

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	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)	18.500	Minimum Backdrop Height (m)	1.000
Ratio-R	0.340	Preferred Cover Depth (m)	1.200
CV	0.750	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)
RE1	0.164	5.00	85.600	450	385920.780	403295.290	0.800
CP01			84.250	450	385887.910	403274.190	1.650
RE2	0.042	5.00	85.400	450	385913.470	403275.490	1.300
J1			85.300	450	385906.490	403286.120	1.584
RE3	0.042	5.00	84.200	450	385897.310	403259.870	1.150
T1	0.040	5.00	83.950	1200	385886.940	403273.580	2.350
T2			84.000	1200	385874.360	403266.710	2.472
FC1			83.950	1200	385872.110	403265.250	2.500
PPIC1			83.950	450	385882.390	403247.220	2.708
PPIC2			83.400	450	385874.340	403234.690	2.407
PPIC3			81.200	1200	385852.360	403221.550	1.450
OUTFALL			80.750		385847.980	403214.260	1.400

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	RE1	J1	16.979	0.600	84.800	83.716	1.084	15.7	225	5.09	50.0
1.001	CP01	T1	1.146	0.600	82.600	82.550	0.050	22.9	225	5.27	50.0
2.000	RE2	J1	12.717	0.600	84.100	83.791	0.309	41.2	150	5.13	50.0
1.001_1	J1	CP01	22.080	0.600	83.716	82.600	1.116	19.8	225	5.26	50.0
3.000	RE3	CP01	17.130	0.600	83.050	82.600	0.450	38.1	150	5.17	50.0
1.002	T1	T2	14.334	0.600	81.600	81.528	0.072	200.0	225	5.53	50.0
1.003	T2	FC1	2.682	0.600	81.528	81.500	0.028	95.8	300	5.55	50.0
1.004	FC1	PPIC1	20.755	0.600	81.450	81.242	0.208	100.0	150	5.90	50.0
1.005	PPIC1	PPIC2	14.893	0.600	81.242	80.993	0.249	59.8	150	6.09	50.0
1.006	PPIC2	PPIC3	25.608	0.600	80.993	79.750	1.243	20.6	150	6.28	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	3.322	132.1	22.2	0.575	1.359	0.164	0.0	62	2.483
1.001	2.744	109.1	33.6	1.425	1.175	0.248	0.0	86	2.427
2.000	1.573	27.8	5.7	1.150	1.359	0.042	0.0	46	1.240
1.001_1	2.955	117.5	27.9	1.359	1.425	0.206	0.0	74	2.431
3.000	1.636	28.9	5.7	1.000	1.500	0.042	0.0	45	1.272
1.002	0.921	36.6	39.0	2.125	2.247	0.288	0.0	205	1.026
1.003	1.606	113.5	39.0	2.172	2.150	0.288	0.0	121	1.461
1.004	1.005	17.8	39.0	2.350	2.558	0.288	0.0	150	1.023
1.005	1.303	23.0	39.0	2.558	2.257	0.288	0.0	150	1.327
1.006	2.229	39.4	39.0	2.257	1.300	0.288	0.0	122	2.531

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)
1.007	PPIC3	OUTFALL	8.505	0.600	79.750	79.350	0.400	21.3	150	6.34	50.0

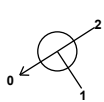
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.007	2.193	38.8	39.0	1.300	1.250	0.288	0.0	125	2.490

Pipeline Schedule

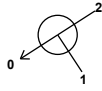
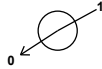
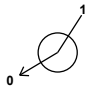
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	16.979	15.7	225	Circular	85.600	84.800	0.575	85.300	83.716	1.359
1.001	1.146	22.9	225	Circular	84.250	82.600	1.425	83.950	82.550	1.175
2.000	12.717	41.2	150	Circular	85.400	84.100	1.150	85.300	83.791	1.359
1.001_1	22.080	19.8	225	Circular	85.300	83.716	1.359	84.250	82.600	1.425
3.000	17.130	38.1	150	Circular	84.200	83.050	1.000	84.250	82.600	1.500
1.002	14.334	200.0	225	Circular	83.950	81.600	2.125	84.000	81.528	2.247
1.003	2.682	95.8	300	Circular	84.000	81.528	2.172	83.950	81.500	2.150
1.004	20.755	100.0	150	Circular	83.950	81.450	2.350	83.950	81.242	2.558
1.005	14.893	59.8	150	Circular	83.950	81.242	2.558	83.400	80.993	2.257
1.006	25.608	20.6	150	Circular	83.400	80.993	2.257	81.200	79.750	1.300
1.007	8.505	21.3	150	Circular	81.200	79.750	1.300	80.750	79.350	1.250

