



Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	200.0
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)	1.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

D AND CG Manhole Type

Max Width (mm)	Diameter (mm)	Max Width (mm)	Diameter (mm)	Max Width (mm)	Diameter (mm)
299	1200	899	1800	1801	3000
449	1350	1199	2100		
599	1500	1799	2700		

>1801 Link+900 mm

SW CIRCULAR Link Type

Shape	Circular	Auto Increment (mm)	75
Barrels	1	Follow Ground	x

Available Diameters (mm)

225	375	525	750	900	1200	1500
300	450	600	825	1050	1350	1800

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.051	5.00	43.000	1800	346102.762	392109.425	1.200
2	0.051	5.00	42.966	2700	346098.176	392097.020	2.529
3	0.051	5.00	42.988	2700	346085.434	392078.413	2.608
4	0.051	5.00	42.813	2700	346095.193	392071.028	2.464
5	0.051	5.00	42.708	2700	346101.232	392056.160	2.400
6	0.051	5.00	42.919	2700	346114.230	392045.495	2.654
7	0.051	5.00	43.850	2700	346157.248	392074.082	3.526
8	0.051	5.00	43.640	2700	346147.614	392065.484	3.349
9	0.051	5.00	43.422	2700	346139.928	392050.218	3.174
10	0.051	5.00	43.225	2700	346134.539	392035.405	3.017
11	0.051	5.00	43.163	2700	346129.174	392022.188	2.991
12	0.051	5.00	43.426	2700	346121.565	392001.128	3.311
13	0.051	5.00	43.580	2700	346117.986	391990.663	3.493
14	0.051	5.00	43.721	2700	346111.023	391982.683	3.661
15	0.051	5.00	42.512	2700	346043.915	392016.876	2.324
16	0.051	5.00	42.642	2700	346060.862	392005.343	2.506
17	0.051	5.00	42.825	2700	346074.847	391999.883	2.727
18	0.051	5.00	43.100	2700	346084.243	391992.670	3.032
19	0.051	5.00	43.942	2700	346094.580	391973.657	3.929
20	0.051	5.00	44.383	2700	346064.865	391956.081	4.457
21	0.051	5.00	44.523	2700	346053.232	391949.800	4.630
22	0.051	5.00	44.535	2700	346044.830	391947.738	4.664
23	0.051	5.00	44.230	2700	346018.305	391949.788	4.426

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
HB1	0.051	5.00	44.300	2700	346014.793	391935.109	4.534
OF			40.800	1350	345993.110	391935.836	1.146

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	13.226	0.600	41.800	41.337	0.463	28.6	300	5.07	69.8
1.001	2	3	22.552	0.600	40.437	40.380	0.057	395.0	1200	5.28	68.7
1.002	3	4	12.238	0.600	40.380	40.349	0.031	395.0	1200	5.38	68.1
1.003	4	5	16.048	0.600	40.349	40.308	0.041	395.0	1200	5.53	67.3
1.004	5	6	16.813	0.600	40.308	40.265	0.043	395.0	1200	5.68	66.5
1.005	6	10	22.677	0.600	40.265	40.208	0.057	395.0	1200	5.88	65.5
2.000	7	8	12.913	0.600	40.324	40.291	0.033	395.0	1200	5.11	69.6
2.001	8	9	17.092	0.600	40.291	40.248	0.043	395.0	1200	5.27	68.7
2.002	9	10	15.763	0.600	40.248	40.208	0.040	395.0	1200	5.41	67.9
1.006	10	11	14.264	0.600	40.208	40.172	0.036	395.0	1200	6.00	64.8
1.008	11	12	22.392	0.600	40.172	40.115	0.057	395.0	1200	6.20	63.9
1.009	12	13	11.060	0.600	40.115	40.087	0.028	395.0	1200	6.30	63.4
1.010	13	14	10.591	0.600	40.087	40.060	0.027	395.0	1200	6.40	63.0
1.011	14	19	18.757	0.600	40.060	40.013	0.047	395.0	1200	6.56	62.2
3.000	15	16	20.499	0.600	40.188	40.136	0.052	395.0	1200	5.18	69.2
3.001	16	17	15.013	0.600	40.136	40.098	0.038	395.0	1200	5.32	68.4
3.002	17	18	11.845	0.600	40.098	40.068	0.030	395.0	1200	5.42	67.9
3.003	18	19	21.641	0.600	40.068	40.013	0.055	395.0	1200	5.61	66.8
1.012	19	20	34.524	0.600	40.013	39.926	0.087	395.0	1200	6.87	60.9
1.013	20	21	13.220	0.600	39.926	39.893	0.033	395.0	1200	6.99	60.4

