STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for 20.08.13.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
Site Location	GB 450500 225250 SP 50500 25250
C (1km)	-0.023
D1 (1km)	0.328
D2 (1km)	0.309
D3 (1km)	0.264
E (1km)	0.292
F (1km)	2.461
Maximum Rainfall (mm/hr)	0
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for 20.08.13.SWS

- 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)	Auto Design
1.000	46.310	0.699	66.3	0.462	5.00	0.0	0.600	o	225	
1.001	27.589	0.287	96.1	0.090	0.00	0.0	0.600	o	225	
1.002	19.709	0.161	122.4	0.084	0.00	0.0	0.600	o	225	
1.003	54.656	0.602	90.8	0.024	0.00	0.0	0.600	o	225	
1.004	48.308	0.537	90.0	0.000	0.00	0.0	0.600	o	300	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	5.48	125.633	0.462	0.0	0.0	0.0	1.61	64.0	0.0
1.001	0.00	5.82	124.934	0.552	0.0	0.0	0.0	1.33	53.0	0.0
1.002	0.00	6.10	124.647	0.636	0.0	0.0	0.0	1.18	46.9	0.0
1.003	0.00	6.77	124.486	0.660	0.0	0.0	0.0	1.37	54.6	0.0
1.004	0.00	7.25	123.809	0.660	0.0	0.0	0.0	1.66	117.2	0.0

Network Design Table for 20.08.13.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)	Auto Design
1.005	11.396	0.122	93.4	0.000	0.00	0.0	0.600	o	300	
2.000	9.477	0.311	30.5	0.100	5.00	0.0	0.600	o	150	
2.001	22.265	0.731	30.5	0.049	0.00	0.0	0.600	o	150	
2.002	38.145#	0.302	126.3	0.109	0.00	0.0	0.600	o	150	
2.003	7.222#	0.675	10.7	0.000	0.00	0.0	0.600	o	225	
1.006	59.849	0.160	374.1	0.145	0.00	0.0	0.600	o	450	
3.000	26.967	0.234	115.2	0.105	5.00	0.0	0.600	o	150	
3.001	46.625	0.520	89.7	0.090	0.00	0.0	0.600	o	150	
3.002	4.363	0.018	242.4	0.130	0.00	0.0	0.600	o	150	
3.003	22.819	0.169	135.0	0.076	0.00	0.0	0.600	o	150	
3.004	21.320#	0.119	179.2	0.060	0.00	0.0	0.600	o	150	
4.000	71.622	0.359	199.5	0.175	5.00	0.0	0.600	o	150	
3.005	27.060#	0.185	146.3	0.000	0.00	0.0	0.600	o	450	
5.000	8.420#	0.093	90.5	0.057	5.00	0.0	0.600	o	150	
3.006	40.137	0.227	176.8	0.057	0.00	0.0	0.600	o	450	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.005	0.00	7.37	123.272	0.660	0.0	0.0	0.0	1.63	115.0	0.0
2.000	0.00	5.09	125.319	0.100	0.0	0.0	0.0	1.83	32.3	0.0
2.001	0.00	5.29	125.008	0.149	0.0	0.0	0.0	1.83	32.4	0.0
2.002	0.00	6.00	124.277	0.258	0.0	0.0	0.0	0.89	15.8	0.0
2.003	0.00	6.03	123.900	0.258	0.0	0.0	0.0	4.02	160.0	0.0
1.006	0.00	8.32	123.000	1.063	0.0	0.0	0.0	1.05	166.2	0.0
3.000	0.00	5.48	126.002	0.105	0.0	0.0	0.0	0.94	16.5	0.0
3.001	0.00	6.21	125.768	0.195	0.0	0.0	0.0	1.06	18.8	0.0
3.002	0.00	6.33	125.248	0.325	0.0	0.0	0.0	0.64	11.3	0.0
3.003	0.00	6.77	125.230	0.401	0.0	0.0	0.0	0.86	15.3	0.0
3.004	0.00	7.24	125.061	0.461	0.0	0.0	0.0	0.75	13.2	0.0
4.000	0.00	6.69	125.351	0.175	0.0	0.0	0.0	0.71	12.5	0.0
3.005	0.00	7.51	124.892	0.636	0.0	0.0	0.0	1.68	267.0	0.0
5.000	0.00	5.13	125.100	0.057	0.0	0.0	0.0	1.06	18.7	0.0
3.006	0.00	7.95	124.707	0.750	0.0	0.0	0.0	1.53	242.7	0.0

