

Curtins Consulting		Page 1
Merchant Exchange 17-19 Whitworth Street West Manchester M1 5WG		
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Micro Drainage	Network 2018.1.1	

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Proposed Area B

« - Indicates pipe capacity < flow

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
B1.000	14.914	0.149	100.1	0.039	5.00	0.0	0.600	o	150	Pipe/Conduit	
B1.001	7.353	0.074	99.4	0.011	0.00	0.0	0.600	o	150	Pipe/Conduit	
B1.002	14.068	0.141	99.8	0.017	0.00	0.0	0.600	o	150	Pipe/Conduit	
B1.003	7.777	0.097	80.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
B2.000	15.911	0.159	100.1	0.023	5.00	0.0	0.600	o	150	Pipe/Conduit	
B2.001	26.952	0.270	100.0	0.018	0.00	0.0	0.600	o	150	Pipe/Conduit	
B2.002	7.644	0.076	100.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
B3.000	7.641	0.076	100.5	0.004	5.00	0.0	0.600	o	150	Pipe/Conduit	
B3.001	19.191	0.434	44.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
B1.004	10.345	0.517	20.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
B4.000	37.103	0.371	100.0	0.000	5.00	0.0	0.600	o	150	Pipe/Conduit	
B4.001	32.000	0.457	70.0	0.144	0.00	0.0	0.600	o	225	Pipe/Conduit	
B4.002	9.000	0.113	80.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
B5.000	18.271	0.228	80.1	0.031	5.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
B1.000	43.71	5.25	133.688	0.039	0.0	0.0	0.0	1.00	17.7	4.6
B1.001	43.32	5.37	133.539	0.050	0.0	0.0	0.0	1.01	17.8	5.9
B1.002	42.58	5.60	133.465	0.067	0.0	0.0	0.0	1.01	17.8	7.7
B1.003	42.22	5.72	133.324	0.067	0.0	0.0	0.0	1.12	19.9	7.7
B2.000	43.66	5.26	133.643	0.023	0.0	0.0	0.0	1.00	17.8	2.7
B2.001	42.24	5.71	133.484	0.041	0.0	0.0	0.0	1.00	17.8	4.7
B2.002	41.86	5.84	133.214	0.041	0.0	0.0	0.0	1.00	17.7	4.7
B3.000	44.12	5.13	133.730	0.004	0.0	0.0	0.0	1.00	17.7	0.5
B3.001	43.42	5.34	133.654	0.004	0.0	0.0	0.0	1.52	26.8	0.5
B1.004	41.68	5.90	133.180	0.112	0.0	0.0	0.0	2.94	116.9	12.6
B4.000	42.53	5.62	133.658	0.000	0.0	0.0	0.0	1.00	17.8	0.0
B4.001	41.51	5.96	133.250	0.144	0.0	0.0	0.0	1.57	62.2	16.2
B4.002	41.21	6.06	132.793	0.144	0.0	0.0	0.0	1.46	58.2	16.2
B5.000	43.64	5.27	133.240	0.031	0.0	0.0	0.0	1.12	19.9	3.7

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STORM SEWER DESIGN by the Modified Rational Method

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
B5.001	11.227	0.161	69.7	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit		
B6.000	21.984	0.220	99.9	0.009	5.00	0.0	0.600	o	100	Pipe/Conduit		
B7.000	22.585	0.226	99.9	0.019	5.00	0.0	0.600	o	150	Pipe/Conduit		
B5.002	5.074	0.051	99.5	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit		
B4.003	18.349	0.092	200.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit		
B4.004	29.480	0.147	200.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit		
B8.000	31.792	0.845	37.6	0.000	5.00	0.0	0.600	o	100	Pipe/Conduit		
B9.000	36.167	0.241	150.1	0.002	5.00	0.0	0.600	o	150	Pipe/Conduit		
B9.001	13.887	0.093	149.3	0.148	0.00	0.0	0.600	o	225	Pipe/Conduit		
B8.001	4.962	0.050	100.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit		
B1.005	24.954	0.100	249.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit		
B1.006	8.038	0.032	250.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit		

Network Results Table

B5.001	43.13	5.43	133.012	0.031	0.0	0.0	0.0	1.21	21.3	3.7
B6.000	42.97	5.48	133.121	0.009	0.0	0.0	0.0	0.77	6.0	1.0
B7.000	43.30	5.37	133.400	0.019	0.0	0.0	0.0	1.01	17.8	2.2
B5.002	42.71	5.56	132.851	0.059	0.0	0.0	0.0	1.01	17.8	6.8
B4.003	40.44	6.33	132.560	0.203	0.0	0.0	0.0	1.11	78.3	22.2
B4.004	39.26	6.78	132.468	0.203	0.0	0.0	0.0	1.11	78.3	22.2
B8.000	43.15	5.42	133.681	0.000	0.0	0.0	0.0	1.26	9.9	0.0
B9.000	42.16	5.74	133.120	0.002	0.0	0.0	0.0	0.82	14.5	0.2
B9.001	41.52	5.95	132.804	0.150	0.0	0.0	0.0	1.07	42.5	16.9
B8.001	41.33	6.02	132.711	0.150	0.0	0.0	0.0	1.31	52.0	16.9
B1.005	38.22	7.20	132.330	0.465	0.0	0.0	0.0	0.99	70.0	48.1
B1.006	37.90	7.33	132.230	0.465	0.0	0.0	0.0	0.99	70.0	48.1

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STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Proposed Area B

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
B10.000	15.059	0.151	99.7	0.009	5.00	0.0	0.600	o	150	Pipe/Conduit	
B10.001	10.160	0.102	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
B11.000	7.777	0.078	99.7	0.024	5.00	0.0	0.600	o	150	Pipe/Conduit	
B11.001	5.524	0.055	100.4	0.024	0.00	0.0	0.600	o	150	Pipe/Conduit	
B12.000	8.781	0.088	100.0	0.007	5.00	0.0	0.600	o	150	Pipe/Conduit	
B11.002	6.341	0.063	100.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
B1.007	10.650	0.043	250.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
B13.000	26.550	0.133	199.6	0.088	5.00	0.0	0.600	o	300	Pipe/Conduit	
B14.000	15.462	0.103	150.0	0.007	5.00	0.0	0.600	o	150	Pipe/Conduit	
B14.001	5.969	0.040	149.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
B14.002	4.019	0.027	148.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
B13.001	25.456	0.127	200.4	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
B15.000	14.301	0.143	100.0	0.011	5.00	0.0	0.600	o	150	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)
B10.000	43.71	5.25	133.495	0.009	0.0	0.0	0.0	1.01	17.8	1.1
B10.001	43.16	5.42	133.344	0.009	0.0	0.0	0.0	1.00	17.8	1.1
B11.000	44.11	5.13	132.950	0.024	0.0	0.0	0.0	1.01	17.8	2.9
B11.001	43.80	5.22	132.872	0.048	0.0	0.0	0.0	1.00	17.7	5.7
B12.000	44.06	5.15	133.189	0.007	0.0	0.0	0.0	1.00	17.8	0.8
B11.002	43.54	5.30	132.742	0.055	0.0	0.0	0.0	1.30	51.8	6.5
B1.007	37.49	7.51	132.198	0.529	0.0	0.0	0.0	0.99	70.0	53.7
B13.000	43.22	5.40	132.900	0.088	0.0	0.0	0.0	1.11	78.4	10.3
B14.000	43.49	5.31	133.140	0.007	0.0	0.0	0.0	0.82	14.5	0.8
B14.001	43.10	5.44	133.037	0.007	0.0	0.0	0.0	0.82	14.5	0.8
B14.002	42.84	5.52	132.997	0.007	0.0	0.0	0.0	0.82	14.5	0.8
B13.001	41.67	5.90	132.767	0.095	0.0	0.0	0.0	1.11	78.2	10.7
B15.000	43.75	5.24	133.290	0.011	0.0	0.0	0.0	1.00	17.8	1.3

