



**Design Settings**

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.900
CV	0.750	Preferred Cover Depth (m)	0.900
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

**Nodes**

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
400	0.012	5.00	31.600	4150	359388.850	430561.167	2.658
401	0.012	5.00	30.931	4150	359395.891	430589.471	2.135
402	0.012	5.00	30.506	4150	359404.796	430613.135	1.836
403	0.012	5.00	29.552	4150	359412.237	430625.081	0.952
404	0.012	5.00	27.688	4150	359408.114	430637.069	0.688
405			26.464	1200	359406.122	430651.404	1.432
406			26.272	1200	359406.255	430658.439	1.815

**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	400	401	29.167	0.032	28.942	28.796	0.146	200.0	500	5.55	46.5
1.001	401	402	25.284	0.032	28.796	28.670	0.126	200.0	500	6.02	45.0
1.002	402	403	14.074	0.032	28.670	28.600	0.070	200.0	500	6.28	44.2
1.003	403	404	12.677	0.032	28.600	27.000	1.600	7.9	500	6.33	44.1
1.004	404	405	14.473	0.032	27.000	25.032	1.968	7.4	150	6.51	43.6
1.005	405	406	7.036	0.032	25.032	24.457	0.575	12.2	150	6.63	43.2

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	0.892	780.4	1.5	2.158	1.635	0.012	0.0	27	0.169
1.001	0.892	780.4	2.9	1.635	1.336	0.024	0.0	39	0.206
1.002	0.892	780.4	4.3	1.336	0.452	0.036	0.0	47	0.231
1.003	4.481	3920.9	5.7	0.452	0.188	0.048	0.0	23	0.777
1.004	1.291	22.8	7.1	0.538	1.282	0.060	0.0	57	1.137
1.005	1.001	17.7	7.0	1.282	1.665	0.060	0.0	66	0.945



**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	29.167	200.0	500	1:3 swale	31.600	28.942	2.158	30.931	28.796	1.635
1.001	25.284	200.0	500	1:3 swale	30.931	28.796	1.635	30.506	28.670	1.336
1.002	14.074	200.0	500	1:3 swale	30.506	28.670	1.336	29.552	28.600	0.452
1.003	12.677	7.9	500	1:3 swale	29.552	28.600	0.452	27.688	27.000	0.188
1.004	14.473	7.4	150	Circular_Default Sewer Type	27.688	27.000	0.538	26.464	25.032	1.282
1.005	7.036	12.2	150	Circular_Default Sewer Type	26.464	25.032	1.282	26.272	24.457	1.665

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	400	4150	Manhole	Adoptable	401	4150	Manhole	Adoptable
1.001	401	4150	Manhole	Adoptable	402	4150	Manhole	Adoptable
1.002	402	4150	Manhole	Adoptable	403	4150	Manhole	Adoptable
1.003	403	4150	Manhole	Adoptable	404	4150	Manhole	Adoptable
1.004	404	4150	Manhole	Adoptable	405	1200	Manhole	Adoptable
1.005	405	1200	Manhole	Adoptable	406	1200	Manhole	Adoptable

**Manhole Schedule**

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
400	359388.850	430561.167	31.600	2.658	4150				
						0	1.000	28.942	500
401	359395.891	430589.471	30.931	2.135	4150				
						0	1.001	28.796	500
402	359404.796	430613.135	30.506	1.836	4150				
						0	1.002	28.670	500
403	359412.237	430625.081	29.552	0.952	4150				
						0	1.003	28.600	500
404	359408.114	430637.069	27.688	0.688	4150				
						0	1.004	27.000	150
405	359406.122	430651.404	26.464	1.432	1200				
						0	1.004	25.032	150
406	359406.255	430658.439	26.272	1.815	1200				
						0	1.005	25.032	150
						1	1.005	24.457	150



**Simulation Settings**

Rainfall Methodology	FEH-22	Drain Down Time (mins)	240	100 year (l/s)	0.0
Summer CV	0.750	Additional Storage (m <sup>3</sup> /ha)	20.0	Check Discharge Volume	✓
Winter CV	0.840	Check Discharge Rate(s)	✓	100 year 360 minute (m <sup>3</sup> )	
Analysis Speed	Normal	10 year (l/s)	0.0		
Skip Steady State	✓	30 year (l/s)	0.0		

**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 %)
100	50	0	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 <sup>3</sup> )	

**Node 405 Online Hydro-Brake® Control**

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	25.032	Product Number	CTL-SHE-0059-1500-0900-1500
Design Depth (m)	0.900	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.5	Min Node Diameter (mm)	1200

