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)	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	0.070	5.00	100.200	1200	419721.519	424029.671	1.350
2	0.189	5.00	98.300	1200	419632.292	424054.245	1.425
3	0.155	5.00	97.500	1200	419624.979	424065.309	1.425
4	0.013	5.00	94.000	1200	419634.672	424101.678	1.689
5	0.015	5.00	93.300	1350	419642.679	424110.119	2.302
6	0.105	5.00	92.650	1350	419660.352	424111.053	1.785
9	0.026	5.00	93.400	1200	419739.315	424088.140	2.177
10	0.070	5.00	92.450	1200	419719.293	424096.237	1.492
11	0.181	5.00	92.150	1350	419697.975	424101.596	1.725
15	0.102	5.00	87.700	1200	419684.199	424172.970	2.290
16	0.012	5.00	87.800	1200	419701.701	424168.072	2.844
12	0.100	5.00	88.300	1500	419713.574	424159.716	4.004
13	0.081	5.00	88.200	1500	419729.318	424158.424	4.299
14	0.120	5.00	87.300	1500	419757.850	424150.717	4.003
Tank Inlet		5.00	86.620	1500	419759.872	424158.325	3.250
8	0.026	5.00	94.100	1200	419748.535	424076.918	1.350
7	0.026	5.00	98.700	1200	419740.185	424042.226	2.700
Outfall			85.271	1200	419811.034	424137.014	2.275

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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)
1.000	1	2	92.549	0.600	98.850	96.950	1.900	48.7	150	6.07	50.0
1.001	2	3	13.262	0.600	96.875	96.075	0.800	16.6	225	6.14	50.0
1.002	3	4	37.639	0.600	96.075	92.311	3.764	10.0	225	6.29	50.0
1.003	4	5	11.635	0.600	92.311	91.148	1.163	10.0	225	6.33	50.0
1.004	5	6	17.698	0.600	90.998	90.865	0.133	133.1	375	6.52	50.0
1.005	6	11	38.793	0.600	90.865	90.425	0.440	88.2	375	6.86	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	90.425	86.725	3.700	16.3	375	7.08	50.0
3.000	15	16	18.174	0.600	85.410	84.956	0.454	40.0	150	5.19	50.0
3.001	16	12	14.519	0.600	84.956	84.596	0.360	40.3	225	5.31	50.0
1.007	12	13	15.797	0.600	84.296	83.901	0.395	40.0	525	7.15	50.0
1.008	13	14	29.555	0.600	83.901	83.347	0.554	53.3	525	7.31	50.0
4.001	Tank Inlet	14	7.872	0.600	83.370	83.347	0.023	342.3	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	1.445	25.5	17.7	1.200	1.200	0.070	0.0	92	1.559
1.001	3.229	128.4	65.5	1.200	1.200	0.259	0.0	114	3.244
1.002	4.161	165.5	104.7	1.200	1.464	0.414	0.0	131	4.401
1.003	4.161	165.5	108.0	1.464	1.927	0.427	0.0	133	4.430
1.004	1.569	173.3	111.8	1.927	1.410	0.442	0.0	219	1.663
1.005	1.930	213.2	138.4	1.410	1.350	0.547	0.0	221	2.050
2.002	1.449	57.6	19.7	1.952	1.267	0.078	0.0	91	1.318
2.003	1.730	68.8	37.4	1.267	1.350	0.148	0.0	118	1.764
1.006	4.511	498.2	221.6	1.350	1.200	0.876	0.0	175	4.381
3.000	1.596	28.2	25.8	2.140	2.694	0.102	0.0	113	1.805
3.001	2.066	82.1	28.8	2.619	3.479	0.114	0.0	92	1.888
1.007	3.549	768.2	275.7	3.479	3.774	1.090	0.0	217	3.267
1.008	3.071	664.8	296.2	3.774	3.428	1.171	0.0	245	2.987
4.001	1.205	260.8	0.0	2.725	3.428	0.000	0.0	0	0.000

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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)
1.009	14	Outfall	54.921	0.600	83.297	82.996	0.301	182.5	300	8.10	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	1.160	82.0	326.6	3.703	1.975	1.291	0.0	300	1.175
2.000	3.058	54.0	6.6	2.550	1.200	0.026	0.0	35	2.086
2.001	3.204	56.6	13.2	1.200	1.952	0.052	0.0	49	2.614

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	40	0	0
30	0	0	0				

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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 (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	580.0	0.0	2.500	580.0	0.0	2.501	0.0	0.0

