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)	100	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.404	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.	0.750	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
S1.000	51.264	0.250	205.1	0.159	4.00	0.0	0.600		o	375	Pipe/Conduit	
S2.000	26.243	0.353	74.3	0.144	4.00	0.0	0.600		o	375	Pipe/Conduit	
S2.001	40.837	0.075	544.5	0.047	0.00	0.0	0.600		o	375	Pipe/Conduit	
S3.000	42.512	0.216	196.8	0.144	4.00	0.0	0.600		o	375	Pipe/Conduit	
S3.001	26.274	0.216	121.9	0.000	0.00	0.0	0.600		o	375	Pipe/Conduit	
S2.002	21.199	0.267	79.4	0.116	0.00	0.0	0.600		o	375	Pipe/Conduit	
S2.003	31.682	0.116	273.1	0.040	0.00	0.0	0.600		o	375	Pipe/Conduit	
S1.001	17.216	0.197	87.4	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
S1.002	19.403	0.057	339.8	0.000	0.00	0.0	0.600		o	450	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)
S1.000	50.00	4.68	91.720	0.159	0.0	0.0	0.0	1.26	139.3	21.5
S2.000	50.00	4.21	92.600	0.144	0.0	0.0	0.0	2.10	232.3	19.5
S2.001	50.00	5.09	92.247	0.191	0.0	0.0	0.0	0.77	85.0	25.9
S3.000	50.00	4.55	93.200	0.144	0.0	0.0	0.0	1.29	142.2	19.5
S3.001	50.00	4.82	92.984	0.144	0.0	0.0	0.0	1.64	181.1	19.5
S2.002	50.00	5.27	92.172	0.451	0.0	0.0	0.0	2.04	224.8	61.1
S2.003	50.00	5.75	91.905	0.491	0.0	0.0	0.0	1.09	120.5	66.5
S1.001	50.00	5.88	91.395	0.650	0.0	0.0	0.0	2.18	346.0	88.0
S1.002	50.00	6.18	91.123	0.650	0.0	0.0	0.0	1.10	174.5	88.0

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
S1.003	12.081	0.057	211.6	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
S4.000	37.473	0.641	58.5	0.000	4.00	0.0	0.600		o	150	Pipe/Conduit	
S4.001	42.302	0.723	58.5	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S4.002	12.686	0.110	115.3	0.095	0.00	0.0	0.600		o	450	Pipe/Conduit	
S1.004	55.130	0.198	278.4	0.125	0.00	0.0	0.600		o	450	Pipe/Conduit	
S5.000	25.592	0.286	89.5	0.221	4.00	0.0	0.600		o	300	Pipe/Conduit	
S5.001	13.127	0.072	183.6	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
S5.002	13.735	0.072	192.1	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
S5.003	26.863	0.143	187.9	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
S5.004	14.001	0.125	112.0	0.064	0.00	0.0	0.600		o	300	Pipe/Conduit	
S1.005	42.790	0.207	206.7	0.165	0.00	0.0	0.600		o	450	Pipe/Conduit	
S1.006	26.448	0.207	127.8	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
S6.000	54.559	0.376	145.1	0.092	4.00	0.0	0.600		o	450	Pipe/Conduit	
S7.000	31.585	0.063	501.3	0.174	4.00	0.0	0.600		o	450	Pipe/Conduit	
S7.001	55.642	0.205	271.4	0.057	0.00	0.0	0.600		o	450	Pipe/Conduit	
S7.002	21.652	0.065	333.1	0.000	0.00	0.0	0.600		o	450	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)
S1.003	50.00	6.32	91.066	0.650	0.0	0.0	0.0	1.39	221.7	88.0
S4.000	50.00	4.47	93.597	0.000	0.0	0.0	0.0	1.32	23.3	0.0
S4.001	50.00	5.01	92.956	0.000	0.0	0.0	0.0	1.32	23.3	0.0
S4.002	50.00	5.12	91.630	0.095	0.0	0.0	0.0	1.89	301.0	12.9
S1.004	50.00	7.08	91.009	0.870	0.0	0.0	0.0	1.21	193.0	117.8
S5.000	50.00	4.26	92.300	0.221	0.0	0.0	0.0	1.66	117.5	29.9
S5.001	50.00	4.45	92.014	0.221	0.0	0.0	0.0	1.16	81.8	29.9
S5.002	50.00	4.65	91.943	0.221	0.0	0.0	0.0	1.13	79.9	29.9
S5.003	50.00	5.04	91.871	0.221	0.0	0.0	0.0	1.14	80.8	29.9
S5.004	50.00	5.20	91.728	0.285	0.0	0.0	0.0	1.48	105.0	38.6
S1.005	50.00	7.58	90.811	1.320	0.0	0.0	0.0	1.41	224.3	178.7
S1.006	50.00	7.83	90.604	1.320	0.0	0.0	0.0	1.80	285.8	178.7
S6.000	50.00	4.54	92.000	0.092	0.0	0.0	0.0	1.69	268.1	12.5
S7.000	50.00	4.58	91.263	0.174	0.0	0.0	0.0	0.90	143.3	23.6
S7.001	50.00	5.34	91.200	0.231	0.0	0.0	0.0	1.23	195.5	31.3
S7.002	50.00	5.66	90.995	0.231	0.0	0.0	0.0	1.11	176.3	31.3

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
S6.001	56.679	0.125	453.4	0.110	0.00	0.0	0.600		o	450	Pipe/Conduit	
S6.002	14.631	0.065	225.1	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
S1.007	34.016	0.253	134.4	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
S1.008	5.739	0.370	15.5	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
S8.000	40.958	0.109	375.8	0.000	4.00	0.0	0.600		o	150	Pipe/Conduit	
S9.000	14.851	0.483	30.7	0.100	4.00	0.0	0.600		o	150	Pipe/Conduit	
S8.001	36.565	0.366	99.9	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S1.009	46.168	0.462	99.9	0.000	0.00	0.0	0.600		o	525	Pipe/Conduit	
S1.010	17.278	0.214	80.7	0.065	0.00	0.0	0.600		o	450	Pipe/Conduit	
S1.011	54.333	0.264	206.1	0.000	0.00	0.0	0.600		o	525	Pipe/Conduit	
S1.012	15.439	0.176	87.5	0.000	0.00	0.0	0.600		o	525	Pipe/Conduit	
S10.000	32.375	0.175	185.0	0.000	4.00	0.0	0.600		o	450	Pipe/Conduit	
S10.001	68.718	0.404	170.1	0.183	0.00	0.0	0.600		o	450	Pipe/Conduit	
S11.000	14.944	0.149	100.3	0.000	4.00	0.0	0.600		o	450	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)
S6.001	50.00	6.66	90.930	0.433	0.0	0.0	0.0	0.95	150.8	58.6
S6.002	50.00	6.84	90.613	0.433	0.0	0.0	0.0	1.35	214.9	58.6
S1.007	50.00	8.15	90.397	1.753	0.0	0.0	0.0	1.75	278.6	237.4
S1.008	50.00	8.17	90.144	1.753	0.0	0.0	0.0	5.18	824.2	237.4
S8.000	50.00	5.33	90.249	0.000	0.0	0.0	0.0	0.51	9.1	0.0
S9.000	50.00	4.14	90.623	0.100	0.0	0.0	0.0	1.82	32.2	13.5
S8.001	50.00	5.94	90.140	0.100	0.0	0.0	0.0	1.01	17.8	13.5
S1.009	50.00	8.51	89.774	1.853	0.0	0.0	0.0	2.24	485.1	250.9
S1.010	50.00	8.64	89.312	1.918	0.0	0.0	0.0	2.26	360.1	259.7
S1.011	50.00	9.22	89.023	1.918	0.0	0.0	0.0	1.56	336.9	259.7
S1.012	50.00	9.33	88.759	1.918	0.0	0.0	0.0	2.40	518.6	259.7
S10.000	50.00	4.36	91.021	0.000	0.0	0.0	0.0	1.49	237.2	0.0
S10.001	50.00	5.10	88.206	0.183	0.0	0.0	0.0	1.56	247.5	24.8
S11.000	50.00	4.12	89.200	0.000	0.0	0.0	0.0	2.03	322.9	0.0

