STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	5	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.355	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	1.000	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	12.754	0.075	170.1	0.126	5.00	0.0	0.600		o	225	Pipe/Conduit	
1.001	32.954	0.195	169.0	0.050	0.00	0.0	0.600		o	225	Pipe/Conduit	
1.002	24.153	0.100	241.5	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.003	35.039	0.150	233.6	0.033	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.004	26.906	0.115	234.0	0.045	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.005	16.735	0.045	371.9	0.082	0.00	0.0	0.600		o	450	Pipe/Conduit	
2.000	35.933	0.455	79.0	0.036	5.00	0.0	0.600		o	150	Pipe/Conduit	
2.001	34.021	0.340	100.1	0.027	0.00	0.0		0.045	o	225	Pipe/Conduit	
2.002	23.009	0.230	100.0	0.000	0.00	0.0		0.045	o	225	Pipe/Conduit	
2.003	11.382	0.315	36.1	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
2.004	21.800	0.130	167.7	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
2.005	27.302	0.165	165.5	0.059	0.00	0.0	0.600		o	225	Pipe/Conduit	
2.006	26.966	0.160	168.5	0.043	0.00	0.0	0.600		o	225	Pipe/Conduit	
3.000	14.841	0.150	98.9	0.032	5.00	0.0		0.045	o	225	Pipe/Conduit	
3.001	12.486	0.375	33.3	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.21	55.280	0.126	0.0	0.0	0.0	1.00	39.7	22.7
1.001	50.00	5.76	55.205	0.176	0.0	0.0	0.0	1.00	39.9	31.8
1.002	50.00	6.16	54.935	0.176	0.0	0.0	0.0	1.01	71.2	31.8
1.003	50.00	6.73	54.835	0.209	0.0	0.0	0.0	1.02	72.4	37.7
1.004	50.00	7.17	54.685	0.254	0.0	0.0	0.0	1.02	72.4	45.9
1.005	50.00	7.43	54.420	0.336	0.0	0.0	0.0	1.05	166.7	60.7
2.000	50.00	5.53	60.500	0.036	0.0	0.0	0.0	1.13	20.0	6.5
2.001	50.00	7.27	59.970	0.063	0.0	0.0	0.0	0.33	13.0	11.4
2.002	50.00	8.44	59.630	0.063	0.0	0.0	0.0	0.33	13.0	11.4
2.003	50.00	8.53	59.400	0.063	0.0	0.0	0.0	2.18	86.8	11.4
2.004	50.00	8.89	59.085	0.063	0.0	0.0	0.0	1.01	40.0	11.4
2.005	50.00	9.34	58.955	0.122	0.0	0.0	0.0	1.01	40.3	22.0
2.006	50.00	9.79	58.790	0.165	0.0	0.0	0.0	1.00	39.9	29.8
3.000	50.00	5.75	60.500	0.032	0.0	0.0	0.0	0.33	13.0	5.8
3.001	50.00	5.85	60.350	0.032	0.0	0.0	0.0	2.28	90.5	5.8

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
2.007	19.136	0.305	62.7	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
2.008	16.045	0.160	100.3	0.041	0.00	0.0	0.600		o	300	Pipe/Conduit	
2.009	8.234	0.085	96.9	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
4.000	42.433	0.430	98.7	0.000	5.00	0.0	0.600		o	150	Pipe/Conduit	
4.001	5.080	0.055	92.4	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
2.010	7.560	0.080	94.5	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
5.000	26.276	0.450	58.4	0.024	5.00	0.0	0.600		o	150	Pipe/Conduit	
2.011	21.568	0.220	98.0	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
6.000	50.645	0.510	99.3	0.050	5.00	0.0		0.045	o	225	Pipe/Conduit	
6.001	6.750	0.070	96.4	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
2.012	11.115	0.440	25.3	0.080	0.00	0.0	0.600		o	300	Pipe/Conduit	
7.000	36.084	0.220	164.0	0.071	5.00	0.0	0.600		o	225	Pipe/Conduit	
7.001	41.002	0.240	170.8	0.065	0.00	0.0	0.600		o	225	Pipe/Conduit	
2.013	22.613	0.750	30.2	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
8.000	36.054	1.500	24.0	0.038	5.00	0.0	0.600		o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
2.007	50.00	9.95	58.555	0.197	0.0	0.0	0.0	1.99	140.5	35.6
2.008	50.00	10.12	58.250	0.238	0.0	0.0	0.0	1.57	111.0	43.0
2.009	50.00	10.20	58.090	0.238	0.0	0.0	0.0	1.60	112.9	43.0
4.000	50.00	5.70	60.000	0.000	0.0	0.0	0.0	1.01	17.9	0.0
4.001	50.00	5.78	59.570	0.000	0.0	0.0	0.0	1.05	18.5	0.0
2.010	50.00	10.28	58.005	0.238	0.0	0.0	0.0	1.62	114.4	43.0
5.000	50.00	5.33	60.000	0.024	0.0	0.0	0.0	1.32	23.3	4.3
2.011	50.00	10.51	57.925	0.262	0.0	0.0	0.0	1.59	112.3	47.3
6.000	50.00	7.58	60.850	0.050	0.0	0.0	0.0	0.33	13.0	9.0
6.001	50.00	7.66	60.340	0.050	0.0	0.0	0.0	1.33	52.9	9.0
2.012	50.00	10.57	57.705	0.392	0.0	0.0	0.0	3.14	222.0	70.8
7.000	50.00	5.59	58.500	0.071	0.0	0.0	0.0	1.02	40.5	12.8
7.001	50.00	6.28	58.280	0.136	0.0	0.0	0.0	1.00	39.7	24.6
2.013	50.00	10.70	57.265	0.528	0.0	0.0	0.0	2.87	203.1	95.3
8.000	50.00	5.22	60.000	0.038	0.0	0.0	0.0	2.68	106.6	6.9

