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)	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	0.018	5.00	85.780	1200	553444.083	226017.183	1.280
2	0.093	5.00	84.840	1200	553430.671	225999.184	1.240
3	0.017	5.00	83.980	1500	553430.524	225976.502	1.280
4	0.079	5.00	84.500	1500	553414.531	225975.216	1.975
5	0.067	5.00	84.830	1500	553390.619	225971.648	2.580
6	0.051	5.00	84.140	1500	553372.043	225963.384	2.340
7	0.094	5.00	82.400	1500	553341.706	225942.300	2.050
8	0.067	5.00	81.826	1350	553339.109	225928.712	1.776
9	0.025	5.00	80.503	1350	553356.669	225907.401	1.903
10	0.191	5.00	79.563	1500	553367.604	225888.111	3.063
11	0.025	5.00	77.850	1800	553365.111	225871.515	1.420
12			77.850	1800	553348.079	225860.611	1.450
13			77.850	1350	553349.161	225856.457	1.965
14			74.300	1200	553347.001	225844.128	0.275

Links (Results)

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	2.630	104.6	2.4	1.055	1.015	0.018	0.0	23	1.091
1.001	2.616	104.0	15.0	1.015	1.055	0.111	0.0	58	1.876
1.003	1.029	40.9	17.3	1.055	1.675	0.128	0.0	102	0.989
1.004	1.127	79.6	28.1	1.675	2.130	0.207	0.0	123	1.031
1.005	3.030	482.0	37.1	2.130	1.890	0.274	0.0	84	1.831
1.006	4.040	642.5	44.0	1.890	1.600	0.325	0.0	79	2.352
1.007	3.000	477.1	56.8	1.600	1.326	0.419	0.0	104	2.049
1.008	4.675	743.5	65.9	1.326	1.453	0.486	0.0	89	2.929
1.009	6.283	999.2	69.3	1.453	2.613	0.511	0.0	80	3.685
1.010	1.308	208.1	94.2	2.613	0.970	0.702	0.0	212	1.277
1.011	1.136	607.1	95.4	0.595	0.625	0.727	0.0	219	0.838
1.012	7.073	1124.9	95.4	1.000	1.515	0.727	0.0	87	4.383
1.013	5.309	211.1	91.4	1.740	0.050	0.727	0.0	103	5.120

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	✓
Ratio-R	0.400	Drain Down Time (mins)	240
Summer CV	0.750	Additional Storage (m^3/ha)	0.0

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Simulation Settings

Check Discharge Rate(s)	✓	100 year 360 minute (m³)
Check Discharge Volume	✓	

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	5	0
30	0	5	0
100	40	5	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 13 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	75.885	Product Number	CTL-SHE-0105-6500-1965-6500
Design Depth (m)	1.965	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	6.5	Min Node Diameter (mm)	1200

Node 13 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	76.400
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	248

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	338.0	0.0	1.350	975.5	0.0

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Results for 1 year +5% A Critical Storm Duration. Lowest mass balance: 92.28%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	84.525	0.025	2.7	0.0280	0.0000	OK
15 minute winter	2	10	83.660	0.060	16.4	0.0678	0.0000	OK
15 minute winter	3	11	82.812	0.112	18.8	0.1974	0.0000	OK
15 minute winter	4	11	82.658	0.133	29.8	0.2344	0.0000	OK
15 minute winter	5	11	82.341	0.091	39.2	0.1611	0.0000	OK
15 minute winter	6	11	81.881	0.081	46.4	0.1431	0.0000	OK
15 minute winter	7	11	80.468	0.118	59.7	0.2083	0.0000	OK
15 minute winter	8	11	80.148	0.098	69.2	0.1404	0.0000	OK
15 minute winter	9	11	78.681	0.081	72.9	0.1163	0.0000	OK
15 minute winter	10	11	76.730	0.230	99.6	0.4071	0.0000	OK
15 minute winter	11	11	76.627	0.197	103.6	0.5018	0.0000	OK
60 minute winter	12	47	76.568	0.168	66.5	0.4281	0.0000	OK
120 minute winter	13	112	76.559	0.674	88.1	60.9405	0.0000	SURCHARGED
15 minute summer	14	1	74.025	0.000	5.8	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	1	1.000	2	2.7	0.514	0.025	0.1215	
15 minute winter	2	1.001	3	16.3	1.177	0.157	0.3178	
15 minute winter	3	1.003	4	18.5	0.978	0.452	0.3034	
15 minute winter	4	1.004	5	29.9	1.030	0.375	0.7013	
15 minute winter	5	1.005	6	39.3	1.861	0.082	0.4296	
15 minute winter	6	1.006	7	46.6	1.795	0.072	0.9670	
15 minute winter	7	1.007	8	59.9	2.053	0.126	0.4046	
15 minute winter	8	1.008	9	69.4	3.098	0.093	0.6199	
15 minute winter	9	1.009	10	73.0	1.499	0.073	1.1207	
15 minute winter	10	1.010	11	100.1	1.349	0.481	1.2455	
15 minute winter	11	1.011	12	103.8	1.669	0.171	1.3074	
60 minute winter	12	1.012	13	102.5	1.181	0.091	0.4570	
120 minute winter	13	Hydro-Brake®	14	5.8				101.8