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STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Proposed Area B

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
B15.001	2.981	0.030	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
B1.008	7.166	0.029	247.1	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
B16.000	24.465	0.245	100.0	0.003	5.00	0.0	0.600	o	150	Pipe/Conduit	
B16.001	2.879	0.029	100.0	0.017	0.00	0.0	0.600	o	150	Pipe/Conduit	
B17.000	15.372	0.154	100.0	0.008	5.00	0.0	0.600	o	100	Pipe/Conduit	
B16.002	2.262	0.023	100.0	0.004	0.00	0.0	0.600	o	150	Pipe/Conduit	
B1.009	20.239	0.081	250.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
B18.000	24.755	0.165	150.0	0.015	5.00	0.0	0.600	o	225	Pipe/Conduit	
B18.001	16.673	0.111	150.0	0.028	0.00	0.0	0.600	o	300	Pipe/Conduit	
B18.002	46.997	0.313	150.2	0.044	0.00	0.0	0.600	o	450	Pipe/Conduit	
B18.003	47.377	0.316	150.0	0.064	0.00	0.0	0.600	o	450	Pipe/Conduit	
B1.010	15.788	0.395	40.0	0.030	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)
B15.001	43.58	5.29	133.147	0.011	0.0	0.0	0.0	1.00	17.8	1.3
B1.008	37.22	7.63	132.155	0.635	0.0	0.0	0.0	1.00	70.4	64.0
B16.000	43.20	5.41	133.580	0.003	0.0	0.0	0.0	1.00	17.8	0.4
B16.001	43.04	5.45	133.335	0.020	0.0	0.0	0.0	1.00	17.8	2.3
B17.000	43.43	5.33	133.250	0.008	0.0	0.0	0.0	0.77	6.0	0.9
B16.002	42.92	5.49	133.046	0.032	0.0	0.0	0.0	1.00	17.8	3.7
B1.009	36.47	7.97	132.126	0.667	0.0	0.0	0.0	0.99	70.0	65.9
B18.000	43.26	5.39	133.100	0.015	0.0	0.0	0.0	1.07	42.4	1.8
B18.001	42.57	5.60	132.860	0.043	0.0	0.0	0.0	1.28	90.6	5.0
B18.002	41.16	6.08	132.599	0.087	0.0	0.0	0.0	1.66	263.5	9.7
B18.003	39.85	6.55	132.286	0.151	0.0	0.0	0.0	1.66	263.6	16.3
B1.010	36.20	8.10	131.940	0.848	0.0	0.0	0.0	2.07	82.5«	83.1

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Micro Drainage				Network 2018.1.1					
Manhole Schedules for Proposed Area B									
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)
RE01	134.388	0.700	Open Manhole	150	B1.000	133.688	150		
PP01	134.367	0.828	Open Manhole	450	B1.001	133.539	150	B1.000	133.539
PP02	134.281	0.816	Open Manhole	450	B1.002	133.465	150	B1.001	133.465
PP03	134.035	0.711	Open Manhole	450	B1.003	133.324	150	B1.002	133.324
RE02	134.393	0.750	Open Manhole	150	B2.000	133.643	150		
PP04	134.331	0.847	Open Manhole	450	B2.001	133.484	150	B2.000	133.484
PP06	133.986	0.772	Open Manhole	450	B2.002	133.214	150	B2.001	133.214
RE04	134.256	0.526	Open Manhole	150	B3.000	133.730	150		
PP07	134.342	0.688	Open Manhole	450	B3.001	133.654	150	B3.000	133.654
S01	133.812	0.673	Open Manhole	600	B1.004	133.180	225	B1.003	133.227
								B2.002	133.138
								B3.001	133.220
RE	134.408	0.750	Open Manhole	150	B4.000	133.658	150		
PP10	134.163	0.913	Open Manhole	600	B4.001	133.250	225	B4.000	133.287
PP11	133.878	1.085	Open Manhole	600	B4.002	132.793	225	B4.001	132.793
10A	133.993	0.753	Open Manhole	450	B5.000	133.240	150		
10B	133.934	0.922	Open Manhole	450	B5.001	133.012	150	B5.000	133.012
10	133.921	0.800	Open Manhole	450	B6.000	133.121	100		
RWP	134.000	0.600	Open Manhole	150	B7.000	133.400	150		
10C	133.947	1.096	Open Manhole	450	B5.002	132.851	150	B5.001	132.851
								B6.000	132.901
								B7.000	133.174
S02	133.917	1.357	Open Manhole	1500	B4.003	132.560	300	B4.002	132.680
								B5.002	132.800
A-TANK	133.891	1.423	Open Manhole	1200	B4.004	132.468	300	B4.003	132.468
PP09A	134.431	0.750	Open Manhole	450	B8.000	133.681	100		
PP08	133.945	0.825	Open Manhole	450	B9.000	133.120	150		
PP09	133.504	0.700	Open Manhole	600	B9.001	132.804	225	B9.000	132.879
PP09B	133.585	0.874	Open Manhole	1200	B8.001	132.711	225	B8.000	132.836
								B9.001	132.711
S03	133.586	1.265	Open Manhole	1500	B1.005	132.330	300	B1.004	132.663
								B4.004	132.321
								B8.001	132.661
S04	134.296	2.066	Open Manhole	1500	B1.006	132.230	300	B1.005	132.230
RE05	134.245	0.750	Open Manhole	150	B10.000	133.495	150		
PP13	134.234	0.890	Open Manhole	450	B10.001	133.344	150	B10.000	133.344
RE07	133.701	0.751	Open Manhole	150	B11.000	132.950	150		
PP14A	133.833	0.961	Open Manhole	450	B11.001	132.872	150	B11.000	132.872
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Micro Drainage				Network 2018.1.1					
<u>Manhole Schedules for Proposed Area B</u>									
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)
RE06	133.939	0.750	Open Manhole	150	B12.000	133.189	150		
PP14	133.873	1.131	Open Manhole	450	B11.002	132.742	225	B11.001	132.817
								B12.000	133.101
S05	134.070	1.872	Open Manhole	1500	B1.007	132.198	300	B1.006	132.198
								B10.001	133.242
								B11.002	132.679
S06	134.000	1.100	Open Manhole	600	B13.000	132.900	300		
RE09	133.898	0.758	Open Manhole	225	B14.000	133.140	150		
PP16	133.779	0.742	Open Manhole	450	B14.001	133.037	150	B14.000	133.037
PP16A	133.859	0.862	Open Manhole	450	B14.002	132.997	150	B14.001	132.997
S07	133.928	1.161	Open Manhole	600	B13.001	132.767	300	B13.000	132.767
								B14.002	132.970
RE08	134.044	0.754	Open Manhole	150	B15.000	133.290	150		
PP15	133.877	0.730	Open Manhole	450	B15.001	133.147	150	B15.000	133.147
S08	133.926	1.770	Open Manhole	1500	B1.008	132.155	300	B1.007	132.155
								B13.001	132.640
								B15.001	133.117
RE10	134.338	0.758	Open Manhole	150	B16.000	133.580	150		
PP17	133.957	0.622	Open Manhole	450	B16.001	133.335	150	B16.000	133.335
RE11	133.950	0.700	Open Manhole	150	B17.000	133.250	100		
PP18	133.952	0.906	Open Manhole	450	B16.002	133.046	150	B16.001	133.307
								B17.000	133.096
S09	133.966	1.839	Open Manhole	1500	B1.009	132.126	300	B1.008	132.126
								B16.002	133.024
S11a	133.960	0.860	Open Manhole	600	B18.000	133.100	225		
S11b	133.961	1.101	Open Manhole	600	B18.001	132.860	300	B18.000	132.935
S11	133.702	1.103	Open Manhole	1500	B18.002	132.599	450	B18.001	132.749
S12	133.941	1.655	Open Manhole	1500	B18.003	132.286	450	B18.002	132.286
S13	133.996	2.056	Open Manhole	1500	B1.010	131.940	225	B1.009	132.045
								B18.003	131.970
CW03	134.620	3.075	Open Manhole	300		OUTFALL		B1.010	131.545
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PIPELINE SCHEDULES for Proposed Area B