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
S12.000	11.878	0.368	32.3	0.000	4.00	0.0	0.600		o	225	Pipe/Conduit	
S11.001	50.420	0.168	300.0	0.183	0.00	0.0	0.600		o	450	Pipe/Conduit	
S11.002	16.157	0.162	99.7	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
S10.002	56.992	0.600	95.0	0.253	0.00	0.0	0.600		o	450	Pipe/Conduit	
S10.003	9.988	0.546	18.3	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
S1.013	35.899	0.176	203.5	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
S13.000	41.400	0.303	136.6	0.000	4.00	0.0	0.600		o	150	Pipe/Conduit	
S13.001	36.410	0.623	58.5	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S13.002	12.245	0.326	37.6	0.182	0.00	0.0	0.600		o	225	Pipe/Conduit	
S13.003	12.886	0.052	250.2	0.041	0.00	0.0	0.600		o	225	Pipe/Conduit	
S13.004	8.007	0.052	155.5	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
S13.005	8.136	0.103	79.0	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
S13.006	28.881	0.457	63.2	0.078	0.00	0.0	0.600		o	225	Pipe/Conduit	
S13.007	13.538	0.343	39.5	0.061	0.00	0.0	0.600		o	225	Pipe/Conduit	
S13.008	21.529	0.122	175.8	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
S13.009	25.087	0.200	125.4	0.290	0.00	0.0	0.600		o	300	Pipe/Conduit	
S13.010	18.061	0.112	161.3	0.000	0.00	0.0	0.600		o	375	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)
S12.000	50.00	4.09	89.419	0.000	0.0	0.0	0.0	2.31	91.9	0.0
S11.001	50.00	4.84	88.132	0.183	0.0	0.0	0.0	1.17	185.8	24.8
S11.002	50.00	4.97	87.964	0.183	0.0	0.0	0.0	2.04	323.8	24.8
S10.002	50.00	5.55	87.802	0.619	0.0	0.0	0.0	2.09	331.8	83.8
S10.003	50.00	5.59	87.202	0.619	0.0	0.0	0.0	4.77	758.8	83.8
S1.013	50.00	9.68	86.506	2.537	0.0	0.0	0.0	1.70	481.7	343.5
S13.000	50.00	4.80	91.727	0.000	0.0	0.0	0.0	0.86	15.2	0.0
S13.001	50.00	5.26	91.424	0.000	0.0	0.0	0.0	1.32	23.3	0.0
S13.002	50.00	5.36	90.726	0.182	0.0	0.0	0.0	2.14	85.1	24.6
S13.003	50.00	5.62	90.400	0.223	0.0	0.0	0.0	0.82	32.7	30.2
S13.004	50.00	5.75	90.349	0.223	0.0	0.0	0.0	1.05	41.6	30.2
S13.005	50.00	5.84	90.297	0.223	0.0	0.0	0.0	1.47	58.6	30.2
S13.006	50.00	6.13	90.194	0.301	0.0	0.0	0.0	1.65	65.5	40.8
S13.007	50.00	6.24	89.737	0.362	0.0	0.0	0.0	2.09	83.0	49.0
S13.008	50.00	6.54	89.319	0.362	0.0	0.0	0.0	1.18	83.6	49.0
S13.009	50.00	6.84	89.197	0.652	0.0	0.0	0.0	1.40	99.1	88.3
S13.010	50.00	7.05	88.922	0.652	0.0	0.0	0.0	1.42	157.3	88.3

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
S13.011	13.598	0.091	149.4	0.065	0.00	0.0	0.600		o	375	Pipe/Conduit	
S13.012	18.723	0.150	124.8	0.010	0.00	0.0	0.600		o	375	Pipe/Conduit	
S13.013	38.277	0.233	164.3	0.167	0.00	0.0	0.600		o	375	Pipe/Conduit	
S1.014	26.075	0.043	600.0	0.000	0.00	0.0	0.600		o	750	Pipe/Conduit	
S1.015	28.280	0.047	600.0	0.000	0.00	0.0	0.600		o	750	Pipe/Conduit	
S1.016	37.532	0.063	600.0	0.061	0.00	0.0	0.600		o	750	Pipe/Conduit	
S14.000	37.291	0.481	77.5	0.142	4.00	0.0	0.600		o	450	Pipe/Conduit	
S14.001	15.446	0.159	97.1	0.074	0.00	0.0	0.600		o	450	Pipe/Conduit	
S14.002	19.398	0.080	244.0	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
S14.003	11.708	0.080	147.3	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
S14.004	22.071	0.338	65.3	0.059	0.00	0.0	0.600		o	450	Pipe/Conduit	
S14.005	7.653	0.083	91.7	0.043	0.00	0.0	0.600		o	450	Pipe/Conduit	
S15.000	34.037	0.050	680.7	0.000	4.00	0.0	0.600		o	450	Pipe/Conduit	
S14.006	33.481	0.100	334.8	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
S14.007	14.915	0.122	122.3	0.010	0.00	0.0	0.600		o	450	Pipe/Conduit	
S1.017	30.517	0.051	600.0	0.000	0.00	0.0	0.600		o	825	Pipe/Conduit	
S1.018	47.969	0.080	600.0	0.057	0.00	0.0	0.600		o	825	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)
S13.011	50.00	7.21	88.810	0.717	0.0	0.0	0.0	1.48	163.5	97.1
S13.012	50.00	7.40	88.719	0.727	0.0	0.0	0.0	1.62	179.0	98.4
S13.013	50.00	7.85	88.569	0.894	0.0	0.0	0.0	1.41	155.8	121.1
S1.014	50.00	10.07	86.179	3.431	0.0	0.0	0.0	1.14	501.5	464.6
S1.015	50.00	10.48	86.136	3.431	0.0	0.0	0.0	1.14	501.5	464.6
S1.016	50.00	11.03	86.089	3.492	0.0	0.0	0.0	1.14	501.5	472.9
S14.000	50.00	4.27	90.000	0.142	0.0	0.0	0.0	2.31	367.5	19.2
S14.001	50.00	4.39	89.519	0.216	0.0	0.0	0.0	2.06	328.1	29.2
S14.002	50.00	4.64	89.360	0.216	0.0	0.0	0.0	1.30	206.3	29.2
S14.003	50.00	4.76	89.281	0.216	0.0	0.0	0.0	1.67	266.1	29.2
S14.004	50.00	4.91	89.201	0.275	0.0	0.0	0.0	2.52	400.6	37.2
S14.005	50.00	4.97	88.863	0.318	0.0	0.0	0.0	2.12	337.7	43.1
S15.000	50.00	4.74	88.500	0.000	0.0	0.0	0.0	0.77	122.7	0.0
S14.006	50.00	5.47	88.450	0.318	0.0	0.0	0.0	1.11	175.8	43.1
S14.007	50.00	5.61	88.350	0.328	0.0	0.0	0.0	1.84	292.3	44.4
S1.017	50.00	11.45	85.951	3.820	0.0	0.0	0.0	1.20	644.0	517.3
S1.018	50.00	12.12	85.900	3.877	0.0	0.0	0.0	1.20	644.0	525.0

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
S1.019	28.920	0.048	600.0	0.060	0.00	0.0	0.600		o	825	Pipe/Conduit	
S16.000	44.201	0.756	58.5	0.098	4.00	0.0	0.600		o	300	Pipe/Conduit	
S17.000	90.968	1.555	58.5	0.098	4.00	0.0	0.600		o	300	Pipe/Conduit	
S16.001	56.352	0.125	450.0	0.335	0.00	0.0	0.600		o	450	Pipe/Conduit	
S16.002	9.016	0.073	124.1	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
S1.020	32.413	0.054	600.0	0.096	0.00	0.0	0.600		o	825	Pipe/Conduit	
S1.021	66.273	0.110	600.0	0.053	0.00	0.0	0.600		o	825	Pipe/Conduit	
S1.022	19.291	0.032	600.0	0.051	0.00	0.0	0.600		o	825	Pipe/Conduit	
S1.023	24.985	0.040	620.3	0.000	0.00	0.0	0.600		o	825	Pipe/Conduit	
S1.024	5.949	0.010	600.0	0.323	0.00	0.0	0.600		o	900	Pipe/Conduit	
S1.025	18.498	0.023	799.0	0.000	0.00	0.0	0.600		o	900	Pipe/Conduit	
S18.000	48.710	0.122	399.3	0.107	4.00	0.0		0.045	3 \=/	600	1:3 Swale	
S18.001	4.760	0.227	21.0	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S18.002	34.371	0.086	399.7	0.074	0.00	0.0		0.045	3 \=/	600	1:3 Swale	
S18.003	47.989	0.227	211.4	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
S18.004	8.020	0.306	26.2	0.115	0.00	0.0		0.045	3 \=/	600	1:3 Swale	
S18.005	27.658	0.233	118.7	0.000	0.00	0.0	0.600		o	300	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)
S1.019	50.00	12.52	85.821	3.937	0.0	0.0	0.0	1.20	644.0	533.1
S16.000	50.00	4.36	88.782	0.098	0.0	0.0	0.0	2.06	145.6	13.3
S17.000	50.00	4.74	88.700	0.098	0.0	0.0	0.0	2.06	145.6	13.3
S16.001	50.00	5.72	86.995	0.531	0.0	0.0	0.0	0.95	151.4	71.9
S16.002	50.00	5.81	86.870	0.531	0.0	0.0	0.0	1.82	290.0	71.9
S1.020	50.00	12.97	85.772	4.564	0.0	0.0	0.0	1.20	644.0	618.0
S1.021	50.00	13.88	85.718	4.617	0.0	0.0	0.0	1.20	644.0	625.2
S1.022	50.00	14.15	85.608	4.668	0.0	0.0	0.0	1.20	644.0	632.1
S1.023	50.00	14.50	85.576	4.668	0.0	0.0	0.0	1.18	633.3	632.1
S1.024	50.00	14.58	85.460	4.991	0.0	0.0	0.0	1.27	809.1	675.8
S1.025	50.00	14.86	85.451	4.991	0.0	0.0	0.0	1.10	700.1	675.8
S18.000	50.00	7.35	89.000	0.107	0.0	0.0	0.0	0.24	38.2	14.5
S18.001	50.00	7.39	88.878	0.107	0.0	0.0	0.0	2.21	39.0	14.5
S18.002	50.00	9.75	88.651	0.181	0.0	0.0	0.0	0.24	38.1	24.5
S18.003	50.00	10.64	88.565	0.181	0.0	0.0	0.0	0.90	35.6	24.5
S18.004	50.00	10.79	88.338	0.296	0.0	0.0	0.0	0.95	149.0	40.1
S18.005	50.00	11.11	87.957	0.296	0.0	0.0	0.0	1.44	101.9	40.1

