

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	150.0
Additional Flow (%)	0	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	0.300	Preferred Cover Depth (m)	0.400
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)
SW1	0.022	5.00	152.570	600	389090.605	408894.106	0.550
SW2	0.026	5.00	152.140	600	389079.378	408922.051	0.850
SW3		5.00	152.390	450	389102.792	408931.682	0.500
SW4	0.041	5.00	152.390	1200	389098.870	408930.008	1.590
TANK			152.570		389097.570	408933.500	2.870
SW5-FC			153.050	1200	389116.720	408941.339	3.556
SW6			153.260	900	389115.695	408943.816	3.860
SW7			150.980	900	389054.034	408919.308	2.135
SW8			152.200	900	389069.136	408881.850	3.739

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	SW1	SW2	30.116	0.600	152.020	151.290	0.730	41.3	150	5.32	46.2
1.001	SW2	SW4	21.054	0.600	151.290	150.800	0.490	43.0	150	5.55	45.4
2.000	SW3	SW4	4.264	0.600	151.890	150.800	1.090	3.9	150	5.01	47.3
1.003	SW4	TANK	3.726	0.600	150.800	149.700	1.100	3.4	150	5.56	45.4
1.004	TANK	SW5-FC	20.692	0.600	149.700	149.494	0.206	100.4	150	5.90	44.2
1.005	SW5-FC	SW6	2.681	0.600	149.494	149.400	0.094	28.5	150	5.93	44.2
1.006	SW6	SW7	66.353	0.600	149.400	148.845	0.555	119.6	150	7.13	40.7
1.007	SW7	SW8	40.388	0.600	148.845	148.461	0.384	105.2	150	7.82	39.0

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	1.571	27.8	3.7	0.400	0.700	0.022	0.0	37	1.090
1.001	1.539	27.2	7.9	0.700	1.440	0.048	0.0	55	1.337
2.000	5.131	90.7	0.0	0.350	1.440	0.000	0.0	0	0.000
1.003	5.515	97.5	14.6	1.440	2.720	0.089	0.0	39	3.975
1.004	1.002	17.7	14.2	2.720	3.406	0.089	0.0	102	1.113
1.005	1.892	33.4	14.2	3.406	3.710	0.089	0.0	68	1.817
1.006	0.918	16.2	13.1	3.710	1.985	0.089	0.0	102	1.019
1.007	0.979	17.3	12.6	1.985	3.589	0.089	0.0	95	1.065

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	30.116	41.3	150	Circular	152.570	152.020	0.400	152.140	151.290	0.700
1.001	21.054	43.0	150	Circular	152.140	151.290	0.700	152.390	150.800	1.440
2.000	4.264	3.9	150	Circular	152.390	151.890	0.350	152.390	150.800	1.440
1.003	3.726	3.4	150	Circular	152.390	150.800	1.440	152.570	149.700	2.720
1.004	20.692	100.4	150	Circular	152.570	149.700	2.720	153.050	149.494	3.406
1.005	2.681	28.5	150	Circular	153.050	149.494	3.406	153.260	149.400	3.710
1.006	66.353	119.6	150	Circular	153.260	149.400	3.710	150.980	148.845	1.985
1.007	40.388	105.2	150	Circular	150.980	148.845	1.985	152.200	148.461	3.589