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)
B1.000	o	150	RE01	134.388	133.688	0.475	Open Manhole	150
B1.001	o	150	PP01	134.367	133.539	0.603	Open Manhole	450
B1.002	o	150	PP02	134.281	133.465	0.591	Open Manhole	450
B1.003	o	150	PP03	134.035	133.324	0.561	Open Manhole	450
B2.000	o	150	RE02	134.393	133.643	0.600	Open Manhole	150
B2.001	o	150	PP04	134.331	133.484	0.697	Open Manhole	450
B2.002	o	150	PP06	133.986	133.214	0.622	Open Manhole	450
B3.000	o	150	RE04	134.256	133.730	0.376	Open Manhole	150
B3.001	o	150	PP07	134.342	133.654	0.538	Open Manhole	450
B1.004	o	225	S01	133.812	133.180	0.407	Open Manhole	600
B4.000	o	150	RE	134.408	133.658	0.600	Open Manhole	150
B4.001	o	225	PP10	134.163	133.250	0.688	Open Manhole	600
B4.002	o	225	PP11	133.878	132.793	0.860	Open Manhole	600
B5.000	o	150	10A	133.993	133.240	0.603	Open Manhole	450
B5.001	o	150	10B	133.934	133.012	0.772	Open Manhole	450

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)
B1.000	14.914	100.1	PP01	134.367	133.539	0.603	Open Manhole	450
B1.001	7.353	99.4	PP02	134.281	133.465	0.591	Open Manhole	450
B1.002	14.068	99.8	PP03	134.035	133.324	0.486	Open Manhole	450
B1.003	7.777	80.2	S01	133.812	133.227	0.435	Open Manhole	600
B2.000	15.911	100.1	PP04	134.331	133.484	0.697	Open Manhole	450
B2.001	26.952	100.0	PP06	133.986	133.214	0.622	Open Manhole	450
B2.002	7.644	100.6	S01	133.812	133.138	0.523	Open Manhole	600
B3.000	7.641	100.5	PP07	134.342	133.654	0.538	Open Manhole	450
B3.001	19.191	44.2	S01	133.812	133.220	0.442	Open Manhole	600
B1.004	10.345	20.0	S03	133.586	132.663	0.698	Open Manhole	1500
B4.000	37.103	100.0	PP10	134.163	133.287	0.726	Open Manhole	600
B4.001	32.000	70.0	PP11	133.878	132.793	0.860	Open Manhole	600
B4.002	9.000	80.0	S02	133.917	132.680	1.012	Open Manhole	1500
B5.000	18.271	80.1	10B	133.934	133.012	0.772	Open Manhole	450
B5.001	11.227	69.7	10C	133.947	132.851	0.946	Open Manhole	450

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PIPELINE SCHEDULES for Proposed Area B

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)
B6.000	o	100	10	133.921	133.121	0.700	Open Manhole	450
B7.000	o	150	RWP	134.000	133.400	0.450	Open Manhole	150
B5.002	o	150	10C	133.947	132.851	0.946	Open Manhole	450
B4.003	o	300	S02	133.917	132.560	1.057	Open Manhole	1500
B4.004	o	300	A-TANK	133.891	132.468	1.123	Open Manhole	1200
B8.000	o	100	PP09A	134.431	133.681	0.650	Open Manhole	450
B9.000	o	150	PP08	133.945	133.120	0.675	Open Manhole	450
B9.001	o	225	PP09	133.504	132.804	0.475	Open Manhole	600
B8.001	o	225	PP09B	133.585	132.711	0.649	Open Manhole	1200
B1.005	o	300	S03	133.586	132.330	0.956	Open Manhole	1500
B1.006	o	300	S04	134.296	132.230	1.766	Open Manhole	1500
B10.000	o	150	RE05	134.245	133.495	0.600	Open Manhole	150
B10.001	o	150	PP13	134.234	133.344	0.740	Open Manhole	450

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)
B6.000	21.984	99.9	10C	133.947	132.901	0.946	Open Manhole	450
B7.000	22.585	99.9	10C	133.947	133.174	0.623	Open Manhole	450
B5.002	5.074	99.5	S02	133.917	132.800	0.967	Open Manhole	1500
B4.003	18.349	200.0	A-TANK	133.891	132.468	1.123	Open Manhole	1200
B4.004	29.480	200.0	S03	133.586	132.321	0.965	Open Manhole	1500
B8.000	31.792	37.6	PP09B	133.585	132.836	0.649	Open Manhole	1200
B9.000	36.167	150.1	PP09	133.504	132.879	0.475	Open Manhole	600
B9.001	13.887	149.3	PP09B	133.585	132.711	0.649	Open Manhole	1200
B8.001	4.962	100.0	S03	133.586	132.661	0.699	Open Manhole	1500
B1.005	24.954	249.5	S04	134.296	132.230	1.766	Open Manhole	1500
B1.006	8.038	250.0	S05	134.070	132.198	1.572	Open Manhole	1500
B10.000	15.059	99.7	PP13	134.234	133.344	0.740	Open Manhole	450
B10.001	10.160	100.0	S05	134.070	133.242	0.678	Open Manhole	1500

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PIPELINE SCHEDULES for Proposed Area B

