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)	2	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	550	Maximum Backdrop Height (m)	0.000
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 Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.117	4-8	0.048

Total Area Contributing (ha) = 0.165

Total Pipe Volume (m³) = 11.160

Network Design Table for Storm

- Indicates pipe length does not match coordinates

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	21.238	0.618	34.4	0.002	4.00	0.0	0.600	o	100	Pipe/Conduit	
S1.001	7.942	0.829	9.6	0.004	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.002	3.105	0.039	79.6	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.003	17.299	0.173	100.0	0.002	0.00	0.0	0.600	o	150	Pipe/Conduit	
S2.000	5.698	0.450	12.7	0.002	4.00	0.0	0.600	o	100	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	74.94	4.27	102.235	0.002	0.0	0.0	0.0	1.32	10.4	0.4
S1.001	74.58	4.32	101.617	0.006	0.0	0.0	0.0	2.51	19.7	1.2
S1.002	74.17	4.38	100.788	0.006	0.0	0.0	0.0	0.86	6.8	1.2
S1.003	72.30	4.67	100.749	0.008	0.0	0.0	0.0	1.00	17.8	1.6
S2.000	76.53	4.04	102.250	0.002	0.0	0.0	0.0	2.18	17.1	0.4

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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)	HYD SECT	DIA (mm)	Section Type	Auto Design
S3.000	11.632	0.300	38.8	0.005	4.00	0.0	0.600	o	100	Pipe/Conduit	
S2.001	16.543	1.224	13.5	0.007	0.00	0.0	0.600	o	100	Pipe/Conduit	
S4.000	10.137	0.756	13.4	0.002	4.00	0.0	0.600	o	100	Pipe/Conduit	
S4.001	7.075	0.176	40.2	0.007	0.00	0.0	0.600	o	100	Pipe/Conduit	
S4.002	1.305	0.017	76.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S4.003	13.543	0.246	55.1	0.002	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.004	15.270	0.266	57.4	0.005	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.005	11.320	0.500	22.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.006	5.000#	1.450	3.4	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S5.000	16.776	0.168	99.9	0.000	4.00	0.0	0.600	o	150	Pipe/Conduit	
S5.001	10.074	0.101	99.7	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S6.000	12.072	0.151	79.9	0.003	4.00	0.0	0.600	o	100	Pipe/Conduit	
S6.001	5.992	0.381	15.7	0.006	0.00	0.0	0.600	o	100	Pipe/Conduit	
S7.000	13.065	0.543	24.1	0.004	4.00	0.0	0.600	o	100	Pipe/Conduit	
S7.001	4.310	0.057	75.6	0.004	0.00	0.0	0.600	o	100	Pipe/Conduit	
S8.000	19.316	0.242	79.8	0.003	4.00	0.0	0.600	o	100	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)
S3.000	75.72	4.16	102.100	0.005	0.0	0.0	0.0	1.24	9.8	1.0
S2.001	74.81	4.29	101.800	0.014	0.0	0.0	0.0	2.11	16.6	2.8
S4.000	76.27	4.08	101.771	0.002	0.0	0.0	0.0	2.12	16.7	0.4
S4.001	75.58	4.18	101.015	0.009	0.0	0.0	0.0	1.22	9.6	1.8
S4.002	75.41	4.20	100.839	0.009	0.0	0.0	0.0	0.88	6.9	1.8
S4.003	74.26	4.37	100.822	0.011	0.0	0.0	0.0	1.36	24.0	2.2
S1.004	71.11	4.86	100.576	0.038	0.0	0.0	0.0	1.33	23.5	7.3
S1.005	70.57	4.95	100.310	0.038	0.0	0.0	0.0	2.13	37.6	7.3
S1.006	70.48	4.96	99.810	0.038	0.0	0.0	0.0	5.47	96.6	7.3
S5.000	74.87	4.28	98.655	0.000	0.0	0.0	0.0	1.01	17.8	0.0
S5.001	73.74	4.44	98.487	0.000	0.0	0.0	0.0	1.01	17.8	0.0
S6.000	75.18	4.23	100.595	0.003	0.0	0.0	0.0	0.86	6.8	0.6
S6.001	74.83	4.28	100.444	0.009	0.0	0.0	0.0	1.96	15.4	1.8
S7.000	75.85	4.14	100.952	0.004	0.0	0.0	0.0	1.58	12.4	0.8
S7.001	75.28	4.22	100.409	0.008	0.0	0.0	0.0	0.89	7.0	1.6
S8.000	74.22	4.37	100.595	0.003	0.0	0.0	0.0	0.86	6.8	0.6

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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)	HYD SECT	DIA (mm)	Section Type	Auto Design
S7.002	13.561	0.178	76.2	0.006	0.00	0.0	0.600	o	100	Pipe/Conduit	
S7.003	8.980	0.111	80.9	0.007	0.00	0.0	0.600	o	100	Pipe/Conduit	
S6.002	5.638	1.677	3.4	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S5.002	2.575	0.013	198.1	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S5.003	5.000#	0.013	384.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S9.000	5.637	0.112	50.3	0.003	4.00	0.0	0.600	o	100	Pipe/Conduit	
S9.001	7.678	0.100	76.8	0.004	0.00	0.0	0.600	o	100	Pipe/Conduit	
S9.002	7.815	0.880	8.9	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S9.003	10.665	1.450	7.4	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S1.007	7.047	0.042	167.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.008	9.972	0.059	169.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.009	29.262	0.732	40.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.010	13.999	0.350	40.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S10.000	10.633	0.965	11.0	0.002	4.00	0.0	0.600	o	100	Pipe/Conduit	
S10.001	17.422	0.218	79.9	0.004	0.00	0.0	0.600	o	100	Pipe/Conduit	
S10.002	22.903	0.281	81.5	0.006	0.00	0.0	0.600	o	100	Pipe/Conduit	
S11.000	13.341	0.499	26.7	0.002	4.00	0.0	0.600	o	100	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)
S7.002	72.54	4.63	100.352	0.017	0.0	0.0	0.0	0.88	6.9	3.3
S7.003	71.44	4.80	100.174	0.024	0.0	0.0	0.0	0.86	6.7	4.6
S6.002	71.31	4.83	100.063	0.033	0.0	0.0	0.0	4.25	33.4	6.4
S5.002	70.94	4.89	98.386	0.033	0.0	0.0	0.0	0.71	12.6	6.4
S5.003	69.95	5.05	98.373	0.033	0.0	0.0	0.0	0.51	9.0	6.4
S9.000	76.22	4.09	100.952	0.003	0.0	0.0	0.0	1.09	8.6	0.6
S9.001	75.19	4.23	100.840	0.007	0.0	0.0	0.0	0.88	6.9	1.4
S9.002	74.85	4.28	100.740	0.007	0.0	0.0	0.0	2.61	20.5	1.4
S9.003	74.42	4.34	99.860	0.007	0.0	0.0	0.0	2.87	22.5	1.4
S1.007	69.28	5.17	98.360	0.078	0.0	0.0	0.0	1.01	40.0	14.6
S1.008	68.34	5.33	98.318	0.078	0.0	0.0	0.0	1.00	39.9	14.6
S1.009	67.06	5.57	98.259	0.078	0.0	0.0	0.0	2.08	82.5	14.6
S1.010	66.46	5.68	97.527	0.078	0.0	0.0	0.0	2.07	82.5	14.6
S10.000	76.29	4.08	100.965	0.002	0.0	0.0	0.0	2.34	18.4	0.4
S10.001	73.96	4.41	100.000	0.006	0.0	0.0	0.0	0.86	6.8	1.2
S10.002	71.10	4.86	99.782	0.012	0.0	0.0	0.0	0.85	6.7	2.3
S11.000	75.78	4.15	100.000	0.002	0.0	0.0	0.0	1.50	11.8	0.4

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Network Design Table for Storm