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
2.014	8.702	0.350	24.9	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
2.015	56.008	0.140	400.1	0.072	0.00	0.0	0.600		o	750	Pipe/Conduit	
9.000	46.294	0.465	99.6	0.000	5.00	0.0	0.600		o	150	Pipe/Conduit	
9.001	26.901	0.270	99.6	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
9.002	6.387	0.120	53.2	0.005	0.00	0.0	0.600		o	150	Pipe/Conduit	
9.003	38.152	0.315	121.1	0.120	0.00	0.0	0.600		o	225	Pipe/Conduit	
10.000	21.045	0.210	100.2	0.040	5.00	0.0	0.600		o	225	Pipe/Conduit	
10.001	27.292	0.275	99.2	0.047	0.00	0.0	0.600		o	225	Pipe/Conduit	
10.002	8.627	0.110	78.4	0.004	0.00	0.0	0.600		o	225	Pipe/Conduit	
10.003	15.800	0.095	166.3	0.021	0.00	0.0	0.600		o	300	Pipe/Conduit	
10.004	28.930	0.165	175.3	0.018	0.00	0.0	0.600		o	300	Pipe/Conduit	
10.005	13.768	0.070	196.7	0.004	0.00	0.0	0.600		o	300	Pipe/Conduit	
10.006	8.717	0.320	27.2	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
9.004	47.017	0.200	235.1	0.040	0.00	0.0	0.600		o	300	Pipe/Conduit	
11.000	11.588	0.120	96.6	0.007	5.00	0.0	0.600		o	150	Pipe/Conduit	
11.001	2.444	0.025	97.8	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
11.002	27.509	0.275	100.0	0.041	0.00	0.0		0.045	o	225	Pipe/Conduit	
11.003	6.893	0.070	98.5	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
11.004	9.082	0.095	95.6	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
11.005	8.071	0.085	95.0	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
11.006	16.445	0.200	82.3	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
2.014	50.00	10.74	56.515	0.566	0.0	0.0	0.0	3.17	223.8	102.2
2.015	50.00	11.41	54.215	0.638	0.0	0.0	0.0	1.39	615.4	115.2
9.000	50.00	5.77	60.000	0.000	0.0	0.0	0.0	1.01	17.8	0.0
9.001	50.00	6.21	59.535	0.000	0.0	0.0	0.0	1.01	17.8	0.0
9.002	50.00	6.29	59.265	0.005	0.0	0.0	0.0	1.38	24.4	0.9
9.003	50.00	6.82	59.070	0.125	0.0	0.0	0.0	1.19	47.2	22.6
10.000	50.00	5.27	60.000	0.040	0.0	0.0	0.0	1.31	51.9	7.2
10.001	50.00	5.62	59.790	0.087	0.0	0.0	0.0	1.31	52.2	15.7
10.002	50.00	5.71	59.515	0.091	0.0	0.0	0.0	1.48	58.8	16.4
10.003	50.00	5.93	59.330	0.112	0.0	0.0	0.0	1.22	86.0	20.2
10.004	50.00	6.34	59.235	0.130	0.0	0.0	0.0	1.18	83.7	23.5
10.005	50.00	6.54	59.070	0.134	0.0	0.0	0.0	1.12	79.0	24.2
10.006	50.00	6.59	59.000	0.134	0.0	0.0	0.0	3.02	213.8	24.2
9.004	50.00	7.59	58.680	0.299	0.0	0.0	0.0	1.02	72.2	54.0
11.000	50.00	5.19	59.500	0.007	0.0	0.0	0.0	1.02	18.1	1.3
11.001	50.00	5.23	59.380	0.007	0.0	0.0	0.0	1.02	18.0	1.3
11.002	50.00	6.63	59.280	0.048	0.0	0.0	0.0	0.33	13.0	8.7
11.003	50.00	6.72	59.005	0.048	0.0	0.0	0.0	1.32	52.4	8.7
11.004	50.00	6.83	58.935	0.048	0.0	0.0	0.0	1.34	53.2	8.7
11.005	50.00	6.94	58.840	0.048	0.0	0.0	0.0	1.34	53.4	8.7
11.006	50.00	7.13	58.755	0.048	0.0	0.0	0.0	1.44	57.4	8.7

