

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	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)	0.600
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	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.000	5.00	22.350	450	506703.234	105430.121	0.600
S2	0.038	5.00	22.400	450	506713.315	105429.313	0.755
S3	0.034	5.00	21.850	450	506715.215	105392.830	1.259
S4	0.049	5.00	21.000	600	506713.332	105364.271	0.878
S5	0.051	5.00	20.450	1200	506717.901	105332.597	1.067
AT1	0.000		20.350	1	506737.402	105336.897	1.553
S6	0.036	5.00	19.920	1200	506740.994	105319.027	1.249
S7	0.000	5.00	20.300	450	506706.861	105321.009	0.556
S8	0.015	5.00	20.300	450	506717.726	105322.850	0.701
S9	0.000	5.00	19.700	450	506712.435	105306.423	0.598
S10	0.000		19.920	450	506746.620	105314.833	2.385

Links (Input)

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	S1	S2	10.113	0.600	21.750	21.645	0.105	96.3	100	5.22	50.0
1.001	S2	S3	36.532	0.600	21.645	20.591	1.054	34.7	150	5.57	50.0
1.002	S3	S4	28.621	0.600	20.591	20.197	0.394	72.6	150	5.97	50.0
2.000	S4	S5	32.002	0.600	20.122	19.383	0.739	43.3	225	6.24	50.0
2.001	S5	AT1	19.969	0.600	19.383	19.297	0.086	232.2	225	6.63	50.0
2.002	AT1	S6	18.227	0.600	18.797	18.671	0.126	144.7	225	6.91	50.0
3.000	S9	S6	31.217	0.600	19.102	18.796	0.306	102.0	100	5.68	50.0
4.000	S7	S8	11.020	0.600	19.744	19.599	0.145	76.0	100	5.21	50.0
4.001	S8	S5	9.749	0.600	19.599	19.508	0.091	107.1	100	5.43	50.0
5.000	S6	S10	7.017	0.600	18.671	17.535	1.136	6.2	150	6.94	50.0

Simulation Settings

Rainfall Methodology	FSR	Winter CV	0.840
FSR Region	England and Wales	Analysis Speed	Normal
M5-60 (mm)	20.000	Skip Steady State	x
Ratio-R	0.300	Drain Down Time (mins)	240
Summer CV	0.750	Additional Storage (m³/ha)	20.0

Simulation Settings

Check Discharge Rate(s) x Check Discharge Volume x

Storm Durations

15 30 60 120 180 240 360 480 600 720 960 1440

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

Node S6 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	18.671	Product Number	CTL-SHE-0044-1000-1249-1000
Design Depth (m)	1.249	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.0	Min Node Diameter (mm)	1200

Node AT1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	18.797
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	234.0	0.0	0.800	234.0	0.0	0.801	0.0	0.0

Node S1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	21.750	Slope (1:X)	31.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.400
Safety Factor	2.0	Width (m)	8.600	Inf Depth (m)	
Porosity	0.30	Length (m)	6.000		

Node S3 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	20.591	Slope (1:X)	50.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	4	Depth (m)	0.400
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.30	Length (m)	10.000		

Node S4 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	20.122	Slope (1:X)	30.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	4	Depth (m)	0.400
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.30	Length (m)	5.000		

Node S5 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	19.383	Slope (1:X)	30.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	9	Depth (m)	0.400
Safety Factor	2.0	Width (m)	6.000	Inf Depth (m)	
Porosity	0.30	Length (m)	5.300		

Node S5 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	19.383	Slope (1:X)	30.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	8	Depth (m)	0.400
Safety Factor	2.0	Width (m)	6.000	Inf Depth (m)	
Porosity	0.30	Length (m)	7.000		

Node S8 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	19.599	Slope (1:X)	30.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	90	Depth (m)	0.400
Safety Factor	2.0	Width (m)	8.000	Inf Depth (m)	
Porosity	0.30	Length (m)	7.000		