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S12.000	7.430	0.244	30.5	0.003	4.00	0.0	0.600	o	100	Pipe/Conduit	
S10.003	4.467	0.222	20.1	0.008	0.00	0.0	0.600	o	150	Pipe/Conduit	
S10.004	5.000#	0.222	22.5	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S13.000	15.759	0.527	29.9	0.003	4.00	0.0	0.600	o	100	Pipe/Conduit	
S14.000	10.185	0.742	13.7	0.003	4.00	0.0	0.600	o	100	Pipe/Conduit	
S15.000	12.938	0.162	79.9	0.004	4.00	0.0	0.600	o	100	Pipe/Conduit	
S13.001	5.337	0.181	29.5	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S13.002	5.000#	1.050	4.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S16.000	20.704	0.259	79.9	0.003	4.00	0.0	0.600	o	100	Pipe/Conduit	
S16.001	10.697	0.201	53.2	0.003	0.00	0.0	0.600	o	100	Pipe/Conduit	
S17.000	20.329	0.253	80.4	0.003	4.00	0.0	0.600	o	100	Pipe/Conduit	
S17.001	25.948	0.325	79.8	0.009	0.00	0.0	0.600	o	100	Pipe/Conduit	
S16.002	8.274	0.040	206.9	0.010	0.00	0.0	0.600	o	150	Pipe/Conduit	
S16.003	5.000#	0.043	116.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S18.000	13.037	0.763	17.1	0.000	4.00	0.0	0.600	o	100	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	76.20	4.09	99.745	0.003	0.0	0.0	0.0	1.40	11.0	0.6
S10.003	70.90	4.89	99.501	0.025	0.0	0.0	0.0	2.26	39.9	4.8
S10.004	70.66	4.93	99.279	0.025	0.0	0.0	0.0	2.13	37.7	4.8
S13.000	75.51	4.19	100.815	0.003	0.0	0.0	0.0	1.42	11.1	0.6
S14.000	76.26	4.08	101.030	0.003	0.0	0.0	0.0	2.10	16.5	0.6
S15.000	75.06	4.25	100.450	0.004	0.0	0.0	0.0	0.86	6.8	0.8
S13.001	74.73	4.30	100.288	0.010	0.0	0.0	0.0	1.86	32.9	2.0
S13.002	74.61	4.32	100.107	0.010	0.0	0.0	0.0	4.65	82.2	2.0
S16.000	74.04	4.40	99.600	0.003	0.0	0.0	0.0	0.86	6.8	0.6
S16.001	72.93	4.57	99.341	0.006	0.0	0.0	0.0	1.06	8.3	1.2
S17.000	74.08	4.39	99.718	0.003	0.0	0.0	0.0	0.86	6.7	0.6
S17.001	70.88	4.90	99.465	0.012	0.0	0.0	0.0	0.86	6.8	2.3
S16.002	69.70	5.09	99.140	0.028	0.0	0.0	0.0	0.69	12.3	5.3
S16.003	69.18	5.18	99.100	0.028	0.0	0.0	0.0	0.93	16.5	5.3
S18.000	76.01	4.12	100.438	0.000	0.0	0.0	0.0	1.88	14.7	0.0

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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)	HYD SECT	DIA (mm)	Section Type	Auto Design
S18.001	5.438	0.300	18.1	0.003	0.00	0.0	0.600	o	100	Pipe/Conduit	
S18.002	5.000#	0.318	15.7	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S19.000	16.351	0.271	60.3	0.003	4.00	0.0	0.600	o	100	Pipe/Conduit	
S20.000	8.224	0.452	18.2	0.000	4.00	0.0	0.600	o	100	Pipe/Conduit	
S19.001	17.511	0.219	80.0	0.008	0.00	0.0	0.600	o	100	Pipe/Conduit	
S19.002	13.202	0.100	132.0	0.010	0.00	0.0	0.600	o	100	Pipe/Conduit	
S19.003	5.000#	0.074	67.6	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
S10.005	11.574	0.069	167.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S10.006	52.090	1.811	28.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.011	5.851	0.100	58.5	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)
S18.001	75.66	4.17	99.675	0.003	0.0	0.0	0.0	1.82	14.3	0.6
S18.002	75.36	4.21	99.375	0.003	0.0	0.0	0.0	1.96	15.4	0.6
S19.000	74.90	4.27	99.721	0.003	0.0	0.0	0.0	0.99	7.8	0.6
S20.000	76.30	4.08	99.902	0.000	0.0	0.0	0.0	1.82	14.3	0.0
S19.001	72.65	4.61	99.450	0.011	0.0	0.0	0.0	0.86	6.8	2.2
S19.002	70.60	4.94	99.231	0.021	0.0	0.0	0.0	0.67	5.2	4.0
S19.003	70.07	5.03	99.131	0.021	0.0	0.0	0.0	0.94	7.4	4.0
S10.005	68.11	5.38	99.057	0.087	0.0	0.0	0.0	1.01	40.0	16.0
S10.006	66.21	5.73	98.988	0.087	0.0	0.0	0.0	2.45	97.4	16.0
S1.011	65.92	5.79	97.177	0.165	0.0	0.0	0.0	1.71	68.1	29.5

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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)
SRE1	102.835	0.600	Open Manhole	300	S1.000	102.235	100				
S1	102.650	1.033	Open Manhole	450	S1.001	101.617	100	S1.000	101.617	100	
S2	102.600	1.812	Open Manhole	600	S1.002	100.788	100	S1.001	100.788	100	
S3	102.750	2.001	Open Manhole	600	S1.003	100.749	150	S1.002	100.749	100	
SRE2	102.850	0.600	Open Manhole	300	S2.000	102.250	100				
SRE3	102.700	0.600	Open Manhole	300	S3.000	102.100	100				
S4	102.700	0.900	Open Manhole	450	S2.001	101.800	100	S2.000	101.800	100	
								S3.000	101.800	100	
SRE4	102.371	0.600	Open Manhole	300	S4.000	101.771	100				
S6	101.615	0.600	Open Manhole	300	S4.001	101.015	100	S4.000	101.015	100	
S7	101.721	0.882	Open Manhole	450	S4.002	100.839	100	S4.001	100.839	100	
S8	102.350	1.528	Open Manhole	600	S4.003	100.822	150	S4.002	100.822	100	
S9	102.002	1.426	Open Manhole	600	S1.004	100.576	150	S1.003	100.576	150	
								S2.001	100.576	100	
								S4.003	100.576	150	
S21	101.310	1.000	Open Manhole	450	S1.005	100.310	150	S1.004	100.310	150	
SD1	101.150	1.340	Sealed Manhole	1200	S1.006	99.810	150	S1.005	99.810	150	
S34	99.505	0.850	Open Manhole	600	S5.000	98.655	150				
S35	100.441	1.954	Open Manhole	600	S5.001	98.487	150	S5.000	98.487	150	
SRE13	101.195	0.600	Open Manhole	300	S6.000	100.595	100				
S26	101.245	0.801	Open Manhole	450	S6.001	100.444	100	S6.000	100.444	100	
SRE9	101.552	0.600	Open Manhole	300	S7.000	100.952	100				
S24	101.552	1.143	Open Manhole	450	S7.001	100.409	100	S7.000	100.409	100	
SRE11	101.195	0.600	Open Manhole	300	S8.000	100.595	100				
SJ	101.590	1.238	Junction		S7.002	100.352	100	S7.001	100.352	100	
								S8.000	100.353	100	1
S25	101.370	1.196	Open Manhole	450	S7.003	100.174	100	S7.002	100.174	100	
S27	100.955	0.892	Open Manhole	450	S6.002	100.063	100	S6.001	100.063	100	
								S7.003	100.063	100	
S36	100.724	2.338	Open Manhole	900	S5.002	98.386	150	S5.001	98.386	150	
								S6.002	98.386	100	
SD2	101.150	2.777	Sealed Manhole	1200	S5.003	98.373	150	S5.002	98.373	150	
SRE12	101.552	0.600	Open Manhole	300	S9.000	100.952	100				
S22	101.540	0.700	Open Manhole	450	S9.001	100.840	100	S9.000	100.840	100	
S23	101.497	0.757	Open Manhole	450	S9.002	100.740	100	S9.001	100.740	100	
SD3	101.150	1.290	Sealed Manhole	1200	S9.003	99.860	100	S9.002	99.860	100	
STank1	101.150	2.790	Open Manhole	1200	S1.007	98.360	225	S1.006	98.360	150	
								S5.003	98.360	150	
								S9.003	98.410	100	
S28 FCC	100.729	2.411	Open Manhole	1350	S1.008	98.318	225	S1.007	98.318	225	
S37	100.261	2.002	Open Manhole	600	S1.009	98.259	225	S1.008	98.259	225	