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
9.005	5.965	0.035	170.4	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
9.006	12.821	0.855	15.0	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.006	22.320	0.060	372.0	0.000	0.00	0.0	0.600		o	750	Pipe/Conduit	
1.007	55.429	0.140	395.9	0.107	0.00	0.0	0.600		o	900	Pipe/Conduit	
1.008	54.805	0.140	391.5	0.331	0.00	0.0	0.600		o	900	Pipe/Conduit	
12.000	30.468	0.800	38.1	0.203	5.00	0.0	0.600		o	300	Pipe/Conduit	
1.009	31.865	0.080	398.3	0.016	0.00	0.0	0.600		o	900	Pipe/Conduit	
1.010	31.904	0.080	398.8	0.141	0.00	0.0	0.600		o	900	Pipe/Conduit	
1.011	26.364	0.070	376.6	0.083	0.00	0.0	0.600		o	900	Pipe/Conduit	
13.000	11.015	0.035	314.7	0.018	5.00	0.0	0.600		o	900	Pipe/Conduit	
13.001	24.649	0.065	379.2	0.083	0.00	0.0	0.600		o	1200	Pipe/Conduit	
14.000	27.936	0.070	399.1	0.070	5.00	0.0	0.600		o	1200	Pipe/Conduit	
14.001	11.954	0.030	398.5	0.075	0.00	0.0	0.600		o	1200	Pipe/Conduit	
14.002	30.001	0.075	400.0	0.063	0.00	0.0	0.600		o	1200	Pipe/Conduit	
14.003	50.932	0.130	391.8	0.123	0.00	0.0	0.600		o	1200	Pipe/Conduit	
14.004	21.936	0.055	398.8	0.129	0.00	0.0	0.600		o	1200	Pipe/Conduit	
15.000	46.026	0.265	173.7	0.120	5.00	0.0	0.600		o	750	Pipe/Conduit	
15.001	18.455	0.050	369.1	0.118	0.00	0.0	0.600		o	1200	Pipe/Conduit	
14.005	22.685	0.060	378.1	0.066	0.00	0.0	0.600		o	1200	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
9.005	50.00	7.67	58.480	0.347	0.0	0.0	0.0	1.20	84.9	62.7
9.006	50.00	7.73	58.445	0.347	0.0	0.0	0.0	4.08	288.4	62.7
1.006	50.00	11.67	54.075	1.321	0.0	0.0	0.0	1.44	638.4	238.5
1.007	50.00	12.26	53.865	1.428	0.0	0.0	0.0	1.57	997.8	257.8
1.008	48.77	12.84	53.725	1.759	0.0	0.0	0.0	1.58	1003.6	309.8
12.000	50.00	5.20	56.500	0.203	0.0	0.0	0.0	2.56	180.6	36.7
1.009	48.07	13.18	53.585	1.978	0.0	0.0	0.0	1.56	994.8	343.3
1.010	47.38	13.52	53.505	2.119	0.0	0.0	0.0	1.56	994.2	362.6
1.011	46.85	13.79	53.425	2.202	0.0	0.0	0.0	1.61	1023.3	372.6
13.000	50.00	5.10	54.010	0.018	0.0	0.0	0.0	1.76	1120.2	3.2
13.001	50.00	5.32	53.675	0.101	0.0	0.0	0.0	1.92	2166.0	18.2
14.000	50.00	5.25	54.195	0.070	0.0	0.0	0.0	1.87	2111.0	12.6
14.001	50.00	5.36	54.125	0.145	0.0	0.0	0.0	1.87	2112.7	26.2
14.002	50.00	5.62	54.095	0.208	0.0	0.0	0.0	1.86	2108.6	37.6
14.003	50.00	6.07	54.020	0.331	0.0	0.0	0.0	1.88	2130.7	59.8
14.004	50.00	6.27	53.890	0.460	0.0	0.0	0.0	1.87	2111.7	83.1
15.000	50.00	5.36	54.600	0.120	0.0	0.0	0.0	2.12	936.8	21.7
15.001	50.00	5.52	53.885	0.238	0.0	0.0	0.0	1.94	2195.7	43.0
14.005	50.00	6.47	53.835	0.764	0.0	0.0	0.0	1.92	2169.3	137.9

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
14.006	14.288	0.040	357.2	0.056	0.00	0.0	0.600		o	1200	Pipe/Conduit	
14.007	16.197	0.045	359.9	0.000	0.00	0.0	0.600		o	1200	Pipe/Conduit	
14.008	7.940	0.020	397.0	0.069	0.00	0.0	0.600		o	1200	Pipe/Conduit	
14.009	22.190	0.060	369.8	0.052	0.00	0.0	0.600		o	1200	Pipe/Conduit	
13.002	33.152	0.085	390.0	0.074	0.00	0.0	0.600		o	1200	Pipe/Conduit	
13.003	31.654	0.080	395.7	0.083	0.00	0.0	0.600		o	1200	Pipe/Conduit	
13.004	35.144	0.090	390.5	0.071	0.00	0.0	0.600		o	1200	Pipe/Conduit	
1.012	6.306	0.016	394.1	0.051	0.00	0.0	0.600		o	600	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
14.006	50.00	6.59	53.775	0.820	0.0	0.0	0.0	1.97	2232.2	148.1
14.007	50.00	6.73	53.735	0.820	0.0	0.0	0.0	1.97	2223.6	148.1
14.008	50.00	6.80	53.690	0.889	0.0	0.0	0.0	1.87	2116.6	160.5
14.009	50.00	6.99	53.670	0.941	0.0	0.0	0.0	1.94	2193.5	169.9
13.002	50.00	7.28	53.610	1.116	0.0	0.0	0.0	1.89	2135.6	201.5
13.003	50.00	7.56	53.525	1.199	0.0	0.0	0.0	1.87	2120.2	216.5
13.004	50.00	7.87	53.445	1.270	0.0	0.0	0.0	1.89	2134.3	229.3
1.012	50.00	5.09	53.355	0.000	200.0	0.0	0.0	1.22	345.1	200.0