**Node 405 Depth/Area Storage Structure**

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	25.032
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	0

Depth (m)	Area (m <sup>2</sup> )	Inf Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf Area (m <sup>2</sup> )
0.000	20.0	0.0	0.900	85.7	0.0	0.905	86.2	0.0



**Results for 100 year +50% CC Critical Storm Duration. Lowest mass balance: 99.54%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
15 minute winter	400	12	28.999	0.057	7.3	0.7726	0.0000	OK
15 minute winter	401	13	28.871	0.075	12.8	1.0252	0.0000	OK
30 minute winter	402	21	28.777	0.107	15.4	1.4567	0.0000	OK
30 minute winter	403	20	28.644	0.044	19.3	0.6106	0.0000	OK
30 minute winter	404	21	27.123	0.123	24.1	1.7133	0.0000	OK
120 minute winter	405	126	25.644	0.612	11.8	26.5921	0.0000	SURCHARGED
15 minute summer	406	1	24.457	0.000	1.4	0.0000	0.0000	OK

  

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
15 minute winter	400	1.000	401	6.1	0.214	0.008	0.8652	
15 minute winter	401	1.001	402	10.6	0.231	0.014	1.2106	
30 minute winter	402	1.002	403	14.5	0.404	0.019	0.5472	
30 minute winter	403	1.003	404	19.1	0.477	0.005	0.5931	
30 minute winter	404	1.004	405	22.9	1.316	1.002	0.2396	
120 minute winter	405	Hydro-Brake <sup>®</sup>	406	1.4				25.7



**Results for 100 year +50% CC 15 minute summer. 255 minute analysis at 1 minute timestep. Mass balance: 100.00%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
15 minute summer	400	12	28.997	0.055	6.9	0.7454	0.0000	OK
15 minute summer	401	13	28.868	0.072	12.0	0.9768	0.0000	OK
15 minute summer	402	13	28.771	0.101	14.9	1.3728	0.0000	OK
15 minute summer	403	13	28.640	0.040	16.1	0.5547	0.0000	OK
15 minute summer	404	13	27.109	0.109	20.8	1.5097	0.0000	OK
15 minute summer	405	34	25.367	0.335	20.0	11.1839	0.0000	SURCHARGED
15 minute summer	406	1	24.457	0.000	1.4	0.0000	0.0000	OK

  

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
15 minute summer	400	1.000	401	5.7	0.212	0.007	0.8125	
15 minute summer	401	1.001	402	9.6	0.227	0.012	1.1219	
15 minute summer	402	1.002	403	12.3	0.382	0.016	0.4952	
15 minute summer	403	1.003	404	15.9	0.451	0.004	0.4922	
15 minute summer	404	1.004	405	20.0	1.608	0.876	0.2264	
15 minute summer	405	Hydro-Brake®	406	1.4				14.7



**Results for 100 year +50% CC 15 minute winter. 255 minute analysis at 1 minute timestep. Mass balance: 99.77%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
15 minute winter	400	12	28.999	0.057	7.3	0.7726	0.0000	OK
15 minute winter	401	13	28.871	0.075	12.8	1.0252	0.0000	OK
15 minute winter	402	13	28.776	0.106	16.2	1.4445	0.0000	OK
15 minute winter	403	13	28.643	0.043	18.3	0.5986	0.0000	OK
15 minute winter	404	13	27.119	0.119	23.2	1.6519	0.0000	OK
15 minute winter	405	34	25.405	0.373	22.1	12.9833	0.0000	SURCHARGED
15 minute winter	406	1	24.457	0.000	1.4	0.0000	0.0000	OK

  

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
15 minute winter	400	1.000	401	6.1	0.214	0.008	0.8652	
15 minute winter	401	1.001	402	10.6	0.231	0.014	1.2106	
15 minute winter	402	1.002	403	14.1	0.403	0.018	0.5386	
15 minute winter	403	1.003	404	18.4	0.458	0.005	0.5630	
15 minute winter	404	1.004	405	22.1	1.603	0.968	0.2359	
15 minute winter	405	Hydro-Brake®	406	1.4				16.5



**Results for 100 year +50% CC 30 minute summer. 270 minute analysis at 1 minute timestep. Mass balance: 99.73%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
30 minute summer	400	19	28.997	0.055	6.6	0.7527	0.0000	OK
30 minute summer	401	20	28.871	0.075	12.0	1.0168	0.0000	OK
30 minute summer	402	21	28.776	0.106	15.9	1.4482	0.0000	OK
30 minute summer	403	20	28.644	0.044	19.0	0.6070	0.0000	OK
30 minute summer	404	21	27.121	0.121	23.7	1.6759	0.0000	OK
30 minute summer	405	46	25.470	0.438	22.4	16.2549	0.0000	SURCHARGED
30 minute summer	406	1	24.457	0.000	1.4	0.0000	0.0000	OK