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S38	99.120	1.593	Open Manhole	600	S1.010	97.527	225	S1.009	97.527	225	
SRE5	101.565	0.600	Open Manhole	300	S10.000	100.965	100				
S12	100.750	0.750	Open Manhole	450	S10.001	100.000	100	S10.000	100.000	100	
S13	100.720	0.938	Open Manhole	450	S10.002	99.782	100	S10.001	99.782	100	
S15	100.750	0.750	Open Manhole	450	S11.000	100.000	100				
SRE7	100.345	0.600	Open Manhole	300	S12.000	99.745	100				
S16	100.601	1.100	Open Manhole	450	S10.003	99.501	150	S10.002	99.501	100	
								S11.000	99.501	100	
								S12.000	99.501	100	
SD4	101.000	1.721	Sealed Manhole	1200	S10.004	99.279	150	S10.003	99.279	150	
S10	101.565	0.750	Open Manhole	450	S13.000	100.815	100				
SRE10	101.630	0.600	Open Manhole	300	S14.000	101.030	100				
SRE6	101.050	0.600	Open Manhole	300	S15.000	100.450	100				
S11	101.397	1.109	Open Manhole	450	S13.001	100.288	150	S13.000	100.288	100	
								S14.000	100.288	100	
								S15.000	100.288	100	
SD5	101.000	0.893	Sealed Manhole	1200	S13.002	100.107	150	S13.001	100.107	150	
SRE8	100.200	0.600	Open Manhole	300	S16.000	99.600	100				
S18	100.000	0.659	Open Manhole	450	S16.001	99.341	100	S16.000	99.341	100	
SRE15	100.318	0.600	Open Manhole	300	S17.000	99.718	100				
S31	100.500	1.035	Open Manhole	450	S17.001	99.465	100	S17.000	99.465	100	
S19	100.480	1.340	Open Manhole	600	S16.002	99.140	150	S16.001	99.140	100	
								S17.001	99.140	100	
SD6	101.000	1.900	Sealed Manhole	1200	S16.003	99.100	150	S16.002	99.100	150	
S30	101.188	0.750	Open Manhole	450	S18.000	100.438	100				
S29	100.425	0.750	Open Manhole	450	S18.001	99.675	100	S18.000	99.675	100	
SD7	101.000	1.625	Sealed Manhole	1200	S18.002	99.375	100	S18.001	99.375	100	
SRE16	100.321	0.600	Open Manhole	300	S19.000	99.721	100				
S20	100.652	0.750	Open Manhole	450	S20.000	99.902	100				
S33	100.200	0.750	Open Manhole	450	S19.001	99.450	100	S19.000	99.450	100	
								S20.000	99.450	100	
S32	100.500	1.269	Open Manhole	450	S19.002	99.231	100	S19.001	99.231	100	
SD8	101.000	1.869	Sealed Manhole	1200	S19.003	99.131	100	S19.002	99.131	100	
STank2	101.000	1.943	Open Manhole	1200	S10.005	99.057	225	S10.004	99.057	150	
								S13.002	99.057	150	
								S16.003	99.057	150	
								S18.002	99.057	100	
								S19.003	99.057	100	
S14 FCC	100.200	1.212	Open Manhole	1200	S10.006	98.988	225	S10.005	98.988	225	
S39	98.850	1.673	Open Manhole	600	S1.011	97.177	225	S1.010	97.177	225	
								S10.006	97.177	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)
SDitch	97.750	0.673	Open Manhole	0	OUTFALL			S1.011	97.077	225	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SRE1	446347.470	296879.317	446347.470	296879.317	Required	
S1	446366.946	296870.847	446366.946	296870.847	Required	
S2	446364.021	296863.463	446364.021	296863.463	Required	
S3	446360.954	296863.947	446360.954	296863.947	Required	
SRE2	446356.028	296869.294	446356.028	296869.294	Required	
SRE3	446343.218	296868.638	446343.218	296868.638	Required	
S4	446353.891	296864.012	446353.891	296864.012	Required	
SRE4	446336.800	296861.659	446336.800	296861.659	Required	
S6	446334.672	296851.748	446334.672	296851.748	Required	
S7	446341.425	296849.638	446341.425	296849.638	Required	
S8	446342.272	296850.631	446342.272	296850.631	Required	
S9	446355.459	296847.544	446355.459	296847.544	Required	
S21	446360.237	296833.041	446360.237	296833.041	Required	
SD1	446371.333	296830.801			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)
S34	446410.942	296828.472	446410.942	296828.472	Required	
S35	446394.264	296826.666	446394.264	296826.666	Required	
SRE13	446398.951	296837.299	446398.951	296837.299	Required	
S26	446387.127	296839.734	446387.127	296839.734	Required	
SRE9	446370.684	296861.337	446370.684	296861.337	Required	
S24	446383.446	296858.538	446383.446	296858.538	Required	
SRE11	446401.732	296850.997	446401.732	296850.997	Required	
SJ	446382.700	296854.293			No Entry	
S25	446380.352	296840.937	446380.352	296840.937	Required	
S27	446385.894	296833.871	446385.894	296833.871	Required	
S36	446384.349	296828.449	446384.349	296828.449	Required	
SD2	446381.802	296828.836			No Entry	
SRE12	446373.023	296844.116	446373.023	296844.116	Required	
S22	446367.463	296845.045	446367.463	296845.045	Required	
S23	446366.012	296837.505	446366.012	296837.505	Required	
SD3	446371.535	296831.975			No Entry	
STank1	446382.048	296830.177	446382.048	296830.177	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)
S28 FCC	446388.980	296828.909	446388.980	296828.909	Required	
S37	446398.886	296827.761	446398.886	296827.761	Required	
S38	446409.831	296800.623	446409.831	296800.623	Required	
SRE5	446331.926	296844.787	446331.926	296844.787	Required	
S12	446327.389	296835.171	446327.389	296835.171	Required	
S13	446323.118	296818.280	446323.118	296818.280	Required	
S15	446332.429	296816.910	446332.429	296816.910	Required	
SRE7	446343.467	296806.147	446343.467	296806.147	Required	
S16	446345.286	296813.351	446345.286	296813.351	Required	
SD4	446348.801	296816.108	446348.801	296816.108	Required	
S10	446338.519	296833.462	446338.519	296833.462	Required	
SRE10	446347.024	296837.120	446347.024	296837.120	Required	
SRE6	446340.980	296831.442	446340.980	296831.442	Required	
S11	446353.769	296829.489			No Entry	
SD5	446353.698	296824.152			No Entry	
SRE8	446331.313	296802.715	446331.313	296802.715	Required	
S18	446351.316	296797.375	446351.316	296797.375	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)
SRE15	446399.501	296799.814	446399.501	296799.814	Required	
S31	446379.294	296802.048	446379.294	296802.048	Required	
S19	446353.977	296807.735	446353.977	296807.735	Required	
SD6	446351.353	296815.582			No Entry	
S30	446364.387	296829.418	446364.387	296829.418	Required	
S29	446361.654	296816.671	446361.654	296816.671	Required	
SD7	446356.361	296817.918			No Entry	
SRE16	446403.140	296814.995	446403.140	296814.995	Required	
S20	446388.910	296826.417	446388.910	296826.417	Required	
S33	446387.144	296818.385	446387.144	296818.385	Required	
S32	446369.998	296821.944	446369.998	296821.944	Required	
SD8	446356.904	296820.255			No Entry	
STank2	446355.048	296814.821	446355.048	296814.821	Required	
S14 FCC	446359.239	296804.032	446359.239	296804.032	Required	
S39	446408.361	296786.701	446408.361	296786.701	Required	
SDitch	446413.888	296784.777			No Entry	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

- Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	100	SRE1	102.835	102.235	0.500	Open Manhole	300
S1.001	o	100	S1	102.650	101.617	0.933	Open Manhole	450
S1.002	o	100	S2	102.600	100.788	1.712	Open Manhole	600
S1.003	o	150	S3	102.750	100.749	1.851	Open Manhole	600
S2.000	o	100	SRE2	102.850	102.250	0.500	Open Manhole	300
S3.000	o	100	SRE3	102.700	102.100	0.500	Open Manhole	300
S2.001	o	100	S4	102.700	101.800	0.800	Open Manhole	450
S4.000	o	100	SRE4	102.371	101.771	0.500	Open Manhole	300
S4.001	o	100	S6	101.615	101.015	0.500	Open Manhole	300
S4.002	o	100	S7	101.721	100.839	0.782	Open Manhole	450
S4.003	o	150	S8	102.350	100.822	1.378	Open Manhole	600
S1.004	o	150	S9	102.002	100.576	1.276	Open Manhole	600
S1.005	o	150	S21	101.310	100.310	0.850	Open Manhole	450
S1.006	o	150	SD1	101.150	99.810	1.190	Sealed Manhole	1200
S5.000	o	150	S34	99.505	98.655	0.700	Open Manhole	600
S5.001	o	150	S35	100.441	98.487	1.804	Open Manhole	600

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	21.238	34.4	S1	102.650	101.617	0.933	Open Manhole	450
S1.001	7.942	9.6	S2	102.600	100.788	1.712	Open Manhole	600
S1.002	3.105	79.6	S3	102.750	100.749	1.901	Open Manhole	600
S1.003	17.299	100.0	S9	102.002	100.576	1.276	Open Manhole	600
S2.000	5.698	12.7	S4	102.700	101.800	0.800	Open Manhole	450
S3.000	11.632	38.8	S4	102.700	101.800	0.800	Open Manhole	450
S2.001	16.543	13.5	S9	102.002	100.576	1.326	Open Manhole	600
S4.000	10.137	13.4	S6	101.615	101.015	0.500	Open Manhole	300
S4.001	7.075	40.2	S7	101.721	100.839	0.782	Open Manhole	450
S4.002	1.305	76.8	S8	102.350	100.822	1.428	Open Manhole	600
S4.003	13.543	55.1	S9	102.002	100.576	1.276	Open Manhole	600
S1.004	15.270	57.4	S21	101.310	100.310	0.850	Open Manhole	450
S1.005	11.320	22.6	SD1	101.150	99.810	1.190	Sealed Manhole	1200
S1.006	5.000#	3.4	STank1	101.150	98.360	2.640	Open Manhole	1200
S5.000	16.776	99.9	S35	100.441	98.487	1.804	Open Manhole	600
S5.001	10.074	99.7	S36	100.724	98.386	2.188	Open Manhole	900