Network Design Table for 20.08.13.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)	Auto Design
3.007	20.544	0.085	241.7	0.074	0.00	0.0	0.600	o	450	
3.008	7.935	1.330	6.0	0.000	0.00	0.0	0.600	o	225	
6.000	8.698	0.037	235.1	0.000	5.00	0.0	0.600	o	300	
6.001	24.347	0.063	386.5	0.000	0.00	0.0	0.600	o	450	
1.007	37.392	0.253	147.8	0.069	0.00	0.0	0.600	o	150	
7.000	12.065#	0.453	26.6	0.036	5.00	0.0	0.600	o	100	
7.001	33.946#	0.418	81.2	0.060	0.00	0.0	0.600	o	100	
7.002	24.933	0.375	66.5	0.042	0.00	0.0	0.600	o	150	
7.003	12.230	0.045	271.8	0.045	0.00	0.0	0.600	o	150	
8.000	11.634	0.383	30.4	0.061	5.00	0.0	0.600	o	100	
7.004	48.302	0.600	80.5	0.055	0.00	0.0	0.600	o	150	
7.005	39.390	0.653	60.3	0.000	0.00	0.0	0.600	o	150	
1.008	13.653	0.092	148.4	0.000	0.00	0.0	0.600	o	150	
1.009	29.758	0.157	189.5	0.000	0.00	0.0	0.600	o	225	
9.000	49.037	0.490	100.1	0.102	5.00	0.0	0.600	o	300	

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)
3.007	0.00	8.21	124.480	0.824	0.0	0.0	0.0	1.30	207.3	0.0
3.008	0.00	8.24	124.395	0.824	0.0	0.0	0.0	5.39	214.4	0.0
6.000	0.00	5.14	122.940	0.000	0.0	0.0	0.0	1.02	72.2	0.0
6.001	0.00	5.54	122.903	0.000	0.0	0.0	0.0	1.03	163.5	0.0
1.007	0.00	9.08	122.840	1.956	0.0	0.0	0.0	0.82	14.6	0.0
7.000	0.00	5.13	125.181	0.036	0.0	0.0	0.0	1.50	11.8	0.0
7.001	0.00	5.80	124.728	0.096	0.0	0.0	0.0	0.85	6.7	0.0
7.002	0.00	6.13	124.260	0.138	0.0	0.0	0.0	1.24	21.8	0.0
7.003	0.00	6.47	123.885	0.183	0.0	0.0	0.0	0.60	10.7	0.0
8.000	0.00	5.14	124.273	0.061	0.0	0.0	0.0	1.41	11.0	0.0
7.004	0.00	7.19	123.840	0.299	0.0	0.0	0.0	1.12	19.8	0.0
7.005	0.00	7.69	123.240	0.299	0.0	0.0	0.0	1.30	22.9	0.0
1.008	0.00	9.36	122.587	2.255	0.0	0.0	0.0	0.82	14.5	0.0
1.009	0.00	9.88	122.420	2.255	0.0	0.0	0.0	0.95	37.6	0.0
9.000	0.00	5.52	122.870	0.102	0.0	0.0	0.0	1.57	111.1	0.0

Network Design Table for 20.08.13.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)	Auto Design
9.001	3.625	0.042	86.3	0.000	0.00	0.0	0.600	o	150	
1.010	23.462	0.160	146.6	0.030	0.00	0.0	0.600	o	225	
1.011	14.060	0.079	178.0	0.000	0.00	0.0	0.600	o	225	
1.012	74.443	1.113	66.9	0.046	0.00	0.0	0.600	o	225	
1.013	38.178	0.321	118.9	0.021	0.00	0.0	0.600	o	225	
1.014	39.956	0.269	148.5	0.012	0.00	0.0	0.600	oo	-1	
1.015	14.126	0.079	178.8	0.015	0.00	0.0	0.600	oo	-1	
10.000	16.816	0.095	177.0	0.000	5.00	0.0	0.600	o	300	
10.001	23.092	0.066	349.9	0.070	0.00	0.0	0.600	o	300	
11.000	7.219	0.024	300.8	0.080	5.00	0.0	0.600	o	300	
10.002	37.034	0.553	67.0	0.020	0.00	0.0	0.600	o	450	
10.003	22.412	0.230	97.4	0.080	0.00	0.0	0.600	o	450	
10.004	12.749	0.110	115.9	0.000	0.00	0.0	0.600	o	300	
10.005	21.721	0.325	66.8	0.027	0.00	0.0	0.600	o	300	
12.000	30.605	0.313	97.8	0.020	5.00	0.0	0.600	o	150	
13.000	52.101	0.591	88.2	0.040	5.00	0.0	0.600	o	100	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
9.001	0.00	5.58	122.380	0.102	0.0	0.0	0.0	1.08	19.1	0.0
1.010	0.00	10.24	122.263	2.387	0.0	0.0	0.0	1.08	42.8	0.0
1.011	0.00	10.48	122.103	2.387	0.0	0.0	0.0	0.98	38.8	0.0
1.012	0.00	11.26	122.024	2.433	0.0	0.0	0.0	1.60	63.7	0.0
1.013	0.00	11.79	120.911	2.454	0.0	0.0	0.0	1.20	47.6	0.0
1.014	0.00	12.41	120.590	2.466	0.0	0.0	0.0	1.07	85.6	0.0
1.015	0.00	12.65	120.321	2.481	0.0	0.0	0.0	0.97	78.0	0.0
10.000	0.00	5.24	122.676	0.000	0.0	0.0	0.0	1.18	83.3	0.0
10.001	0.00	5.70	122.581	0.070	0.0	0.0	0.0	0.83	59.0	0.0
11.000	0.00	5.13	122.539	0.080	0.0	0.0	0.0	0.90	63.7	0.0
10.002	0.00	5.95	122.515	0.170	0.0	0.0	0.0	2.49	395.6	0.0
10.003	0.00	6.13	121.962	0.250	0.0	0.0	0.0	2.06	327.6	0.0
10.004	0.00	6.27	121.732	0.250	0.0	0.0	0.0	1.46	103.2	0.0
10.005	0.00	6.46	121.622	0.277	0.0	0.0	0.0	1.93	136.1	0.0
12.000	0.00	5.50	121.610	0.020	0.0	0.0	0.0	1.02	18.0	0.0
13.000	0.00	6.06	122.246	0.040	0.0	0.0	0.0	0.82	6.4	0.0

