

Appendix N

MICRODRAINAGE CALCULATIONS

WSP Group Ltd		Page 0
.	Barnham South	
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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for 5083-SWS-01-B.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.350	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	0.900
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	420
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for 5083-SWS-01-B.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
S1.000	31.500	0.070	450.0	0.053	5.00	0.0	0.600	o	525	525
S1.001	32.414	0.072	450.2	0.077	0.00	0.0	0.600	o	525	525
S2.000	5.000	0.035	142.9	0.116	5.00	0.0	0.600	o	225	225
S2.001	5.000	0.110	45.5	0.000	0.00	0.0	0.600	o	225	225
S1.002	13.778	0.031	444.5	0.033	0.00	0.0	0.600	o	525	525
S1.003	6.193	0.014	442.4	0.028	0.00	0.0	0.600	o	525	525
S1.004	16.243	0.036	451.2	0.025	0.00	0.0	0.600	o	525	525
S3.000	15.739	0.035	449.7	0.053	5.00	0.0	0.600	o	525	525
S3.001	21.258	0.047	452.3	0.053	0.00	0.0	0.600	o	525	525

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL E (m)	I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	0.00	5.50	8.395	0.053	0.0	0.0	0.0	1.05	227.2	0.0
S1.001	0.00	6.02	8.325	0.130	0.0	0.0	0.0	1.05	227.1	0.0
S2.000	0.00	5.08	8.698	0.116	0.0	0.0	0.0	1.09	43.4	0.0
S2.001	0.00	5.12	8.663	0.116	0.0	0.0	0.0	1.95	77.3	0.0
S1.002	0.00	6.23	8.253	0.279	0.0	0.0	0.0	1.06	228.6	0.0
S1.003	0.00	6.33	8.222	0.307	0.0	0.0	0.0	1.06	229.1	0.0
S1.004	0.00	6.59	8.208	0.332	0.0	0.0	0.0	1.05	226.9	0.0
S3.000	0.00	5.25	8.353	0.053	0.0	0.0	0.0	1.05	227.2	0.0
S3.001	0.00	5.59	8.318	0.106	0.0	0.0	0.0	1.05	226.6	0.0

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WSP Group Ltd										Page 1			
.					Barnham South								
.													
.													
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<u>Network Design Table for 5083-SWS-01-B.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)	Auto Design			
S4.000	5.000	0.035	142.9	0.045	5.00	0.0	0.600	o	150	0.00			
S4.001	5.000	0.035	142.9	0.000	0.00	0.0	0.600	o	150	0.00			
S3.002	43.993	0.099	444.4	0.087	0.00	0.0	0.600	o	525	0.00			
S1.005	45.820	0.100	458.2	0.082	0.00	0.0	0.600	o	525	0.00			
S5.000	5.000	0.035	142.9	0.053	5.00	0.0	0.600	o	150	0.00			
S5.001	5.000	0.035	142.9	0.000	0.00	0.0	0.600	o	150	0.00			
S1.006	29.823	0.068	438.6	0.034	0.00	0.0	0.600	o	525	0.00			
S6.000	5.000	0.035	142.9	0.112	5.00	0.0	0.600	o	225	0.00			
S6.001	5.000	0.035	142.9	0.000	0.00	0.0	0.600	o	225	0.00			
S6.002	8.950	0.019	471.1	0.054	0.00	0.0	0.600	o	525	0.00			
S6.003	20.825	0.045	462.8	0.044	0.00	0.0	0.600	o	525	0.00			
S6.004	25.111	0.055	456.6	0.033	0.00	0.0	0.600	o	525	0.00			
S6.005	14.650	0.032	457.8	0.012	0.00	0.0	0.600	o	525	0.00			
S6.006	8.093	0.018	449.6	0.017	0.00	0.0	0.600	o	525	0.00			
S7.000	5.000	0.035	142.9	0.316	5.00	0.0	0.600	o	300	0.00			
S7.001	5.000	0.185	27.0	0.000	0.00	0.0	0.600	o	300	0.00			
<u>Network Results Table</u>													
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)			
S4.000	0.00	5.10	8.716	0.045	0.0	0.0	0.0	0.84	14.8	0.0			
S4.001	0.00	5.20	8.681	0.045	0.0	0.0	0.0	0.84	14.8	0.0			
S3.002	0.00	6.28	8.271	0.238	0.0	0.0	0.0	1.06	228.6	0.0			
S1.005	0.00	7.32	8.172	0.652	0.0	0.0	0.0	1.04	225.1	0.0			
S5.000	0.00	5.10	8.517	0.053	0.0	0.0	0.0	0.84	14.8	0.0			
S5.001	0.00	5.20	8.482	0.053	0.0	0.0	0.0	0.84	14.8	0.0			
S1.006	0.00	7.79	8.072	0.739	0.0	0.0	0.0	1.06	230.1	0.0			
S6.000	0.00	5.08	8.870	0.112	0.0	0.0	0.0	1.09	43.4	0.0			
S6.001	0.00	5.15	8.835	0.112	0.0	0.0	0.0	1.09	43.4	0.0			
S6.002	0.00	5.30	8.500	0.166	0.0	0.0	0.0	1.03	222.0	0.0			
S6.003	0.00	5.63	8.481	0.210	0.0	0.0	0.0	1.03	224.0	0.0			
S6.004	0.00	6.04	8.436	0.243	0.0	0.0	0.0	1.04	225.5	0.0			
S6.005	0.00	6.27	8.381	0.255	0.0	0.0	0.0	1.04	225.2	0.0			
S6.006	0.00	6.40	8.349	0.272	0.0	0.0	0.0	1.05	227.3	0.0			
S7.000	0.00	5.06	8.776	0.316	0.0	0.0	0.0	1.31	92.8	0.0			
S7.001	0.00	5.09	8.741	0.316	0.0	0.0	0.0	1.04	214.6	0.0			
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WSP Group Ltd										Page 2	
.					Barnham South						
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<u>Network Design Table for 5083-SWS-01-B.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)	Auto Design	
S6.007	31.591	0.069	457.8	0.025	0.00	0.0	0.600	o	525		
S8.000	5.000	0.035	142.9	0.050	5.00	0.0	0.600	o	225		
S8.001	5.000	0.110	45.5	0.000	0.00	0.0	0.600	o	225		
S6.008	31.253	0.068	459.6	0.041	0.00	0.0	0.600	o	525		
S9.000	42.307	0.109	388.1	0.058	5.00	0.0	0.600	o	525		
S9.001	27.484	0.072	381.7	0.025	0.00	0.0	0.600	o	525		
S6.009	20.057	0.044	455.8	0.017	0.00	0.0	0.600	o	525		
S6.010	67.114	0.146	459.7	0.070	0.00	0.0	0.600	o	525		
S10.000	50.000	0.425	117.6	0.186	5.00	0.0	0.600	o	300		
S10.001	5.000	0.276	18.1	0.000	0.00	0.0	0.600	o	300		
S1.007	13.074	0.029	450.8	0.000	0.00	0.0	0.600	o	525		
S1.008	15.743	0.035	449.8	0.000	0.00	0.0	0.600	o	525		
<u>Network Results Table</u>											
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	
S6.007	0.00	6.90	8.331	0.613	0.0	0.0	0.0	1.04	225.2	0.0	
S8.000	0.00	5.08	8.797	0.050	0.0	0.0	0.0	1.09	43.4	0.0	
S8.001	0.00	5.12	8.672	0.050	0.0	0.0	0.0	1.95	77.3	0.0	
S6.008	0.00	7.41	8.262	0.704	0.0	0.0	0.0	1.04	224.7	0.0	
S9.000	0.00	5.62	8.375	0.058	0.0	0.0	0.0	1.13	244.8	0.0	
S9.001	0.00	6.03	8.266	0.083	0.0	0.0	0.0	1.14	246.9	0.0	
S6.009	0.00	7.73	8.194	0.804	0.0	0.0	0.0	1.04	225.7	0.0	
S6.010	0.00	8.80	8.150	0.874	0.0	0.0	0.0	1.04	224.7	0.0	
S10.000	0.00	5.58	8.930	0.186	0.0	0.0	0.0	1.45	102.4	0.0	
S10.001	0.00	5.60	8.505	0.186	0.0	0.0	0.0	3.71	262.3	0.0	
S1.007	0.00	9.01	8.004	1.799	0.0	0.0	0.0	1.05	226.9	0.0	
S1.008	0.00	9.26	7.975	1.799	0.0	0.0	0.0	1.05	227.2	0.0	
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WSP Group Ltd							Page 3				
.				Barnham South							
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Manhole Schedules for 5083-SWS-01-B.SWS											
MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1	9.375	0.980	Open Manhole	1500	S1.000	8.395	525				
S102	9.773	1.448	Open Manhole	1500	S1.001	8.325	525	S1.000	8.325	525	
S3	10.000	1.302	Open Manhole	1200	S2.000	8.698	225				
S3	9.867	1.204	Open Manhole	1200	S2.001	8.663	225	S2.000	8.663	225	
S103	9.867	1.614	Open Manhole	1500	S1.002	8.253	525	S1.001	8.253	525	
								S2.001	8.553	225	
S104	9.721	1.499	Open Manhole	1500	S1.003	8.222	525	S1.002	8.222	525	
S105	9.641	1.433	Open Manhole	1500	S1.004	8.208	525	S1.003	8.208	525	
S106	9.758	1.405	Open Manhole	1500	S3.000	8.353	525				
S107	9.598	1.280	Open Manhole	1500	S3.001	8.318	525	S3.000	8.318	525	
S10	9.743	1.027	Open Manhole	1200	S4.000	8.716	150				
S10	9.743	1.062	Open Manhole	1200	S4.001	8.681	150	S4.000	8.681	150	
S108	9.743	1.472	Open Manhole	1500	S3.002	8.271	525	S3.001	8.271	525	
								S4.001	8.646	150	
S109	9.436	1.264	Open Manhole	1500	S1.005	8.172	525	S1.004	8.172	525	
								S3.002	8.172	525	
S13	9.400	0.883	Open Manhole	1200	S5.000	8.517	150				
S13	9.400	0.918	Open Manhole	1200	S5.001	8.482	150	S5.000	8.482	150	
S112	9.400	1.328	Open Manhole	1500	S1.006	8.072	525	S1.005	8.072	525	
								S5.001	8.447	150	
S15	10.041	1.171	Open Manhole	1200	S6.000	8.670	225				
S15	10.041	1.206	Open Manhole	1200	S6.001	8.835	225	S6.000	8.835	225	
S113	10.041	1.541	Open Manhole	1500	S6.002	8.500	525	S6.001	8.800	225	
S114	9.942	1.461	Open Manhole	1500	S6.003	8.481	525	S6.002	8.481	525	
S115	9.719	1.283	Open Manhole	1500	S6.004	8.436	525	S6.003	8.436	525	
S116	9.728	1.347	Open Manhole	1500	S6.005	8.381	525	S6.004	8.381	525	
S117	9.633	1.284	Open Manhole	1500	S6.006	8.349	525	S6.005	8.349	525	
S22	9.621	0.845	Open Manhole	1200	S7.000	8.776	300				
S22	9.621	0.880	Open Manhole	1200	S7.001	8.741	300	S7.000	8.741	300	
S118	9.621	1.290	Open Manhole	1500	S6.007	8.331	525	S6.006	8.331	525	
								S7.001	8.556	300	
S24	9.750	1.043	Open Manhole	1200	S8.000	8.707	225				
S24	9.750	1.078	Open Manhole	1200	S8.001	8.672	225	S8.000	8.672	225	
S119	9.750	1.488	Open Manhole	1500	S6.008	8.262	525	S6.007	8.262	525	
								S8.001	8.562	225	
S120	9.777	1.402	Open Manhole	1500	S9.000	8.375	525				
S121	9.662	1.396	Open Manhole	1500	S9.001	8.266	525	S9.000	8.266	525	
S122	9.607	1.413	Open Manhole	1500	S6.009	8.194	525	S6.008	8.194	525	
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WSP Group Ltd		Page 4
.	Barnham South	
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XP Solutions		Network 2015.1

Manhole Schedules for 5083-SWS-01-B.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S123	9.745	1.595	Open Manhole	1500	S6.010	8.150	525	S9.001	8.194	525	
S34	9.430	0.500	Open Manhole	1200	S10.000	8.930	300	S6.009	8.150	525	
S34	9.430	0.925	Open Manhole	1200	S10.001	8.505	300	S10.000	8.505	300	
S22	9.429	1.425	Open Manhole	1500	S1.007	8.004	525	S1.006	8.004	525	
								S6.010	8.004	525	
								S10.001	8.229	300	
S126	9.429	1.454	Open Manhole	1500	S1.008	7.975	525	S1.007	7.975	525	
S127	9.400	1.460	Open Manhole	0		OUTFALL		S1.008	7.940	525	

WSP Group Ltd							Page 5	
.				Barnham South				
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Date 09/08/2016				Designed by GB				
File 50600666-SWS-01_1.mdx				Checked by EI				
XP Solutions				Network 2015.1				
PIPELINE SCHEDULES for 5083-SWS-01-B.SWS								
Upstream Manhole								
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	525	S1	9.375	8.395	0.455	Open Manhole	1500
S1.001	o	525	S102	9.773	8.325	0.923	Open Manhole	1500
S2.000	o	225	S3	10.000	8.638	1.077	Open Manhole	1200
S2.001	o	225	S3	9.867	8.663	0.979	Open Manhole	1200
S1.002	o	525	S103	9.867	8.253	1.089	Open Manhole	1500
S1.003	o	525	S104	9.721	8.222	0.974	Open Manhole	1500
S1.004	o	525	S105	9.641	8.208	0.908	Open Manhole	1500
S3.000	o	525	S106	9.758	8.353	0.880	Open Manhole	1500
S3.001	o	525	S107	9.598	8.318	0.755	Open Manhole	1500
S4.000	o	150	S10	9.743	8.716	0.877	Open Manhole	1200
S4.001	o	150	S10	9.743	8.681	0.912	Open Manhole	1200
S3.002	o	525	S108	9.743	8.271	0.947	Open Manhole	1500
S1.005	o	525	S109	9.436	8.172	0.739	Open Manhole	1500
S5.000	o	150	S13	9.400	8.517	0.733	Open Manhole	1200
Downstream Manhole								
PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	31.500	450.0	S102	9.773	8.325	0.923	Open Manhole	1500
S1.001	32.414	450.2	S103	9.867	8.253	1.089	Open Manhole	1500
S2.000	5.000	142.9	S3	9.867	8.663	0.979	Open Manhole	1200
S2.001	5.000	45.5	S103	9.867	8.553	1.089	Open Manhole	1500
S1.002	13.778	444.5	S104	9.721	8.222	0.974	Open Manhole	1500
S1.003	6.193	442.4	S105	9.641	8.208	0.908	Open Manhole	1500
S1.004	16.243	451.2	S109	9.436	8.172	0.739	Open Manhole	1500
S3.000	15.739	449.7	S107	9.598	8.318	0.755	Open Manhole	1500
S3.001	21.258	452.3	S108	9.743	8.271	0.947	Open Manhole	1500
S4.000	5.000	142.9	S10	9.743	8.681	0.912	Open Manhole	1200
S4.001	5.000	142.9	S108	9.743	8.646	0.947	Open Manhole	1500
S3.002	43.993	444.4	S109	9.436	8.172	0.739	Open Manhole	1500
S1.005	45.820	458.2	S112	9.400	8.072	0.803	Open Manhole	1500
S5.000	5.000	142.9	S13	9.400	8.482	0.768	Open Manhole	1200
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WSP Group Ltd								Page 6	
.				Barnham South					
.									
.									
Date 09/08/2016				Designed by GB					
File 50600666-SWS-01_1.mdx				Checked by EI					
XP Solutions				Network 2015.1					
<u>PIPELINE SCHEDULES for 5083-SWS-01-B.SWS</u>									
<u>Upstream Manhole</u>									
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., (mm)	L*W
S5.001	o	150	S13	9.400	8.482	0.768	Open Manhole		1200
S1.006	o	525	S112	9.400	8.072	0.803	Open Manhole		1500
S6.000	o	225	S15	10.041	8.870	0.946	Open Manhole		1200
S6.001	o	225	S15	10.041	8.835	0.981	Open Manhole		1200
S6.002	o	525	S113	10.041	8.500	1.016	Open Manhole		1500
S6.003	o	525	S114	9.942	8.481	0.936	Open Manhole		1500
S6.004	o	525	S115	9.719	8.436	0.758	Open Manhole		1500
S6.005	o	525	S116	9.728	8.381	0.822	Open Manhole		1500
S6.006	o	525	S117	9.638	8.349	0.759	Open Manhole		1500
S7.000	o	300	S22	9.621	8.776	0.545	Open Manhole		1200
S7.001	o	300	S22	9.621	8.741	0.580	Open Manhole		1200
S6.007	o	525	S118	9.621	8.331	0.765	Open Manhole		1500
S8.000	o	225	S24	9.750	8.707	0.818	Open Manhole		1200
S8.001	o	225	S24	9.750	8.672	0.853	Open Manhole		1200
S6.008	o	525	S119	9.750	8.262	0.963	Open Manhole		1500
<u>Downstream Manhole</u>									
PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., (mm)	L*W
S5.001	5.000	142.9	S112	9.400	8.447	0.803	Open Manhole		1500
S1.006	29.823	438.6	S22	9.429	8.004	0.900	Open Manhole		1500
S6.000	5.000	142.9	S15	10.041	8.835	0.981	Open Manhole		1200
S6.001	5.000	142.9	S113	10.041	8.800	1.016	Open Manhole		1500
S6.002	8.950	471.1	S114	9.942	8.481	0.936	Open Manhole		1500
S6.003	20.825	462.8	S115	9.719	8.436	0.758	Open Manhole		1500
S6.004	25.111	456.6	S116	9.728	8.381	0.822	Open Manhole		1500
S6.005	14.650	457.8	S117	9.638	8.349	0.759	Open Manhole		1500
S6.006	8.093	449.6	S118	9.621	8.331	0.765	Open Manhole		1500
S7.000	5.000	142.9	S22	9.621	8.741	0.580	Open Manhole		1200
S7.001	5.000	27.0	S118	9.621	8.556	0.765	Open Manhole		1500
S6.007	31.591	457.8	S119	9.750	8.262	0.963	Open Manhole		1500
S8.000	5.000	142.9	S24	9.750	8.672	0.853	Open Manhole		1200
S8.001	5.000	45.5	S119	9.750	8.562	0.963	Open Manhole		1500
S6.008	31.253	459.6	S122	9.607	8.194	0.888	Open Manhole		1500
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WSP Group Ltd				Page 7				
.				Barnham South				
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Date 09/08/2016				Designed by GB				
File 50600666-SWS-01_1.mdx				Checked by EI				
XP Solutions				Network 2015.1				
<u>PIPELINE SCHEDULES for 5083-SWS-01-B.SWS</u>								
<u>Upstream Manhole</u>								
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S9.000	o	525	S120	9.777	8.375	0.877	Open Manhole	1500
S9.001	o	525	S121	9.662	8.266	0.871	Open Manhole	1500
S6.009	o	525	S122	9.607	8.194	0.888	Open Manhole	1500
S6.010	o	525	S123	9.745	8.150	1.070	Open Manhole	1500
S10.000	o	300	S34	9.430	8.930	0.200	Open Manhole	1200
S10.001	o	300	S34	9.430	8.505	0.625	Open Manhole	1200
S1.007	o	525	S22	9.429	8.004	0.900	Open Manhole	1500
S1.008	o	525	S126	9.429	7.975	0.929	Open Manhole	1500
<u>Downstream Manhole</u>								
PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S9.000	42.307	388.1	S121	9.662	8.266	0.871	Open Manhole	1500
S9.001	27.484	381.7	S122	9.607	8.194	0.888	Open Manhole	1500
S6.009	20.057	455.8	S123	9.745	8.150	1.070	Open Manhole	1500
S6.010	67.114	459.7	S22	9.429	8.004	0.900	Open Manhole	1500
S10.000	50.000	117.6	S34	9.430	8.505	0.625	Open Manhole	1200
S10.001	5.000	18.1	S22	9.429	8.229	0.900	Open Manhole	1500
S1.007	13.074	450.8	S126	9.429	7.975	0.929	Open Manhole	1500
S1.008	15.743	449.8	S127	9.400	7.940	0.935	Open Manhole	0
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WSP Group Ltd		Page 8
.	Barnham South	
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.		
Date 09/08/2016	Designed by GB	
File 50600666-SWS-01_1.mdx	Checked by EI	
XP Solutions	Network 2015.1	

