

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	45	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	19.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.350	Preferred Cover Depth (m)	1.200
CV	1.000	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)
1	0.074	5.00	100.200	1200	419721.519	424029.671	1.425
2	0.193	5.00	98.300	1200	419631.952	424054.042	1.500
3	0.159	5.00	97.500	1200	419624.979	424065.309	1.500
4	0.017	5.00	94.000	1200	419634.672	424101.678	1.764
5	0.019	5.00	93.300	1350	419642.679	424110.119	2.377
6	0.109	5.00	92.650	1350	419660.352	424111.053	1.785
9	0.030	5.00	93.400	1200	419739.315	424088.140	2.177
10	0.074	5.00	92.450	1200	419719.293	424096.237	1.492
11	0.185	5.00	92.150	1350	419697.975	424101.596	1.800
15	0.107	5.00	87.600	1200	419664.355	424176.983	2.190
16	0.017	5.00	87.800	1200	419700.361	424167.616	2.769
12	0.105	5.00	88.300	1500	419713.574	424159.716	4.004
13	0.086	5.00	88.200	1500	419729.318	424158.424	4.299
14	0.125	5.00	87.300	1500	419757.850	424150.698	4.003
Tank Inlet		5.00	86.620	1500	419759.872	424158.325	3.250
8	0.031	5.00	94.100	1200	419748.535	424076.918	1.350
7	0.031	5.00	98.700	1200	419740.185	424042.226	2.700
Outfall			85.271	1200	419811.034	424137.014	2.275

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	92.823	0.600	98.775	96.875	1.900	48.9	225	5.82	50.0
1.001	2	3	13.250	0.600	96.800	96.000	0.800	16.6	300	5.88	50.0
1.002	3	4	37.639	0.600	96.000	92.236	3.764	10.0	300	6.01	50.0
1.003	4	5	11.635	0.600	92.236	91.073	1.163	10.0	300	6.05	50.0
1.004	5	6	17.698	0.600	90.923	90.865	0.058	305.1	450	6.30	50.0
1.005	6	11	38.793	0.600	90.865	90.425	0.440	88.2	450	6.60	50.0
2.002	9	10	21.597	0.600	91.223	90.958	0.265	81.5	225	5.52	50.0
2.003	10	11	21.981	0.600	90.958	90.575	0.383	57.4	225	5.73	50.0
1.006	11	12	60.177	0.600	90.350	86.650	3.700	16.3	450	6.80	50.0
3.000	15	16	37.204	0.600	85.410	85.031	0.379	98.2	225	5.47	50.0
3.001	16	12	15.395	0.600	85.031	84.596	0.435	35.4	225	5.59	50.0
1.007	12	13	15.797	0.600	84.296	83.901	0.395	40.0	525	6.87	50.0
1.008	13	14	29.560	0.600	83.901	83.347	0.554	53.4	525	7.03	50.0
4.001	Tank Inlet	14	7.890	0.600	83.370	83.347	0.023	343.1	525	5.11	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	1.876	74.6	19.4	1.200	1.200	0.074	0.0	78	1.580
1.001	3.881	274.4	70.0	1.200	1.200	0.267	0.0	103	3.262
1.002	4.999	353.4	111.6	1.200	1.464	0.426	0.0	116	4.454
1.003	4.999	353.4	116.1	1.464	1.927	0.443	0.0	118	4.497
1.004	1.158	184.2	121.1	1.927	1.335	0.462	0.0	267	1.233
1.005	2.166	344.4	149.6	1.335	1.275	0.571	0.0	207	2.092
2.002	1.449	57.6	24.1	1.952	1.267	0.092	0.0	102	1.387
2.003	1.730	68.8	43.5	1.267	1.350	0.166	0.0	130	1.825
1.006	5.060	804.7	241.6	1.350	1.200	0.922	0.0	168	4.447
3.000	1.319	52.5	28.0	1.965	2.544	0.107	0.0	117	1.342
3.001	2.206	87.7	32.5	2.544	3.479	0.124	0.0	94	2.044
1.007	3.549	768.2	301.6	3.479	3.774	1.151	0.0	228	3.343
1.008	3.071	664.8	324.1	3.774	3.428	1.237	0.0	259	3.053
4.001	1.203	260.5	0.0	2.725	3.428	0.000	0.0	0	0.000

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)
1.009	14	Outfall	54.916	0.600	83.297	82.996	0.301	182.4	300	7.82	50.0
2.000	7	8	35.683	0.600	96.000	92.750	3.250	11.0	150	5.19	50.0
2.001	8	9	14.524	0.600	92.750	91.298	1.452	10.0	150	5.27	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)
1.009	1.161	82.0	356.9	3.703	1.975	1.362	0.0	300	1.175
2.000	3.058	54.0	8.1	2.550	1.200	0.031	0.0	39	2.202
2.001	3.204	56.6	16.2	1.200	1.952	0.062	0.0	55	2.771