  

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
30 minute summer	400	1.000	401	5.8	0.205	0.007	0.8426	
30 minute summer	401	1.001	402	10.4	0.223	0.013	1.2063	
30 minute summer	402	1.002	403	14.3	0.404	0.018	0.5415	
30 minute summer	403	1.003	404	18.8	0.475	0.005	0.5735	
30 minute summer	404	1.004	405	22.4	1.300	0.983	0.2374	
30 minute summer	405	Hydro-Brake®	406	1.4				20.0



**Results for 100 year +50% CC 30 minute winter. 270 minute analysis at 1 minute timestep. Mass balance: 99.68%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
30 minute winter	400	19	28.995	0.053	5.9	0.7282	0.0000	OK
30 minute winter	401	20	28.870	0.074	11.1	1.0031	0.0000	OK
30 minute winter	402	21	28.777	0.107	15.4	1.4567	0.0000	OK
30 minute winter	403	20	28.644	0.044	19.3	0.6106	0.0000	OK
30 minute winter	404	21	27.123	0.123	24.1	1.7133	0.0000	OK
30 minute winter	405	47	25.514	0.482	22.9	18.6745	0.0000	SURCHARGED
30 minute winter	406	1	24.457	0.000	1.4	0.0000	0.0000	OK

  

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
30 minute winter	400	1.000	401	5.4	0.198	0.007	0.8224	
30 minute winter	401	1.001	402	10.1	0.217	0.013	1.2025	
30 minute winter	402	1.002	403	14.5	0.404	0.019	0.5472	
30 minute winter	403	1.003	404	19.1	0.477	0.005	0.5931	
30 minute winter	404	1.004	405	22.9	1.316	1.002	0.2396	
30 minute winter	405	Hydro-Brake®	406	1.4				21.3





**Results for 100 year +50% CC 60 minute summer. 300 minute analysis at 1 minute timestep. Mass balance: 99.81%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
60 minute summer	400	34	28.992	0.050	5.1	0.6765	0.0000	OK
60 minute summer	401	35	28.865	0.069	9.6	0.9382	0.0000	OK
60 minute summer	402	36	28.772	0.102	13.5	1.3874	0.0000	OK
60 minute summer	403	35	28.642	0.042	17.0	0.5725	0.0000	OK
60 minute summer	404	36	27.112	0.112	21.3	1.5473	0.0000	OK
60 minute summer	405	73	25.560	0.529	20.6	21.3732	0.0000	SURCHARGED
60 minute summer	406	1	24.457	0.000	1.4	0.0000	0.0000	OK

  

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
60 minute summer	400	1.000	401	4.7	0.188	0.006	0.7457	
60 minute summer	401	1.001	402	8.9	0.206	0.011	1.1059	
60 minute summer	402	1.002	403	12.8	0.384	0.016	0.5054	
60 minute summer	403	1.003	404	16.9	0.471	0.004	0.5112	
60 minute summer	404	1.004	405	20.6	1.213	0.902	0.2290	
60 minute summer	405	Hydro-Brake®	406	1.4				22.7



**Results for 100 year +50% CC 60 minute winter. 300 minute analysis at 1 minute timestep. Mass balance: 100.00%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
60 minute winter	400	34	28.988	0.046	4.2	0.6228	0.0000	OK
60 minute winter	401	35	28.860	0.064	8.1	0.8786	0.0000	OK
60 minute winter	402	36	28.768	0.098	11.7	1.3338	0.0000	OK
60 minute winter	403	36	28.639	0.039	15.3	0.5415	0.0000	OK
60 minute winter	404	36	27.104	0.104	19.1	1.4412	0.0000	OK
60 minute winter	405	73	25.614	0.583	18.8	24.7011	0.0000	SURCHARGED
60 minute winter	406	1	24.457	0.000	1.4	0.0000	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
60 minute winter	400	1.000	401	4.0	0.177	0.005	0.6744	
60 minute winter	401	1.001	402	7.8	0.195	0.010	1.0313	
60 minute winter	402	1.002	403	11.5	0.368	0.015	0.4750	
60 minute winter	403	1.003	404	15.2	0.465	0.004	0.4614	
60 minute winter	404	1.004	405	18.8	1.130	0.825	0.2216	
60 minute winter	405	Hydro-Brake®	406	1.4				22.2