Area Summary for 5083-SWS-01-B.SWS

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.053	0.053	0.053
1.001	-	-	100	0.077	0.077	0.077
2.000	-	-	100	0.116	0.116	0.116
2.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.033	0.033	0.033
1.003	-	-	100	0.028	0.028	0.028
1.004	-	-	100	0.025	0.025	0.025
3.000	-	-	100	0.053	0.053	0.053
3.001	-	-	100	0.053	0.053	0.053
4.000	-	-	100	0.045	0.045	0.045
4.001	-	-	100	0.000	0.000	0.000
3.002	-	-	100	0.087	0.087	0.087
1.005	-	-	100	0.082	0.082	0.082
5.000	-	-	100	0.053	0.053	0.053
5.001	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.034	0.034	0.034
6.000	-	-	100	0.112	0.112	0.112
6.001	-	-	100	0.000	0.000	0.000
6.002	-	-	100	0.054	0.054	0.054
6.003	-	-	100	0.044	0.044	0.044
6.004	-	-	100	0.033	0.033	0.033
6.005	-	-	100	0.012	0.012	0.012
6.006	-	-	100	0.017	0.017	0.017
7.000	-	-	100	0.316	0.316	0.316
7.001	-	-	100	0.000	0.000	0.000
6.007	-	-	100	0.025	0.025	0.025
8.000	-	-	100	0.050	0.050	0.050
8.001	-	-	100	0.000	0.000	0.000
6.008	-	-	100	0.041	0.041	0.041
9.000	-	-	100	0.058	0.058	0.058
9.001	-	-	100	0.025	0.025	0.025
6.009	-	-	100	0.017	0.017	0.017
6.010	-	-	100	0.070	0.070	0.070
10.000	-	-	100	0.186	0.186	0.186
10.001	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				1.799	1.799	1.799

Free Flowing Outfall Details for 5083-SWS-01-B.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.008	S127	9.400	7.940	7.940	0	0

WSP Group Ltd		Page 9
. . .	Barnham South	
Date 09/08/2016	Designed by GB	
File 50600666-SWS-01_1.mdx	Checked by EI	
XP Solutions		Network 2015.1

Simulation Criteria for 5083-SWS-01-B.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /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	8
Number of Online Controls	8	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)	19.500	Storm Duration (mins)	30
Ratio R	0.350		

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.	Barnham South																																		
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Date 09/08/2016	Designed by GB																																		
File 50600666-SWS-01_1.mdx	Checked by EI																																		
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<u>Online Controls for 5083-SWS-01-B.SWS</u> <u>Orifice Manhole: S3, DS/PN: S2.001, Volume (m³): 1.5</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.663 <u>Orifice Manhole: S10, DS/PN: S4.001, Volume (m³): 1.3</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.681 <u>Orifice Manhole: S13, DS/PN: S5.001, Volume (m³): 1.1</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.482 <u>Orifice Manhole: S15, DS/PN: S6.001, Volume (m³): 1.5</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.835 <u>Orifice Manhole: S22, DS/PN: S7.001, Volume (m³): 1.3</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.741 <u>Orifice Manhole: S24, DS/PN: S8.001, Volume (m³): 1.4</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.672 <u>Orifice Manhole: S34, DS/PN: S10.001, Volume (m³): 4.5</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.505 <u>Hydro-Brake Optimum® Manhole: S126, DS/PN: S1.008, Volume (m³): 5.1</u> <table><tr><td>Unit Reference</td><td>MD-SHE-0123-7300-1200-7300</td></tr><tr><td>Design Head (m)</td><td>1.200</td></tr><tr><td>Design Flow (l/s)</td><td>7.3</td></tr><tr><td>Flush-Flo™</td><td>Calculated</td></tr><tr><td>Objective</td><td>Minimise upstream storage</td></tr><tr><td>Diameter (mm)</td><td>123</td></tr><tr><td>Invert Level (m)</td><td>7.975</td></tr><tr><td>Minimum Outlet Pipe Diameter (mm)</td><td>150</td></tr><tr><td>Suggested Manhole Diameter (mm)</td><td>1200</td></tr></table> <table><tr><td>Control Points</td><td>Head (m)</td><td>Flow (l/s)</td></tr><tr><td>Design Point (Calculated)</td><td>1.200</td><td>7.3</td></tr><tr><td>Flush-Flo™</td><td>0.352</td><td>7.3</td></tr><tr><td>Kick-Flo®</td><td>0.757</td><td>5.9</td></tr><tr><td>Mean Flow over Head Range</td><td>-</td><td>6.3</td></tr></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			Unit Reference	MD-SHE-0123-7300-1200-7300	Design Head (m)	1.200	Design Flow (l/s)	7.3	Flush-Flo™	Calculated	Objective	Minimise upstream storage	Diameter (mm)	123	Invert Level (m)	7.975	Minimum Outlet Pipe Diameter (mm)	150	Suggested Manhole Diameter (mm)	1200	Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	1.200	7.3	Flush-Flo™	0.352	7.3	Kick-Flo®	0.757	5.9	Mean Flow over Head Range	-	6.3
Unit Reference	MD-SHE-0123-7300-1200-7300																																		
Design Head (m)	1.200																																		
Design Flow (l/s)	7.3																																		
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Minimum Outlet Pipe Diameter (mm)	150																																		
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WSP Group Ltd		Page 11																																																																								
. . .		Barnham South 																																																																								
Date 09/08/2016	Designed by GB																																																																									
File 50600666-SWS-01_1.mdx	Checked by EI																																																																									
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Hydro-Brake Optimum® Manhole: S126, DS/PN: S1.008, Volume (m³): 5.1																																																																										
Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated																																																																										
<table><tr><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td></tr><tr><td>0.100</td><td>4.4</td><td>1.200</td><td>7.3</td><td>3.000</td><td>11.2</td><td>7.000</td><td>16.8</td></tr><tr><td>0.200</td><td>6.9</td><td>1.400</td><td>7.8</td><td>3.500</td><td>12.0</td><td>7.500</td><td>17.3</td></tr><tr><td>0.300</td><td>7.2</td><td>1.600</td><td>8.3</td><td>4.000</td><td>12.8</td><td>8.000</td><td>17.9</td></tr><tr><td>0.400</td><td>7.2</td><td>1.800</td><td>8.8</td><td>4.500</td><td>13.6</td><td>8.500</td><td>18.4</td></tr><tr><td>0.500</td><td>7.1</td><td>2.000</td><td>9.2</td><td>5.000</td><td>14.3</td><td>9.000</td><td>18.9</td></tr><tr><td>0.600</td><td>6.9</td><td>2.200</td><td>9.7</td><td>5.500</td><td>14.9</td><td>9.500</td><td>19.4</td></tr><tr><td>0.800</td><td>6.0</td><td>2.400</td><td>10.1</td><td>6.000</td><td>15.6</td><td></td><td></td></tr><tr><td>1.000</td><td>6.7</td><td>2.600</td><td>10.5</td><td>6.500</td><td>16.2</td><td></td><td></td></tr></table>			Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	4.4	1.200	7.3	3.000	11.2	7.000	16.8	0.200	6.9	1.400	7.8	3.500	12.0	7.500	17.3	0.300	7.2	1.600	8.3	4.000	12.8	8.000	17.9	0.400	7.2	1.800	8.8	4.500	13.6	8.500	18.4	0.500	7.1	2.000	9.2	5.000	14.3	9.000	18.9	0.600	6.9	2.200	9.7	5.500	14.9	9.500	19.4	0.800	6.0	2.400	10.1	6.000	15.6			1.000	6.7	2.600	10.5	6.500	16.2		
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)																																																																			
0.100	4.4	1.200	7.3	3.000	11.2	7.000	16.8																																																																			
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0.400	7.2	1.800	8.8	4.500	13.6	8.500	18.4																																																																			
0.500	7.1	2.000	9.2	5.000	14.3	9.000	18.9																																																																			
0.600	6.9	2.200	9.7	5.500	14.9	9.500	19.4																																																																			
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WSP Group Ltd		Page 12
.	Barnham South	
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Date 09/08/2016	Designed by GB	
File 50600666-SWS-01_1.mdx	Checked by EI	
XP Solutions	Network 2015.1	
<u>Storage Structures for 5083-SWS-01-B.SWS</u> <u>Porous Car Park Manhole: S3, DS/PN: S2.001</u> Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 22.4 Membrane Percolation (mm/hr) 1000 Length (m) 22.5 Max Percolation (l/s) 140.0 Slope (1:X) 0.0 Safety Factor 2.0 Depression Storage (mm) 5 Porosity 0.30 Evaporation (mm/day) 3 Invert Level (m) 9.367 Cap Volume Depth (m) 9.767 <u>Porous Car Park Manhole: S10, DS/PN: S4.001</u> Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 16.2 Membrane Percolation (mm/hr) 1000 Length (m) 16.2 Max Percolation (l/s) 72.9 Slope (1:X) 0.0 Safety Factor 2.0 Depression Storage (mm) 5 Porosity 0.30 Evaporation (mm/day) 3 Invert Level (m) 9.243 Cap Volume Depth (m) 9.643 <u>Porous Car Park Manhole: S13, DS/PN: S5.001</u> Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 16.8 Membrane Percolation (mm/hr) 1000 Length (m) 16.8 Max Percolation (l/s) 78.4 Slope (1:X) 0.0 Safety Factor 2.0 Depression Storage (mm) 5 Porosity 0.30 Evaporation (mm/day) 3 Invert Level (m) 8.900 Cap Volume Depth (m) 9.300 <u>Porous Car Park Manhole: S15, DS/PN: S6.001</u> Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 24.6 Membrane Percolation (mm/hr) 1000 Length (m) 24.6 Max Percolation (l/s) 168.1 Slope (1:X) 0.0 Safety Factor 2.0 Depression Storage (mm) 5 Porosity 0.30 Evaporation (mm/day) 3 Invert Level (m) 9.541 Cap Volume Depth (m) 9.941 <u>Porous Car Park Manhole: S22, DS/PN: S7.001</u> Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 38.5 Membrane Percolation (mm/hr) 1000 Length (m) 38.5 Max Percolation (l/s) 411.7 Slope (1:X) 0.0 Safety Factor 2.0 Depression Storage (mm) 5 Porosity 0.30 Evaporation (mm/day) 3 Invert Level (m) 9.121 Cap Volume Depth (m) 9.521 <u>Porous Car Park Manhole: S24, DS/PN: S8.001</u> Infiltration Coefficient Base (m/hr) 0.00000 Max Percolation (l/s) 81.2 Membrane Percolation (mm/hr) 1000 Safety Factor 2.0		
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WSP Group Ltd		Page 13
.	Barnham South	
.		
.		
Date 09/08/2016	Designed by GB	
File 50600666-SWS-01_1.mdx	Checked by EI	
XP Solutions	Network 2015.1	

Porous Car Park Manhole: S24, DS/PN: S8.001

Porosity	0.30	Slope (1:X)	0.0
Invert Level (m)	9.250	Depression Storage (mm)	5
Width (m)	17.1	Evaporation (mm/day)	3
Length (m)	17.1	Cap Volume Depth (m)	9.650

Porous Car Park Manhole: S34, DS/PN: S10.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	200.0
Membrane Percolation (mm/hr)	1000	Length (m)	8.4
Max Percolation (l/s)	466.7	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	8.930	Cap Volume Depth (m)	9.330

Tank or Pond Manhole: S126, DS/PN: S1.008

Invert Level (m) 7.975

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	206.0	1.000	808.1	1.300	1065.1

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WSP Group Ltd		Page 14	
.		Barnham South	
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.			
Date 09/08/2016		Designed by GB	
File 50600666-SWS-01_1.mdx		Checked by EI	
XP Solutions		Network 2015.1	
<u>1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for 5083-SWS-01-B.SWS</u>			
<u>Simulation Criteria</u>			
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 8			
Number of Online Controls 8 Number of Time/Area Diagrams 0			
Number of Offline Controls 0 Number of Real Time Controls 0			
<u>Synthetic Rainfall Details</u>			
Rainfall Model FSR Ratio R 0.350			
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 DVD Status OFF			
Analysis Timestep Fine Inertia Status OFF			
DTS Status ON			
Profile(s) Summer and Winter			
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440			
Return Period(s) (years) 1			
Climate Change (%) 0			

WSP Group Ltd					Page 15		
.			Barnham South				
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.							
Date 09/08/2016			Designed by GB				
File 50600666-SWS-01_1.mdx			Checked by EI				
XP Solutions			Network 2015.1				
<u>1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for 5083-SWS-01-B.SWS</u>							

