



Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	5	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)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	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)
24	0.020	5.00	52.074	450	385226.760	398997.427	0.800
22	0.025	5.00	50.603	450	385213.102	398895.327	0.200
21	0.047	5.00	50.800	450	385244.726	398881.393	0.600
20	0.006	5.00	50.888	450	385243.917	398894.736	1.171
17	0.006	5.00	51.315	450	385203.973	398938.641	0.700
16	0.002	5.00	52.149	450	385221.390	398996.717	0.200
15	0.016	5.00	51.662	450	385181.733	398973.476	0.903
14	0.005	5.00	51.336	450	385171.145	398972.533	0.624
13			51.226	450	385175.789	398966.856	0.606
12			51.388	450	385180.850	398963.761	0.827
11			51.384	450	385193.220	398941.812	1.059
10	0.004	5.00	51.413	450	385164.796	398979.074	0.600
9	0.027	5.00	51.400	600	385191.741	398935.646	1.302
8	0.019	5.00	51.400	600	385204.592	398929.054	1.508
7	0.001	5.00	50.907	450	385239.268	398892.524	1.307
6	0.048	5.00	50.979	1200	385228.390	398906.887	1.634
5	0.012	5.00	51.024	450	385248.216	398898.081	1.608
4			51.174	450	385243.894	398915.005	2.124
3	0.049	5.00	51.326	1200	385270.590	398929.029	2.783
2			51.165	1200	385278.502	398917.188	2.850
1			51.184	450	385283.708	398919.833	3.048

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)
2	2	1	5.839	0.600	48.315	48.136	0.179	32.6	150	8.50	50.0
3	3	2	14.241	0.600	48.543	48.315	0.228	62.5	225	8.45	50.0
24	24	3	81.236	0.600	51.274	48.668	2.606	31.2	100	5.98	50.0
4	4	3	30.155	0.600	49.050	48.543	0.507	59.5	225	8.30	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)
2	1.768	31.2	38.9	2.700	2.898	0.287	0.0
3	1.657	65.9	38.9	2.558	2.625	0.287	0.0
24	1.387	10.9	2.7	0.700	2.558	0.020	0.0
4	1.699	67.5	29.5	1.899	2.558	0.218	0.0

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)
6	6	4	17.501	0.600	49.345	49.050	0.295	59.3	225	8.01	50.0
5	5	4	17.467	0.600	49.416	49.125	0.291	60.0	150	5.22	50.0
20	20	6	19.716	0.600	49.717	49.470	0.247	79.8	100	6.60	50.0
8	8	6	32.523	0.600	49.892	49.345	0.547	59.5	225	7.84	50.0
7	7	6	18.017	0.600	49.600	49.420	0.180	100.1	150	5.30	50.0
17	17	8	9.607	0.600	50.615	49.967	0.648	14.8	100	5.08	50.0
9	9	8	14.443	0.600	50.098	49.892	0.206	70.1	225	7.52	50.0
11	11	9	6.341	0.600	50.325	50.173	0.152	41.7	150	7.36	50.0
10	10	9	51.108	0.600	50.813	50.174	0.639	80.0	150	5.76	50.0
12	12	11	25.195	0.600	50.561	50.325	0.236	106.8	150	7.30	50.0
13	13	12	5.932	0.600	50.620	50.561	0.059	100.0	150	6.86	50.0
15	15	13	8.897	0.030	50.759	50.670	0.089	100.0	100	6.77	50.0
14	14	13	7.335	0.600	50.712	50.620	0.092	79.7	100	5.14	50.0
16	16	15	45.965	0.030	51.949	51.462	0.487	94.4	100	6.24	50.0
22	22	20	30.821	0.030	50.403	50.249	0.154	200.0	100	6.22	50.0
21	21	20	13.368	0.600	50.200	50.038	0.162	82.5	150	5.20	50.0