**Results for 100 year +50% CC 120 minute summer. 360 minute analysis at 2 minute timestep. Mass balance: 100.00%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	400	66	28.981	0.039	3.2	0.5354	0.0000	OK
120 minute summer	401	66	28.852	0.056	6.2	0.7616	0.0000	OK
120 minute summer	402	68	28.757	0.087	8.8	1.1910	0.0000	OK
120 minute summer	403	66	28.633	0.033	11.3	0.4606	0.0000	OK
120 minute summer	404	66	27.085	0.085	14.2	1.1796	0.0000	OK
120 minute summer	405	126	25.586	0.554	14.0	22.8985	0.0000	SURCHARGED
120 minute summer	406	2	24.457	0.000	1.4	0.0000	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	400	1.000	401	3.0	0.164	0.004	0.5511	
120 minute summer	401	1.001	402	5.9	0.177	0.008	0.8572	
120 minute summer	402	1.002	403	8.5	0.327	0.011	0.3955	
120 minute summer	403	1.003	404	11.3	0.445	0.003	0.3464	
120 minute summer	404	1.004	405	14.0	0.893	0.614	0.2019	
120 minute summer	405	Hydro-Brake®	406	1.4				26.0



**Results for 100 year +50% CC 120 minute winter. 360 minute analysis at 2 minute timestep. Mass balance: 99.87%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
120 minute winter	400	66	28.977	0.035	2.5	0.4771	0.0000	OK
120 minute winter	401	66	28.846	0.050	4.9	0.6868	0.0000	OK
120 minute winter	402	68	28.751	0.081	7.2	1.1019	0.0000	OK
120 minute winter	403	66	28.630	0.030	9.5	0.4183	0.0000	OK
120 minute winter	404	66	27.077	0.077	11.8	1.0617	0.0000	OK
120 minute winter	405	126	25.644	0.612	11.8	26.5921	0.0000	SURCHARGED
120 minute winter	406	2	24.457	0.000	1.4	0.0000	0.0000	OK

  

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
120 minute winter	400	1.000	401	2.4	0.152	0.003	0.4760	
120 minute winter	401	1.001	402	4.8	0.165	0.006	0.7561	
120 minute winter	402	1.002	403	7.1	0.307	0.009	0.3522	
120 minute winter	403	1.003	404	9.4	0.431	0.002	0.2983	
120 minute winter	404	1.004	405	11.8	0.865	0.517	0.1928	
120 minute winter	405	Hydro-Brake®	406	1.4				25.7



**Results for 100 year +50% CC 180 minute summer. 420 minute analysis at 4 minute timestep. Mass balance: 100.00%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute summer	400	96	28.976	0.034	2.4	0.4659	0.0000	OK
180 minute summer	401	96	28.845	0.049	4.7	0.6630	0.0000	OK
180 minute summer	402	100	28.748	0.078	6.9	1.0662	0.0000	OK
180 minute summer	403	96	28.629	0.029	8.8	0.4005	0.0000	OK
180 minute summer	404	100	27.073	0.073	11.1	1.0131	0.0000	OK
180 minute summer	405	176	25.583	0.552	10.9	22.7694	0.0000	SURCHARGED
180 minute summer	406	4	24.457	0.000	1.4	0.0000	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
180 minute summer	400	1.000	401	2.3	0.150	0.003	0.4566	
180 minute summer	401	1.001	402	4.5	0.164	0.006	0.7191	
180 minute summer	402	1.002	403	6.6	0.300	0.008	0.3348	
180 minute summer	403	1.003	404	8.7	0.425	0.002	0.2790	
180 minute summer	404	1.004	405	10.9	0.727	0.477	0.1890	
180 minute summer	405	Hydro-Brake®	406	1.4				29.6



**Results for 100 year +50% CC 180 minute winter. 420 minute analysis at 4 minute timestep. Mass balance: 99.88%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
180 minute winter	400	100	28.972	0.030	1.8	0.4040	0.0000	OK
180 minute winter	401	100	28.839	0.043	3.6	0.5880	0.0000	OK
180 minute winter	402	100	28.741	0.071	5.4	0.9630	0.0000	OK
180 minute winter	403	100	28.626	0.026	7.1	0.3580	0.0000	OK
180 minute winter	404	100	27.065	0.065	8.9	0.9032	0.0000	OK
180 minute winter	405	180	25.639	0.607	8.9	26.2770	0.0000	SURCHARGED
180 minute winter	406	4	24.457	0.000	1.4	0.0000	0.0000	OK