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S6.000	o	100	SRE13	101.195	100.595	0.500	Open Manhole	300
S6.001	o	100	S26	101.245	100.444	0.701	Open Manhole	450
S7.000	o	100	SRE9	101.552	100.952	0.500	Open Manhole	300
S7.001	o	100	S24	101.552	100.409	1.043	Open Manhole	450
S8.000	o	100	SRE11	101.195	100.595	0.500	Open Manhole	300
S7.002	o	100	SJ	101.590	100.352	1.138	Junction	
S7.003	o	100	S25	101.370	100.174	1.096	Open Manhole	450
S6.002	o	100	S27	100.955	100.063	0.792	Open Manhole	450
S5.002	o	150	S36	100.724	98.386	2.188	Open Manhole	900
S5.003	o	150	SD2	101.150	98.373	2.627	Sealed Manhole	1200
S9.000	o	100	SRE12	101.552	100.952	0.500	Open Manhole	300
S9.001	o	100	S22	101.540	100.840	0.600	Open Manhole	450
S9.002	o	100	S23	101.497	100.740	0.657	Open Manhole	450
S9.003	o	100	SD3	101.150	99.860	1.190	Sealed Manhole	1200
S1.007	o	225	STank1	101.150	98.360	2.565	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S6.000	12.072	79.9	S26	101.245	100.444	0.701	Open Manhole	450
S6.001	5.992	15.7	S27	100.955	100.063	0.792	Open Manhole	450
S7.000	13.065	24.1	S24	101.552	100.409	1.043	Open Manhole	450
S7.001	4.310	75.6	SJ	101.590	100.352	1.138	Junction	
S8.000	19.316	79.8	SJ	101.590	100.353	1.137	Junction	
S7.002	13.561	76.2	S25	101.370	100.174	1.096	Open Manhole	450
S7.003	8.980	80.9	S27	100.955	100.063	0.792	Open Manhole	450
S6.002	5.638	3.4	S36	100.724	98.386	2.238	Open Manhole	900
S5.002	2.575	198.1	SD2	101.150	98.373	2.627	Sealed Manhole	1200
S5.003	5.000#	384.6	STank1	101.150	98.360	2.640	Open Manhole	1200
S9.000	5.637	50.3	S22	101.540	100.840	0.600	Open Manhole	450
S9.001	7.678	76.8	S23	101.497	100.740	0.657	Open Manhole	450
S9.002	7.815	8.9	SD3	101.150	99.860	1.190	Sealed Manhole	1200
S9.003	10.665	7.4	STank1	101.150	98.410	2.640	Open Manhole	1200
S1.007	7.047	167.8	S28 FCC	100.729	98.318	2.186	Open Manhole	1350

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.008	o	225	S28 FCC	100.729	98.318	2.186	Open Manhole	1350
S1.009	o	225	S37	100.261	98.259	1.777	Open Manhole	600
S1.010	o	225	S38	99.120	97.527	1.368	Open Manhole	600
S10.000	o	100	SRE5	101.565	100.965	0.500	Open Manhole	300
S10.001	o	100	S12	100.750	100.000	0.650	Open Manhole	450
S10.002	o	100	S13	100.720	99.782	0.838	Open Manhole	450
S11.000	o	100	S15	100.750	100.000	0.650	Open Manhole	450
S12.000	o	100	SRE7	100.345	99.745	0.500	Open Manhole	300
S10.003	o	150	S16	100.601	99.501	0.950	Open Manhole	450
S10.004	o	150	SD4	101.000	99.279	1.571	Sealed Manhole	1200
S13.000	o	100	S10	101.565	100.815	0.650	Open Manhole	450
S14.000	o	100	SRE10	101.630	101.030	0.500	Open Manhole	300
S15.000	o	100	SRE6	101.050	100.450	0.500	Open Manhole	300
S13.001	o	150	S11	101.397	100.288	0.959	Open Manhole	450
S13.002	o	150	SD5	101.000	100.107	0.743	Sealed Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.008	9.972	169.0	S37	100.261	98.259	1.777	Open Manhole	600
S1.009	29.262	40.0	S38	99.120	97.527	1.368	Open Manhole	600
S1.010	13.999	40.0	S39	98.850	97.177	1.448	Open Manhole	600
S10.000	10.633	11.0	S12	100.750	100.000	0.650	Open Manhole	450
S10.001	17.422	79.9	S13	100.720	99.782	0.838	Open Manhole	450
S10.002	22.903	81.5	S16	100.601	99.501	1.000	Open Manhole	450
S11.000	13.341	26.7	S16	100.601	99.501	1.000	Open Manhole	450
S12.000	7.430	30.5	S16	100.601	99.501	1.000	Open Manhole	450
S10.003	4.467	20.1	SD4	101.000	99.279	1.571	Sealed Manhole	1200
S10.004	5.000#	22.5	STank2	101.000	99.057	1.793	Open Manhole	1200
S13.000	15.759	29.9	S11	101.397	100.288	1.009	Open Manhole	450
S14.000	10.185	13.7	S11	101.397	100.288	1.009	Open Manhole	450
S15.000	12.938	79.9	S11	101.397	100.288	1.009	Open Manhole	450
S13.001	5.337	29.5	SD5	101.000	100.107	0.743	Sealed Manhole	1200
S13.002	5.000#	4.8	STank2	101.000	99.057	1.793	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S16.000	o	100	SRE8	100.200	99.600	0.500	Open Manhole	300
S16.001	o	100	S18	100.000	99.341	0.559	Open Manhole	450
S17.000	o	100	SRE15	100.318	99.718	0.500	Open Manhole	300
S17.001	o	100	S31	100.500	99.465	0.935	Open Manhole	450
S16.002	o	150	S19	100.480	99.140	1.190	Open Manhole	600
S16.003	o	150	SD6	101.000	99.100	1.750	Sealed Manhole	1200
S18.000	o	100	S30	101.188	100.438	0.650	Open Manhole	450
S18.001	o	100	S29	100.425	99.675	0.650	Open Manhole	450
S18.002	o	100	SD7	101.000	99.375	1.525	Sealed Manhole	1200
S19.000	o	100	SRE16	100.321	99.721	0.500	Open Manhole	300
S20.000	o	100	S20	100.652	99.902	0.650	Open Manhole	450
S19.001	o	100	S33	100.200	99.450	0.650	Open Manhole	450
S19.002	o	100	S32	100.500	99.231	1.169	Open Manhole	450
S19.003	o	100	SD8	101.000	99.131	1.769	Sealed Manhole	1200
S10.005	o	225	STank2	101.000	99.057	1.718	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S16.000	20.704	79.9	S18	100.000	99.341	0.559	Open Manhole	450
S16.001	10.697	53.2	S19	100.480	99.140	1.240	Open Manhole	600
S17.000	20.329	80.4	S31	100.500	99.465	0.935	Open Manhole	450
S17.001	25.948	79.8	S19	100.480	99.140	1.240	Open Manhole	600
S16.002	8.274	206.9	SD6	101.000	99.100	1.750	Sealed Manhole	1200
S16.003	5.000#	116.3	STank2	101.000	99.057	1.793	Open Manhole	1200
S18.000	13.037	17.1	S29	100.425	99.675	0.650	Open Manhole	450
S18.001	5.438	18.1	SD7	101.000	99.375	1.525	Sealed Manhole	1200
S18.002	5.000#	15.7	STank2	101.000	99.057	1.843	Open Manhole	1200
S19.000	16.351	60.3	S33	100.200	99.450	0.650	Open Manhole	450
S20.000	8.224	18.2	S33	100.200	99.450	0.650	Open Manhole	450
S19.001	17.511	80.0	S32	100.500	99.231	1.169	Open Manhole	450
S19.002	13.202	132.0	SD8	101.000	99.131	1.769	Sealed Manhole	1200
S19.003	5.000#	67.6	STank2	101.000	99.057	1.843	Open Manhole	1200
S10.005	11.574	167.7	S14 FCC	100.200	98.988	0.987	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S10.006	o	225	S14 FCC	100.200	98.988	0.987	Open Manhole	1200
S1.011	o	225	S39	98.850	97.177	1.448	Open Manhole	600

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S10.006	52.090	28.8	S39	98.850	97.177	1.448	Open Manhole	600
S1.011	5.851	58.5	SDitch	97.750	97.077	0.448	Open Manhole	0