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	SW1	600	Manhole	Adoptable	SW2	600	Manhole	Adoptable
1.001	SW2	600	Manhole	Adoptable	SW4	1200	Manhole	Adoptable
2.000	SW3	450	Manhole	Adoptable	SW4	1200	Manhole	Adoptable
1.003	SW4	1200	Manhole	Adoptable	TANK		Junction	
1.004	TANK		Junction		SW5-FC	1200	Manhole	Adoptable
1.005	SW5-FC	1200	Manhole	Adoptable	SW6	900	Manhole	Adoptable
1.006	SW6	900	Manhole	Adoptable	SW7	900	Manhole	Adoptable
1.007	SW7	900	Manhole	Adoptable	SW8	900	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
SW1	389090.605	408894.106	152.570	0.550	600		0	1.000	152.020	150
SW2	389079.378	408922.051	152.140	0.850	600		1	1.000	151.290	150
						0	1.001	151.290	150	
SW3	389102.792	408931.682	152.390	0.500	450		0	2.000	151.890	150
SW4	389098.870	408930.008	152.390	1.590	1200		1	2.000	150.800	150
						2	1.001	150.800	150	
						0	1.003	150.800	150	
TANK	389097.570	408933.500	152.570	2.870			1	1.003	149.700	150
						0	1.004	149.700	150	
SW5-FC	389116.720	408941.339	153.050	3.556	1200		1	1.004	149.494	150
						0	1.005	149.494	150	
SW6	389115.695	408943.816	153.260	3.860	900		1	1.005	149.400	150
						0	1.006	149.400	150	



Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
SW7	389054.034	408919.308	150.980	2.135	900		1	1.006	148.845	150
							0	1.007	148.845	150
SW8	389069.136	408881.850	152.200	3.739	900		1	1.007	148.461	150

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	0.300	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
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	40	0	0
100	0	0	0
100	45	0	0

Node SW5-FC Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	149.494	Product Number	CTL-SHE-0092-5000-2000-5000
Design Depth (m)	2.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node TANK Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	149.700
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	116

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	24.0	0.0	1.000	24.0	0.0	1.001	0.0	0.0

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW1	10	152.052	0.032	2.8	0.0347	0.0000	OK
15 minute winter	SW2	10	151.342	0.052	6.1	0.0463	0.0000	OK
15 minute summer	SW3	1	151.890	0.000	0.0	0.0000	0.0000	OK
15 minute winter	SW4	10	150.834	0.034	11.2	0.0560	0.0000	OK
30 minute winter	TANK	24	149.816	0.116	9.2	2.6515	0.0000	OK
30 minute winter	SW5-FC	24	149.808	0.313	5.7	0.3545	0.0000	SURCHARGED
15 minute summer	SW6	12	149.453	0.053	4.0	0.0337	0.0000	OK
30 minute winter	SW7	26	148.895	0.050	4.0	0.0317	0.0000	OK
30 minute winter	SW8	26	148.510	0.049	4.0	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)
15 minute winter	SW1	1.000	SW2	2.8	0.689	0.100	0.1224	
15 minute winter	SW2	1.001	SW4	5.9	1.439	0.218	0.0882	
15 minute summer	SW3	2.000	SW4	0.0	0.000	0.000	0.0062	
15 minute winter	SW4	1.003	TANK	11.2	3.110	0.115	0.0280	
30 minute winter	TANK	1.004	SW5-FC	5.7	0.447	0.324	0.3337	
30 minute winter	SW5-FC	1.005	SW6	4.0	0.912	0.121	0.0119	
15 minute summer	SW6	1.006	SW7	4.1	0.890	0.251	0.3449	
30 minute winter	SW7	1.007	SW8	4.0	0.798	0.234	0.2048	7.2

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW1	10	152.081	0.061	9.7	0.0658	0.0000	OK
15 minute winter	SW2	10	151.401	0.111	21.0	0.0992	0.0000	OK
15 minute summer	SW3	1	151.890	0.000	0.0	0.0000	0.0000	OK
15 minute winter	SW4	11	150.867	0.067	38.6	0.1104	0.0000	OK
60 minute winter	TANK	58	150.539	0.839	21.9	19.1278	0.0000	SURCHARGED
60 minute winter	SW5-FC	58	150.529	1.035	4.9	1.1707	0.0000	SURCHARGED
15 minute winter	SW6	9	149.454	0.054	4.1	0.0345	0.0000	OK
15 minute winter	SW7	56	148.896	0.051	4.2	0.0321	0.0000	OK
15 minute winter	SW8	56	148.511	0.050	4.1	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)
15 minute winter	SW1	1.000	SW2	9.6	0.920	0.345	0.3109	
15 minute winter	SW2	1.001	SW4	20.6	1.911	0.757	0.2250	
15 minute summer	SW3	2.000	SW4	0.0	0.000	0.000	0.0152	
15 minute winter	SW4	1.003	TANK	38.3	3.866	0.393	0.0470	
60 minute winter	TANK	1.004	SW5-FC	4.9	0.518	0.278	0.3643	
60 minute winter	SW5-FC	1.005	SW6	4.1	0.917	0.124	0.0122	
15 minute winter	SW6	1.006	SW7	4.2	0.926	0.261	0.3534	
15 minute winter	SW7	1.007	SW8	4.1	0.803	0.239	0.2084	18.0