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	2.952	208.7	12.9	0.900	1.329	0.051	0.0	50	1.661
1.001	1.876	2121.6	25.3	1.329	1.408	0.102	0.0	89	0.661
1.002	1.876	2121.6	37.6	1.408	1.264	0.153	0.0	108	0.744
1.003	1.876	2121.6	49.6	1.264	1.200	0.204	0.0	123	0.806
1.004	1.876	2121.6	61.3	1.200	1.454	0.255	0.0	137	0.859
1.005	1.876	2121.6	72.4	1.454	1.817	0.306	0.0	149	0.902
2.000	1.876	2121.6	12.8	2.326	2.149	0.051	0.0	65	0.539
2.001	1.876	2121.6	25.3	2.149	1.974	0.102	0.0	89	0.661
2.002	1.876	2121.6	37.6	1.974	1.817	0.153	0.0	108	0.744
1.006	1.876	2121.6	119.5	1.817	1.791	0.510	0.0	190	1.041
1.008	1.876	2121.6	129.5	1.791	2.111	0.561	0.0	197	1.065
1.009	1.876	2121.6	140.2	2.111	2.293	0.612	0.0	205	1.091
1.010	1.876	2121.6	150.9	2.293	2.461	0.663	0.0	213	1.114
1.011	1.876	2121.6	160.5	2.461	2.729	0.714	0.0	219	1.133
3.000	1.876	2121.6	12.8	1.124	1.306	0.051	0.0	65	0.539
3.001	1.876	2121.6	25.2	1.306	1.527	0.102	0.0	89	0.661
3.002	1.876	2121.6	37.5	1.527	1.832	0.153	0.0	108	0.744
3.003	1.876	2121.6	49.3	1.832	2.729	0.204	0.0	123	0.806
1.012	1.876	2121.6	213.1	2.729	3.257	0.969	0.0	253	1.227
1.013	1.876	2121.6	222.5	3.257	3.430	1.020	0.0	259	1.242

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)
1.014	21	22	8.651	0.600	39.893	39.871	0.022	395.0	1200	7.06	60.1
1.015	22	23	26.604	0.600	39.871	39.804	0.067	395.0	1200	7.30	59.1
1.016	23	HB1	15.093	0.600	39.804	39.766	0.038	395.0	1200	7.43	58.6
1.017	HB1	OF	21.695	0.600	39.766	39.654	0.112	193.7	300	7.75	57.3

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)
1.014	1.876	2121.6	232.4	3.430	3.464	1.071	0.0	265	1.258
1.015	1.876	2121.6	239.6	3.464	3.226	1.122	0.0	269	1.269
1.016	1.876	2121.6	248.3	3.226	3.334	1.173	0.0	273	1.281
1.017	1.126	79.6	253.7	4.234	0.846	1.224	0.0	300	1.140

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	13.226	28.6	300	SW CIRCULAR	43.000	41.800	0.900	42.966	41.337	1.329
1.001	22.552	395.0	1200	SW CIRCULAR	42.966	40.437	1.329	42.988	40.380	1.408
1.002	12.238	395.0	1200	SW CIRCULAR	42.988	40.380	1.408	42.813	40.349	1.264
1.003	16.048	395.0	1200	SW CIRCULAR	42.813	40.349	1.264	42.708	40.308	1.200
1.004	16.813	395.0	1200	SW CIRCULAR	42.708	40.308	1.200	42.919	40.265	1.454
1.005	22.677	395.0	1200	SW CIRCULAR	42.919	40.265	1.454	43.225	40.208	1.817
2.000	12.913	395.0	1200	SW CIRCULAR	43.850	40.324	2.326	43.640	40.291	2.149
2.001	17.092	395.0	1200	SW CIRCULAR	43.640	40.291	2.149	43.422	40.248	1.974
2.002	15.763	395.0	1200	SW CIRCULAR	43.422	40.248	1.974	43.225	40.208	1.817
1.006	14.264	395.0	1200	SW CIRCULAR	43.225	40.208	1.817	43.163	40.172	1.791
1.008	22.392	395.0	1200	SW CIRCULAR	43.163	40.172	1.791	43.426	40.115	2.111
1.009	11.060	395.0	1200	SW CIRCULAR	43.426	40.115	2.111	43.580	40.087	2.293
1.010	10.591	395.0	1200	SW CIRCULAR	43.580	40.087	2.293	43.721	40.060	2.461
1.011	18.757	395.0	1200	SW CIRCULAR	43.721	40.060	2.461	43.942	40.013	2.729
3.000	20.499	395.0	1200	SW CIRCULAR	42.512	40.188	1.124	42.642	40.136	1.306
3.001	15.013	395.0	1200	SW CIRCULAR	42.642	40.136	1.306	42.825	40.098	1.527

