

Rogers Cory Ptn Ltd		Page 0
The Old School Old School Road Hook RG27 9NJ		
Date 01/01/0001 File SW1.MDX	Designed by Terry Checked by	
Micro Drainage		
Network 2017.1.2		

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for SW1.SWS

Pipe Sizes SW1- windes export Manhole Sizes SW1- windes export

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	19.100	Add Flow / Climate Change (%)	10
Ratio R	0.350	Minimum Backdrop Height (m)	0.100
Maximum Rainfall (mm/hr)	50	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 Soffits

Network Design Table for SW1.SWS

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	37.954	1.898	20.0	0.000	5.00	0.0	0.600	o	225	Pipe/Conduit	🔒
S1.001	21.741	1.087	20.0	0.090	0.00	0.0	0.600	o	225	Pipe/Conduit	🔒
S1.002	15.995	0.800	20.0	0.090	0.00	0.0	0.600	o	225	Pipe/Conduit	🔒
S2.000	35.876	0.209	172.0	0.104	5.00	0.0	0.600	o	375	Pipe/Conduit	🔒
S3.000	19.798	1.320	15.0	0.000	5.00	0.0	0.600	o	225	Pipe/Conduit	🔒
S2.001	15.939	0.049	325.0	0.167	0.00	0.0	0.600	o	375	Pipe/Conduit	🔒
S2.002	28.060	0.050	561.2	0.142	0.00	0.0	0.600	o	600	Pipe/Conduit	🔒
S1.003	34.487	0.069	499.8	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	🔒
S1.004	46.720	0.467	100.0	0.069	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)
S1.000	50.00	5.22	8.450	0.000	0.0	0.0	0.0	2.94	116.9	0.0
S1.001	50.00	5.34	6.552	0.090	0.0	0.0	1.2	2.94	116.9	13.4
S1.002	50.00	5.43	5.465	0.180	0.0	0.0	2.4	2.94	116.9	26.8
S2.000	50.00	5.43	3.665	0.104	0.0	0.0	1.4	1.38	152.3	15.5
S3.000	50.00	5.10	4.955	0.000	0.0	0.0	0.0	3.40	135.0	0.0
S2.001	50.00	5.70	3.456	0.271	0.0	0.0	3.7	1.00	110.4	40.4
S2.002	50.00	6.16	3.211	0.413	0.0	0.0	5.6	1.02	288.6	61.5
S1.003	50.00	6.62	3.014	0.593	0.0	0.0	8.0	1.24	550.0	88.3
S1.004	50.00	6.90	2.945	0.662	0.0	0.0	9.0	2.80	1236.4	98.6