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
01	59.756	4.476	Open Manhole	2400	1.000	55.280	225				
02	59.879	4.674	Open Manhole	1800	1.001	55.205	225	1.000	55.205	225	
03	60.203	5.268	Open Manhole	1800	1.002	54.935	300	1.001	55.010	225	
04	60.494	5.659	Open Manhole	1800	1.003	54.835	300	1.002	54.835	300	
05	60.145	5.460	Open Manhole	1800	1.004	54.685	300	1.003	54.685	300	
06	59.943	5.523	Open Manhole	1800	1.005	54.420	450	1.004	54.570	300	
50	61.600	1.100	Open Manhole	600	2.000	60.500	150				
HW	61.600	1.630	Junction		2.001	59.970	225	2.000	60.045	150	
SWALE	61.600	1.970	Junction		2.002	59.630	225	2.001	59.630	225	
HW	61.600	2.200	Junction		2.003	59.400	225	2.002	59.400	225	
51	61.470	2.385	Open Manhole	1200	2.004	59.085	225	2.003	59.085	225	
52	61.684	2.729	Open Manhole	1200	2.005	58.955	225	2.004	58.955	225	
54	61.517	2.727	Open Manhole	1200	2.006	58.790	225	2.005	58.790	225	
SWALE	61.350	0.850	Junction		3.000	60.500	225				
HW	61.350	1.000	Junction		3.001	60.350	225	3.000	60.350	225	
55	61.234	2.679	Open Manhole	1350	2.007	58.555	300	2.006	58.630	225	
								3.001	59.975	225	1345
56	61.063	2.813	Open Manhole	1350	2.008	58.250	300	2.007	58.250	300	
57	61.120	3.030	Open Manhole	1350	2.009	58.090	300	2.008	58.090	300	
58a	61.375	1.375	Open Manhole	600	4.000	60.000	150				
58B	61.250	1.680	Open Manhole	600	4.001	59.570	150	4.000	59.570	150	
58	61.224	3.219	Open Manhole	1500	2.010	58.005	300	2.009	58.005	300	
								4.001	59.515	150	1360
59	61.350	1.350	Open Manhole	600	5.000	60.000	150				
60	61.301	3.376	Open Manhole	1500	2.011	57.925	300	2.010	57.925	300	
								5.000	59.550	150	1475
HW	61.350	0.500	Junction		6.000	60.850	225				
HW	61.350	1.010	Junction		6.001	60.340	225	6.000	60.340	225	
61	61.263	3.558	Open Manhole	1500	2.012	57.705	300	2.011	57.705	300	
								6.001	60.270	225	2490
62	60.900	2.400	Open Manhole	600	7.000	58.500	225				
63	60.900	2.620	Open Manhole	600	7.001	58.280	225	7.000	58.280	225	
64	61.300	4.035	Open Manhole	1500	2.013	57.265	300	2.012	57.265	300	
								7.001	58.040	225	700
65A	60.900	0.900	Open Manhole	600	8.000	60.000	225				
65	60.750	4.235	Open Manhole	3000	2.014	56.515	300	2.013	56.515	300	
								8.000	58.500	225	1910
07	60.650	6.435	Open Manhole	3000	2.015	54.215	750	2.014	56.165	300	1500
66	61.700	1.700	Open Manhole	600	9.000	60.000	150				
67	61.700	2.165	Open Manhole	1200	9.001	59.535	150	9.000	59.535	150	
68	61.600	2.335	Open Manhole	1200	9.002	59.265	150	9.001	59.265	150	
69	61.390	2.320	Open Manhole	1200	9.003	59.070	225	9.002	59.145	150	
70	61.675	1.675	Open Manhole	600	10.000	60.000	225				
71	61.801	2.011	Open Manhole	600	10.001	59.790	225	10.000	59.790	225	

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
72	60.989	1.474	Open Manhole	600	10.002	59.515	225	10.001	59.515	225	
73	60.850	1.520	Open Manhole	600	10.003	59.330	300	10.002	59.405	225	
74	61.800	2.565	Open Manhole	1350	10.004	59.235	300	10.003	59.235	300	
75	61.650	2.580	Open Manhole	1350	10.005	59.070	300	10.004	59.070	300	
76	61.650	2.650	Open Manhole	1350	10.006	59.000	300	10.005	59.000	300	
77	61.345	2.665	Open Manhole	1350	9.004	58.680	300	9.003	58.755	225	
								10.006	58.680	300	
78	60.850	1.350	Open Manhole	600	11.000	59.500	150				
79	60.850	1.470	Open Manhole	1200	11.001	59.380	150	11.000	59.380	150	
HW	60.850	1.570	Junction		11.002	59.280	225	11.001	59.355	150	
HW	61.150	2.145	Junction		11.003	59.005	225	11.002	59.005	225	
80	61.000	2.065	Open Manhole	1200	11.004	58.935	225	11.003	58.935	225	
HW BASIN	60.075	1.235	Junction		11.005	58.840	225	11.004	58.840	225	
HW	60.075	1.320	Junction		11.006	58.755	225	11.005	58.755	225	
81	60.900	2.420	Open Manhole	1500	9.005	58.480	300	9.004	58.480	300	
								11.006	58.555	225	
82	60.900	2.455	Open Manhole	2700	9.006	58.445	300	9.005	58.445	300	
08	60.094	6.019	Open Manhole	3000	1.006	54.075	750	1.005	54.375	450	
								2.015	54.075	750	
								9.006	57.590	300	3065
09	59.692	5.827	Open Manhole	3000	1.007	53.865	900	1.006	54.015	750	
10	58.760	5.035	Open Manhole	3000	1.008	53.725	900	1.007	53.725	900	
11	58.328	1.828	Open Manhole	1800	12.000	56.500	300				
12	57.966	4.381	Open Manhole	3000	1.009	53.585	900	1.008	53.585	900	
								12.000	55.700	300	1515
13	58.267	4.762	Open Manhole	3000	1.010	53.505	900	1.009	53.505	900	
14	58.586	5.161	Open Manhole	3000	1.011	53.425	900	1.010	53.425	900	
15	58.850	4.840	Open Manhole	2700	13.000	54.010	900				
16	58.740	5.065	Open Manhole	3000	13.001	53.675	1200	13.000	53.975	900	
17	57.509	3.314	Open Manhole	3000	14.000	54.195	1200				
18	57.064	2.939	Open Manhole	3000	14.001	54.125	1200	14.000	54.125	1200	
19	57.365	3.270	Open Manhole	3000	14.002	54.095	1200	14.001	54.095	1200	
20	57.645	3.625	Open Manhole	3000	14.003	54.020	1200	14.002	54.020	1200	
21	57.215	3.325	Open Manhole	3000	14.004	53.890	1200	14.003	53.890	1200	
22	56.994	2.394	Open Manhole	2700	15.000	54.600	750				
23	57.119	3.234	Open Manhole	3000	15.001	53.885	1200	15.000	54.335	750	
24	57.019	3.184	Open Manhole	3000	14.005	53.835	1200	14.004	53.835	1200	
								15.001	53.835	1200	
25	57.319	3.544	Open Manhole	3000	14.006	53.775	1200	14.005	53.775	1200	
26	57.591	3.856	Open Manhole	3000	14.007	53.735	1200	14.006	53.735	1200	
27	57.897	4.207	Open Manhole	3000	14.008	53.690	1200	14.007	53.690	1200	
28	58.048	4.378	Open Manhole	3000	14.009	53.670	1200	14.008	53.670	1200	
29	58.489	4.879	Open Manhole	3000	13.002	53.610	1200	13.001	53.610	1200	
								14.009	53.610	1200	