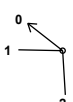
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
6	1.701	67.6	27.9	1.409	1.899	0.206	0.0
5	1.300	23.0	1.6	1.458	1.899	0.012	0.0
20	0.862	6.8	10.6	1.071	1.409	0.078	0.0
8	1.699	67.6	10.7	1.283	1.409	0.079	0.0
7	1.004	17.7	0.1	1.157	1.409	0.001	0.0
17	2.016	15.8	0.8	0.600	1.333	0.006	0.0
9	1.564	62.2	7.3	1.077	1.283	0.054	0.0
11	1.562	27.6	3.1	0.909	1.077	0.023	0.0
10	1.125	19.9	0.5	0.450	1.076	0.004	0.0
12	0.972	17.2	3.1	0.677	0.909	0.023	0.0
13	1.005	17.8	3.1	0.456	0.677	0.023	0.0
15	0.285	2.2	2.4	0.803	0.456	0.018	0.0
14	0.862	6.8	0.7	0.524	0.506	0.005	0.0
16	0.615	64.6	0.3	0.100	0.100	0.002	0.0
22	0.423	44.4	3.4	0.100	0.539	0.025	0.0
21	1.107	19.6	6.4	0.450	0.700	0.047	0.0

Pipeline Schedule

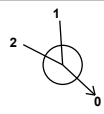
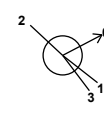
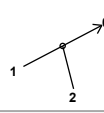
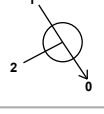
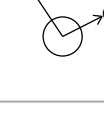
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
2	5.839	32.6	150	Circular	51.165	48.315	2.700	51.184	48.136	2.898
3	14.241	62.5	225	Circular	51.326	48.543	2.558	51.165	48.315	2.625
24	81.236	31.2	100	Circular	52.074	51.274	0.700	51.326	48.668	2.558
4	30.155	59.5	225	Circular	51.174	49.050	1.899	51.326	48.543	2.558
6	17.501	59.3	225	Circular	50.979	49.345	1.409	51.174	49.050	1.899
5	17.467	60.0	150	Circular	51.024	49.416	1.458	51.174	49.125	1.899
20	19.716	79.8	100	Circular	50.888	49.717	1.071	50.979	49.470	1.409
8	32.523	59.5	225	Circular	51.400	49.892	1.283	50.979	49.345	1.409
7	18.017	100.1	150	Circular	50.907	49.600	1.157	50.979	49.420	1.409
17	9.607	14.8	100	Circular	51.315	50.615	0.600	51.400	49.967	1.333
9	14.443	70.1	225	Circular	51.400	50.098	1.077	51.400	49.892	1.283
11	6.341	41.7	150	Circular	51.384	50.325	0.909	51.400	50.173	1.077
10	51.108	80.0	150	Circular	51.413	50.813	0.450	51.400	50.174	1.076
12	25.195	106.8	150	Circular	51.388	50.561	0.677	51.384	50.325	0.909
13	5.932	100.0	150	Circular	51.226	50.620	0.456	51.388	50.561	0.677
15	8.897	100.0	100	Circular	51.662	50.759	0.803	51.226	50.670	0.456
14	7.335	79.7	100	Circular	51.336	50.712	0.524	51.226	50.620	0.506
16	45.965	94.4	100	1:3 Swale	52.149	51.949	0.100	51.662	51.462	0.100
22	30.821	200.0	100	1:3 Swale	50.603	50.403	0.100	50.888	50.249	0.539
21	13.368	82.5	150	Circular	50.800	50.200	0.450	50.888	50.038	0.700