Rogers Cory Ptn Ltd											Page 1	
The Old School Old School Road Hook RG27 9NJ												
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Network Design Table for SW1.SWS												
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	
S1.005	7.396	0.103	72.0	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit		
S4.000	53.039	0.265	200.1	0.161	5.00	0.0	0.600	o	300	Pipe/Conduit		
S5.000	38.650	0.245	157.8	0.272	5.00	0.0	0.600	o	300	Pipe/Conduit		
S1.006	63.418	0.127	499.4	0.310	0.00	0.0	0.600	o	750	Pipe/Conduit		
S6.000	45.988	0.602	76.4	0.000	5.00	0.0	0.600	o	225	Pipe/Conduit		
S1.007	17.258	0.035	493.1	0.145	0.00	0.0	0.600	o	750	Pipe/Conduit		
S7.000	26.107	0.537	48.6	0.152	5.00	0.0	0.600	o	300	Pipe/Conduit		
S1.008	35.663	0.807	44.2	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit		
S8.000	27.936	1.027	27.2	0.132	5.00	0.0	0.600	o	225	Pipe/Conduit		
S8.001	63.689	0.159	400.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		
S9.000	48.374	0.605	80.0	0.082	5.00	0.0	0.600	o	225	Pipe/Conduit		
S8.002	60.197	0.590	102.0	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)		
S1.005	50.00	6.93	2.478	0.662	0.0	0.0	9.0	3.30	1458.0	98.6		
S4.000	50.00	5.80	3.090	0.161	0.0	0.0	2.2	1.11	78.3	24.0		
S5.000	50.00	5.52	3.070	0.272	0.0	0.0	3.7	1.25	88.3	40.5		
S1.006	50.00	7.78	2.375	1.405	0.0	0.0	19.0	1.25	550.2	209.3		
S6.000	50.00	5.51	3.375	0.000	0.0	0.0	0.0	1.50	59.5	0.0		
S1.007	50.00	8.01	2.248	1.550	0.0	0.0	21.0	1.25	553.7	230.9		
S7.000	50.00	5.19	3.200	0.152	0.0	0.0	2.1	2.26	159.8	22.6		
S1.008	50.00	8.15	2.213	1.702	0.0	0.0	23.0	4.22	1862.7	253.5		
S8.000	50.00	5.18	3.972	0.132	0.0	0.0	1.8	2.52	100.1	19.7		
S8.001	50.00	6.24	2.719	0.132	0.0	0.0	1.8	1.01	160.7	19.7		
S9.000	50.00	5.55	3.390	0.082	0.0	0.0	1.1	1.46	58.2	12.2		
S8.002	50.00	6.73	2.560	0.214	0.0	0.0	2.9	2.01	320.1	31.9		
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Rogers Cory Ptn Ltd										Page 2	
The Old School Old School Road Hook RG27 9NJ					Designed by Terry Checked by						
Date 01/01/0001 File SW1.MDX											
Micro Drainage					Network 2017.1.2						
<u>Network Design Table for SW1.SWS</u>											
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
S10.000	36.603	0.215	170.2	0.133	5.00	0.0	0.600	o	225	Pipe/Conduit	
S10.001	8.667	0.051	169.9	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S10.002	64.689	0.381	170.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.003	54.809	0.101	543.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S11.000	42.185	0.560	75.3	0.156	5.00	0.0	0.600	o	300	Pipe/Conduit	
S12.000	37.059	0.151	245.4	0.226	5.00	0.0	0.600	o	300	Pipe/Conduit	
S11.001	63.449	0.930	68.2	0.169	0.00	0.0	0.600	o	375	Pipe/Conduit	
S8.004	40.500	0.049	826.5	0.000	0.00	0.0	0.600	o	825	Pipe/Conduit	
S8.005	23.659	0.029	824.3	0.000	0.00	0.0	0.600	o	825	Pipe/Conduit	
S8.006	19.722	0.024	825.2	0.000	0.00	0.0	0.600	o	825	Pipe/Conduit	
S8.007	50.960	0.062	824.6	0.000	0.00	0.0	0.600	o	825	Pipe/Conduit	
S13.000	35.778	0.304	117.7	0.207	5.00	0.0	0.600	o	300	Pipe/Conduit	
S13.001	30.485	0.543	56.1	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S14.000	37.748	0.369	102.3	0.000	5.00	0.0	0.600	o	300	Pipe/Conduit	
<u>Network Results Table</u>											
PN	Rain (mm/hr)	T.C. (mins)	US/IL Σ (m)	I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	
S10.000	50.00	5.61	2.842	0.133	0.0	0.0	1.8	1.00	39.7	19.8	
S10.001	50.00	5.76	2.627	0.133	0.0	0.0	1.8	1.00	39.8	19.8	
S10.002	50.00	6.83	2.576	0.133	0.0	0.0	1.8	1.00	39.8	19.8	
S8.003	50.00	7.71	1.820	0.347	0.0	0.0	4.7	1.04	293.5	51.7	
S11.000	50.00	5.39	3.596	0.156	0.0	0.0	2.1	1.81	128.2	23.2	
S12.000	50.00	5.62	3.100	0.226	0.0	0.0	3.1	1.00	70.6	33.7	
S11.001	50.00	6.10	2.874	0.551	0.0	0.0	7.5	2.20	242.6	82.1	
S8.004	49.72	8.37	1.494	0.898	0.0	0.0	12.1	1.02	547.7	133.0	
S8.005	48.63	8.76	1.445	0.898	0.0	0.0	12.1	1.03	548.5	133.0	
S8.006	47.76	9.08	1.416	0.898	0.0	0.0	12.1	1.03	548.2	133.0	
S8.007	45.68	9.90	1.392	0.898	0.0	0.0	12.1	1.03	548.4	133.0	
S13.000	50.00	5.41	3.687	0.207	0.0	0.0	2.8	1.45	102.4	30.8	
S13.001	50.00	5.65	3.383	0.207	0.0	0.0	2.8	2.10	148.6	30.8	
S14.000	50.00	5.40	3.210	0.000	0.0	0.0	0.0	1.55	109.9	0.0	
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Rogers Cory Ptn Ltd										Page 3	
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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
S15.000	15.428	0.908	17.0	0.132	5.00	0.0	0.600	o	225	Pipe/Conduit	
S16.000	43.919	0.149	294.8	0.248	5.00	0.0	0.600	o	375	Pipe/Conduit	
S15.001	35.610	0.123	289.5	0.136	0.00	0.0	0.600	o	375	Pipe/Conduit	
S15.002	12.129	1.002	12.1	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S17.000	14.783	1.019	14.5	0.000	5.00	0.0	0.600	o	225	Pipe/Conduit	
S17.001	20.903	0.128	163.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S17.002	14.071	0.083	170.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.003	26.178	0.447	58.6	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S15.004	14.969	0.255	58.7	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S18.000	39.625	0.624	63.5	0.000	5.00	0.0	0.600	o	225	Pipe/Conduit	
S15.005	53.482	0.244	219.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S13.002	20.559	0.041	501.4	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
S13.003	35.836	0.072	497.7	0.359	0.00	0.0	0.600	o	750	Pipe/Conduit	
Network Results Table											
PN	Rain (mm/hr)	T.C. (mins)	US/IL Σ (m)	I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	
S15.000	50.00	5.08	8.875	0.132	0.0	0.0	1.8	3.19	126.8	19.7	
S16.000	50.00	5.70	6.364	0.248	0.0	0.0	3.4	1.05	116.0	36.9	
S15.001	50.00	6.26	6.215	0.516	0.0	0.0	7.0	1.06	117.0	76.9	
S15.002	50.00	6.30	6.092	0.516	0.0	0.0	7.0	5.23	577.9	76.9	
S17.000	50.00	5.07	5.095	0.000	0.0	0.0	0.0	3.45	137.3	0.0	
S17.001	50.00	5.41	4.076	0.000	0.0	0.0	0.0	1.02	40.6	0.0	
S17.002	50.00	5.65	3.945	0.000	0.0	0.0	0.0	1.00	39.8	0.0	
S15.003	50.00	6.48	3.712	0.516	0.0	0.0	7.0	2.37	261.9	76.9	
S15.004	50.00	6.58	3.265	0.516	0.0	0.0	7.0	2.37	261.6	76.9	
S18.000	50.00	5.40	3.784	0.000	0.0	0.0	0.0	1.64	65.4	0.0	
S15.005	50.00	7.24	2.935	0.516	0.0	0.0	7.0	1.37	217.8	76.9	
S13.002	50.00	7.51	2.391	0.723	0.0	0.0	9.8	1.24	549.1	107.7	
S13.003	50.00	7.99	2.350	1.082	0.0	0.0	14.7	1.25	551.1	161.2	
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Rogers Cory Ptn Ltd										Page 4	
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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
S19.000	24.246	0.143	169.6	0.000	5.00	0.0	0.600	o	225	Pipe/Conduit	
S20.000	12.406	0.203	61.1	0.000	5.00	0.0	0.600	o	225	Pipe/Conduit	
S19.001	38.414	0.324	118.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S13.004	14.528	0.029	501.0	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
S13.005	36.366	0.093	391.0	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
S13.006	38.453	0.447	86.0	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
S13.007	27.407	0.305	90.0	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
S1.009	33.125	0.040	828.1	0.000	0.00	0.0	0.600	o	825	Pipe/Conduit	
S1.010	83.161	0.101	825.0	0.000	0.00	0.0	0.600	o	825	Pipe/Conduit	
S1.011	47.986	0.052	921.0	0.000	0.00	0.0	0.600	o	825	Pipe/Conduit	
S21.000	24.592	0.766	32.1	0.094	5.00	0.0	0.600	o	225	Pipe/Conduit	
S21.001	6.767	0.344	19.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S21.002	50.495	2.103	24.0	0.143	0.00	0.0	0.600	o	225	Pipe/Conduit	
S22.000	40.971	0.102	401.7	0.268	5.00	0.0	0.600	o	450	Pipe/Conduit	
S22.001	15.602	0.284	54.9	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)	
S19.000	50.00	5.40	3.270	0.000	0.0	0.0	0.0	1.00	39.8	0.0	
S20.000	50.00	5.12	3.330	0.000	0.0	0.0	0.0	1.68	66.6	0.0	
S19.001	50.00	5.94	3.127	0.000	0.0	0.0	0.0	1.20	47.7	0.0	
S13.004	50.00	8.19	2.278	1.082	0.0	0.0	14.7	1.24	549.3	161.2	
S13.005	49.02	8.62	2.249	1.082	0.0	0.0	14.7	1.41	622.5	161.2	
S13.006	48.43	8.83	2.156	1.082	0.0	0.0	14.7	3.02	1333.5	161.2	
S13.007	48.01	8.98	1.709	1.082	0.0	0.0	14.7	2.95	1303.6	161.2	
S1.009	44.44	10.44	1.330	3.682	0.0	0.0	44.3	1.02	547.2	487.4	
S1.010	41.68	11.80	1.290	3.682	0.0	0.0	44.3	1.03	548.2	487.4	
S1.011	40.21	12.62	1.189	3.682	0.0	0.0	44.3	0.97	518.5	487.4	
S21.000	50.00	5.18	6.116	0.094	0.0	0.0	1.3	2.32	92.1	14.0	
S21.001	50.00	5.21	5.276	0.094	0.0	0.0	1.3	2.96	117.8	14.0	
S21.002	50.00	5.53	4.932	0.237	0.0	0.0	3.2	2.68	106.6	35.3	
S22.000	50.00	5.68	2.990	0.268	0.0	0.0	3.6	1.01	160.3	39.9	
S22.001	50.00	5.77	2.888	0.268	0.0	0.0	3.6	2.75	437.0	39.9	
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Rogers Cory Ptn Ltd										Page 5	
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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
S21.003	13.753	0.028	491.2	0.203	0.00	0.0	0.600	o	750	Pipe/Conduit	
S21.004	17.181	0.034	505.3	0.189	0.00	0.0	0.600	o	750	Pipe/Conduit	
S21.005	24.128	0.048	502.7	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
S21.006	22.163	0.044	500.3	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
S21.007	13.831	0.028	494.0	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
S23.000	40.826	0.240	170.1	0.104	5.00	0.0	0.600	o	225	Pipe/Conduit	
S23.001	18.522	0.812	22.8	0.154	0.00	0.0	0.600	o	225	Pipe/Conduit	
S21.008	55.835	0.108	517.0	0.125	0.00	0.0	0.600	o	750	Pipe/Conduit	
S24.000	30.689	0.521	58.9	0.000	5.00	0.0	0.600	o	225	Pipe/Conduit	
S25.000	10.501	0.711	14.8	0.000	5.00	0.0	0.600	o	225	Pipe/Conduit	
S21.009	12.084	0.020	604.2	0.380	0.00	0.0	0.600	o	750	Pipe/Conduit	
S21.010	20.312	0.041	495.4	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
S21.011	38.098	0.076	501.3	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
S21.012	145.475	0.490	296.9	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
S1.012	15.154	0.029	522.5	0.000	0.00	0.0	0.600	o	825	Pipe/Conduit	
Network Results Table											
PN	Rain (mm/hr)	T.C. (mins)	US/IL E (m)	I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	
S21.003	50.00	5.95	2.304	0.708	0.0	0.0	9.6	1.26	554.8	105.5	
S21.004	50.00	6.19	2.276	0.897	0.0	0.0	12.1	1.24	546.9	133.6	
S21.005	50.00	6.51	2.242	0.897	0.0	0.0	12.1	1.24	548.4	133.6	
S21.006	50.00	6.81	2.194	0.897	0.0	0.0	12.1	1.24	549.7	133.6	
S21.007	50.00	6.99	2.150	0.897	0.0	0.0	12.1	1.25	553.3	133.6	
S23.000	50.00	5.68	3.699	0.104	0.0	0.0	1.4	1.00	39.7	15.5	
S23.001	50.00	5.79	3.459	0.258	0.0	0.0	3.5	2.75	109.4	38.4	
S21.008	50.00	7.75	2.122	1.280	0.0	0.0	17.3	1.22	540.7	190.7	
S24.000	50.00	5.30	3.060	0.000	0.0	0.0	0.0	1.71	67.9	0.0	
S25.000	50.00	5.05	3.250	0.000	0.0	0.0	0.0	3.42	136.1	0.0	
S21.009	50.00	7.93	2.014	1.660	0.0	0.0	22.5	1.13	499.7	247.3	
S21.010	50.00	8.20	1.994	1.660	0.0	0.0	22.5	1.25	552.4	247.3	
S21.011	48.76	8.71	1.778	1.660	0.0	0.0	22.5	1.24	549.1	247.3	
S21.012	44.97	10.21	1.702	1.660	0.0	0.0	22.5	1.62	715.2	247.3	
S1.012	39.87	12.82	1.137	5.342	0.0	0.0	57.7	1.29	690.6	634.5	
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Rogers Cory Ptn Ltd		Page 6
The Old School Old School Road Hook RG27 9NJ		
Date 01/01/0001 File SW1.MDX		
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Free Flowing Outfall Details for SW1.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.012	S14	2.300	1.108	1.150	20	0