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Results for 1 year Critical Storm Duration. Lowest mass balance: 99.58%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	98.919	0.069	11.4	0.0778	0.0000	OK
15 minute summer	2	10	96.967	0.092	41.0	0.1041	0.0000	OK
15 minute summer	3	10	96.174	0.099	65.9	0.1119	0.0000	OK
15 minute summer	4	10	92.422	0.111	67.7	0.1256	0.0000	OK
15 minute summer	5	10	91.179	0.181	69.5	0.2591	0.0000	OK
15 minute summer	6	11	91.041	0.176	85.9	0.2523	0.0000	OK
15 minute summer	9	10	91.294	0.071	12.5	0.0799	0.0000	OK
15 minute summer	10	10	91.053	0.095	23.8	0.1070	0.0000	OK
15 minute summer	11	11	90.563	0.138	137.9	0.1978	0.0000	OK
15 minute summer	15	10	85.498	0.088	16.5	0.0994	0.0000	OK
15 minute summer	16	10	85.032	0.076	18.3	0.0858	0.0000	OK
15 minute summer	12	11	84.483	0.187	172.3	0.3300	0.0000	OK
15 minute winter	13	9	84.361	0.460	172.8	0.8133	0.0000	OK
15 minute summer	14	9	84.320	1.023	242.0	1.8078	0.0000	SURCHARGED
960 minute winter	Tank Inlet	930	83.846	0.476	14.3	263.3156	0.0000	OK

Link Event (Velocity)	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	10.9	1.385	0.425	0.7251	
15 minute summer	2	1.001	3	40.8	2.551	0.318	0.2126	
15 minute summer	3	1.002	4	65.6	3.614	0.396	0.6833	
15 minute summer	4	1.003	5	67.1	3.694	0.406	0.2116	
15 minute summer	5	1.004	6	69.4	1.343	0.400	0.9145	
15 minute summer	6	1.005	11	86.6	1.977	0.406	1.7017	
15 minute summer	9	2.002	10	12.4	0.936	0.215	0.2859	
15 minute summer	10	2.003	11	23.4	1.531	0.340	0.3360	
15 minute summer	11	1.006	12	138.8	3.855	0.279	2.1674	
15 minute summer	15	3.000	16	16.4	1.668	0.581	0.1786	
15 minute summer	16	3.001	12	18.1	1.608	0.221	0.1639	
15 minute summer	12	1.007	13	170.9	2.451	0.223	2.0186	
30 minute summer	13	1.008	14	170.4	1.478	0.256	3.5915	
15 minute summer	14	Hydro-Brake®	Outfall	2.3				33.6
15 minute summer	Tank Inlet	4.001	14	-292.2	-2.096	-1.120	0.9147	

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Results for 1 year Critical Storm Duration. Lowest mass balance: 99.58%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	8	10	92.790	0.040	8.4	0.0452	0.0000	OK
15 minute summer	7	10	96.028	0.028	4.2	0.0319	0.0000	OK
15 minute summer	Outfall	1	82.996	0.000	2.3	0.0000	0.0000	OK

Link Event (Velocity)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	8	2.001	9	8.3	2.247	0.146	0.0535	
15 minute summer	7	2.000	8	4.2	1.387	0.077	0.1080	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.58%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	98.980	0.130	27.8	0.1469	0.0000	OK
15 minute summer	2	11	97.049	0.174	101.0	0.1966	0.0000	OK
15 minute summer	3	11	96.423	0.348	162.4	0.3930	0.0000	SURCHARGED
15 minute summer	4	10	92.864	0.553	164.7	0.6255	0.0000	SURCHARGED
15 minute summer	5	11	91.360	0.362	162.1	0.5185	0.0000	OK
15 minute summer	6	11	91.193	0.328	204.0	0.4698	0.0000	OK
15 minute summer	9	10	91.345	0.122	30.7	0.1384	0.0000	OK
15 minute summer	10	10	91.131	0.173	58.4	0.1951	0.0000	OK
15 minute summer	11	11	90.661	0.236	333.7	0.3380	0.0000	OK
15 minute summer	15	11	86.143	0.733	40.5	0.8295	0.0000	SURCHARGED
15 minute winter	16	8	85.225	0.269	40.3	0.3039	0.0000	SURCHARGED
15 minute winter	12	8	85.137	0.841	386.5	1.4867	0.0000	SURCHARGED
15 minute winter	13	8	85.027	1.126	421.7	1.9889	0.0000	SURCHARGED
15 minute winter	14	8	84.838	1.541	480.3	2.7236	0.0000	SURCHARGED
2160 minute winter	Tank Inlet	2040	84.603	1.233	21.9	681.7659	0.0000	SURCHARGED