Network Design Table for 20.08.13.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)	Auto Design
13.001	27.999	0.358	78.2	0.056	0.00	0.0	0.600	o	150	
10.006	17.974	1.055	17.0	0.010	0.00	0.0	0.600	o	225	
1.016	27.337	0.141	193.9	0.047	0.00	0.0	0.600	oo	-1	
1.017	8.947	0.284	31.5	0.000	0.00	0.0	0.600	oo	-1	
1.018	66.119	0.710	93.1	0.066	0.00	0.0	0.600	o	225	
1.019	47.865	0.330	145.0	0.066	0.00	0.0	0.600	o	225	
1.020	8.672	0.025	346.9	0.000	0.00	0.0	0.600	o	225	
1.021	14.635	0.213	68.7	0.000	0.00	0.0	0.600	o	300	
14.000	27.683	0.135	205.1	0.042	5.00	0.0	0.600	o	100	
1.022	78.854	0.348	226.6	0.000	0.00	0.0	0.600	o	300	
1.023	20.664	0.861	24.0	0.000	0.00	0.0	0.600	o	300	
1.024	22.191	0.107	207.4	0.000	0.00	0.0	0.600	o	300	
15.000	21.772	0.370	58.8	0.000	5.00	0.0	0.600	o	150	
15.001	28.601	0.630	45.4	0.000	0.00	0.0	0.600	o	150	
15.002	27.782	0.366	75.9	0.000	0.00	0.0	0.600	o	150	
15.003	37.742	0.277	136.3	0.067	0.00	0.0	0.600	o	150	

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)
13.001	0.00	6.47	121.655	0.096	0.0	0.0	0.0	1.14	20.1	0.0
10.006	0.00	6.56	121.297	0.403	0.0	0.0	0.0	3.19	126.7	0.0
1.016	0.00	13.14	120.242	2.931	0.0	0.0	0.0	0.94	74.8	0.0
1.017	0.00	13.20	120.101	2.931	0.0	0.0	0.0	2.34	187.1	0.0
1.018	0.00	14.02	119.817	2.997	0.0	0.0	0.0	1.36	53.9	0.0
1.019	0.00	14.75	119.107	3.063	0.0	0.0	0.0	1.08	43.1	0.0
1.020	0.00	14.96	118.777	3.063	0.0	0.0	0.0	0.70	27.7	0.0
1.021	0.00	15.09	118.752	3.063	0.0	0.0	0.0	1.90	134.3	0.0
14.000	0.00	5.87	118.874	0.042	0.0	0.0	0.0	0.53	4.2	0.0
1.022	0.00	16.35	118.539	3.105	0.0	0.0	0.0	1.04	73.5	0.0
1.023	0.00	16.46	118.191	3.105	0.0	0.0	0.0	3.22	227.8	0.0
1.024	0.00	16.80	117.330	3.105	0.0	0.0	0.0	1.09	76.9	0.0
15.000	0.00	5.28	119.570	0.000	0.0	0.0	0.0	1.31	23.2	0.0
15.001	0.00	5.59	119.200	0.000	0.0	0.0	0.0	1.50	26.5	0.0
15.002	0.00	6.00	118.570	0.000	0.0	0.0	0.0	1.16	20.4	0.0
15.003	0.00	6.73	118.204	0.067	0.0	0.0	0.0	0.86	15.2	0.0