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.002	0.002	0.002
1.001	-	-	100	0.004	0.004	0.004
1.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.002	0.002	0.002
2.000	-	-	100	0.002	0.002	0.002
3.000	-	-	100	0.005	0.005	0.005
2.001	-	-	100	0.007	0.007	0.007
4.000	-	-	100	0.002	0.002	0.002
4.001	-	-	100	0.007	0.007	0.007
4.002	-	-	100	0.000	0.000	0.000
4.003	-	-	100	0.002	0.002	0.002
1.004	-	-	100	0.005	0.005	0.005
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
5.000	-	-	100	0.000	0.000	0.000
5.001	-	-	100	0.000	0.000	0.000
6.000	-	-	100	0.003	0.003	0.003
6.001	-	-	100	0.006	0.006	0.006
7.000	-	-	100	0.004	0.004	0.004
7.001	-	-	100	0.004	0.004	0.004
8.000	-	-	100	0.003	0.003	0.003
7.002	-	-	100	0.006	0.006	0.006
7.003	-	-	100	0.007	0.007	0.007
6.002	-	-	100	0.000	0.000	0.000
5.002	-	-	100	0.000	0.000	0.000
5.003	-	-	100	0.000	0.000	0.000
9.000	-	-	100	0.003	0.003	0.003
9.001	-	-	100	0.004	0.004	0.004
9.002	-	-	100	0.000	0.000	0.000
9.003	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
1.010	-	-	100	0.000	0.000	0.000
10.000	-	-	100	0.002	0.002	0.002
10.001	-	-	100	0.004	0.004	0.004
10.002	-	-	100	0.006	0.006	0.006
11.000	-	-	100	0.002	0.002	0.002
12.000	-	-	100	0.003	0.003	0.003
10.003	-	-	100	0.008	0.008	0.008
10.004	-	-	100	0.000	0.000	0.000
13.000	-	-	100	0.003	0.003	0.003
14.000	-	-	100	0.003	0.003	0.003
15.000	-	-	100	0.004	0.004	0.004
13.001	-	-	100	0.000	0.000	0.000
13.002	-	-	100	0.000	0.000	0.000
16.000	-	-	100	0.003	0.003	0.003
16.001	-	-	100	0.003	0.003	0.003
17.000	-	-	100	0.003	0.003	0.003
17.001	-	-	100	0.009	0.009	0.009
16.002	-	-	100	0.010	0.010	0.010
16.003	-	-	100	0.000	0.000	0.000
18.000	-	-	100	0.000	0.000	0.000
18.001	-	-	100	0.003	0.003	0.003
18.002	-	-	100	0.000	0.000	0.000
19.000	-	-	100	0.003	0.003	0.003

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
20.000	-	-	100	0.000	0.000	0.000
19.001	-	-	100	0.008	0.008	0.008
19.002	-	-	100	0.010	0.010	0.010
19.003	-	-	100	0.000	0.000	0.000
10.005	-	-	100	0.000	0.000	0.000
10.006	-	-	100	0.000	0.000	0.000
1.011	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.165	0.165	0.165

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)
S1.011	SDitch	97.750	97.077	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	0.000
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 Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	3	Number of Storage Structures	11	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.400		

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Online Controls for Storm

Non Return Valve Manhole: S35, DS/PN: S5.001, Volume (m³): 0.8

Hydro-Brake® Optimum Manhole: S28 FCC, DS/PN: S1.008, Volume (m³): 3.7

Unit Reference	MD-SHE-0060-2000-1642-2000
Design Head (m)	1.642
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	60
Invert Level (m)	98.318
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.642	2.0	Kick-Flo®	0.532	1.2
Flush-Flo™	0.263	1.5	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)	Depth (m)	Flow (l/s)
0.100	1.3	0.800	1.4	2.000	2.2	4.000	3.0	7.000	3.9
0.200	1.5	1.000	1.6	2.200	2.3	4.500	3.2	7.500	4.0
0.300	1.5	1.200	1.7	2.400	2.4	5.000	3.3	8.000	4.2
0.400	1.4	1.400	1.9	2.600	2.5	5.500	3.5	8.500	4.3
0.500	1.3	1.600	2.0	3.000	2.6	6.000	3.6	9.000	4.4
0.600	1.3	1.800	2.1	3.500	2.8	6.500	3.8	9.500	4.5

Hydro-Brake® Optimum Manhole: S14 FCC, DS/PN: S10.006, Volume (m³): 1.8

Unit Reference	MD-SHE-0063-2000-1269-2000
Design Head (m)	1.269
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	63
Invert Level (m)	98.988
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.269	2.0	Kick-Flo®	0.567	1.4
Flush-Flo™	0.280	1.7	Mean Flow over Head Range	-	1.6

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

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Hydro-Brake® Optimum Manhole: S14 FCC, DS/PN: S10.006, Volume (m³): 1.8

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	1.5	0.800	1.6	2.000	2.5	4.000	3.4	7.000	4.4
0.200	1.7	1.000	1.8	2.200	2.6	4.500	3.6	7.500	4.5
0.300	1.7	1.200	1.9	2.400	2.7	5.000	3.8	8.000	4.7
0.400	1.7	1.400	2.1	2.600	2.8	5.500	3.9	8.500	4.8
0.500	1.6	1.600	2.2	3.000	3.0	6.000	4.1	9.000	5.0
0.600	1.4	1.800	2.3	3.500	3.2	6.500	4.2	9.500	5.1

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Storage Structures for Storm

Porous Car Park Manhole: S9, DS/PN: S1.004

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	18.2
Max Percolation (l/s)	50.6	Slope (1:X)	25.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	100.576	Cap Volume Depth (m)	0.350

Porous Car Park Manhole: S21, DS/PN: S1.005

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	22.0
Max Percolation (l/s)	61.1	Slope (1:X)	45.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	100.310	Cap Volume Depth (m)	0.350

Porous Car Park Manhole: S34, DS/PN: S5.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	16.9
Max Percolation (l/s)	46.9	Slope (1:X)	20.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	98.655	Cap Volume Depth (m)	0.350

Porous Car Park Manhole: S27, DS/PN: S6.002

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.5
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	12.5	Slope (1:X)	26.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	100.063	Cap Volume Depth (m)	0.350

Porous Car Park Manhole: S23, DS/PN: S9.002

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	3.9
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	10.8	Slope (1:X)	72.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	100.740	Cap Volume Depth (m)	0.350

Cellular Storage Manhole: STank1, DS/PN: S1.007

Invert Level (m)	98.360	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)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	45.0	0.0	1.600	45.0	0.0	1.601	0.0	0.0

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Porous Car Park Manhole: S16, DS/PN: S10.003

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	16.2
Max Percolation (l/s)	45.0	Slope (1:X)	60.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	99.501	Cap Volume Depth (m)	0.350

Porous Car Park Manhole: S11, DS/PN: S13.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	8.0
Membrane Percolation (mm/hr)	1000	Length (m)	13.0
Max Percolation (l/s)	28.9	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	100.288	Cap Volume Depth (m)	0.350

Porous Car Park Manhole: S29, DS/PN: S18.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	9.5
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	26.4	Slope (1:X)	19.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	99.675	Cap Volume Depth (m)	0.350

Porous Car Park Manhole: S33, DS/PN: S19.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	6.1
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	16.9	Slope (1:X)	22.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	99.450	Cap Volume Depth (m)	0.350

Cellular Storage Manhole: STank2, DS/PN: S10.005

Invert Level (m)	99.057	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)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	80.0	0.0	1.200	80.0	0.0	1.201	0.0	0.0

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1 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 0.000
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 11 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

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)
S1.000	SRE1	15 Winter	1	+0%					102.246	-0.089
S1.001	S1	15 Winter	1	+0%					101.630	-0.087
S1.002	S2	15 Winter	1	+0%					100.813	-0.075
S1.003	S3	15 Winter	1	+0%					100.773	-0.126
S2.000	SRE2	15 Winter	1	+0%					102.259	-0.091
S3.000	SRE3	15 Winter	1	+0%					102.119	-0.081
S2.001	S4	15 Winter	1	+0%					101.823	-0.077
S4.000	SRE4	15 Winter	1	+0%					101.780	-0.091
S4.001	S6	15 Winter	1	+0%					101.039	-0.076
S4.002	S7	15 Winter	1	+0%	100/15 Summer				100.876	-0.063
S4.003	S8	15 Winter	1	+0%					100.846	-0.126
S1.004	S9	15 Winter	1	+0%					100.620	-0.106
S1.005	S21	15 Winter	1	+0%					100.345	-0.115
S1.006	SD1	15 Winter	1	+0%					99.833	-0.127
S5.000	S34	15 Summer	1	+0%					98.655	-0.150
S5.001	S35	15 Summer	1	+0%					98.487	-0.150
S6.000	SRE13	15 Winter	1	+0%					100.612	-0.083
S6.001	S26	15 Winter	1	+0%					100.463	-0.081
S7.000	SRE9	15 Winter	1	+0%					100.966	-0.086
S7.001	S24	15 Winter	1	+0%	100/15 Summer				100.437	-0.072
S8.000	SRE11	15 Winter	1	+0%	100/15 Summer				100.612	-0.083
S7.002	SJ	15 Winter	1	+0%	30/15 Summer				100.391	-0.061
S7.003	S25	15 Winter	1	+0%	30/15 Summer				100.224	-0.050
S6.002	S27	15 Winter	1	+0%					100.088	-0.075
S5.002	S36	60 Winter	1	+0%	30/15 Summer				98.465	-0.071
S5.003	SD2	60 Winter	1	+0%	30/15 Summer				98.464	-0.059
S9.000	SRE12	15 Winter	1	+0%					100.968	-0.084
S9.001	S22	15 Winter	1	+0%					100.865	-0.075