  

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
180 minute winter	400	1.000	401	1.8	0.138	0.002	0.3852	
180 minute winter	401	1.001	402	3.6	0.150	0.005	0.6183	
180 minute winter	402	1.002	403	5.3	0.280	0.007	0.2890	
180 minute winter	403	1.003	404	7.1	0.405	0.002	0.2377	
180 minute winter	404	1.004	405	8.9	0.786	0.390	0.1804	
180 minute winter	405	Hydro-Brake <sup>®</sup>	406	1.4				29.5



**Results for 100 year +50% CC 240 minute summer. 480 minute analysis at 4 minute timestep. Mass balance: 100.00%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
240 minute summer	400	128	28.973	0.031	2.0	0.4196	0.0000	OK
240 minute summer	401	128	28.841	0.044	3.9	0.6069	0.0000	OK
240 minute summer	402	128	28.742	0.072	5.7	0.9819	0.0000	OK
240 minute summer	403	128	28.627	0.027	7.5	0.3667	0.0000	OK
240 minute summer	404	128	27.067	0.067	9.3	0.9249	0.0000	OK
240 minute summer	405	208	25.574	0.543	9.3	22.2104	0.0000	SURCHARGED
240 minute summer	406	4	24.457	0.000	1.4	0.0000	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
240 minute summer	400	1.000	401	1.9	0.142	0.002	0.4028	
240 minute summer	401	1.001	402	3.8	0.154	0.005	0.6391	
240 minute summer	402	1.002	403	5.6	0.284	0.007	0.2974	
240 minute summer	403	1.003	404	7.4	0.409	0.002	0.2458	
240 minute summer	404	1.004	405	9.3	0.720	0.407	0.1821	
240 minute summer	405	Hydro-Brake®	406	1.4				33.6



**Results for 100 year +50% CC 240 minute winter. 480 minute analysis at 4 minute timestep. Mass balance: 99.88%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
240 minute winter	400	128	28.969	0.027	1.5	0.3646	0.0000	OK
240 minute winter	401	128	28.835	0.039	3.0	0.5317	0.0000	OK
240 minute winter	402	132	28.734	0.064	4.5	0.8780	0.0000	OK
240 minute winter	403	128	28.623	0.023	5.9	0.3216	0.0000	OK
240 minute winter	404	128	27.059	0.059	7.4	0.8127	0.0000	OK
240 minute winter	405	228	25.642	0.611	7.3	26.5219	0.0000	SURCHARGED
240 minute winter	406	4	24.457	0.000	1.4	0.0000	0.0000	OK

  

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
240 minute winter	400	1.000	401	1.5	0.130	0.002	0.3376	
240 minute winter	401	1.001	402	3.0	0.142	0.004	0.5408	
240 minute winter	402	1.002	403	4.4	0.263	0.006	0.2529	
240 minute winter	403	1.003	404	5.9	0.385	0.002	0.2054	
240 minute winter	404	1.004	405	7.3	0.722	0.322	0.1735	
240 minute winter	405	Hydro-Brake®	406	1.4				33.6





**Results for 100 year +50% CC 360 minute summer. 600 minute analysis at 8 minute timestep. Mass balance: 100.00%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute summer	400	184	28.968	0.026	1.5	0.3539	0.0000	OK
360 minute summer	401	192	28.834	0.038	2.9	0.5122	0.0000	OK
360 minute summer	402	192	28.733	0.063	4.2	0.8546	0.0000	OK
360 minute summer	403	192	28.622	0.022	5.5	0.3090	0.0000	OK
360 minute summer	404	192	27.056	0.056	6.9	0.7829	0.0000	OK
360 minute summer	405	272	25.556	0.525	6.9	21.1376	0.0000	SURCHARGED
360 minute summer	406	8	24.457	0.000	1.4	0.0000	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute summer	400	1.000	401	1.4	0.129	0.002	0.3219	
360 minute summer	401	1.001	402	2.8	0.140	0.004	0.5185	
360 minute summer	402	1.002	403	4.1	0.258	0.005	0.2429	
360 minute summer	403	1.003	404	5.5	0.378	0.001	0.1951	
360 minute summer	404	1.004	405	6.9	0.585	0.301	0.1712	
360 minute summer	405	Hydro-Brake®	406	1.4				40.3