WSP Group Ltd								Page 16																																																																																																																																																																																															
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<u>1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for 5083-SWS-01-B.SWS</u>																																																																																																																																																																																																							
<table><tr><th></th><th>US/MH</th><th></th><th>Return</th><th>Climate</th><th>First (X)</th><th>First (Y)</th><th>First (Z)</th><th>Overflow</th><th>Water</th></tr><tr><th>PN</th><th>Name</th><th>Storm</th><th>Period</th><th>Change</th><th>Surcharge</th><th>Flood</th><th>Overflow</th><th>Act.</th><th>Level</th></tr><tr><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>(m)</th></tr><tr><td>S6.005</td><td>S116</td><td>15 Winter</td><td>1</td><td>+0%</td><td></td><td></td><td></td><td></td><td>8.540</td></tr><tr><td>S6.006</td><td>S117</td><td>15 Winter</td><td>1</td><td>+0%</td><td></td><td></td><td></td><td></td><td>8.513</td></tr><tr><td>S7.000</td><td>S22</td><td>30 Winter</td><td>1</td><td>+0%</td><td>1/15 Summer</td><td></td><td></td><td></td><td>9.150</td></tr><tr><td>S7.001</td><td>S22</td><td>30 Winter</td><td>1</td><td>+0%</td><td>1/15 Summer</td><td></td><td></td><td></td><td>9.145</td></tr><tr><td>S6.007</td><td>S118</td><td>15 Winter</td><td>1</td><td>+0%</td><td></td><td></td><td></td><td></td><td>8.497</td></tr><tr><td>S8.000</td><td>S24</td><td>15 Winter</td><td>1</td><td>+0%</td><td></td><td></td><td></td><td></td><td>8.884</td></tr><tr><td>S8.001</td><td>S24</td><td>15 Winter</td><td>1</td><td>+0%</td><td></td><td></td><td></td><td></td><td>8.880</td></tr><tr><td>S6.008</td><td>S119</td><td>360 Winter</td><td>1</td><td>+0%</td><td></td><td></td><td></td><td></td><td>8.481</td></tr><tr><td>S9.000</td><td>S120</td><td>360 Winter</td><td>1</td><td>+0%</td><td></td><td></td><td></td><td></td><td>8.480</td></tr><tr><td>S9.001</td><td>S121</td><td>360 Winter</td><td>1</td><td>+0%</td><td></td><td></td><td></td><td></td><td>8.480</td></tr><tr><td>S6.009</td><td>S122</td><td>360 Winter</td><td>1</td><td>+0%</td><td></td><td></td><td></td><td></td><td>8.480</td></tr><tr><td>S6.010</td><td>S123</td><td>360 Winter</td><td>1</td><td>+0%</td><td></td><td></td><td></td><td></td><td>8.479</td></tr><tr><td>S10.000</td><td>S34</td><td>15 Winter</td><td>1</td><td>+0%</td><td></td><td></td><td></td><td></td><td>9.030</td></tr><tr><td>S10.001</td><td>S34</td><td>30 Winter</td><td>1</td><td>+0%</td><td>1/15 Summer</td><td></td><td></td><td></td><td>8.936</td></tr><tr><td>S1.007</td><td>S22</td><td>360 Winter</td><td>1</td><td>+0%</td><td></td><td></td><td></td><td></td><td>8.478</td></tr><tr><td>S1.008</td><td>S126</td><td>360 Winter</td><td>1</td><td>+0%</td><td></td><td></td><td></td><td></td><td>8.476</td></tr></table>											US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Water	PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	Level										(m)	S6.005	S116	15 Winter	1	+0%					8.540	S6.006	S117	15 Winter	1	+0%					8.513	S7.000	S22	30 Winter	1	+0%	1/15 Summer				9.150	S7.001	S22	30 Winter	1	+0%	1/15 Summer				9.145	S6.007	S118	15 Winter	1	+0%					8.497	S8.000	S24	15 Winter	1	+0%					8.884	S8.001	S24	15 Winter	1	+0%					8.880	S6.008	S119	360 Winter	1	+0%					8.481	S9.000	S120	360 Winter	1	+0%					8.480	S9.001	S121	360 Winter	1	+0%					8.480	S6.009	S122	360 Winter	1	+0%					8.480	S6.010	S123	360 Winter	1	+0%					8.479	S10.000	S34	15 Winter	1	+0%					9.030	S10.001	S34	30 Winter	1	+0%	1/15 Summer				8.936	S1.007	S22	360 Winter	1	+0%					8.478	S1.008	S126	360 Winter	1	+0%					8.476
	US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Water																																																																																																																																																																																														
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<table><tr><th></th><th>US/MH</th><th>Depth</th><th>Volume</th><th>Flow /</th><th>Overflow</th><th>Pipe</th><th></th><th>Level</th></tr><tr><th>PN</th><th>Name</th><th>(m)</th><th>(m³)</th><th>Cap.</th><th>(l/s)</th><th>Flow</th><th>Status</th><th>Exceeded</th></tr><tr><th></th><th></th><th></th><th></th><th></th><th></th><th>(l/s)</th><th></th><th></th></tr><tr><td>S6.005</td><td>S116</td><td>-0.366</td><td>0.000</td><td>0.15</td><td></td><td>20.0</td><td>OK</td><td></td></tr><tr><td>S6.006</td><td>S117</td><td>-0.361</td><td>0.000</td><td>0.16</td><td></td><td>21.0</td><td>OK</td><td></td></tr><tr><td>S7.000</td><td>S22</td><td>0.074</td><td>0.000</td><td>0.51</td><td></td><td>31.1</td><td>SURCHARGED</td><td></td></tr><tr><td>S7.001</td><td>S22</td><td>0.104</td><td>0.000</td><td>0.07</td><td></td><td>7.1</td><td>SURCHARGED</td><td></td></tr><tr><td>S6.007</td><td>S118</td><td>-0.359</td><td>0.000</td><td>0.16</td><td></td><td>29.5</td><td>OK</td><td></td></tr><tr><td>S8.000</td><td>S24</td><td>-0.048</td><td>0.000</td><td>0.18</td><td></td><td>5.3</td><td>OK</td><td></td></tr><tr><td>S8.001</td><td>S24</td><td>-0.017</td><td>0.000</td><td>0.10</td><td></td><td>4.8</td><td>OK</td><td></td></tr><tr><td>S6.008</td><td>S119</td><td>-0.306</td><td>0.000</td><td>0.07</td><td></td><td>13.5</td><td>OK</td><td></td></tr><tr><td>S9.000</td><td>S120</td><td>-0.420</td><td>0.000</td><td>0.01</td><td></td><td>1.2</td><td>OK</td><td></td></tr><tr><td>S9.001</td><td>S121</td><td>-0.311</td><td>0.000</td><td>0.01</td><td></td><td>1.6</td><td>OK</td><td></td></tr><tr><td>S6.009</td><td>S122</td><td>-0.239</td><td>0.000</td><td>0.09</td><td></td><td>14.5</td><td>OK</td><td></td></tr><tr><td>S6.010</td><td>S123</td><td>-0.196</td><td>0.000</td><td>0.08</td><td></td><td>15.6</td><td>OK</td><td></td></tr><tr><td>S10.000</td><td>S34</td><td>-0.200</td><td>0.000</td><td>0.24</td><td></td><td>22.9</td><td>OK</td><td></td></tr><tr><td>S10.001</td><td>S34</td><td>0.131</td><td>0.000</td><td>0.06</td><td></td><td>7.4</td><td>SURCHARGED</td><td></td></tr><tr><td>S1.007</td><td>S22</td><td>-0.051</td><td>0.000</td><td>0.22</td><td></td><td>29.1</td><td>OK</td><td></td></tr><tr><td>S1.008</td><td>S126</td><td>-0.024</td><td>0.000</td><td>0.05</td><td></td><td>7.2</td><td>OK</td><td></td></tr></table>											US/MH	Depth	Volume	Flow /	Overflow	Pipe		Level	PN	Name	(m)	(m³)	Cap.	(l/s)	Flow	Status	Exceeded							(l/s)			S6.005	S116	-0.366	0.000	0.15		20.0	OK		S6.006	S117	-0.361	0.000	0.16		21.0	OK		S7.000	S22	0.074	0.000	0.51		31.1	SURCHARGED		S7.001	S22	0.104	0.000	0.07		7.1	SURCHARGED		S6.007	S118	-0.359	0.000	0.16		29.5	OK		S8.000	S24	-0.048	0.000	0.18		5.3	OK		S8.001	S24	-0.017	0.000	0.10		4.8	OK		S6.008	S119	-0.306	0.000	0.07		13.5	OK		S9.000	S120	-0.420	0.000	0.01		1.2	OK		S9.001	S121	-0.311	0.000	0.01		1.6	OK		S6.009	S122	-0.239	0.000	0.09		14.5	OK		S6.010	S123	-0.196	0.000	0.08		15.6	OK		S10.000	S34	-0.200	0.000	0.24		22.9	OK		S10.001	S34	0.131	0.000	0.06		7.4	SURCHARGED		S1.007	S22	-0.051	0.000	0.22		29.1	OK		S1.008	S126	-0.024	0.000	0.05		7.2	OK																				
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WSP Group Ltd		Page 0
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Date 09/08/2016	Designed by GB	
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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for 5083-SWS-01-B.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.350	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	0.900
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	420
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for 5083-SWS-01-B.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
S1.000	31.500	0.070	450.0	0.053	5.00	0.0	0.600	o	525	525
S1.001	32.414	0.072	450.2	0.077	0.00	0.0	0.600	o	525	525
S2.000	5.000	0.035	142.9	0.116	5.00	0.0	0.600	o	225	225
S2.001	5.000	0.110	45.5	0.000	0.00	0.0	0.600	o	225	225
S1.002	13.778	0.031	444.5	0.033	0.00	0.0	0.600	o	525	525
S1.003	6.193	0.014	442.4	0.028	0.00	0.0	0.600	o	525	525
S1.004	16.243	0.036	451.2	0.025	0.00	0.0	0.600	o	525	525
S3.000	15.739	0.035	449.7	0.053	5.00	0.0	0.600	o	525	525
S3.001	21.258	0.047	452.3	0.053	0.00	0.0	0.600	o	525	525

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL E (m)	I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	0.00	5.50	8.395	0.053	0.0	0.0	0.0	1.05	227.2	0.0
S1.001	0.00	6.02	8.325	0.130	0.0	0.0	0.0	1.05	227.1	0.0
S2.000	0.00	5.08	8.698	0.116	0.0	0.0	0.0	1.09	43.4	0.0
S2.001	0.00	5.12	8.663	0.116	0.0	0.0	0.0	1.95	77.3	0.0
S1.002	0.00	6.23	8.253	0.279	0.0	0.0	0.0	1.06	228.6	0.0
S1.003	0.00	6.33	8.222	0.307	0.0	0.0	0.0	1.06	229.1	0.0
S1.004	0.00	6.59	8.208	0.332	0.0	0.0	0.0	1.05	226.9	0.0
S3.000	0.00	5.25	8.353	0.053	0.0	0.0	0.0	1.05	227.2	0.0
S3.001	0.00	5.59	8.318	0.106	0.0	0.0	0.0	1.05	226.6	0.0

WSP Group Ltd										Page 1			
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Date 09/08/2016					Designed by GB								
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<u>Network Design Table for 5083-SWS-01-B.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)	Auto Design			
S4.000	5.000	0.035	142.9	0.045	5.00	0.0	0.600	o	150	0.00			
S4.001	5.000	0.035	142.9	0.000	0.00	0.0	0.600	o	150	0.00			
S3.002	43.993	0.099	444.4	0.087	0.00	0.0	0.600	o	525	0.00			
S1.005	45.820	0.100	458.2	0.082	0.00	0.0	0.600	o	525	0.00			
S5.000	5.000	0.035	142.9	0.053	5.00	0.0	0.600	o	150	0.00			
S5.001	5.000	0.035	142.9	0.000	0.00	0.0	0.600	o	150	0.00			
S1.006	29.823	0.068	438.6	0.034	0.00	0.0	0.600	o	525	0.00			
S6.000	5.000	0.035	142.9	0.112	5.00	0.0	0.600	o	225	0.00			
S6.001	5.000	0.035	142.9	0.000	0.00	0.0	0.600	o	225	0.00			
S6.002	8.950	0.019	471.1	0.054	0.00	0.0	0.600	o	525	0.00			
S6.003	20.825	0.045	462.8	0.044	0.00	0.0	0.600	o	525	0.00			
S6.004	25.111	0.055	456.6	0.033	0.00	0.0	0.600	o	525	0.00			
S6.005	14.650	0.032	457.8	0.012	0.00	0.0	0.600	o	525	0.00			
S6.006	8.093	0.018	449.6	0.017	0.00	0.0	0.600	o	525	0.00			
S7.000	5.000	0.035	142.9	0.316	5.00	0.0	0.600	o	300	0.00			
S7.001	5.000	0.185	27.0	0.000	0.00	0.0	0.600	o	300	0.00			
<u>Network Results Table</u>													
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)			
S4.000	0.00	5.10	8.716	0.045	0.0	0.0	0.0	0.84	14.8	0.0			
S4.001	0.00	5.20	8.681	0.045	0.0	0.0	0.0	0.84	14.8	0.0			
S3.002	0.00	6.28	8.271	0.238	0.0	0.0	0.0	1.06	228.6	0.0			
S1.005	0.00	7.32	8.172	0.652	0.0	0.0	0.0	1.04	225.1	0.0			
S5.000	0.00	5.10	8.517	0.053	0.0	0.0	0.0	0.84	14.8	0.0			
S5.001	0.00	5.20	8.482	0.053	0.0	0.0	0.0	0.84	14.8	0.0			
S1.006	0.00	7.79	8.072	0.739	0.0	0.0	0.0	1.06	230.1	0.0			
S6.000	0.00	5.08	8.870	0.112	0.0	0.0	0.0	1.09	43.4	0.0			
S6.001	0.00	5.15	8.835	0.112	0.0	0.0	0.0	1.09	43.4	0.0			
S6.002	0.00	5.30	8.500	0.166	0.0	0.0	0.0	1.03	222.0	0.0			
S6.003	0.00	5.63	8.481	0.210	0.0	0.0	0.0	1.03	224.0	0.0			
S6.004	0.00	6.04	8.436	0.243	0.0	0.0	0.0	1.04	225.5	0.0			
S6.005	0.00	6.27	8.381	0.255	0.0	0.0	0.0	1.04	225.2	0.0			
S6.006	0.00	6.40	8.349	0.272	0.0	0.0	0.0	1.05	227.3	0.0			
S7.000	0.00	5.06	8.776	0.316	0.0	0.0	0.0	1.31	92.8	0.0			
S7.001	0.00	5.09	8.741	0.316	0.0	0.0	0.0	1.04	214.6	0.0			
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WSP Group Ltd										Page 2	
.					Barnham South						
.											
.											
Date 09/08/2016					Designed by GB						
File 50600666-SWS-01_30.mdx					Checked by EI						
XP Solutions					Network 2015.1						
<u>Network Design Table for 5083-SWS-01-B.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)	Auto Design	
S6.007	31.591	0.069	457.8	0.025	0.00	0.0	0.600	o	525		
S8.000	5.000	0.035	142.9	0.050	5.00	0.0	0.600	o	225		
S8.001	5.000	0.110	45.5	0.000	0.00	0.0	0.600	o	225		
S6.008	31.253	0.068	459.6	0.041	0.00	0.0	0.600	o	525		
S9.000	42.307	0.109	388.1	0.058	5.00	0.0	0.600	o	525		
S9.001	27.484	0.072	381.7	0.025	0.00	0.0	0.600	o	525		
S6.009	20.057	0.044	455.8	0.017	0.00	0.0	0.600	o	525		
S6.010	67.114	0.146	459.7	0.070	0.00	0.0	0.600	o	525		
S10.000	50.000	0.425	117.6	0.186	5.00	0.0	0.600	o	300		
S10.001	5.000	0.276	18.1	0.000	0.00	0.0	0.600	o	300		
S1.007	13.074	0.029	450.8	0.000	0.00	0.0	0.600	o	525		
S1.008	15.743	0.035	449.8	0.000	0.00	0.0	0.600	o	525		
<u>Network Results Table</u>											
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	
S6.007	0.00	6.90	8.331	0.613	0.0	0.0	0.0	1.04	225.2	0.0	
S8.000	0.00	5.08	8.797	0.050	0.0	0.0	0.0	1.09	43.4	0.0	
S8.001	0.00	5.12	8.672	0.050	0.0	0.0	0.0	1.95	77.3	0.0	
S6.008	0.00	7.41	8.262	0.704	0.0	0.0	0.0	1.04	224.7	0.0	
S9.000	0.00	5.62	8.375	0.058	0.0	0.0	0.0	1.13	244.8	0.0	
S9.001	0.00	6.03	8.266	0.083	0.0	0.0	0.0	1.14	246.9	0.0	
S6.009	0.00	7.73	8.194	0.804	0.0	0.0	0.0	1.04	225.7	0.0	
S6.010	0.00	8.80	8.150	0.874	0.0	0.0	0.0	1.04	224.7	0.0	
S10.000	0.00	5.58	8.930	0.186	0.0	0.0	0.0	1.45	102.4	0.0	
S10.001	0.00	5.60	8.505	0.186	0.0	0.0	0.0	3.71	262.3	0.0	
S1.007	0.00	9.01	8.004	1.799	0.0	0.0	0.0	1.05	226.9	0.0	
S1.008	0.00	9.26	7.975	1.799	0.0	0.0	0.0	1.05	227.2	0.0	
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WSP Group Ltd							Page 3				
.				Barnham South							
Date 09/08/2016				Designed by GB							
File 50600666-SWS-01_30.mdx				Checked by EI							
XP Solutions				Network 2015.1							
Manhole Schedules for 5083-SWS-01-B.SWS											
MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1	9.375	0.980	Open Manhole	1500	S1.000	8.395	525				
S102	9.773	1.448	Open Manhole	1500	S1.001	8.325	525	S1.000	8.325	525	
S3	10.000	1.302	Open Manhole	1200	S2.000	8.698	225				
S3	9.867	1.204	Open Manhole	1200	S2.001	8.663	225	S2.000	8.663	225	
S103	9.867	1.614	Open Manhole	1500	S1.002	8.253	525	S1.001	8.253	525	
								S2.001	8.553	225	
S104	9.721	1.499	Open Manhole	1500	S1.003	8.222	525	S1.002	8.222	525	
S105	9.641	1.433	Open Manhole	1500	S1.004	8.208	525	S1.003	8.208	525	
S106	9.758	1.405	Open Manhole	1500	S3.000	8.353	525				
S107	9.598	1.280	Open Manhole	1500	S3.001	8.318	525	S3.000	8.318	525	
S10	9.743	1.027	Open Manhole	1200	S4.000	8.716	150				
S10	9.743	1.062	Open Manhole	1200	S4.001	8.681	150	S4.000	8.681	150	
S108	9.743	1.472	Open Manhole	1500	S3.002	8.271	525	S3.001	8.271	525	
								S4.001	8.646	150	
S109	9.436	1.264	Open Manhole	1500	S1.005	8.172	525	S1.004	8.172	525	
								S3.002	8.172	525	
S13	9.400	0.883	Open Manhole	1200	S5.000	8.517	150				
S13	9.400	0.918	Open Manhole	1200	S5.001	8.482	150	S5.000	8.482	150	
S112	9.400	1.328	Open Manhole	1500	S1.006	8.072	525	S1.005	8.072	525	
								S5.001	8.447	150	
S15	10.041	1.171	Open Manhole	1200	S6.000	8.670	225				
S15	10.041	1.206	Open Manhole	1200	S6.001	8.835	225	S6.000	8.835	225	
S113	10.041	1.541	Open Manhole	1500	S6.002	8.500	525	S6.001	8.800	225	
S114	9.942	1.461	Open Manhole	1500	S6.003	8.481	525	S6.002	8.481	525	
S115	9.719	1.283	Open Manhole	1500	S6.004	8.436	525	S6.003	8.436	525	
S116	9.728	1.347	Open Manhole	1500	S6.005	8.381	525	S6.004	8.381	525	
S117	9.633	1.284	Open Manhole	1500	S6.006	8.349	525	S6.005	8.349	525	
S22	9.621	0.845	Open Manhole	1200	S7.000	8.776	300				
S22	9.621	0.880	Open Manhole	1200	S7.001	8.741	300	S7.000	8.741	300	
S118	9.621	1.290	Open Manhole	1500	S6.007	8.331	525	S6.006	8.331	525	
								S7.001	8.556	300	
S24	9.750	1.043	Open Manhole	1200	S8.000	8.707	225				
S24	9.750	1.078	Open Manhole	1200	S8.001	8.672	225	S8.000	8.672	225	
S119	9.750	1.488	Open Manhole	1500	S6.008	8.262	525	S6.007	8.262	525	
								S8.001	8.562	225	
S120	9.777	1.402	Open Manhole	1500	S9.000	8.375	525				
S121	9.662	1.396	Open Manhole	1500	S9.001	8.266	525	S9.000	8.266	525	
S122	9.607	1.413	Open Manhole	1500	S6.009	8.194	525	S6.008	8.194	525	
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WSP Group Ltd		Page 4
. . .		Barnham South
Date 09/08/2016 File 50600666-SWS-01_30.mdx		Designed by GB Checked by EI
XP Solutions		Network 2015.1



