

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	50.0
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	0.400	Preferred Cover Depth (m)	1.200
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
SW1	0.030	5.00	52.800	1800	3.360
SW2	0.009	5.00	51.000	1800	5.590
SW3	0.091	5.00	50.300	1800	4.905
SW4	0.000		49.200	1800	5.400
SW5			49.100	1800	5.304
SW6	0.020	5.00	48.500	1800	3.100
SW7	0.084	5.00	45.200	1800	2.937
SW9			42.000	1800	1.500
SW10	0.094	5.00	45.300	1800	3.014
SW5A			48.700	1800	4.917
SW5B			49.000	1800	5.205
SW5C		5.00	47.700	1800	3.876
SW10A		5.00	45.800	1800	3.497

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	25.900	0.600	49.440	46.800	2.640	9.8	300	5.09	50.0
1.001	SW2	SW3	7.900	0.600	45.410	45.395	0.015	526.7	900	5.18	50.0
1.002	SW3	SW4	13.500	0.600	45.395	45.370	0.025	540.0	900	5.35	50.0
1.003	SW4	SW5	1.800	0.600	43.800	43.796	0.004	450.0	900	5.37	50.0
1.004	SW5	SW5A	52.200	0.600	43.796	43.783	0.013	4015.4	900	7.17	46.2
2.000	SW6	SW4	14.600	0.600	45.400	45.370	0.030	486.7	900	5.17	50.0
3.000	SW5C	SW5B	14.600	0.600	43.824	43.795	0.029	503.4	900	5.18	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	5.047	356.8	5.4	3.060	3.900	0.030	0.0	25	1.868
1.001	1.358	863.9	7.0	4.690	4.005	0.039	0.0	57	0.425
1.002	1.341	853.1	23.5	4.005	2.930	0.130	0.0	101	0.601
1.003	1.470	935.3	27.1	4.500	4.404	0.150	0.0	103	0.671
1.004	0.484	308.2	25.0	4.404	4.017	0.150	0.0	172	0.296
2.000	1.413	899.1	3.6	2.200	2.930	0.020	0.0	41	0.357
3.000	1.389	883.8	0.0	2.976	4.305	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)
3.001	SW5B	SW5A	5.900	0.600	43.795	43.783	0.012	491.7	900	5.25	50.0
1.005	SW5A	SW10	31.000	0.600	43.783	42.286	1.497	20.7	900	7.24	45.9
1.006	SW10	SW7	11.500	0.600	42.286	42.263	0.023	500.0	900	7.38	45.5
1.007	SW7	SW9	10.000	0.600	42.263	40.500	1.763	5.7	900	7.39	45.5
4.000	SW10A	SW10	8.600	0.600	42.303	42.286	0.017	505.9	900	5.10	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)
3.001	1.406	894.4	0.0	4.305	4.017	0.000	0.0	0	0.000
1.005	6.901	4390.0	24.9	4.017	2.114	0.150	0.0	47	1.946
1.006	1.394	886.9	40.1	2.114	2.037	0.244	0.0	128	0.723
1.007	13.197	8395.7	53.9	2.037	0.600	0.328	0.0	50	3.861
4.000	1.386	881.7	0.0	2.597	2.114	0.000	0.0	0	0.000

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	25.900	9.8	300	Circular	52.800	49.440	3.060	51.000	46.800	3.900
1.001	7.900	526.7	900	Circular	51.000	45.410	4.690	50.300	45.395	4.005
1.002	13.500	540.0	900	Circular	50.300	45.395	4.005	49.200	45.370	2.930
1.003	1.800	450.0	900	Circular	49.200	43.800	4.500	49.100	43.796	4.404
1.004	52.200	4015.4	900	Circular	49.100	43.796	4.404	48.700	43.783	4.017
2.000	14.600	486.7	900	Circular	48.500	45.400	2.200	49.200	45.370	2.930
3.000	14.600	503.4	900	Circular	47.700	43.824	2.976	49.000	43.795	4.305
3.001	5.900	491.7	900	Circular	49.000	43.795	4.305	48.700	43.783	4.017
1.005	31.000	20.7	900	Circular	48.700	43.783	4.017	45.300	42.286	2.114
1.006	11.500	500.0	900	Circular	45.300	42.286	2.114	45.200	42.263	2.037
1.007	10.000	5.7	900	Circular	45.200	42.263	2.037	42.000	40.500	0.600

