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)	0.70
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	19.500	Minimum Backdrop Height (m)	0.200
Ratio-R	0.311	Preferred Cover Depth (m)	1.200
CV	0.840	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)	Depth (m)
store 1		5.00	207.000	100	1.700
01	0.145	5.00	208.000	1800	2.817
02	0.152	5.00	208.500	1800	3.728
02A			208.750	1800	4.241
03	0.078	5.00	208.250	1800	3.865
04			208.000	1200	3.678
05	0.085	5.00	208.900	1200	1.500
06			211.130	1200	1.275
ex			210.500	1200	1.145
Pump			208.000	1800	4.300

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)
1.001	store 1	01	17.500	0.600	205.300	205.183	0.117	150.0	300	5.23	46.2
1.002	01	02	39.200	0.600	205.183	204.922	0.261	150.0	300	5.74	44.4
1.003	02	02A	17.000	0.600	204.772	204.659	0.113	150.0	450	5.91	43.9
1.003A	02A	03	18.600	0.600	204.509	204.385	0.124	150.0	600	6.06	43.4
1.004	03	04	9.400	0.600	204.385	204.322	0.063	150.0	600	6.14	43.2
1.005	04	Pump	3.400	0.600	204.322	204.299	0.023	150.0	300	6.19	43.0
1.006	05	03	32.600	0.600	207.400	207.183	0.217	150.0	300	5.42	45.5
1.009	Pump	06	93.000	0.600	203.700	209.905	-6.205	-15.0	100	30.00	18.8
1.007	06	ex	12.500	0.600	209.855	209.355	0.500	25.0	150	30.00	18.8

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)
1.001	1.281	90.6	0.0	1.400	2.517	0.000	0.0	0	0.000
1.002	1.281	90.6	19.6	2.517	3.278	0.145	0.0	94	1.027
1.003	1.657	263.6	39.6	3.278	3.641	0.297	0.0	117	1.208
1.003A	1.986	561.5	39.1	3.641	3.265	0.297	0.0	106	1.164
1.004	1.986	561.5	60.3	3.265	3.078	0.460	0.0	131	1.316
1.005	1.281	90.6	60.1	3.378	3.401	0.460	0.0	179	1.367
1.006	1.281	90.6	11.7	1.200	0.767	0.085	0.0	72	0.890
1.009	0.005	0.0	26.2	4.200	1.125	0.460	0.0	100	0.000
1.007	2.022	35.7	26.2	1.125	0.995	0.460	0.0	96	2.206

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
Rainfall Events	Singular	Drain Down Time (mins)	60
FSR Region	England and Wales	Additional Storage (m³/ha)	0.0
M5-60 (mm)	19.500	Starting Level (m)	
Ratio-R	0.311	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x
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	0	0
2	0	0	0
30	0	0	0
100	40	0	0

Node Pump Online Pump Control

Flap Valve	x	Design Depth (m)	4.300	Switch off depth (m)	0.100
Replaces Downstream Link	✓	Design Flow (l/s)	5.0		
Invert Level (m)	203.700	Switch on depth (m)	0.150		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.000	2.700	5.000	4.300	5.000

Node 04 Online Hydro-Brake® Control

Flap Valve	x	Objective	(CL) Minimise blockage risk
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	204.322	Product Number	CTL-SCL-0086-5000-2200-5000
Design Depth (m)	2.200	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node store 1 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	205.300	Depth (m)	1.100
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	8.800	Number Required	1
Porosity	0.96	Pit Length (m)	9.600		

Node 04 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	204.322	Depth (m)	2.500
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	4.800	Number Required	1
Porosity	0.96	Pit Length (m)	15.200		