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
S18.006	18.214	0.437	41.7	0.017	0.00	0.0		0.045	3 \=/	600	1:3 Swale	
S18.007	49.541	0.648	76.5	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
S1.026	8.395	0.037	224.8	0.000	0.00	0.0	0.600		o	900	Pipe/Conduit	
S19.000	48.251	0.060	804.2	0.000	4.00	0.0	0.600		o	900	Pipe/Conduit	
S1.027	64.045	0.100	640.5	0.000	0.00	0.0	0.600		o	900	Pipe/Conduit	
S20.000	56.800	0.379	150.0	0.158	4.00	0.0	0.600		o	450	Pipe/Conduit	
S21.000	52.598	0.351	150.0	0.158	4.00	0.0	0.600		o	600	Pipe/Conduit	
S20.001	52.702	0.351	150.0	0.158	0.00	0.0	0.600		o	450	Pipe/Conduit	
S22.000	46.711	0.500	93.4	0.158	4.00	0.0	0.600		o	450	Pipe/Conduit	
S22.001	27.865	0.800	34.8	0.158	0.00	0.0	0.600		o	450	Pipe/Conduit	
S20.002	62.987	0.630	100.0	0.158	0.00	0.0	0.600		o	750	Pipe/Conduit	
S23.000	6.216	0.021	300.0	0.158	4.00	0.0	0.600		o	750	Pipe/Conduit	
S23.001	53.569	0.179	300.0	0.158	0.00	0.0	0.600		o	750	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)
S18.006	50.00	11.51	87.724	0.313	0.0	0.0	0.0	0.75	118.1	42.4
S18.007	50.00	11.97	87.212	0.313	0.0	0.0	0.0	1.80	127.2	42.4
S1.026	50.00	14.93	85.427	5.304	0.0	0.0	0.0	2.09	1327.0	718.2
S19.000	50.00	4.73	85.450	0.000	0.0	0.0	0.0	1.10	697.8	0.0
S1.027	50.00	15.79	85.390	5.304	0.0	0.0	0.0	1.23	782.9	718.2
S20.000	50.00	4.57	88.400	0.158	0.0	0.0	0.0	1.66	263.6	21.4
S21.000	50.00	4.44	88.300	0.158	0.0	0.0	0.0	1.99	561.6	21.4
S20.001	50.00	5.10	87.700	0.474	0.0	0.0	0.0	1.66	263.6	64.2
S22.000	50.00	4.37	88.800	0.158	0.0	0.0	0.0	2.10	334.6	21.4
S22.001	50.00	4.50	88.300	0.316	0.0	0.0	0.0	3.45	549.3	42.8
S20.002	50.00	5.48	87.200	0.948	0.0	0.0	0.0	2.80	1236.4	128.4
S23.000	50.00	4.06	86.400	0.158	0.0	0.0	0.0	1.61	711.5	21.4
S23.001	50.00	4.62	86.379	0.316	0.0	0.0	0.0	1.61	711.5	42.8

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
S20.003	21.115	0.070	300.0	0.158	0.00	0.0	0.600		o	900	Pipe/Conduit	
S20.004	42.231	0.141	300.0	0.158	0.00	0.0	0.600		o	900	Pipe/Conduit	
S24.000	32.483	0.255	127.4	0.158	4.00	0.0	0.600		o	450	Pipe/Conduit	
S20.005	52.859	0.176	300.0	0.158	0.00	0.0	0.600		o	900	Pipe/Conduit	
S25.000	16.156	0.032	504.9	0.158	4.00	0.0	0.600		o	900	Pipe/Conduit	
S20.006	10.896	0.027	403.6	0.158	0.00	0.0	0.600		o	900	Pipe/Conduit	
S20.007	17.217	0.034	500.0	0.158	0.00	0.0	0.600		o	900	Pipe/Conduit	
S20.008	13.245	0.033	401.4	0.000	0.00	0.0	0.600		o	900	Pipe/Conduit	
S20.009	13.394	0.033	405.9	0.000	0.00	0.0	0.600		o	900	Pipe/Conduit	
S1.028	25.264	0.030	842.1	0.000	0.00	0.0	0.600		o	900	Pipe/Conduit	
S1.029	64.268	0.038	1691.3	0.000	0.00	0.0		0.045	3 \=/	600	1:3 Swale	
S1.030	7.158	0.022	325.4	0.000	0.00	0.0		0.045	o	300	Pipe/Conduit	
S26.000	25.555	0.437	58.5	0.000	4.00	0.0		0.045	o	600	Pipe/Conduit	
S26.001	7.498	0.128	58.6	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
S26.002	54.768	0.183	300.0	0.000	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)
S20.003	50.00	5.67	86.051	1.422	0.0	0.0	0.0	1.80	1147.5	192.6
S20.004	50.00	6.06	85.980	1.580	0.0	0.0	0.0	1.80	1147.5	214.0
S24.000	50.00	4.30	86.400	0.158	0.0	0.0	0.0	1.80	286.3	21.4
S20.005	50.00	6.55	85.695	1.896	0.0	0.0	0.0	1.80	1147.5	256.7
S25.000	50.00	4.19	85.550	0.158	0.0	0.0	0.0	1.39	882.7	21.4
S20.006	50.00	6.67	85.518	2.212	0.0	0.0	0.0	1.55	988.3	299.5
S20.007	50.00	6.87	85.491	2.370	0.0	0.0	0.0	1.39	887.1	320.9
S20.008	50.00	7.01	85.457	2.370	0.0	0.0	0.0	1.56	991.0	320.9
S20.009	50.00	7.16	85.424	2.370	0.0	0.0	0.0	1.55	985.4	320.9
S1.028	50.00	4.39	85.250	0.000	7.0	0.0	0.0	1.07	681.7	7.0
S1.029	50.00	13.49	85.220	0.000	7.0	0.0	0.0	0.12	18.5	7.0
S1.030	50.00	14.04	85.032	0.000	7.0	0.0	0.0	0.22	15.5	7.0
S26.000	50.00	4.52	89.500	0.000	0.0	0.0	0.0	0.82	232.0	0.0
S26.001	50.00	4.58	89.063	0.000	0.0	0.0	0.0	2.06	145.5	0.0
S26.002	50.00	5.23	88.935	0.000	0.0	0.0	0.0	1.40	396.0	0.0

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
S26.003	11.198	0.182	61.5	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
S27.000	36.442	0.469	77.7	0.063	4.00	0.0	0.600		o	600	Pipe/Conduit	
S27.001	103.224	0.104	992.5	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
S27.002	3.998	1.137	3.5	0.194	0.00	0.0	0.600		o	600	Pipe/Conduit	
S27.003	11.336	0.199	56.9	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
S27.004	105.471	1.074	98.2	0.131	0.00	0.0		0.045	o	600	Pipe/Conduit	
S26.004	18.969	0.138	137.8	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
S26.005	50.051	0.167	299.7	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
S26.006	17.509	0.058	300.0	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
S28.000	58.162	0.371	156.8	0.127	4.00	0.0	0.600		o	300	Pipe/Conduit	
S28.001	19.504	0.065	300.0	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
S26.007	4.128	0.014	294.9	0.163	0.00	0.0	0.600		o	750	Pipe/Conduit	
S26.008	113.722	0.379	300.1	0.000	0.00	0.0	0.600		o	750	Pipe/Conduit	
S26.009	8.793	0.088	99.9	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
S29.000	70.924	0.691	102.6	0.292	4.00	0.0	0.600		o	450	Pipe/Conduit	
S29.001	16.102	0.106	152.1	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)
S26.003	50.00	5.32	88.750	0.000	0.0	0.0	0.0	2.01	141.9	0.0
S27.000	50.00	4.22	91.500	0.063	0.0	0.0	0.0	2.76	781.7	8.5
S27.001	50.00	7.72	91.031	0.063	0.0	0.0	0.0	0.49	34.7	8.5
S27.002	50.00	7.73	90.927	0.257	0.0	0.0	0.0	13.04	3688.2	34.8
S27.003	50.00	7.84	89.715	0.257	0.0	0.0	0.0	1.74	69.1	34.8
S27.004	50.00	10.61	88.553	0.388	0.0	0.0	0.0	0.63	179.0	52.5
S26.004	50.00	10.77	87.479	0.388	0.0	0.0	0.0	2.07	586.2	52.5
S26.005	50.00	11.36	87.341	0.388	0.0	0.0	0.0	1.40	396.2	52.5
S26.006	50.00	11.57	87.174	0.388	0.0	0.0	0.0	1.40	396.0	52.5
S28.000	50.00	4.77	88.800	0.127	0.0	0.0	0.0	1.25	88.6	17.2
S28.001	50.00	5.13	88.429	0.127	0.0	0.0	0.0	0.90	63.8	17.2
S26.007	50.00	11.61	86.966	0.678	0.0	0.0	0.0	1.62	717.7	91.8
S26.008	50.00	12.79	86.952	0.678	0.0	0.0	0.0	1.61	711.4	91.8
S26.009	50.00	12.88	86.573	0.678	0.0	0.0	0.0	1.57	111.2	91.8
S29.000	50.00	4.59	92.850	0.292	0.0	0.0	0.0	2.01	319.1	39.5
S29.001	50.00	4.84	92.084	0.292	0.0	0.0	0.0	1.06	42.1	39.5

