



HOLDGATE
CONSULTING

Drainage Design
Calculations

Project:
Land at Fenay Lane
Huddersfield

Job No.:
26-255

DRAFT

Author: NM

Date: Sept 2026

Checked: RJP

Approved: RJP

FINAL

Author: NM

Date: Sept 2026

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Approved: RJP

**Design Settings**

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Inverts
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.000
CV	0.750	Preferred Cover Depth (m)	0.350
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)	Depth (m)	Invert Level (m)
SW IC01	0.004	5.00	119.374	450	0.350	119.024
SW IC02	0.008	5.00	118.434	450	0.385	118.049
SW IC03	0.000		117.530	450	0.434	117.096
SW IC04	0.003	5.00	118.061	450	1.414	116.647
SW IC05	0.008	5.00	116.510	450	0.348	116.162
SW IC06	0.003	5.00	116.474	450	0.529	115.945
SW IC07	0.010	5.00	119.289	450	1.382	117.907
SW IC08	0.020	5.00	118.705	450	1.077	117.628
SW IC09	0.014	5.00	118.156	450	1.251	116.905
SW IC10	0.011	5.00	116.657	450	0.450	116.207
SW IC11	0.018	5.00	116.340	450	0.450	115.890
POND 1						
SW MH01	0.022	5.00	116.271	1200	1.967	114.304
POND 2						
SW MH02	0.000		114.794	1200	1.434	113.360
SW MH03	0.000		114.334	1200	1.084	113.250
SW IC12	0.011		116.991	315		
SW IC13	0.002	5.00	113.831	315	1.023	112.808
SW IC14	0.029	5.00	113.351	450	1.239	112.112
SW IC15	0.026	5.00	113.330	450	1.508	111.822
SW IC16	0.003	5.00	113.406	450	1.735	111.671
SW IC17	0.006	5.00	113.820	450	2.288	111.532
SW IC18			113.033	450	1.562	111.471
SW IC19	0.025	5.00	111.916	450	0.870	111.046
SW IC20	0.010	5.00	111.313	315	0.350	110.963
SW IC21	0.008	5.00	111.475	450	1.080	110.395
SW IC22	0.000		111.396	450	1.431	109.965
SW IC23	0.018	5.00	110.000	315	0.450	109.550
SW IC24	0.017	5.00	111.127	450	1.772	109.355
SW IC25	0.005	5.00	109.429	315	0.450	108.979
SW IC26	0.011	5.00	109.773	450	1.096	108.677
SW IC27	0.000		109.075	600	2.575	106.500
Turret 1	0.000		108.735	450	2.311	106.424
SW MH04	0.000		108.031	1200	1.702	106.329
outfall			103.500	150	1.211	102.289


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	SW IC01	SW IC02	20.481	0.600	119.024	118.049	0.975	21.0	100	5.20	48.5
1.001	SW IC02	SW IC03	15.250	0.600	118.049	117.096	0.953	16.0	100	5.33	48.0
1.002	SW IC03	SW IC04	7.100	0.600	117.096	117.007	0.089	80.0	100	5.47	47.5
1.003	SW IC04	SW IC05	9.700	0.600	116.647	116.162	0.485	20.0	100	5.56	47.2
1.004	SW IC05	SW IC06	17.350	0.600	116.162	115.945	0.217	80.0	150	5.82	46.3
1.005	SW IC06	SW MH03	11.060	0.600	115.945	114.012	1.933	5.7	150	5.86	46.1
2.000	SW IC07	SW IC08	5.580	0.600	117.907	117.628	0.279	20.0	150	5.04	49.1
2.001	SW IC08	SW IC09	14.460	0.600	117.628	116.905	0.723	20.0	150	5.15	48.7
2.002	SW IC09	SW IC10	12.460	0.600	116.905	116.207	0.698	17.9	150	5.23	48.4
2.003	SW IC10	SW IC11	8.870	0.600	116.207	115.890	0.317	28.0	150	5.31	48.1
2.004	SW IC11	SW MH01	14.900	0.600	115.890	114.304	1.586	9.4	150	5.39	47.8
2.005	SW MH01	SW MH02	10.400	0.600	114.304	113.360	0.944	11.0	150	5.44	47.6
2.006	SW MH02	SW MH03	7.300	0.600	113.360	113.250	0.110	66.4	150	5.54	47.3
1.006	SW MH03	SW IC14	22.760	0.600	113.250	112.112	1.138	20.0	150	6.03	45.6
1.007	SW IC14	SW IC18	11.990	0.600	112.112	111.725	0.387	31.0	150	6.14	45.2
1.008	SW IC18	SW IC22	8.550	0.600	111.471	111.043	0.428	20.0	150	6.20	45.0
1.009	SW IC22	SW IC27	24.800	0.600	109.965	108.312	1.653	15.0	225	6.33	44.7
1.010	SW IC27	Turret 1	11.380	0.600	106.500	106.424	0.076	150.0	225	6.50	44.1
1.011	Turret 1	SW MH04	14.300	0.600	106.424	106.329	0.095	150.5	225	6.73	43.5
1.012	SW MH04	outfall	20.200	0.600	106.329	102.289	4.040	5.0	225	6.79	43.3
3.000	SW IC13	SW IC14	12.700	0.600	112.808	112.112	0.696	18.2	150	5.09	48.9