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)
B11.000	o	150	RE07	133.701	132.950	0.601	Open Manhole	150
B11.001	o	150	PP14A	133.833	132.872	0.811	Open Manhole	450
B12.000	o	150	RE06	133.939	133.189	0.600	Open Manhole	150
B11.002	o	225	PP14	133.873	132.742	0.906	Open Manhole	450
B1.007	o	300	S05	134.070	132.198	1.572	Open Manhole	1500
B13.000	o	300	S06	134.000	132.900	0.800	Open Manhole	600
B14.000	o	150	RE09	133.898	133.140	0.608	Open Manhole	225
B14.001	o	150	PP16	133.779	133.037	0.592	Open Manhole	450
B14.002	o	150	PP16A	133.859	132.997	0.712	Open Manhole	450
B13.001	o	300	S07	133.928	132.767	0.861	Open Manhole	600
B15.000	o	150	RE08	134.044	133.290	0.604	Open Manhole	150
B15.001	o	150	PP15	133.877	133.147	0.580	Open Manhole	450

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)
B11.000	7.777	99.7	PP14A	133.833	132.872	0.811	Open Manhole	450
B11.001	5.524	100.4	PP14	133.873	132.817	0.906	Open Manhole	450
B12.000	8.781	100.0	PP14	133.873	133.101	0.622	Open Manhole	450
B11.002	6.341	100.7	S05	134.070	132.679	1.166	Open Manhole	1500
B1.007	10.650	250.0	S08	133.926	132.155	1.470	Open Manhole	1500
B13.000	26.550	199.6	S07	133.928	132.767	0.861	Open Manhole	600
B14.000	15.462	150.0	PP16	133.779	133.037	0.592	Open Manhole	450
B14.001	5.969	149.2	PP16A	133.859	132.997	0.712	Open Manhole	450
B14.002	4.019	148.9	S07	133.928	132.970	0.808	Open Manhole	600
B13.001	25.456	200.4	S08	133.926	132.640	0.986	Open Manhole	1500
B15.000	14.301	100.0	PP15	133.877	133.147	0.580	Open Manhole	450
B15.001	2.981	100.0	S08	133.926	133.117	0.659	Open Manhole	1500

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PIPELINE SCHEDULES for Proposed Area B

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)
B1.008	o	300	S08	133.926	132.155	1.470	Open Manhole	1500
B16.000	o	150	RE10	134.338	133.580	0.608	Open Manhole	150
B16.001	o	150	PP17	133.957	133.335	0.472	Open Manhole	450
B17.000	o	100	RE11	133.950	133.250	0.600	Open Manhole	150
B16.002	o	150	PP18	133.952	133.046	0.756	Open Manhole	450
B1.009	o	300	S09	133.966	132.126	1.539	Open Manhole	1500
B18.000	o	225	S11a	133.960	133.100	0.635	Open Manhole	600
B18.001	o	300	S11b	133.961	132.860	0.801	Open Manhole	600
B18.002	o	450	S11	133.702	132.599	0.653	Open Manhole	1500
B18.003	o	450	S12	133.941	132.286	1.205	Open Manhole	1500
B1.010	o	225	S13	133.996	131.940	1.831	Open Manhole	1500

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)
B1.008	7.166	247.1	S09	133.966	132.126	1.539	Open Manhole	1500
B16.000	24.465	100.0	PP17	133.957	133.335	0.472	Open Manhole	450
B16.001	2.879	100.0	PP18	133.952	133.307	0.496	Open Manhole	450
B17.000	15.372	100.0	PP18	133.952	133.096	0.756	Open Manhole	450
B16.002	2.262	100.0	S09	133.966	133.024	0.792	Open Manhole	1500
B1.009	20.239	250.0	S13	133.996	132.045	1.651	Open Manhole	1500
B18.000	24.755	150.0	S11b	133.961	132.935	0.801	Open Manhole	600
B18.001	16.673	150.0	S11	133.702	132.749	0.653	Open Manhole	1500
B18.002	46.997	150.2	S12	133.941	132.286	1.205	Open Manhole	1500
B18.003	47.377	150.0	S13	133.996	131.970	1.576	Open Manhole	1500
B1.010	15.788	40.0	CW03	134.620	131.545	2.850	Open Manhole	300

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<u>Area Summary for Proposed Area B</u> <table><tr><th>Pipe Number</th><th>PIMP Type</th><th>PIMP Name</th><th>PIMP (%)</th><th>Gross Area (ha)</th><th>Imp. Area (ha)</th><th>Pipe Total (ha)</th></tr><tr><td colspan="4"></td><td>Total</td><td>Total</td><td>Total</td></tr><tr><td colspan="4"></td><td>0.848</td><td>0.848</td><td>0.848</td></tr></table> <u>Surcharged Outfall Details for Proposed Area B</u> <table><tr><th>Outfall Pipe Number</th><th>Outfall Name</th><th>C. Level (m)</th><th>I. Level (m)</th><th>Min I. Level (m)</th><th>D,L (mm)</th><th>W (mm)</th></tr><tr><td>B1.010</td><td>CW03</td><td>134.620</td><td>131.545</td><td>131.540</td><td>300</td><td>0</td></tr></table> Datum (m) 0.000 Offset (mins) 0 <table><tr><th>Time (mins)</th><th>Depth (m)</th><th>Time (mins)</th><th>Depth (m)</th><th>Time (mins)</th><th>Depth (m)</th><th>Time (mins)</th><th>Depth (m)</th><th>Time (mins)</th><th>Depth (m)</th></tr><tr><td>60</td><td>133.020</td><td>360</td><td>133.020</td><td>660</td><td>133.020</td><td>960</td><td>133.020</td><td>1260</td><td>133.020</td></tr><tr><td>120</td><td>133.020</td><td>420</td><td>133.020</td><td>720</td><td>133.020</td><td>1020</td><td>133.020</td><td>1320</td><td>133.020</td></tr><tr><td>180</td><td>133.020</td><td>480</td><td>133.020</td><td>780</td><td>133.020</td><td>1080</td><td>133.020</td><td>1380</td><td>133.020</td></tr><tr><td>240</td><td>133.020</td><td>540</td><td>133.020</td><td>840</td><td>133.020</td><td>1140</td><td>133.020</td><td>1440</td><td>133.020</td></tr><tr><td>300</td><td>133.020</td><td>600</td><td>133.020</td><td>900</td><td>133.020</td><td>1200</td><td>133.020</td><td></td><td></td></tr></table>								Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)					Total	Total	Total					0.848	0.848	0.848	Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)	B1.010	CW03	134.620	131.545	131.540	300	0	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	60	133.020	360	133.020	660	133.020	960	133.020	1260	133.020	120	133.020	420	133.020	720	133.020	1020	133.020	1320	133.020	180	133.020	480	133.020	780	133.020	1080	133.020	1380	133.020	240	133.020	540	133.020	840	133.020	1140	133.020	1440	133.020	300	133.020	600	133.020	900	133.020	1200	133.020		
Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)																																																																																																
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300	133.020	600	133.020	900	133.020	1200	133.020																																																																																															
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Online Controls for Proposed Area B

Complex Manhole: S13, DS/PN: B1.010, Volume (m³): 12.3

Hydro-Brake® Optimum

Unit Reference	MD-SHE-0202-2240-1500-2240
Design Head (m)	1.500
Design Flow (l/s)	22.4
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	202
Invert Level (m)	131.940
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	22.4
Flush-Flo™	0.454	22.4
Kick-Flo®	0.993	18.4
Mean Flow over Head Range	-	19.3