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
S30.000	96.334	1.287	74.9	0.087	4.00	0.0	0.600		o	600	Pipe/Conduit	
S30.001	38.007	0.293	129.7	0.059	0.00	0.0	0.600		o	600	Pipe/Conduit	
S30.002	15.890	0.293	54.2	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
S29.002	19.722	0.541	36.5	0.134	0.00	0.0	0.600		o	600	Pipe/Conduit	
S29.003	45.477	0.178	255.4	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
S29.004	27.080	0.821	33.0	0.140	0.00	0.0	0.600		o	600	Pipe/Conduit	
S29.005	54.524	0.173	315.7	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
S29.006	7.157	0.830	8.6	0.063	0.00	0.0	0.600		o	700	Pipe/Conduit	
S29.007	22.190	0.116	192.0	0.000	0.00	0.0	0.600		o	375	Pipe/Conduit	
S31.000	20.447	0.419	48.8	0.035	4.00	0.0	0.600		o	600	Pipe/Conduit	
S31.001	44.323	0.801	55.3	0.067	0.00	0.0	0.600		o	600	Pipe/Conduit	
S31.002	11.989	0.199	60.2	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S31.003	52.366	0.474	110.5	0.051	0.00	0.0	0.600		o	600	Pipe/Conduit	
S31.004	20.025	0.145	137.8	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
S29.008	27.333	0.831	32.9	0.075	0.00	0.0	0.600		o	1000	Pipe/Conduit	
S29.009	18.295	0.134	136.1	0.000	0.00	0.0	0.600		o	1000	Pipe/Conduit	
S29.010	163.598	0.551	297.1	0.245	0.00	0.0	0.600		o	1300	Pipe/Conduit	
S29.011	6.281	0.067	93.7	0.000	0.00	0.0	0.600		o	375	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)
S30.000	50.00	4.57	93.850	0.087	0.0	0.0	0.0	2.82	796.5	11.8
S30.001	50.00	4.87	92.563	0.146	0.0	0.0	0.0	2.14	604.1	19.8
S30.002	50.00	4.95	92.270	0.146	0.0	0.0	0.0	3.31	936.4	19.8
S29.002	50.00	5.03	91.603	0.572	0.0	0.0	0.0	4.04	1142.9	77.5
S29.003	50.00	5.53	91.062	0.572	0.0	0.0	0.0	1.52	429.6	77.5
S29.004	50.00	5.63	90.884	0.712	0.0	0.0	0.0	4.25	1201.7	96.4
S29.005	50.00	6.30	90.063	0.712	0.0	0.0	0.0	1.37	386.0	96.4
S29.006	50.00	6.31	89.790	0.775	0.0	0.0	0.0	9.16	3525.9	104.9
S29.007	50.00	6.60	88.960	0.775	0.0	0.0	0.0	1.30	144.0	104.9
S31.000	50.00	4.10	92.600	0.035	0.0	0.0	0.0	3.49	987.3	4.7
S31.001	50.00	4.32	92.181	0.102	0.0	0.0	0.0	3.28	926.9	13.8
S31.002	50.00	4.48	91.380	0.102	0.0	0.0	0.0	1.30	23.0	13.8
S31.003	50.00	4.85	91.181	0.153	0.0	0.0	0.0	2.32	654.9	20.7
S31.004	50.00	5.15	90.161	0.153	0.0	0.0	0.0	1.11	44.2	20.7
S29.008	50.00	6.67	88.220	1.003	0.0	0.0	0.0	5.84	4587.5	135.8
S29.009	50.00	6.78	87.389	1.003	0.0	0.0	0.0	2.87	2250.3	135.8
S29.010	50.00	7.98	86.954	1.248	0.0	0.0	0.0	2.27	3019.3	169.0
S29.011	50.00	8.03	86.404	1.248	0.0	0.0	0.0	1.87	206.7	169.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.030	S	86.500	85.010	0.000	0	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S26.009	S	88.300	86.485	0.000	0	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S29.011	S	89.500	86.337	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	35
Number of Online Controls	18	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.404		

Online Controls for Storm

Orifice Manhole: S2, DS/PN: S1.001, Volume (m³): 12.1

Diameter (m) 0.130 Discharge Coefficient 0.600 Invert Level (m) 91.395

Orifice Manhole: S33, DS/PN: S4.002, Volume (m³): 4.0

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 91.630

Orifice Manhole: S14, DS/PN: S5.004, Volume (m³): 3.8

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 91.728

Orifice Manhole: S18, DS/PN: S6.002, Volume (m³): 12.1

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 90.613

Hydro-Brake® Optimum Manhole: S44, DS/PN: S10.003, Volume (m³): 15.5

Unit Reference	MD-SHE-0062-3300-4000-3300
Design Head (m)	4.000
Design Flow (l/s)	3.3
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	62
Invert Level (m)	87.202
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	4.000	3.3
Flush-Flo™	0.274	1.6
Kick-Flo®	0.557	1.3
Mean Flow over Head Range	-	2.3

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)
0.100	1.4	0.800	1.6	2.000	2.4	4.000	3.3
0.200	1.6	1.000	1.7	2.200	2.5	4.500	3.5
0.300	1.6	1.200	1.9	2.400	2.6	5.000	3.7
0.400	1.6	1.400	2.0	2.600	2.7	5.500	3.8
0.500	1.5	1.600	2.2	3.000	2.9	6.000	4.0
0.600	1.4	1.800	2.3	3.500	3.1	6.500	4.1

Hydro-Brake® Optimum Manhole: S44, DS/PN: S10.003, Volume (m³): 15.5

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
7.000	4.3	8.000	4.6	9.000	4.8		
7.500	4.4	8.500	4.7	9.500	4.9		

Orifice Manhole: S31, DS/PN: S13.003, Volume (m³): 3.7

Diameter (m) 0.100 Discharge Coefficient 0.600 Invert Level (m) 90.400

Orifice Manhole: S36, DS/PN: S13.010, Volume (m³): 6.5

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 88.923

Hydro-Brake® Optimum Manhole: S13, DS/PN: S1.014, Volume (m³): 26.4

Unit Reference	MD-SHE-0152-1550-2750-1550
Design Head (m)	2.750
Design Flow (l/s)	15.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	152
Invert Level (m)	86.179
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.750	15.5
Flush-Flo™	0.655	14.1
Kick-Flo®	1.352	11.1
Mean Flow over Head Range	-	12.8

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)
0.100	5.5	1.200	12.5	3.000	16.1	7.000	24.2
0.200	11.3	1.400	11.3	3.500	17.4	7.500	25.0
0.300	12.7	1.600	12.0	4.000	18.5	8.000	25.8
0.400	13.5	1.800	12.7	4.500	19.6	8.500	26.6
0.500	13.9	2.000	13.3	5.000	20.6	9.000	27.3
0.600	14.1	2.200	13.9	5.500	21.6	9.500	28.1
0.800	14.0	2.400	14.5	6.000	22.5		
1.000	13.5	2.600	15.1	6.500	23.4		

Hydro-Brake® Optimum Manhole: S33, DS/PN: S14.007, Volume (m³): 7.6

Unit Reference	MD-SHE-0057-2000-2000-2000
Design Head (m)	2.000
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	57
Invert Level (m)	88.350
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	2.0
Flush-Flo™	0.247	1.3
Kick-Flo®	0.506	1.1
Mean Flow over Head Range	-	1.5

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)
0.100	1.2	1.200	1.6	3.000	2.4	7.000	3.6
0.200	1.3	1.400	1.7	3.500	2.6	7.500	3.7
0.300	1.3	1.600	1.8	4.000	2.7	8.000	3.8
0.400	1.3	1.800	1.9	4.500	2.9	8.500	3.9
0.500	1.1	2.000	2.0	5.000	3.0	9.000	4.0
0.600	1.2	2.200	2.1	5.500	3.2	9.500	4.1
0.800	1.3	2.400	2.2	6.000	3.3		
1.000	1.5	2.600	2.3	6.500	3.4		

Orifice Manhole: S78, DS/PN: S16.002, Volume (m³): 12.1

Diameter (m) 0.060 Discharge Coefficient 0.600 Invert Level (m) 86.870

Orifice Manhole: S79, DS/PN: S18.001, Volume (m³): 216.0

Diameter (m) 0.100 Discharge Coefficient 0.600 Invert Level (m) 88.878

Orifice Manhole: S81, DS/PN: S18.003, Volume (m³): 390.7

Diameter (m) 0.105 Discharge Coefficient 0.600 Invert Level (m) 88.565

Orifice Manhole: S83, DS/PN: S18.005, Volume (m³): 32.2

Diameter (m) 0.115 Discharge Coefficient 0.600 Invert Level (m) 87.957

Orifice Manhole: S109, DS/PN: S20.009, Volume (m³): 12.6

Diameter (m) 0.120 Discharge Coefficient 0.600 Invert Level (m) 85.424

Hydro-Brake® Optimum Manhole: S57, DS/PN: S1.028, Volume (m³): 52.7

Unit Reference	MD-SHE-0109-7000-2000-7000
Design Head (m)	2.000
Design Flow (l/s)	7.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	109
Invert Level (m)	85.250
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	7.0
Flush-Flo™	0.475	6.3
Kick-Flo®	0.973	5.0
Mean Flow over Head Range	-	5.8

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)
0.100	3.7	1.200	5.5	3.000	8.5	7.000	12.7
0.200	5.6	1.400	5.9	3.500	9.1	7.500	13.1
0.300	6.1	1.600	6.3	4.000	9.7	8.000	13.5
0.400	6.3	1.800	6.7	4.500	10.3	8.500	13.9
0.500	6.3	2.000	7.0	5.000	10.8	9.000	14.3
0.600	6.2	2.200	7.3	5.500	11.3	9.500	14.6
0.800	5.9	2.400	7.6	6.000	11.8		
1.000	5.1	2.600	7.9	6.500	12.2		

Hydro-Brake® Optimum Manhole: S85, DS/PN: S1.030, Volume (m³): 832.2

Unit Reference	MD-SHE-0090-4000-1300-4000
Design Head (m)	1.300
Design Flow (l/s)	4.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	90
Invert Level (m)	85.032
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Hydro-Brake® Optimum Manhole: S85, DS/PN: S1.030, Volume (m³): 832.2

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.300	4.0
Flush-Flo™	0.388	4.0
Kick-Flo®	0.796	3.2
Mean Flow over Head Range	-	3.5

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)
0.100	2.8	1.200	3.9	3.000	5.9	7.000	8.8
0.200	3.7	1.400	4.1	3.500	6.3	7.500	9.1
0.300	3.9	1.600	4.4	4.000	6.8	8.000	9.4
0.400	4.0	1.800	4.7	4.500	7.1	8.500	9.7
0.500	3.9	2.000	4.9	5.000	7.5	9.000	9.9
0.600	3.8	2.200	5.1	5.500	7.9	9.500	10.2
0.800	3.2	2.400	5.3	6.000	8.2		
1.000	3.5	2.600	5.5	6.500	8.5		