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW1	10	152.078	0.058	8.9	0.0628	0.0000	OK
15 minute winter	SW2	10	151.394	0.104	19.4	0.0934	0.0000	OK
15 minute summer	SW3	1	151.890	0.000	0.0	0.0000	0.0000	OK
15 minute winter	SW4	11	150.862	0.062	35.6	0.1023	0.0000	OK
60 minute winter	TANK	57	150.468	0.768	20.6	17.5024	0.0000	SURCHARGED
60 minute winter	SW5-FC	57	150.459	0.964	4.9	1.0908	0.0000	SURCHARGED
15 minute winter	SW6	9	149.454	0.054	4.1	0.0345	0.0000	OK
480 minute summer	SW7	272	148.896	0.051	4.1	0.0321	0.0000	OK
480 minute summer	SW8	272	148.511	0.050	4.1	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)
15 minute winter	SW1	1.000	SW2	8.8	0.905	0.317	0.2916	
15 minute winter	SW2	1.001	SW4	19.0	1.895	0.698	0.2100	
15 minute summer	SW3	2.000	SW4	0.0	0.000	0.000	0.0141	
15 minute winter	SW4	1.003	TANK	35.5	3.790	0.364	0.0456	
60 minute winter	TANK	1.004	SW5-FC	4.9	0.513	0.278	0.3643	
60 minute winter	SW5-FC	1.005	SW6	4.1	0.917	0.124	0.0122	
15 minute winter	SW6	1.006	SW7	4.2	0.929	0.261	0.3534	
480 minute summer	SW7	1.007	SW8	4.1	0.803	0.239	0.2084	50.3

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW1	10	152.092	0.072	13.0	0.0777	0.0000	OK
120 minute winter	SW2	92	151.799	0.509	10.4	0.4559	0.0000	SURCHARGED
15 minute summer	SW3	1	151.890	0.000	0.0	0.0000	0.0000	OK
120 minute winter	SW4	92	151.793	0.993	19.3	1.6355	0.0000	SURCHARGED
120 minute winter	TANK	92	151.788	2.088	19.2	22.8114	0.0000	SURCHARGED
120 minute winter	SW5-FC	92	151.768	2.274	6.7	2.5716	0.0000	SURCHARGED
120 minute winter	SW6	92	149.459	0.059	5.3	0.0378	0.0000	OK
120 minute winter	SW7	94	148.903	0.057	5.3	0.0365	0.0000	OK
120 minute winter	SW8	94	148.518	0.057	5.3	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)
15 minute winter	SW1	1.000	SW2	12.9	0.952	0.463	0.3902	
120 minute winter	SW2	1.001	SW4	10.4	1.645	0.383	0.3707	
15 minute summer	SW3	2.000	SW4	0.0	0.000	0.000	0.0215	
120 minute winter	SW4	1.003	TANK	19.2	2.799	0.197	0.0656	
120 minute winter	TANK	1.004	SW5-FC	6.7	0.445	0.381	0.3643	
120 minute winter	SW5-FC	1.005	SW6	5.3	0.966	0.157	0.0146	
120 minute winter	SW6	1.006	SW7	5.3	0.830	0.324	0.4208	
120 minute winter	SW7	1.007	SW8	5.3	0.857	0.304	0.2480	55.6