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.9	1.200	20.1	3.000	31.2	7.000	47.0
0.200	19.1	1.400	21.7	3.500	33.6	7.500	48.6
0.300	21.8	1.600	23.1	4.000	35.9	8.000	50.1
0.400	22.3	1.800	24.4	4.500	37.9	8.500	51.6
0.500	22.4	2.000	25.7	5.000	39.9	9.000	53.1
0.600	22.1	2.200	26.9	5.500	41.8	9.500	54.5
0.800	21.2	2.400	28.0	6.000	43.6		
1.000	18.5	2.600	29.1	6.500	45.3		

Orifice

Diameter (m) 0.170 Discharge Coefficient 0.600 Invert Level (m) 133.090

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<u>Offline Controls for Proposed Area B</u> <u>Pipe Manhole: PP09, DS/PN: B9.001, Loop to PN: B4.004</u> <table><tr><td>Diameter (m)</td><td>0.150</td><td>Roughness k (mm)</td><td>0.600</td></tr><tr><td>Section Type</td><td>Pipe/Conduit</td><td>Entry Loss Coefficient</td><td>0.500</td></tr><tr><td>Slope (1:X)</td><td>100.0</td><td>Coefficient of Contraction</td><td>0.600</td></tr><tr><td>Length (m)</td><td>3.000</td><td>Upstream Invert Level (m)</td><td>132.500</td></tr></table>			Diameter (m)	0.150	Roughness k (mm)	0.600	Section Type	Pipe/Conduit	Entry Loss Coefficient	0.500	Slope (1:X)	100.0	Coefficient of Contraction	0.600	Length (m)	3.000	Upstream Invert Level (m)	132.500
Diameter (m)	0.150	Roughness k (mm)	0.600															
Section Type	Pipe/Conduit	Entry Loss Coefficient	0.500															
Slope (1:X)	100.0	Coefficient of Contraction	0.600															
Length (m)	3.000	Upstream Invert Level (m)	132.500															
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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Proposed Area B

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.294
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	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
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.
B1.000	RE01	15 Winter	1	+0%	100/15 Summer	100/15 Winter		
B1.001	PP01	15 Winter	1	+0%	30/15 Summer			
B1.002	PP02	15 Winter	1	+0%	30/15 Summer			
B1.003	PP03	15 Winter	1	+0%	30/15 Summer			
B2.000	RE02	15 Winter	1	+0%	100/15 Summer			
B2.001	PP04	15 Winter	1	+0%	100/15 Summer			
B2.002	PP06	15 Winter	1	+0%	100/15 Summer			
B3.000	RE04	15 Winter	1	+0%				
B3.001	PP07	15 Winter	1	+0%				
B1.004	S01	15 Winter	1	+0%				
B4.000	RE 120	Winter	1	+0%	100/15 Summer			
B4.001	PP10	15 Winter	1	+0%	100/15 Summer			
B4.002	PP11	15 Winter	1	+0%	30/1440 Winter			
B5.000	10A	15 Winter	1	+0%	100/15 Summer			
B5.001	10B	15 Winter	1	+0%	100/15 Summer			
B6.000	10	15 Winter	1	+0%	100/15 Summer			
B7.000	RWP	15 Winter	1	+0%				
B5.002	10C	15 Winter	1	+0%	30/15 Summer			

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Proposed Area B

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
B1.000	RE01	133.743	-0.095	0.000	0.28		4.6	OK	1
B1.001	PP01	133.603	-0.086	0.000	0.37		5.7	OK	
B1.002	PP02	133.537	-0.078	0.000	0.46		7.5	OK	
B1.003	PP03	133.393	-0.081	0.000	0.44		7.5	OK	
B2.000	RE02	133.684	-0.109	0.000	0.16		2.7	OK	
B2.001	PP04	133.537	-0.097	0.000	0.27		4.5	OK	
B2.002	PP06	133.270	-0.094	0.000	0.30		4.5	OK	
B3.000	RE04	133.747	-0.133	0.000	0.03		0.5	OK	
B3.001	PP07	133.668	-0.136	0.000	0.02		0.5	OK	
B1.004	S01	133.233	-0.172	0.000	0.13		12.5	OK	
B4.000	RE	133.658	-0.150	0.000	0.00		0.0	OK	
B4.001	PP10	133.326	-0.149	0.000	0.25		14.5	OK	
B4.002	PP11	132.879	-0.139	0.000	0.31		14.5	OK	
B5.000	10A	133.285	-0.105	0.000	0.20		3.6	OK	
B5.001	10B	133.057	-0.105	0.000	0.19		3.7	OK	
B6.000	10	133.150	-0.071	0.000	0.18		1.1	OK	
B7.000	RWP	133.437	-0.113	0.000	0.13		2.2	OK	
B5.002	10C	132.926	-0.075	0.000	0.49		7.0	OK	

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Proposed Area B

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
B4.003	S02	1440 Winter	1	+0%	30/480 Winter		
B4.004	A-TANK	1440 Winter	1	+0%	30/240 Winter		
B8.000	PP09A	120 Winter	1	+0%			
B9.000	PP08	15 Winter	1	+0%	100/15 Winter		
B9.001	PP09	1440 Winter	1	+0%	30/1440 Winter		1/15 Summer
B8.001	PP09B	1440 Winter	1	+0%	30/960 Winter		
B1.005	S03	1440 Winter	1	+0%	1/120 Summer		
B1.006	S04	1440 Winter	1	+0%	1/120 Summer		
B10.000	RE05	15 Winter	1	+0%			
B10.001	PP13	15 Winter	1	+0%	100/15 Winter		
B11.000	RE07	15 Winter	1	+0%	100/15 Summer		
B11.001	PP14A	15 Winter	1	+0%	30/1440 Winter		
B12.000	RE06	15 Winter	1	+0%	100/15 Summer		
B11.002	PP14	15 Winter	1	+0%	30/15 Winter		
B1.007	S05	240 Summer	1	+0%	1/120 Summer		
B13.000	S06	15 Winter	1	+0%	100/15 Summer		
B14.000	RE09	15 Winter	1	+0%	100/15 Summer		
B14.001	PP16	15 Winter	1	+0%	100/15 Summer		
B14.002	PP16A	15 Winter	1	+0%	100/15 Summer		
B13.001	S07	15 Winter	1	+0%	100/15 Summer		
B15.000	RE08	15 Winter	1	+0%	100/15 Summer		
B15.001	PP15	15 Winter	1	+0%	100/15 Summer		
B1.008	S08	240 Summer	1	+0%	1/120 Summer		
B16.000	RE10	15 Winter	1	+0%			
B16.001	PP17	15 Winter	1	+0%	100/15 Summer		
B17.000	RE11	15 Winter	1	+0%	100/15 Summer		
B16.002	PP18	15 Winter	1	+0%	100/15 Summer		
B1.009	S09	240 Summer	1	+0%	1/15 Winter		
B18.000	S11a	15 Winter	1	+0%	100/15 Summer		
B18.001	S11b	15 Winter	1	+0%	100/15 Summer		
B18.002	S11	240 Summer	1	+0%	30/30 Winter	100/15 Winter	
B18.003	S12	240 Summer	1	+0%	1/180 Summer		
B1.010	S13	240 Summer	1	+0%	1/15 Summer		

