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	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	2.00	Enforce best practice design rules	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Width (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.010	2.00	58.300			527119.480	184548.202	0.450
2	0.050	2.00	58.300	660	440	527119.072	184559.210	0.628
3	0.020	2.00	58.300	660	440	527131.016	184559.490	0.950
4	0.020	2.00	58.300	660	440	527145.203	184555.677	1.109
6			58.300	1200		527147.196	184532.826	1.507
5	0.015	2.00	58.300	660	440	527123.965	184536.301	1.310
Sewer			58.300			527147.524	184519.276	1.676

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	11.016	0.600	57.850	57.712	0.138	80.0	110	2.20	50.0
1.001	2	3	11.947	0.600	57.672	57.523	0.149	80.0	150	2.38	50.0
1.002	3	4	14.690	0.600	57.350	57.266	0.084	175.0	225	2.63	50.0
1.003	4	6	22.938	0.600	57.191	57.076	0.115	200.0	300	2.97	50.0
2.000	5	6	23.489	0.600	56.990	56.833	0.157	150.0	110	2.59	50.0
1.004	6	Sewer	13.554	0.600	56.793	56.624	0.169	80.0	150	3.17	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	0.917	8.7	1.4	0.340	0.478	0.010	0.0	30	0.670
1.001	1.125	19.9	8.1	0.478	0.627	0.060	0.0	67	1.067
1.002	0.985	39.2	10.8	0.725	0.809	0.080	0.0	80	0.843
1.003	1.108	78.3	13.6	0.809	0.924	0.100	0.0	84	0.836
2.000	0.666	6.3	2.0	1.200	1.357	0.015	0.0	43	0.591
1.004	1.125	19.9	15.6	1.357	1.526	0.115	0.0	100	1.242

Simulation Settings

Rainfall Methodology	FSR	Drain Down Time (mins)	240
FSR Region	England and Wales	Additional Storage (m³/ha)	20.0
M5-60 (mm)	20.000	Check Discharge Rate(s)	✓
Ratio-R	0.400	1 year (l/s)	5.0
Summer CV	0.750	30 year (l/s)	5.0
Winter CV	0.840	100 year (l/s)	5.0
Analysis Speed	Normal	Check Discharge Volume	✓
Skip Steady State	x	100 year +40% 360 minute (m³)	24

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	40	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 years	2.40
Greenfield Method	IH124	Growth Factor 100 years	3.19
Positively Drained Area (ha)	0.060	Betterment (%)	0
SAAR (mm)	638	QBar	0.3
Soil Index	4	Q 1 year (l/s)	0.2
SPR	0.47	Q 30 year (l/s)	0.6
Region	6	Q 100 year (l/s)	0.8
Growth Factor 1 year	0.85		

Pre-development Discharge Volume

Site Makeup	Greenfield	Return Period (years)	100
Greenfield Method	FSR/FEH	Climate Change (%)	40
Positively Drained Area (ha)	0.060	Storm Duration (mins)	360
Soil Index	4	Betterment (%)	0
SPR	0.47	PR	0.465
CWI	96.000	Runoff Volume (m^3)	24

Node 6 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	56.793	Product Number	CTL-SHE-0101-5000-1300-5000
Design Depth (m)	1.300	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node 6 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	56.793
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	81

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	37.5	0.0	1.040	37.5	0.0	1.041	0.0	0.0

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.59%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	9	57.885	0.035	1.9	0.0155	0.0000	OK
15 minute summer	2	9	57.759	0.087	11.2	0.1629	0.0000	OK
15 minute summer	3	9	57.452	0.102	15.0	0.0725	0.0000	OK
15 minute summer	4	9	57.294	0.103	18.8	0.0669	0.0000	OK
30 minute winter	6	24	56.950	0.157	13.1	5.7776	0.0000	SURCHARGED
15 minute summer	5	9	57.041	0.051	2.8	0.0265	0.0000	OK
15 minute summer	Sewer	1	56.624	0.000	4.1	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	1	1.000	2	1.9	0.654	0.218	0.0352	
15 minute summer	2	1.001	3	11.3	1.116	0.567	0.1205	
15 minute summer	3	1.002	4	15.0	0.895	0.383	0.2463	
15 minute summer	4	1.003	6	18.1	0.889	0.231	0.4699	
30 minute winter	6	Hydro-Brake®	Sewer	4.4				9.6
15 minute summer	5	2.000	6	2.7	0.634	0.422	0.1100	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.59%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	9	57.964	0.114	4.6	0.0507	0.0000	SURCHARGED
15 minute summer	2	9	57.941	0.269	27.2	0.5061	0.0000	SURCHARGED
15 minute summer	3	9	57.523	0.173	33.5	0.1230	0.0000	OK
15 minute summer	4	9	57.356	0.165	42.3	0.1074	0.0000	OK
60 minute winter	6	47	57.259	0.466	19.9	17.1355	0.0000	SURCHARGED
60 minute winter	5	48	57.261	0.271	2.7	0.1406	0.0000	SURCHARGED
15 minute summer	Sewer	1	56.624	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 summer	1	1.000	2	5.1	0.626	0.584	0.1043	
15 minute summer	2	1.001	3	24.3	1.380	1.222	0.2064	
15 minute summer	3	1.002	4	33.1	1.077	0.845	0.4508	
15 minute summer	4	1.003	6	41.3	1.097	0.528	0.8680	
60 minute winter	6	Hydro-Brake®	Sewer	5.0				29.6
60 minute winter	5	2.000	6	2.6	0.446	0.404	0.2224	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.59%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	9	58.300	0.450	8.4	0.2530	0.0000	FLOOD RISK
15 minute summer	2	9	58.300	0.628	49.0	1.1825	0.7403	FLOOD
60 minute winter	3	58	57.800	0.450	26.2	0.3201	0.0000	SURCHARGED
60 minute winter	4	58	57.800	0.609	32.8	0.3962	0.0000	SURCHARGED
60 minute winter	6	59	57.800	1.007	36.4	37.0093	0.0000	SURCHARGED
60 minute winter	5	58	57.801	0.811	5.0	0.4209	0.0000	SURCHARGED
15 minute summer	Sewer	1	56.624	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 summer	1	1.000	2	7.4	0.784	0.852	0.1043	
15 minute summer	2	1.001	3	36.7	2.084	1.846	0.2082	
60 minute winter	3	1.002	4	26.2	1.020	0.668	0.5842	
60 minute winter	4	1.003	6	32.4	1.001	0.413	1.6153	
60 minute winter	6	Hydro-Brake®	Sewer	5.0				54.4
60 minute winter	5	2.000	6	4.2	0.473	0.663	0.2224	