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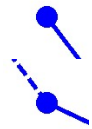
Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
30	58.162	4.637	Open Manhole	3000	13.003	53.525	1200	13.002	53.525	1200	
31	57.845	4.400	Open Manhole	3000	13.004	53.445	1200	13.003	53.445	1200	
32	58.500	5.145	Open Manhole	4000	1.012	53.355	600	1.011	53.355	900	
								13.004	53.355	1200	
	58.300	4.961	Open Manhole	0		OUTFALL		1.012	53.339	600	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
01	387232.424	399523.332	387232.424	399523.332	Required	
02	387224.811	399533.564	387224.811	399533.564	Required	
03	387192.665	399540.818	387192.665	399540.818	Required	
04	387168.512	399540.818	387168.512	399540.818	Required	
05	387168.512	399505.779	387168.512	399505.779	Required	
06	387165.462	399479.040	387165.462	399479.040	Required	
50	387052.530	399503.254	387052.530	399503.254	Required	
HW	387023.321	399482.325			No Entry	
SWALE	387011.245	399450.520			No Entry	
HW	387033.151	399443.484			No Entry	
51	387044.354	399441.468	387044.354	399441.468	Required	
52	387052.713	399461.602	387052.713	399461.602	Required	
54	387075.592	399476.500	387075.592	399476.500	Required	
SWALE	387064.987	399459.806			No Entry	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
HW	387079.239	399455.668			No Entry	
55	387091.700	399454.874	387091.700	399454.874	Required	
56	387107.318	399465.931	387107.318	399465.931	Required	
57	387116.872	399453.041	387116.872	399453.041	Required	
58a	387085.463	399480.969	387085.463	399480.969	Required	
58B	387110.997	399447.067	387110.997	399447.067	Required	
58	387115.590	399444.907	387115.590	399444.907	Required	
59	387089.750	399447.611	387089.750	399447.611	Required	
60	387114.008	399437.514	387114.008	399437.514	Required	
HW	387055.113	399434.776			No Entry	
HW	387103.117	399418.633			No Entry	
61	387109.495	399416.423	387109.495	399416.423	Required	
62	387106.577	399483.932	387106.577	399483.932	Required	
63	387127.481	399454.521	387127.481	399454.521	Required	
64	387120.373	399414.139	387120.373	399414.139	Required	
65A	387149.117	399444.771	387149.117	399444.771	Required	
65	387142.469	399409.335	387142.469	399409.335	Required	
07	387151.022	399407.731	387151.022	399407.731	Required	

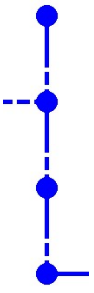
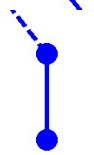
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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
66	387102.892	399536.893	387102.892	399536.893	Required	
67	387065.364	399509.787	387065.364	399509.787	Required	
68	387081.019	399487.909	387081.019	399487.909	Required	
69	387086.899	399485.414	387086.899	399485.414	Required	
70	387111.754	399537.193	387111.754	399537.193	Required	
71	387128.884	399549.418	387128.884	399549.418	Required	
72	387156.167	399550.095	387156.167	399550.095	Required	
73	387156.481	399541.474	387156.481	399541.474	Required	
74	387140.698	399540.747	387140.698	399540.747	Required	
75	387117.241	399523.815	387117.241	399523.815	Required	
76	387125.121	399512.525	387125.121	399512.525	Required	
77	387118.212	399507.210	387118.212	399507.210	Required	
78	387162.668	399528.004	387162.668	399528.004	Required	
79	387162.850	399516.417	387162.850	399516.417	Required	
HW	387161.695	399514.264			No Entry	
HW	387137.544	399501.093			No Entry	
80	387140.941	399495.095	387140.941	399495.095	Required	
HW BASIN	387149.382	399491.743			No Entry	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
HW	387152.316	399484.223			No Entry	
81	387145.788	399469.129	387145.788	399469.129	Required	
82	387149.287	399464.298	387149.287	399464.298	Required	
08	387162.002	399462.653	387162.002	399462.653	Required	
09	387184.046	399459.153	387184.046	399459.153	Required	
10	387239.474	399459.093	387239.474	399459.093	Required	
11	387294.507	399489.375	387294.507	399489.375	Required	
12	387294.279	399458.907	387294.279	399458.907	Required	
13	387294.280	399427.043	387294.280	399427.043	Required	
14	387294.255	399395.139	387294.255	399395.139	Required	
15	387348.843	399493.578	387348.843	399493.578	Required	
16	387355.657	399484.923	387355.657	399484.923	Required	
17	387541.762	399420.842	387541.762	399420.842	Required	
18	387541.937	399448.778	387541.937	399448.778	Required	
19	387541.741	399460.730	387541.741	399460.730	Required	
20	387511.741	399460.998	387511.741	399460.998	Required	
21	387460.811	399460.639	387460.811	399460.639	Required	
22	387438.702	399395.795	387438.702	399395.795	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
23	387438.705	399441.821	387438.705	399441.821	Required	
24	387438.878	399460.275	387438.878	399460.275	Required	
25	387416.193	399460.396	387416.193	399460.396	Required	
26	387402.026	399458.538	387402.026	399458.538	Required	
27	387385.829	399458.673	387385.829	399458.673	Required	
28	387378.052	399460.270	387378.052	399460.270	Required	
29	387355.862	399460.275	387355.862	399460.275	Required	
30	387355.674	399427.124	387355.674	399427.124	Required	
31	387355.704	399395.470	387355.704	399395.470	Required	
32	387320.607	399395.020	387320.607	399395.020	Required	
	387320.468	399388.716			No Entry	