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

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SRE1	0.000	0.03			0.3	OK	
S1.001	S1	0.000	0.04			0.8	OK	
S1.002	S2	0.000	0.14			0.8	OK	
S1.003	S3	0.000	0.06			1.0	OK	
S2.000	SRE2	0.000	0.02			0.3	OK	
S3.000	SRE3	0.000	0.08			0.7	OK	
S2.001	S4	0.000	0.12			1.9	OK	
S4.000	SRE4	0.000	0.02			0.3	OK	
S4.001	S6	0.000	0.13			1.1	OK	
S4.002	S7	0.000	0.28			1.1	OK	
S4.003	S8	0.000	0.06			1.4	OK	
S1.004	S9	0.000	0.19		7	4.2	OK	
S1.005	S21	0.000	0.12		6	4.1	OK	
S1.006	SD1	0.000	0.06			4.1	OK	
S5.000	S34	0.000	0.00			0.0	OK	
S5.001	S35	0.000	0.00			0.0	OK	
S6.000	SRE13	0.000	0.07			0.4	OK	
S6.001	S26	0.000	0.08			1.2	OK	
S7.000	SRE9	0.000	0.05			0.6	OK	
S7.001	S24	0.000	0.18			1.1	OK	
S8.000	SRE11	0.000	0.07			0.4	OK	
S7.002	SJ	0.000	0.32			2.2	OK*	
S7.003	S25	0.000	0.49			3.0	OK	
S6.002	S27	0.000	0.14		6	4.2	OK	
S5.002	S36	0.000	0.21			2.3	OK	
S5.003	SD2	0.000	0.25			2.3	OK	
S9.000	SRE12	0.000	0.06			0.4	OK	
S9.001	S22	0.000	0.15			0.9	OK	

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1 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.	Water Level (m)
S9.002	S23	15 Winter	1	+0%					100.754
S9.003	SD3	15 Winter	1	+0%					99.873
S1.007	STank1	60 Winter	1	+0%	30/30 Summer				98.463
S1.008	S28 FCC	60 Winter	1	+0%	30/15 Summer	100/1440 Summer			98.480
S1.009	S37	60 Winter	1	+0%					98.278
S1.010	S38	60 Winter	1	+0%					97.548
S10.000	SRE5	15 Winter	1	+0%					100.973
S10.001	S12	15 Winter	1	+0%					100.023
S10.002	S13	15 Winter	1	+0%	100/15 Summer				99.814
S11.000	S15	15 Winter	1	+0%					100.011
S12.000	SRE7	15 Winter	1	+0%					99.758
S10.003	S16	15 Winter	1	+0%	100/480 Summer				99.527
S10.004	SD4	15 Winter	1	+0%	100/60 Winter				99.305
S13.000	S10	15 Winter	1	+0%					100.828
S14.000	SRE10	15 Winter	1	+0%					101.041
S15.000	SRE6	15 Winter	1	+0%					100.470
S13.001	S11	15 Winter	1	+0%					100.311
S13.002	SD5	15 Winter	1	+0%					100.122
S16.000	SRE8	15 Winter	1	+0%	100/480 Summer				99.617
S16.001	S18	15 Winter	1	+0%	100/60 Winter				99.362
S17.000	SRE15	15 Winter	1	+0%					99.735
S17.001	S31	15 Winter	1	+0%	100/15 Summer				99.497
S16.002	S19	15 Winter	1	+0%	100/15 Summer				99.199
S16.003	SD6	15 Winter	1	+0%	30/60 Winter				99.152
S18.000	S30	15 Summer	1	+0%					100.438
S18.001	S29	720 Winter	1	+0%					99.676
S18.002	SD7	480 Winter	1	+0%	100/120 Winter				99.376
S19.000	SRE16	15 Winter	1	+0%					99.737
S20.000	S20	15 Summer	1	+0%					99.902
S19.001	S33	30 Winter	1	+0%	100/15 Summer				99.477
S19.002	S32	30 Winter	1	+0%	30/15 Summer				99.276
S19.003	SD8	30 Winter	1	+0%	30/15 Summer				99.169
S10.005	STank2	60 Winter	1	+0%	100/15 Summer				99.117
S10.006	S14 FCC	60 Winter	1	+0%	30/30 Winter	100/480 Summer			99.114
S1.011	S39	60 Winter	1	+0%					97.214

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
S9.002	S23	-0.086	0.000	0.05		6	0.9	OK	
S9.003	SD3	-0.087	0.000	0.04			0.9	OK	
S1.007	STank1	-0.122	0.000	0.05		44	1.6	OK	
S1.008	S28 FCC	-0.063	0.000	0.04			1.4	OK	1
S1.009	S37	-0.206	0.000	0.02			1.4	OK	
S1.010	S38	-0.204	0.000	0.02			1.4	OK	
S10.000	SRE5	-0.092	0.000	0.02			0.3	OK	
S10.001	S12	-0.077	0.000	0.12			0.8	OK	
S10.002	S13	-0.068	0.000	0.23			1.5	OK	
S11.000	S15	-0.089	0.000	0.03			0.3	OK	
S12.000	SRE7	-0.087	0.000	0.04			0.4	OK	
S10.003	S16	-0.124	0.000	0.07		6	2.1	OK	

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1 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
S10.004	SD4	-0.124	0.000	0.07			2.1	OK	
S13.000	S10	-0.087	0.000	0.04			0.4	OK	
S14.000	SRE10	-0.089	0.000	0.03			0.4	OK	
S15.000	SRE6	-0.080	0.000	0.09			0.6	OK	
S13.001	S11	-0.127	0.000	0.05		5	1.4	OK	
S13.002	SD5	-0.135	0.000	0.02			1.4	OK	
S16.000	SRE8	-0.083	0.000	0.07			0.4	OK	
S16.001	S18	-0.079	0.000	0.10			0.8	OK	
S17.000	SRE15	-0.083	0.000	0.07			0.4	OK	
S17.001	S31	-0.068	0.000	0.23			1.5	OK	
S16.002	S19	-0.091	0.000	0.32			3.5	OK	
S16.003	SD6	-0.098	0.000	0.27			3.5	OK	
S18.000	S30	-0.100	0.000	0.00			0.0	OK	
S18.001	S29	-0.099	0.000	0.00		60	0.0	OK	
S18.002	SD7	-0.099	0.000	0.00			0.0	OK	
S19.000	SRE16	-0.084	0.000	0.06			0.4	OK	
S20.000	S20	-0.100	0.000	0.00			0.0	OK	
S19.001	S33	-0.073	0.000	0.16		7	1.1	OK	
S19.002	S32	-0.055	0.000	0.41			2.0	OK	
S19.003	SD8	-0.062	0.000	0.31			2.0	OK	
S10.005	STank2	-0.165	0.000	0.05		42	1.7	OK	
S10.006	S14 FCC	-0.099	0.000	0.02			1.5	OK	4
S1.011	S39	-0.188	0.000	0.07			2.9	OK	

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30 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 0.000
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 11 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