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Results for 30 year +5% A Critical Storm Duration. Lowest mass balance: 92.28%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	84.538	0.038	6.5	0.0428	0.0000	OK
15 minute winter	2	10	83.696	0.096	40.3	0.1088	0.0000	OK
15 minute winter	3	11	82.936	0.236	46.1	0.4166	0.0000	SURCHARGED
15 minute winter	4	11	82.767	0.242	72.3	0.4279	0.0000	OK
15 minute winter	5	11	82.398	0.148	95.6	0.2608	0.0000	OK
15 minute winter	6	11	81.926	0.126	113.2	0.2229	0.0000	OK
15 minute winter	7	11	80.546	0.196	145.6	0.3468	0.0000	OK
15 minute winter	8	11	80.209	0.159	169.1	0.2280	0.0000	OK
15 minute winter	9	11	78.727	0.127	178.0	0.1814	0.0000	OK
15 minute winter	10	11	76.937	0.437	243.7	0.7728	0.0000	OK
180 minute winter	11	180	76.839	0.409	60.9	1.0396	0.0000	OK
180 minute winter	12	180	76.839	0.439	113.7	1.1162	0.0000	OK
180 minute winter	13	180	76.839	0.954	149.5	195.1817	0.0000	SURCHARGED
15 minute summer	14	1	74.025	0.000	5.8	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	1	1.000	2	6.5	0.652	0.062	0.2310	
15 minute winter	2	1.001	3	40.0	1.388	0.384	0.6345	
15 minute winter	3	1.003	4	44.9	1.177	1.098	0.5883	
15 minute winter	4	1.004	5	72.7	1.275	0.913	1.3750	
15 minute winter	5	1.005	6	95.8	2.354	0.199	0.8287	
15 minute winter	6	1.006	7	113.5	2.226	0.177	1.8975	
15 minute winter	7	1.007	8	146.2	2.512	0.307	0.8064	
15 minute winter	8	1.008	9	169.5	3.917	0.228	1.1980	
15 minute winter	9	1.009	10	178.3	1.750	0.178	2.1486	
15 minute winter	10	1.010	11	244.3	1.723	1.174	2.3461	
180 minute winter	11	1.011	12	75.4	1.091	0.124	5.5714	
180 minute winter	12	1.012	13	149.5	1.153	0.133	0.6779	
180 minute winter	13	Hydro-Brake®	14	5.8				124.4

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Results for 100 year +40% CC +5% A Critical Storm Duration. Lowest mass balance: 92.28%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	84.551	0.051	11.9	0.0576	0.0000	OK
15 minute winter	2	11	83.989	0.389	73.2	0.4400	0.0000	SURCHARGED
15 minute winter	3	11	83.517	0.817	77.9	1.4433	0.0000	SURCHARGED
15 minute winter	4	11	83.053	0.528	125.8	0.9326	0.0000	SURCHARGED
15 minute winter	5	10	82.455	0.205	167.2	0.3617	0.0000	OK
15 minute winter	6	11	81.969	0.169	200.0	0.2991	0.0000	OK
15 minute winter	7	10	80.634	0.284	260.1	0.5013	0.0000	OK
15 minute winter	8	10	80.274	0.224	300.7	0.3199	0.0000	OK
15 minute winter	9	11	78.781	0.181	316.3	0.2587	0.0000	OK
15 minute winter	10	11	77.483	0.983	437.9	1.7378	0.0000	SURCHARGED
360 minute winter	11	352	77.202	0.772	64.5	1.9657	0.0000	OK
360 minute winter	12	352	77.202	0.802	89.9	2.0421	0.0000	SURCHARGED
360 minute winter	13	352	77.202	1.317	109.8	425.2391	0.0000	SURCHARGED
15 minute summer	14	1	74.025	0.000	5.8	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	1	1.000	2	11.8	0.707	0.113	0.5218	
15 minute winter	2	1.001	3	67.3	1.692	0.647	0.9021	
15 minute winter	3	1.003	4	77.1	1.939	1.884	0.6381	
15 minute winter	4	1.004	5	125.6	1.786	1.577	1.6545	
15 minute winter	5	1.005	6	167.3	2.690	0.347	1.2657	
15 minute winter	6	1.006	7	199.2	2.496	0.310	2.9480	
15 minute winter	7	1.007	8	258.5	2.821	0.542	1.2717	
15 minute winter	8	1.008	9	300.8	4.400	0.405	1.8981	
15 minute winter	9	1.009	10	317.2	2.484	0.317	2.4165	
15 minute winter	10	1.010	11	435.6	2.749	2.093	2.6590	
360 minute winter	11	1.011	12	63.2	0.815	0.104	10.5958	
360 minute winter	12	1.012	13	109.8	0.926	0.098	0.6802	
360 minute winter	13	Hydro-Brake®	14	5.8				188.4

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