

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)	19.300	Minimum Backdrop Height (m)	0.200
Ratio-R	0.389	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)	Easting (m)	Northing (m)	Depth (m)
1	0.056	5.00	30.029	2700	341831.713	397667.738	4.768
2	0.081	5.00	29.778	2700	341814.348	397681.425	4.572
7	0.100	5.00	29.955	2700	341814.651	397697.455	4.741
3	0.022	5.00	29.486	2700	341806.688	397687.426	4.304
4	0.088	5.00	29.082	2700	341794.213	397697.214	3.940
5	0.000		29.116	2700	341787.893	397702.122	3.994
6	0.000		29.567	2700	341775.557	397711.637	4.537

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	1	2	22.111	0.600	25.261	25.206	0.055	400.0	900	5.24	50.0
1.001	2	3	9.731	0.600	25.206	25.182	0.024	400.0	900	5.34	50.0
2.000	7	3	12.806	0.600	25.214	25.182	0.032	400.0	900	5.14	50.0
1.002	3	4	15.857	0.600	25.182	25.142	0.040	400.0	900	5.51	49.9
1.003	4	5	8.002	0.600	25.142	25.122	0.020	400.0	900	5.60	49.6
1.004	5	6	15.579	0.600	25.122	25.030	0.092	170.0	300	5.81	0.0

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	1.560	992.5	10.1	3.868	3.672	0.056	0.0	63	0.522
1.001	1.560	992.5	24.8	3.672	3.404	0.137	0.0	96	0.682
2.000	1.560	992.5	18.1	3.841	3.404	0.100	0.0	82	0.619
1.002	1.560	992.5	46.7	3.404	3.040	0.259	0.0	131	0.819
1.003	1.560	992.5	62.2	3.040	3.094	0.347	0.0	150	0.889
1.004	1.203	85.0	0.0	3.694	4.237	0.347	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	22.111	400.0	900	Circular_Default Sewer Type	30.029	25.261	3.868	29.778	25.206	3.672
1.001	9.731	400.0	900	Circular_Default Sewer Type	29.778	25.206	3.672	29.486	25.182	3.404
2.000	12.806	400.0	900	Circular_Default Sewer Type	29.955	25.214	3.841	29.486	25.182	3.404
1.002	15.857	400.0	900	Circular_Default Sewer Type	29.486	25.182	3.404	29.082	25.142	3.040
1.003	8.002	400.0	900	Circular_Default Sewer Type	29.082	25.142	3.040	29.116	25.122	3.094
1.004	15.579	170.0	300	Circular_Default Sewer Type	29.116	25.122	3.694	29.567	25.030	4.237

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	2700	Manhole	Adoptable	2	2700	Manhole	Adoptable
1.001	2	2700	Manhole	Adoptable	3	2700	Manhole	Adoptable
2.000	7	2700	Manhole	Adoptable	3	2700	Manhole	Adoptable
1.002	3	2700	Manhole	Adoptable	4	2700	Manhole	Adoptable
1.003	4	2700	Manhole	Adoptable	5	2700	Manhole	Adoptable
1.004	5	2700	Manhole	Adoptable	6	2700	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	341831.713	397667.738	30.029	4.768	2700				
						0	1.000	25.261	900
2	341814.348	397681.425	29.778	4.572	2700				
						0	1.001	25.206	900
7	341814.651	397697.455	29.955	4.741	2700				
						0	2.000	25.214	900
3	341806.688	397687.426	29.486	4.304	2700				
						1	2.000	25.182	900
						2	1.001	25.182	900
						0	1.002	25.182	900
4	341794.213	397697.214	29.082	3.940	2700				
						1	1.002	25.142	900
						0	1.003	25.142	900
5	341787.893	397702.122	29.116	3.994	2700				
						1	1.003	25.122	900
						0	1.004	25.122	300
6	341775.557	397711.637	29.567	4.537	2700				
						1	1.004	25.030	300

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	✓
Rainfall Events	Singular	Drain Down Time (mins)	240
FSR Region	England and Wales	Additional Storage (m³/ha)	20.0
M5-60 (mm)	19.300	Starting Level (m)	
Ratio-R	0.389	Check Discharge Rate(s)	✓
Summer CV	1.000	Check Discharge Volume	✓
Winter CV	1.000	100 year 360 minute (m³)	
Analysis Speed	Normal		

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	10	0
2	0	10	0
30	0	10	0
100	45	10	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.95
Greenfield Method	IH124	Growth Factor 100 year	2.48
Positively Drained Area (ha)		Betterment (%)	0
SAAR (mm)		QBar	
Soil Index	1	Q 1 year (l/s)	
SPR	0.10	Q 30 year (l/s)	
Region	1	Q 100 year (l/s)	
Growth Factor 1 year	0.85		

Pre-development Discharge Volume

Site Makeup	Greenfield	Return Period (years)	100
Greenfield Method	FSR/FEH	Climate Change (%)	0
Positively Drained Area (ha)		Storm Duration (mins)	360
Soil Index	1	Betterment (%)	0
SPR	0.10	PR	
CWI		Runoff Volume (m³)	