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)
S1.000	SRE1	15 Winter	30	+0%					102.253	-0.082
S1.001	S1	15 Winter	30	+0%					101.640	-0.077
S1.002	S2	15 Winter	30	+0%					100.832	-0.056
S1.003	S3	15 Winter	30	+0%					100.791	-0.108
S2.000	SRE2	15 Winter	30	+0%					102.264	-0.086
S3.000	SRE3	15 Winter	30	+0%					102.130	-0.070
S2.001	S4	15 Winter	30	+0%					101.839	-0.061
S4.000	SRE4	15 Winter	30	+0%					101.785	-0.086
S4.001	S6	15 Winter	30	+0%					101.058	-0.057
S4.002	S7	15 Summer	30	+0%	100/15 Summer				100.909	-0.030
S4.003	S8	15 Summer	30	+0%					100.865	-0.107
S1.004	S9	15 Winter	30	+0%					100.656	-0.070
S1.005	S21	15 Winter	30	+0%					100.371	-0.089
S1.006	SD1	15 Winter	30	+0%					99.849	-0.111
S5.000	S34	15 Summer	30	+0%					98.655	-0.150
S5.001	S35	15 Summer	30	+0%					98.487	-0.150
S6.000	SRE13	15 Winter	30	+0%					100.623	-0.072
S6.001	S26	15 Winter	30	+0%					100.477	-0.067
S7.000	SRE9	15 Winter	30	+0%					100.975	-0.077
S7.001	S24	15 Winter	30	+0%	100/15 Summer				100.481	-0.028
S8.000	SRE11	15 Winter	30	+0%	100/15 Summer				100.622	-0.073
S7.002	SJ	15 Summer	30	+0%	30/15 Summer				100.453	0.001
S7.003	S25	15 Winter	30	+0%	30/15 Summer				100.346	0.072
S6.002	S27	15 Winter	30	+0%					100.106	-0.057
S5.002	S36	480 Winter	30	+0%	30/15 Summer				99.335	0.799
S5.003	SD2	480 Winter	30	+0%	30/15 Summer				99.338	0.815
S9.000	SRE12	15 Winter	30	+0%					100.977	-0.075
S9.001	S22	15 Winter	30	+0%					100.884	-0.056

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

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SRE1	0.000	0.07			0.7	OK	
S1.001	S1	0.000	0.12			2.2	OK	
S1.002	S2	0.000	0.40			2.2	OK	
S1.003	S3	0.000	0.18			2.9	OK	
S2.000	SRE2	0.000	0.05			0.7	OK	
S3.000	SRE3	0.000	0.20			1.8	OK	
S2.001	S4	0.000	0.32			5.1	OK	
S4.000	SRE4	0.000	0.05			0.7	OK	
S4.001	S6	0.000	0.38			3.3	OK	
S4.002	S7	0.000	0.84			3.3	OK	
S4.003	S8	0.000	0.18			4.0	OK	
S1.004	S9	0.000	0.54		4	11.8	OK	
S1.005	S21	0.000	0.35		5	11.9	OK	
S1.006	SD1	0.000	0.16			11.8	OK	
S5.000	S34	0.000	0.00			0.0	OK	
S5.001	S35	0.000	0.00			0.0	OK	
S6.000	SRE13	0.000	0.17			1.1	OK	
S6.001	S26	0.000	0.24			3.3	OK	
S7.000	SRE9	0.000	0.12			1.5	OK	
S7.001	S24	0.000	0.48			2.8	OK	
S8.000	SRE11	0.000	0.17			1.1	OK	
S7.002	SJ	0.000	0.82			5.7	SURCHARGED*	
S7.003	S25	0.000	1.29			8.0	SURCHARGED	
S6.002	S27	0.000	0.38		4	11.1	OK	
S5.002	S36	0.000	0.11			1.2	SURCHARGED	
S5.003	SD2	0.000	0.13			1.2	SURCHARGED*	
S9.000	SRE12	0.000	0.14			1.1	OK	
S9.001	S22	0.000	0.41			2.6	OK	

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30 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.	Water Level (m)
S9.002	S23	15 Summer	30	+0%					100.765
S9.003	SD3	15 Winter	30	+0%					99.883
S1.007	STank1	480 Winter	30	+0%	30/30 Summer				99.346
S1.008	S28 FCC	480 Winter	30	+0%	30/15 Summer	100/1440 Summer			99.450
S1.009	S37	480 Winter	30	+0%					98.282
S1.010	S38	480 Winter	30	+0%					97.549
S10.000	SRE5	15 Winter	30	+0%					100.978
S10.001	S12	15 Winter	30	+0%					100.040
S10.002	S13	15 Winter	30	+0%	100/15 Summer				99.842
S11.000	S15	15 Winter	30	+0%					100.017
S12.000	SRE7	15 Winter	30	+0%					99.767
S10.003	S16	15 Winter	30	+0%	100/480 Summer				99.554
S10.004	SD4	15 Winter	30	+0%	100/60 Winter				99.331
S13.000	S10	15 Winter	30	+0%					100.836
S14.000	SRE10	15 Winter	30	+0%					101.047
S15.000	SRE6	15 Winter	30	+0%					100.482
S13.001	S11	15 Winter	30	+0%					100.325
S13.002	SD5	15 Winter	30	+0%					100.130
S16.000	SRE8	15 Winter	30	+0%	100/480 Summer				99.627
S16.001	S18	15 Winter	30	+0%	100/60 Winter				99.377
S17.000	SRE15	15 Winter	30	+0%					99.745
S17.001	S31	15 Winter	30	+0%	100/15 Summer				99.525
S16.002	S19	120 Winter	30	+0%	100/15 Summer				99.263
S16.003	SD6	120 Winter	30	+0%	30/60 Winter				99.261
S18.000	S30	15 Summer	30	+0%					100.438
S18.001	S29	30 Winter	30	+0%					99.689
S18.002	SD7	60 Winter	30	+0%	100/120 Winter				99.387
S19.000	SRE16	15 Winter	30	+0%					99.746
S20.000	S20	15 Summer	30	+0%					99.902
S19.001	S33	15 Winter	30	+0%	100/15 Summer				99.511
S19.002	S32	15 Winter	30	+0%	30/15 Summer				99.444
S19.003	SD8	120 Winter	30	+0%	30/15 Summer				99.262
S10.005	STank2	120 Winter	30	+0%	100/15 Summer				99.260
S10.006	S14 FCC	180 Winter	30	+0%	30/30 Winter	100/480 Summer			99.477
S1.011	S39	60 Winter	30	+0%					97.216

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
S9.002	S23	-0.075	0.000	0.14		4	2.6	OK	
S9.003	SD3	-0.077	0.000	0.12			2.6	OK	
S1.007	STank1	0.761	0.000	0.06			1.7	SURCHARGED	
S1.008	S28 FCC	0.907	0.000	0.05			1.6	SURCHARGED	1
S1.009	S37	-0.202	0.000	0.02			1.6	OK	
S1.010	S38	-0.203	0.000	0.02			1.6	OK	
S10.000	SRE5	-0.087	0.000	0.04			0.7	OK	
S10.001	S12	-0.060	0.000	0.34			2.2	OK	
S10.002	S13	-0.040	0.000	0.67			4.3	OK	
S11.000	S15	-0.083	0.000	0.07			0.7	OK	
S12.000	SRE7	-0.078	0.000	0.11			1.1	OK	
S10.003	S16	-0.097	0.000	0.25		4	7.5	OK	

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30 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
S10.004	SD4	-0.098	0.000	0.26			7.6	OK	
S13.000	S10	-0.079	0.000	0.10			1.1	OK	
S14.000	SRE10	-0.083	0.000	0.07			1.1	OK	
S15.000	SRE6	-0.068	0.000	0.23			1.5	OK	
S13.001	S11	-0.113	0.000	0.13		5	3.5	OK	
S13.002	SD5	-0.127	0.000	0.06			3.6	OK	
S16.000	SRE8	-0.073	0.000	0.17			1.1	OK	
S16.001	S18	-0.064	0.000	0.28			2.2	OK	
S17.000	SRE15	-0.073	0.000	0.17			1.1	OK	
S17.001	S31	-0.040	0.000	0.66			4.3	OK	
S16.002	S19	-0.027	0.000	0.28			3.0	OK	
S16.003	SD6	0.011	0.000	0.22			2.9	SURCHARGED*	
S18.000	S30	-0.100	0.000	0.00			0.0	OK	
S18.001	S29	-0.086	0.000	0.04		5	0.5	OK	
S18.002	SD7	-0.088	0.000	0.03			0.4	OK	
S19.000	SRE16	-0.075	0.000	0.15			1.1	OK	
S20.000	S20	-0.100	0.000	0.00			0.0	OK	
S19.001	S33	-0.039	0.000	0.59		4	3.8	OK	
S19.002	S32	0.113	0.000	1.42			7.1	SURCHARGED	
S19.003	SD8	0.031	0.000	0.34			2.2	SURCHARGED*	
S10.005	STank2	-0.022	0.000	0.06		108	1.9	OK	
S10.006	S14 FCC	0.264	0.000	0.02			1.7	SURCHARGED	4
S1.011	S39	-0.186	0.000	0.07			3.2	OK	