Simulation Criteria for SW1.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	10.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	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	5
Number of Online Controls	2	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)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.100	Storm Duration (mins)	30
Ratio R	0.350		

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Rogers Cory Ptn Ltd		Page 7
The Old School Old School Road Hook RG27 9NJ		
Date 01/01/0001 File SW1.MDX	Designed by Terry Checked by	
Micro Drainage	Network 2017.1.2	

Online Controls for SW1.SWS

Hydro-Brake® Optimum Manhole: S11, DS/PN: S1.010, Volume (m³): 24.7

Unit Reference	MD-SHE-0131-1050-2191-1050
Design Head (m)	2.191
Design Flow (l/s)	10.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	131
Invert Level (m)	1.290
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.191	10.5
Flush-Flo™	0.578	9.9
Kick-Flo®	1.176	7.8
Mean Flow over Head Range	-	8.9

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

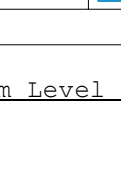
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.7	1.200	7.9	3.000	12.2	7.000	18.2
0.200	8.3	1.400	8.5	3.500	13.1	7.500	18.9
0.300	9.2	1.600	9.1	4.000	14.0	8.000	19.5
0.400	9.6	1.800	9.6	4.500	14.8	8.500	20.0
0.500	9.8	2.000	10.1	5.000	15.5	9.000	20.6
0.600	9.9	2.200	10.5	5.500	16.3	9.500	21.1
0.800	9.7	2.400	11.0	6.000	16.9		
1.000	9.1	2.600	11.4	6.500	17.6		

Hydro-Brake® Optimum Manhole: S77, DS/PN: S21.010, Volume (m³): 10.9

Unit Reference	MD-SHE-0131-1050-2191-1050
Design Head (m)	2.191
Design Flow (l/s)	10.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	131
Invert Level (m)	1.994
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1500