Link Event (Velocity)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	1	1.000	2	24.7	1.633	0.969	1.4647	
30 minute summer	2	1.001	3	93.1	3.015	0.725	0.4110	
15 minute winter	3	1.002	4	150.1	4.092	0.907	1.3505	
15 minute summer	4	1.003	5	156.1	4.184	0.943	0.4574	
15 minute summer	5	1.004	6	164.2	1.617	0.948	1.8713	
15 minute summer	6	1.005	11	207.8	2.376	0.975	3.4025	
15 minute summer	9	2.002	10	30.6	1.109	0.531	0.5910	
15 minute summer	10	2.003	11	57.4	1.859	0.835	0.6809	
15 minute summer	11	1.006	12	334.3	4.751	0.671	4.2332	
15 minute summer	15	3.000	16	38.6	2.210	1.370	0.3200	
15 minute summer	16	3.001	12	45.1	1.984	0.549	0.5478	
60 minute summer	12	1.007	13	297.8	2.700	0.388	1.8468	
15 minute summer	13	1.008	14	462.0	2.139	0.695	6.3848	
15 minute winter	14	Hydro-Brake®	Outfall	2.8				34.3
15 minute summer	Tank Inlet	4.001	14	-517.0	-3.328	-1.982	1.3740	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.58%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	8	10	92.816	0.066	20.5	0.0742	0.0000	OK
15 minute summer	7	10	96.044	0.044	10.3	0.0501	0.0000	OK
15 minute summer	Outfall	1	82.996	0.000	2.7	0.0000	0.0000	OK

Link Event (Velocity)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	8	2.001	9	20.4	2.851	0.360	0.1039	
15 minute summer	7	2.000	8	10.2	1.754	0.190	0.2096	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.58%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	9	100.200	1.350	50.4	1.5269	5.3378	FLOOD
15 minute summer	2	9	98.300	1.425	160.2	1.6117	9.7896	FLOOD
30 minute summer	3	16	97.500	1.425	211.6	1.6117	12.4817	FLOOD
15 minute summer	4	11	93.412	1.101	170.4	1.2457	0.0000	SURCHARGED
15 minute summer	5	10	91.691	0.693	178.3	0.9923	0.0000	SURCHARGED
15 minute summer	6	10	91.482	0.617	253.0	0.8834	0.0000	SURCHARGED
15 minute summer	9	11	92.067	0.844	54.7	0.9547	0.0000	SURCHARGED
15 minute summer	10	11	91.784	0.826	101.1	0.9341	0.0000	SURCHARGED
15 minute summer	11	11	90.750	0.325	478.6	0.4644	0.0000	OK
15 minute summer	15	10	87.700	2.290	73.4	2.5900	3.8100	FLOOD
15 minute winter	16	7	85.902	0.946	62.0	1.0695	0.0000	SURCHARGED
15 minute winter	12	7	85.826	1.530	584.7	2.7031	0.0000	SURCHARGED
2880 minute winter	13	2760	85.811	1.910	59.2	3.3755	0.0000	SURCHARGED
2880 minute winter	14	2760	85.811	2.514	26.2	4.4427	0.0000	SURCHARGED
2880 minute winter	Tank Inlet	2760	85.811	2.441	23.6	1349.4620	0.0000	SURCHARGED

Link Event (Velocity)	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	27.6	1.669	1.080	1.6293	
60 minute winter	2	1.001	3	94.9	3.021	0.739	0.4229	
30 minute summer	3	1.002	4	163.9	4.120	0.990	1.4969	
60 minute summer	4	1.003	5	168.0	4.255	1.016	0.4627	
15 minute winter	5	1.004	6	178.0	1.639	1.028	1.9520	
15 minute summer	6	1.005	11	251.9	2.424	1.182	4.1056	
15 minute summer	9	2.002	10	53.1	1.336	0.922	0.8589	
15 minute summer	10	2.003	11	100.9	2.538	1.468	0.8654	
15 minute summer	11	1.006	12	478.9	4.993	0.961	5.7833	
15 minute winter	15	3.000	16	55.7	3.166	1.976	0.3200	
15 minute winter	16	3.001	12	66.4	2.058	0.808	0.5774	
15 minute summer	12	1.007	13	612.8	2.837	0.798	3.4127	
15 minute summer	13	1.008	14	671.7	3.109	1.010	6.3848	
2880 minute winter	14	Hydro-Brake®	Outfall	3.5				508.0
15 minute summer	Tank Inlet	4.001	14	-755.1	-4.229	-2.895	1.7006	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.58%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	8	11	92.857	0.107	37.3	0.1213	0.0000	OK
15 minute summer	7	10	96.061	0.061	18.7	0.0687	0.0000	OK
15 minute summer	Outfall	1	82.996	0.000	2.9	0.0000	0.0000	OK

Link Event (Velocity)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	8	2.001	9	26.4	3.024	0.467	0.1824	
15 minute summer	7	2.000	8	18.6	2.100	0.344	0.3564	

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