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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 0.000
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 11 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 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)	Surcharged Depth (m)
S1.000	SRE1	15 Winter	100	+40%					102.259	-0.076
S1.001	S1	15 Winter	100	+40%					101.649	-0.068
S1.002	S2	15 Winter	100	+40%					100.851	-0.037
S1.003	S3	15 Winter	100	+40%					100.807	-0.092
S2.000	SRE2	15 Winter	100	+40%					102.270	-0.080
S3.000	SRE3	15 Winter	100	+40%					102.142	-0.058
S2.001	S4	15 Winter	100	+40%					101.855	-0.045
S4.000	SRE4	15 Winter	100	+40%					101.791	-0.080
S4.001	S6	15 Winter	100	+40%					101.076	-0.039
S4.002	S7	15 Summer	100	+40%	100/15 Summer				100.965	0.026
S4.003	S8	15 Summer	100	+40%					100.882	-0.090
S1.004	S9	15 Winter	100	+40%					100.703	-0.023
S1.005	S21	15 Winter	100	+40%					100.397	-0.063
S1.006	SD1	1440 Winter	100	+40%					99.902	-0.058
S5.000	S34	15 Summer	100	+40%					98.655	-0.150
S5.001	S35	15 Summer	100	+40%					98.487	-0.150
S6.000	SRE13	15 Winter	100	+40%					100.633	-0.062
S6.001	S26	15 Winter	100	+40%					100.490	-0.054
S7.000	SRE9	15 Winter	100	+40%					100.984	-0.068
S7.001	S24	15 Winter	100	+40%	100/15 Summer				100.950	0.441
S8.000	SRE11	15 Winter	100	+40%	100/15 Summer				100.938	0.243
S7.002	SJ	15 Summer	100	+40%	30/15 Summer				100.453	0.001
S7.003	S25	15 Winter	100	+40%	30/15 Summer				100.630	0.356
S6.002	S27	15 Winter	100	+40%					100.120	-0.043
S5.002	S36	1440 Winter	100	+40%	30/15 Summer				99.936	1.400

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

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SRE1	0.000	0.13			1.3	OK	
S1.001	S1	0.000	0.22			4.0	OK	
S1.002	S2	0.000	0.73			4.0	OK	
S1.003	S3	0.000	0.32			5.3	OK	
S2.000	SRE2	0.000	0.09			1.3	OK	
S3.000	SRE3	0.000	0.36			3.3	OK	
S2.001	S4	0.000	0.59			9.3	OK	
S4.000	SRE4	0.000	0.09			1.3	OK	
S4.001	S6	0.000	0.69			6.0	OK	
S4.002	S7	0.000	1.53			6.0	SURCHARGED	
S4.003	S8	0.000	0.33			7.3	OK	
S1.004	S9	0.000	1.00		3	21.6	OK	
S1.005	S21	0.000	0.64		4	21.6	OK	
S1.006	SD1	0.000	0.01			1.1	OK	
S5.000	S34	0.000	0.00			0.0	OK	
S5.001	S35	0.000	0.00			0.0	OK	
S6.000	SRE13	0.000	0.31			2.0	OK	
S6.001	S26	0.000	0.44			6.0	OK	
S7.000	SRE9	0.000	0.23			2.7	OK	
S7.001	S24	0.000	0.73			4.4	SURCHARGED	
S8.000	SRE11	0.000	0.27			1.8	FLOOD RISK	
S7.002	SJ	0.000	1.29			9.0	SURCHARGED*	
S7.003	S25	0.000	2.01			12.5	SURCHARGED	
S6.002	S27	0.000	0.61		7	17.9	OK	
S5.002	S36	0.000	0.08			0.9	SURCHARGED	

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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.	Water Level (m)
S5.003	SD2	1440 Winter	100	+40%	30/15 Summer				99.934
S9.000	SRE12	15 Winter	100	+40%					100.987
S9.001	S22	15 Winter	100	+40%					100.904
S9.002	S23	15 Summer	100	+40%					100.774
S9.003	SD3	1440 Winter	100	+40%					99.894
S1.007	STank1	1440 Winter	100	+40%	30/30 Summer				99.934
S1.008	S28 FCC	1440 Winter	100	+40%	30/15 Summer	100/1440 Summer			100.729
S1.009	S37	1440 Summer	100	+40%					98.285
S1.010	S38	1440 Winter	100	+40%					97.553
S10.000	SRE5	15 Winter	100	+40%					100.983
S10.001	S12	15 Winter	100	+40%					100.062
S10.002	S13	15 Winter	100	+40%	100/15 Summer				99.984
S11.000	S15	15 Winter	100	+40%					100.023
S12.000	SRE7	15 Winter	100	+40%					99.775
S10.003	S16	1440 Summer	100	+40%	100/480 Summer				99.772
S10.004	SD4	1440 Summer	100	+40%	100/60 Winter				99.791
S13.000	S10	15 Winter	100	+40%					100.844
S14.000	SRE10	15 Winter	100	+40%					101.054
S15.000	SRE6	15 Winter	100	+40%					100.495
S13.001	S11	15 Winter	100	+40%					100.338
S13.002	SD5	15 Winter	100	+40%					100.139
S16.000	SRE8	1440 Summer	100	+40%	100/480 Summer				99.782
S16.001	S18	1440 Summer	100	+40%	100/60 Winter				99.784
S17.000	SRE15	15 Winter	100	+40%					99.810
S17.001	S31	15 Winter	100	+40%	100/15 Summer				99.789
S16.002	S19	1440 Summer	100	+40%	100/15 Summer				99.787
S16.003	SD6	1440 Summer	100	+40%	30/60 Winter				99.788
S18.000	S30	15 Summer	100	+40%					100.438
S18.001	S29	1440 Summer	100	+40%					99.770
S18.002	SD7	1440 Summer	100	+40%	100/120 Winter				99.787
S19.000	SRE16	1440 Summer	100	+40%					99.773
S20.000	S20	15 Summer	100	+40%					99.902
S19.001	S33	1440 Summer	100	+40%	100/15 Summer				99.774
S19.002	S32	1440 Summer	100	+40%	30/15 Summer				99.780
S19.003	SD8	1440 Summer	100	+40%	30/15 Summer				99.776
S10.005	STank2	1440 Summer	100	+40%	100/15 Summer				99.793
S10.006	S14 FCC	1440 Summer	100	+40%	30/30 Winter	100/480 Summer			100.201
S1.011	S39	1440 Winter	100	+40%					97.220

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
S5.003	SD2	1.411	0.000	0.09			0.9	SURCHARGED*	
S9.000	SRE12	-0.065	0.000	0.26			2.0	OK	
S9.001	S22	-0.036	0.000	0.74			4.7	OK	
S9.002	S23	-0.066	0.000	0.25		4	4.7	OK	
S9.003	SD3	-0.066	0.000	0.01			0.2	OK	
S1.007	STank1	1.349	0.000	0.07			2.0	SURCHARGED	
S1.008	S28 FCC	2.186	3.318	0.06			1.9	FLOOD	1
S1.009	S37	-0.199	0.000	0.02			1.8	OK	
S1.010	S38	-0.199	0.000	0.03			1.9	OK	

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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
S10.000	SRE5	-0.082	0.000	0.08			1.3	OK	
S10.001	S12	-0.038	0.000	0.61			4.0	OK	
S10.002	S13	0.102	0.000	1.16			7.5	SURCHARGED	
S11.000	S15	-0.077	0.000	0.12			1.3	OK	
S12.000	SRE7	-0.070	0.000	0.20			2.0	OK	
S10.003	S16	0.121	0.000	0.03			1.0	SURCHARGED	
S10.004	SD4	0.362	0.000	0.03			1.0	SURCHARGED*	
S13.000	S10	-0.071	0.000	0.19			2.0	OK	
S14.000	SRE10	-0.076	0.000	0.13			2.0	OK	
S15.000	SRE6	-0.055	0.000	0.42			2.7	OK	
S13.001	S11	-0.100	0.000	0.24		5	6.4	OK	
S13.002	SD5	-0.118	0.000	0.10			6.4	OK	
S16.000	SRE8	0.082	0.000	0.02			0.1	SURCHARGED	
S16.001	S18	0.343	0.000	0.03			0.2	FLOOD RISK	
S17.000	SRE15	-0.008	0.000	0.30			1.9	OK	
S17.001	S31	0.224	0.000	1.09			7.2	SURCHARGED	
S16.002	S19	0.497	0.000	0.10			1.1	SURCHARGED	
S16.003	SD6	0.538	0.000	0.08			1.0	SURCHARGED*	
S18.000	S30	-0.100	0.000	0.00			0.0	OK	
S18.001	S29	-0.005	0.000	0.01		312	0.1	OK	
S18.002	SD7	0.312	0.000	0.01			0.1	SURCHARGED*	
S19.000	SRE16	-0.048	0.000	0.02			0.1	OK	
S20.000	S20	-0.100	0.000	0.00			0.0	OK	
S19.001	S33	0.224	0.000	0.06			0.4	SURCHARGED	
S19.002	S32	0.449	0.000	0.16			0.8	SURCHARGED	
S19.003	SD8	0.545	0.000	0.12			0.8	SURCHARGED*	
S10.005	STank2	0.511	0.000	0.08			2.7	SURCHARGED	
S10.006	S14 FCC	0.988	2.384	0.02			1.7	FLOOD	4
S1.011	S39	-0.182	0.000	0.07			3.3	OK	

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