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	92.823	48.9	225	Circular_Default Sewer Type	100.200	98.775	1.200	98.300	96.875	1.200
1.001	13.250	16.6	300	Circular_Default Sewer Type	98.300	96.800	1.200	97.500	96.000	1.200
1.002	37.639	10.0	300	Circular_Default Sewer Type	97.500	96.000	1.200	94.000	92.236	1.464
1.003	11.635	10.0	300	Circular_Default Sewer Type	94.000	92.236	1.464	93.300	91.073	1.927
1.004	17.698	305.1	450	Circular_Default Sewer Type	93.300	90.923	1.927	92.650	90.865	1.335
1.005	38.793	88.2	450	Circular_Default Sewer Type	92.650	90.865	1.335	92.150	90.425	1.275
2.002	21.597	81.5	225	Circular_Default Sewer Type	93.400	91.223	1.952	92.450	90.958	1.267

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	1200	Manhole	Adoptable	2	1200	Manhole	Adoptable
1.001	2	1200	Manhole	Adoptable	3	1200	Manhole	Adoptable
1.002	3	1200	Manhole	Adoptable	4	1200	Manhole	Adoptable
1.003	4	1200	Manhole	Adoptable	5	1350	Manhole	Adoptable
1.004	5	1350	Manhole	Adoptable	6	1350	Manhole	Adoptable
1.005	6	1350	Manhole	Adoptable	11	1350	Manhole	Adoptable
2.002	9	1200	Manhole	Adoptable	10	1200	Manhole	Adoptable

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)
2.003	21.981	57.4	225	Circular_Default Sewer Type	92.450	90.958	1.267	92.150	90.575	1.350
1.006	60.177	16.3	450	Circular_Default Sewer Type	92.150	90.350	1.350	88.300	86.650	1.200
3.000	37.204	98.2	225	Circular_Default Sewer Type	87.600	85.410	1.965	87.800	85.031	2.544
3.001	15.395	35.4	225	Circular_Default Sewer Type	87.800	85.031	2.544	88.300	84.596	3.479
1.007	15.797	40.0	525	Circular_Default Sewer Type	88.300	84.296	3.479	88.200	83.901	3.774
1.008	29.560	53.4	525	Circular_Default Sewer Type	88.200	83.901	3.774	87.300	83.347	3.428
4.001	7.890	343.1	525	Circular_Default Sewer Type	86.620	83.370	2.725	87.300	83.347	3.428
1.009	54.916	182.4	300	Circular_Default Sewer Type	87.300	83.297	3.703	85.271	82.996	1.975
2.000	35.683	11.0	150	Circular_Default Sewer Type	98.700	96.000	2.550	94.100	92.750	1.200
2.001	14.524	10.0	150	Circular_Default Sewer Type	94.100	92.750	1.200	93.400	91.298	1.952

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
2.003	10	1200	Manhole	Adoptable	11	1350	Manhole	Adoptable
1.006	11	1350	Manhole	Adoptable	12	1500	Manhole	Adoptable
3.000	15	1200	Manhole	Adoptable	16	1200	Manhole	Adoptable
3.001	16	1200	Manhole	Adoptable	12	1500	Manhole	Adoptable
1.007	12	1500	Manhole	Adoptable	13	1500	Manhole	Adoptable
1.008	13	1500	Manhole	Adoptable	14	1500	Manhole	Adoptable
4.001	Tank Inlet	1500	Manhole	Adoptable	14	1500	Manhole	Adoptable
1.009	14	1500	Manhole	Adoptable	Outfall	1200	Manhole	Adoptable
2.000	7	1200	Manhole	Adoptable	8	1200	Manhole	Adoptable
2.001	8	1200	Manhole	Adoptable	9	1200	Manhole	Adoptable

Simulation Settings

Rainfall Methodology	FSR	Summer CV	1.000	Drain Down Time (mins)	240
FSR Region	England and Wales	Winter CV	1.000	Additional Storage (m³/ha)	0.0
M5-60 (mm)	19.000	Analysis Speed	Detailed	Check Discharge Rate(s)	x
Ratio-R	0.350	Skip Steady State	x	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 %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0	100	45	0	0
30	0	0	0				

Node 14 Online Hydro-Brake® Control

Flap Valve	✓	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	83.297	Product Number	CTL-SHE-0072-3500-2550-3500
Design Depth (m)	2.550	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	3.5	Min Node Diameter (mm)	1200

Node Tank Inlet Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	1.0	Invert Level (m)	83.370
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	625.0	0.0	2.500	625.0	0.0	2.501	0.0	0.0