**Results for 100 year +50% CC 360 minute winter. 600 minute analysis at 8 minute timestep. Mass balance: 100.00%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
360 minute winter	400	192	28.965	0.023	1.1	0.3073	0.0000	OK
360 minute winter	401	192	28.829	0.033	2.2	0.4520	0.0000	OK
360 minute winter	402	192	28.726	0.056	3.3	0.7620	0.0000	OK
360 minute winter	403	192	28.620	0.020	4.4	0.2723	0.0000	OK
360 minute winter	404	192	27.050	0.050	5.5	0.6950	0.0000	OK
360 minute winter	405	288	25.601	0.569	5.5	23.8583	0.0000	SURCHARGED
360 minute winter	406	8	24.457	0.000	1.4	0.0000	0.0000	OK

  

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
360 minute winter	400	1.000	401	1.1	0.118	0.001	0.2735	
360 minute winter	401	1.001	402	2.2	0.129	0.003	0.4409	
360 minute winter	402	1.002	403	3.3	0.239	0.004	0.2069	
360 minute winter	403	1.003	404	4.4	0.354	0.001	0.1659	
360 minute winter	404	1.004	405	5.5	0.709	0.240	0.1646	
360 minute winter	405	Hydro-Brake®	406	1.4				41.5



**Results for 100 year +50% CC 480 minute summer. 720 minute analysis at 8 minute timestep. Mass balance: 100.00%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
480 minute summer	400	248	28.966	0.024	1.2	0.3213	0.0000	OK
480 minute summer	401	248	28.830	0.034	2.4	0.4693	0.0000	OK
480 minute summer	402	248	28.727	0.057	3.6	0.7817	0.0000	OK
480 minute summer	403	248	28.620	0.020	4.7	0.2814	0.0000	OK
480 minute summer	404	248	27.052	0.052	5.8	0.7159	0.0000	OK
480 minute summer	405	336	25.511	0.479	5.8	18.5191	0.0000	SURCHARGED
480 minute summer	406	8	24.457	0.000	1.4	0.0000	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
480 minute summer	400	1.000	401	1.2	0.122	0.002	0.2877	
480 minute summer	401	1.001	402	2.4	0.132	0.003	0.4589	
480 minute summer	402	1.002	403	3.5	0.243	0.004	0.2146	
480 minute summer	403	1.003	404	4.6	0.360	0.001	0.1727	
480 minute summer	404	1.004	405	5.8	0.585	0.254	0.1662	
480 minute summer	405	Hydro-Brake®	406	1.4				42.8



**Results for 100 year +50% CC 480 minute winter. 720 minute analysis at 8 minute timestep. Mass balance: 100.00%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
480 minute winter	400	248	28.962	0.020	0.9	0.2735	0.0000	OK
480 minute winter	401	248	28.825	0.029	1.8	0.4021	0.0000	OK
480 minute winter	402	248	28.720	0.050	2.7	0.6824	0.0000	OK
480 minute winter	403	248	28.617	0.017	3.5	0.2404	0.0000	OK
480 minute winter	404	248	27.045	0.045	4.4	0.6201	0.0000	OK
480 minute winter	405	368	25.570	0.538	4.4	21.9522	0.0000	SURCHARGED
480 minute winter	406	8	24.457	0.000	1.4	0.0000	0.0000	OK

  

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
480 minute winter	400	1.000	401	0.9	0.111	0.001	0.2364	
480 minute winter	401	1.001	402	1.8	0.121	0.002	0.3788	
480 minute winter	402	1.002	403	2.6	0.222	0.003	0.1778	
480 minute winter	403	1.003	404	3.5	0.330	0.001	0.1422	
480 minute winter	404	1.004	405	4.4	0.593	0.193	0.1592	
480 minute winter	405	Hydro-Brake®	406	1.4				49.3

**Results for 100 year +50% CC 600 minute summer. 840 minute analysis at 15 minute timestep. Mass balance: 99.89%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
600 minute summer	400	315	28.962	0.020	0.9	0.2744	0.0000	OK
600 minute summer	401	315	28.826	0.030	1.8	0.4049	0.0000	OK
600 minute summer	402	315	28.721	0.051	2.7	0.6899	0.0000	OK
600 minute summer	403	315	28.618	0.018	3.6	0.2429	0.0000	OK
600 minute summer	404	315	27.045	0.045	4.5	0.6258	0.0000	OK
600 minute summer	405	405	25.501	0.469	4.5	17.9501	0.0000	SURCHARGED
600 minute summer	406	15	24.457	0.000	1.4	0.0000	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
600 minute summer	400	1.000	401	0.9	0.111	0.001	0.2381	
600 minute summer	401	1.001	402	1.8	0.121	0.002	0.3837	
600 minute summer	402	1.002	403	2.7	0.224	0.003	0.1803	
600 minute summer	403	1.003	404	3.6	0.332	0.001	0.1440	
600 minute summer	404	1.004	405	4.5	0.550	0.196	0.1596	
600 minute summer	405	Hydro-Brake®	406	1.4				46.3