Manhole Schedules for 5083-SWS-01-B.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S123	9.745	1.595	Open Manhole	1500	S6.010	8.150	525	S9.001	8.194	525	
S34	9.430	0.500	Open Manhole	1200	S10.000	8.930	300	S6.009	8.150	525	
S34	9.430	0.925	Open Manhole	1200	S10.001	8.505	300	S10.000	8.505	300	
S22	9.429	1.425	Open Manhole	1500	S1.007	8.004	525	S1.006	8.004	525	
								S6.010	8.004	525	
								S10.001	8.229	300	
S126	9.429	1.454	Open Manhole	1500	S1.008	7.975	525	S1.007	7.975	525	
S127	9.400	1.460	Open Manhole	0		OUTFALL		S1.008	7.940	525	

WSP Group Ltd							Page 5	
.				Barnham South				
.								
.								
Date 09/08/2016				Designed by GB				
File 50600666-SWS-01_30.mdx				Checked by EI				
XP Solutions				Network 2015.1				
PIPELINE SCHEDULES for 5083-SWS-01-B.SWS								
Upstream Manhole								
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	525	S1	9.375	8.395	0.455	Open Manhole	1500
S1.001	o	525	S102	9.773	8.325	0.923	Open Manhole	1500
S2.000	o	225	S3	10.000	8.638	1.077	Open Manhole	1200
S2.001	o	225	S3	9.867	8.663	0.979	Open Manhole	1200
S1.002	o	525	S103	9.867	8.253	1.089	Open Manhole	1500
S1.003	o	525	S104	9.721	8.222	0.974	Open Manhole	1500
S1.004	o	525	S105	9.641	8.208	0.908	Open Manhole	1500
S3.000	o	525	S106	9.758	8.353	0.880	Open Manhole	1500
S3.001	o	525	S107	9.598	8.318	0.755	Open Manhole	1500
S4.000	o	150	S10	9.743	8.716	0.877	Open Manhole	1200
S4.001	o	150	S10	9.743	8.681	0.912	Open Manhole	1200
S3.002	o	525	S108	9.743	8.271	0.947	Open Manhole	1500
S1.005	o	525	S109	9.436	8.172	0.739	Open Manhole	1500
S5.000	o	150	S13	9.400	8.517	0.733	Open Manhole	1200
Downstream Manhole								
PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	31.500	450.0	S102	9.773	8.325	0.923	Open Manhole	1500
S1.001	32.414	450.2	S103	9.867	8.253	1.089	Open Manhole	1500
S2.000	5.000	142.9	S3	9.867	8.663	0.979	Open Manhole	1200
S2.001	5.000	45.5	S103	9.867	8.553	1.089	Open Manhole	1500
S1.002	13.778	444.5	S104	9.721	8.222	0.974	Open Manhole	1500
S1.003	6.193	442.4	S105	9.641	8.208	0.908	Open Manhole	1500
S1.004	16.243	451.2	S109	9.436	8.172	0.739	Open Manhole	1500
S3.000	15.739	449.7	S107	9.598	8.318	0.755	Open Manhole	1500
S3.001	21.258	452.3	S108	9.743	8.271	0.947	Open Manhole	1500
S4.000	5.000	142.9	S10	9.743	8.681	0.912	Open Manhole	1200
S4.001	5.000	142.9	S108	9.743	8.646	0.947	Open Manhole	1500
S3.002	43.993	444.4	S109	9.436	8.172	0.739	Open Manhole	1500
S1.005	45.820	458.2	S112	9.400	8.072	0.803	Open Manhole	1500
S5.000	5.000	142.9	S13	9.400	8.482	0.768	Open Manhole	1200
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WSP Group Ltd		Page 6
.	Barnham South	
.		
.		
Date 09/08/2016	Designed by GB	
File 50600666-SWS-01_30.mdx	Checked by EI	
XP Solutions	Network 2015.1	

PIPELINE SCHEDULES for 5083-SWS-01-B.SWS

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)
S5.001	o	150	S13	9.400	8.482	0.768	Open Manhole	1200
S1.006	o	525	S112	9.400	8.072	0.803	Open Manhole	1500
S6.000	o	225	S15	10.041	8.870	0.946	Open Manhole	1200
S6.001	o	225	S15	10.041	8.835	0.981	Open Manhole	1200
S6.002	o	225	S113	10.041	8.500	1.016	Open Manhole	1500
S6.003	o	525	S114	9.942	8.481	0.936	Open Manhole	1500
S6.004	o	525	S115	9.719	8.436	0.758	Open Manhole	1500
S6.005	o	525	S116	9.728	8.381	0.822	Open Manhole	1500
S6.006	o	525	S117	9.638	8.349	0.759	Open Manhole	1500
S7.000	o	300	S22	9.621	8.776	0.545	Open Manhole	1200
S7.001	o	300	S22	9.621	8.741	0.580	Open Manhole	1200
S6.007	o	525	S118	9.621	8.331	0.765	Open Manhole	1500
S8.000	o	225	S24	9.750	8.707	0.818	Open Manhole	1200
S8.001	o	225	S24	9.750	8.672	0.853	Open Manhole	1200
S6.008	o	525	S119	9.750	8.262	0.963	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)
S5.001	5.000	142.9	S112	9.400	8.447	0.803	Open Manhole	1500
S1.006	29.823	438.6	S22	9.420	8.004	0.900	Open Manhole	1500
S6.000	5.000	142.9	S15	10.041	8.835	0.981	Open Manhole	1200
S6.001	5.000	142.9	S113	10.041	8.800	1.016	Open Manhole	1500
S6.002	8.950	471.1	S114	9.942	8.481	0.936	Open Manhole	1500
S6.003	20.825	462.8	S115	9.719	8.436	0.758	Open Manhole	1500
S6.004	25.111	456.6	S116	9.728	8.381	0.822	Open Manhole	1500
S6.005	14.650	457.8	S117	9.638	8.349	0.759	Open Manhole	1500
S6.006	8.093	449.6	S118	9.621	8.331	0.765	Open Manhole	1500
S7.000	5.000	142.9	S22	9.621	8.741	0.580	Open Manhole	1200
S7.001	5.000	27.0	S118	9.621	8.556	0.765	Open Manhole	1500
S6.007	31.591	457.8	S119	9.750	8.262	0.963	Open Manhole	1500
S8.000	5.000	142.9	S24	9.750	8.672	0.853	Open Manhole	1200
S8.001	5.000	45.5	S119	9.750	8.562	0.963	Open Manhole	1500
S6.008	31.253	459.6	S122	9.607	8.194	0.888	Open Manhole	1500

WSP Group Ltd		Page 7
.	Barnham South	
.		
.		
Date 09/08/2016	Designed by GB	
File 50600666-SWS-01_30.mdx	Checked by EI	
XP Solutions	Network 2015.1	

PIPELINE SCHEDULES for 5083-SWS-01-B.SWS

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)
S9.000	o	525	S120	9.777	8.375	0.877	Open Manhole	1500
S9.001	o	525	S121	9.662	8.266	0.871	Open Manhole	1500
S6.009	o	525	S122	9.607	8.194	0.888	Open Manhole	1500
S6.010	o	525	S123	9.745	8.150	1.070	Open Manhole	1500
S10.000	o	300	S34	9.430	8.930	0.200	Open Manhole	1200
S10.001	o	300	S34	9.430	8.505	0.625	Open Manhole	1200
S1.007	o	525	S22	9.429	8.004	0.900	Open Manhole	1500
S1.008	o	525	S126	9.429	7.975	0.929	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)
S9.000	42.307	388.1	S121	9.662	8.266	0.871	Open Manhole	1500
S9.001	27.484	381.7	S122	9.607	8.194	0.888	Open Manhole	1500
S6.009	20.057	455.8	S123	9.745	8.150	1.070	Open Manhole	1500
S6.010	67.114	459.7	S22	9.429	8.004	0.900	Open Manhole	1500
S10.000	50.000	117.6	S34	9.430	8.505	0.625	Open Manhole	1200
S10.001	5.000	18.1	S22	9.429	8.229	0.900	Open Manhole	1500
S1.007	13.074	450.8	S126	9.429	7.975	0.929	Open Manhole	1500
S1.008	15.743	449.8	S127	9.400	7.940	0.935	Open Manhole	0

WSP Group Ltd				Page 8		
.				Barnham South		
.						
.						
Date 09/08/2016				Designed by GB		
File 50600666-SWS-01_30.mdx				Checked by EI		
XP Solutions				Network 2015.1		
Area Summary for 5083-SWS-01-B.SWS						
Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.053	0.053	0.053
1.001	-	-	100	0.077	0.077	0.077
2.000	-	-	100	0.116	0.116	0.116
2.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.033	0.033	0.033
1.003	-	-	100	0.028	0.028	0.028
1.004	-	-	100	0.025	0.025	0.025
3.000	-	-	100	0.053	0.053	0.053
3.001	-	-	100	0.053	0.053	0.053
4.000	-	-	100	0.045	0.045	0.045
4.001	-	-	100	0.000	0.000	0.000
3.002	-	-	100	0.087	0.087	0.087
1.005	-	-	100	0.082	0.082	0.082
5.000	-	-	100	0.053	0.053	0.053
5.001	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.034	0.034	0.034
6.000	-	-	100	0.112	0.112	0.112
6.001	-	-	100	0.000	0.000	0.000
6.002	-	-	100	0.054	0.054	0.054
6.003	-	-	100	0.044	0.044	0.044
6.004	-	-	100	0.033	0.033	0.033
6.005	-	-	100	0.012	0.012	0.012
6.006	-	-	100	0.017	0.017	0.017
7.000	-	-	100	0.316	0.316	0.316
7.001	-	-	100	0.000	0.000	0.000
6.007	-	-	100	0.025	0.025	0.025
8.000	-	-	100	0.050	0.050	0.050
8.001	-	-	100	0.000	0.000	0.000
6.008	-	-	100	0.041	0.041	0.041
9.000	-	-	100	0.058	0.058	0.058
9.001	-	-	100	0.025	0.025	0.025
6.009	-	-	100	0.017	0.017	0.017
6.010	-	-	100	0.070	0.070	0.070
10.000	-	-	100	0.186	0.186	0.186
10.001	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				1.799	1.799	1.799
Free Flowing Outfall Details for 5083-SWS-01-B.SWS						
Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.008	S127	9.400	7.940	7.940	0	0
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WSP Group Ltd		Page 9
. . .	Barnham South	
Date 09/08/2016	Designed by GB	
File 50600666-SWS-01_30.mdx	Checked by EI	
XP Solutions		Network 2015.1

Simulation Criteria for 5083-SWS-01-B.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /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	8
Number of Online Controls	8	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)	19.500	Storm Duration (mins)	30
Ratio R	0.350		

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WSP Group Ltd		Page 10															
.	Barnham South																
.																	
.																	
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File 50600666-SWS-01_30.mdx	Checked by EI																
XP Solutions	Network 2015.1																
<u>Online Controls for 5083-SWS-01-B.SWS</u> <u>Orifice Manhole: S3, DS/PN: S2.001, Volume (m³): 1.5</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.663 <u>Orifice Manhole: S10, DS/PN: S4.001, Volume (m³): 1.3</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.681 <u>Orifice Manhole: S13, DS/PN: S5.001, Volume (m³): 1.1</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.482 <u>Orifice Manhole: S15, DS/PN: S6.001, Volume (m³): 1.5</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.835 <u>Orifice Manhole: S22, DS/PN: S7.001, Volume (m³): 1.3</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.741 <u>Orifice Manhole: S24, DS/PN: S8.001, Volume (m³): 1.4</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.672 <u>Orifice Manhole: S34, DS/PN: S10.001, Volume (m³): 4.5</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.505 <u>Hydro-Brake Optimum® Manhole: S126, DS/PN: S1.008, Volume (m³): 5.1</u>																	
Unit Reference MD-SHE-0123-7300-1200-7300 Design Head (m) 1.200 Design Flow (l/s) 7.3 Flush-Flo™ Calculated Objective Minimise upstream storage Diameter (mm) 123 Invert Level (m) 7.975 Minimum Outlet Pipe Diameter (mm) 150 Suggested Manhole Diameter (mm) 1200																	
<table> <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>1.200</td><td>7.3</td></tr> <tr> <td>Flush-Flo™</td><td>0.352</td><td>7.3</td></tr> <tr> <td>Kick-Flo®</td><td>0.757</td><td>5.9</td></tr> <tr> <td>Mean Flow over Head Range</td><td>-</td><td>6.3</td></tr> </tbody> </table>			Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	1.200	7.3	Flush-Flo™	0.352	7.3	Kick-Flo®	0.757	5.9	Mean Flow over Head Range	-	6.3
Control Points	Head (m)	Flow (l/s)															
Design Point (Calculated)	1.200	7.3															
Flush-Flo™	0.352	7.3															
Kick-Flo®	0.757	5.9															
Mean Flow over Head Range	-	6.3															
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																	
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WSP Group Ltd		Page 11					
.	Barnham South						
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.							
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File 50600666-SWS-01_30.mdx	Checked by EI						
XP Solutions	Network 2015.1						
<u>Hydro-Brake Optimum® Manhole: S126, DS/PN: S1.008, Volume (m³): 5.1</u>							
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	4.4	1.200	7.3	3.000	11.2	7.000	16.8
0.200	6.9	1.400	7.8	3.500	12.0	7.500	17.3
0.300	7.2	1.600	8.3	4.000	12.8	8.000	17.9
0.400	7.2	1.800	8.8	4.500	13.6	8.500	18.4
0.500	7.1	2.000	9.2	5.000	14.3	9.000	18.9
0.600	6.9	2.200	9.7	5.500	14.9	9.500	19.4
0.800	6.0	2.400	10.1	6.000	15.6		
1.000	6.7	2.600	10.5	6.500	16.2		
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WSP Group Ltd		Page 12
.	Barnham South	
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File 50600666-SWS-01_30.mdx	Checked by EI	
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<u>Storage Structures for 5083-SWS-01-B.SWS</u> <u>Porous Car Park Manhole: S3, DS/PN: S2.001</u> Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 22.4 Membrane Percolation (mm/hr) 1000 Length (m) 22.5 Max Percolation (l/s) 140.0 Slope (1:X) 0.0 Safety Factor 2.0 Depression Storage (mm) 5 Porosity 0.30 Evaporation (mm/day) 3 Invert Level (m) 9.367 Cap Volume Depth (m) 9.767 <u>Porous Car Park Manhole: S10, DS/PN: S4.001</u> Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 16.2 Membrane Percolation (mm/hr) 1000 Length (m) 16.2 Max Percolation (l/s) 72.9 Slope (1:X) 0.0 Safety Factor 2.0 Depression Storage (mm) 5 Porosity 0.30 Evaporation (mm/day) 3 Invert Level (m) 9.243 Cap Volume Depth (m) 9.643 <u>Porous Car Park Manhole: S13, DS/PN: S5.001</u> Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 16.8 Membrane Percolation (mm/hr) 1000 Length (m) 16.8 Max Percolation (l/s) 78.4 Slope (1:X) 0.0 Safety Factor 2.0 Depression Storage (mm) 5 Porosity 0.30 Evaporation (mm/day) 3 Invert Level (m) 8.900 Cap Volume Depth (m) 9.300 <u>Porous Car Park Manhole: S15, DS/PN: S6.001</u> Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 24.6 Membrane Percolation (mm/hr) 1000 Length (m) 24.6 Max Percolation (l/s) 168.1 Slope (1:X) 0.0 Safety Factor 2.0 Depression Storage (mm) 5 Porosity 0.30 Evaporation (mm/day) 3 Invert Level (m) 9.541 Cap Volume Depth (m) 9.941 <u>Porous Car Park Manhole: S22, DS/PN: S7.001</u> Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 38.5 Membrane Percolation (mm/hr) 1000 Length (m) 38.5 Max Percolation (l/s) 411.7 Slope (1:X) 0.0 Safety Factor 2.0 Depression Storage (mm) 5 Porosity 0.30 Evaporation (mm/day) 3 Invert Level (m) 9.121 Cap Volume Depth (m) 9.521 <u>Porous Car Park Manhole: S24, DS/PN: S8.001</u> Infiltration Coefficient Base (m/hr) 0.00000 Max Percolation (l/s) 81.2 Membrane Percolation (mm/hr) 1000 Safety Factor 2.0		
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WSP Group Ltd							Page 14		
.				Barnham South					
.									
.									
Date 09/08/2016				Designed by GB					
File 50600666-SWS-01_30.mdx				Checked by EI					
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<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for 5083-SWS-01-B.SWS</u>									
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 8									
Number of Online Controls 8 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) 19.000 Cv (Winter) 0.840									
Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF									
Analysis Timestep Fine Inertia Status OFF									
DTS Status ON									
Profile(s) Summer and Winter									
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440									
Return Period(s) (years) 30									
Climate Change (%) 0									
Water									
PN	US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	
	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	Level
									(m)
S1.000	S1	480 Winter	30	+0%	30/360 Winter				8.948
S1.001	S102	480 Winter	30	+0%	30/240 Winter				8.948
S2.000	S3	15 Winter	30	+0%	30/15 Summer				9.452
S2.001	S3	30 Winter	30	+0%	30/15 Summer				9.414
S1.002	S103	480 Winter	30	+0%	30/240 Summer				8.948
S1.003	S104	480 Winter	30	+0%	30/120 Winter				8.948
S1.004	S105	480 Winter	30	+0%	30/120 Winter				8.948
S3.000	S106	480 Winter	30	+0%	30/360 Winter				8.947
S3.001	S107	480 Winter	30	+0%	30/240 Winter				8.947
S4.000	S10	15 Winter	30	+0%	30/15 Summer				9.289
S4.001	S10	15 Winter	30	+0%	30/15 Summer				9.247
S3.002	S108	480 Winter	30	+0%	30/240 Summer				8.947
S1.005	S109	480 Winter	30	+0%	30/120 Summer				8.947
S5.000	S13	15 Winter	30	+0%	30/15 Summer				8.943
S5.001	S13	480 Winter	30	+0%	30/15 Summer				8.943
S1.006	S112	480 Winter	30	+0%	30/60 Summer				8.946
S6.000	S15	15 Winter	30	+0%	30/15 Summer				9.577
S6.001	S15	30 Winter	30	+0%	30/15 Summer				9.577
S6.002	S113	480 Winter	30	+0%					8.954
S6.003	S114	480 Winter	30	+0%					8.954
S6.004	S115	480 Winter	30	+0%					8.954
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WSP Group Ltd					Page 15			
.			Barnham South					
.								
.								
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File 50600666-SWS-01_30.mdx			Checked by EI					
XP Solutions			Network 2015.1					
<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for 5083-SWS-01-B.SWS</u>								
PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)					
S1.000	S1	0.028	0.000	0.01		1.8	SURCHARGED	
S1.001	S102	0.098	0.000	0.02		3.6	SURCHARGED	
~~S2.000~~	~~S3~~	~~0.529~~	~~0.000~~	~~1.18~~		~~35.2~~	~~SURCHARGED~~	
S2.001	S3	0.526	0.000	0.21		9.9	SURCHARGED	
S1.002	S103	0.170	0.000	0.06		8.1	SURCHARGED	
S1.003	S104	0.201	0.000	0.06		8.6	SURCHARGED	
S1.004	S105	0.215	0.000	0.06		9.1	SURCHARGED	
S3.000	S106	0.069	0.000	0.01		1.9	SURCHARGED	
S3.001	S107	0.104	0.000	0.02		3.3	SURCHARGED	
S4.000	S10	0.423	0.000	1.00		11.7	SURCHARGED	
S4.001	S10	0.416	0.000	0.73		8.5	SURCHARGED	
S3.002	S108	0.151	0.000	0.04		7.4	SURCHARGED	
S1.005	S109	0.250	0.000	0.09		17.5	SURCHARGED	
~~S5.000~~	~~S13~~	~~0.308~~	~~0.000~~	~~1.36~~		~~15.9~~	~~SURCHARGED~~	
S5.001	S13	0.311	0.000	0.17		2.0	SURCHARGED	
S1.006	S112	0.349	0.000	0.10		19.9	SURCHARGED	
~~S6.000~~	~~S15~~	~~0.520~~	~~0.000~~	~~1.14~~		~~34.1~~	~~SURCHARGED~~	
S6.001	S15	0.517	0.000	0.33		9.9	SURCHARGED	
S6.002	S113	-0.071	0.000	0.05		6.2	OK	
S6.003	S114	-0.052	0.000	0.05		7.6	OK	
S6.004	S115	-0.007	0.000	0.05		8.3	OK	
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.				Barnham South					
.									
.									
Date 09/08/2016				Designed by GB					
File 50600666-SWS-01_30.mdx				Checked by EI					
XP Solutions				Network 2015.1					
30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)									
for 5083-SWS-01-B.SWS									