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute summer	1	11	98.835	0.060	12.0	0.0678	0.0000	OK
15 minute summer	2	10	96.883	0.083	42.2	0.0941	0.0000	OK
15 minute summer	3	10	96.089	0.089	67.9	0.1006	0.0000	OK
15 minute summer	4	10	92.335	0.099	70.4	0.1124	0.0000	OK
15 minute summer	5	10	91.121	0.198	72.9	0.2837	0.0000	OK
15 minute summer	6	11	91.029	0.164	89.9	0.2341	0.0000	OK
15 minute summer	9	10	91.301	0.078	14.8	0.0882	0.0000	OK
15 minute summer	10	10	91.059	0.101	26.7	0.1145	0.0000	OK
15 minute summer	11	11	90.482	0.132	145.4	0.1891	0.0000	OK
15 minute summer	15	10	85.503	0.093	17.4	0.1048	0.0000	OK
15 minute summer	16	10	85.107	0.076	20.0	0.0864	0.0000	OK
15 minute summer	12	10	84.523	0.227	182.1	0.4004	0.0000	OK
15 minute summer	13	10	84.521	0.620	203.4	1.0948	0.0000	SURCHARGED
15 minute winter	14	9	84.461	1.164	256.9	2.0569	0.0000	SURCHARGED
1440 minute winter	Tank Inlet	1350	83.850	0.480	10.9	286.0025	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
15 minute summer	1	1.000	2	11.5	1.367	0.154	0.7818	
15 minute summer	2	1.001	3	42.1	2.527	0.154	0.2211	
15 minute summer	3	1.002	4	67.6	3.576	0.191	0.7116	
15 minute summer	4	1.003	5	69.8	3.674	0.197	0.2212	
15 minute summer	5	1.004	6	72.4	1.219	0.393	1.0525	
15 minute summer	6	1.005	11	90.6	1.807	0.263	1.9454	
15 minute summer	9	2.002	10	14.7	0.995	0.254	0.3187	
15 minute summer	10	2.003	11	26.3	1.576	0.382	0.3668	
15 minute summer	11	1.006	12	146.1	3.854	0.182	2.2817	
15 minute summer	15	3.000	16	17.2	1.265	0.328	0.5072	
15 minute summer	16	3.001	12	19.7	1.731	0.225	0.1757	
15 minute summer	12	1.007	13	189.4	2.485	0.247	2.4105	
15 minute summer	13	1.008	14	255.1	1.420	0.384	6.3859	
15 minute winter	14	Hydro-Brake®	Outfall	2.4				33.6
15 minute summer	Tank Inlet	4.001	14	-302.9	-2.193	-1.163	0.9104	

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute summer	8	10	92.794	0.044	10.0	0.0496	0.0000	OK
15 minute summer	7	10	96.031	0.031	5.0	0.0348	0.0000	OK
15 minute summer	Outfall	1	82.996	0.000	2.4	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
15 minute summer	8	2.001	9	9.9	2.359	0.174	0.0608	
15 minute summer	7	2.000	8	5.0	1.455	0.092	0.1227	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	98.872	0.097	29.4	0.1098	0.0000	OK
15 minute summer	2	10	96.941	0.141	104.4	0.1596	0.0000	OK
15 minute summer	3	10	96.148	0.148	167.4	0.1673	0.0000	OK
15 minute summer	4	10	92.401	0.165	173.4	0.1864	0.0000	OK
15 minute summer	5	10	91.278	0.355	180.3	0.5082	0.0000	OK
15 minute summer	6	11	91.148	0.283	221.6	0.4045	0.0000	OK
15 minute summer	9	10	91.359	0.136	36.2	0.1535	0.0000	OK
15 minute summer	10	10	91.151	0.193	65.5	0.2183	0.0000	OK
15 minute summer	11	11	90.569	0.219	356.7	0.3138	0.0000	OK
15 minute summer	15	10	85.711	0.301	42.5	0.3409	0.0000	SURCHARGED
15 minute winter	16	8	85.473	0.442	45.5	0.5001	0.0000	SURCHARGED
15 minute summer	12	9	85.345	1.049	465.4	1.8531	0.0000	SURCHARGED
15 minute winter	13	8	85.226	1.325	468.2	2.3407	0.0000	SURCHARGED
15 minute winter	14	8	85.006	1.709	520.2	3.0194	0.0000	SURCHARGED
1440 minute winter	Tank Inlet	1410	84.605	1.235	28.7	735.6285	0.0000	SURCHARGED