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: 65, DS/PN: 2.014, Volume (m³): 32.7

Unit Reference	MD-SHE-0259-5000-3500-5000
Design Head (m)	3.500
Design Flow (l/s)	50.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	259
Invert Level (m)	56.515
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	Site Specific Design (Contact Hydro International)

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	3.500	49.9	Kick-Flo®	2.094	39.0
Flush-Flo™	1.004	49.9	Mean Flow over Head Range	-	43.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	8.3	0.800	49.5	2.000	41.5	4.000	53.3	7.000	69.9
0.200	26.6	1.000	49.9	2.200	39.9	4.500	56.4	7.500	72.2
0.300	39.9	1.200	49.6	2.400	41.6	5.000	59.3	8.000	74.5
0.400	43.5	1.400	48.8	2.600	43.3	5.500	62.1	8.500	76.8
0.500	46.0	1.600	47.4	3.000	46.4	6.000	64.8	9.000	78.9
0.600	47.7	1.800	45.1	3.500	49.9	6.500	67.4	9.500	81.0

Hydro-Brake® Optimum Manhole: 82, DS/PN: 9.006, Volume (m³): 14.3

Unit Reference	MD-SHE-0288-5000-1500-5000
Design Head (m)	1.500
Design Flow (l/s)	50.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	288
Invert Level (m)	58.445
Minimum Outlet Pipe Diameter (mm)	375
Suggested Manhole Diameter (mm)	2100

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	49.9	Kick-Flo®	1.067	42.4
Flush-Flo™	0.505	49.8	Mean Flow over Head Range	-	42.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	8.9	0.400	49.4	0.800	48.2	1.400	48.3	2.000	57.4
0.200	29.7	0.500	49.8	1.000	44.8	1.600	51.5	2.200	60.1
0.300	47.6	0.600	49.6	1.200	44.9	1.800	54.5	2.400	62.7

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Hydro-Brake® Optimum Manhole: 82, DS/PN: 9.006, Volume (m³): 14.3

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
2.600	65.1	4.000	80.3	5.500	93.7	7.000	105.4	8.500	115.9
3.000	69.8	4.500	85.0	6.000	97.8	7.500	109.0	9.000	119.2
3.500	75.2	5.000	89.5	6.500	101.7	8.000	112.5	9.500	122.4

Hydro-Brake® Optimum Manhole: 32, DS/PN: 1.012, Volume (m³): 115.0

Unit Reference	MD-SHE-0496-2000-3400-2000
Design Head (m)	3.400
Design Flow (l/s)	200.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	496
Invert Level (m)	53.355
Minimum Outlet Pipe Diameter (mm)	Site Specific Design (Contact Hydro International)
Suggested Manhole Diameter (mm)	Site Specific Design (Contact Hydro International)

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	3.400	200.0	Kick-Flo®	2.264	164.0
Flush-Flo™	1.040	200.0	Mean Flow over Head Range	-	171.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	12.5	0.800	197.6	2.000	182.2	4.000	216.5	7.000	284.8
0.200	46.1	1.000	199.9	2.200	169.8	4.500	229.4	7.500	294.6
0.300	93.4	1.200	199.3	2.400	168.7	5.000	241.5	8.000	304.1
0.400	144.7	1.400	197.2	2.600	175.5	5.500	253.1	8.500	313.3
0.500	183.3	1.600	194.1	3.000	188.1	6.000	264.1	9.000	322.2
0.600	190.1	1.800	189.5	3.500	202.9	6.500	274.6	9.500	330.9

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Storage Structures for Storm

Swale Manhole: HW, DS/PN: 2.001

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	30.0
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	100.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	59.545	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.5	Include Swale Volume	Yes

Swale Manhole: SWALE, DS/PN: 2.002

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	15.0
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	100.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	59.705	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.5	Include Swale Volume	Yes

Swale Manhole: SWALE, DS/PN: 3.000

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	15.0
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	0.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	60.500	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.5	Include Swale Volume	Yes

Swale Manhole: HW, DS/PN: 6.000

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	15.0
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	100.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	60.000	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.5	Include Swale Volume	Yes