Rogers Cory Ptn Ltd		Page 8																																																																																							
The Old School Old School Road Hook RG27 9NJ																																																																																									
Date 01/01/0001 File SW1.MDX																																																																																									
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<u>Hydro-Brake® Optimum Manhole: S77, DS/PN: S21.010, Volume (m³): 10.9</u> <table border="1"> <thead> <tr> <th>Control Points</th> <th>Head (m)</th> <th>Flow (l/s)</th> </tr> </thead> <tbody> <tr> <td>Design Point (Calculated)</td> <td>2.191</td> <td>10.5</td> </tr> <tr> <td>Flush-Flo™</td> <td>0.578</td> <td>9.9</td> </tr> <tr> <td>Kick-Flo®</td> <td>1.176</td> <td>7.8</td> </tr> <tr> <td>Mean Flow over Head Range</td> <td>-</td> <td>8.9</td> </tr> </tbody> </table> 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 <table border="1"> <thead> <tr> <th>Depth (m)</th> <th>Flow (l/s)</th> <th>Depth (m)</th> <th>Flow (l/s)</th> <th>Depth (m)</th> <th>Flow (l/s)</th> <th>Depth (m)</th> <th>Flow (l/s)</th> </tr> </thead> <tbody> <tr><td>0.100</td><td>4.7</td><td>1.200</td><td>7.9</td><td>3.000</td><td>12.2</td><td>7.000</td><td>18.2</td></tr> <tr><td>0.200</td><td>8.3</td><td>1.400</td><td>8.5</td><td>3.500</td><td>13.1</td><td>7.500</td><td>18.9</td></tr> <tr><td>0.300</td><td>9.2</td><td>1.600</td><td>9.1</td><td>4.000</td><td>14.0</td><td>8.000</td><td>19.5</td></tr> <tr><td>0.400</td><td>9.6</td><td>1.800</td><td>9.6</td><td>4.500</td><td>14.8</td><td>8.500</td><td>20.0</td></tr> <tr><td>0.500</td><td>9.8</td><td>2.000</td><td>10.1</td><td>5.000</td><td>15.5</td><td>9.000</td><td>20.6</td></tr> <tr><td>0.600</td><td>9.9</td><td>2.200</td><td>10.5</td><td>5.500</td><td>16.3</td><td>9.500</td><td>21.1</td></tr> <tr><td>0.800</td><td>9.7</td><td>2.400</td><td>11.0</td><td>6.000</td><td>16.9</td><td></td><td></td></tr> <tr><td>1.000</td><td>9.1</td><td>2.600</td><td>11.4</td><td>6.500</td><td>17.6</td><td></td><td></td></tr> </tbody> </table>			Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	2.191	10.5	Flush-Flo™	0.578	9.9	Kick-Flo®	1.176	7.8	Mean Flow over Head Range	-	8.9	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	4.7	1.200	7.9	3.000	12.2	7.000	18.2	0.200	8.3	1.400	8.5	3.500	13.1	7.500	18.9	0.300	9.2	1.600	9.1	4.000	14.0	8.000	19.5	0.400	9.6	1.800	9.6	4.500	14.8	8.500	20.0	0.500	9.8	2.000	10.1	5.000	15.5	9.000	20.6	0.600	9.9	2.200	10.5	5.500	16.3	9.500	21.1	0.800	9.7	2.400	11.0	6.000	16.9			1.000	9.1	2.600	11.4	6.500	17.6		
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Rogers Cory Ptn Ltd		Page 9																																																								
The Old School Old School Road Hook RG27 9NJ																																																										
Date 01/01/0001 File SW1.MDX																																																										
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<u>Storage Structures for SW1.SWS</u> <u>Tank or Pond Manhole: S22, DS/PN: S8.005</u> Invert Level (m) 3.100 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr><tr><td>0.000</td><td>464.0</td><td>1.000</td><td>785.0</td><td>1.300</td><td>905.0</td></tr></table> <u>Tank or Pond Manhole: S54, DS/PN: S13.006</u> Invert Level (m) 3.100 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr><tr><td>0.000</td><td>357.0</td><td>1.000</td><td>705.0</td><td>1.300</td><td>822.0</td></tr></table> <u>Tank or Pond Manhole: S10, DS/PN: S1.009</u> Invert Level (m) 3.100 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr><tr><td>0.000</td><td>472.0</td><td>1.000</td><td>705.0</td><td>1.300</td><td>822.0</td></tr></table> <u>Tank or Pond Manhole: S11, DS/PN: S1.010</u> Invert Level (m) 3.700 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr><tr><td>0.000</td><td>957.0</td><td>0.400</td><td>1179.0</td></tr></table> <u>Tank or Pond Manhole: S77, DS/PN: S21.010</u> Invert Level (m) 3.100 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr><tr><td>0.000</td><td>1788.0</td><td>1.000</td><td>2355.0</td><td>1.300</td><td>2459.0</td></tr></table>			Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	464.0	1.000	785.0	1.300	905.0	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	357.0	1.000	705.0	1.300	822.0	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	472.0	1.000	705.0	1.300	822.0	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	957.0	0.400	1179.0	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	1788.0	1.000	2355.0	1.300	2459.0
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Rogers Cory Ptn Ltd		Page 10
The Old School Old School Road Hook RG27 9NJ		
Date 01/01/0001 File SW1.MDX		
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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for SW1.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	10.000
Hot Start (mins)	0	MADD Factor * 10m ³ /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	5
Number of Online Controls	2	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	0.350
Region England and Wales Cv (Summer)	0.750		
M5-60 (mm)	19.100	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	360 Winter	1	+0%				
S1.001	S2	15 Winter	1	+0%				
S1.002	S3	15 Winter	1	+0%	100/15 Summer			
S2.000	S38	15 Winter	1	+0%	100/15 Summer			
S3.000	S39a	360 Winter	1	+0%				
S2.001	S39	15 Winter	1	+0%	30/30 Summer			
S2.002	S40	15 Winter	1	+0%	30/30 Winter			
S1.003	S4	480 Winter	1	+0%	30/30 Winter			
S1.004	S5	480 Winter	1	+0%	30/30 Summer			
S1.005	S6	480 Winter	1	+0%	1/240 Winter			
S4.000	S34	480 Winter	1	+0%	30/15 Summer			
S5.000	S37	480 Winter	1	+0%	30/15 Summer	100/30 Summer		
S1.006	S7	480 Winter	1	+0%	1/60 Winter			
S6.000	S8a	360 Winter	1	+0%	30/30 Winter			
S1.007	S8	480 Winter	1	+0%	1/60 Summer			
S7.000	S9a	15 Winter	1	+0%	30/30 Summer			
S1.008	S9	480 Winter	1	+0%	1/30 Winter			