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	1.692	13.3	0.5	0.250	0.285	0.004	0.0	14	0.816
1.001	1.940	15.2	1.6	0.285	0.334	0.012	0.0	21	1.242
1.002	0.861	6.8	1.5	0.334	0.954	0.012	0.0	32	0.696
1.003	1.734	13.6	1.9	1.314	0.248	0.015	0.0	25	1.225
1.004	1.125	19.9	2.9	0.198	0.379	0.023	0.0	38	0.801
1.005	4.240	74.9	3.3	0.379	0.172	0.026	0.0	21	2.135
2.000	2.262	40.0	1.3	1.232	0.927	0.010	0.0	18	1.034
2.001	2.262	40.0	4.0	0.927	1.101	0.030	0.0	32	1.451
2.002	2.395	42.3	5.8	1.101	0.300	0.044	0.0	37	1.680
2.003	1.910	33.8	7.2	0.300	0.300	0.055	0.0	47	1.517
2.004	3.306	58.4	9.5	0.300	1.817	0.073	0.0	41	2.441
2.005	3.052	53.9	12.3	1.817	1.284	0.095	0.0	48	2.474
2.006	1.236	21.8	12.2	1.284	0.934	0.095	0.0	80	1.268
1.006	2.262	40.0	14.9	0.934	1.089	0.121	0.0	64	2.102
1.007	1.814	32.1	18.6	1.089	1.158	0.152	0.0	82	1.882
1.008	2.262	40.0	22.8	1.412	0.203	0.187	0.0	81	2.334
1.009	3.395	135.0	27.8	1.206	0.538	0.230	0.0	69	2.688
1.010	1.065	42.3	33.6	2.350	2.086	0.281	0.0	152	1.178
1.011	1.063	42.3	33.1	2.086	1.477	0.281	0.0	150	1.172
1.012	5.891	234.2	33.0	1.477	0.986	0.281	0.0	57	4.193
3.000	2.369	41.9	0.3	0.873	1.089	0.002	0.0	8	0.644


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)
4.000	SW IC15	SW IC16	12.100	0.600	111.822	111.671	0.151	80.0	150	5.18	48.6
4.001	SW IC16	SW IC17	11.100	0.600	111.671	111.532	0.139	80.0	150	5.34	48.0
4.002	SW IC17	SW IC18	4.900	0.600	111.532	111.471	0.061	80.0	150	5.42	47.7
5.000	SW IC19	SW IC21	18.000	0.600	111.046	110.821	0.225	80.0	150	5.27	48.3
5.001	SW IC21	SW IC22	3.000	0.600	110.395	110.245	0.150	20.0	150	5.29	48.2
6.000	SW IC20	SW IC21	11.355	0.600	110.963	110.395	0.568	20.0	150	5.08	48.9
7.000	SW IC23	SW IC24	15.630	0.600	109.550	109.355	0.195	80.0	150	5.23	48.4
7.001	SW IC24	SW IC26	15.930	0.600	109.355	108.691	0.664	24.0	150	5.36	47.9
7.002	SW IC26	SW IC27	6.320	0.600	108.677	108.414	0.263	24.0	150	5.52	47.4
8.000	SW IC25	SW IC26	24.200	0.600	108.979	108.677	0.302	80.0	100	5.47	47.5

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)
4.000	1.125	19.9	3.4	1.358	1.585	0.026	0.0	42	0.842
4.001	1.125	19.9	3.8	1.585	2.138	0.029	0.0	44	0.867
4.002	1.125	19.9	4.5	2.138	1.412	0.035	0.0	48	0.910
5.000	1.125	19.9	3.3	0.720	0.504	0.025	0.0	41	0.835
5.001	2.262	40.0	5.6	0.930	1.001	0.043	0.0	38	1.600
6.000	2.262	40.0	1.3	0.200	0.930	0.010	0.0	18	1.034
7.000	1.125	19.9	2.4	0.300	1.622	0.018	0.0	35	0.758
7.001	2.064	36.5	4.5	1.622	0.932	0.035	0.0	35	1.407
7.002	2.064	36.5	6.5	0.946	0.511	0.051	0.0	43	1.571
8.000	0.861	6.8	0.6	0.350	0.996	0.005	0.0	21	0.537

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	20.481	21.0	100	Circular	119.374	119.024	0.250	118.434	118.049	0.285
1.001	15.250	16.0	100	Circular	118.434	118.049	0.285	117.530	117.096	0.334
1.002	7.100	80.0	100	Circular	117.530	117.096	0.334	118.061	117.007	0.954
1.003	9.700	20.0	100	Circular	118.061	116.647	1.314	116.510	116.162	0.248
1.004	17.350	80.0	150	Circular	116.510	116.162	0.198	116.474	115.945	0.379