Node S6 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	18.671	Slope (1:X)	30.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.400
Safety Factor	2.0	Width (m)	6.000	Inf Depth (m)	
Porosity	0.30	Length (m)	8.500		

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.67%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	1	21.750	0.000	0.0	0.0000	0.0000	OK
15 minute winter	S2	10	21.710	0.065	11.9	0.0757	0.0000	OK
15 minute winter	S3	11	20.720	0.129	22.4	0.7202	0.0000	OK
15 minute winter	S4	11	20.226	0.104	35.0	0.3958	0.0000	OK
15 minute winter	S5	13	19.653	0.270	54.1	4.2464	0.0000	SURCHARGED
960 minute winter	AT1	930	19.218	0.421	4.9	93.5115	0.0000	SURCHARGED
960 minute winter	S6	930	19.218	0.547	1.1	4.9065	0.0000	SURCHARGED
15 minute summer	S7	1	19.744	0.000	0.0	0.0000	0.0000	OK
15 minute winter	S8	13	19.675	0.076	4.7	0.2593	0.0000	OK
960 minute winter	S9	930	19.218	0.116	0.0	0.0184	0.0000	SURCHARGED
15 minute summer	S10	1	17.535	0.000	0.7	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 summer	S1	1.000	S2	0.0	0.000	0.000	0.0263	
15 minute winter	S2	1.001	S3	11.8	1.058	0.388	0.4233	
15 minute winter	S3	1.002	S4	20.5	1.313	0.984	0.4630	
15 minute winter	S4	2.000	S5	35.0	1.141	0.442	0.9234	
15 minute winter	S5	2.001	AT1	44.4	1.144	1.309	0.7304	
960 minute winter	AT1	2.002	S6	0.8	0.100	0.018	0.7249	
960 minute winter	S6	Hydro-Brake®	S10	0.7				45.6
15 minute summer	S7	4.000	S8	0.0	0.000	0.000	0.0298	
15 minute winter	S8	4.001	S5	4.3	0.741	0.746	0.0693	
960 minute winter	S9	3.000	S6	0.0	-0.008	-0.007	0.2443	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.67%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	1	21.750	0.000	0.0	0.0000	0.0000	OK
15 minute winter	S2	10	21.738	0.093	21.6	0.1084	0.0000	OK
15 minute winter	S3	13	20.955	0.364	40.7	4.2301	0.0000	SURCHARGED
15 minute winter	S4	12	20.260	0.138	50.7	0.6275	0.0000	OK
15 minute winter	S5	12	19.891	0.508	79.1	7.6316	0.0000	SURCHARGED
1440 minute winter	AT1	1380	19.858	1.061	6.8	177.9512	0.0000	SURCHARGED
1440 minute winter	S6	1380	19.858	1.187	1.2	6.0003	0.0000	FLOOD RISK
1440 minute winter	S7	1380	19.858	0.114	0.0	0.0182	0.0000	SURCHARGED
1440 minute winter	S8	1380	19.858	0.259	0.5	2.5627	0.0000	SURCHARGED
960 minute winter	S9	885	19.700	0.598	0.1	0.1031	0.0000	FLOOD RISK
15 minute summer	S10	1	17.535	0.000	0.7	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 summer	S1	1.000	S2	0.0	0.000	0.000	0.0375	
15 minute winter	S2	1.001	S3	21.4	1.326	0.705	0.5311	
15 minute winter	S3	1.002	S4	24.9	1.412	1.191	0.4955	
15 minute winter	S4	2.000	S5	49.2	1.383	0.621	1.0441	
15 minute winter	S5	2.001	AT1	65.8	1.656	1.940	0.7775	
1440 minute winter	AT1	2.002	S6	0.9	0.103	0.021	0.7249	
1440 minute winter	S6	Hydro-Brake®	S10	1.0				77.0
1440 minute winter	S7	4.000	S8	0.0	0.005	0.005	0.0862	
1440 minute winter	S8	4.001	S5	0.5	0.451	0.088	0.0763	
960 minute winter	S9	3.000	S6	-0.1	-0.018	-0.017	0.2443	