WSP Group Ltd		Page 0
.	Barnham South	
.		
.		
Date 09/08/2016	Designed by GB	
File 50600666-SWS-01_100+20%...	Checked by EI	
XP Solutions	Network 2015.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for 5083-SWS-01-B.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.350	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	0.900
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	420
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for 5083-SWS-01-B.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
S1.000	31.500	0.070	450.0	0.053	5.00	0.0	0.600	o	525	525
S1.001	32.414	0.072	450.2	0.077	0.00	0.0	0.600	o	525	525
S2.000	5.000	0.035	142.9	0.116	5.00	0.0	0.600	o	225	225
S2.001	5.000	0.110	45.5	0.000	0.00	0.0	0.600	o	225	225
S1.002	13.778	0.031	444.5	0.033	0.00	0.0	0.600	o	525	525
S1.003	6.193	0.014	442.4	0.028	0.00	0.0	0.600	o	525	525
S1.004	16.243	0.036	451.2	0.025	0.00	0.0	0.600	o	525	525
S3.000	15.739	0.035	449.7	0.053	5.00	0.0	0.600	o	525	525
S3.001	21.258	0.047	452.3	0.053	0.00	0.0	0.600	o	525	525

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)
S1.000	0.00	5.50	8.395	0.053	0.0	0.0	0.0	1.05	227.2	0.0
S1.001	0.00	6.02	8.325	0.130	0.0	0.0	0.0	1.05	227.1	0.0
S2.000	0.00	5.08	8.698	0.116	0.0	0.0	0.0	1.09	43.4	0.0
S2.001	0.00	5.12	8.663	0.116	0.0	0.0	0.0	1.95	77.3	0.0
S1.002	0.00	6.23	8.253	0.279	0.0	0.0	0.0	1.06	228.6	0.0
S1.003	0.00	6.33	8.222	0.307	0.0	0.0	0.0	1.06	229.1	0.0
S1.004	0.00	6.59	8.208	0.332	0.0	0.0	0.0	1.05	226.9	0.0
S3.000	0.00	5.25	8.353	0.053	0.0	0.0	0.0	1.05	227.2	0.0
S3.001	0.00	5.59	8.318	0.106	0.0	0.0	0.0	1.05	226.6	0.0

WSP Group Ltd										Page 1	
.					Barnham South						
.											
.											
Date 09/08/2016					Designed by GB						
File 50600666-SWS-01_100+20%...					Checked by EI						
XP Solutions					Network 2015.1						
Network Design Table for 5083-SWS-01-B.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	
S4.000	5.000	0.035	142.9	0.045	5.00	0.0	0.600	o	150	0.00	
S4.001	5.000	0.035	142.9	0.000	0.00	0.0	0.600	o	150	0.00	
S3.002	43.993	0.099	444.4	0.087	0.00	0.0	0.600	o	525	0.00	
S1.005	45.820	0.100	458.2	0.082	0.00	0.0	0.600	o	525	0.00	
S5.000	5.000	0.035	142.9	0.053	5.00	0.0	0.600	o	150	0.00	
S5.001	5.000	0.035	142.9	0.000	0.00	0.0	0.600	o	150	0.00	
S1.006	29.823	0.068	438.6	0.034	0.00	0.0	0.600	o	525	0.00	
S6.000	5.000	0.035	142.9	0.112	5.00	0.0	0.600	o	225	0.00	
S6.001	5.000	0.035	142.9	0.000	0.00	0.0	0.600	o	225	0.00	
S6.002	8.950	0.019	471.1	0.054	0.00	0.0	0.600	o	525	0.00	
S6.003	20.825	0.045	462.8	0.044	0.00	0.0	0.600	o	525	0.00	
S6.004	25.111	0.055	456.6	0.033	0.00	0.0	0.600	o	525	0.00	
S6.005	14.650	0.032	457.8	0.012	0.00	0.0	0.600	o	525	0.00	
S6.006	8.093	0.018	449.6	0.017	0.00	0.0	0.600	o	525	0.00	
S7.000	5.000	0.035	142.9	0.316	5.00	0.0	0.600	o	300	0.00	
S7.001	5.000	0.185	27.0	0.000	0.00	0.0	0.600	o	300	0.00	
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)	
S4.000	0.00	5.10	8.716	0.045	0.0	0.0	0.0	0.84	14.8	0.0	
S4.001	0.00	5.20	8.681	0.045	0.0	0.0	0.0	0.84	14.8	0.0	
S3.002	0.00	6.28	8.271	0.238	0.0	0.0	0.0	1.06	228.6	0.0	
S1.005	0.00	7.32	8.172	0.652	0.0	0.0	0.0	1.04	225.1	0.0	
S5.000	0.00	5.10	8.517	0.053	0.0	0.0	0.0	0.84	14.8	0.0	
S5.001	0.00	5.20	8.482	0.053	0.0	0.0	0.0	0.84	14.8	0.0	
S1.006	0.00	7.79	8.072	0.739	0.0	0.0	0.0	1.06	230.1	0.0	
S6.000	0.00	5.08	8.870	0.112	0.0	0.0	0.0	1.09	43.4	0.0	
S6.001	0.00	5.15	8.835	0.112	0.0	0.0	0.0	1.09	43.4	0.0	
S6.002	0.00	5.30	8.500	0.166	0.0	0.0	0.0	1.03	222.0	0.0	
S6.003	0.00	5.63	8.481	0.210	0.0	0.0	0.0	1.03	224.0	0.0	
S6.004	0.00	6.04	8.436	0.243	0.0	0.0	0.0	1.04	225.5	0.0	
S6.005	0.00	6.27	8.381	0.255	0.0	0.0	0.0	1.04	225.2	0.0	
S6.006	0.00	6.40	8.349	0.272	0.0	0.0	0.0	1.05	227.3	0.0	
S7.000	0.00	5.06	8.776	0.316	0.0	0.0	0.0	1.31	92.8	0.0	
S7.001	0.00	5.09	8.741	0.316	0.0	0.0	0.0	1.04	214.6	0.0	
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WSP Group Ltd										Page 2
.					Barnham South					
.										
.										
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File 50600666-SWS-01_100+20%...					Checked by EI					
XP Solutions					Network 2015.1					
<u>Network Design Table for 5083-SWS-01-B.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)	Auto Design
S6.007	31.591	0.069	457.8	0.025	0.00	0.0	0.600	o	525	
S8.000	5.000	0.035	142.9	0.050	5.00	0.0	0.600	o	225	
S8.001	5.000	0.110	45.5	0.000	0.00	0.0	0.600	o	225	
S6.008	31.253	0.068	459.6	0.041	0.00	0.0	0.600	o	525	
S9.000	42.307	0.109	388.1	0.058	5.00	0.0	0.600	o	525	
S9.001	27.484	0.072	381.7	0.025	0.00	0.0	0.600	o	525	
S6.009	20.057	0.044	455.8	0.017	0.00	0.0	0.600	o	525	
S6.010	67.114	0.146	459.7	0.070	0.00	0.0	0.600	o	525	
S10.000	50.000	0.425	117.6	0.186	5.00	0.0	0.600	o	300	
S10.001	5.000	0.276	18.1	0.000	0.00	0.0	0.600	o	300	
S1.007	13.074	0.029	450.8	0.000	0.00	0.0	0.600	o	525	
S1.008	15.743	0.035	449.8	0.000	0.00	0.0	0.600	o	525	
<u>Network Results Table</u>										
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S6.007	0.00	6.90	8.331	0.613	0.0	0.0	0.0	1.04	225.2	0.0
S8.000	0.00	5.08	8.797	0.050	0.0	0.0	0.0	1.09	43.4	0.0
S8.001	0.00	5.12	8.672	0.050	0.0	0.0	0.0	1.95	77.3	0.0
S6.008	0.00	7.41	8.262	0.704	0.0	0.0	0.0	1.04	224.7	0.0
S9.000	0.00	5.62	8.375	0.058	0.0	0.0	0.0	1.13	244.8	0.0
S9.001	0.00	6.03	8.266	0.083	0.0	0.0	0.0	1.14	246.9	0.0
S6.009	0.00	7.73	8.194	0.804	0.0	0.0	0.0	1.04	225.7	0.0
S6.010	0.00	8.80	8.150	0.874	0.0	0.0	0.0	1.04	224.7	0.0
S10.000	0.00	5.58	8.930	0.186	0.0	0.0	0.0	1.45	102.4	0.0
S10.001	0.00	5.60	8.505	0.186	0.0	0.0	0.0	3.71	262.3	0.0
S1.007	0.00	9.01	8.004	1.799	0.0	0.0	0.0	1.05	226.9	0.0
S1.008	0.00	9.26	7.975	1.799	0.0	0.0	0.0	1.05	227.2	0.0
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WSP Group Ltd							Page 3				
.				Barnham South							
Date 09/08/2016				Designed by GB							
File 50600666-SWS-01_100+20%...				Checked by EI							
XP Solutions				Network 2015.1							
<u>Manhole Schedules for 5083-SWS-01-B.SWS</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)	Diameter (mm)	Backdrop (mm)
S1	9.375	0.980	Open Manhole	1500	S1.000	8.395	525				
S102	9.773	1.448	Open Manhole	1500	S1.001	8.325	525	S1.000	8.325	525	
S3	10.000	1.302	Open Manhole	1200	S2.000	8.698	225				
S3	9.867	1.204	Open Manhole	1200	S2.001	8.663	225	S2.000	8.663	225	
S103	9.867	1.614	Open Manhole	1500	S1.002	8.253	525	S1.001	8.253	525	
								S2.001	8.553	225	
S104	9.721	1.499	Open Manhole	1500	S1.003	8.222	525	S1.002	8.222	525	
S105	9.641	1.433	Open Manhole	1500	S1.004	8.208	525	S1.003	8.208	525	
S106	9.758	1.405	Open Manhole	1500	S3.000	8.353	525				
S107	9.598	1.280	Open Manhole	1500	S3.001	8.318	525	S3.000	8.318	525	
S10	9.743	1.027	Open Manhole	1200	S4.000	8.716	150				
S10	9.743	1.062	Open Manhole	1200	S4.001	8.681	150	S4.000	8.681	150	
S108	9.743	1.472	Open Manhole	1500	S3.002	8.271	525	S3.001	8.271	525	
								S4.001	8.646	150	
S109	9.436	1.264	Open Manhole	1500	S1.005	8.172	525	S1.004	8.172	525	
								S3.002	8.172	525	
S13	9.400	0.883	Open Manhole	1200	S5.000	8.517	150				
S13	9.400	0.918	Open Manhole	1200	S5.001	8.482	150	S5.000	8.482	150	
S112	9.400	1.328	Open Manhole	1500	S1.006	8.072	525	S1.005	8.072	525	
								S5.001	8.447	150	
S15	10.041	1.171	Open Manhole	1200	S6.000	8.670	225				
S15	10.041	1.206	Open Manhole	1200	S6.001	8.835	225	S6.000	8.835	225	
S113	10.041	1.541	Open Manhole	1500	S6.002	8.500	525	S6.001	8.800	225	
S114	9.942	1.461	Open Manhole	1500	S6.003	8.481	525	S6.002	8.481	525	
S115	9.719	1.283	Open Manhole	1500	S6.004	8.436	525	S6.003	8.436	525	
S116	9.728	1.347	Open Manhole	1500	S6.005	8.381	525	S6.004	8.381	525	
S117	9.633	1.284	Open Manhole	1500	S6.006	8.349	525	S6.005	8.349	525	
S22	9.621	0.845	Open Manhole	1200	S7.000	8.776	300				
S22	9.621	0.880	Open Manhole	1200	S7.001	8.741	300	S7.000	8.741	300	
S118	9.621	1.290	Open Manhole	1500	S6.007	8.331	525	S6.006	8.331	525	
								S7.001	8.556	300	
S24	9.750	1.043	Open Manhole	1200	S8.000	8.707	225				
S24	9.750	1.078	Open Manhole	1200	S8.001	8.672	225	S8.000	8.672	225	
S119	9.750	1.488	Open Manhole	1500	S6.008	8.262	525	S6.007	8.262	525	
								S8.001	8.562	225	
S120	9.777	1.402	Open Manhole	1500	S9.000	8.375	525				
S121	9.662	1.396	Open Manhole	1500	S9.001	8.266	525	S9.000	8.266	525	
S122	9.607	1.413	Open Manhole	1500	S6.009	8.194	525	S6.008	8.194	525	
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WSP Group Ltd		Page 4
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Manhole Schedules for 5083-SWS-01-B.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S123	9.745	1.595	Open Manhole	1500	S6.010	8.150	525	S9.001	8.194	525	
S34	9.430	0.500	Open Manhole	1200	S10.000	8.930	300	S6.009	8.150	525	
S34	9.430	0.925	Open Manhole	1200	S10.001	8.505	300	S10.000	8.505	300	
S22	9.429	1.425	Open Manhole	1500	S1.007	8.004	525	S1.006	8.004	525	
								S6.010	8.004	525	
								S10.001	8.229	300	
S126	9.429	1.454	Open Manhole	1500	S1.008	7.975	525	S1.007	7.975	525	
S127	9.400	1.460	Open Manhole	0		OUTFALL		S1.008	7.940	525	