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	1800	Manhole	D AND CG	2	2700	Manhole	D AND CG
1.001	2	2700	Manhole	D AND CG	3	2700	Manhole	D AND CG
1.002	3	2700	Manhole	D AND CG	4	2700	Manhole	D AND CG
1.003	4	2700	Manhole	D AND CG	5	2700	Manhole	D AND CG
1.004	5	2700	Manhole	D AND CG	6	2700	Manhole	D AND CG
1.005	6	2700	Manhole	D AND CG	10	2700	Manhole	D AND CG
2.000	7	2700	Manhole	D AND CG	8	2700	Manhole	D AND CG
2.001	8	2700	Manhole	D AND CG	9	2700	Manhole	D AND CG
2.002	9	2700	Manhole	D AND CG	10	2700	Manhole	D AND CG
1.006	10	2700	Manhole	D AND CG	11	2700	Manhole	D AND CG
1.008	11	2700	Manhole	D AND CG	12	2700	Manhole	D AND CG
1.009	12	2700	Manhole	D AND CG	13	2700	Manhole	D AND CG
1.010	13	2700	Manhole	D AND CG	14	2700	Manhole	D AND CG
1.011	14	2700	Manhole	D AND CG	19	2700	Manhole	D AND CG
3.000	15	2700	Manhole	D AND CG	16	2700	Manhole	D AND CG
3.001	16	2700	Manhole	D AND CG	17	2700	Manhole	D AND CG

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)
3.002	11.845	395.0	1200	SW CIRCULAR	42.825	40.098	1.527	43.100	40.068	1.832
3.003	21.641	395.0	1200	SW CIRCULAR	43.100	40.068	1.832	43.942	40.013	2.729
1.012	34.524	395.0	1200	SW CIRCULAR	43.942	40.013	2.729	44.383	39.926	3.257
1.013	13.220	395.0	1200	SW CIRCULAR	44.383	39.926	3.257	44.523	39.893	3.430
1.014	8.651	395.0	1200	SW CIRCULAR	44.523	39.893	3.430	44.535	39.871	3.464
1.015	26.604	395.0	1200	SW CIRCULAR	44.535	39.871	3.464	44.230	39.804	3.226
1.016	15.093	395.0	1200	SW CIRCULAR	44.230	39.804	3.226	44.300	39.766	3.334
1.017	21.695	193.7	300	SW CIRCULAR	44.300	39.766	4.234	40.800	39.654	0.846

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
3.002	17	2700	Manhole	D AND CG	18	2700	Manhole	D AND CG
3.003	18	2700	Manhole	D AND CG	19	2700	Manhole	D AND CG
1.012	19	2700	Manhole	D AND CG	20	2700	Manhole	D AND CG
1.013	20	2700	Manhole	D AND CG	21	2700	Manhole	D AND CG
1.014	21	2700	Manhole	D AND CG	22	2700	Manhole	D AND CG
1.015	22	2700	Manhole	D AND CG	23	2700	Manhole	D AND CG
1.016	23	2700	Manhole	D AND CG	HB1	2700	Manhole	D AND CG
1.017	HB1	2700	Manhole	D AND CG	OF	1350	Manhole	D AND CG

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)	13.4
Summer CV	1.000	30 year (l/s)	26.1
Winter CV	1.000	100 year (l/s)	32.0
Analysis Speed	Detailed	Check Discharge Volume	✓
Skip Steady State	✓	100 year 360 minute (m³)	

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	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 (m ³)	

Node HB1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	39.766	Product Number	CTL-SHE-0169-1340-0800-1340
Design Depth (m)	0.800	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	13.4	Min Node Diameter (mm)	1200

Node HB1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	40.400	Product Number	CTL-SHE-0126-9100-1900-9100
Design Depth (m)	1.900	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	9.1	Min Node Diameter (mm)	1500