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	RE1	450	Manhole	RE	J1	450	Manhole	RE
1.001	CP01	450	Manhole	PPIC	T1	1200	Manhole	PPIC
2.000	RE2	450	Manhole	Adoptable	J1	450	Manhole	RE
1.001_1	J1	450	Manhole	RE	CP01	450	Manhole	PPIC
3.000	RE3	450	Manhole	RE	CP01	450	Manhole	PPIC
1.002	T1	1200	Manhole	PPIC	T2	1200	Manhole	PPIC
1.003	T2	1200	Manhole	PPIC	FC1	1200	Manhole	Adoptable
1.004	FC1	1200	Manhole	Adoptable	PPIC1	450	Manhole	PPIC
1.005	PPIC1	450	Manhole	PPIC	PPIC2	450	Manhole	PPIC
1.006	PPIC2	450	Manhole	PPIC	PPIC3	1200	Manhole	Adoptable
1.007	PPIC3	1200	Manhole	Adoptable	OUTFALL		Junction	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
RE1	385920.780	403295.290	85.600	0.800	450				
						0	1.000	84.800	225
CP01	385887.910	403274.190	84.250	1.650	450				
						1	3.000	82.600	150
						2	1.001_1	82.600	225
						0	1.001	82.600	225
RE2	385913.470	403275.490	85.400	1.300	450				
						0	2.000	84.100	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
J1	385906.490	403286.120	85.300	1.584	450	 1 2 0	2.000 1.000	83.791 83.716	150 225
RE3	385897.310	403259.870	84.200	1.150	450	 0	1.001_1	83.716	225
T1	385886.940	403273.580	83.950	2.350	1200	 1 0	3.000 1.001	83.050 82.550	150 225
T2	385874.360	403266.710	84.000	2.472	1200	 1 0	1.002 1.002	81.600 81.528	225 225
FC1	385872.110	403265.250	83.950	2.500	1200	 1 0	1.003 1.003	81.528 81.500	300 300
PPIC1	385882.390	403247.220	83.950	2.708	450	 1 0	1.004 1.004	81.450 81.242	150 150
PPIC2	385874.340	403234.690	83.400	2.407	450	 1 0	1.005 1.005	81.242 80.993	150 150
PPIC3	385852.360	403221.550	81.200	1.450	1200	 1 0	1.006 1.006	80.993 79.750	150 150
OUTFALL	385847.980	403214.260	80.750	1.400		 1	1.007 1.007	79.750 79.350	150 150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	18.500	Drain Down Time (mins)	240
Ratio-R	0.340	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 %)
1	0	0	0
30	0	0	0
100	45	0	0

Node FC1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	81.450	Product Number	CTL-SHE-0080-3500-1600-3500
Design Depth (m)	1.600	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	3.5	Min Node Diameter (mm)	1200

Node T1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	81.600
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	115.0	0.0	1.600	115.0	0.0	1.601	0.0	0.0

Approval Settings

Node Size	✓	Minimum Full Bore Velocity (m/s)	
Node Losses	✓	Maximum Full Bore Velocity (m/s)	3.000
Link Size	✓	Proportional Velocity	✓
Minimum Diameter (mm)	150	Return Period (years)	
Link Length	✓	Minimum Proportional Velocity (m/s)	0.750
Maximum Length (m)	100.000	Maximum Proportional Velocity (m/s)	3.000
Coordinates	✓	Surcharged Depth	✓
Accuracy (m)	1.000	Return Period (years)	
Crossings	✓	Maximum Surcharged Depth (m)	0.100
Cover Depth	✓	Flooding	✓
Minimum Cover Depth (m)		Return Period (years)	30
Maximum Cover Depth (m)	3.000	Time to Half Empty	x
Backdrops	✓	Discharge Rates	✓
Minimum Backdrop Height (m)		Discharge Volume	✓
Maximum Backdrop Height (m)	1.500	100 year 360 minute (m³)	
Full Bore Velocity	✓		

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE1	10	84.859	0.059	20.2	0.2528	0.0000	OK
15 minute winter	CP01	10	82.716	0.116	30.1	0.0185	0.0000	OK
15 minute winter	RE2	10	84.145	0.045	5.2	0.0365	0.0000	OK
15 minute winter	J1	10	83.786	0.070	25.1	0.0112	0.0000	OK
15 minute winter	RE3	10	83.093	0.043	5.2	0.0381	0.0000	OK
120 minute winter	T1	94	81.787	0.187	12.5	20.7137	0.0000	OK
120 minute winter	T2	90	81.789	0.261	4.7	0.2947	0.0000	OK
120 minute winter	FC1	92	81.787	0.337	7.1	0.3814	0.0000	SURCHARGED
120 minute winter	PPIC1	92	81.281	0.039	3.0	0.0062	0.0000	OK
120 minute winter	PPIC2	96	81.021	0.028	3.0	0.0045	0.0000	OK
120 minute winter	PPIC3	96	79.779	0.029	3.0	0.0326	0.0000	OK
120 minute winter	OUTFALL	96	79.378	0.028	3.0	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	RE1	1.000	J1	20.0	2.122	0.152	0.1604	
15 minute winter	CP01	1.001	T1	29.7	1.794	0.272	0.0191	
15 minute winter	RE2	2.000	J1	5.1	1.176	0.185	0.0556	
15 minute winter	J1	1.001_1	CP01	25.0	1.611	0.212	0.3443	
15 minute winter	RE3	3.000	CP01	5.2	0.694	0.178	0.1608	
120 minute winter	T1	1.002	T2	4.7	0.591	0.128	0.5380	
120 minute winter	T2	1.003	FC1	7.1	0.570	0.062	0.1797	
120 minute winter	FC1	Hydro-Brake®	PPIC1	3.0				
120 minute winter	PPIC1	1.005	PPIC2	3.0	1.020	0.131	0.0443	
120 minute winter	PPIC2	1.006	PPIC3	3.0	1.293	0.076	0.0596	
120 minute winter	PPIC3	1.007	OUTFALL	3.0	1.292	0.078	0.0198	35.2