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
B4.003	S02		132.752	-0.108	0.000	0.03		2.0	OK
B4.004	A-TANK		132.752	-0.016	0.000	0.27		19.1	OK
B8.000	PP09A		133.681	-0.100	0.000	0.00		0.0	OK
B9.000	PP08		133.132	-0.138	0.000	0.02		0.2	OK
B9.001	PP09	72	132.752	-0.277	0.000	0.00	1.4	0.0	OK
B8.001	PP09B		132.747	-0.189	0.000	0.01		0.3	OK
B1.005	S03		132.770	0.140	0.000	0.31		19.6	SURCHARGED
B1.006	S04		132.770	0.240	0.000	0.39		20.5	SURCHARGED
B10.000	RE05		133.520	-0.125	0.000	0.07		1.1	OK

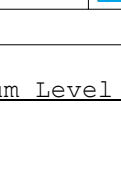
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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Proposed Area B

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
B10.001	PP13		133.370	-0.124	0.000	0.07		1.1	OK
B11.000	RE07		132.994	-0.106	0.000	0.19		2.9	OK
B11.001	PP14A		132.935	-0.087	0.000	0.36		5.2	OK
B12.000	RE06		133.211	-0.128	0.000	0.05		0.8	OK
B11.002	PP14		132.805	-0.162	0.000	0.17		6.1	OK
B1.007	S05		132.786	0.288	0.000	0.02		1.4	SURCHARGED
B13.000	S06		132.977	-0.223	0.000	0.15		10.3	OK
B14.000	RE09		133.164	-0.126	0.000	0.06		0.8	OK
B14.001	PP16		133.063	-0.124	0.000	0.07		0.8	OK
B14.002	PP16A		133.024	-0.123	0.000	0.08		0.8	OK
B13.001	S07		132.847	-0.220	0.000	0.16		11.2	OK
B15.000	RE08		133.318	-0.122	0.000	0.08		1.3	OK
B15.001	PP15		133.182	-0.115	0.000	0.12		1.3	OK
B1.008	S08		132.805	0.350	0.000	0.04		2.1	SURCHARGED
B16.000	RE10		133.595	-0.135	0.000	0.02		0.4	OK
B16.001	PP17		133.380	-0.105	0.000	0.19		2.1	OK
B17.000	RE11		133.277	-0.073	0.000	0.16		0.9	OK
B16.002	PP18		133.104	-0.092	0.000	0.32		3.4	OK
B1.009	S09		132.832	0.406	0.000	0.04		2.5	SURCHARGED
B18.000	S11a		133.131	-0.194	0.000	0.05		1.8	OK
B18.001	S11b		132.908	-0.252	0.000	0.06		4.6	OK
B18.002	S11		132.835	-0.214	0.000	0.01		3.0	OK
B18.003	S12		132.836	0.101	0.000	0.02		5.5	SURCHARGED
B1.010	S13		132.855	0.690	0.000	0.04		2.9	SURCHARGED

PN	US/MH Name	Level Exceeded
B4.003	S02	
B4.004	A-TANK	
B8.000	PP09A	
B9.000	PP08	
B9.001	PP09	
B8.001	PP09B	
B1.005	S03	
B1.006	S04	
B10.000	RE05	
B10.001	PP13	
B11.000	RE07	
B11.001	PP14A	
B12.000	RE06	
B11.002	PP14	
B1.007	S05	
B13.000	S06	
B14.000	RE09	
B14.001	PP16	

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	<table><thead><tr><th>PN</th><th>US/MH Name</th><th>Level Exceeded</th></tr></thead><tbody><tr><td>B14.002</td><td>PP16A</td><td></td></tr><tr><td>B13.001</td><td>S07</td><td></td></tr><tr><td>B15.000</td><td>RE08</td><td></td></tr><tr><td>B15.001</td><td>PP15</td><td></td></tr><tr><td>B1.008</td><td>S08</td><td></td></tr><tr><td>B16.000</td><td>RE10</td><td></td></tr><tr><td>B16.001</td><td>PP17</td><td></td></tr><tr><td>B17.000</td><td>RE11</td><td></td></tr><tr><td>B16.002</td><td>PP18</td><td></td></tr><tr><td>B1.009</td><td>S09</td><td></td></tr><tr><td>B18.000</td><td>S11a</td><td></td></tr><tr><td>B18.001</td><td>S11b</td><td></td></tr><tr><td>B18.002</td><td>S11</td><td>3</td></tr><tr><td>B18.003</td><td>S12</td><td></td></tr><tr><td>B1.010</td><td>S13</td><td></td></tr></tbody></table>	PN	US/MH Name	Level Exceeded	B14.002	PP16A		B13.001	S07		B15.000	RE08		B15.001	PP15		B1.008	S08		B16.000	RE10		B16.001	PP17		B17.000	RE11		B16.002	PP18		B1.009	S09		B18.000	S11a		B18.001	S11b		B18.002	S11	3	B18.003	S12		B1.010	S13		
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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Proposed Area B

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	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	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.294
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	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
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.
B1.000	RE01	15 Winter	30	+0%	100/15 Summer	100/15 Winter		
B1.001	PP01	15 Winter	30	+0%	30/15 Summer			
B1.002	PP02	15 Winter	30	+0%	30/15 Summer			
B1.003	PP03	15 Winter	30	+0%	30/15 Summer			
B2.000	RE02	15 Winter	30	+0%	100/15 Summer			
B2.001	PP04	15 Winter	30	+0%	100/15 Summer			
B2.002	PP06	15 Winter	30	+0%	100/15 Summer			
B3.000	RE04	15 Winter	30	+0%				
B3.001	PP07	15 Winter	30	+0%				
B1.004	S01	15 Winter	30	+0%				
B4.000	RE	120 Winter	30	+0%	100/15 Summer			
B4.001	PP10	15 Winter	30	+0%	100/15 Summer			
B4.002	PP11	1440 Winter	30	+0%	30/1440 Winter			
B5.000	10A	15 Winter	30	+0%	100/15 Summer			
B5.001	10B	15 Winter	30	+0%	100/15 Summer			
B6.000	10	15 Winter	30	+0%	100/15 Summer			
B7.000	RWP	15 Winter	30	+0%				
B5.002	10C	1440 Winter	30	+0%	30/15 Summer			