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	28.5	1.753	0.382	1.5076	
15 minute summer	2	1.001	3	104.2	3.102	0.380	0.4449	
15 minute summer	3	1.002	4	166.6	4.488	0.471	1.3970	
15 minute summer	4	1.003	5	172.8	4.124	0.489	0.5292	
15 minute summer	5	1.004	6	178.3	1.489	0.968	2.1107	
15 minute summer	6	1.005	11	222.2	2.237	0.645	3.8522	
15 minute summer	9	2.002	10	36.1	1.160	0.626	0.6619	
15 minute summer	10	2.003	11	64.4	1.877	0.937	0.7525	
15 minute summer	11	1.006	12	358.9	4.858	0.446	4.4469	
15 minute summer	15	3.000	16	44.5	1.495	0.849	1.4796	
15 minute summer	16	3.001	12	66.7	2.085	0.761	0.6123	
15 minute summer	12	1.007	13	473.6	2.599	0.617	3.4127	
15 minute summer	13	1.008	14	511.1	2.366	0.769	6.3859	
15 minute winter	14	Hydro-Brake®	Outfall	2.9				34.4
15 minute summer	Tank Inlet	4.001	14	-563.6	-3.647	-2.164	1.3463	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute summer	8	10	92.823	0.073	24.5	0.0824	0.0000	OK
15 minute summer	7	10	96.049	0.049	12.3	0.0549	0.0000	OK
15 minute summer	Outfall	1	82.996	0.000	2.9	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
15 minute summer	8	2.001	9	24.3	2.975	0.429	0.1187	
15 minute summer	7	2.000	8	12.2	1.830	0.226	0.2394	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute summer	1	10	98.919	0.144	55.1	0.1629	0.0000	OK
15 minute summer	2	11	97.042	0.242	198.1	0.2741	0.0000	OK
15 minute summer	3	11	96.495	0.495	315.4	0.5594	0.0000	SURCHARGED
15 minute summer	4	11	93.272	1.036	322.4	1.1722	0.0000	SURCHARGED
15 minute summer	5	11	91.861	0.938	320.5	1.3426	0.0000	SURCHARGED
15 minute summer	6	11	91.581	0.716	398.1	1.0240	0.0000	SURCHARGED
15 minute summer	9	11	92.352	1.129	61.2	1.2767	0.0000	SURCHARGED
15 minute summer	10	11	92.000	1.042	111.7	1.1785	0.0000	SURCHARGED
15 minute summer	11	11	90.679	0.329	641.3	0.4709	0.0000	OK
15 minute summer	15	10	87.600	2.190	79.7	2.4769	2.6039	FLOOD
15 minute summer	16	11	87.102	2.071	75.5	2.3422	0.0000	SURCHARGED
15 minute summer	12	10	86.738	2.442	790.6	4.3157	0.0000	SURCHARGED
2160 minute winter	13	2100	86.620	2.719	32.7	4.8047	0.0000	SURCHARGED
2160 minute winter	14	2100	86.620	3.323	35.9	5.8718	0.0000	SURCHARGED
2880 minute winter	Tank Inlet	2700	86.620	3.250	67.0	1490.4150	4.5232	FLOOD

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
15 minute summer	1	1.000	2	54.3	2.006	0.729	2.6818	
15 minute summer	2	1.001	3	196.9	3.451	0.718	0.8704	
15 minute summer	3	1.002	4	309.7	4.741	0.876	2.6505	
15 minute summer	4	1.003	5	307.0	4.360	0.869	0.8193	
15 minute summer	5	1.004	6	320.6	2.024	1.740	2.8041	
15 minute summer	6	1.005	11	398.5	2.515	1.157	6.0529	
15 minute summer	9	2.002	10	61.3	1.540	1.063	0.8589	
15 minute summer	10	2.003	11	111.4	2.800	1.619	0.8654	
15 minute summer	11	1.006	12	646.6	5.477	0.804	7.0985	
15 minute winter	15	3.000	16	67.3	1.692	1.283	1.4796	
15 minute winter	16	3.001	12	84.2	2.116	0.959	0.6123	
15 minute summer	12	1.007	13	796.8	3.689	1.037	3.4127	
15 minute summer	13	1.008	14	863.2	3.996	1.298	6.3859	
2160 minute winter	14	Hydro-Brake®	Outfall	4.0				396.8
15 minute summer	Tank Inlet	4.001	14	-954.9	-5.055	-3.666	1.7045	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute summer	8	12	93.241	0.491	46.1	0.5555	0.0000	SURCHARGED
15 minute summer	7	10	96.068	0.068	23.1	0.0773	0.0000	OK
15 minute summer	Outfall	1	82.996	0.000	3.1	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
15 minute summer	8	2.001	9	41.2	2.926	0.728	0.2557	
15 minute summer	7	2.000	8	23.0	2.018	0.426	0.4535	