Node 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	41.800
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	0

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	28.5	0.0	1.200	243.5	0.0

Node 20 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	41.500
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	68

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	72.0	0.0	0.800	72.0	0.0	0.801	0.0	0.0

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	109.521	30.991
1 year 15 minute winter	76.857	30.991
1 year 30 minute summer	71.439	20.215
1 year 30 minute winter	50.133	20.215
1 year 60 minute summer	48.435	12.800
1 year 60 minute winter	32.179	12.800
1 year 120 minute summer	30.053	7.942
1 year 120 minute winter	19.966	7.942
1 year 180 minute summer	23.233	5.979

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 180 minute winter	15.102	5.979
1 year 240 minute summer	18.475	4.882
1 year 240 minute winter	12.274	4.882
1 year 360 minute summer	14.169	3.646
1 year 360 minute winter	9.210	3.646
1 year 480 minute summer	11.185	2.956
1 year 480 minute winter	7.431	2.956
1 year 600 minute summer	9.182	2.511
1 year 600 minute winter	6.274	2.511
1 year 720 minute summer	8.203	2.199
1 year 720 minute winter	5.513	2.199
1 year 960 minute summer	6.768	1.782
1 year 960 minute winter	4.483	1.782
1 year 1440 minute summer	4.949	1.326
1 year 1440 minute winter	3.326	1.326
30 year 15 minute summer	268.706	76.035
30 year 15 minute winter	188.566	76.035
30 year 30 minute summer	174.929	49.499
30 year 30 minute winter	122.757	49.499
30 year 60 minute summer	116.589	30.811
30 year 60 minute winter	77.459	30.811
30 year 120 minute summer	70.438	18.615
30 year 120 minute winter	46.797	18.615
30 year 180 minute summer	53.298	13.715
30 year 180 minute winter	34.645	13.715
30 year 240 minute summer	41.604	10.995
30 year 240 minute winter	27.641	10.995
30 year 360 minute summer	31.221	8.034
30 year 360 minute winter	20.295	8.034
30 year 480 minute summer	24.324	6.428
30 year 480 minute winter	16.160	6.428
30 year 600 minute summer	19.756	5.404
30 year 600 minute winter	13.498	5.404
30 year 720 minute summer	17.490	4.687
30 year 720 minute winter	11.754	4.687
30 year 960 minute summer	14.215	3.743
30 year 960 minute winter	9.416	3.743
30 year 1440 minute summer	10.161	2.723
30 year 1440 minute winter	6.829	2.723
100 year +45% CC +10% A 15 minute summer	505.670	143.087
100 year +45% CC +10% A 15 minute winter	354.856	143.087
100 year +45% CC +10% A 30 minute summer	332.000	93.944
100 year +45% CC +10% A 30 minute winter	232.982	93.944
100 year +45% CC +10% A 60 minute summer	222.268	58.739
100 year +45% CC +10% A 60 minute winter	147.669	58.739
100 year +45% CC +10% A 120 minute summer	134.215	35.469
100 year +45% CC +10% A 120 minute winter	89.169	35.469
100 year +45% CC +10% A 180 minute summer	101.219	26.047
100 year +45% CC +10% A 180 minute winter	65.795	26.047
100 year +45% CC +10% A 240 minute summer	78.690	20.795
100 year +45% CC +10% A 240 minute winter	52.280	20.795
100 year +45% CC +10% A 360 minute summer	58.701	15.106

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +45% CC +10% A 360 minute winter	38.157	15.106
100 year +45% CC +10% A 480 minute summer	45.550	12.038
100 year +45% CC +10% A 480 minute winter	30.262	12.038
100 year +45% CC +10% A 600 minute summer	36.875	10.086
100 year +45% CC +10% A 600 minute winter	25.195	10.086
100 year +45% CC +10% A 720 minute summer	32.556	8.725
100 year +45% CC +10% A 720 minute winter	21.879	8.725
100 year +45% CC +10% A 960 minute summer	26.340	6.936
100 year +45% CC +10% A 960 minute winter	17.448	6.936
100 year +45% CC +10% A 1440 minute summer	18.700	5.012
100 year +45% CC +10% A 1440 minute winter	12.567	5.012