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	SW1	1800	Manhole	Adoptable	SW2	1800	Manhole	Adoptable
1.001	SW2	1800	Manhole	Adoptable	SW3	1800	Manhole	Adoptable
1.002	SW3	1800	Manhole	Adoptable	SW4	1800	Manhole	Adoptable
1.003	SW4	1800	Manhole	Adoptable	SW5	1800	Manhole	Adoptable
1.004	SW5	1800	Manhole	Adoptable	SW5A	1800	Manhole	Adoptable
2.000	SW6	1800	Manhole	Adoptable	SW4	1800	Manhole	Adoptable
3.000	SW5C	1800	Manhole	Adoptable	SW5B	1800	Manhole	Adoptable
3.001	SW5B	1800	Manhole	Adoptable	SW5A	1800	Manhole	Adoptable
1.005	SW5A	1800	Manhole	Adoptable	SW10	1800	Manhole	Adoptable
1.006	SW10	1800	Manhole	Adoptable	SW7	1800	Manhole	Adoptable
1.007	SW7	1800	Manhole	Adoptable	SW9	1800	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)
4.000	8.600	505.9	900	Circular	45.800	42.303	2.597	45.300	42.286	2.114

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
4.000	SW10A	1800	Manhole	Adoptable	SW10	1800	Manhole	Adoptable

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
SW1	52.800	3.360	1800	○	0	1.000	49.440	300
SW2	51.000	5.590	1800		1	1.000	46.800	300
SW3	50.300	4.905	1800	○	0	1.001	45.410	900
					1	1.001	45.395	900
SW4	49.200	5.400	1800	○	0	1.002	45.395	900
					1	2.000	45.370	900
					2	1.002	45.370	900
SW5	49.100	5.304	1800	○	0	1.003	43.800	900
					1	1.003	43.796	900
SW6	48.500	3.100	1800	○	0	1.004	43.796	900
					0	2.000	45.400	900
SW7	45.200	2.937	1800	○	1	1.006	42.263	900
					0	1.007	42.263	900
SW9	42.000	1.500	1800	○	1	1.007	40.500	900
					1	1.007	40.500	900
SW10	45.300	3.014	1800	○	1	4.000	42.286	900
					2	1.005	42.286	900
					0	1.006	42.286	900
SW5A	48.700	4.917	1800	○	1	3.001	43.783	900
					2	1.004	43.783	900
					0	1.005	43.783	900

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW5B	49.000	5.205	1800	○	1	3.000	43.795
					0	3.001	43.795
SW5C	47.700	3.876	1800	○			900
					0	3.000	43.824
SW10A	45.800	3.497	1800	○			900
					0	4.000	42.303

Node SW7 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	42.263	Product Number	CTL-SHE-0072-3100-2000-3100
Design Depth (m)	2.000	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	3.1	Min Node Diameter (mm)	1200

Node SW4 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	43.800	Product Number	CTL-SHE-0082-3500-1500-3500
Design Depth (m)	1.500	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	3.5	Min Node Diameter (mm)	1200

Results for 1 year Critical Storm Duration. Lowest mass balance: 53.25%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute summer	SW1	10	49.466	0.026	5.4	0.0704	0.0000	OK
60 minute summer	SW2	44	45.599	0.189	4.8	0.4873	0.0000	OK
60 minute summer	SW3	44	45.600	0.205	15.4	0.5965	0.0000	OK
60 minute summer	SW4	44	45.599	1.799	17.3	4.5788	0.0000	SURCHARGED
60 minute summer	SW5	47	43.873	0.077	3.7	0.1970	0.0000	OK
60 minute summer	SW6	45	45.601	0.201	10.3	0.5376	0.0000	OK
180 minute summer	SW7	184	43.570	1.307	7.8	4.0754	0.0000	SURCHARGED
15 minute summer	SW9	1	40.500	0.000	2.3	0.0000	0.0000	OK
180 minute summer	SW10	184	43.571	1.285	9.5	4.0708	0.0000	SURCHARGED
60 minute summer	SW5A	48	43.804	0.021	3.8	0.0525	0.0000	OK
60 minute summer	SW5B	54	43.804	0.009	0.0	0.0221	0.0000	OK
15 minute summer	SW5C	1	43.824	0.000	0.0	0.0000	0.0000	OK
180 minute summer	SW10A	184	43.564	1.261	3.3	3.2099	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
15 minute summer	SW1	1.000	SW2	5.3	1.840	0.015	0.0748	
60 minute summer	SW2	1.001	SW3	4.6	0.175	0.005	0.8088	
60 minute summer	SW3	1.002	SW4	14.9	0.601	0.017	1.5862	
60 minute summer	SW4	Hydro-Brake®	SW5	3.7				
60 minute summer	SW5	1.004	SW5A	3.7	0.281	0.012	0.7716	
60 minute summer	SW6	2.000	SW4	-7.9	0.446	-0.009	1.6855	
180 minute summer	SW7	Hydro-Brake®	SW9	2.6				51.7
180 minute summer	SW10	1.006	SW7	7.3	0.099	0.008	7.2884	
60 minute summer	SW5A	1.005	SW10	3.7	0.147	0.001	9.5415	
60 minute summer	SW5B	3.001	SW5A	0.0	-0.036	0.000	0.0130	
15 minute summer	SW5C	3.000	SW5B	0.0	0.000	0.000	0.0073	
180 minute summer	SW10A	4.000	SW10	4.9	-0.044	0.006	5.4505	