Network Design Table for 20.08.13.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)	Auto Design
16.000	19.832	0.319	62.2	0.166	5.00	0.0	0.600	o	150	
16.001	25.385	0.352	72.1	0.000	0.00	0.0	0.600	o	150	
15.004	19.179	0.504	38.1	0.000	0.00	0.0	0.600	o	225	
1.025	54.442	0.256	212.7	0.000	0.00	0.0	0.600	o	300	
17.000	22.755	0.136	167.3	0.020	5.00	0.0	0.600	o	225	
17.001	11.129	0.197	56.5	0.000	0.00	0.0	0.600	o	225	
1.026	8.542	0.146	58.5	0.000	0.00	0.0	0.600	o	300	
1.027	12.733	0.171	74.5	0.000	0.00	0.0	0.600	o	300	
1.028	13.272#	0.080	165.9	0.032	0.00	0.0	0.600	o	300	
18.000	52.498	0.823	63.8	0.087	5.00	0.0	0.600	o	150	
19.000	45.667	0.402	113.6	0.021	5.00	0.0	0.600	o	150	
20.000	20.060	0.199	100.8	0.000	5.00	0.0	0.600	o	150	
19.001	19.282	0.262	73.6	0.118	0.00	0.0	0.600	o	225	
19.002	21.801	0.175	124.6	0.000	0.00	0.0	0.600	o	300	

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)
16.000	0.00	5.26	118.598	0.166	0.0	0.0	0.0	1.28	22.6	0.0
16.001	0.00	5.62	118.279	0.166	0.0	0.0	0.0	1.19	20.9	0.0
15.004	0.00	6.88	117.927	0.233	0.0	0.0	0.0	2.13	84.6	0.0
1.025	0.00	17.64	117.223	3.338	0.0	0.0	0.0	1.07	75.9	0.0
17.000	0.00	5.38	117.200	0.020	0.0	0.0	0.0	1.01	40.1	0.0
17.001	0.00	5.48	117.064	0.020	0.0	0.0	0.0	1.74	69.3	0.0
1.026	0.00	17.71	116.867	3.358	0.0	0.0	0.0	2.06	145.6	0.0
1.027	0.00	17.83	116.721	3.358	0.0	0.0	0.0	1.82	128.9	0.0
1.028	0.00	18.01	116.550	3.390	0.0	0.0	0.0	1.22	86.1	0.0
18.000	0.00	5.69	117.313	0.087	0.0	0.0	0.0	1.26	22.3	0.0
19.000	0.00	5.81	118.556	0.021	0.0	0.0	0.0	0.94	16.6	0.0
20.000	0.00	5.33	118.353	0.000	0.0	0.0	0.0	1.00	17.7	0.0
19.001	0.00	6.02	118.154	0.139	0.0	0.0	0.0	1.53	60.7	0.0
19.002	0.00	6.28	117.892	0.139	0.0	0.0	0.0	1.41	99.5	0.0

Network Design Table for 20.08.13.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)	Auto Design
21.000	23.008	0.164	140.3	0.075	5.00	0.0	0.600	o	150	
21.001	13.760	0.194	70.9	0.000	0.00	0.0	0.600	o	150	
21.002	13.711	0.278	49.3	0.021	0.00	0.0	0.600	o	150	
19.003	24.117	0.211	114.3	0.000	0.00	0.0	0.600	o	225	
22.000	3.531	0.043	82.1	0.020	5.00	0.0	0.600	o	100	
22.001	32.662	0.650	50.2	0.020	0.00	0.0	0.600	o	100	
22.002	20.297	0.151	134.4	0.063	0.00	0.0	0.600	o	150	
19.004	21.134	0.518	40.8	0.000	0.00	0.0	0.600	o	300	
23.000	22.705	1.303	17.4	0.034	5.00	0.0	0.600	o	150	
23.001	14.241	0.088	161.8	0.045	0.00	0.0	0.600	o	150	
23.002	11.996	0.334	35.9	0.035	0.00	0.0	0.600	o	150	
19.005	41.699	0.273	152.7	0.020	0.00	0.0	0.600	o	225	
24.000	30.734	0.288	106.7	0.084	5.00	0.0	0.600	o	225	
24.001	43.456	1.150	37.8	0.113	0.00	0.0	0.600	o	225	

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)
21.000	0.00	5.45	118.353	0.075	0.0	0.0	0.0	0.85	15.0	0.0
21.001	0.00	5.64	118.189	0.075	0.0	0.0	0.0	1.20	21.1	0.0
21.002	0.00	5.80	117.995	0.096	0.0	0.0	0.0	1.44	25.4	0.0
19.003	0.00	6.61	117.717	0.235	0.0	0.0	0.0	1.22	48.6	0.0
22.000	0.00	5.07	118.350	0.020	0.0	0.0	0.0	0.85	6.7	0.0
22.001	0.00	5.57	118.307	0.040	0.0	0.0	0.0	1.09	8.6	0.0
22.002	0.00	5.96	117.657	0.103	0.0	0.0	0.0	0.87	15.3	0.0
19.004	0.00	6.75	117.506	0.338	0.0	0.0	0.0	2.47	174.5	0.0
23.000	0.00	5.16	118.713	0.034	0.0	0.0	0.0	2.42	42.8	0.0
23.001	0.00	5.46	117.410	0.079	0.0	0.0	0.0	0.79	13.9	0.0
23.002	0.00	5.58	117.322	0.114	0.0	0.0	0.0	1.69	29.8	0.0
19.005	0.00	7.41	116.988	0.472	0.0	0.0	0.0	1.06	42.0	0.0
24.000	0.00	5.40	118.153	0.084	0.0	0.0	0.0	1.27	50.3	0.0
24.001	0.00	5.74	117.865	0.197	0.0	0.0	0.0	2.13	84.9	0.0