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute winter	68.872	27.771	30 year 15 minute winter	168.610	67.988
1 year 30 minute winter	46.563	18.775	30 year 30 minute winter	114.416	46.135
1 year 60 minute winter	31.277	12.441	30 year 60 minute winter	75.485	30.026
1 year 120 minute winter	20.393	8.112	30 year 120 minute winter	47.637	18.949
1 year 180 minute winter	15.905	6.296	30 year 180 minute winter	36.090	14.288
1 year 240 minute winter	13.189	5.246	30 year 240 minute winter	29.260	11.639
1 year 360 minute winter	10.161	4.023	30 year 360 minute winter	22.019	8.717
1 year 480 minute winter	8.376	3.332	30 year 480 minute winter	17.824	7.090
1 year 600 minute winter	7.192	2.879	30 year 600 minute winter	15.077	6.036
1 year 720 minute winter	6.409	2.556	30 year 720 minute winter	13.263	5.289
1 year 960 minute winter	5.330	2.119	30 year 960 minute winter	10.795	4.291
1 year 1440 minute winter	4.076	1.625	30 year 1440 minute winter	8.001	3.191
2 year 15 minute winter	89.107	35.930	100 year +40% CC 15 minute winter	305.144	123.042
2 year 30 minute winter	60.050	24.214	100 year +40% CC 30 minute winter	209.232	84.368
2 year 60 minute winter	39.660	15.776	100 year +40% CC 60 minute winter	138.899	55.250
2 year 120 minute winter	25.370	10.091	100 year +40% CC 120 minute winter	87.604	34.846
2 year 180 minute winter	19.543	7.737	100 year +40% CC 180 minute winter	66.026	26.138
2 year 240 minute winter	16.077	6.395	100 year +40% CC 240 minute winter	53.225	21.171
2 year 360 minute winter	12.297	4.868	100 year +40% CC 360 minute winter	39.768	15.744
2 year 480 minute winter	10.081	4.010	100 year +40% CC 480 minute winter	32.015	12.735
2 year 600 minute winter	8.616	3.449	100 year +40% CC 600 minute winter	26.958	10.792
2 year 720 minute winter	7.648	3.050	100 year +40% CC 720 minute winter	23.623	9.421
2 year 960 minute winter	6.319	2.512	100 year +40% CC 960 minute winter	19.103	7.594
2 year 1440 minute winter	4.789	1.910	100 year +40% CC 1440 minute winter	14.020	5.591

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.70%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	store 1	1	205.300	0.000	0.0	0.0000	0.0000	OK
15 minute winter	01	11	205.274	0.091	18.2	0.2326	0.0000	OK
15 minute winter	02	11	204.891	0.119	36.3	0.3025	0.0000	OK
180 minute winter	02A	140	204.822	0.313	10.9	0.7975	0.0000	OK
180 minute winter	03	140	204.822	0.437	16.4	1.1126	0.0000	OK
180 minute winter	04	144	204.822	0.500	15.6	35.6086	0.0000	SURCHARGED
15 minute winter	05	10	207.470	0.070	10.7	0.0788	0.0000	OK
180 minute winter	06	64	209.895	0.040	5.0	0.0448	0.0000	OK
180 minute winter	ex	216	209.393	0.038	5.1	0.0000	0.0000	OK
180 minute winter	Pump	212	203.860	0.160	4.1	0.4074	0.0000	SURCHARGED

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	store 1	1.001	01	0.0	0.000	0.000	0.1586	
15 minute winter	01	1.002	02	17.7	0.995	0.196	0.6983	
15 minute winter	02	1.003	02A	36.3	1.137	0.138	0.5421	
180 minute winter	02A	1.003A	03	10.4	0.532	0.018	3.4304	
180 minute winter	03	1.004	04	15.6	0.824	0.028	2.2141	
180 minute winter	04	Hydro-Brake®	Pump	4.1				
15 minute winter	05	1.006	03	10.4	0.856	0.115	0.3962	
180 minute winter	06	1.007	ex	5.1	1.402	0.142	0.0452	49.4
180 minute winter	Pump	Pump	06	5.0				

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.74%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	store 1	1	205.300	0.000	0.0	0.0000	0.0000	OK
15 minute winter	01	11	205.288	0.105	23.6	0.2674	0.0000	OK
240 minute winter	02	192	204.971	0.199	11.1	0.5061	0.0000	OK
240 minute winter	02A	192	204.971	0.462	11.1	1.1753	0.0000	OK
240 minute winter	03	192	204.971	0.586	16.3	1.4908	0.0000	OK
240 minute winter	04	192	204.971	0.649	15.0	46.1760	0.0000	SURCHARGED
15 minute winter	05	10	207.480	0.080	13.9	0.0903	0.0000	OK
180 minute winter	06	164	209.895	0.040	5.0	0.0448	0.0000	OK
1440 minute winter	ex	1230	209.393	0.038	5.1	0.0000	0.0000	OK
60 minute winter	Pump	111	203.860	0.160	4.1	0.4060	0.0000	SURCHARGED