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<u>PIPELINE SCHEDULES for 5083-SWS-01-B.SWS</u> <u>Upstream Manhole</u> <table><tr><th>PN</th><th>Hyd Sect</th><th>Diam (mm)</th><th>MH Name</th><th>C.Level (m)</th><th>I.Level (m)</th><th>D.Depth (m)</th><th>MH Connection</th><th>MH DIAM., L*W (mm)</th></tr><tr><td>S1.000</td><td>o</td><td>525</td><td>S1</td><td>9.375</td><td>8.395</td><td>0.455</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S1.001</td><td>o</td><td>525</td><td>S102</td><td>9.773</td><td>8.325</td><td>0.923</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S2.000</td><td>o</td><td>225</td><td>S3</td><td>10.000</td><td>8.638</td><td>1.077</td><td>Open Manhole</td><td>1200</td></tr><tr><td>S2.001</td><td>o</td><td>225</td><td>S3</td><td>9.867</td><td>8.663</td><td>0.979</td><td>Open Manhole</td><td>1200</td></tr><tr><td>S1.002</td><td>o</td><td>525</td><td>S103</td><td>9.867</td><td>8.253</td><td>1.089</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S1.003</td><td>o</td><td>525</td><td>S104</td><td>9.721</td><td>8.222</td><td>0.974</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S1.004</td><td>o</td><td>525</td><td>S105</td><td>9.641</td><td>8.208</td><td>0.908</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S3.000</td><td>o</td><td>525</td><td>S106</td><td>9.758</td><td>8.353</td><td>0.880</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S3.001</td><td>o</td><td>525</td><td>S107</td><td>9.598</td><td>8.318</td><td>0.755</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S4.000</td><td>o</td><td>150</td><td>S10</td><td>9.743</td><td>8.716</td><td>0.877</td><td>Open Manhole</td><td>1200</td></tr><tr><td>S4.001</td><td>o</td><td>150</td><td>S10</td><td>9.743</td><td>8.681</td><td>0.912</td><td>Open Manhole</td><td>1200</td></tr><tr><td>S3.002</td><td>o</td><td>525</td><td>S108</td><td>9.743</td><td>8.271</td><td>0.947</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S1.005</td><td>o</td><td>525</td><td>S109</td><td>9.436</td><td>8.172</td><td>0.739</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S5.000</td><td>o</td><td>150</td><td>S13</td><td>9.400</td><td>8.517</td><td>0.733</td><td>Open Manhole</td><td>1200</td></tr></table> <u>Downstream Manhole</u> <table><tr><th>PN</th><th>Length (m)</th><th>Slope (1:X)</th><th>MH Name</th><th>C.Level (m)</th><th>I.Level (m)</th><th>D.Depth (m)</th><th>MH Connection</th><th>MH DIAM., L*W (mm)</th></tr><tr><td>S1.000</td><td>31.500</td><td>450.0</td><td>S102</td><td>9.773</td><td>8.325</td><td>0.923</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S1.001</td><td>32.414</td><td>450.2</td><td>S103</td><td>9.867</td><td>8.253</td><td>1.089</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S2.000</td><td>5.000</td><td>142.9</td><td>S3</td><td>9.867</td><td>8.663</td><td>0.979</td><td>Open Manhole</td><td>1200</td></tr><tr><td>S2.001</td><td>5.000</td><td>45.5</td><td>S103</td><td>9.867</td><td>8.553</td><td>1.089</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S1.002</td><td>13.778</td><td>444.5</td><td>S104</td><td>9.721</td><td>8.222</td><td>0.974</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S1.003</td><td>6.193</td><td>442.4</td><td>S105</td><td>9.641</td><td>8.208</td><td>0.908</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S1.004</td><td>16.243</td><td>451.2</td><td>S109</td><td>9.436</td><td>8.172</td><td>0.739</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S3.000</td><td>15.739</td><td>449.7</td><td>S107</td><td>9.598</td><td>8.318</td><td>0.755</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S3.001</td><td>21.258</td><td>452.3</td><td>S108</td><td>9.743</td><td>8.271</td><td>0.947</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S4.000</td><td>5.000</td><td>142.9</td><td>S10</td><td>9.743</td><td>8.681</td><td>0.912</td><td>Open Manhole</td><td>1200</td></tr><tr><td>S4.001</td><td>5.000</td><td>142.9</td><td>S108</td><td>9.743</td><td>8.646</td><td>0.947</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S3.002</td><td>43.993</td><td>444.4</td><td>S109</td><td>9.436</td><td>8.172</td><td>0.739</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S1.005</td><td>45.820</td><td>458.2</td><td>S112</td><td>9.400</td><td>8.072</td><td>0.803</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S5.000</td><td>5.000</td><td>142.9</td><td>S13</td><td>9.400</td><td>8.482</td><td>0.768</td><td>Open Manhole</td><td>1200</td></tr></table>									PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)	S1.000	o	525	S1	9.375	8.395	0.455	Open Manhole	1500	S1.001	o	525	S102	9.773	8.325	0.923	Open Manhole	1500	S2.000	o	225	S3	10.000	8.638	1.077	Open Manhole	1200	S2.001	o	225	S3	9.867	8.663	0.979	Open Manhole	1200	S1.002	o	525	S103	9.867	8.253	1.089	Open Manhole	1500	S1.003	o	525	S104	9.721	8.222	0.974	Open Manhole	1500	S1.004	o	525	S105	9.641	8.208	0.908	Open Manhole	1500	S3.000	o	525	S106	9.758	8.353	0.880	Open Manhole	1500	S3.001	o	525	S107	9.598	8.318	0.755	Open Manhole	1500	S4.000	o	150	S10	9.743	8.716	0.877	Open Manhole	1200	S4.001	o	150	S10	9.743	8.681	0.912	Open Manhole	1200	S3.002	o	525	S108	9.743	8.271	0.947	Open Manhole	1500	S1.005	o	525	S109	9.436	8.172	0.739	Open Manhole	1500	S5.000	o	150	S13	9.400	8.517	0.733	Open Manhole	1200	PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)	S1.000	31.500	450.0	S102	9.773	8.325	0.923	Open Manhole	1500	S1.001	32.414	450.2	S103	9.867	8.253	1.089	Open Manhole	1500	S2.000	5.000	142.9	S3	9.867	8.663	0.979	Open Manhole	1200	S2.001	5.000	45.5	S103	9.867	8.553	1.089	Open Manhole	1500	S1.002	13.778	444.5	S104	9.721	8.222	0.974	Open Manhole	1500	S1.003	6.193	442.4	S105	9.641	8.208	0.908	Open Manhole	1500	S1.004	16.243	451.2	S109	9.436	8.172	0.739	Open Manhole	1500	S3.000	15.739	449.7	S107	9.598	8.318	0.755	Open Manhole	1500	S3.001	21.258	452.3	S108	9.743	8.271	0.947	Open Manhole	1500	S4.000	5.000	142.9	S10	9.743	8.681	0.912	Open Manhole	1200	S4.001	5.000	142.9	S108	9.743	8.646	0.947	Open Manhole	1500	S3.002	43.993	444.4	S109	9.436	8.172	0.739	Open Manhole	1500	S1.005	45.820	458.2	S112	9.400	8.072	0.803	Open Manhole	1500	S5.000	5.000	142.9	S13	9.400	8.482	0.768	Open Manhole	1200
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)																																																																																																																																																																																																																																																																														
S1.000	o	525	S1	9.375	8.395	0.455	Open Manhole	1500																																																																																																																																																																																																																																																																														
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S3.000	o	525	S106	9.758	8.353	0.880	Open Manhole	1500																																																																																																																																																																																																																																																																														
S3.001	o	525	S107	9.598	8.318	0.755	Open Manhole	1500																																																																																																																																																																																																																																																																														
S4.000	o	150	S10	9.743	8.716	0.877	Open Manhole	1200																																																																																																																																																																																																																																																																														
S4.001	o	150	S10	9.743	8.681	0.912	Open Manhole	1200																																																																																																																																																																																																																																																																														
S3.002	o	525	S108	9.743	8.271	0.947	Open Manhole	1500																																																																																																																																																																																																																																																																														
S1.005	o	525	S109	9.436	8.172	0.739	Open Manhole	1500																																																																																																																																																																																																																																																																														
S5.000	o	150	S13	9.400	8.517	0.733	Open Manhole	1200																																																																																																																																																																																																																																																																														
PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)																																																																																																																																																																																																																																																																														
S1.000	31.500	450.0	S102	9.773	8.325	0.923	Open Manhole	1500																																																																																																																																																																																																																																																																														
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S4.000	5.000	142.9	S10	9.743	8.681	0.912	Open Manhole	1200																																																																																																																																																																																																																																																																														
S4.001	5.000	142.9	S108	9.743	8.646	0.947	Open Manhole	1500																																																																																																																																																																																																																																																																														
S3.002	43.993	444.4	S109	9.436	8.172	0.739	Open Manhole	1500																																																																																																																																																																																																																																																																														
S1.005	45.820	458.2	S112	9.400	8.072	0.803	Open Manhole	1500																																																																																																																																																																																																																																																																														
S5.000	5.000	142.9	S13	9.400	8.482	0.768	Open Manhole	1200																																																																																																																																																																																																																																																																														
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WSP Group Ltd		Page 6
.	Barnham South	
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Date 09/08/2016	Designed by GB	
File 50600666-SWS-01_100+20%...	Checked by EI	
XP Solutions	Network 2015.1	

PIPELINE SCHEDULES for 5083-SWS-01-B.SWS

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)
S5.001	o	150	S13	9.400	8.482	0.768	Open Manhole	1200
S1.006	o	525	S112	9.400	8.072	0.803	Open Manhole	1500
S6.000	o	225	S15	10.041	8.870	0.946	Open Manhole	1200
S6.001	o	225	S15	10.041	8.835	0.981	Open Manhole	1200
S6.002	o	225	S113	10.041	8.500	1.016	Open Manhole	1500
S6.003	o	525	S114	9.942	8.481	0.936	Open Manhole	1500
S6.004	o	525	S115	9.719	8.436	0.758	Open Manhole	1500
S6.005	o	525	S116	9.728	8.381	0.822	Open Manhole	1500
S6.006	o	525	S117	9.638	8.349	0.759	Open Manhole	1500
S7.000	o	300	S22	9.621	8.776	0.545	Open Manhole	1200
S7.001	o	300	S22	9.621	8.741	0.580	Open Manhole	1200
S6.007	o	525	S118	9.621	8.331	0.765	Open Manhole	1500
S8.000	o	225	S24	9.750	8.707	0.818	Open Manhole	1200
S8.001	o	225	S24	9.750	8.672	0.853	Open Manhole	1200
S6.008	o	525	S119	9.750	8.262	0.963	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)
S5.001	5.000	142.9	S112	9.400	8.447	0.803	Open Manhole	1500
S1.006	29.823	438.6	S22	9.420	8.004	0.900	Open Manhole	1500
S6.000	5.000	142.9	S15	10.041	8.835	0.981	Open Manhole	1200
S6.001	5.000	142.9	S113	10.041	8.800	1.016	Open Manhole	1500
S6.002	8.950	471.1	S114	9.942	8.481	0.936	Open Manhole	1500
S6.003	20.825	462.8	S115	9.719	8.436	0.758	Open Manhole	1500
S6.004	25.111	456.6	S116	9.728	8.381	0.822	Open Manhole	1500
S6.005	14.650	457.8	S117	9.638	8.349	0.759	Open Manhole	1500
S6.006	8.093	449.6	S118	9.621	8.331	0.765	Open Manhole	1500
S7.000	5.000	142.9	S22	9.621	8.741	0.580	Open Manhole	1200
S7.001	5.000	27.0	S118	9.621	8.556	0.765	Open Manhole	1500
S6.007	31.591	457.8	S119	9.750	8.262	0.963	Open Manhole	1500
S8.000	5.000	142.9	S24	9.750	8.672	0.853	Open Manhole	1200
S8.001	5.000	45.5	S119	9.750	8.562	0.963	Open Manhole	1500
S6.008	31.253	459.6	S122	9.607	8.194	0.888	Open Manhole	1500

WSP Group Ltd		Page 7
.	Barnham South	
.		
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Date 09/08/2016	Designed by GB	
File 50600666-SWS-01_100+20%...	Checked by EI	
XP Solutions	Network 2015.1	

PIPELINE SCHEDULES for 5083-SWS-01-B.SWS

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)
S9.000	o	525	S120	9.777	8.375	0.877	Open Manhole	1500
S9.001	o	525	S121	9.662	8.266	0.871	Open Manhole	1500
S6.009	o	525	S122	9.607	8.194	0.888	Open Manhole	1500
S6.010	o	525	S123	9.745	8.150	1.070	Open Manhole	1500
S10.000	o	300	S34	9.430	8.930	0.200	Open Manhole	1200
S10.001	o	300	S34	9.430	8.505	0.625	Open Manhole	1200
S1.007	o	525	S22	9.429	8.004	0.900	Open Manhole	1500
S1.008	o	525	S126	9.429	7.975	0.929	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)
S9.000	42.307	388.1	S121	9.662	8.266	0.871	Open Manhole	1500
S9.001	27.484	381.7	S122	9.607	8.194	0.888	Open Manhole	1500
S6.009	20.057	455.8	S123	9.745	8.150	1.070	Open Manhole	1500
S6.010	67.114	459.7	S22	9.429	8.004	0.900	Open Manhole	1500
S10.000	50.000	117.6	S34	9.430	8.505	0.625	Open Manhole	1200
S10.001	5.000	18.1	S22	9.429	8.229	0.900	Open Manhole	1500
S1.007	13.074	450.8	S126	9.429	7.975	0.929	Open Manhole	1500
S1.008	15.743	449.8	S127	9.400	7.940	0.935	Open Manhole	0

WSP Group Ltd		Page 8
.	Barnham South	
.		
.		
Date 09/08/2016	Designed by GB	
File 50600666-SWS-01_100+20%...	Checked by EI	
XP Solutions	Network 2015.1	

Area Summary for 5083-SWS-01-B.SWS

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.053	0.053	0.053
1.001	-	-	100	0.077	0.077	0.077
2.000	-	-	100	0.116	0.116	0.116
2.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.033	0.033	0.033
1.003	-	-	100	0.028	0.028	0.028
1.004	-	-	100	0.025	0.025	0.025
3.000	-	-	100	0.053	0.053	0.053
3.001	-	-	100	0.053	0.053	0.053
4.000	-	-	100	0.045	0.045	0.045
4.001	-	-	100	0.000	0.000	0.000
3.002	-	-	100	0.087	0.087	0.087
1.005	-	-	100	0.082	0.082	0.082
5.000	-	-	100	0.053	0.053	0.053
5.001	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.034	0.034	0.034
6.000	-	-	100	0.112	0.112	0.112
6.001	-	-	100	0.000	0.000	0.000
6.002	-	-	100	0.054	0.054	0.054
6.003	-	-	100	0.044	0.044	0.044
6.004	-	-	100	0.033	0.033	0.033
6.005	-	-	100	0.012	0.012	0.012
6.006	-	-	100	0.017	0.017	0.017
7.000	-	-	100	0.316	0.316	0.316
7.001	-	-	100	0.000	0.000	0.000
6.007	-	-	100	0.025	0.025	0.025
8.000	-	-	100	0.050	0.050	0.050
8.001	-	-	100	0.000	0.000	0.000
6.008	-	-	100	0.041	0.041	0.041
9.000	-	-	100	0.058	0.058	0.058
9.001	-	-	100	0.025	0.025	0.025
6.009	-	-	100	0.017	0.017	0.017
6.010	-	-	100	0.070	0.070	0.070
10.000	-	-	100	0.186	0.186	0.186
10.001	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				1.799	1.799	1.799

Free Flowing Outfall Details for 5083-SWS-01-B.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.008	S127	9.400	7.940	7.940	0	0

WSP Group Ltd		Page 9
. . .	Barnham South	
Date 09/08/2016	Designed by GB	
File 50600666-SWS-01_100+20%...	Checked by EI	
XP Solutions		Network 2015.1

Simulation Criteria for 5083-SWS-01-B.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /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	8
Number of Online Controls	8	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)	19.500	Storm Duration (mins)	30
Ratio R	0.350		