Hydro-Brake® Optimum Manhole: S87, DS/PN: S26.009, Volume (m³): 50.2

Unit Reference	MD-SHE-0175-1450-0750-1450
Design Head (m)	0.750
Design Flow (l/s)	14.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	175
Invert Level (m)	86.573
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.750	14.5
Flush-Flo™	0.283	14.5
Kick-Flo®	0.561	12.6
Mean Flow over Head Range	-	12.0

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)
0.100	6.2	0.300	14.5	0.500	13.6	0.800	14.9
0.200	14.2	0.400	14.2	0.600	13.0	1.000	16.6

Hydro-Brake® Optimum Manhole: S87, DS/PN: S26.009, Volume (m³): 50.2

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
1.200	18.1	2.400	25.2	5.000	35.9	8.000	44.9
1.400	19.5	2.600	26.2	5.500	37.6	8.500	46.3
1.600	20.8	3.000	28.1	6.000	39.2	9.000	47.7
1.800	22.0	3.500	30.2	6.500	40.8	9.500	49.0
2.000	23.1	4.000	32.3	7.000	42.3		
2.200	24.2	4.500	34.1	7.500	43.7		

Hydro-Brake® Optimum Manhole: S121, DS/PN: S29.011, Volume (m³): 217.1

Unit Reference	MD-SHE-0046-1000-1100-1000
Design Head (m)	1.100
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	46
Invert Level (m)	86.404
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.100	1.0
Flush-Flo™	0.200	0.8
Kick-Flo®	0.408	0.6
Mean Flow over Head Range	-	0.8

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)
0.100	0.7	1.200	1.0	3.000	1.6	7.000	2.3
0.200	0.8	1.400	1.1	3.500	1.7	7.500	2.4
0.300	0.8	1.600	1.2	4.000	1.8	8.000	2.5
0.400	0.7	1.800	1.2	4.500	1.9	8.500	2.5
0.500	0.7	2.000	1.3	5.000	2.0	9.000	2.6
0.600	0.8	2.200	1.4	5.500	2.1	9.500	2.7
0.800	0.9	2.400	1.4	6.000	2.2		
1.000	1.0	2.600	1.5	6.500	2.2		

Storage Structures for Storm

Complex Manhole: S1, DS/PN: S1.000

Cellular Storage

Invert Level (m) 91.720 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	125.0	125.0	0.751	0.0	173.0
0.750	125.0	173.0			

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	20.0
Max Percolation (l/s)	27.8	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	92.470	Membrane Depth (mm)	130

Cellular Storage Manhole: S2, DS/PN: S1.001

Invert Level (m) 91.395 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	67.5	67.5	1.001	0.0	106.5
1.000	67.5	106.5			

Cellular Storage Manhole: S33, DS/PN: S4.002

Invert Level (m) 91.630 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	102.5	102.5	1.100	0.0	153.5
1.000	102.5	153.5			

Cellular Storage Manhole: S14, DS/PN: S5.004

Invert Level (m) 91.728 Infiltration Coefficient Side (m/hr) 0.00000
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Cellular Storage Manhole: S14, DS/PN: S5.004

Porosity 0.95

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	300.0	300.0	1.100	0.0	430.0
1.000	300.0	430.0			

Complex Manhole: S17, DS/PN: S7.001

Cellular Storage

Invert Level (m) 91.200 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	520.0	520.0	0.501	0.0	582.0
0.500	520.0	582.0			

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	25.0
Max Percolation (l/s)	69.4	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	91.700	Membrane Depth (mm)	130

Cellular Storage Manhole: S31, DS/PN: S9.000

Invert Level (m) 89.623 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	120.0	0.0	1.001	0.0	0.0
1.000	120.0	0.0			

Complex Manhole: S138, DS/PN: S10.001

Cellular Storage

Invert Level (m) 89.846 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Cellular Storage

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	102.0	0.0	1.251	0.0	0.0
1.250	102.0	0.0			

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	21.0
Max Percolation (l/s)	29.2	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	91.096	Membrane Depth (mm)	130

Complex Manhole: S40, DS/PN: S11.001

Cellular Storage

Invert Level (m)	88.132	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	170.5	170.5	1.501	0.0	243.5
1.500	170.5	243.5			

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.5
Membrane Percolation (mm/hr)	1000	Length (m)	65.0
Max Percolation (l/s)	99.3	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	89.632	Membrane Depth (mm)	130

Complex Manhole: S41, DS/PN: S11.002

Cellular Storage

Invert Level (m)	88.189	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	237.0	0.0	1.501	0.0	0.0
1.500	237.0	0.0			

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	30.0
Max Percolation (l/s)	41.7	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	89.689	Membrane Depth (mm)	130

Cellular Storage Manhole: S30, DS/PN: S13.002

Invert Level (m)	91.350	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	262.0	262.0	0.751	0.0	334.4
0.750	262.0	334.4			

Tank or Pond Manhole: S35, DS/PN: S13.009

Invert Level (m) 89.821

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	440.0	1.500	910.0	1.501	0.0

Complex Manhole: S39, DS/PN: S13.013

Cellular Storage

Invert Level (m)	89.193	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	650.0	650.0	1.251	0.0	817.7
1.250	650.0	817.7			

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	12.0
Membrane Percolation (mm/hr)	1000	Length (m)	50.0
Max Percolation (l/s)	166.7	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	90.450	Membrane Depth (mm)	130

Tank or Pond Manhole: S48, DS/PN: S15.000

Invert Level (m) 88.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	212.0	1.500	812.0	1.501	0.0

Tank or Pond Manhole: S33, DS/PN: S14.007

Invert Level (m) 88.350

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	207.0	1.800	811.0

Cellular Storage Manhole: S36, DS/PN: S16.001

Invert Level (m) 86.995 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	200.0	100.0	1.251	0.0	175.0
1.250	200.0	175.0			

Complex Manhole: S79, DS/PN: S18.001

Filter Drain

Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	400.0
Invert Level (m)	88.878	Cap Volume Depth (m)	1.000
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000
Trench Length (m)	40.0		

Swale

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)	40.0
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	400.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	89.878	Cap Infiltration Depth (m)	0.000
Base Width (m)	1.0	Include Swale Volume	Yes

Complex Manhole: S81, DS/PN: S18.003

Filter Drain

Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	400.0
Invert Level (m)	88.565	Cap Volume Depth (m)	0.500
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000
Trench Length (m)	48.0		

Swale

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)	48.0
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	400.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	89.065	Cap Infiltration Depth (m)	0.000
Base Width (m)	1.0	Include Swale Volume	Yes

Complex Manhole: S83, DS/PN: S18.005

Swale

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)	45.0
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	400.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	87.957	Cap Infiltration Depth (m)	0.000
Base Width (m)	1.0	Include Swale Volume	Yes

Swale Manhole: S85, DS/PN: S18.007

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)	87.212	Cap Infiltration Depth (m)	0.000
Base Width (m)	1.0	Include Swale Volume	Yes

Tank or Pond Manhole: S79, DS/PN: S19.000

Invert Level (m) 85.450

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	244.0	2.000	679.0

Complex Manhole: S96, DS/PN: S23.001

Cellular Storage

Invert Level (m) 86.379 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	400.0	250.0	0.751	0.0	295.5
0.750	400.0	295.5			

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	20.0
Membrane Percolation (mm/hr)	1000	Length (m)	25.0
Max Percolation (l/s)	138.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	87.129	Membrane Depth (mm)	130

Complex Manhole: S41, DS/PN: S20.003

Dry Swale

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	Trench Infiltration Side (m/hr)	0.00000
Infiltration Coefficient Side (m/hr)	0.00000	Trench Porosity	0.30
Safety Factor	2.0	Side Slope (1:X)	3.0
Porosity	1.00	Slope (1:X)	100.0
Invert Level (m)	86.051	Cap Volume Depth (m)	0.000
Trench Height (m)	1.000	Cap Infiltration Depth (m)	0.000
Trench Width (m)	0.5	Include Swale Volume	Yes
Trench Length (m)	80.0		

Complex Manhole: S106, DS/PN: S25.000

Cellular Storage

Invert Level (m) 85.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	600.0	400.0	1.501	0.0	520.0
1.500	600.0	520.0			

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	25.0
Membrane Percolation (mm/hr)	1000	Length (m)	15.0
Max Percolation (l/s)	104.2	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	87.050	Membrane Depth (mm)	130

Porous Car Park Manhole: S79, DS/PN: S20.006

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.5
Membrane Percolation (mm/hr)	1000	Length (m)	40.0
Max Percolation (l/s)	61.1	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	85.500	Membrane Depth (mm)	130

Tank or Pond Manhole: S57, DS/PN: S1.028

Invert Level (m) 85.290

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1065.0	1.750	2090.0	1.751	0.0

Complex Manhole: S81, DS/PN: S26.003

Filter Drain

Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	60.0
Invert Level (m)	88.001	Cap Volume Depth (m)	1.500
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000
Trench Length (m)	80.0		

Swale

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)	80.0
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	60.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	89.501	Cap Infiltration Depth (m)	0.000
Base Width (m)	1.0	Include Swale Volume	Yes

Complex Manhole: S85, DS/PN: S26.007

Filter Drain

Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	80.0
Invert Level (m)	85.862	Cap Volume Depth (m)	1.000
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000
Trench Length (m)	70.0		

Swale

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)	70.0
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	80.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	86.862	Cap Infiltration Depth (m)	0.000
Base Width (m)	1.0	Include Swale Volume	Yes