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Rogers Cory Ptn Ltd							Page 12	
The Old School Old School Road Hook RG27 9NJ								
Date 01/01/0001 File SW1.MDX				Designed by Terry Checked by				
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<u>1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for SW1.SWS</u>								
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S8.000	S17	15 Winter	1	+0%	100/600 Winter			
S8.001	S18	480 Winter	1	+0%	1/120 Winter			
S9.000	S32	15 Winter	1	+0%	30/180 Winter			
S8.002	S19	480 Winter	1	+0%	1/60 Summer			
S10.000	S24	480 Winter	1	+0%	1/60 Summer			
S10.001	S25	480 Winter	1	+0%	1/30 Winter			
S10.002	S26	480 Winter	1	+0%	1/30 Summer			
S8.003	S20	480 Winter	1	+0%	1/15 Summer			
S11.000	S27	15 Winter	1	+0%	100/15 Summer			
S12.000	S31	480 Winter	1	+0%	30/15 Summer	100/15 Summer		
S11.001	S28	480 Winter	1	+0%	30/15 Summer			
S8.004	S29	480 Winter	1	+0%	1/15 Summer			
S8.005	S22	480 Winter	1	+0%	1/15 Summer			
S8.006	S36	480 Winter	1	+0%	1/15 Summer			
S8.007	S23	480 Winter	1	+0%	1/15 Summer			
S13.000	S64	15 Winter	1	+0%	100/15 Summer			
S13.001	S65	15 Winter	1	+0%	30/240 Winter			
S14.000	S49a	480 Winter	1	+0%	30/120 Summer			
S15.000	S42	15 Winter	1	+0%				
S16.000	S59	15 Winter	1	+0%	30/15 Summer			
S15.001	S43	15 Winter	1	+0%	30/15 Summer			
S15.002	S44	15 Winter	1	+0%				
S17.000	S46	360 Winter	1	+0%				
S17.001	S47	360 Winter	1	+0%	100/15 Summer			
S17.002	S45a	360 Winter	1	+0%	100/15 Summer			
S15.003	S45	15 Winter	1	+0%	100/15 Summer			
S15.004	S81	15 Winter	1	+0%	30/15 Winter			
S18.000	S55	360 Winter	1	+0%	100/120 Winter			
S15.005	S48	480 Winter	1	+0%	30/15 Summer			
S13.002	S49	480 Winter	1	+0%	1/120 Summer			
S13.003	S50	480 Winter	1	+0%	1/60 Winter			
S19.000	S56b	360 Winter	1	+0%	30/120 Summer			
S20.000	S56a	360 Winter	1	+0%	30/120 Winter			
S19.001	S56	480 Winter	1	+0%	30/30 Winter			
S13.004	S51	480 Winter	1	+0%	1/60 Summer			
S13.005	S52	480 Winter	1	+0%	1/60 Summer			
S13.006	S54	480 Winter	1	+0%	1/30 Winter			
S13.007	S62	480 Winter	1	+0%	1/15 Summer			
S1.009	S10	480 Winter	1	+0%	1/15 Summer			
S1.010	S11	480 Winter	1	+0%	1/15 Summer			
S1.011	S12	1440 Winter	1	+0%				
S21.000	S66	15 Winter	1	+0%	100/15 Summer			
S21.001	S67	15 Winter	1	+0%	100/15 Summer			
S21.002	S68	15 Winter	1	+0%	100/15 Summer			
S22.000	S80	60 Winter	1	+0%	30/15 Summer			
S22.001	S80a	60 Winter	1	+0%	30/15 Summer			
S21.003	S69	180 Winter	1	+0%	1/15 Winter			
S21.004	S70	180 Winter	1	+0%	1/15 Winter			
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Page 13



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

for SW1.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S8.000	S17	4.040	-0.157	0.000	0.20		18.4	OK	
S8.001	S18	3.246	0.077	0.000	0.02		2.5	SURCHARGED	
S9.000	S32	3.459	-0.156	0.000	0.20		11.4	OK	
S8.002	S19	3.246	0.236	0.000	0.03		9.7	SURCHARGED	
S10.000	S24	3.249	0.182	0.000	0.07		2.6	SURCHARGED	
S10.001	S25	3.248	0.396	0.000	0.09		2.9	SURCHARGED	
S10.002	S26	3.247	0.446	0.000	0.06		2.3	SURCHARGED	
S8.003	S20	3.246	0.826	0.000	0.02		5.6	SURCHARGED	
S11.000	S27	3.683	-0.213	0.000	0.18		21.5	OK	
S12.000	S31	3.250	-0.150	0.000	0.07		4.5	OK	4
S11.001	S28	3.249	0.000	0.000	0.06		13.2	OK	
S8.004	S29	3.246	0.927	0.000	0.03		14.7	SURCHARGED	
S8.005	S22	3.246	0.976	0.000	0.02		7.1	SURCHARGED	
S8.006	S36	3.248	1.007	0.000	0.03		6.5	SURCHARGED	
S8.007	S23	3.248	1.031	0.000	0.01		5.9	SURCHARGED	
S13.000	S64	3.801	-0.186	0.000	0.30		28.4	OK	
S13.001	S65	3.477	-0.206	0.000	0.21		28.6	OK	
S14.000	S49a	3.247	-0.263	0.000	0.00		0.0	OK	
S15.000	S42	8.936	-0.164	0.000	0.16		18.4	OK	
S16.000	S59	6.512	-0.227	0.000	0.32		33.6	OK	
S15.001	S43	6.432	-0.158	0.000	0.62		65.6	OK	
S15.002	S44	6.195	-0.272	0.000	0.17		65.9	OK	
S17.000	S46	5.095	-0.225	0.000	0.00		0.0	OK	
S17.001	S47	4.076	-0.225	0.000	0.00		0.0	OK	
S17.002	S45a	3.945	-0.225	0.000	0.00		0.0	OK	
S15.003	S45	3.849	-0.238	0.000	0.29		65.9	OK	
S15.004	S81	3.414	-0.226	0.000	0.33		65.5	OK	
S18.000	S55	3.784	-0.225	0.000	0.00		0.0	OK	
S15.005	S48	3.247	-0.138	0.000	0.05		10.1	OK	
S13.002	S49	3.247	0.106	0.000	0.04		13.4	SURCHARGED	
S13.003	S50	3.247	0.147	0.000	0.04		19.2	SURCHARGED	
S19.000	S56b	3.270	-0.225	0.000	0.00		0.0	OK	
S20.000	S56a	3.330	-0.225	0.000	0.00		0.0	OK	
S19.001	S56	3.247	-0.105	0.000	0.00		0.1	OK	
S13.004	S51	3.247	0.219	0.000	0.07		18.8	SURCHARGED	
S13.005	S52	3.247	0.248	0.000	0.04		18.6	SURCHARGED	
S13.006	S54	3.247	0.341	0.000	0.01		15.4	SURCHARGED	
S13.007	S62	3.248	0.789	0.000	0.02		15.3	SURCHARGED	
S1.009	S10	3.248	1.093	0.000	0.06		24.4	SURCHARGED	
S1.010	S11	3.314	1.199	0.000	0.02		9.9	SURCHARGED	
S1.011	S12	1.303	-0.711	0.000	0.02		10.1	OK	
S21.000	S66	6.175	-0.166	0.000	0.15		13.1	OK	
S21.001	S67	5.336	-0.165	0.000	0.16		13.0	OK	
S21.002	S68	5.016	-0.141	0.000	0.29		30.0	OK	
S22.000	S80	3.165	-0.275	0.000	0.14		20.4	OK	
S22.001	S80a	3.156	-0.182	0.000	0.07		20.3	OK	
S21.003	S69	3.153	0.099	0.000	0.09		24.6	SURCHARGED	

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The Old School

Old School Road

Hook RG27 9NJ

Date 01/01/0001

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Micro Drainage

Network 2017.1.2

Page 16



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

for SW1.SWS

Simulation Criteria

Areal Reduction Factor 1.000

Hot Start (mins) 0

Hot Start Level (mm) 0

Manhole Headloss Coeff (Global) 0.500

Foul Sewage per hectare (l/s) 0.000

Additional Flow - % of Total Flow 10.000

MADD Factor * 10m³/ha Storage 2.000

Inlet Coeffiecient 0.800

Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0

Number of Online Controls 2

Number of Offline Controls 0

Number of Storage Structures 5

Number of Time/Area Diagrams 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model

M5-60 (mm)

FSR

19.100 Cv (Winter)

Ratio R 0.350

Region England and Wales Cv (Summer) 0.750

0.840

Margin for Flood Risk Warning (mm)

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status

DVD Status

Inertia Status

300.0

OFF

ON

ON

Profile(s)

Duration(s) (mins)

Summer and Winter

15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080

Return Period(s) (years)

Climate Change (%)

1, 30, 100

0, 0, 40

US/MH

PN

Name

Storm

Return Period

Climate Change

First (X) Surcharge

First (Y) Flood

First (Z) Overflow

Overflow Act.