**Results for 100 year +50% CC 600 minute winter. 840 minute analysis at 15 minute timestep. Mass balance: 100.00%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
600 minute winter	400	330	28.959	0.017	0.7	0.2380	0.0000	OK
600 minute winter	401	330	28.822	0.026	1.4	0.3528	0.0000	OK
600 minute winter	402	330	28.715	0.045	2.1	0.6100	0.0000	OK
600 minute winter	403	330	28.615	0.015	2.8	0.2109	0.0000	OK
600 minute winter	404	330	27.040	0.040	3.5	0.5520	0.0000	OK
600 minute winter	405	435	25.527	0.495	3.5	19.4055	0.0000	SURCHARGED
600 minute winter	406	15	24.457	0.000	1.4	0.0000	0.0000	OK

  

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
600 minute winter	400	1.000	401	0.7	0.103	0.001	0.2007	
600 minute winter	401	1.001	402	1.4	0.112	0.002	0.3240	
600 minute winter	402	1.002	403	2.1	0.206	0.003	0.1526	
600 minute winter	403	1.003	404	2.8	0.306	0.001	0.1219	
600 minute winter	404	1.004	405	3.5	0.589	0.153	0.1544	
600 minute winter	405	Hydro-Brake®	406	1.4				50.1



**Results for 100 year +50% CC 720 minute summer. 960 minute analysis at 15 minute timestep. Mass balance: 99.75%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
720 minute summer	400	375	28.961	0.019	0.8	0.2566	0.0000	OK
720 minute summer	401	375	28.824	0.028	1.6	0.3793	0.0000	OK
720 minute summer	402	375	28.718	0.048	2.4	0.6500	0.0000	OK
720 minute summer	403	375	28.616	0.016	3.2	0.2268	0.0000	OK
720 minute summer	404	375	27.042	0.042	4.0	0.5886	0.0000	OK
720 minute summer	405	465	25.466	0.434	4.0	16.0568	0.0000	SURCHARGED
720 minute summer	406	15	24.457	0.000	1.4	0.0000	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
720 minute summer	400	1.000	401	0.8	0.107	0.001	0.2195	
720 minute summer	401	1.001	402	1.6	0.117	0.002	0.3536	
720 minute summer	402	1.002	403	2.4	0.215	0.003	0.1662	
720 minute summer	403	1.003	404	3.2	0.319	0.001	0.1327	
720 minute summer	404	1.004	405	4.0	0.550	0.174	0.1570	
720 minute summer	405	Hydro-Brake®	406	1.4				49.0



**Results for 100 year +50% CC 720 minute winter. 960 minute analysis at 15 minute timestep. Mass balance: 99.87%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
720 minute winter	400	390	28.958	0.016	0.6	0.2179	0.0000	OK
720 minute winter	401	405	28.820	0.024	1.2	0.3237	0.0000	OK
720 minute winter	402	405	28.711	0.041	1.8	0.5641	0.0000	OK
720 minute winter	403	405	28.614	0.014	2.4	0.1930	0.0000	OK
720 minute winter	404	405	27.037	0.037	3.0	0.5108	0.0000	OK
720 minute winter	405	510	25.481	0.449	3.0	16.8413	0.0000	SURCHARGED
720 minute winter	406	15	24.457	0.000	1.4	0.0000	0.0000	OK

  

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
720 minute winter	400	1.000	401	0.6	0.098	0.001	0.1807	
720 minute winter	401	1.001	402	1.2	0.106	0.002	0.2917	
720 minute winter	402	1.002	403	1.8	0.195	0.002	0.1375	
720 minute winter	403	1.003	404	2.4	0.290	0.001	0.1100	
720 minute winter	404	1.004	405	3.0	0.589	0.131	0.1516	
720 minute winter	405	Hydro-Brake®	406	1.4				52.8