Network Design Table for 20.08.13.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)	Auto Design
19.006	23.208	0.181	128.2	0.000	0.00	0.0	0.600	o	375	
19.007	6.386#	0.045	141.9	0.000	0.00	0.0	0.600	o	375	
19.008	5.090#	0.019	267.9	0.000	0.00	0.0	0.600	o	375	
1.029	8.579#	0.135	63.5	0.000	0.00	0.0	0.600	o	375	
1.030	28.710#	0.160	179.4	0.000	0.00	0.0	0.600	o	450	
1.031	5.466#	0.210	26.0	0.000	0.00	0.0	0.600	o	450	

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)
19.006	0.00	7.65	116.715	0.669	0.0	0.0	0.0	1.60	176.6	0.0
19.007	0.00	7.72	116.534	0.669	0.0	0.0	0.0	1.52	167.8	0.0
19.008	0.00	7.80	116.489	0.669	0.0	0.0	0.0	1.10	121.7	0.0
1.029	0.00	18.07	116.470	4.146	0.0	0.0	0.0	2.28	251.4	0.0
1.030	0.00	18.39	116.260	4.146	0.0	0.0	0.0	1.51	240.9	0.0
1.031	0.00	18.41	116.010	4.146	0.0	0.0	0.0	4.00	635.8	0.0

Free Flowing Outfall Details for 20.08.13.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.031	Outfall	116.600	115.800	121.405	0	0

Simulation Criteria for 20.08.13.SWS

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	1.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
Site Location GB 450500 225250 SP 50500 25250	
C (1km)	-0.023

Synthetic Rainfall Details

D1 (1km)	0.328
D2 (1km)	0.309
D3 (1km)	0.264
E (1km)	0.292
F (1km)	2.461
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	15

Online Controls for 20.08.13.SWS

Hydro-Brake® Manhole: SC6, DS/PN: 1.007, Volume (m³): 26.3

Design Head (m) 1.200 Hydro-Brake® Type Md6 SW Only Invert Level (m) 122.840
Design Flow (l/s) 10.0 Diameter (mm) 126

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.1	1.200	9.9	3.000	15.7	7.000	24.0
0.200	8.0	1.400	10.7	3.500	16.9	7.500	24.8
0.300	8.5	1.600	11.5	4.000	18.1	8.000	25.6
0.400	8.1	1.800	12.2	4.500	19.2	8.500	26.4
0.500	7.8	2.000	12.8	5.000	20.3	9.000	27.2
0.600	7.8	2.200	13.4	5.500	21.2	9.500	27.9
0.800	8.3	2.400	14.0	6.000	22.2		
1.000	9.1	2.600	14.6	6.500	23.1		

Storage Structures for 20.08.13.SWS

Tank or Pond Manhole: TANK, DS/PN: 6.000

Invert Level (m) 122.940

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	470.0	1.200	470.0	1.201	0.0

Tank or Pond Manhole: 0011, DS/PN: 1.018

Invert Level (m) 119.830

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	133.0	0.800	133.0	0.801	0.0

Summary of Critical Results by Maximum Level (Rank 1) for 20.08.13.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	1.000
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	2
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Site Location GB 450500 225250 SP 50500 25250	
C (1km)	-0.023
D1 (1km)	0.328
D2 (1km)	0.309
D3 (1km)	0.264
E (1km)	0.292
F (1km)	2.461
Cv (Summer)	0.750
Cv (Winter)	0.840

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

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

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			8
1.001	30 Winter	100	0%	100/15 Summer	100/15 Summer			9
1.002	15 Winter	100	0%	100/15 Summer				
1.003	15 Winter	100	0%	100/15 Summer	100/15 Summer			6
1.004	120 Winter	100	0%	100/15 Summer				
1.005	120 Winter	100	0%	100/15 Summer	100/120 Winter			4
2.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			6
2.001	15 Summer	100	0%	100/15 Summer				
2.002	480 Winter	100	0%	100/15 Summer	100/15 Summer			18
2.003	360 Winter	100	0%	100/15 Summer	100/60 Winter			13
1.006	240 Winter	100	0%	100/15 Summer				
3.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			6
3.001	30 Winter	100	0%	100/15 Summer	100/15 Summer			11
3.002	15 Winter	100	0%	100/15 Summer	100/15 Summer			11
3.003	15 Winter	100	0%	100/15 Summer				