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

PN	US/MH Name	Water	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Pipe	Status	Level
		Level (m)	Depth (m)	Volume (m³)			Flow (l/s)		Exceeded
B1.000	RE01	133.786	-0.052	0.000	0.69		11.3	OK	1
B1.001	PP01	133.721	0.032	0.000	0.91		13.9	SURCHARGED	
B1.002	PP02	133.661	0.046	0.000	1.13		18.4	SURCHARGED	
B1.003	PP03	133.482	0.008	0.000	1.07		18.3	SURCHARGED	
B2.000	RE02	133.710	-0.083	0.000	0.40		6.6	OK	
B2.001	PP04	133.580	-0.054	0.000	0.70		11.9	OK	
B2.002	PP06	133.316	-0.048	0.000	0.79		12.0	OK	
B3.000	RE04	133.757	-0.123	0.000	0.08		1.2	OK	
B3.001	PP07	133.675	-0.129	0.000	0.05		1.2	OK	
B1.004	S01	133.267	-0.138	0.000	0.32		30.9	OK	
B4.000	RE	133.658	-0.150	0.000	0.00		0.0	OK	
B4.001	PP10	133.399	-0.076	0.000	0.77		44.7	OK	
B4.002	PP11	133.033	0.015	0.000	0.06		2.8	SURCHARGED	
B5.000	10A	133.314	-0.076	0.000	0.48		8.9	OK	
B5.001	10B	133.085	-0.077	0.000	0.46		8.9	OK	
B6.000	10	133.168	-0.053	0.000	0.44		2.6	OK	
B7.000	RWP	133.460	-0.090	0.000	0.32		5.5	OK	
B5.002	10C	133.033	0.032	0.000	0.08		1.1	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
B4.003	S02	1440 Winter	30	+0%	30/480 Winter		
B4.004	A-TANK	1440 Winter	30	+0%	30/240 Winter		
B8.000	PP09A	120 Winter	30	+0%			
B9.000	PP08	15 Winter	30	+0%	100/15 Winter		
B9.001	PP09	1440 Winter	30	+0%	30/1440 Winter		1/15 Summer
B8.001	PP09B	1440 Winter	30	+0%	30/960 Winter		
B1.005	S03	1440 Winter	30	+0%	1/120 Summer		
B1.006	S04	1440 Winter	30	+0%	1/120 Summer		
B10.000	RE05	15 Winter	30	+0%			
B10.001	PP13	15 Winter	30	+0%	100/15 Winter		
B11.000	RE07	1440 Winter	30	+0%	100/15 Summer		
B11.001	PP14A	1440 Winter	30	+0%	30/1440 Winter		
B12.000	RE06	15 Winter	30	+0%	100/15 Summer		
B11.002	PP14	1440 Winter	30	+0%	30/15 Winter		
B1.007	S05	1440 Winter	30	+0%	1/120 Summer		
B13.000	S06	30 Winter	30	+0%	100/15 Summer		
B14.000	RE09	15 Winter	30	+0%	100/15 Summer		
B14.001	PP16	15 Winter	30	+0%	100/15 Summer		
B14.002	PP16A	30 Winter	30	+0%	100/15 Summer		
B13.001	S07	30 Winter	30	+0%	100/15 Summer		
B15.000	RE08	15 Winter	30	+0%	100/15 Summer		
B15.001	PP15	15 Winter	30	+0%	100/15 Summer		
B1.008	S08	1440 Winter	30	+0%	1/120 Summer		
B16.000	RE10	15 Winter	30	+0%			
B16.001	PP17	15 Winter	30	+0%	100/15 Summer		
B17.000	RE11	15 Winter	30	+0%	100/15 Summer		
B16.002	PP18	15 Winter	30	+0%	100/15 Summer		
B1.009	S09	30 Winter	30	+0%	1/15 Winter		
B18.000	S11a	15 Winter	30	+0%	100/15 Summer		
B18.001	S11b	180 Summer	30	+0%	100/15 Summer		
B18.002	S11	180 Summer	30	+0%	30/30 Winter	100/15 Winter	
B18.003	S12	180 Summer	30	+0%	1/180 Summer		
B1.010	S13	180 Summer	30	+0%	1/15 Summer		

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
B4.003	S02		133.033	0.173	0.000	0.06		3.9	SURCHARGED
B4.004	A-TANK		133.033	0.265	0.000	0.27		19.1	SURCHARGED
B8.000	PP09A		133.681	-0.100	0.000	0.00		0.0	OK
B9.000	PP08		133.140	-0.130	0.000	0.04		0.6	OK
B9.001	PP09	72	133.034	0.005	0.000	0.06	2.8	2.4	SURCHARGED
B8.001	PP09B		133.034	0.098	0.000	0.08		2.5	SURCHARGED
B1.005	S03		133.034	0.404	0.000	0.33		20.6	SURCHARGED
B1.006	S04		133.034	0.504	0.000	0.39		20.6	SURCHARGED
B10.000	RE05		133.535	-0.110	0.000	0.16		2.6	OK

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
B10.001	PP13		133.385	-0.109	0.000	0.16		2.6	OK
B11.000	RE07		133.035	-0.065	0.000	0.04		0.6	OK
B11.001	PP14A		133.035	0.013	0.000	0.10		1.5	SURCHARGED
B12.000	RE06		133.225	-0.114	0.000	0.13		2.0	OK
B11.002	PP14		133.035	0.068	0.000	0.04		1.5	SURCHARGED
B1.007	S05		133.035	0.537	0.000	0.38		20.9	SURCHARGED
B13.000	S06		133.085	-0.115	0.000	0.30		20.9	OK
B14.000	RE09		133.179	-0.111	0.000	0.15		2.0	OK
B14.001	PP16		133.078	-0.109	0.000	0.17		2.0	OK
B14.002	PP16A		133.069	-0.078	0.000	0.15		1.7	OK
B13.001	S07		133.067	0.000	0.000	0.30		20.8	OK
B15.000	RE08		133.335	-0.105	0.000	0.20		3.2	OK
B15.001	PP15		133.203	-0.094	0.000	0.29		3.2	OK
B1.008	S08		133.035	0.580	0.000	0.41		21.1	SURCHARGED
B16.000	RE10		133.602	-0.128	0.000	0.05		0.9	OK
B16.001	PP17		133.417	-0.069	0.000	0.57		6.2	OK
B17.000	RE11		133.294	-0.056	0.000	0.40		2.3	OK
B16.002	PP18		133.157	-0.039	0.000	0.89		9.7	OK
B1.009	S09		133.044	0.617	0.000	0.42		25.9	SURCHARGED
B18.000	S11a		133.150	-0.175	0.000	0.11		4.3	OK
B18.001	S11b		133.093	-0.067	0.000	0.06		4.4	OK
B18.002	S11		133.089	0.040	0.000	0.04		8.9	SURCHARGED
B18.003	S12		133.084	0.348	0.000	0.06		15.1	SURCHARGED
B1.010	S13		133.076	0.911	0.000	0.14		10.2	SURCHARGED

PN	US/MH Name	Level Exceeded
B4.003	S02	
B4.004	A-TANK	
B8.000	PP09A	
B9.000	PP08	
B9.001	PP09	
B8.001	PP09B	
B1.005	S03	
B1.006	S04	
B10.000	RE05	
B10.001	PP13	
B11.000	RE07	
B11.001	PP14A	
B12.000	RE06	
B11.002	PP14	
B1.007	S05	
B13.000	S06	
B14.000	RE09	
B14.001	PP16	

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<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Proposed Area B</u>																																																		
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100 year Return Period Summary of Critical Results by Maximum Level (Rank
1) for Proposed Area B