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WSP Group Ltd		Page 10																																	
.	Barnham South																																		
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.																																			
Date 09/08/2016	Designed by GB																																		
File 50600666-SWS-01_100+20%...	Checked by EI																																		
XP Solutions	Network 2015.1																																		
<u>Online Controls for 5083-SWS-01-B.SWS</u> <u>Orifice Manhole: S3, DS/PN: S2.001, Volume (m³): 1.5</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.663 <u>Orifice Manhole: S10, DS/PN: S4.001, Volume (m³): 1.3</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.681 <u>Orifice Manhole: S13, DS/PN: S5.001, Volume (m³): 1.1</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.482 <u>Orifice Manhole: S15, DS/PN: S6.001, Volume (m³): 1.5</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.835 <u>Orifice Manhole: S22, DS/PN: S7.001, Volume (m³): 1.3</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.741 <u>Orifice Manhole: S24, DS/PN: S8.001, Volume (m³): 1.4</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.672 <u>Orifice Manhole: S34, DS/PN: S10.001, Volume (m³): 4.5</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.505 <u>Hydro-Brake Optimum® Manhole: S126, DS/PN: S1.008, Volume (m³): 5.1</u> <table><tr><td>Unit Reference</td><td>MD-SHE-0123-7300-1200-7300</td></tr><tr><td>Design Head (m)</td><td>1.200</td></tr><tr><td>Design Flow (l/s)</td><td>7.3</td></tr><tr><td>Flush-Flo™</td><td>Calculated</td></tr><tr><td>Objective</td><td>Minimise upstream storage</td></tr><tr><td>Diameter (mm)</td><td>123</td></tr><tr><td>Invert Level (m)</td><td>7.975</td></tr><tr><td>Minimum Outlet Pipe Diameter (mm)</td><td>150</td></tr><tr><td>Suggested Manhole Diameter (mm)</td><td>1200</td></tr></table> <table><tr><td>Control Points</td><td>Head (m)</td><td>Flow (l/s)</td></tr><tr><td>Design Point (Calculated)</td><td>1.200</td><td>7.3</td></tr><tr><td>Flush-Flo™</td><td>0.352</td><td>7.3</td></tr><tr><td>Kick-Flo®</td><td>0.757</td><td>5.9</td></tr><tr><td>Mean Flow over Head Range</td><td>-</td><td>6.3</td></tr></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			Unit Reference	MD-SHE-0123-7300-1200-7300	Design Head (m)	1.200	Design Flow (l/s)	7.3	Flush-Flo™	Calculated	Objective	Minimise upstream storage	Diameter (mm)	123	Invert Level (m)	7.975	Minimum Outlet Pipe Diameter (mm)	150	Suggested Manhole Diameter (mm)	1200	Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	1.200	7.3	Flush-Flo™	0.352	7.3	Kick-Flo®	0.757	5.9	Mean Flow over Head Range	-	6.3
Unit Reference	MD-SHE-0123-7300-1200-7300																																		
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WSP Group Ltd		Page 11																																																																									
.		Barnham South																																																																									
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Date 09/08/2016																																																																											
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<u>Hydro-Brake Optimum® Manhole: S126, DS/PN: S1.008, Volume (m³): 5.1</u>																																																																											
Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated																																																																											
<table><tr><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td></tr><tr><td>0.100</td><td>4.4</td><td>1.200</td><td>7.3</td><td>3.000</td><td>11.2</td><td>7.000</td><td>16.8</td></tr><tr><td>0.200</td><td>6.9</td><td>1.400</td><td>7.8</td><td>3.500</td><td>12.0</td><td>7.500</td><td>17.3</td></tr><tr><td>0.300</td><td>7.2</td><td>1.600</td><td>8.3</td><td>4.000</td><td>12.8</td><td>8.000</td><td>17.9</td></tr><tr><td>0.400</td><td>7.2</td><td>1.800</td><td>8.8</td><td>4.500</td><td>13.6</td><td>8.500</td><td>18.4</td></tr><tr><td>0.500</td><td>7.1</td><td>2.000</td><td>9.2</td><td>5.000</td><td>14.3</td><td>9.000</td><td>18.9</td></tr><tr><td>0.600</td><td>6.9</td><td>2.200</td><td>9.7</td><td>5.500</td><td>14.9</td><td>9.500</td><td>19.4</td></tr><tr><td>0.800</td><td>6.0</td><td>2.400</td><td>10.1</td><td>6.000</td><td>15.6</td><td></td><td></td></tr><tr><td>1.000</td><td>6.7</td><td>2.600</td><td>10.5</td><td>6.500</td><td>16.2</td><td></td><td></td></tr></table>				Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	4.4	1.200	7.3	3.000	11.2	7.000	16.8	0.200	6.9	1.400	7.8	3.500	12.0	7.500	17.3	0.300	7.2	1.600	8.3	4.000	12.8	8.000	17.9	0.400	7.2	1.800	8.8	4.500	13.6	8.500	18.4	0.500	7.1	2.000	9.2	5.000	14.3	9.000	18.9	0.600	6.9	2.200	9.7	5.500	14.9	9.500	19.4	0.800	6.0	2.400	10.1	6.000	15.6			1.000	6.7	2.600	10.5	6.500	16.2		
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WSP Group Ltd		Page 12																																																																																																																																
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<u>Storage Structures for 5083-SWS-01-B.SWS</u> <u>Porous Car Park Manhole: S3, DS/PN: S2.001</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Width (m)</td><td>22.4</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>22.5</td></tr><tr><td>Max Percolation (l/s)</td><td>140.0</td><td>Slope (1:X)</td><td>0.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>9.367</td><td>Cap Volume Depth (m)</td><td>9.767</td></tr></table> <u>Porous Car Park Manhole: S10, DS/PN: S4.001</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Width (m)</td><td>16.2</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>16.2</td></tr><tr><td>Max Percolation (l/s)</td><td>72.9</td><td>Slope (1:X)</td><td>0.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>9.243</td><td>Cap Volume Depth (m)</td><td>9.643</td></tr></table> <u>Porous Car Park Manhole: S13, DS/PN: S5.001</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Width (m)</td><td>16.8</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>16.8</td></tr><tr><td>Max Percolation (l/s)</td><td>78.4</td><td>Slope (1:X)</td><td>0.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>8.900</td><td>Cap Volume Depth (m)</td><td>9.300</td></tr></table> <u>Porous Car Park Manhole: S15, DS/PN: S6.001</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Width (m)</td><td>24.6</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>24.6</td></tr><tr><td>Max Percolation (l/s)</td><td>168.1</td><td>Slope (1:X)</td><td>0.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>9.541</td><td>Cap Volume Depth (m)</td><td>9.941</td></tr></table> <u>Porous Car Park Manhole: S22, DS/PN: S7.001</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Width (m)</td><td>38.5</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>38.5</td></tr><tr><td>Max Percolation (l/s)</td><td>411.7</td><td>Slope (1:X)</td><td>0.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>9.121</td><td>Cap Volume Depth (m)</td><td>9.521</td></tr></table> <u>Porous Car Park Manhole: S24, DS/PN: S8.001</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Max Percolation (l/s)</td><td>81.2</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Safety Factor</td><td>2.0</td></tr></table>			Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	22.4	Membrane Percolation (mm/hr)	1000	Length (m)	22.5	Max Percolation (l/s)	140.0	Slope (1:X)	0.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	9.367	Cap Volume Depth (m)	9.767	Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	16.2	Membrane Percolation (mm/hr)	1000	Length (m)	16.2	Max Percolation (l/s)	72.9	Slope (1:X)	0.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	9.243	Cap Volume Depth (m)	9.643	Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	16.8	Membrane Percolation (mm/hr)	1000	Length (m)	16.8	Max Percolation (l/s)	78.4	Slope (1:X)	0.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	8.900	Cap Volume Depth (m)	9.300	Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	24.6	Membrane Percolation (mm/hr)	1000	Length (m)	24.6	Max Percolation (l/s)	168.1	Slope (1:X)	0.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	9.541	Cap Volume Depth (m)	9.941	Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	38.5	Membrane Percolation (mm/hr)	1000	Length (m)	38.5	Max Percolation (l/s)	411.7	Slope (1:X)	0.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	9.121	Cap Volume Depth (m)	9.521	Infiltration Coefficient Base (m/hr)	0.00000	Max Percolation (l/s)	81.2	Membrane Percolation (mm/hr)	1000	Safety Factor	2.0
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WSP Group Ltd				Page 14					
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<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 5083-SWS-01-B.SWS</u>									
<u>Simulation Criteria</u>									
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 8									
Number of Online Controls 8 Number of Time/Area Diagrams 0									
Number of Offline Controls 0 Number of Real Time Controls 0									
<u>Synthetic Rainfall Details</u>									
Rainfall Model FSR Ratio R 0.350									
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 DVD Status OFF									
Analysis Timestep Fine Inertia Status OFF									
DTS Status ON									
Profile(s) Summer and Winter									
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440									
Return Period(s) (years) 100									
Climate Change (%) 20									
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	960 Winter	100	+20%	100/120 Summer				9.201
S1.001	S102	960 Winter	100	+20%	100/60 Winter				9.201
S2.000	S3	15 Winter	100	+20%	100/15 Summer				9.567
S2.001	S3	30 Winter	100	+20%	100/15 Summer				9.481
S1.002	S103	960 Winter	100	+20%	100/60 Summer				9.201
S1.003	S104	960 Winter	100	+20%	100/60 Summer				9.201
S1.004	S105	960 Winter	100	+20%	100/60 Summer				9.201
S3.000	S106	960 Winter	100	+20%	100/120 Summer				9.200
S3.001	S107	960 Winter	100	+20%	100/60 Winter				9.200
S4.000	S10	15 Winter	100	+20%	100/15 Summer				9.374
S4.001	S10	15 Winter	100	+20%	100/15 Summer				9.278
S3.002	S108	960 Winter	100	+20%	100/60 Summer				9.200
S1.005	S109	960 Winter	100	+20%	100/30 Winter				9.200
S5.000	S13	960 Winter	100	+20%	100/15 Summer				9.206
S5.001	S13	960 Winter	100	+20%	100/15 Summer				9.206
S1.006	S112	960 Winter	100	+20%	100/15 Summer				9.199
S6.000	S15	15 Winter	100	+20%	100/15 Summer				9.721
S6.001	S15	30 Winter	100	+20%	100/15 Summer				9.629
S6.002	S113	960 Winter	100	+20%	100/240 Summer				9.205
S6.003	S114	960 Winter	100	+20%	100/120 Winter				9.204
S6.004	S115	960 Winter	100	+20%	100/120 Winter				9.205
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 5083-SWS-01-B.SWS

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)					
S1.000	S1	0.281	0.000	0.01		1.7	FLOOD RISK	
S1.001	S102	0.351	0.000	0.02		4.0	SURCHARGED	
~~S2.000~~	~~S2~~	~~0.544~~	~~0.000~~	~~1.81~~		~~54.0~~	~~SURCHARGED~~	
S2.001	S3	0.593	0.000	0.22		10.4	SURCHARGED	
S1.002	S103	0.423	0.000	0.06		8.6	SURCHARGED	
S1.003	S104	0.454	0.000	0.06		9.5	SURCHARGED	
S1.004	S105	0.468	0.000	0.07		10.2	SURCHARGED	
S3.000	S106	0.322	0.000	0.01		1.7	SURCHARGED	
S3.001	S107	0.357	0.000	0.02		3.3	SURCHARGED	
~~S4.000~~	~~S10~~	~~0.508~~	~~0.000~~	~~1.79~~		~~20.2~~	~~SURCHARGED~~	
S4.001	S10	0.447	0.000	0.75		8.7	SURCHARGED	
S3.002	S108	0.404	0.000	0.04		7.5	SURCHARGED	
S1.005	S109	0.503	0.000	0.10		20.2	FLOOD RISK	
S5.000	S13	0.539	0.000	0.15		1.8	FLOOD RISK	
S5.001	S13	0.574	0.000	0.14		1.6	FLOOD RISK	
S1.006	S112	0.602	0.000	0.12		22.3	FLOOD RISK	
~~S6.000~~	~~S15~~	~~0.626~~	~~0.000~~	~~1.75~~		~~52.3~~	~~SURCHARGED~~	
S6.001	S15	0.569	0.000	0.34		10.2	SURCHARGED	
S6.002	S113	0.180	0.000	0.05		5.6	SURCHARGED	
S6.003	S114	0.198	0.000	0.04		6.8	SURCHARGED	
S6.004	S115	0.244	0.000	0.04		7.6	SURCHARGED	

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<table><tr><th>PN</th><th>US/MH Name</th><th>Water Level (m)</th><th>Surcharged Depth (m)</th><th>Flooded Volume (m³)</th><th>Flow / Cap.</th><th>Overflow (l/s)</th><th>Pipe Flow (l/s)</th><th>Status</th><th>Level Exceeded</th></tr><tr><td>S6.005</td><td>S116</td><td>9.204</td><td>0.298</td><td>0.000</td><td>0.06</td><td></td><td>7.8</td><td>SURCHARGED</td><td></td></tr><tr><td>S6.006</td><td>S117</td><td>9.204</td><td>0.330</td><td>0.000</td><td>0.06</td><td></td><td>8.2</td><td>SURCHARGED</td><td></td></tr><tr><td>S7.000</td><td>S22</td><td>9.527</td><td>0.451</td><td>0.000</td><td>2.37</td><td></td><td>145.3</td><td>FLOOD RISK</td><td></td></tr><tr><td>S7.001</td><td>S22</td><td>9.340</td><td>0.299</td><td>0.000</td><td>0.07</td><td></td><td>8.1</td><td>FLOOD RISK</td><td></td></tr><tr><td>S6.007</td><td>S118</td><td>9.204</td><td>0.348</td><td>0.000</td><td>0.08</td><td></td><td>14.3</td><td>SURCHARGED</td><td></td></tr><tr><td>S8.000</td><td>S24</td><td>9.298</td><td>0.366</td><td>0.000</td><td>0.79</td><td></td><td>23.6</td><td>SURCHARGED</td><td></td></tr><tr><td>S8.001</td><td>S24</td><td>9.289</td><td>0.392</td><td>0.000</td><td>0.19</td><td></td><td>8.9</td><td>SURCHARGED</td><td></td></tr><tr><td>S6.008</td><td>S119</td><td>9.202</td><td>0.415</td><td>0.000</td><td>0.09</td><td></td><td>17.1</td><td>SURCHARGED</td><td></td></tr><tr><td>S9.000</td><td>S120</td><td>9.201</td><td>0.301</td><td>0.000</td><td>0.01</td><td></td><td>1.9</td><td>SURCHARGED</td><td></td></tr><tr><td>S9.001</td><td>S121</td><td>9.201</td><td>0.410</td><td>0.000</td><td>0.01</td><td></td><td>2.6</td><td>SURCHARGED</td><td></td></tr><tr><td>S6.009</td><td>S122</td><td>9.201</td><td>0.482</td><td>0.000</td><td>0.12</td><td></td><td>20.2</td><td>SURCHARGED</td><td></td></tr><tr><td>S6.010</td><td>S123</td><td>9.200</td><td>0.525</td><td>0.000</td><td>0.11</td><td></td><td>22.4</td><td>SURCHARGED</td><td></td></tr><tr><td>S10.000</td><td>S34</td><td>9.279</td><td>0.049</td><td>0.000</td><td>0.84</td><td></td><td>81.5</td><td>FLOOD RISK</td><td></td></tr><tr><td>S10.001</td><td>S34</td><td>9.185</td><td>0.380</td><td>0.000</td><td>0.03</td><td></td><td>4.1</td><td>FLOOD RISK</td><td></td></tr><tr><td>S1.007</td><td>S22</td><td>9.198</td><td>0.669</td><td>0.000</td><td>0.36</td><td></td><td>46.7</td><td>FLOOD RISK</td><td></td></tr><tr><td>S1.008</td><td>S126</td><td>9.196</td><td>0.696</td><td>0.000</td><td>0.05</td><td></td><td>7.3</td><td>FLOOD RISK</td><td></td></tr></table>									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	S6.005	S116	9.204	0.298	0.000	0.06		7.8	SURCHARGED		S6.006	S117	9.204	0.330	0.000	0.06		8.2	SURCHARGED		S7.000	S22	9.527	0.451	0.000	2.37		145.3	FLOOD RISK		S7.001	S22	9.340	0.299	0.000	0.07		8.1	FLOOD RISK		S6.007	S118	9.204	0.348	0.000	0.08		14.3	SURCHARGED		S8.000	S24	9.298	0.366	0.000	0.79		23.6	SURCHARGED		S8.001	S24	9.289	0.392	0.000	0.19		8.9	SURCHARGED		S6.008	S119	9.202	0.415	0.000	0.09		17.1	SURCHARGED		S9.000	S120	9.201	0.301	0.000	0.01		1.9	SURCHARGED		S9.001	S121	9.201	0.410	0.000	0.01		2.6	SURCHARGED		S6.009	S122	9.201	0.482	0.000	0.12		20.2	SURCHARGED		S6.010	S123	9.200	0.525	0.000	0.11		22.4	SURCHARGED		S10.000	S34	9.279	0.049	0.000	0.84		81.5	FLOOD RISK		S10.001	S34	9.185	0.380	0.000	0.03		4.1	FLOOD RISK		S1.007	S22	9.198	0.669	0.000	0.36		46.7	FLOOD RISK		S1.008	S126	9.196	0.696	0.000	0.05		7.3	FLOOD RISK	
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																																																																																																																																																																									
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WSP Group Ltd		Page 0
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Date 09/08/2016	Designed by GB	
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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for 5083-SWS-01-B.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.350	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	0.900
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	420
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for 5083-SWS-01-B.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
S1.000	31.500	0.070	450.0	0.053	5.00	0.0	0.600	o	525	525
S1.001	32.414	0.072	450.2	0.077	0.00	0.0	0.600	o	525	525
S2.000	5.000	0.035	142.9	0.116	5.00	0.0	0.600	o	225	225
S2.001	5.000	0.110	45.5	0.000	0.00	0.0	0.600	o	225	225
S1.002	13.778	0.031	444.5	0.033	0.00	0.0	0.600	o	525	525
S1.003	6.193	0.014	442.4	0.028	0.00	0.0	0.600	o	525	525
S1.004	16.243	0.036	451.2	0.025	0.00	0.0	0.600	o	525	525
S3.000	15.739	0.035	449.7	0.053	5.00	0.0	0.600	o	525	525
S3.001	21.258	0.047	452.3	0.053	0.00	0.0	0.600	o	525	525

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL E (m)	I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	0.00	5.50	8.395	0.053	0.0	0.0	0.0	1.05	227.2	0.0
S1.001	0.00	6.02	8.325	0.130	0.0	0.0	0.0	1.05	227.1	0.0
S2.000	0.00	5.08	8.698	0.116	0.0	0.0	0.0	1.09	43.4	0.0
S2.001	0.00	5.12	8.663	0.116	0.0	0.0	0.0	1.95	77.3	0.0
S1.002	0.00	6.23	8.253	0.279	0.0	0.0	0.0	1.06	228.6	0.0
S1.003	0.00	6.33	8.222	0.307	0.0	0.0	0.0	1.06	229.1	0.0
S1.004	0.00	6.59	8.208	0.332	0.0	0.0	0.0	1.05	226.9	0.0
S3.000	0.00	5.25	8.353	0.053	0.0	0.0	0.0	1.05	227.2	0.0
S3.001	0.00	5.59	8.318	0.106	0.0	0.0	0.0	1.05	226.6	0.0