**Results for 100 year +50% CC 960 minute summer. 1200 minute analysis at 15 minute timestep. Mass balance: 99.55%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute summer	400	495	28.959	0.017	0.7	0.2378	0.0000	OK
960 minute summer	401	495	28.822	0.026	1.4	0.3520	0.0000	OK
960 minute summer	402	495	28.714	0.044	2.1	0.6068	0.0000	OK
960 minute summer	403	495	28.615	0.015	2.8	0.2098	0.0000	OK
960 minute summer	404	495	27.040	0.040	3.5	0.5492	0.0000	OK
960 minute summer	405	600	25.419	0.387	3.5	13.6522	0.0000	SURCHARGED
960 minute summer	406	15	24.457	0.000	1.4	0.0000	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
960 minute summer	400	1.000	401	0.7	0.103	0.001	0.2002	
960 minute summer	401	1.001	402	1.4	0.112	0.002	0.3221	
960 minute summer	402	1.002	403	2.1	0.205	0.003	0.1515	
960 minute summer	403	1.003	404	2.8	0.305	0.001	0.1211	
960 minute summer	404	1.004	405	3.5	0.550	0.152	0.1542	
960 minute summer	405	Hydro-Brake®	406	1.4				55.2



**Results for 100 year +50% CC 960 minute winter. 1200 minute analysis at 15 minute timestep. Mass balance: 99.69%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
960 minute winter	400	525	28.956	0.014	0.5	0.1962	0.0000	OK
960 minute winter	401	525	28.817	0.021	1.0	0.2922	0.0000	OK
960 minute winter	402	525	28.708	0.038	1.5	0.5138	0.0000	OK
960 minute winter	403	525	28.613	0.013	2.0	0.1737	0.0000	OK
960 minute winter	404	525	27.034	0.034	2.5	0.4661	0.0000	OK
960 minute winter	405	645	25.412	0.381	2.5	13.3368	0.0000	SURCHARGED
960 minute winter	406	15	24.457	0.000	1.4	0.0000	0.0000	OK

  

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
960 minute winter	400	1.000	401	0.5	0.092	0.001	0.1598	
960 minute winter	401	1.001	402	1.0	0.100	0.001	0.2577	
960 minute winter	402	1.002	403	1.5	0.184	0.002	0.1216	
960 minute winter	403	1.003	404	2.0	0.271	0.001	0.0977	
960 minute winter	404	1.004	405	2.5	0.589	0.110	0.1487	
960 minute winter	405	Hydro-Brake®	406	1.4				58.2



**Results for 100 year +50% CC 1440 minute summer. 1680 minute analysis at 30 minute timestep. Mass balance: 99.61%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
1440 minute summer	400	750	28.956	0.014	0.5	0.1962	0.0000	OK
1440 minute summer	401	750	28.817	0.021	1.0	0.2922	0.0000	OK
1440 minute summer	402	750	28.708	0.038	1.5	0.5135	0.0000	OK
1440 minute summer	403	750	28.613	0.013	2.0	0.1735	0.0000	OK
1440 minute summer	404	750	27.034	0.034	2.5	0.4659	0.0000	OK
1440 minute summer	405	810	25.303	0.271	2.5	8.4065	0.0000	SURCHARGED
1440 minute summer	406	30	24.457	0.000	1.4	0.0000	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
1440 minute summer	400	1.000	401	0.5	0.092	0.001	0.1598	
1440 minute summer	401	1.001	402	1.0	0.100	0.001	0.2576	
1440 minute summer	402	1.002	403	1.5	0.184	0.002	0.1215	
1440 minute summer	403	1.003	404	2.0	0.271	0.001	0.0976	
1440 minute summer	404	1.004	405	2.5	0.539	0.109	0.1486	
1440 minute summer	405	Hydro-Brake®	406	1.4				55.5



**Results for 100 year +50% CC 1440 minute winter. 1680 minute analysis at 30 minute timestep. Mass balance: 99.54%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
1440 minute winter	400	780	28.955	0.013	0.4	0.1724	0.0000	OK
1440 minute winter	401	780	28.815	0.019	0.8	0.2575	0.0000	OK
1440 minute winter	402	780	28.704	0.034	1.2	0.4576	0.0000	OK
1440 minute winter	403	780	28.611	0.011	1.6	0.1525	0.0000	OK
1440 minute winter	404	780	27.030	0.030	2.0	0.4173	0.0000	OK
1440 minute winter	405	810	25.268	0.237	2.0	7.0448	0.0000	SURCHARGED
1440 minute winter	406	30	24.457	0.000	1.4	0.0000	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
1440 minute winter	400	1.000	401	0.4	0.085	0.001	0.1376	
1440 minute winter	401	1.001	402	0.8	0.093	0.001	0.2217	
1440 minute winter	402	1.002	403	1.2	0.170	0.002	0.1047	
1440 minute winter	403	1.003	404	1.6	0.249	0.000	0.0847	
1440 minute winter	404	1.004	405	2.0	0.539	0.088	0.1456	
1440 minute winter	405	Hydro-Brake®	406	1.4				67.9