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	12	41.840	0.040	9.1	1.4109	0.0000	OK
15 minute summer	2	11	40.508	0.071	15.8	0.4359	0.0000	OK
15 minute summer	3	11	40.475	0.095	24.1	0.5838	0.0000	OK
15 minute summer	4	12	40.456	0.107	31.8	0.6558	0.0000	OK
15 minute summer	5	12	40.428	0.120	39.4	0.7358	0.0000	OK
120 minute summer	6	98	40.407	0.142	23.6	0.8661	0.0000	OK
120 minute summer	7	96	40.407	0.083	4.1	0.5007	0.0000	OK
120 minute summer	8	106	40.407	0.116	8.2	0.6976	0.0000	OK
120 minute summer	9	96	40.407	0.159	12.3	0.9607	0.0000	OK
120 minute summer	10	98	40.407	0.199	39.0	1.2050	0.0000	OK
120 minute summer	11	98	40.407	0.235	42.4	1.4250	0.0000	OK
120 minute summer	12	98	40.407	0.292	45.5	1.7602	0.0000	OK
120 minute summer	13	98	40.407	0.320	44.5	1.9242	0.0000	OK
120 minute summer	14	98	40.407	0.347	44.3	2.0817	0.0000	OK
120 minute summer	15	98	40.408	0.220	5.3	1.3553	0.0000	OK
120 minute summer	16	98	40.408	0.272	8.2	1.6657	0.0000	OK
120 minute summer	17	98	40.407	0.309	9.8	1.8846	0.0000	OK
120 minute summer	18	98	40.407	0.339	11.9	2.0566	0.0000	OK
120 minute summer	19	98	40.407	0.394	44.2	2.3556	0.0000	OK
120 minute summer	20	106	40.407	0.481	40.2	2.8626	0.0000	OK
120 minute summer	21	106	40.407	0.514	33.9	3.0552	0.0000	OK
120 minute summer	22	106	40.407	0.536	31.0	3.1851	0.0000	OK
120 minute summer	23	106	40.407	0.603	25.7	3.5914	0.0000	OK
120 minute summer	HB1	106	40.407	0.641	18.4	3.8148	0.0000	SURCHARGED

Link Event (Outflow)	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	1.381	0.036	0.0713	
15 minute summer	2	1.001	3	15.4	0.456	0.007	0.7703	
15 minute summer	3	1.002	4	23.2	0.514	0.011	0.5523	
15 minute summer	4	1.003	5	31.1	0.582	0.015	0.8580	
15 minute summer	5	1.004	6	38.8	0.627	0.018	1.0468	
15 minute summer	6	1.005	10	46.0	0.570	0.022	1.8384	
15 minute summer	7	2.000	8	8.7	0.359	0.004	0.3643	
15 minute summer	8	2.001	9	16.7	0.457	0.008	0.8763	
15 minute summer	9	2.002	10	20.8	0.375	0.010	1.2689	
15 minute summer	10	1.006	11	72.1	0.745	0.034	1.3806	
15 minute summer	11	1.008	12	78.2	0.738	0.037	2.3745	
15 minute summer	12	1.009	13	83.4	0.720	0.039	1.5077	
15 minute summer	13	1.010	14	89.1	0.758	0.042	1.7026	
15 minute summer	14	1.011	19	93.9	0.772	0.044	3.7119	
30 minute summer	15	3.000	16	-14.2	0.351	-0.007	2.7745	
15 minute summer	16	3.001	17	-21.5	0.457	-0.010	1.9294	
15 minute summer	17	3.002	18	-30.7	0.523	-0.014	1.8655	
15 minute summer	18	3.003	19	-41.1	0.444	-0.019	4.2451	
15 minute summer	19	1.012	20	116.4	0.841	0.055	9.3641	
15 minute summer	20	1.013	21	89.6	0.723	0.042	4.5392	
15 minute summer	21	1.014	22	76.4	0.746	0.036	3.2632	
15 minute summer	22	1.015	23	52.6	0.555	0.025	11.4163	
15 minute summer	23	1.016	HB1	24.7	0.246	0.012	7.4187	
30 minute summer	HB1	Hydro-Brake®	OF	13.4				123.5
120 minute summer	HB1	Hydro-Brake®	OF	0.0				0.1