Summary of Critical Results by Maximum Level (Rank 1) for 20.08.13.SWS

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
3.004	15 Winter	100	0%	100/15 Summer	100/15 Summer			2
4.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			7
3.005	15 Winter	100	0%	100/15 Summer				
5.000	15 Winter	100	0%	100/15 Summer				
3.006	15 Winter	100	0%	100/15 Summer				
3.007	240 Winter	100	0%	100/15 Summer				
3.008	240 Winter	100	0%	100/15 Summer	100/240 Winter			3
6.000	240 Winter	100	0%	100/15 Summer				
6.001	240 Winter	100	0%	100/15 Summer				
1.007	240 Winter	100	0%	100/15 Summer	100/120 Summer			9
7.000	30 Winter	100	0%	100/15 Summer	100/15 Summer			6
7.001	15 Winter	100	0%	100/15 Summer	100/15 Summer			7
7.002	30 Winter	100	0%	100/15 Summer	100/15 Summer			9
7.003	15 Winter	100	0%	100/15 Summer				
8.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			6
7.004	15 Winter	100	0%	100/15 Summer	100/15 Summer			3
7.005	15 Winter	100	0%	100/15 Summer				
1.008	15 Winter	100	0%	100/15 Summer				
1.009	15 Winter	100	0%	100/15 Summer				
9.000	15 Winter	100	0%	100/15 Summer				
9.001	15 Winter	100	0%	100/15 Summer				
1.010	15 Winter	100	0%	100/15 Summer				
1.011	15 Winter	100	0%	100/15 Summer				
1.012	15 Winter	100	0%	100/15 Summer				
1.013	15 Winter	100	0%	100/15 Summer				
1.014	30 Winter	100	0%	100/15 Summer	100/15 Winter			3
1.015	30 Winter	100	0%	100/15 Summer				
10.000	15 Winter	100	0%					
10.001	15 Winter	100	0%	100/15 Winter				
11.000	15 Winter	100	0%	100/15 Winter				
10.002	15 Winter	100	0%					
10.003	15 Winter	100	0%	100/15 Summer	100/15 Winter			1
10.004	15 Winter	100	0%	100/15 Summer				
10.005	15 Winter	100	0%	100/15 Summer				
12.000	15 Winter	100	0%	100/15 Summer				
13.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			6
13.001	15 Winter	100	0%	100/15 Summer	100/15 Summer			5
10.006	15 Winter	100	0%	100/15 Summer	100/15 Winter			1
1.016	30 Winter	100	0%	100/15 Summer				
1.017	60 Winter	100	0%	100/15 Summer	100/15 Summer			10
1.018	60 Winter	100	0%	100/15 Summer	100/15 Summer			8
1.019	120 Winter	100	0%	100/15 Summer	100/15 Summer			10
1.020	120 Winter	100	0%	100/15 Summer				
1.021	120 Winter	100	0%					
14.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			5
1.022	30 Winter	100	0%					
1.023	30 Winter	100	0%					
1.024	30 Winter	100	0%	100/15 Summer				
15.000	60 Winter	100	0%					
15.001	60 Winter	100	0%					
15.002	15 Winter	100	0%	100/15 Summer				

Summary of Critical Results by Maximum Level (Rank 1) for 20.08.13.SWS

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
15.003	15 Winter	100	0%	100/15 Summer				
16.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			6
16.001	15 Winter	100	0%	100/15 Summer				
15.004	30 Winter	100	0%	100/15 Summer				
1.025	30 Winter	100	0%	100/15 Summer				
17.000	30 Winter	100	0%	100/15 Summer				
17.001	30 Winter	100	0%	100/15 Summer				
1.026	30 Winter	100	0%	100/15 Summer				
1.027	30 Winter	100	0%	100/15 Summer				
1.028	30 Winter	100	0%	100/15 Summer	100/15 Summer			6
18.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			4
19.000	15 Winter	100	0%	100/15 Summer				
20.000	15 Winter	100	0%	100/15 Summer				
19.001	15 Winter	100	0%	100/15 Summer	100/15 Winter			1
19.002	15 Winter	100	0%	100/15 Summer				
21.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			4
21.001	15 Winter	100	0%	100/15 Summer	100/15 Summer			4
21.002	15 Winter	100	0%	100/15 Summer	100/15 Summer			4
19.003	15 Winter	100	0%	100/15 Summer				
22.000	15 Winter	100	0%	100/15 Summer	100/15 Summer			4
22.001	15 Winter	100	0%	100/15 Summer	100/15 Summer			4
22.002	15 Winter	100	0%	100/15 Summer	100/15 Summer			4
19.004	15 Winter	100	0%	100/15 Summer				
23.000	15 Winter	100	0%	100/15 Summer				
23.001	15 Winter	100	0%	100/15 Summer	100/15 Summer			4
23.002	15 Winter	100	0%	100/15 Summer	100/15 Summer			4
19.005	15 Winter	100	0%	100/15 Summer				
24.000	15 Winter	100	0%	100/15 Summer				
24.001	15 Winter	100	0%	100/15 Summer	100/15 Winter			1
19.006	15 Winter	100	0%	100/15 Summer				
19.007	15 Winter	100	0%	100/15 Summer				
19.008	15 Winter	100	0%	100/15 Summer				
1.029	15 Winter	100	0%	100/15 Summer				
1.030	15 Winter	100	0%	100/15 Summer				
1.031	15 Winter	100	0%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	0542	126.651	0.793	72.125	0.97	0.0	59.0	FLOOD
1.001	0648	126.111	0.952	35.073	1.27	0.0	62.6	FLOOD
1.002	Ex MH	126.066	1.194	0.000	1.75	0.0	74.4	FLOOD RISK
1.003	0579	125.646	0.935	5.637	1.34	0.0	70.5	FLOOD
1.004	SC1	125.341	1.232	0.000	0.57	0.0	62.6	SURCHARGED
1.005	SC2	125.221	1.649	15.192	0.71	0.0	61.8	FLOOD
2.000	0580	125.963	0.494	14.373	0.94	0.0	26.9	FLOOD
2.001	EX MH	125.949	0.791	0.000	1.08	0.0	33.1	FLOOD RISK
2.002	1015	125.174	0.747	92.609	0.89	0.0	13.6	FLOOD
2.003	SC3	125.200	1.075	100.394	0.22	0.0	25.1	FLOOD
1.006	SC4	125.216	1.766	0.000	0.54	0.0	83.3	FLOOD RISK