S1.000

S1.001

S1.002

S2.000

S3.000

S2.001

S2.002

S1.003

S1.004

S1.005

S4.000

S5.000

S1.006

S6.000

S1.007

S7.000

S1.008

S1 360 Winter

S2 15 Winter

S3 15 Winter

S38 120 Winter

S39a 360 Winter

S39 120 Winter

S40 120 Winter

S4 120 Winter

S5 120 Winter

S6 180 Winter

S34 180 Winter

S37 180 Winter

S7 180 Winter

S8a 180 Winter

S8 180 Winter

S9a 180 Winter

S9 180 Winter

30

30

30

30

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30

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+0%

+0%

+0%

+0%

+0%

+0%

+0%

+0%

+0%

+0%

+0%

+0%

+0%

+0%

+0%

+0%

100/15 Summer

100/15 Summer

30/30 Summer

30/30 Winter

30/30 Winter

30/30 Summer

1/240 Winter

30/15 Summer

30/15 Summer 100/30 Summer

1/60 Winter

30/30 Winter

1/60 Summer

30/30 Summer

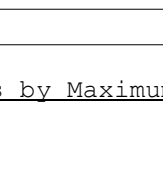
1/30 Winter

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Rogers Cory Ptn Ltd										Page 18	
The Old School Old School Road Hook RG27 9NJ											
Date 01/01/0001 File SW1.MDX											
Micro Drainage						Network 2017.1.2					
<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for SW1.SWS</u>											
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.			
S8.000	S17	15 Winter	30	+0%	100/600 Winter						
S8.001	S18	960 Winter	30	+0%	1/120 Winter						
S9.000	S32	960 Winter	30	+0%	30/180 Winter						
S8.002	S19	960 Winter	30	+0%	1/60 Summer						
S10.000	S24	960 Winter	30	+0%	1/60 Summer						
S10.001	S25	960 Winter	30	+0%	1/30 Winter						
S10.002	S26	960 Winter	30	+0%	1/30 Summer						
S8.003	S20	960 Winter	30	+0%	1/15 Summer						
S11.000	S27	960 Winter	30	+0%	100/15 Summer						
S12.000	S31	960 Winter	30	+0%	30/15 Summer	100/15 Summer					
S11.001	S28	960 Winter	30	+0%	30/15 Summer						
S8.004	S29	960 Winter	30	+0%	1/15 Summer						
S8.005	S22	960 Winter	30	+0%	1/15 Summer						
S8.006	S36	960 Winter	30	+0%	1/15 Summer						
S8.007	S23	960 Winter	30	+0%	1/15 Summer						
S13.000	S64	15 Winter	30	+0%	100/15 Summer						
S13.001	S65	960 Winter	30	+0%	30/240 Winter						
S14.000	S49a	960 Winter	30	+0%	30/120 Summer						
S15.000	S42	15 Winter	30	+0%							
S16.000	S59	15 Winter	30	+0%	30/15 Summer						
S15.001	S43	15 Winter	30	+0%	30/15 Summer						
S15.002	S44	15 Winter	30	+0%							
S17.000	S46	360 Winter	30	+0%							
S17.001	S47	360 Winter	30	+0%	100/15 Summer						
S17.002	S45a	15 Winter	30	+0%	100/15 Summer						
S15.003	S45	15 Winter	30	+0%	100/15 Summer						
S15.004	S81	960 Winter	30	+0%	30/15 Winter						
S18.000	S55	360 Winter	30	+0%	100/120 Winter						
S15.005	S48	960 Winter	30	+0%	30/15 Summer						
S13.002	S49	960 Winter	30	+0%	1/120 Summer						
S13.003	S50	960 Winter	30	+0%	1/60 Winter						
S19.000	S56b	960 Winter	30	+0%	30/120 Summer						
S20.000	S56a	960 Winter	30	+0%	30/120 Winter						
S19.001	S56	960 Winter	30	+0%	30/30 Winter						
S13.004	S51	960 Winter	30	+0%	1/60 Summer						
S13.005	S52	960 Winter	30	+0%	1/60 Summer						
S13.006	S54	960 Winter	30	+0%	1/30 Winter						
S13.007	S62	960 Winter	30	+0%	1/15 Summer						
S1.009	S10	960 Winter	30	+0%	1/15 Summer						
S1.010	S11	960 Winter	30	+0%	1/15 Summer						
S1.011	S12	30 Winter	30	+0%							
S21.000	S66	15 Winter	30	+0%	100/15 Summer						
S21.001	S67	15 Winter	30	+0%	100/15 Summer						
S21.002	S68	15 Winter	30	+0%	100/15 Summer						
S22.000	S80	15 Winter	30	+0%	30/15 Summer						
S22.001	S80a	15 Winter	30	+0%	30/15 Summer						
S21.003	S69	15 Winter	30	+0%	1/15 Winter						
S21.004	S70	15 Winter	30	+0%	1/15 Winter						
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Rogers Cory Ptn Ltd								Page 19	
The Old School Old School Road Hook RG27 9NJ									
Date 01/01/0001 File SW1.MDX				Designed by Terry Checked by					
Micro Drainage				Network 2017.1.2					
<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for SW1.SWS</u>									
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S8.000	S17	4.083	-0.114	0.000	0.48		45.1	OK	
S8.001	S18	3.763	0.594	0.000	0.02		3.2	SURCHARGED	
S9.000	S32	3.763	0.148	0.000	0.04		2.1	SURCHARGED	
S8.002	S19	3.763	0.753	0.000	0.02		5.1	SURCHARGED	
S10.000	S24	3.766	0.699	0.000	0.09		3.2	SURCHARGED	
S10.001	S25	3.765	0.913	0.000	0.10		3.2	SURCHARGED	
S10.002	S26	3.764	0.963	0.000	0.08		3.1	SURCHARGED	
S8.003	S20	3.763	1.343	0.000	0.03		8.1	SURCHARGED	
S11.000	S27	3.765	-0.131	0.000	0.03		4.0	OK	
S12.000	S31	3.765	0.365	0.000	0.09		5.7	SURCHARGED	4
S11.001	S28	3.764	0.515	0.000	0.06		13.5	SURCHARGED	
S8.004	S29	3.763	1.444	0.000	0.05		21.4	SURCHARGED	
S8.005	S22	3.763	1.493	0.000	0.02		5.9	SURCHARGED	
S8.006	S36	3.763	1.522	0.000	0.02		5.4	SURCHARGED	
S8.007	S23	3.763	1.546	0.000	0.01		4.6	SURCHARGED	
S13.000	S64	3.883	-0.104	0.000	0.74		69.6	OK	
S13.001	S65	3.765	0.082	0.000	0.04		5.2	SURCHARGED	
S14.000	S49a	3.764	0.254	0.000	0.00		0.0	SURCHARGED	
S15.000	S42	8.975	-0.125	0.000	0.40		45.1	OK	
S16.000	S59	6.863	0.124	0.000	0.75		79.2	SURCHARGED	
S15.001	S43	6.770	0.180	0.000	1.55		163.1	SURCHARGED	
S15.002	S44	6.261	-0.206	0.000	0.41		162.6	OK	
S17.000	S46	5.095	-0.225	0.000	0.00		0.0	OK	
S17.001	S47	4.076	-0.225	0.000	0.00		0.0	OK	
S17.002	S45a	3.945	-0.225	0.000	0.00		0.0	OK	
S15.003	S45	3.949	-0.138	0.000	0.72		163.8	OK	
S15.004	S81	3.766	0.126	0.000	0.07		13.0	SURCHARGED	
S18.000	S55	3.784	-0.225	0.000	0.00		0.0	OK	
S15.005	S48	3.765	0.380	0.000	0.07		13.0	SURCHARGED	
S13.002	S49	3.764	0.623	0.000	0.05		17.6	SURCHARGED	
S13.003	S50	3.764	0.664	0.000	0.06		26.4	SURCHARGED	
S19.000	S56b	3.764	0.269	0.000	0.00		0.0	SURCHARGED	
S20.000	S56a	3.764	0.209	0.000	0.00		0.0	SURCHARGED	
S19.001	S56	3.764	0.412	0.000	0.00		0.0	SURCHARGED	
S13.004	S51	3.764	0.736	0.000	0.09		25.9	SURCHARGED	
S13.005	S52	3.764	0.765	0.000	0.05		25.7	SURCHARGED	
S13.006	S54	3.764	0.858	0.000	0.01		8.8	SURCHARGED	
S13.007	S62	3.764	1.305	0.000	0.01		7.4	SURCHARGED	
S1.009	S10	3.763	1.608	0.000	0.08		29.2	SURCHARGED	
S1.010	S11	3.762	1.647	0.000	0.02		11.0	SURCHARGED	
S1.011	S12	1.407	-0.607	0.000	0.10		43.3	OK	
S21.000	S66	6.212	-0.129	0.000	0.38		32.1	OK	
S21.001	S67	5.374	-0.127	0.000	0.38		31.8	OK	
S21.002	S68	5.089	-0.068	0.000	0.82		83.4	OK	
S22.000	S80	3.666	0.226	0.000	0.56		80.3	SURCHARGED	
S22.001	S80a	3.596	0.258	0.000	0.27		81.4	SURCHARGED	
S21.003	S69	3.396	0.342	0.000	0.73		200.4	SURCHARGED	
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Rogers Cory Ptn Ltd							Page 20	
The Old School Old School Road Hook RG27 9NJ								
Date 01/01/0001 File SW1.MDX				Designed by Terry Checked by				
Micro Drainage				Network 2017.1.2				
<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for SW1.SWS</u>								
		Water	Surcharged	Flooded			Pipe	
	US/MH	Level	Depth	Volume	Flow /	Overflow	Flow	Level
PN	Name	(m)	(m)	(m³)	Cap.	(l/s)	(l/s)	Exceeded
S21.004	S70	3.387	0.361	0.000	0.81		248.6	SURCHARGED