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	SW IC01	450	Manhole	Adoptable	SW IC02	450	Manhole	Adoptable
1.001	SW IC02	450	Manhole	Adoptable	SW IC03	450	Manhole	Adoptable
1.002	SW IC03	450	Manhole	Adoptable	SW IC04	450	Manhole	Adoptable
1.003	SW IC04	450	Manhole	Adoptable	SW IC05	450	Manhole	Adoptable
1.004	SW IC05	450	Manhole	Adoptable	SW IC06	450	Manhole	Adoptable

**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)
1.005	11.060	5.7	150	Circular	116.474	115.945	0.379	114.334	114.012	0.172
2.000	5.580	20.0	150	Circular	119.289	117.907	1.232	118.705	117.628	0.927
2.001	14.460	20.0	150	Circular	118.705	117.628	0.927	118.156	116.905	1.101
2.002	12.460	17.9	150	Circular	118.156	116.905	1.101	116.657	116.207	0.300
2.003	8.870	28.0	150	Circular	116.657	116.207	0.300	116.340	115.890	0.300
2.004	14.900	9.4	150	Circular	116.340	115.890	0.300	116.271	114.304	1.817
2.005	10.400	11.0	150	Circular	116.271	114.304	1.817	114.794	113.360	1.284
2.006	7.300	66.4	150	Circular	114.794	113.360	1.284	114.334	113.250	0.934
1.006	22.760	20.0	150	Circular	114.334	113.250	0.934	113.351	112.112	1.089
1.007	11.990	31.0	150	Circular	113.351	112.112	1.089	113.033	111.725	1.158
1.008	8.550	20.0	150	Circular	113.033	111.471	1.412	111.396	111.043	0.203
1.009	24.800	15.0	225	Circular	111.396	109.965	1.206	109.075	108.312	0.538
1.010	11.380	150.0	225	Circular	109.075	106.500	2.350	108.735	106.424	2.086
1.011	14.300	150.5	225	Circular	108.735	106.424	2.086	108.031	106.329	1.477
1.012	20.200	5.0	225	Circular	108.031	106.329	1.477	103.500	102.289	0.986
3.000	12.700	18.2	150	Circular	113.831	112.808	0.873	113.351	112.112	1.089
4.000	12.100	80.0	150	Circular	113.330	111.822	1.358	113.406	111.671	1.585
4.001	11.100	80.0	150	Circular	113.406	111.671	1.585	113.820	111.532	2.138
4.002	4.900	80.0	150	Circular	113.820	111.532	2.138	113.033	111.471	1.412
5.000	18.000	80.0	150	Circular	111.916	111.046	0.720	111.475	110.821	0.504

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.005	SW IC06	450	Manhole	Adoptable	SW MH03	1200	Manhole	Adoptable
2.000	SW IC07	450	Manhole	Adoptable	SW IC08	450	Manhole	Adoptable
2.001	SW IC08	450	Manhole	Adoptable	SW IC09	450	Manhole	Adoptable
2.002	SW IC09	450	Manhole	Adoptable	SW IC10	450	Manhole	Adoptable
2.003	SW IC10	450	Manhole	Adoptable	SW IC11	450	Manhole	Adoptable
2.004	SW IC11	450	Manhole	Adoptable	SW MH01	1200	Manhole	Adoptable
2.005	SW MH01	1200	Manhole	Adoptable	SW MH02	1200	Manhole	Adoptable
2.006	SW MH02	1200	Manhole	Adoptable	SW MH03	1200	Manhole	Adoptable
1.006	SW MH03	1200	Manhole	Adoptable	SW IC14	450	Manhole	Adoptable
1.007	SW IC14	450	Manhole	Adoptable	SW IC18	450	Manhole	Adoptable
1.008	SW IC18	450	Manhole	Adoptable	SW IC22	450	Manhole	Adoptable
1.009	SW IC22	450	Manhole	Adoptable	SW IC27	600	Manhole	Adoptable
1.010	SW IC27	600	Manhole	Adoptable	Turret 1	450	Manhole	Adoptable
1.011	Turret 1	450	Manhole	Adoptable	SW MH04	1200	Manhole	Adoptable
1.012	SW MH04	1200	Manhole	Adoptable	outfall	150	Manhole	Adoptable
3.000	SW IC13	315	Manhole	Adoptable	SW IC14	450	Manhole	Adoptable
4.000	SW IC15	450	Manhole	Adoptable	SW IC16	450	Manhole	Adoptable
4.001	SW IC16	450	Manhole	Adoptable	SW IC17	450	Manhole	Adoptable
4.002	SW IC17	450	Manhole	Adoptable	SW IC18	450	Manhole	Adoptable
5.000	SW IC19	450	Manhole	Adoptable	SW IC21	450	Manhole	Adoptable