Results for 1 year Critical Storm Duration. Lowest mass balance: 99.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	OF	1	39.654	0.000	13.4	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	41.866	0.066	22.4	2.4901	0.0000	OK
120 minute winter	2	114	40.793	0.356	13.1	2.1817	0.0000	OK
120 minute winter	3	116	40.793	0.413	18.8	2.5265	0.0000	OK
120 minute winter	4	116	40.793	0.444	23.0	2.7274	0.0000	OK
120 minute winter	5	116	40.793	0.485	27.4	2.9851	0.0000	OK
120 minute winter	6	116	40.793	0.528	29.9	3.2278	0.0000	OK
120 minute winter	7	114	40.793	0.469	6.6	2.8210	0.0000	OK
120 minute winter	8	116	40.793	0.502	11.0	3.0271	0.0000	OK
120 minute winter	9	116	40.793	0.545	13.4	3.2970	0.0000	OK
120 minute winter	10	116	40.793	0.585	40.5	3.5500	0.0000	OK
120 minute winter	11	116	40.793	0.621	42.0	3.7701	0.0000	OK
120 minute winter	12	116	40.793	0.678	40.6	4.0940	0.0000	OK
120 minute winter	13	116	40.794	0.707	40.3	4.2519	0.0000	OK
120 minute winter	14	116	40.793	0.733	41.0	4.4039	0.0000	OK
120 minute winter	15	116	40.793	0.605	6.6	3.7307	0.0000	OK
120 minute winter	16	116	40.793	0.657	9.7	4.0302	0.0000	OK
120 minute winter	17	116	40.793	0.695	10.8	4.2407	0.0000	OK
120 minute winter	18	116	40.793	0.725	12.3	4.3955	0.0000	OK
120 minute winter	19	116	40.793	0.780	40.0	4.6694	0.0000	OK
120 minute winter	20	114	40.793	0.867	29.0	5.1626	0.0000	OK
120 minute winter	21	114	40.793	0.900	24.8	5.3528	0.0000	OK
120 minute winter	22	114	40.793	0.922	26.5	5.4821	0.0000	OK
120 minute winter	23	114	40.793	0.989	26.1	5.8922	0.0000	OK
120 minute winter	HB1	114	40.793	1.027	25.1	6.1132	0.0000	SURCHARGED

Link Event (Outflow)	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	20.0	1.817	0.096	0.1453	
15 minute summer	2	1.001	3	40.4	0.523	0.019	2.7922	
15 minute summer	3	1.002	4	59.8	0.583	0.028	1.9681	
15 minute summer	4	1.003	5	78.9	0.663	0.037	3.0819	
15 minute summer	5	1.004	6	96.7	0.697	0.046	3.8552	
15 minute summer	6	1.005	10	110.5	0.655	0.052	6.3086	
15 minute summer	7	2.000	8	17.4	0.397	0.008	2.5964	
15 minute summer	8	2.001	9	33.0	0.460	0.016	4.0955	
15 minute summer	9	2.002	10	48.8	0.387	0.023	4.5086	
15 minute summer	10	1.006	11	172.1	0.830	0.081	4.6665	
15 minute summer	11	1.008	12	176.2	0.811	0.083	8.4002	
15 minute summer	12	1.009	13	183.7	0.783	0.087	4.6959	
15 minute summer	13	1.010	14	189.8	0.835	0.089	4.8462	
15 minute summer	14	1.011	19	179.4	0.847	0.085	9.4398	
15 minute winter	15	3.000	16	-24.5	0.417	-0.012	7.7625	
15 minute summer	16	3.001	17	-74.6	0.486	-0.035	6.4063	
15 minute summer	17	3.002	18	-102.6	0.543	-0.048	5.4854	
15 minute summer	18	3.003	19	-123.0	0.456	-0.058	10.9254	
15 minute summer	19	1.012	20	186.1	0.894	0.088	20.2747	
15 minute summer	20	1.013	21	144.5	0.726	0.068	8.8127	
15 minute summer	21	1.014	22	116.4	0.749	0.055	6.0765	
15 minute winter	22	1.015	23	77.7	0.559	0.037	20.0837	
15 minute winter	23	1.016	HB1	31.9	0.261	0.015	12.3343	
120 minute winter	HB1	Hydro-Brake®	OF	15.1				276.1
120 minute winter	HB1	Hydro-Brake®	OF	8.8				95.4