Swale Manhole: HW, DS/PN: 11.002

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Base Width (m)	0.5
Infiltration Coefficient Side (m/hr)	0.00000	Length (m)	15.0
Safety Factor	2.0	Side Slope (1:X)	3.0
Porosity	1.00	Slope (1:X)	100.0
Invert Level (m)	59.355	Cap Volume Depth (m)	0.000

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Swale Manhole: HW, DS/PN: 11.002

Cap Infiltration Depth (m) 0.000 Include Swale Volume Yes

Tank or Pond Manhole: HW BASIN, DS/PN: 11.005

Invert Level (m) 58.915

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	110.0	1.100	266.9	1.101	0.0

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 3 Number of Storage Structures 6 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 18.500	Cv (Summer) 1.000
Region England and Wales	Ratio R	0.317	Cv (Winter) 1.000

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 2, 30
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
1.000	01	15 Summer	30	+0%	30/15 Summer				55.808	0.303	0.000
1.001	02	15 Summer	30	+0%	30/15 Summer				55.693	0.263	0.000
1.002	03	15 Summer	30	+0%					55.165	-0.070	0.000
1.003	04	15 Summer	30	+0%					55.092	-0.043	0.000
1.004	05	30 Summer	30	+0%					54.975	-0.010	0.000
1.005	06	60 Winter	30	+0%	30/60 Summer				54.873	0.003	0.000
2.000	50	15 Summer	30	+0%					60.592	-0.058	0.000
2.001	HW	240 Summer	30	+0%					60.048	-0.147	0.000
2.002	SWALE	240 Summer	30	+0%					59.708	-0.147	0.000
2.003	HW	240 Summer	30	+0%					59.430	-0.195	0.000
2.004	51	240 Summer	30	+0%					59.131	-0.179	0.000
2.005	52	30 Summer	30	+0%					59.090	-0.090	0.000
2.006	54	30 Summer	30	+0%	30/15 Summer				59.080	0.065	0.000
3.000	SWALE	30 Summer	30	+0%					60.635	-0.090	0.000
3.001	HW	15 Summer	30	+0%					60.397	-0.178	0.000
2.007	55	30 Summer	30	+0%	30/15 Summer				59.063	0.208	0.000
2.008	56	30 Summer	30	+0%	30/15 Summer				59.050	0.500	0.000
2.009	57	30 Summer	30	+0%	30/15 Summer				59.035	0.645	0.000
4.000	58a	15 Summer	1	+0%					60.000	-0.150	0.000
4.001	58B	15 Summer	1	+0%					59.570	-0.150	0.000
2.010	58	30 Summer	30	+0%	30/15 Summer				59.026	0.721	0.000
5.000	59	15 Summer	30	+0%					60.066	-0.084	0.000
2.011	60	30 Summer	30	+0%	30/15 Summer				59.017	0.792	0.000
6.000	HW	1440 Summer	30	+0%					60.852	-0.223	0.000
6.001	HW	1440 Summer	30	+0%					60.341	-0.224	0.000
2.012	61	30 Summer	30	+0%	30/15 Summer				58.997	0.992	0.000
7.000	62	30 Summer	30	+0%	30/15 Summer				59.036	0.311	0.000
7.001	63	30 Summer	30	+0%	30/15 Summer				59.016	0.511	0.000
2.013	64	30 Summer	30	+0%	30/15 Summer				58.979	1.414	0.000
8.000	65A	15 Summer	30	+0%					60.056	-0.169	0.000
2.014	65	30 Summer	30	+0%	1/15 Summer				58.902	2.087	0.000