**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)
5.001	3.000	20.0	150	Circular	111.475	110.395	0.930	111.396	110.245	1.001
6.000	11.355	20.0	150	Circular	111.313	110.963	0.200	111.475	110.395	0.930
7.000	15.630	80.0	150	Circular	110.000	109.550	0.300	111.127	109.355	1.622
7.001	15.930	24.0	150	Circular	111.127	109.355	1.622	109.773	108.691	0.932
7.002	6.320	24.0	150	Circular	109.773	108.677	0.946	109.075	108.414	0.511
8.000	24.200	80.0	100	Circular	109.429	108.979	0.350	109.773	108.677	0.996

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
5.001	SW IC21	450	Manhole	Adoptable	SW IC22	450	Manhole	Adoptable
6.000	SW IC20	315	Manhole	Adoptable	SW IC21	450	Manhole	Adoptable
7.000	SW IC23	315	Manhole	Adoptable	SW IC24	450	Manhole	Adoptable
7.001	SW IC24	450	Manhole	Adoptable	SW IC26	450	Manhole	Adoptable
7.002	SW IC26	450	Manhole	Adoptable	SW IC27	600	Manhole	Adoptable
8.000	SW IC25	315	Manhole	Adoptable	SW IC26	450	Manhole	Adoptable

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW IC01	119.374	0.350	450				
				0	1.000	119.024	100
SW IC02	118.434	0.385	450				
				0	1.001	118.049	100
SW IC03	117.530	0.434	450				
				0	1.002	117.096	100
SW IC04	118.061	1.414	450				
				0	1.003	116.647	100
SW IC05	116.510	0.348	450				
				0	1.004	116.162	150
SW IC06	116.474	0.529	450				
				0	1.005	115.945	150

**Manhole Schedule**

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
SW IC07	119.289	1.382	450					
				0	2.000	117.907	150	
SW IC08	118.705	1.077	450		1	2.000	117.628	150
				0	2.001	117.628	150	
SW IC09	118.156	1.251	450		1	2.001	116.905	150
				0	2.002	116.905	150	
SW IC10	116.657	0.450	450		1	2.002	116.207	150
				0	2.003	116.207	150	
SW IC11	116.340	0.450	450		1	2.003	115.890	150
				0	2.004	115.890	150	
POND 1								
SW MH01	116.271	1.967	1200		1	2.004	114.304	150
				0	2.005	114.304	150	
POND 2								
SW MH02	114.794	1.434	1200		1	2.005	113.360	150
				0	2.006	113.360	150	
SW MH03	114.334	1.084	1200		1	2.006	113.250	150
				2	1.005	114.012	150	
				0	1.006	113.250	150	
SW IC12	116.991		315					
SW IC13	113.831	1.023	315					
				0	3.000	112.808	150	
SW IC14	113.351	1.239	450		1	3.000	112.112	150
				2	1.006	112.112	150	
				0	1.007	112.112	150	

**Manhole Schedule**

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
SW IC15	113.330	1.508	450		0	4.000	111.822	150
SW IC16	113.406	1.735	450		1	4.000	111.671	150
					0	4.001	111.671	150
SW IC17	113.820	2.288	450		1	4.001	111.532	150
					0	4.002	111.532	150
SW IC18	113.033	1.562	450		1	4.002	111.471	150
					2	1.007	111.725	150
					0	1.008	111.471	150
SW IC19	111.916	0.870	450		0	5.000	111.046	150
SW IC20	111.313	0.350	315		0	6.000	110.963	150
SW IC21	111.475	1.080	450		1	6.000	110.395	150
					2	5.000	110.821	150
					0	5.001	110.395	150
SW IC22	111.396	1.431	450		1	5.001	110.245	150
					2	1.008	111.043	150
					0	1.009	109.965	225
SW IC23	110.000	0.450	315		0	7.000	109.550	150
SW IC24	111.127	1.772	450		1	7.000	109.355	150
					0	7.001	109.355	150
SW IC25	109.429	0.450	315		0	8.000	108.979	100
SW IC26	109.773	1.096	450		1	8.000	108.677	100
					2	7.001	108.691	150
					0	7.002	108.677	150
SW IC27	109.075	2.575	600		1	7.002	108.414	150
					2	1.009	108.312	225
					0	1.010	106.500	225



Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Turret 1	108.735	2.311	450	1	1.010	106.424	225
				0	1.011	106.424	225
SW MH04	108.031	1.702	1200	1	1.011	106.329	225
				0	1.012	106.329	225
outfall	103.500	1.211	150	1	1.012	102.289	225

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	0.750	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

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 %)
2	0	0	0
30	0	0	0
100	40	0	0

Node SW MH04 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	106.329	Product Number	CTL-SHE-0109-5000-0800-5000
Design Depth (m)	0.800	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node SW MH01 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	114.304	Product Number	CTL-SHE-0085-3000-0800-3000
Design Depth (m)	0.800	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	3.0	Min Node Diameter (mm)	1200