Complex Manhole: S87, DS/PN: S26.009

Filter Drain

Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.450
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	80.0
Invert Level (m)	83.656	Cap Volume Depth (m)	0.500
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000
Trench Length (m)	90.0		

Swale

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)	90.0
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)	84.156	Cap Infiltration Depth (m)	0.000
Base Width (m)	1.0	Include Swale Volume	Yes

Complex Manhole: S119, DS/PN: S30.002

Filter Drain

Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	80.0
Invert Level (m)	92.270	Cap Volume Depth (m)	1.000
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000
Trench Length (m)	130.0		

Swale

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)	130.0
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	80.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	93.270	Cap Infiltration Depth (m)	0.000
Base Width (m)	1.0	Include Swale Volume	Yes

Complex Manhole: S112, DS/PN: S29.002

Filter Drain

Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	150.0
Invert Level (m)	91.978	Cap Volume Depth (m)	1.100
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000
Trench Length (m)	85.0		

Swale

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)	85.0
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	150.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	93.078	Cap Infiltration Depth (m)	0.000
Base Width (m)	1.0	Include Swale Volume	Yes

Complex Manhole: S114, DS/PN: S29.004

Filter Drain

Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	255.0
Invert Level (m)	91.109	Cap Volume Depth (m)	1.000
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000
Trench Length (m)	60.0		

Swale

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)	60.0
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	255.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	92.109	Cap Infiltration Depth (m)	0.000
Base Width (m)	1.0	Include Swale Volume	Yes

Complex Manhole: S116, DS/PN: S29.006

Filter Drain

Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	315.0
Invert Level (m)	89.965	Cap Volume Depth (m)	1.500
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000
Trench Length (m)	55.0		

Swale

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)	55.0
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	315.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	91.465	Cap Infiltration Depth (m)	0.000
Base Width (m)	1.0	Include Swale Volume	Yes

Complex Manhole: S126, DS/PN: S31.004

Filter Drain

Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	300.0
Invert Level (m)	90.161	Cap Volume Depth (m)	1.200
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000
Trench Length (m)	115.0		

Swale

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)	115.0
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	300.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	91.361	Cap Infiltration Depth (m)	0.000
Base Width (m)	1.0	Include Swale Volume	Yes

Complex Manhole: S119, DS/PN: S29.009

Filter Drain

Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	200.0
Invert Level (m)	87.814	Cap Volume Depth (m)	1.200
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000
Trench Length (m)	43.0		

Swale

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)	43.0
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	200.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	89.014	Cap Infiltration Depth (m)	0.000
Base Width (m)	1.0	Include Swale Volume	Yes

Complex Manhole: S121, DS/PN: S29.011

Filter Drain

Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.450
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	100.0
Invert Level (m)	84.777	Cap Volume Depth (m)	1.500
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000
Trench Length (m)	165.0		

Swale

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)	165.0
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)	86.277	Cap Infiltration Depth (m)	0.000
Base Width (m)	1.0	Include Swale Volume	Yes

100 year Return Period 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 Storage Structures	35
Number of Online Controls	18	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.405
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	100
Climate Change (%)	40

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	60 Winter	100	+40%	100/15 Summer				93.118
S2.000	S2	15 Winter	100	+40%	100/15 Summer				93.549
S2.001	S3	15 Winter	100	+40%	100/15 Summer				93.380
S3.000	S4	15 Winter	100	+40%					93.441
S3.001	S8	60 Winter	100	+40%					93.317
S2.002	S4	60 Winter	100	+40%	100/15 Summer				93.300
S2.003	S5	60 Winter	100	+40%	100/15 Summer				93.203
S1.001	S2	60 Winter	100	+40%	100/15 Summer				93.111
S1.002	S3	240 Winter	100	+40%					91.401
S1.003	S13	240 Winter	100	+40%					91.374
S4.000	S13	15 Summer	100	+40%					93.597
S4.001	S14	15 Summer	100	+40%					92.956
S4.002	S33	120 Winter	100	+40%					92.040
S1.004	S4	240 Winter	100	+40%					91.351
S5.000	S13	15 Winter	100	+40%	100/15 Summer				93.368

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	1.023	0.000	0.20		57	25.2	SURCHARGED	
S2.000	S2	0.574	0.000	0.41			83.3	SURCHARGED	
S2.001	S3	0.758	0.000	1.32			101.9	SURCHARGED	
S3.000	S4	-0.134	0.000	0.73			94.6	OK	
S3.001	S8	-0.042	0.000	0.30			47.0	OK	
S2.002	S4	0.753	0.000	0.70			132.6	SURCHARGED	
S2.003	S5	0.923	0.000	1.32			141.8	SURCHARGED	
S1.001	S2	1.266	0.000	0.18			45.3	SURCHARGED	
S1.002	S3	-0.172	0.000	0.25			35.7	OK	
S1.003	S13	-0.142	0.000	0.22			35.6	OK	
S4.000	S13	-0.150	0.000	0.00			0.0	OK	
S4.001	S14	-0.150	0.000	0.00			0.0	OK	
S4.002	S33	-0.040	0.000	0.02			3.2	OK	
S1.004	S4	-0.108	0.000	0.27			48.2	OK	
S5.000	S13	0.768	0.000	1.21			127.5	SURCHARGED	

100 year Return Period 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.
S5.001	S18	15 Winter	100	+40%	100/15 Summer			
S5.002	S19	15 Winter	100	+40%	100/15 Summer			
S5.003	S19	15 Winter	100	+40%	100/15 Summer			
S5.004	S14	360 Winter	100	+40%	100/30 Summer			
S1.005	S5	240 Winter	100	+40%	100/240 Winter			
S1.006	S23	240 Winter	100	+40%	100/120 Winter			
S6.000	S16	15 Winter	100	+40%				
S7.000	S23	360 Winter	100	+40%				
S7.001	S17	360 Winter	100	+40%				
S7.002	S18	15 Winter	100	+40%	100/15 Summer			
S6.001	S17	15 Winter	100	+40%	100/15 Summer			
S6.002	S18	15 Summer	100	+40%	100/15 Summer			
S1.007	S6	360 Winter	100	+40%	100/120 Winter			
S1.008	S14	360 Winter	100	+40%	100/60 Winter			
S8.000	S29	360 Winter	100	+40%	100/60 Winter			
S9.000	S31	1440 Winter	100	+40%				
S8.001	S30	360 Winter	100	+40%	100/15 Winter			
S1.009	S29	360 Winter	100	+40%	100/15 Winter			
S1.010	S10	360 Winter	100	+40%	100/15 Summer			
S1.011	S11	360 Winter	100	+40%	100/15 Summer			
S1.012	S12	360 Winter	100	+40%	100/15 Summer			
S10.000	S137	15 Summer	100	+40%				
S10.001	S138	1440 Winter	100	+40%	100/15 Summer			
S11.000	S39	1440 Winter	100	+40%	100/720 Winter			
S12.000	S40	1440 Winter	100	+40%	100/720 Winter			
S11.001	S40	1440 Winter	100	+40%	100/30 Summer			
S11.002	S41	1440 Winter	100	+40%	100/15 Summer			
S10.002	S39	1440 Winter	100	+40%	100/15 Summer			
S10.003	S44	1440 Winter	100	+40%	100/15 Summer			
S1.013	S37	360 Winter	100	+40%	100/15 Summer			
S13.000	S38	15 Summer	100	+40%				
S13.001	S39	30 Winter	100	+40%				
S13.002	S30	30 Winter	100	+40%	100/15 Summer			
S13.003	S31	30 Winter	100	+40%	100/15 Summer			
S13.004	S40	15 Winter	100	+40%	100/15 Summer			
S13.005	S40	15 Winter	100	+40%	100/15 Summer			
S13.006	S32	15 Winter	100	+40%	100/15 Summer			
S13.007	S33	15 Winter	100	+40%	100/15 Summer			
S13.008	S34	600 Winter	100	+40%	100/15 Summer			
S13.009	S35	600 Winter	100	+40%	100/15 Summer			
S13.010	S36	600 Winter	100	+40%	100/15 Summer			
S13.011	S37	720 Winter	100	+40%	100/15 Summer			
S13.012	S38	720 Winter	100	+40%	100/15 Summer			
S13.013	S39	720 Winter	100	+40%	100/15 Summer			
S1.014	S13	600 Winter	100	+40%	100/15 Summer			
S1.015	S14	1440 Winter	100	+40%	100/720 Summer			
S1.016	S15	1440 Winter	100	+40%	100/720 Winter			
S14.000	S60	15 Winter	100	+40%				