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
2	2	1200	Manhole	Adoptable	1	450	Manhole	Adoptable
3	3	1200	Manhole	Adoptable	2	1200	Manhole	Adoptable
24	24	450	Manhole	Adoptable	3	1200	Manhole	Adoptable
4	4	450	Junction		3	1200	Manhole	Adoptable
6	6	1200	Manhole	Adoptable	4	450	Junction	
5	5	450	Manhole	Adoptable	4	450	Junction	
20	20	450	Junction		6	1200	Manhole	Adoptable
8	8	600	Manhole	Adoptable	6	1200	Manhole	Adoptable
7	7	450	Manhole	Adoptable	6	1200	Manhole	Adoptable
17	17	450	Manhole	Adoptable	8	600	Manhole	Adoptable
9	9	600	Manhole	Adoptable	8	600	Manhole	Adoptable
11	11	450	Manhole	Adoptable	9	600	Manhole	Adoptable
10	10	450	Manhole	Adoptable	9	600	Manhole	Adoptable
12	12	450	Manhole	Adoptable	11	450	Manhole	Adoptable
13	13	450	Manhole	Adoptable	12	450	Manhole	Adoptable
15	15	450	Junction		13	450	Manhole	Adoptable
14	14	450	Manhole	Adoptable	13	450	Manhole	Adoptable
16	16	450	Junction		15	450	Junction	
22	22	450	Manhole	Adoptable	20	450	Junction	
21	21	450	Manhole	Adoptable	20	450	Junction	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
24	385226.760	398997.427	52.074	0.800	450		0	24	51.274 100
22	385213.102	398895.327	50.603	0.200	450		0	22	50.403 100
21	385244.726	398881.393	50.800	0.600	450		0	21	50.200 150
20	385243.917	398894.736	50.888	1.171	450		1 2 0	22 21 20	50.249 100 50.038 150 49.717 100
17	385203.973	398938.641	51.315	0.700	450		0	17	50.615 100
16	385221.390	398996.717	52.149	0.200	450		0	16	51.949 100
15	385181.733	398973.476	51.662	0.903	450		1 0	16 15	51.462 100 50.759 100
14	385171.145	398972.533	51.336	0.624	450		0	14	50.712 100
13	385175.789	398966.856	51.226	0.606	450		1 2 0	15 14 13	50.670 100 50.620 100 50.620 150
12	385180.850	398963.761	51.388	0.827	450		1 0	13 12	50.561 150 50.561 150
11	385193.220	398941.812	51.384	1.059	450		1 0	12 11	50.325 150 50.325 150
10	385164.796	398979.074	51.413	0.600	450		0	10	50.813 150
9	385191.741	398935.646	51.400	1.302	600		1 2 0	11 10 9	50.173 150 50.174 150 50.098 225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
8	385204.592	398929.054	51.400	1.508	600		1 17 2 9 0 8	49.967 49.892 49.892	100 225 225
7	385239.268	398892.524	50.907	1.307	450		0 7	49.600	150
6	385228.390	398906.887	50.979	1.634	1200		1 20 2 8 3 7 0 6	49.470 49.345 49.420 49.345	100 225 150 225
5	385248.216	398898.081	51.024	1.608	450		0 5	49.416	150
4	385243.894	398915.005	51.174	2.124	450		1 6 2 5 0 4	49.050 49.125 49.050	225 150 225
3	385270.590	398929.029	51.326	2.783	1200		1 24 2 4 0 3	48.668 48.543 48.543	100 225 225
2	385278.502	398917.188	51.165	2.850	1200		1 3 0 2	48.315 48.315	225 150
1	385283.708	398919.833	51.184	3.048	450		1 2	48.136	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	17.000	Drain Down Time (mins)	240
Ratio-R	0.400	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

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

Node 2 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	48.315	Product Number	CTL-SHE-0101-5000-1289-5000
Design Depth (m)	1.289	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node 9 Link Surround Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Link	10
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	50.098	Surround Shape	Trench
Safety Factor	2.0	Time to half empty (mins)	0	Diameter (mm)	150

Node 13 Link Surround Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Link	14
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	50.620	Surround Shape	Trench
Safety Factor	2.0	Time to half empty (mins)	0	Diameter (mm)	100

Node 11 Link Surround Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Link	12
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	50.325	Surround Shape	Trench
Safety Factor	2.0	Time to half empty (mins)	0	Diameter (mm)	150

Node 3 Link Surround Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Link	24
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	48.668	Surround Shape	Trench
Safety Factor	2.0	Time to half empty (mins)	0	Diameter (mm)	100

Node 6 Link Surround Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Link	7
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	49.345	Surround Shape	Trench
Safety Factor	2.0	Time to half empty (mins)	0	Diameter (mm)	150

Node 4 Link Surround Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Link	5
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	49.125	Surround Shape	Trench
Safety Factor	2.0	Time to half empty (mins)	0	Diameter (mm)	150

Node 4 Link Surround Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Link	6
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	49.050	Surround Shape	Trench
Safety Factor	2.0	Time to half empty (mins)	0	Diameter (mm)	225

Node 3 Link Surround Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Link	4
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	48.543	Surround Shape	Trench
Safety Factor	2.0	Time to half empty (mins)	0	Diameter (mm)	225

Node 13 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	50.620
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	0

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	160.0	0.0	0.607	160.0	0.0	0.608	0.0	0.0

Node 3 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	48.543
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	0