Rogers Cory Ptn Ltd		Page 22
The Old School Old School Road Hook RG27 9NJ		
Date 01/01/0001 File SW1.MDX		
Designed by Terry Checked by		
Micro Drainage		Network 2017.1.2

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW1.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	10.000
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	5
Number of Online Controls	2	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	0.350
Region England and Wales Cv (Summer)	0.750		
M5-60 (mm)	19.100	Cv (Winter)	0.840

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

Profile(s)		Summer and Winter	
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080		
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.
S1.000	S1	360 Winter	100	+40%				
S1.001	S2	15 Winter	100	+40%				
S1.002	S3	15 Winter	100	+40%	100/15 Summer			
S2.000	S38	15 Summer	100	+40%	100/15 Summer			
S3.000	S39a	360 Winter	100	+40%				
S2.001	S39	15 Summer	100	+40%	30/30 Summer			
S2.002	S40	180 Winter	100	+40%	30/30 Winter			
S1.003	S4	180 Winter	100	+40%	30/30 Winter			
S1.004	S5	180 Winter	100	+40%	30/30 Summer			
S1.005	S6	360 Winter	100	+40%	1/240 Winter			
S4.000	S34	360 Winter	100	+40%	30/15 Summer			
S5.000	S37	30 Summer	100	+40%	30/15 Summer	100/30 Summer		
S1.006	S7	360 Winter	100	+40%	1/60 Winter			
S6.000	S8a	360 Winter	100	+40%	30/30 Winter			
S1.007	S8	360 Winter	100	+40%	1/60 Summer			
S7.000	S9a	360 Winter	100	+40%	30/30 Summer			
S1.008	S9	360 Winter	100	+40%	1/30 Winter			

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Rogers Cory Ptn Ltd		Page 23
The Old School Old School Road Hook RG27 9NJ		
Date 01/01/0001 File SW1.MDX	Designed by Terry Checked by	
Micro Drainage		
Network 2017.1.2		

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW1.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	8.450	-0.225	0.000	0.00	0.0	OK	
S1.001	S2	6.673	-0.104	0.000	0.56	59.7	OK	
S1.002	S3	5.924	0.234	0.000	1.11	115.0	SURCHARGED	
S2.000	S38	4.894	0.854	0.000	0.41	55.6	SURCHARGED	
S3.000	S39a	4.955	-0.225	0.000	0.00	0.0	OK	
S2.001	S39	4.694	0.862	0.000	1.78	157.1	SURCHARGED	
S2.002	S40	4.436	0.625	0.000	0.27	63.3	SURCHARGED	
S1.003	S4	4.428	0.664	0.000	0.21	91.7	SURCHARGED	
S1.004	S5	4.421	0.726	0.000	0.10	101.9	SURCHARGED	
S1.005	S6	4.308	1.080	0.000	0.10	60.8	SURCHARGED	
S4.000	S34	4.318	0.928	0.000	0.20	15.0	FLOOD RISK	
S5.000	S37	4.565	1.195	0.091	1.58	129.1	FLOOD	1
S1.006	S7	4.306	1.181	0.000	0.27	129.8	SURCHARGED	
S6.000	S8a	4.295	0.695	0.000	0.01	0.3	SURCHARGED	
S1.007	S8	4.295	1.297	0.000	0.45	143.0	SURCHARGED	
S7.000	S9a	4.295	0.795	0.000	0.10	14.3	FLOOD RISK	
S1.008	S9	4.287	1.324	0.000	0.11	156.8	FLOOD RISK	