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S5.001	S18	92.958	0.644	0.000	1.89			126.9	SURCHARGED
S5.002	S19	92.706	0.463	0.000	1.90			125.5	SURCHARGED
S5.003	S19	92.446	0.275	0.000	1.73			125.6	SURCHARGED
S5.004	S14	92.268	0.240	0.000	0.04			3.7	SURCHARGED
S1.005	S5	91.286	0.025	0.000	0.34			69.3	SURCHARGED
S1.006	S23	91.166	0.112	0.000	0.29			69.3	SURCHARGED
S6.000	S16	92.152	-0.298	0.000	0.25			60.9	OK
S7.000	S23	91.618	-0.095	0.000	0.12			14.7	OK
S7.001	S17	91.618	-0.032	0.000	0.06			10.9	OK
S7.002	S18	91.893	0.448	0.000	0.04			5.5	SURCHARGED
S6.001	S17	91.951	0.571	0.000	0.41			56.5	SURCHARGED
S6.002	S18	92.033	0.970	0.000	0.03			5.0	SURCHARGED
S1.007	S6	91.033	0.186	0.000	0.26			63.2	SURCHARGED
S1.008	S14	90.885	0.291	0.000	0.18			61.2	SURCHARGED
S8.000	S29	90.752	0.353	0.000	0.08			0.7	SURCHARGED
S9.000	S31	90.455	-0.318	0.000	0.00			0.0	OK
S8.001	S30	90.752	0.462	0.000	0.12			2.0	SURCHARGED
S1.009	S29	90.779	0.480	0.000	0.14			60.4	SURCHARGED
S1.010	S10	90.743	0.981	0.000	0.25			65.3	SURCHARGED
S1.011	S11	90.617	1.069	0.000	0.21			65.0	SURCHARGED
S1.012	S12	90.482	1.198	0.000	0.20			64.8	SURCHARGED
S10.000	S137	91.021	-0.450	0.000	0.00			0.0	OK
S10.001	S138	89.924	1.268	0.000	0.03		295	6.5	SURCHARGED
S11.000	S39	89.939	0.289	0.000	0.00			0.1	SURCHARGED
S12.000	S40	89.939	0.295	0.000	0.00			0.1	SURCHARGED
S11.001	S40	89.939	1.357	0.000	0.02			2.7	SURCHARGED
S11.002	S41	89.954	1.540	0.000	0.09			20.0	SURCHARGED
S10.002	S39	89.996	1.744	0.000	0.03			8.5	SURCHARGED
S10.003	S44	90.057	2.405	0.000	0.01			2.4	SURCHARGED
S1.013	S37	90.353	3.247	0.000	0.16			62.8	SURCHARGED
S13.000	S38	91.727	-0.150	0.000	0.00			0.0	OK
S13.001	S39	91.553	-0.021	0.000	0.01			0.3	OK
S13.002	S30	91.553	0.602	0.000	0.28		27	20.1	SURCHARGED
S13.003	S31	91.529	0.903	0.000	0.72			20.4	SURCHARGED
S13.004	S40	91.147	0.573	0.000	0.75			23.9	SURCHARGED
S13.005	S40	91.136	0.613	0.000	0.56			25.5	SURCHARGED
S13.006	S32	91.126	0.707	0.000	0.92			56.4	SURCHARGED
S13.007	S33	90.738	0.775	0.000	1.27			91.9	SURCHARGED
S13.008	S34	90.540	0.921	0.000	0.27			20.2	SURCHARGED
S13.009	S35	90.538	1.041	0.000	0.07			6.5	SURCHARGED
S13.010	S36	90.594	1.297	0.000	0.04			4.9	SURCHARGED
S13.011	S37	90.332	1.147	0.000	0.06			7.0	SURCHARGED
S13.012	S38	90.331	1.237	0.000	0.05			7.4	SURCHARGED
S13.013	S39	90.329	1.385	0.000	0.08			11.8	SURCHARGED
S1.014	S13	90.327	3.398	0.000	0.05			17.8	SURCHARGED
S1.015	S14	87.449	0.563	0.000	0.05			17.9	SURCHARGED
S1.016	S15	87.448	0.610	0.000	0.05			19.1	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S14.000	S60	90.165	-0.285	0.000	0.29			94.8	OK

PN	US/MH Name	Level Exceeded
S5.001	S18	
S5.002	S19	
S5.003	S19	
S5.004	S14	
S1.005	S5	
S1.006	S23	
S6.000	S16	
S7.000	S23	
S7.001	S17	
S7.002	S18	
S6.001	S17	
S6.002	S18	
S1.007	S6	
S1.008	S14	
S8.000	S29	
S9.000	S31	
S8.001	S30	
S1.009	S29	
S1.010	S10	
S1.011	S11	
S1.012	S12	
S10.000	S137	
S10.001	S138	
S11.000	S39	
S12.000	S40	
S11.001	S40	
S11.002	S41	
S10.002	S39	
S10.003	S44	
S1.013	S37	
S13.000	S38	
S13.001	S39	
S13.002	S30	
S13.003	S31	
S13.004	S40	
S13.005	S40	
S13.006	S32	
S13.007	S33	
S13.008	S34	
S13.009	S35	
S13.010	S36	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Level Exceeded
S13.011	S37	
S13.012	S38	
S13.013	S39	
S1.014	S13	
S1.015	S14	
S1.016	S15	
S14.000	S60	

100 year Return Period 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.
S14.001	S61	15 Summer	100	+40%				
S14.002	S57	15 Winter	100	+40%				
S14.003	S58	15 Winter	100	+40%				
S14.004	S62	15 Winter	100	+40%				
S14.005	S63	15 Winter	100	+40%	100/15 Summer			
S15.000	S48	960 Winter	100	+40%				
S14.006	S47	960 Winter	100	+40%				
S14.007	S33	960 Winter	100	+40%	100/240 Winter			
S1.017	S16	1440 Winter	100	+40%	100/600 Summer			
S1.018	S17	1440 Winter	100	+40%	100/360 Winter			
S1.019	S18	1440 Winter	100	+40%	100/480 Summer			
S16.000	S67	180 Winter	100	+40%				
S17.000	S68	180 Winter	100	+40%				
S16.001	S36	180 Winter	100	+40%	100/15 Summer			
S16.002	S78	180 Winter	100	+40%	100/15 Summer			
S1.020	S19	1440 Winter	100	+40%	100/360 Winter			
S1.021	S20	1440 Winter	100	+40%	100/480 Summer			
S1.022	S21	1440 Winter	100	+40%	100/360 Winter			
S1.023	S22	1440 Winter	100	+40%	100/360 Summer			
S1.024	S23	1440 Winter	100	+40%	100/360 Summer			
S1.025	S64	1440 Winter	100	+40%	100/360 Summer			
S18.000	S78	30 Winter	100	+40%				
S18.001	S79	30 Winter	100	+40%	100/15 Summer			
S18.002	S80	60 Winter	100	+40%				
S18.003	S81	60 Winter	100	+40%	100/15 Summer			
S18.004	S82	15 Winter	100	+40%				
S18.005	S83	120 Winter	100	+40%	100/15 Summer			
S18.006	S84	15 Winter	100	+40%				
S18.007	S85	1440 Winter	100	+40%				
S1.026	S24	1440 Winter	100	+40%	100/360 Summer			
S19.000	S79	1440 Winter	100	+40%	100/360 Summer			
S1.027	S25	1440 Winter	100	+40%	100/360 Summer			
S20.000	S38	15 Winter	100	+40%				
S21.000	S90	15 Winter	100	+40%				
S20.001	S39	15 Winter	100	+40%	100/15 Summer			
S22.000	S91	15 Winter	100	+40%				
S22.001	S92	15 Winter	100	+40%				
S20.002	S40	15 Winter	100	+40%				
S23.000	S95	1440 Winter	100	+40%	100/1440 Winter			
S23.001	S96	1440 Winter	100	+40%	100/1440 Winter			
S20.003	S41	1440 Winter	100	+40%	100/15 Winter			
S20.004	S42	1440 Winter	100	+40%	100/15 Winter			
S24.000	S78	1440 Winter	100	+40%	100/15 Winter			
S20.005	S43	1440 Winter	100	+40%	100/15 Summer			
S25.000	S106	1440 Winter	100	+40%	100/30 Winter			
S20.006	S79	1440 Winter	100	+40%	100/15 Summer			
S20.007	S107	1440 Winter	100	+40%	100/15 Summer			
S20.008	S108	1440 Winter	100	+40%	100/15 Summer			

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S14.001	S61	89.782	-0.187	0.000	0.64			144.1	OK
S14.002	S57	89.685	-0.125	0.000	0.85			141.2	OK
S14.003	S58	89.600	-0.130	0.000	0.85			143.2	OK
S14.004	S62	89.443	-0.208	0.000	0.54			178.1	OK
S14.005	S63	89.343	0.030	0.000	1.20			203.4	SURCHARGED
S15.000	S48	88.844	-0.106	0.000	0.01			0.7	OK
S14.006	S47	88.844	-0.056	0.000	0.04			6.3	OK
S14.007	S33	88.844	0.044	0.000	0.01			1.3	SURCHARGED
S1.017	S16	87.448	0.672	0.000	0.04			20.8	SURCHARGED
S1.018	S17	87.449	0.723	0.000	0.04			20.2	SURCHARGED
S1.019	S18	87.449	0.803	0.000	0.05			21.6	SURCHARGED
S16.000	S67	88.945	-0.137	0.000	0.11			14.5	OK
S17.000	S68	88.946	-0.054	0.000	0.10			14.5	OK
S16.001	S36	88.942	1.497	0.000	0.19			26.0	FLOOD RISK
S16.002	S78	88.936	1.616	0.000	0.06			10.7	FLOOD RISK
S1.020	S19	87.448	0.851	0.000	0.06			31.0	SURCHARGED
S1.021	S20	87.448	0.905	0.000	0.06			32.2	SURCHARGED
S1.022	S21	87.448	1.015	0.000	0.10			33.3	SURCHARGED
S1.023	S22	87.447	1.047	0.000	0.08			33.3	SURCHARGED
S1.024	S23	87.447	1.087	0.000	0.08			40.8	SURCHARGED
S1.025	S64	87.447	1.097	0.000	0.13			40.8	FLOOD RISK
S18.000	S78	89.303	-0.817	0.000	0.02			51.5	OK
S18.001	S79	89.301	0.273	0.000	0.39		26	11.8	SURCHARGED*
S18.002	S80	89.008	-1.492	0.000	0.00			34.7	OK
S18.003	S81	89.007	0.217	0.000	0.40		50	14.4	SURCHARGED*
S18.004	S82	88.450	-0.950	0.000	0.01			85.5	OK
S18.005	S83	88.437	0.180	0.000	0.18		70	17.9	FLOOD RISK*
S18.006	S84	87.788	-0.512	0.000	0.01			23.4	OK
S18.007	S85	87.375	-0.137	0.000	0.11			13.6	OK*
S1.026	S24	87.448	1.120	0.000	0.07			48.6	FLOOD RISK
S19.000	S79	87.403	1.053	0.000	0.05			29.3	FLOOD RISK
S1.027	S25	87.450	1.160	0.000	0.07			46.1	FLOOD RISK
S20.000	S38	88.607	-0.243	0.000	0.43			103.9	OK
S21.000	S90	88.487	-0.413	0.000	0.21			104.5	OK
S20.001	S39	88.273	0.123	0.000	1.17			282.1	SURCHARGED
S22.000	S91	88.983	-0.267	0.000	0.35			105.0	OK
S22.001	S92	88.512	-0.238	0.000	0.45			210.1	OK
S20.002	S40	87.596	-0.354	0.000	0.54			576.6	OK
S23.000	S95	87.362	0.212	0.000	0.01			4.2	FLOOD RISK
S23.001	S96	87.362	0.233	0.000	0.02			9.4	FLOOD RISK
S20.003	S41	87.373	0.423	0.000	0.04			34.9	FLOOD RISK
S20.004	S42	87.381	0.501	0.000	0.04			34.7	SURCHARGED
S24.000	S78	87.391	0.541	0.000	0.03			6.8	SURCHARGED
S20.005	S43	87.389	0.794	0.000	0.04			42.4	SURCHARGED
S25.000	S106	87.391	0.941	0.000	0.08			34.9	FLOOD RISK
S20.006	S79	87.394	0.976	0.000	0.19			90.0	FLOOD RISK
S20.007	S107	87.398	1.007	0.000	0.13			60.1	FLOOD RISK