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	500.0	0.0	2.650	500.0	0.0	2.651	0.0	0.0

Node 6 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	49.345
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	0

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	230.0	0.0	1.634	230.0	0.0	1.635	0.0	0.0

Node 9 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	50.098
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	0

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	310.0	0.0	1.230	310.0	0.0	1.231	0.0	0.0

Node 20 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	50.038
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	14

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	79.0	0.0	0.377	79.0	0.0	0.378	0.0	0.0

Node 15 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	51.300
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	0

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	77.0	0.0	0.300	77.0	0.0	0.301	0.0	0.0

Node 3 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	48.668
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	0

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	310.0	0.0	2.783	310.0	0.0	2.784	0.0	0.0

Node 11 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	50.325
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	0

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	379.0	0.0	1.060	379.0	0.0	1.061	0.0	0.0

Results for 100 year +45% 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 winter	24	11	51.353	0.079	10.9	0.0518	0.0000	OK
15 minute winter	22	11	50.465	0.062	13.6	0.1643	0.0000	OK
15 minute winter	21	12	50.517	0.317	25.6	0.5469	0.0000	FLOOD RISK
30 minute winter	20	25	50.379	0.662	32.8	8.1663	0.0000	SURCHARGED
15 minute winter	17	10	50.647	0.032	3.3	0.0105	0.0000	OK
30 minute winter	16	22	51.958	0.009	0.8	0.0017	0.0000	OK
15 minute winter	15	13	51.316	0.557	9.0	0.5747	0.0000	SURCHARGED
15 minute winter	14	10	50.759	0.047	2.7	0.0150	0.0000	OK
30 minute winter	13	24	50.686	0.066	7.8	3.1570	0.0000	OK
15 minute winter	12	13	50.642	0.081	5.2	0.0129	0.0000	OK
60 minute winter	11	51	50.361	0.036	5.2	4.0623	0.0000	OK
15 minute winter	10	11	50.846	0.033	2.2	0.0097	0.0000	OK
30 minute winter	9	22	50.153	0.055	13.1	5.1955	0.0000	OK
15 minute winter	8	11	49.970	0.078	18.0	0.0419	0.0000	OK
15 minute winter	7	11	49.617	0.017	0.5	0.0030	0.0000	OK
15 minute winter	6	13	49.482	0.137	53.8	9.7218	0.0000	OK
15 minute winter	5	10	49.471	0.055	6.5	0.0170	0.0000	OK
15 minute winter	4	12	49.195	0.145	47.9	0.0087	0.0000	OK
180 minute winter	3	184	49.030	0.487	33.7	107.8068	0.0000	SURCHARGED
180 minute winter	2	184	49.028	0.713	6.0	0.8069	0.0000	SURCHARGED
15 minute summer	1	1	48.136	0.000	5.0	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	24	24	3	10.9	1.559	0.998	0.5858	
15 minute winter	22	22	20	16.0	0.291	0.359	2.4265	
15 minute winter	21	21	20	23.3	1.326	1.193	0.2353	
30 minute winter	20	20	6	11.9	1.524	1.761	0.1527	
15 minute winter	17	17	8	3.3	1.552	0.206	0.0202	
30 minute winter	16	16	15	0.5	0.113	0.008	0.2174	
15 minute winter	15	15	13	5.8	0.762	2.599	0.0640	
15 minute winter	14	14	13	2.7	0.998	0.399	0.0245	
30 minute winter	13	13	12	5.8	0.754	0.328	0.0464	
15 minute winter	12	12	11	5.2	1.324	0.304	0.1239	
60 minute winter	11	11	9	3.1	1.001	0.112	0.0196	
15 minute winter	10	10	9	2.1	0.732	0.105	0.1460	
30 minute winter	9	9	8	8.2	0.939	0.132	0.1360	
15 minute winter	8	8	6	17.8	1.083	0.263	0.6006	
15 minute winter	7	7	6	0.5	0.384	0.028	0.0699	
15 minute winter	6	6	4	43.9	1.710	0.650	0.4556	
15 minute winter	5	5	4	6.4	1.098	0.280	0.1143	
15 minute winter	4	4	3	48.5	2.070	0.718	0.8479	
180 minute winter	3	3	2	6.0	0.362	0.092	0.5664	
180 minute winter	2	Hydro-Brake®	1	5.0				109.6