Results for 30 year Critical Storm Duration. Lowest mass balance: 99.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	OF	1	39.654	0.000	13.7	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
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Results for 100 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 99.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	1	176	42.272	0.472	27.6	35.0902	0.0000	SURCHARGED
180 minute winter	2	176	42.272	1.835	22.3	11.3226	0.0000	SURCHARGED
180 minute winter	3	176	42.272	1.892	21.9	11.6496	0.0000	SURCHARGED
180 minute winter	4	176	42.272	1.923	27.3	11.8884	0.0000	SURCHARGED
180 minute winter	5	176	42.272	1.964	33.4	12.1651	0.0000	SURCHARGED
180 minute winter	6	176	42.272	2.007	39.4	12.3405	0.0000	SURCHARGED
180 minute winter	7	176	42.272	1.948	10.1	11.7719	0.0000	SURCHARGED
180 minute winter	8	176	42.272	1.981	14.4	12.0054	0.0000	SURCHARGED
180 minute winter	9	176	42.272	2.024	19.9	12.3033	0.0000	SURCHARGED
180 minute winter	10	176	42.272	2.064	61.7	12.5846	0.0000	SURCHARGED
180 minute winter	11	176	42.272	2.100	66.0	12.8126	0.0000	SURCHARGED
180 minute winter	12	176	42.272	2.157	69.8	13.0805	0.0000	SURCHARGED
180 minute winter	13	176	42.272	2.185	72.4	13.2129	0.0000	SURCHARGED
180 minute winter	14	176	42.272	2.212	74.9	13.3425	0.0000	SURCHARGED
180 minute winter	15	176	42.271	2.083	10.1	12.9298	0.0000	FLOOD RISK
180 minute winter	16	176	42.271	2.135	14.5	13.1789	0.0000	SURCHARGED
180 minute winter	17	176	42.271	2.173	17.3	13.3365	0.0000	SURCHARGED
180 minute winter	18	176	42.271	2.203	22.3	13.4316	0.0000	SURCHARGED
180 minute winter	19	176	42.272	2.259	96.1	13.5774	0.0000	SURCHARGED
180 minute winter	20	176	42.272	2.346	100.0	69.6473	0.0000	SURCHARGED
180 minute winter	21	176	42.272	2.379	31.9	14.1985	0.0000	SURCHARGED
180 minute winter	22	176	42.272	2.401	33.5	14.3251	0.0000	SURCHARGED
180 minute winter	23	176	42.272	2.468	34.4	14.7577	0.0000	SURCHARGED
180 minute winter	HB1	176	42.272	2.506	34.6	14.9700	0.0000	SURCHARGED

Link Event (Outflow)	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	42.9	2.218	0.206	0.2561	
15 minute summer	2	1.001	3	78.2	0.544	0.037	13.8217	
15 minute summer	3	1.002	4	108.2	0.601	0.051	8.1703	
15 minute summer	4	1.003	5	139.8	0.694	0.066	11.3294	
15 minute summer	5	1.004	6	167.6	0.723	0.079	12.5186	
15 minute summer	6	1.005	10	189.0	0.671	0.089	17.8652	
15 minute summer	7	2.000	8	34.0	0.382	0.016	9.2048	
15 minute summer	8	2.001	9	59.0	0.478	0.028	12.8933	
15 minute summer	9	2.002	10	81.2	0.419	0.038	12.5793	
15 minute summer	10	1.006	11	274.5	0.863	0.129	11.9365	
15 minute summer	11	1.008	12	269.5	0.841	0.127	19.7240	
15 minute summer	12	1.009	13	261.3	0.815	0.123	10.3202	
15 minute summer	13	1.010	14	257.1	0.844	0.121	10.2102	
15 minute summer	14	1.011	19	250.8	0.867	0.118	18.7886	
15 minute winter	15	3.000	16	44.5	0.430	0.021	18.3189	
15 minute summer	16	3.001	17	-111.8	0.488	-0.053	14.0825	
15 minute summer	17	3.002	18	-149.0	0.562	-0.070	11.4528	
15 minute summer	18	3.003	19	-184.2	0.496	-0.087	21.5790	
15 minute winter	19	1.012	20	222.1	0.911	0.105	36.5314	
15 minute winter	20	1.013	21	161.3	0.744	0.076	14.6276	
15 minute winter	21	1.014	22	137.1	0.760	0.065	9.6989	
15 minute winter	22	1.015	23	90.8	0.544	0.043	29.9518	
15 minute winter	23	1.016	HB1	53.0	0.249	0.025	17.0054	
180 minute winter	HB1	Hydro-Brake®	OF	23.0				452.4
180 minute winter	HB1	Hydro-Brake®	OF	9.0				179.4



Results for 100 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 99.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	OF	1	39.654	0.000	16.9	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
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