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	01	1.25			42.8	SURCHARGED	
1.001	02	1.51			56.6	SURCHARGED	
1.002	03	0.86			54.7	OK	
1.003	04	0.89			59.0	OK	
1.004	05	1.00			65.1	OK	
1.005	06	0.51			62.8	SURCHARGED	
2.000	50	0.68			13.2	OK	
2.001	HW	0.26			3.4	OK*	
2.002	SWALE	0.26		76	3.4	OK*	
2.003	HW	0.04			3.4	OK*	
2.004	51	0.09			3.4	OK	
2.005	52	0.57			21.5	OK	
2.006	54	0.99			36.5	SURCHARGED	
3.000	SWALE	0.66		9	8.6	OK*	
3.001	HW	0.10			8.6	OK*	
2.007	55	0.35			43.1	SURCHARGED	
2.008	56	0.56			53.0	SURCHARGED	
2.009	57	0.67			48.8	SURCHARGED	
4.000	58a	0.00			0.0	OK	
4.001	58B	0.00			0.0	OK	
2.010	58	0.65			46.2	SURCHARGED	
5.000	59	0.40			8.8	OK	
2.011	60	0.52			51.4	SURCHARGED	
6.000	HW	0.00			0.0	OK*	
6.001	HW	0.00			0.0	OK*	
2.012	61	0.38			63.8	SURCHARGED	
7.000	62	0.62			23.8	SURCHARGED	
7.001	63	1.12			42.2	SURCHARGED	
2.013	64	0.47			84.5	SURCHARGED	
8.000	65A	0.14			14.1	OK	
2.014	65	0.34			49.8	SURCHARGED	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
2.015	07	30 Summer	30	+0%					54.962	-0.003
9.000	66	15 Summer	1	+0%					60.000	-0.150
9.001	67	15 Summer	1	+0%					59.535	-0.150
9.002	68	15 Summer	30	+0%	30/15 Summer				59.501	0.086
9.003	69	15 Summer	30	+0%	30/15 Summer				59.518	0.223
10.000	70	15 Summer	30	+0%					60.087	-0.138
10.001	71	15 Summer	30	+0%					59.931	-0.084
10.002	72	15 Summer	30	+0%					59.663	-0.077
10.003	73	30 Summer	30	+0%					59.566	-0.064
10.004	74	30 Summer	30	+0%					59.533	-0.002
10.005	75	30 Summer	30	+0%	30/15 Summer				59.458	0.088
10.006	76	15 Summer	30	+0%	30/15 Summer				59.409	0.109
9.004	77	15 Summer	30	+0%	30/15 Summer				59.378	0.398
11.000	78	15 Summer	30	+0%					59.541	-0.109
11.001	79	15 Summer	30	+0%					59.517	-0.013
11.002	HW	15 Summer	30	+0%	30/15 Summer				59.514	0.009
11.003	HW	15 Summer	30	+0%					59.098	-0.132
11.004	80	15 Summer	30	+0%					59.020	-0.140
11.005	HW BASIN	30 Summer	30	+0%					59.010	-0.055
11.006	HW	30 Summer	30	+0%					58.980	0.000
9.005	81	15 Summer	30	+0%	2/15 Summer				59.192	0.412
9.006	82	15 Summer	30	+0%	30/15 Summer				59.131	0.386
1.006	08	60 Winter	30	+0%	30/60 Winter				54.828	0.003
1.007	09	60 Summer	30	+0%					54.765	0.000
1.008	10	120 Winter	30	+0%					54.625	0.000
12.000	11	15 Summer	30	+0%					56.643	-0.157
1.009	12	60 Winter	30	+0%					54.485	0.000
1.010	13	60 Winter	30	+0%	30/60 Summer				54.422	0.017
1.011	14	60 Winter	30	+0%	30/60 Summer				54.407	0.082
13.000	15	60 Summer	30	+0%					54.449	-0.461
13.001	16	60 Summer	30	+0%					54.449	-0.426
14.000	17	60 Summer	30	+0%					54.487	-0.908
14.001	18	60 Summer	30	+0%					54.486	-0.839
14.002	19	60 Summer	30	+0%					54.486	-0.809
14.003	20	60 Summer	30	+0%					54.486	-0.734
14.004	21	60 Summer	30	+0%					54.484	-0.606
15.000	22	15 Summer	30	+0%					54.715	-0.635
15.001	23	60 Summer	30	+0%					54.482	-0.603
14.005	24	60 Summer	30	+0%					54.482	-0.553
14.006	25	60 Summer	30	+0%					54.475	-0.500
14.007	26	60 Summer	30	+0%					54.468	-0.467
14.008	27	60 Summer	30	+0%					54.462	-0.428
14.009	28	60 Summer	30	+0%					54.459	-0.411
13.002	29	60 Summer	30	+0%					54.449	-0.361
13.003	30	60 Summer	30	+0%					54.428	-0.297
13.004	31	60 Winter	30	+0%					54.410	-0.235
1.012	32	60 Winter	30	+0%	2/15 Summer				54.392	0.437

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
2.015	07	0.000	0.14			73.3	OK	
9.000	66	0.000	0.00			0.0	OK	
9.001	67	0.000	0.00			0.0	OK	
9.002	68	0.000	0.20			4.1	SURCHARGED	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
9.003	69	0.000	0.99			44.2	SURCHARGED	
10.000	70	0.000	0.31			14.7	OK	
10.001	71	0.000	0.69			33.6	OK	
10.002	72	0.000	0.74			34.8	OK	
10.003	73	0.000	0.55			39.7	OK	
10.004	74	0.000	0.59			44.9	OK	
10.005	75	0.000	0.60			39.3	SURCHARGED	
10.006	76	0.000	0.25			35.2	SURCHARGED	
9.004	77	0.000	1.16			78.6	SURCHARGED	
11.000	78	0.000	0.16			2.6	OK	
11.001	79	0.000	0.22			2.4	OK	
11.002	HW	0.000	1.03		4	13.3	SURCHARGED*	
11.003	HW	0.000	0.36			13.3	OK*	
11.004	80	0.000	0.31			13.3	OK	
11.005	HW BASIN	0.000	0.65			26.7	OK*	
11.006	HW	0.000	0.48			27.5	SURCHARGED*	
9.005	81	0.000	1.11			65.8	SURCHARGED	
9.006	82	0.000	0.21			49.8	SURCHARGED	
1.006	08	0.000	0.36			166.7	SURCHARGED	
1.007	09	0.000	0.23			189.8	OK	
1.008	10	0.000	0.18			152.9	OK	
12.000	11	0.000	0.46			75.0	OK	
1.009	12	0.000	0.26			192.4	OK	
1.010	13	0.000	0.27			202.6	SURCHARGED	
1.011	14	0.000	0.28			201.4	SURCHARGED	
13.000	15	0.000	0.01			3.9	OK	
13.001	16	0.000	0.01			17.9	OK	
14.000	17	0.000	0.01			18.2	OK	
14.001	18	0.000	0.04			36.4	OK	
14.002	19	0.000	0.04			51.3	OK	
14.003	20	0.000	0.05			76.1	OK	
14.004	21	0.000	0.07			87.7	OK	
15.000	22	0.000	0.06			43.9	OK	
15.001	23	0.000	0.05			59.7	OK	
14.005	24	0.000	0.11			142.3	OK	
14.006	25	0.000	0.13			138.9	OK	
14.007	26	0.000	0.10			123.4	OK	
14.008	27	0.000	0.16			122.9	OK	
14.009	28	0.000	0.09			124.1	OK	
13.002	29	0.000	0.09			132.2	OK	
13.003	30	0.000	0.09			131.8	OK	
13.004	31	0.000	0.09			139.0	OK	
1.012	32	0.000	0.98			199.9	SURCHARGED	

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