Node Turret 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	106.424
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	



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	100.0	100.0	1.200	100.0	142.5	1.201	0.0	142.5

Node SW MH01 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	114.304
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	144

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	97.0	97.0	0.500	97.0	114.5	0.501	0.0	114.5

Node SW MH03 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	113.250
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)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	15.0	15.0	0.500	15.0	21.9	0.501	0.0	21.9


Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW IC01	11	119.039	0.015	0.6	0.0023	0.0000	OK
15 minute winter	SW IC02	11	118.072	0.023	1.8	0.0037	0.0000	OK
15 minute winter	SW IC03	11	117.133	0.037	1.8	0.0058	0.0000	OK
15 minute winter	SW IC04	10	116.675	0.028	2.3	0.0044	0.0000	OK
15 minute winter	SW IC05	10	116.209	0.047	3.5	0.0075	0.0000	OK
15 minute winter	SW IC06	10	115.969	0.024	3.9	0.0038	0.0000	OK
15 minute winter	SW IC07	10	117.928	0.020	1.6	0.0033	0.0000	OK
15 minute winter	SW IC08	10	117.663	0.035	4.7	0.0055	0.0000	OK
15 minute winter	SW IC09	10	116.946	0.041	6.9	0.0065	0.0000	OK
15 minute winter	SW IC10	10	116.262	0.055	8.5	0.0087	0.0000	OK
15 minute winter	SW IC11 POND 1	10	115.940	0.050	11.2	0.0079	0.0000	OK
180 minute winter	SW MH01 POND 2	124	114.409	0.105	4.3	10.3147	0.0000	OK
180 minute winter	SW MH02	124	113.394	0.034	2.2	0.0385	0.0000	OK
15 minute winter	SW MH03	13	113.282	0.032	4.2	0.5091	0.0000	OK
	SW IC12							
15 minute winter	SW IC13	11	112.817	0.009	0.3	0.0007	0.0000	OK
15 minute winter	SW IC14	11	112.165	0.053	7.9	0.0084	0.0000	OK
15 minute winter	SW IC15	10	111.869	0.047	4.0	0.0074	0.0000	OK
15 minute winter	SW IC16	10	111.720	0.049	4.5	0.0078	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	SW IC01	1.000	SW IC02	0.6	0.584	0.045	0.0213	
15 minute winter	SW IC02	1.001	SW IC03	1.8	0.921	0.118	0.0304	
15 minute winter	SW IC03	1.002	SW IC04	1.8	0.711	0.266	0.0180	
15 minute winter	SW IC04	1.003	SW IC05	2.3	0.855	0.167	0.0260	
15 minute winter	SW IC05	1.004	SW IC06	3.4	1.092	0.173	0.0563	
15 minute winter	SW IC06	1.005	SW MH03	3.9	2.211	0.052	0.0195	
15 minute winter	SW IC07	2.000	SW IC08	1.6	0.717	0.040	0.0126	
15 minute winter	SW IC08	2.001	SW IC09	4.7	1.346	0.117	0.0501	
15 minute winter	SW IC09	2.002	SW IC10	6.8	1.414	0.161	0.0602	
15 minute winter	SW IC10	2.003	SW IC11	8.4	1.584	0.250	0.0482	
15 minute winter	SW IC11	2.004	SW MH01	11.2	3.173	0.192	0.0656	
180 minute winter	SW MH01	2.005	SW MH02	2.2	1.000	0.041	0.0232	
180 minute winter	SW MH02	2.006	SW MH03	2.2	0.868	0.100	0.0189	
15 minute winter	SW MH03	1.006	SW IC14	3.9	1.030	0.097	0.0925	
15 minute winter	SW IC13	3.000	SW IC14	0.3	0.133	0.007	0.0381	
15 minute winter	SW IC14	1.007	SW IC18	7.9	1.458	0.245	0.0646	
15 minute winter	SW IC15	4.000	SW IC16	4.0	0.818	0.200	0.0588	
15 minute winter	SW IC16	4.001	SW IC17	4.4	0.779	0.222	0.0630	


Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW IC17	10	111.590	0.058	5.3	0.0093	0.0000	OK
15 minute winter	SW IC18	11	111.535	0.064	13.1	0.0101	0.0000	OK
15 minute winter	SW IC19	10	111.092	0.046	3.9	0.0073	0.0000	OK
15 minute winter	SW IC20	10	110.984	0.020	1.6	0.0016	0.0000	OK
15 minute winter	SW IC21	10	110.442	0.047	6.6	0.0075	0.0000	OK
15 minute winter	SW IC22	11	110.024	0.059	19.6	0.0094	0.0000	OK
15 minute winter	SW IC23	10	109.589	0.039	2.8	0.0030	0.0000	OK
15 minute winter	SW IC24	10	109.395	0.040	5.4	0.0063	0.0000	OK
15 minute winter	SW IC25	10	109.002	0.023	0.8	0.0018	0.0000	OK
15 minute winter	SW IC26	10	108.728	0.051	7.8	0.0080	0.0000	OK
15 minute winter	SW IC27	6	106.708	0.208	27.2	0.0589	0.0000	OK
180 minute winter	Turret 1	132	106.579	0.155	10.0	15.5606	0.0000	OK
180 minute winter	SW MH04	132	106.578	0.249	6.0	0.2817	0.0000	SURCHARGED
180 minute winter	outfall	132	102.312	0.023	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 winter	SW IC17	4.002	SW IC18	5.3	0.810	0.265	0.0328	
15 minute winter	SW IC18	1.008	SW IC22	13.1	1.929	0.327	0.0579	
15 minute winter	SW IC19	5.000	SW IC21	3.8	0.859	0.193	0.0805	
15 minute winter	SW IC20	6.000	SW IC21	1.6	0.539	0.040	0.0348	
15 minute winter	SW IC21	5.001	SW IC22	6.6	1.532	0.165	0.0129	
15 minute winter	SW IC22	1.009	SW IC27	19.6	2.392	0.145	0.2030	
15 minute winter	SW IC23	7.000	SW IC24	2.8	0.759	0.139	0.0570	
15 minute winter	SW IC24	7.001	SW IC26	5.3	1.449	0.145	0.0583	
15 minute winter	SW IC25	8.000	SW IC26	0.8	0.296	0.114	0.0643	
15 minute winter	SW IC26	7.002	SW IC27	7.7	1.555	0.211	0.0313	
15 minute winter	SW IC27	1.010	Turret 1	27.3	1.722	0.645	0.2195	
180 minute winter	Turret 1	1.011	SW MH04	6.0	0.296	0.142	0.4934	
180 minute winter	SW MH04	1.012	outfall	5.0	2.377	0.021	0.0425	52.2


Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW IC01	10	119.047	0.023	1.6	0.0037	0.0000	OK
15 minute winter	SW IC02	10	118.088	0.039	4.9	0.0062	0.0000	OK
15 minute winter	SW IC03	10	117.163	0.067	4.8	0.0106	0.0000	OK
15 minute winter	SW IC04	11	116.693	0.046	6.0	0.0074	0.0000	OK
15 minute winter	SW IC05	10	116.242	0.080	9.2	0.0127	0.0000	OK
15 minute winter	SW IC06	11	115.984	0.039	10.3	0.0062	0.0000	OK
15 minute winter	SW IC07	10	117.939	0.032	4.1	0.0052	0.0000	OK
15 minute winter	SW IC08	10	117.686	0.058	12.3	0.0091	0.0000	OK
15 minute winter	SW IC09	10	116.973	0.068	17.9	0.0108	0.0000	OK
15 minute winter	SW IC10	10	116.308	0.101	22.3	0.0161	0.0000	OK
15 minute winter	SW IC11	10	115.969	0.079	29.6	0.0126	0.0000	OK
	POND 1							
120 minute winter	SW MH01	94	114.556	0.251	12.9	24.6753	0.0000	SURCHARGED
	POND 2							
60 minute winter	SW MH02	69	113.401	0.041	3.0	0.0459	0.0000	OK
15 minute winter	SW MH03	12	113.306	0.056	12.4	0.9067	0.0000	OK
	SW IC12							
15 minute winter	SW IC13	11	112.823	0.014	0.8	0.0011	0.0000	OK
15 minute winter	SW IC14	11	112.217	0.105	23.5	0.0167	0.0000	OK
15 minute winter	SW IC15	10	111.905	0.083	10.6	0.0132	0.0000	OK
15 minute winter	SW IC16	10	111.760	0.089	11.7	0.0142	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	SW IC01	1.000	SW IC02	1.6	0.763	0.119	0.0431	
15 minute winter	SW IC02	1.001	SW IC03	4.8	1.153	0.318	0.0639	
15 minute winter	SW IC03	1.002	SW IC04	4.8	0.896	0.704	0.0378	
15 minute winter	SW IC04	1.003	SW IC05	6.0	1.145	0.437	0.0498	
15 minute winter	SW IC05	1.004	SW IC06	9.1	1.406	0.460	0.1146	
15 minute winter	SW IC06	1.005	SW MH03	10.4	2.915	0.138	0.0393	
15 minute winter	SW IC07	2.000	SW IC08	4.1	0.920	0.102	0.0251	
15 minute winter	SW IC08	2.001	SW IC09	12.2	1.750	0.305	0.1010	
15 minute winter	SW IC09	2.002	SW IC10	17.8	1.741	0.421	0.1271	
15 minute winter	SW IC10	2.003	SW IC11	22.2	2.040	0.656	0.0978	
15 minute winter	SW IC11	2.004	SW MH01	29.6	3.527	0.506	0.1739	
120 minute winter	SW MH01	2.005	SW MH02	3.0	1.111	0.056	0.0294	
60 minute winter	SW MH02	2.006	SW MH03	3.0	0.989	0.137	0.0295	
15 minute winter	SW MH03	1.006	SW IC14	11.9	1.326	0.298	0.2162	
15 minute winter	SW IC13	3.000	SW IC14	0.8	0.156	0.019	0.0889	
15 minute winter	SW IC14	1.007	SW IC18	23.3	1.876	0.728	0.1492	
15 minute winter	SW IC15	4.000	SW IC16	10.5	1.033	0.530	0.1262	
15 minute winter	SW IC16	4.001	SW IC17	11.8	0.899	0.592	0.1529	


Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW IC17	12	111.691	0.159	14.2	0.0253	0.0000	SURCHARGED
15 minute winter	SW IC18	12	111.653	0.182	36.1	0.0290	0.0000	SURCHARGED
15 minute winter	SW IC19	10	111.125	0.079	10.2	0.0126	0.0000	OK
15 minute winter	SW IC20	10	110.995	0.032	4.1	0.0025	0.0000	OK
15 minute winter	SW IC21	10	110.481	0.085	17.4	0.0136	0.0000	OK
15 minute winter	SW IC22	10	110.067	0.102	52.6	0.0162	0.0000	OK
15 minute winter	SW IC23	10	109.616	0.066	7.4	0.0051	0.0000	OK
15 minute winter	SW IC24	10	109.421	0.066	14.2	0.0104	0.0000	OK
15 minute winter	SW IC25	10	109.016	0.037	2.0	0.0029	0.0000	OK
15 minute winter	SW IC26	10	108.769	0.092	20.6	0.0147	0.0000	OK
240 minute winter	SW IC27	236	107.016	0.516	18.1	0.1460	0.0000	SURCHARGED
240 minute winter	Turret 1	236	107.015	0.591	18.0	59.1766	0.0000	SURCHARGED
240 minute winter	SW MH04	236	107.013	0.684	5.9	0.7740	0.0000	SURCHARGED
30 minute summer	outfall	108	102.312	0.023	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 winter	SW IC17	4.002	SW IC18	14.0	0.916	0.703	0.0863	
15 minute winter	SW IC18	1.008	SW IC22	35.6	2.309	0.890	0.1345	
15 minute winter	SW IC19	5.000	SW IC21	10.1	1.101	0.506	0.1644	
15 minute winter	SW IC20	6.000	SW IC21	4.1	0.635	0.102	0.0747	
15 minute winter	SW IC21	5.001	SW IC22	17.3	1.896	0.434	0.0274	
15 minute winter	SW IC22	1.009	SW IC27	52.1	3.092	0.386	0.4184	
15 minute winter	SW IC23	7.000	SW IC24	7.3	0.991	0.369	0.1158	
15 minute winter	SW IC24	7.001	SW IC26	14.1	1.694	0.388	0.1330	
15 minute winter	SW IC25	8.000	SW IC26	2.0	0.369	0.293	0.1233	
15 minute winter	SW IC26	7.002	SW IC27	20.4	1.947	0.560	0.0662	
240 minute winter	SW IC27	1.010	Turret 1	18.0	0.896	0.424	0.4526	
240 minute winter	Turret 1	1.011	SW MH04	5.9	0.292	0.139	0.5687	
240 minute winter	SW MH04	1.012	outfall	5.0	2.378	0.021	0.0425	118.8


Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.83%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW IC01	10	119.056	0.032	2.9	0.0051	0.0000	OK
15 minute winter	SW IC02	10	118.103	0.054	8.8	0.0087	0.0000	OK
15 minute winter	SW IC03	11	117.270	0.173	8.7	0.0276	0.0000	FLOOD RISK
15 minute winter	SW IC04	11	116.714	0.067	10.6	0.0107	0.0000	OK
15 minute winter	SW IC05	11	116.279	0.117	16.2	0.0185	0.0000	OK
15 minute winter	SW IC06	11	115.998	0.053	18.3	0.0085	0.0000	OK
15 minute winter	SW IC07	10	117.950	0.043	7.3	0.0069	0.0000	OK
15 minute winter	SW IC08	10	117.707	0.079	21.9	0.0126	0.0000	OK
15 minute winter	SW IC09	11	117.029	0.124	32.0	0.0197	0.0000	OK
15 minute winter	SW IC10	11	116.611	0.404	39.3	0.0642	0.0000	FLOOD RISK
15 minute winter	SW IC11 POND 1	10	116.004	0.114	51.2	0.0182	0.0000	OK
120 minute winter	SW MH01 POND 2	114	115.555	1.251	22.8	49.9629	0.0000	SURCHARGED
120 minute winter	SW MH02	116	113.405	0.045	3.7	0.0504	0.0000	OK
15 minute winter	SW MH03	12	113.338	0.088	21.2	1.4235	0.0000	OK
	SW IC12							
15 minute winter	SW IC13	12	112.866	0.058	1.5	0.0045	0.0000	OK
15 minute winter	SW IC14	12	112.873	0.761	41.4	0.1210	0.0000	SURCHARGED
15 minute winter	SW IC15	12	112.535	0.713	19.0	0.1134	0.0000	SURCHARGED
15 minute winter	SW IC16	12	112.431	0.760	17.7	0.1208	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	SW IC01	1.000	SW IC02	2.9	0.896	0.217	0.0665	
15 minute winter	SW IC02	1.001	SW IC03	8.7	1.267	0.573	0.0929	
15 minute winter	SW IC03	1.002	SW IC04	8.5	1.083	1.253	0.0543	
15 minute winter	SW IC04	1.003	SW IC05	10.6	1.443	0.778	0.0652	
15 minute winter	SW IC05	1.004	SW IC06	16.2	1.572	0.814	0.1761	
15 minute winter	SW IC06	1.005	SW MH03	18.3	3.393	0.244	0.0597	
15 minute winter	SW IC07	2.000	SW IC08	7.3	1.078	0.182	0.0380	
15 minute winter	SW IC08	2.001	SW IC09	21.8	1.886	0.545	0.1803	
15 minute winter	SW IC09	2.002	SW IC10	31.3	1.814	0.740	0.2065	
15 minute winter	SW IC10	2.003	SW IC11	38.8	2.277	1.149	0.1420	
15 minute winter	SW IC11	2.004	SW MH01	51.3	3.690	0.878	0.2377	
120 minute winter	SW MH01	2.005	SW MH02	3.7	1.148	0.068	0.0336	
120 minute winter	SW MH02	2.006	SW MH03	3.7	0.992	0.167	0.0312	
15 minute winter	SW MH03	1.006	SW IC14	18.9	1.379	0.473	0.3230	
15 minute winter	SW IC13	3.000	SW IC14	1.8	0.168	0.044	0.1515	
15 minute winter	SW IC14	1.007	SW IC18	36.5	2.074	1.139	0.2111	
15 minute winter	SW IC15	4.000	SW IC16	15.5	1.045	0.782	0.2130	
15 minute winter	SW IC16	4.001	SW IC17	15.7	0.911	0.790	0.1954	

**Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.83%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW IC17	12	112.318	0.786	19.4	0.1249	0.0000	SURCHARGED
15 minute winter	SW IC18	13	112.235	0.764	54.4	0.1215	0.0000	SURCHARGED
15 minute winter	SW IC19	10	111.167	0.121	18.3	0.0193	0.0000	OK
15 minute winter	SW IC20	10	111.006	0.043	7.3	0.0034	0.0000	OK
15 minute winter	SW IC21	10	110.534	0.139	31.2	0.0221	0.0000	OK
15 minute winter	SW IC22	11	110.100	0.135	81.8	0.0215	0.0000	OK
15 minute winter	SW IC23	10	109.645	0.095	13.2	0.0074	0.0000	OK
15 minute winter	SW IC24	10	109.451	0.096	25.5	0.0152	0.0000	OK
15 minute winter	SW IC25	10	109.031	0.052	3.7	0.0041	0.0000	OK
15 minute winter	SW IC26	11	108.942	0.265	36.7	0.0421	0.0000	SURCHARGED
240 minute winter	SW IC27	232	107.580	1.080	30.0	0.3057	0.0000	SURCHARGED
240 minute winter	Turret 1	236	107.578	1.154	29.7	115.5871	0.0000	SURCHARGED
240 minute winter	SW MH04	236	107.575	1.246	6.1	1.4097	0.0000	SURCHARGED
240 minute winter	outfall	236	102.314	0.025	6.1	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 winter	SW IC17	4.002	SW IC18	19.6	1.114	0.987	0.0863	
15 minute winter	SW IC18	1.008	SW IC22	53.8	3.056	1.346	0.1505	
15 minute winter	SW IC19	5.000	SW IC21	18.0	1.231	0.906	0.2635	
15 minute winter	SW IC20	6.000	SW IC21	7.3	0.674	0.182	0.1205	
15 minute winter	SW IC21	5.001	SW IC22	31.0	2.074	0.775	0.0441	
15 minute winter	SW IC22	1.009	SW IC27	81.6	3.429	0.605	0.5904	
15 minute winter	SW IC23	7.000	SW IC24	13.1	1.117	0.660	0.1839	
15 minute winter	SW IC24	7.001	SW IC26	25.1	1.728	0.688	0.2346	
15 minute winter	SW IC25	8.000	SW IC26	3.6	0.536	0.539	0.1448	
15 minute winter	SW IC26	7.002	SW IC27	36.1	2.049	0.989	0.1113	
240 minute winter	SW IC27	1.010	Turret 1	29.7	1.042	0.701	0.4526	
240 minute winter	Turret 1	1.011	SW MH04	6.1	0.293	0.144	0.5687	
240 minute winter	SW MH04	1.012	outfall	6.1	2.522	0.026	0.0488	146.8