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
B1.000	RE01	134.388	0.550	0.030	1.17		19.1	FLOOD	1
B1.001	PP01	134.264	0.575	0.000	1.46		22.4	FLOOD RISK	
B1.002	PP02	134.117	0.502	0.000	1.80		29.3	FLOOD RISK	
B1.003	PP03	133.653	0.179	0.000	1.70		29.2	SURCHARGED	
B2.000	RE02	133.883	0.090	0.000	0.69		11.3	SURCHARGED	
B2.001	PP04	133.811	0.177	0.000	1.16		19.7	SURCHARGED	
B2.002	PP06	133.480	0.116	0.000	1.25		19.1	SURCHARGED	
B3.000	RE04	133.767	-0.113	0.000	0.14		2.1	OK	
B3.001	PP07	133.683	-0.121	0.000	0.08		2.1	OK	
B1.004	S01	133.355	-0.050	0.000	0.51		49.9	OK	
B4.000	RE	133.861	0.053	0.000	0.00		0.0	SURCHARGED	
B4.001	PP10	133.861	0.386	0.000	1.21		70.7	SURCHARGED	
B4.002	PP11	133.198	0.180	0.000	1.47		69.4	SURCHARGED	
B5.000	10A	133.427	0.037	0.000	0.83		15.4	SURCHARGED	
B5.001	10B	133.269	0.107	0.000	0.80		15.3	SURCHARGED	
B6.000	10	133.296	0.075	0.000	0.76		4.5	SURCHARGED	
B7.000	RWP	133.484	-0.066	0.000	0.59		9.9	OK	
B5.002	10C	133.186	0.185	0.000	0.14		2.0	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
B4.003	S02	1440 Winter	100	+40%	30/480 Winter		
B4.004	A-TANK	1440 Winter	100	+40%	30/240 Winter		
B8.000	PP09A	120 Winter	100	+40%			
B9.000	PP08	15 Winter	100	+40%	100/15 Winter		
B9.001	PP09	15 Winter	100	+40%	30/1440 Winter		1/15 Summer
B8.001	PP09B	15 Winter	100	+40%	30/960 Winter		
B1.005	S03	15 Winter	100	+40%	1/120 Summer		
B1.006	S04	15 Winter	100	+40%	1/120 Summer		
B10.000	RE05	15 Winter	100	+40%			
B10.001	PP13	15 Winter	100	+40%	100/15 Winter		
B11.000	RE07	15 Winter	100	+40%	100/15 Summer		
B11.001	PP14A	15 Winter	100	+40%	30/1440 Winter		
B12.000	RE06	15 Winter	100	+40%	100/15 Summer		
B11.002	PP14	15 Winter	100	+40%	30/15 Winter		
B1.007	S05	15 Winter	100	+40%	1/120 Summer		
B13.000	S06	15 Winter	100	+40%	100/15 Summer		
B14.000	RE09	15 Winter	100	+40%	100/15 Summer		
B14.001	PP16	15 Winter	100	+40%	100/15 Summer		
B14.002	PP16A	15 Winter	100	+40%	100/15 Summer		
B13.001	S07	15 Winter	100	+40%	100/15 Summer		
B15.000	RE08	15 Winter	100	+40%	100/15 Summer		
B15.001	PP15	15 Winter	100	+40%	100/15 Summer		
B1.008	S08	15 Winter	100	+40%	1/120 Summer		
B16.000	RE10	15 Winter	100	+40%			
B16.001	PP17	15 Winter	100	+40%	100/15 Summer		
B17.000	RE11	15 Winter	100	+40%	100/15 Summer		
B16.002	PP18	15 Winter	100	+40%	100/15 Summer		
B1.009	S09	15 Winter	100	+40%	1/15 Winter		
B18.000	S11a	30 Summer	100	+40%	100/15 Summer		
B18.001	S11b	30 Summer	100	+40%	100/15 Summer		
B18.002	S11	30 Winter	100	+40%	30/30 Winter	100/15 Winter	
B18.003	S12	15 Winter	100	+40%	1/180 Summer		
B1.010	S13	15 Winter	100	+40%	1/15 Summer		

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
B4.003	S02		133.184	0.324	0.000	0.10		6.6	SURCHARGED
B4.004	A-TANK		133.181	0.413	0.000	0.27		19.1	SURCHARGED
B8.000	PP09A		133.681	-0.100	0.000	0.00		0.0	OK
B9.000	PP08		133.272	0.002	0.000	0.07		1.0	SURCHARGED
B9.001	PP09	72	133.267	0.238	0.000	0.81	51.6	30.0	FLOOD RISK
B8.001	PP09B		133.243	0.307	0.000	0.74		23.2	SURCHARGED
B1.005	S03		133.233	0.603	0.000	0.31		19.3	SURCHARGED
B1.006	S04		133.395	0.865	0.000	0.37		19.3	SURCHARGED
B10.000	RE05		133.550	-0.095	0.000	0.29		4.8	OK

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Pipe Flow / Cap. (l/s)	Overflow Flow (l/s)	Pipe Flow (l/s)	Status
B10.001	PP13		133.517	0.023	0.000	0.32		5.0	SURCHARGED
B11.000	RE07		133.680	0.580	0.000	0.66		10.2	FLOOD RISK
B11.001	PP14A		133.647	0.625	0.000	1.46		21.4	FLOOD RISK
B12.000	RE06		133.571	0.232	0.000	0.22		3.4	SURCHARGED
B11.002	PP14		133.561	0.594	0.000	0.65		22.8	SURCHARGED
B1.007	S05		133.498	1.001	0.000	0.35		19.3	SURCHARGED
B13.000	S06		133.763	0.563	0.000	0.57		40.0	FLOOD RISK
B14.000	RE09		133.692	0.402	0.000	0.25		3.3	FLOOD RISK
B14.001	PP16		133.680	0.493	0.000	0.31		3.8	FLOOD RISK
B14.002	PP16A		133.673	0.526	0.000	0.45		4.9	FLOOD RISK
B13.001	S07		133.668	0.601	0.000	0.54		38.0	FLOOD RISK
B15.000	RE08		133.596	0.156	0.000	0.34		5.6	SURCHARGED
B15.001	PP15		133.577	0.280	0.000	0.47		5.1	SURCHARGED
B1.008	S08		133.571	1.116	0.000	0.57		29.1	SURCHARGED
B16.000	RE10		133.621	-0.109	0.000	0.09		1.6	OK
B16.001	PP17		133.615	0.129	0.000	1.00		10.8	SURCHARGED
B17.000	RE11		133.653	0.303	0.000	0.65		3.8	FLOOD RISK
B16.002	PP18		133.606	0.410	0.000	1.44		15.6	SURCHARGED
B1.009	S09		133.575	1.149	0.000	0.52		31.6	SURCHARGED
B18.000	S11a		133.737	0.412	0.000	0.15		6.0	FLOOD RISK
B18.001	S11b		133.721	0.561	0.000	0.23		17.8	FLOOD RISK
B18.002	S11		133.703	0.654	0.792	0.13		30.6	FLOOD
B18.003	S12		133.697	0.962	0.000	0.17		41.2	FLOOD RISK
B1.010	S13		133.565	1.400	0.000	0.82		59.5	SURCHARGED

PN	US/MH Name	Level Exceeded
B4.003	S02	
B4.004	A-TANK	
B8.000	PP09A	
B9.000	PP08	
B9.001	PP09	
B8.001	PP09B	
B1.005	S03	
B1.006	S04	
B10.000	RE05	
B10.001	PP13	
B11.000	RE07	
B11.001	PP14A	
B12.000	RE06	
B11.002	PP14	
B1.007	S05	
B13.000	S06	
B14.000	RE09	
B14.001	PP16	

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