Summary of Critical Results by Maximum Level (Rank 1) for 20.08.13.SWS

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
3.000	0613	126.890	0.738	12.232	1.24	0.0	19.6	FLOOD
3.001	0615	126.548	0.630	39.111	0.71	0.0	13.0	FLOOD
3.002	0610	126.434	1.036	43.269	2.86	0.0	27.1	FLOOD
3.003	0611	126.662	1.282	0.000	1.88	0.0	27.1	FLOOD RISK
3.004	0532	126.430	1.219	2.294	3.35	0.0	41.8	FLOOD
4.000	1032	126.866	1.365	23.674	2.19	0.0	26.9	FLOOD
3.005	0608	125.599	0.257	0.000	0.30	0.0	67.3	SURCHARGED
5.000	GY	125.649	0.399	0.000	1.86	0.0	30.4	FLOOD RISK
3.006	0530	125.463	0.306	0.000	0.52	0.0	111.9	SURCHARGED
3.007	0544	125.344	0.414	0.000	0.37	0.0	62.6	FLOOD RISK
3.008	0529	125.244	0.624	10.811	0.39	0.0	62.6	FLOOD
6.000	TANK	125.220	1.980	0.000	0.02	0.0	1.2	FLOOD RISK
6.001	SC5	125.220	1.867	0.000	0.02	0.0	2.3	FLOOD RISK
1.007	SC6	125.220	2.230	56.487	0.95	0.0	13.4	FLOOD
7.000	0842	126.174	0.893	8.268	0.75	0.0	8.4	FLOOD
7.001	0772	126.186	1.358	5.887	1.53	0.0	10.0	FLOOD
7.002	EX MH	125.229	0.819	29.263	1.05	0.0	21.9	FLOOD
7.003	0535	125.670	1.635	0.000	2.26	0.0	22.0	SURCHARGED
8.000	0533	125.770	1.397	7.576	1.30	0.0	13.5	FLOOD
7.004	0524	125.643	1.653	1.924	1.66	0.0	32.1	FLOOD
7.005	SC19	124.942	1.552	0.000	1.08	0.0	24.1	SURCHARGED
1.008	SC7	124.358	1.621	0.000	2.49	0.0	33.2	SURCHARGED
1.009	SC8	124.011	1.366	0.000	0.99	0.0	34.7	SURCHARGED
9.000	SC9	124.218	1.048	0.000	0.49	0.0	50.8	SURCHARGED
9.001	SC10	124.119	1.589	0.000	2.71	0.0	34.8	SURCHARGED
1.010	SC11	123.933	1.445	0.000	1.43	0.0	56.1	SURCHARGED
1.011	SC12	123.614	1.286	0.000	1.63	0.0	55.4	SURCHARGED
1.012	SC13	123.406	1.157	0.000	0.99	0.0	61.0	SURCHARGED
1.013	SC14	122.315	1.179	0.000	1.41	0.0	63.4	FLOOD RISK
1.014	SC15	121.679	0.864	4.212	0.90	0.0	73.3	FLOOD
1.015	SC16	121.576	1.030	0.000	1.07	0.0	73.1	SURCHARGED
10.000	0015	122.886	-0.090	0.000	0.03	0.0	2.0	OK
10.001	0014	122.886	0.005	0.000	0.80	0.0	42.1	SURCHARGED
11.000	0005	122.878	0.039	0.000	0.99	0.0	46.1	SURCHARGED
10.002	0004	122.836	-0.129	0.000	0.28	0.0	98.2	OK
10.003	0454	122.743	0.331	0.793	0.44	0.0	119.6	FLOOD
10.004	0326	122.632	0.600	0.000	1.11	0.0	92.2	FLOOD RISK
10.005	0323	122.515	0.593	0.000	0.81	0.0	97.1	FLOOD RISK
12.000	0455	122.366	0.606	0.000	0.50	0.0	8.7	FLOOD RISK
13.000	0460	122.820	0.474	4.303	1.11	0.0	7.1	FLOOD
13.001	0459	122.206	0.401	10.750	1.46	0.0	28.0	FLOOD
10.006	0373	122.287	0.765	0.019	0.94	0.0	106.9	FLOOD
1.016	0009	121.497	1.030	0.000	2.32	0.0	161.1	SURCHARGED
1.017	0010	120.991	0.665	64.833	0.93	0.0	140.1	FLOOD
1.018	0011	120.888	0.846	8.465	1.22	0.0	63.5	FLOOD
1.019	0480	119.843	0.511	15.999	1.45	0.0	59.9	FLOOD
1.020	0526	119.146	0.144	0.000	2.85	0.0	59.9	FLOOD RISK
1.021	0643	118.908	-0.144	0.000	0.53	0.0	59.9	OK
14.000	0497	119.697	0.723	3.004	2.53	0.0	10.3	FLOOD
1.022	0029	118.800	-0.039	0.000	0.98	0.0	69.7	OK

