minute winter	S2	1140	72.588	0.468	1.6	0.5291	0.0000	SURCHARGED
1440 minute winter	S3	1140	72.587	0.537	1.6	0.6079	0.0000	SURCHARGED
1440 minute winter	S4	1140	72.587	0.662	1.7	0.7491	0.0000	SURCHARGED
15 minute winter	S5	11	72.613	0.063	6.4	0.0717	0.0000	OK
1440 minute winter	S6	1140	72.589	0.379	2.6	0.4290	0.0000	SURCHARGED
1440 minute winter	S7	1170	72.589	0.919	5.0	1.0391	0.0000	SURCHARGED
960 minute winter	HEADWALL 1	900	72.589	1.189	6.8	1.3445	0.0000	SURCHARGED
15 minute winter	S8	10	73.380	0.050	3.9	0.0566	0.0000	OK
15 minute winter	S9	10	73.232	0.042	12.2	0.0473	0.0000	OK
1440 minute winter	HEADWALL 2	1170	72.589	1.189	0.7	1.3442	0.0000	SURCHARGED
1440 minute winter	POND	1170	72.587	1.187	5.8	1.3430	0.0000	SURCHARGED
1440 minute winter	OUTFALL	1170	72.586	1.186	6.0	123.8619	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
1440 minute winter	S1	PN1	S2	0.8	0.298	0.016	1.0785
1440 minute winter	S2	PN2	S3	1.6	0.460	0.045	0.5856
1440 minute winter	S3	PN3	S4	1.5	0.467	0.035	0.2912
1440 minute winter	S4	PN4	S7	1.6	0.249	0.025	5.3650
15 minute winter	S5	PN5	S6	6.1	0.438	0.176	1.1402
1440 minute winter	S6	PN6	S7	2.6	0.658	0.031	0.7391
1440 minute winter	S7	PN7	HEADWALL 1	4.8	0.216	0.037	1.4081
960 minute winter	HEADWALL 1	NA	POND	7.0	0.155	0.100	0.3853
15 minute winter	S8	PN8	S9	3.8	0.598	0.102	0.0797
15 minute winter	S9	PN9	HEADWALL 2	12.2	1.153	0.076	0.4275
1440 minute winter	HEADWALL 2	NA1	POND	1.4	0.036	0.036	0.1329
1440 minute winter	POND	NA2	OUTFALL	6.0	0.249	0.084	0.2462
1440 minute winter	OUTFALL	Infiltration		1.3			