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S20.008	S108	87.409	1.053	0.000	0.07			37.5	FLOOD RISK

PN	US/MH Name	Level Exceeded
S14.001	S61	
S14.002	S57	
S14.003	S58	
S14.004	S62	
S14.005	S63	
S15.000	S48	
S14.006	S47	
S14.007	S33	
S1.017	S16	
S1.018	S17	
S1.019	S18	
S16.000	S67	
S17.000	S68	
S16.001	S36	
S16.002	S78	
S1.020	S19	
S1.021	S20	
S1.022	S21	
S1.023	S22	
S1.024	S23	
S1.025	S64	
S18.000	S78	
S18.001	S79	
S18.002	S80	
S18.003	S81	
S18.004	S82	
S18.005	S83	
S18.006	S84	
S18.007	S85	
S1.026	S24	
S19.000	S79	
S1.027	S25	
S20.000	S38	
S21.000	S90	
S20.001	S39	
S22.000	S91	
S22.001	S92	
S20.002	S40	
S23.000	S95	
S23.001	S96	
S20.003	S41	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Level Exceeded
S20.004	S42	
S24.000	S78	
S20.005	S43	
S25.000	S106	
S20.006	S79	
S20.007	S107	
S20.008	S108	

100 year Return Period 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.
S20.009	S109	1440 Winter	100	+40%	100/15 Summer			
S1.028	S57	1440 Winter	100	+40%	100/240 Summer			
S1.029	S7	1440 Winter	100	+40%				
S1.030	S85	1440 Winter	100	+40%	100/15 Summer			
S26.000	S78	15 Summer	100	+40%				
S26.001	S79	15 Summer	100	+40%				
S26.002	S80	15 Summer	100	+40%				
S26.003	S81	15 Summer	100	+40%				
S27.000	S86	15 Winter	100	+40%				
S27.001	S87	15 Winter	100	+40%	100/15 Summer			
S27.002	S88	15 Winter	100	+40%				
S27.003	S89	15 Summer	100	+40%	100/15 Summer			
S27.004	S90	15 Summer	100	+40%	100/15 Summer			
S26.004	S82	15 Winter	100	+40%				
S26.005	S83	15 Winter	100	+40%				
S26.006	S84	15 Winter	100	+40%				
S28.000	S117	15 Winter	100	+40%	100/15 Summer			
S28.001	S45	15 Winter	100	+40%	100/15 Summer			
S26.007	S85	15 Winter	100	+40%				
S26.008	S86	15 Winter	100	+40%				
S26.009	S87	1440 Winter	100	+40%				
S29.000	S110	15 Summer	100	+40%				
S29.001	S111	15 Summer	100	+40%	100/15 Summer			
S30.000	S112	15 Winter	100	+40%				
S30.001	S113	15 Winter	100	+40%				
S30.002	S119	15 Winter	100	+40%				
S29.002	S112	15 Winter	100	+40%				
S29.003	S113	15 Winter	100	+40%				
S29.004	S114	15 Winter	100	+40%				
S29.005	S115	15 Winter	100	+40%				
S29.006	S116	15 Winter	100	+40%				
S29.007	S117	15 Summer	100	+40%	100/15 Summer			
S31.000	S120	15 Winter	100	+40%				
S31.001	S121	15 Winter	100	+40%				
S31.002	S122	15 Summer	100	+40%	100/15 Summer			
S31.003	S123	15 Winter	100	+40%				
S31.004	S126	15 Winter	100	+40%	100/15 Summer			
S29.008	S118	15 Winter	100	+40%				
S29.009	S119	1440 Winter	100	+40%				
S29.010	S120	1440 Winter	100	+40%				
S29.011	S121	1440 Winter	100	+40%	100/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S20.009	S109	87.413	1.089	0.000	0.04			20.6	FLOOD RISK

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.028	S57	87.456	1.306	0.000	0.02			6.3	FLOOD RISK
S1.029	S7	86.555	-0.645	0.000	0.00			6.3	OK
S1.030	S85	86.553	1.221	0.000	0.29			4.3	SURCHARGED*
S26.000	S78	89.500	-0.600	0.000	0.00			0.0	OK*
S26.001	S79	89.063	-0.300	0.000	0.00			0.0	OK*
S26.002	S80	88.935	-0.600	0.000	0.00			0.0	OK*
S26.003	S81	88.001	-1.049	0.000	0.00			0.0	OK*
S27.000	S86	91.596	-0.504	0.000	0.06			42.1	OK*
S27.001	S87	91.338	0.007	0.000	0.95			33.1	SURCHARGED*
S27.002	S88	91.079	-0.448	0.000	0.14			154.3	OK*
S27.003	S89	90.390	0.450	0.000	2.39			150.1	SURCHARGED*
S27.004	S90	89.741	0.588	0.000	1.05			188.0	SURCHARGED*
S26.004	S82	87.791	-0.288	0.000	0.53			197.5	OK*
S26.005	S83	87.640	-0.301	0.000	0.49			193.1	OK*
S26.006	S84	87.494	-0.281	0.000	0.56			193.3	OK*
S28.000	S117	89.138	0.038	0.000	0.95			79.6	SURCHARGED
S28.001	S45	88.780	0.051	0.000	1.40			77.9	SURCHARGED
S26.007	S85	87.335	-0.381	0.000	0.48		15	293.3	OK*
S26.008	S86	87.287	-0.415	0.000	0.41			293.1	OK*
S26.009	S87	85.514	-1.359	0.000	0.00			0.0	OK*
S29.000	S110	93.300	0.000	0.000	0.54			172.6	FLOOD RISK*
S29.001	S111	92.609	0.300	0.000	3.08			129.7	SURCHARGED*
S30.000	S112	93.956	-0.494	0.000	0.07			57.2	OK*
S30.001	S113	92.733	-0.430	0.000	0.18			95.2	OK*
S30.002	S119	92.440	-0.430	0.000	0.17		4	94.9	OK*
S29.002	S112	91.876	-0.327	0.000	0.41		9	304.6	OK*
S29.003	S113	91.442	-0.220	0.000	0.71			300.0	OK*
S29.004	S114	91.155	-0.329	0.000	0.42		5	378.4	OK*
S29.005	S115	90.538	-0.125	0.000	0.97			373.1	OK*
S29.006	S116	90.134	-0.357	0.000	0.30		3	370.5	OK*
S29.007	S117	89.660	0.325	0.000	2.74			364.7	SURCHARGED*
S31.000	S120	92.673	-0.527	0.000	0.04			23.4	OK*
S31.001	S121	92.290	-0.491	0.000	0.08			68.1	OK*
S31.002	S122	91.980	0.450	0.000	1.91			43.8	SURCHARGED*
S31.003	S123	91.316	-0.465	0.000	0.11			73.3	OK*
S31.004	S126	90.481	0.095	0.000	1.32		7	58.2	SURCHARGED*
S29.008	S118	88.507	-0.713	0.000	0.18			455.7	OK*
S29.009	S119	88.126	-0.263	0.000	0.02			28.2	OK*
S29.010	S120	88.126	-0.129	0.000	0.01			34.4	OK*
S29.011	S121	88.126	1.347	0.000	0.01			1.2	SURCHARGED*

PN	US/MH Name	Level Exceeded
S20.009	S109	
S1.028	S57	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Level Exceeded
S1.029	S7	
S1.030	S85	
S26.000	S78	
S26.001	S79	
S26.002	S80	
S26.003	S81	
S27.000	S86	
S27.001	S87	
S27.002	S88	
S27.003	S89	
S27.004	S90	
S26.004	S82	
S26.005	S83	
S26.006	S84	
S28.000	S117	
S28.001	S45	
S26.007	S85	
S26.008	S86	
S26.009	S87	
S29.000	S110	
S29.001	S111	
S30.000	S112	
S30.001	S113	
S30.002	S119	
S29.002	S112	
S29.003	S113	
S29.004	S114	
S29.005	S115	
S29.006	S116	
S29.007	S117	
S31.000	S120	
S31.001	S121	
S31.002	S122	
S31.003	S123	
S31.004	S126	
S29.008	S118	
S29.009	S119	
S29.010	S120	
S29.011	S121	