Rogers Cory Ptn Ltd		Page 24						
The Old School Old School Road Hook RG27 9NJ								
Date 01/01/0001 File SW1.MDX								
Micro Drainage		Network 2017.1.2						
<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW1.SWS</u>								
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S8.000	S17	1440 Winter	100	+40%	100/600 Winter			
S8.001	S18	1440 Winter	100	+40%	1/120 Winter			
S9.000	S32	1440 Winter	100	+40%	30/180 Winter			
S8.002	S19	1440 Winter	100	+40%	1/60 Summer			
S10.000	S24	15 Winter	100	+40%	1/60 Summer			
S10.001	S25	1440 Winter	100	+40%	1/30 Winter			
S10.002	S26	1440 Winter	100	+40%	1/30 Summer			
S8.003	S20	1440 Winter	100	+40%	1/15 Summer			
S11.000	S27	15 Winter	100	+40%	100/15 Summer			
S12.000	S31	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
S11.001	S28	15 Winter	100	+40%	30/15 Summer			
S8.004	S29	1440 Winter	100	+40%	1/15 Summer			
S8.005	S22	1440 Winter	100	+40%	1/15 Summer			
S8.006	S36	1440 Winter	100	+40%	1/15 Summer			
S8.007	S23	1440 Winter	100	+40%	1/15 Summer			
S13.000	S64	15 Winter	100	+40%	100/15 Summer			
S13.001	S65	1440 Winter	100	+40%	30/240 Winter			
S14.000	S49a	1440 Winter	100	+40%	30/120 Summer			
S15.000	S42	15 Winter	100	+40%				
S16.000	S59	15 Winter	100	+40%	30/15 Summer			
S15.001	S43	15 Winter	100	+40%	30/15 Summer			
S15.002	S44	15 Winter	100	+40%				
S17.000	S46	360 Winter	100	+40%				
S17.001	S47	15 Winter	100	+40%	100/15 Summer			
S17.002	S45a	15 Winter	100	+40%	100/15 Summer			
S15.003	S45	15 Winter	100	+40%	100/15 Summer			
S15.004	S81	15 Winter	100	+40%	30/15 Winter			
S18.000	S55	1440 Winter	100	+40%	100/120 Winter			
S15.005	S48	1440 Winter	100	+40%	30/15 Summer			
S13.002	S49	1440 Winter	100	+40%	1/120 Summer			
S13.003	S50	1440 Winter	100	+40%	1/60 Winter			
S19.000	S56b	1440 Winter	100	+40%	30/120 Summer			
S20.000	S56a	1440 Winter	100	+40%	30/120 Winter			
S19.001	S56	1440 Winter	100	+40%	30/30 Winter			
S13.004	S51	1440 Winter	100	+40%	1/60 Summer			
S13.005	S52	1440 Winter	100	+40%	1/60 Summer			
S13.006	S54	1440 Winter	100	+40%	1/30 Winter			
S13.007	S62	1440 Winter	100	+40%	1/15 Summer			
S1.009	S10	1440 Winter	100	+40%	1/15 Summer			
S1.010	S11	1440 Winter	100	+40%	1/15 Summer			
S1.011	S12	60 Summer	100	+40%				
S21.000	S66	15 Winter	100	+40%	100/15 Summer			
S21.001	S67	15 Winter	100	+40%	100/15 Summer			
S21.002	S68	15 Winter	100	+40%	100/15 Summer			
S22.000	S80	15 Winter	100	+40%	30/15 Summer			
S22.001	S80a	15 Winter	100	+40%	30/15 Summer			
S21.003	S69	15 Winter	100	+40%	1/15 Winter			
S21.004	S70	15 Winter	100	+40%	1/15 Winter			
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Rogers Cory Ptn Ltd							Page 26	
The Old School Old School Road Hook RG27 9NJ								
Date 01/01/0001 File SW1.MDX				Designed by Terry Checked by				
Micro Drainage				Network 2017.1.2				
<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW1.SWS</u>								
		Water	Surcharged	Flooded			Pipe	
PN	US/MH	Level	Depth	Volume	Flow /	Overflow	Flow	Level
	Name	(m)	(m)	(m³)	Cap.	(l/s)	(l/s)	Exceeded
S21.004	S70	3.806	0.780	0.000	1.52		464.0	SURCHARGED

Rogers Cory Ptn Ltd						Page 27			
The Old School Old School Road Hook RG27 9NJ									
Date 01/01/0001 File SW1.MDX		Designed by Terry Checked by							
Micro Drainage				Network 2017.1.2					
<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW1.SWS</u>									
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	
S21.005	S71	15 Winter	100	+40%	1/15 Winter				
S21.006	S72	15 Winter	100	+40%	1/15 Winter				
S21.007	S73	720 Winter	100	+40%	1/15 Summer				
S23.000	S82	15 Winter	100	+40%	100/15 Summer	100/15 Summer			
S23.001	S83	15 Winter	100	+40%	30/15 Summer				
S21.008	S74	720 Winter	100	+40%	1/15 Summer				
S24.000	S84a	720 Winter	100	+40%	30/120 Winter				
S25.000	S84	720 Winter	100	+40%	100/120 Summer				
S21.009	S76	720 Winter	100	+40%	1/15 Summer				
S21.010	S77	720 Winter	100	+40%	1/15 Summer				
S21.011	S78	10080 Winter	100	+40%					
S21.012	S79	10080 Winter	100	+40%					
S1.012	S13	60 Summer	100	+40%					
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S21.005	S71	3.754	0.762	0.000	1.13		450.5	SURCHARGED	
S21.006	S72	3.699	0.755	0.000	1.20		450.7	SURCHARGED	
S21.007	S73	3.671	0.771	0.000	0.18		49.8	SURCHARGED	
S23.000	S82	5.204	1.280	1.390	1.56		58.8	FLOOD	2
S23.001	S83	4.927	1.243	0.000	1.30		127.4	SURCHARGED	
S21.008	S74	3.671	0.799	0.000	0.15		71.3	SURCHARGED	
S24.000	S84a	3.669	0.384	0.000	0.00		0.0	SURCHARGED	
S25.000	S84	3.669	0.194	0.000	0.00		0.0	SURCHARGED	
S21.009	S76	3.669	0.905	0.000	0.43		92.4	SURCHARGED	
S21.010	S77	3.668	0.924	0.000	0.03		9.9	SURCHARGED	
S21.011	S78	1.857	-0.671	0.000	0.02		9.9	OK	
S21.012	S79	1.754	-0.698	0.000	0.01		9.9	OK	
S1.012	S13	1.341	-0.621	0.000	0.14		46.1	OK	
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