Summary of Critical Results by Maximum Level (Rank 1) for 20.08.13.SWS

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.023	0288	118.469	-0.022	0.000	0.37	0.0	73.5	FLOOD RISK
1.024	SC17	118.290	0.660	0.000	1.09	0.0	73.9	FLOOD RISK
15.000	EX MH	119.570	-0.150	0.000	0.00	0.0	0.0	OK
15.001	EX MH	119.200	-0.150	0.000	0.00	0.0	0.0	OK
15.002	EX MH	119.150	0.430	0.000	0.26	0.0	5.2	SURCHARGED
15.003	0376	119.186	0.832	0.000	1.95	0.0	28.7	FLOOD RISK
16.000	0250	119.328	0.580	20.445	1.45	0.0	30.7	FLOOD
16.001	0248	118.890	0.461	0.000	1.40	0.0	28.0	FLOOD RISK
15.004	0375	118.344	0.192	0.000	0.65	0.0	49.5	SURCHARGED
1.025	SC18	118.194	0.671	0.000	1.46	0.0	105.2	FLOOD RISK
17.000	0274	117.654	0.229	0.000	0.20	0.0	7.2	SURCHARGED
17.001	0272	117.648	0.359	0.000	0.10	0.0	6.2	SURCHARGED
1.026	0271	117.643	0.476	0.000	1.13	0.0	108.5	SURCHARGED
1.027	0269	117.456	0.435	0.000	1.06	0.0	109.6	SURCHARGED
1.028	0270	117.270	0.420	12.263	1.90	0.0	134.2	FLOOD
18.000	0465	118.536	1.073	3.170	1.34	0.0	29.1	FLOOD
19.000	0162	119.600	0.894	0.000	0.48	0.0	7.7	FLOOD RISK
20.000	0471	119.477	0.974	0.000	0.18	0.0	3.0	FLOOD RISK
19.001	0163	119.477	1.098	0.470	0.97	0.0	53.2	FLOOD
19.002	0182	119.313	1.121	0.000	0.49	0.0	43.3	SURCHARGED
21.000	0469	119.537	1.034	4.082	1.72	0.0	24.4	FLOOD
21.001	0395	119.320	0.981	1.421	0.97	0.0	18.7	FLOOD
21.002	0394	119.218	1.073	3.366	1.21	0.0	28.2	FLOOD
19.003	0393	119.194	1.252	0.000	1.11	0.0	49.5	FLOOD RISK
22.000	0464	119.386	0.936	0.849	0.80	0.0	4.5	FLOOD
22.001	0179	119.358	0.951	1.461	0.97	0.0	8.1	FLOOD
22.002	0180	119.061	1.254	4.470	1.66	0.0	23.8	FLOOD
19.004	0181	118.940	1.134	0.000	0.41	0.0	63.2	FLOOD RISK
23.000	0266	119.228	0.365	0.000	0.44	0.0	17.8	FLOOD RISK
23.001	0264	118.964	1.404	4.051	1.64	0.0	21.0	FLOOD
23.002	0386	118.760	1.288	8.137	1.13	0.0	30.4	FLOOD
19.005	0263	118.732	1.519	0.000	2.10	0.0	83.9	FLOOD RISK
24.000	0234	119.222	0.844	0.000	0.88	0.0	41.2	FLOOD RISK
24.001	0254	118.975	0.885	0.296	1.08	0.0	87.7	FLOOD
19.006	0257	117.728	0.638	0.000	1.07	0.0	161.7	SURCHARGED
19.007	0258	117.528	0.619	0.000	1.50	0.0	160.5	SURCHARGED
19.008	0378	117.361	0.497	0.000	2.09	0.0	159.8	SURCHARGED
1.029	Ex MH	117.192	0.347	0.000	1.77	0.0	253.9	FLOOD RISK
1.030	Ex MH	116.771	0.061	0.000	1.23	0.0	253.7	SURCHARGED
1.031	PI	116.365	-0.095	0.000	0.98	0.0	253.6	OK