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE1	10	84.898	0.098	49.4	0.4167	0.0000	OK
15 minute winter	CP01	10	82.820	0.220	73.9	0.0350	0.0000	OK
15 minute winter	RE2	10	84.175	0.075	12.7	0.0606	0.0000	OK
15 minute winter	J1	10	83.831	0.115	61.6	0.0182	0.0000	OK
15 minute winter	RE3	10	83.119	0.069	12.7	0.0616	0.0000	OK
180 minute winter	T1	176	82.225	0.625	22.2	69.2295	0.0000	SURCHARGED
180 minute winter	T2	176	82.231	0.703	3.7	0.7950	0.0000	SURCHARGED
180 minute winter	FC1	180	82.224	0.774	7.9	0.8749	0.0000	SURCHARGED
15 minute summer	PPIC1	70	81.281	0.039	3.0	0.0062	0.0000	OK
30 minute summer	PPIC2	143	81.021	0.028	3.0	0.0045	0.0000	OK
30 minute winter	PPIC3	177	79.779	0.029	3.0	0.0326	0.0000	OK
30 minute summer	OUTFALL	144	79.378	0.028	3.0	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	RE1	1.000	J1	49.0	2.661	0.371	0.3131	
15 minute winter	CP01	1.001	T1	73.0	2.180	0.669	0.0367	
15 minute winter	RE2	2.000	J1	12.6	1.477	0.452	0.1081	
15 minute winter	J1	1.001_1	CP01	61.2	1.932	0.521	0.6609	
15 minute winter	RE3	3.000	CP01	12.6	0.855	0.436	0.2188	
180 minute winter	T1	1.002	T2	3.7	0.579	0.102	0.5701	
180 minute winter	T2	1.003	FC1	7.9	0.576	0.070	0.1889	
180 minute winter	FC1	Hydro-Brake®	PPIC1	3.0				
15 minute summer	PPIC1	1.005	PPIC2	3.0	1.020	0.131	0.0443	
30 minute summer	PPIC2	1.006	PPIC3	3.0	1.293	0.077	0.0597	
30 minute winter	PPIC3	1.007	OUTFALL	3.0	1.292	0.078	0.0198	46.0

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE1	11	84.966	0.166	92.6	0.7081	0.0000	OK
15 minute winter	CP01	11	83.132	0.532	130.2	0.0845	0.0000	SURCHARGED
15 minute winter	RE2	11	84.552	0.452	23.7	0.3640	0.0000	SURCHARGED
15 minute winter	J1	11	84.317	0.601	109.0	0.0956	0.0000	SURCHARGED
15 minute winter	RE3	11	83.464	0.414	23.7	0.3683	0.0000	SURCHARGED
360 minute winter	T1	344	82.982	1.382	25.5	152.9716	0.0000	SURCHARGED
240 minute winter	T2	232	82.982	1.454	4.2	1.6445	0.0000	SURCHARGED
360 minute winter	FC1	344	82.978	1.528	9.5	1.7282	0.0000	SURCHARGED
360 minute winter	PPIC1	344	81.284	0.042	3.4	0.0066	0.0000	OK
360 minute winter	PPIC2	344	81.023	0.030	3.4	0.0048	0.0000	OK
360 minute winter	PPIC3	344	79.781	0.031	3.4	0.0347	0.0000	OK
360 minute winter	OUTFALL	344	79.380	0.030	3.4	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	RE1	1.000	J1	89.9	2.816	0.680	0.6047	
15 minute winter	CP01	1.001	T1	130.1	3.272	1.192	0.0455	
15 minute winter	RE2	2.000	J1	22.1	1.582	0.797	0.2239	
15 minute winter	J1	1.001_1	CP01	107.9	2.712	0.918	0.8781	
15 minute winter	RE3	3.000	CP01	22.4	1.271	0.774	0.3016	
360 minute winter	T1	1.002	T2	3.7	0.578	0.102	0.5701	
240 minute winter	T2	1.003	FC1	9.9	0.544	0.087	0.1889	
360 minute winter	FC1	Hydro-Brake®	PPIC1	3.4				
360 minute winter	PPIC1	1.005	PPIC2	3.4	1.058	0.149	0.0486	
360 minute winter	PPIC2	1.006	PPIC3	3.4	1.342	0.087	0.0654	
360 minute winter	PPIC3	1.007	OUTFALL	3.4	1.341	0.088	0.0217	106.3