Results for 30 year Critical Storm Duration. Lowest mass balance: 53.25%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW1	10	49.480	0.040	13.2	0.1085	0.0000	OK
60 minute summer	SW2	61	46.177	0.767	11.3	1.9765	0.0000	OK
60 minute summer	SW3	61	46.174	0.779	33.0	2.2701	0.0000	OK
60 minute summer	SW4	60	46.174	2.374	25.4	6.0416	0.0000	SURCHARGED
480 minute summer	SW5	480	44.385	0.589	4.6	1.4980	0.0000	OK
60 minute summer	SW6	59	46.175	0.775	13.5	2.0721	0.0000	OK
480 minute summer	SW7	480	44.383	2.120	7.9	6.6068	0.0000	SURCHARGED
15 minute summer	SW9	1	40.500	0.000	2.8	0.0000	0.0000	OK
480 minute summer	SW10	480	44.385	2.099	11.3	6.6502	0.0000	SURCHARGED
480 minute summer	SW5A	480	44.384	0.601	8.2	1.5306	0.0000	OK
480 minute summer	SW5B	480	44.384	0.589	3.0	1.5002	0.0000	OK
480 minute summer	SW5C	480	44.384	0.560	1.6	1.4264	0.0000	OK
480 minute summer	SW10A	480	44.384	2.081	5.0	5.2966	0.0000	SURCHARGED

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 summer	SW1	1.000	SW2	13.1	2.404	0.037	0.1410	
60 minute summer	SW2	1.001	SW3	7.8	0.158	0.009	4.5760	
60 minute summer	SW3	1.002	SW4	24.3	0.553	0.028	7.9750	
60 minute summer	SW4	Hydro-Brake®	SW5	4.2				
480 minute summer	SW5	1.004	SW5A	4.2	0.281	0.014	23.2189	
60 minute summer	SW6	2.000	SW4	-8.6	0.442	-0.010	8.5988	
480 minute summer	SW7	Hydro-Brake®	SW9	3.2				115.4
480 minute summer	SW10	1.006	SW7	7.8	0.062	0.009	7.2884	
480 minute summer	SW5A	1.005	SW10	-6.3	0.158	-0.001	16.8018	
480 minute summer	SW5B	3.001	SW5A	-3.0	-0.049	-0.003	2.6264	
480 minute summer	SW5C	3.000	SW5B	-1.6	-0.049	-0.002	6.2421	
480 minute summer	SW10A	4.000	SW10	-5.0	-0.044	-0.006	5.4505	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 53.25%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW1	10	49.494	0.054	24.8	0.1483	0.0000	OK
120 minute summer	SW2	74	48.603	3.193	1838.5	8.2273	0.0000	SURCHARGED
60 minute summer	SW3	44	49.280	3.885	2814.4	11.3290	0.0000	SURCHARGED
30 minute summer	SW4	64	48.550	4.750	1226.0	12.0881	0.0000	SURCHARGED
180 minute summer	SW5	120	44.643	0.847	22.0	2.1552	0.0000	OK
120 minute summer	SW6	74	48.500	3.100	562.6	8.2894	4.5988	FLOOD
240 minute summer	SW7	344	44.797	2.534	197.3	7.8994	0.0000	SURCHARGED
15 minute summer	SW9	1	40.500	0.000	3.1	0.0000	0.0000	OK
240 minute summer	SW10	144	45.271	2.985	1055.1	9.4562	0.0000	FLOOD RISK
180 minute summer	SW5A	120	44.648	0.865	69.9	2.2007	0.0000	OK
180 minute summer	SW5B	120	44.651	0.856	8.1	2.1780	0.0000	OK
180 minute summer	SW5C	120	44.642	0.818	5.1	2.0822	0.0000	OK
480 minute summer	SW10A	272	44.969	2.666	5.3	6.7854	0.0000	SURCHARGED

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 summer	SW1	1.000	SW2	24.6	2.882	0.069	0.9517	
120 minute summer	SW2	1.001	SW3	-1489.6	-2.351	-1.724	5.0068	
60 minute summer	SW3	1.002	SW4	-1288.5	-2.033	-1.510	8.5559	
30 minute summer	SW4	Hydro-Brake®	SW5	5.4				
180 minute summer	SW5	1.004	SW5A	-17.2	0.283	-0.056	32.4808	
120 minute summer	SW6	2.000	SW4	556.2	0.878	0.619	9.2531	
240 minute summer	SW7	Hydro-Brake®	SW9	3.4				86.4
240 minute summer	SW10	1.006	SW7	-305.3	-0.482	-0.344	7.2884	
180 minute summer	SW5A	1.005	SW10	-63.7	0.130	-0.015	19.5219	
180 minute summer	SW5B	3.001	SW5A	-8.1	-0.231	-0.009	3.6779	
180 minute summer	SW5C	3.000	SW5B	-5.1	-0.070	-0.006	8.9532	
480 minute summer	SW10A	4.000	SW10	713.5	1.126	0.809	5.4505	