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	store 1	1.001	01	0.0	0.000	0.000	0.1923	
15 minute winter	01	1.002	02	23.0	1.068	0.254	0.8445	
240 minute winter	02	1.003	02A	11.1	0.818	0.042	1.5702	
240 minute winter	02A	1.003A	03	10.2	0.501	0.018	4.7684	
240 minute winter	03	1.004	04	15.0	0.809	0.027	2.6396	
240 minute winter	04	Hydro-Brake®	Pump	4.1				
15 minute winter	05	1.006	03	13.5	0.921	0.149	0.4785	
180 minute winter	06	1.007	ex	5.1	1.401	0.142	0.0452	42.6
60 minute winter	Pump	Pump	06	5.0				

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.68%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	store 1	336	205.563	0.263	11.6	21.3214	0.0000	OK
360 minute winter	01	336	205.563	0.380	12.0	0.9672	0.0000	SURCHARGED
360 minute winter	02	344	205.562	0.790	15.2	2.0117	0.0000	SURCHARGED
360 minute winter	02A	344	205.563	1.054	13.0	2.6814	0.0000	SURCHARGED
360 minute winter	03	336	205.563	1.178	20.7	2.9990	0.0000	SURCHARGED
360 minute winter	04	336	205.563	1.241	19.7	88.3078	0.0000	SURCHARGED
15 minute winter	05	10	207.513	0.113	26.2	0.1277	0.0000	OK
960 minute winter	06	210	209.895	0.040	5.0	0.0448	0.0000	OK
600 minute winter	ex	180	209.393	0.038	5.1	0.0000	0.0000	OK
960 minute winter	Pump	615	203.859	0.159	4.1	0.4044	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute winter	store 1	1.001	01	-11.6	-0.344	-0.128	1.1888	
360 minute winter	01	1.002	02	7.4	0.756	0.082	2.7604	
360 minute winter	02	1.003	02A	13.0	0.800	0.049	2.6935	
360 minute winter	02A	1.003A	03	12.6	0.445	0.022	5.2392	
360 minute winter	03	1.004	04	19.7	0.827	0.035	2.6478	
360 minute winter	04	Hydro-Brake®	Pump	4.1				
15 minute winter	05	1.006	03	25.6	1.095	0.283	0.7665	
960 minute winter	06	1.007	ex	5.1	1.403	0.142	0.0453	139.6
960 minute winter	Pump	Pump	06	5.0				

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.62%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
480 minute winter	store 1	456	206.540	1.240	19.9	89.2616	0.0000	SURCHARGED
480 minute winter	01	456	206.540	1.357	21.0	3.4533	0.0000	SURCHARGED
480 minute winter	02	456	206.540	1.768	16.9	4.4988	0.0000	SURCHARGED
480 minute winter	02A	456	206.539	2.030	15.2	5.1672	0.0000	SURCHARGED
480 minute winter	03	456	206.540	2.155	23.1	5.4843	0.0000	SURCHARGED
480 minute winter	04	456	206.540	2.218	25.0	157.8382	0.0000	SURCHARGED
15 minute winter	05	10	207.560	0.160	47.5	0.1811	0.0000	OK
480 minute winter	06	104	209.895	0.040	5.0	0.0448	0.0000	OK
720 minute winter	ex	180	209.393	0.038	5.1	0.0000	0.0000	OK
360 minute winter	Pump	360	203.866	0.166	5.0	0.4228	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
480 minute winter	store 1	1.001	01	-19.9	-0.454	-0.220	1.2323	
480 minute winter	01	1.002	02	-10.9	0.755	-0.121	2.7604	
480 minute winter	02	1.003	02A	15.2	0.759	0.058	2.6935	
480 minute winter	02A	1.003A	03	13.9	0.504	0.025	5.2392	
480 minute winter	03	1.004	04	25.0	0.859	0.044	2.6478	
480 minute winter	04	Hydro-Brake®	Pump	5.0				
15 minute winter	05	1.006	03	46.5	1.270	0.513	1.1992	
480 minute winter	06	1.007	ex	5.1	1.402	0.142	0.0452	131.7
360 minute winter	Pump	Pump	06	5.0				