Node 5 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	25.122	Product Number	CTL-SHE-0188-2270-2500-2270
Design Depth (m)	2.500	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	22.7	Min Node Diameter (mm)	2100

Results for 1 year +10% A Critical Storm Duration. Lowest mass balance: 99.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	1	23	25.471	0.210	9.4	1.2596	0.0000	OK
30 minute summer	2	23	25.470	0.264	17.8	1.6119	0.0000	OK
30 minute summer	7	23	25.469	0.255	16.8	1.5761	0.0000	OK
30 minute summer	3	23	25.469	0.287	23.8	1.6747	0.0000	OK
30 minute summer	4	22	25.470	0.328	28.2	2.0383	0.0000	OK
30 minute summer	5	22	25.470	0.348	21.4	1.9922	0.0000	SURCHARGED
30 minute summer	6	22	25.125	0.095	18.9	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)
30 minute summer	1	1.000	2	4.2	0.220	0.004	2.9524	
30 minute summer	2	1.001	3	9.2	0.307	0.009	1.5971	
30 minute summer	7	2.000	3	11.5	0.335	0.012	2.0550	
30 minute summer	3	1.002	4	14.7	0.361	0.015	3.0305	
30 minute summer	4	1.003	5	21.4	0.468	0.022	1.7396	
30 minute summer	5	1.004	6	18.9	0.946	0.222	0.3106	36.8

Results for 2 year +10% A Critical Storm Duration. Lowest mass balance: 99.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	1	23	25.550	0.289	12.1	1.7296	0.0000	OK
30 minute summer	2	23	25.548	0.342	22.2	2.0917	0.0000	OK
30 minute summer	7	24	25.548	0.334	21.7	2.0653	0.0000	OK
30 minute summer	3	24	25.548	0.366	31.1	2.1342	0.0000	OK
30 minute summer	4	24	25.548	0.406	35.9	2.5249	0.0000	OK
30 minute summer	5	24	25.548	0.426	24.8	2.4395	0.0000	SURCHARGED
30 minute summer	6	24	25.129	0.099	20.3	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)
30 minute summer	1	1.000	2	6.2	0.225	0.006	4.3843	
30 minute summer	2	1.001	3	12.2	0.314	0.012	2.2483	
30 minute summer	7	2.000	3	14.9	0.375	0.015	2.9152	
30 minute summer	3	1.002	4	18.2	0.391	0.018	4.1168	
30 minute summer	4	1.003	5	24.8	0.471	0.025	2.2928	
30 minute summer	5	1.004	6	20.3	0.964	0.239	0.3277	47.4

Results for 30 year +10% A Critical Storm Duration. Lowest mass balance: 99.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	1	44	25.935	0.674	17.3	4.0319	0.0000	OK
60 minute summer	2	44	25.935	0.729	28.7	4.4556	0.0000	OK
60 minute summer	7	44	25.935	0.721	30.8	4.4600	0.0000	OK
60 minute summer	3	44	25.935	0.753	38.1	4.3934	0.0000	OK
60 minute summer	4	44	25.934	0.792	44.8	4.9267	0.0000	OK
60 minute summer	5	44	25.934	0.812	30.0	4.6518	0.0000	SURCHARGED
60 minute summer	6	45	25.134	0.104	22.6	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)
60 minute summer	1	1.000	2	3.8	0.220	0.004	11.7097	
60 minute summer	2	1.001	3	10.8	0.317	0.011	5.4315	
60 minute summer	7	2.000	3	20.5	0.364	0.021	7.1107	
60 minute summer	3	1.002	4	17.7	0.396	0.018	9.1785	
60 minute summer	4	1.003	5	30.0	0.499	0.030	4.7761	
60 minute summer	5	1.004	6	22.6	0.993	0.266	0.3554	113.3

Results for 100 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 99.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	1	57	28.176	2.915	24.1	17.4424	0.0000	SURCHARGED
60 minute winter	2	57	28.175	2.969	40.6	18.1564	0.0000	SURCHARGED
60 minute winter	7	57	28.175	2.961	42.4	18.3299	0.0000	SURCHARGED
60 minute winter	3	57	28.175	2.993	46.0	17.4751	0.0000	SURCHARGED
60 minute winter	4	57	28.174	3.032	64.1	18.8529	0.0000	SURCHARGED
60 minute winter	5	57	28.176	3.054	45.8	17.4850	0.0000	SURCHARGED
60 minute winter	6	57	25.139	0.109	24.5	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)
60 minute winter	1	1.000	2	8.3	0.257	0.008	14.0134	
60 minute winter	2	1.001	3	18.6	0.351	0.019	6.1673	
60 minute winter	7	2.000	3	25.6	0.410	0.026	8.1161	
60 minute winter	3	1.002	4	26.7	0.423	0.027	10.0498	
60 minute winter	4	1.003	5	45.8	0.531	0.046	5.0715	
60 minute winter	5	1.004	6	24.5	1.014	0.289	0.3771	216.0