WSP Group Ltd										Page 1	
.					Barnham South						
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Date 09/08/2016					Designed by GB						
File 50600666-SWS-01_100+40%...					Checked by EI						
XP Solutions					Network 2015.1						
Network Design Table for 5083-SWS-01-B.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	
S4.000	5.000	0.035	142.9	0.045	5.00	0.0	0.600	o	150	0.00	
S4.001	5.000	0.035	142.9	0.000	0.00	0.0	0.600	o	150	0.00	
S3.002	43.993	0.099	444.4	0.087	0.00	0.0	0.600	o	525	0.00	
S1.005	45.820	0.100	458.2	0.082	0.00	0.0	0.600	o	525	0.00	
S5.000	5.000	0.035	142.9	0.053	5.00	0.0	0.600	o	150	0.00	
S5.001	5.000	0.035	142.9	0.000	0.00	0.0	0.600	o	150	0.00	
S1.006	29.823	0.068	438.6	0.034	0.00	0.0	0.600	o	525	0.00	
S6.000	5.000	0.035	142.9	0.112	5.00	0.0	0.600	o	225	0.00	
S6.001	5.000	0.035	142.9	0.000	0.00	0.0	0.600	o	225	0.00	
S6.002	8.950	0.019	471.1	0.054	0.00	0.0	0.600	o	525	0.00	
S6.003	20.825	0.045	462.8	0.044	0.00	0.0	0.600	o	525	0.00	
S6.004	25.111	0.055	456.6	0.033	0.00	0.0	0.600	o	525	0.00	
S6.005	14.650	0.032	457.8	0.012	0.00	0.0	0.600	o	525	0.00	
S6.006	8.093	0.018	449.6	0.017	0.00	0.0	0.600	o	525	0.00	
S7.000	5.000	0.035	142.9	0.316	5.00	0.0	0.600	o	300	0.00	
S7.001	5.000	0.185	27.0	0.000	0.00	0.0	0.600	o	300	0.00	
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)	
S4.000	0.00	5.10	8.716	0.045	0.0	0.0	0.0	0.84	14.8	0.0	
S4.001	0.00	5.20	8.681	0.045	0.0	0.0	0.0	0.84	14.8	0.0	
S3.002	0.00	6.28	8.271	0.238	0.0	0.0	0.0	1.06	228.6	0.0	
S1.005	0.00	7.32	8.172	0.652	0.0	0.0	0.0	1.04	225.1	0.0	
S5.000	0.00	5.10	8.517	0.053	0.0	0.0	0.0	0.84	14.8	0.0	
S5.001	0.00	5.20	8.482	0.053	0.0	0.0	0.0	0.84	14.8	0.0	
S1.006	0.00	7.79	8.072	0.739	0.0	0.0	0.0	1.06	230.1	0.0	
S6.000	0.00	5.08	8.870	0.112	0.0	0.0	0.0	1.09	43.4	0.0	
S6.001	0.00	5.15	8.835	0.112	0.0	0.0	0.0	1.09	43.4	0.0	
S6.002	0.00	5.30	8.500	0.166	0.0	0.0	0.0	1.03	222.0	0.0	
S6.003	0.00	5.63	8.481	0.210	0.0	0.0	0.0	1.03	224.0	0.0	
S6.004	0.00	6.04	8.436	0.243	0.0	0.0	0.0	1.04	225.5	0.0	
S6.005	0.00	6.27	8.381	0.255	0.0	0.0	0.0	1.04	225.2	0.0	
S6.006	0.00	6.40	8.349	0.272	0.0	0.0	0.0	1.05	227.3	0.0	
S7.000	0.00	5.06	8.776	0.316	0.0	0.0	0.0	1.31	92.8	0.0	
S7.001	0.00	5.09	8.741	0.316	0.0	0.0	0.0	1.04	214.6	0.0	
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WSP Group Ltd										Page 2
.					Barnham South					
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File 50600666-SWS-01_100+40%...					Checked by EI					
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<u>Network Design Table for 5083-SWS-01-B.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)	Auto Design
S6.007	31.591	0.069	457.8	0.025	0.00	0.0	0.600	o	525	
S8.000	5.000	0.035	142.9	0.050	5.00	0.0	0.600	o	225	
S8.001	5.000	0.110	45.5	0.000	0.00	0.0	0.600	o	225	
S6.008	31.253	0.068	459.6	0.041	0.00	0.0	0.600	o	525	
S9.000	42.307	0.109	388.1	0.058	5.00	0.0	0.600	o	525	
S9.001	27.484	0.072	381.7	0.025	0.00	0.0	0.600	o	525	
S6.009	20.057	0.044	455.8	0.017	0.00	0.0	0.600	o	525	
S6.010	67.114	0.146	459.7	0.070	0.00	0.0	0.600	o	525	
S10.000	50.000	0.425	117.6	0.186	5.00	0.0	0.600	o	300	
S10.001	5.000	0.276	18.1	0.000	0.00	0.0	0.600	o	300	
S1.007	13.074	0.029	450.8	0.000	0.00	0.0	0.600	o	525	
S1.008	15.743	0.035	449.8	0.000	0.00	0.0	0.600	o	525	
<u>Network Results Table</u>										
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S6.007	0.00	6.90	8.331	0.613	0.0	0.0	0.0	1.04	225.2	0.0
S8.000	0.00	5.08	8.797	0.050	0.0	0.0	0.0	1.09	43.4	0.0
S8.001	0.00	5.12	8.672	0.050	0.0	0.0	0.0	1.95	77.3	0.0
S6.008	0.00	7.41	8.262	0.704	0.0	0.0	0.0	1.04	224.7	0.0
S9.000	0.00	5.62	8.375	0.058	0.0	0.0	0.0	1.13	244.8	0.0
S9.001	0.00	6.03	8.266	0.083	0.0	0.0	0.0	1.14	246.9	0.0
S6.009	0.00	7.73	8.194	0.804	0.0	0.0	0.0	1.04	225.7	0.0
S6.010	0.00	8.80	8.150	0.874	0.0	0.0	0.0	1.04	224.7	0.0
S10.000	0.00	5.58	8.930	0.186	0.0	0.0	0.0	1.45	102.4	0.0
S10.001	0.00	5.60	8.505	0.186	0.0	0.0	0.0	3.71	262.3	0.0
S1.007	0.00	9.01	8.004	1.799	0.0	0.0	0.0	1.05	226.9	0.0
S1.008	0.00	9.26	7.975	1.799	0.0	0.0	0.0	1.05	227.2	0.0
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WSP Group Ltd							Page 3				
.				Barnham South							
Date 09/08/2016				Designed by GB							
File 50600666-SWS-01_100+40%...				Checked by EI							
XP Solutions				Network 2015.1							
Manhole Schedules for 5083-SWS-01-B.SWS											
MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1	9.375	0.980	Open Manhole	1500	S1.000	8.395	525				
S102	9.773	1.448	Open Manhole	1500	S1.001	8.325	525	S1.000	8.325	525	
S3	10.000	1.302	Open Manhole	1200	S2.000	8.698	225				
S3	9.867	1.204	Open Manhole	1200	S2.001	8.663	225	S2.000	8.663	225	
S103	9.867	1.614	Open Manhole	1500	S1.002	8.253	525	S1.001	8.253	525	
								S2.001	8.553	225	
S104	9.721	1.499	Open Manhole	1500	S1.003	8.222	525	S1.002	8.222	525	
S105	9.641	1.433	Open Manhole	1500	S1.004	8.208	525	S1.003	8.208	525	
S106	9.758	1.405	Open Manhole	1500	S3.000	8.353	525				
S107	9.598	1.280	Open Manhole	1500	S3.001	8.318	525	S3.000	8.318	525	
S10	9.743	1.027	Open Manhole	1200	S4.000	8.716	150				
S10	9.743	1.062	Open Manhole	1200	S4.001	8.681	150	S4.000	8.681	150	
S108	9.743	1.472	Open Manhole	1500	S3.002	8.271	525	S3.001	8.271	525	
								S4.001	8.646	150	
S109	9.436	1.264	Open Manhole	1500	S1.005	8.172	525	S1.004	8.172	525	
								S3.002	8.172	525	
S13	9.400	0.883	Open Manhole	1200	S5.000	8.517	150				
S13	9.400	0.918	Open Manhole	1200	S5.001	8.482	150	S5.000	8.482	150	
S112	9.400	1.328	Open Manhole	1500	S1.006	8.072	525	S1.005	8.072	525	
								S5.001	8.447	150	
S15	10.041	1.171	Open Manhole	1200	S6.000	8.670	225				
S15	10.041	1.206	Open Manhole	1200	S6.001	8.835	225	S6.000	8.835	225	
S113	10.041	1.541	Open Manhole	1500	S6.002	8.500	525	S6.001	8.800	225	
S114	9.942	1.461	Open Manhole	1500	S6.003	8.481	525	S6.002	8.481	525	
S115	9.719	1.283	Open Manhole	1500	S6.004	8.436	525	S6.003	8.436	525	
S116	9.728	1.347	Open Manhole	1500	S6.005	8.381	525	S6.004	8.381	525	
S117	9.633	1.284	Open Manhole	1500	S6.006	8.349	525	S6.005	8.349	525	
S22	9.621	0.845	Open Manhole	1200	S7.000	8.776	300				
S22	9.621	0.880	Open Manhole	1200	S7.001	8.741	300	S7.000	8.741	300	
S118	9.621	1.290	Open Manhole	1500	S6.007	8.331	525	S6.006	8.331	525	
								S7.001	8.556	300	
S24	9.750	1.043	Open Manhole	1200	S8.000	8.707	225				
S24	9.750	1.078	Open Manhole	1200	S8.001	8.672	225	S8.000	8.672	225	
S119	9.750	1.488	Open Manhole	1500	S6.008	8.262	525	S6.007	8.262	525	
								S8.001	8.562	225	
S120	9.777	1.402	Open Manhole	1500	S9.000	8.375	525				
S121	9.662	1.396	Open Manhole	1500	S9.001	8.266	525	S9.000	8.266	525	
S122	9.607	1.413	Open Manhole	1500	S6.009	8.194	525	S6.008	8.194	525	
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WSP Group Ltd		Page 4
.	Barnham South	
.		
.		
Date 09/08/2016		Designed by GB
File 50600666-SWS-01_100+40%...		Checked by EI
XP Solutions		Network 2015.1

Manhole Schedules for 5083-SWS-01-B.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S123	9.745	1.595	Open Manhole	1500	S6.010	8.150	525	S9.001	8.194	525	
S34	9.430	0.500	Open Manhole	1200	S10.000	8.930	300	S6.009	8.150	525	
S34	9.430	0.925	Open Manhole	1200	S10.001	8.505	300	S10.000	8.505	300	
S22	9.429	1.425	Open Manhole	1500	S1.007	8.004	525	S1.006	8.004	525	
								S6.010	8.004	525	
								S10.001	8.229	300	
S126	9.429	1.454	Open Manhole	1500	S1.008	7.975	525	S1.007	7.975	525	
S127	9.400	1.460	Open Manhole	0		OUTFALL		S1.008	7.940	525	

WSP Group Ltd							Page 5	
.				Barnham South				
.								
.								
Date 09/08/2016				Designed by GB				
File 50600666-SWS-01_100+40%...				Checked by EI				
XP Solutions				Network 2015.1				
PIPELINE SCHEDULES for 5083-SWS-01-B.SWS								
Upstream Manhole								
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	525	S1	9.375	8.395	0.455	Open Manhole	1500
S1.001	o	525	S102	9.773	8.325	0.923	Open Manhole	1500
S2.000	o	225	S3	10.000	8.638	1.077	Open Manhole	1200
S2.001	o	225	S3	9.867	8.663	0.979	Open Manhole	1200
S1.002	o	525	S103	9.867	8.253	1.089	Open Manhole	1500
S1.003	o	525	S104	9.721	8.222	0.974	Open Manhole	1500
S1.004	o	525	S105	9.641	8.208	0.908	Open Manhole	1500
S3.000	o	525	S106	9.758	8.353	0.880	Open Manhole	1500
S3.001	o	525	S107	9.598	8.318	0.755	Open Manhole	1500
S4.000	o	150	S10	9.743	8.716	0.877	Open Manhole	1200
S4.001	o	150	S10	9.743	8.681	0.912	Open Manhole	1200
S3.002	o	525	S108	9.743	8.271	0.947	Open Manhole	1500
S1.005	o	525	S109	9.436	8.172	0.739	Open Manhole	1500
S5.000	o	150	S13	9.400	8.517	0.733	Open Manhole	1200
Downstream Manhole								
PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	31.500	450.0	S102	9.773	8.325	0.923	Open Manhole	1500
S1.001	32.414	450.2	S103	9.867	8.253	1.089	Open Manhole	1500
S2.000	5.000	142.9	S3	9.867	8.663	0.979	Open Manhole	1200
S2.001	5.000	45.5	S103	9.867	8.553	1.089	Open Manhole	1500
S1.002	13.778	444.5	S104	9.721	8.222	0.974	Open Manhole	1500
S1.003	6.193	442.4	S105	9.641	8.208	0.908	Open Manhole	1500
S1.004	16.243	451.2	S109	9.436	8.172	0.739	Open Manhole	1500
S3.000	15.739	449.7	S107	9.598	8.318	0.755	Open Manhole	1500
S3.001	21.258	452.3	S108	9.743	8.271	0.947	Open Manhole	1500
S4.000	5.000	142.9	S10	9.743	8.681	0.912	Open Manhole	1200
S4.001	5.000	142.9	S108	9.743	8.646	0.947	Open Manhole	1500
S3.002	43.993	444.4	S109	9.436	8.172	0.739	Open Manhole	1500
S1.005	45.820	458.2	S112	9.400	8.072	0.803	Open Manhole	1500
S5.000	5.000	142.9	S13	9.400	8.482	0.768	Open Manhole	1200
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WSP Group Ltd							Page 6	
.				Barnham South				
.								
.								
Date 09/08/2016				Designed by GB				
File 50600666-SWS-01_100+40%...				Checked by EI				
XP Solutions				Network 2015.1				
<u>PIPELINE SCHEDULES for 5083-SWS-01-B.SWS</u> <u>Upstream Manhole</u>								
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S5.001	o	150	S13	9.400	8.482	0.768	Open Manhole	1200
S1.006	o	525	S112	9.400	8.072	0.803	Open Manhole	1500
S6.000	o	225	S15	10.041	8.870	0.946	Open Manhole	1200
S6.001	o	225	S15	10.041	8.835	0.981	Open Manhole	1200
S6.002	o	525	S113	10.041	8.500	1.016	Open Manhole	1500
S6.003	o	525	S114	9.942	8.481	0.936	Open Manhole	1500
S6.004	o	525	S115	9.719	8.436	0.758	Open Manhole	1500
S6.005	o	525	S116	9.728	8.381	0.822	Open Manhole	1500
S6.006	o	525	S117	9.638	8.349	0.759	Open Manhole	1500
S7.000	o	300	S22	9.621	8.776	0.545	Open Manhole	1200
S7.001	o	300	S22	9.621	8.741	0.580	Open Manhole	1200
S6.007	o	525	S118	9.621	8.331	0.765	Open Manhole	1500
S8.000	o	225	S24	9.750	8.707	0.818	Open Manhole	1200
S8.001	o	225	S24	9.750	8.672	0.853	Open Manhole	1200
S6.008	o	525	S119	9.750	8.262	0.963	Open Manhole	1500
<u>Downstream Manhole</u>								
PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S5.001	5.000	142.9	S112	9.400	8.447	0.803	Open Manhole	1500
S1.006	29.823	438.6	S22	9.429	8.004	0.900	Open Manhole	1500
S6.000	5.000	142.9	S15	10.041	8.835	0.981	Open Manhole	1200
S6.001	5.000	142.9	S113	10.041	8.800	1.016	Open Manhole	1500
S6.002	8.950	471.1	S114	9.942	8.481	0.936	Open Manhole	1500
S6.003	20.825	462.8	S115	9.719	8.436	0.758	Open Manhole	1500
S6.004	25.111	456.6	S116	9.728	8.381	0.822	Open Manhole	1500
S6.005	14.650	457.8	S117	9.638	8.349	0.759	Open Manhole	1500
S6.006	8.093	449.6	S118	9.621	8.331	0.765	Open Manhole	1500
S7.000	5.000	142.9	S22	9.621	8.741	0.580	Open Manhole	1200
S7.001	5.000	27.0	S118	9.621	8.556	0.765	Open Manhole	1500
S6.007	31.591	457.8	S119	9.750	8.262	0.963	Open Manhole	1500
S8.000	5.000	142.9	S24	9.750	8.672	0.853	Open Manhole	1200
S8.001	5.000	45.5	S119	9.750	8.562	0.963	Open Manhole	1500
S6.008	31.253	459.6	S122	9.607	8.194	0.888	Open Manhole	1500
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WSP Group Ltd		Page 7
.	Barnham South	
.		
.		
Date 09/08/2016	Designed by GB	
File 50600666-SWS-01_100+40%...	Checked by EI	
XP Solutions	Network 2015.1	

PIPELINE SCHEDULES for 5083-SWS-01-B.SWS

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)
S9.000	o	525	S120	9.777	8.375	0.877	Open Manhole	1500
S9.001	o	525	S121	9.662	8.266	0.871	Open Manhole	1500
S6.009	o	525	S122	9.607	8.194	0.888	Open Manhole	1500
S6.010	o	525	S123	9.745	8.150	1.070	Open Manhole	1500
S10.000	o	300	S34	9.430	8.930	0.200	Open Manhole	1200
S10.001	o	300	S34	9.430	8.505	0.625	Open Manhole	1200
S1.007	o	525	S22	9.429	8.004	0.900	Open Manhole	1500
S1.008	o	525	S126	9.429	7.975	0.929	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)
S9.000	42.307	388.1	S121	9.662	8.266	0.871	Open Manhole	1500
S9.001	27.484	381.7	S122	9.607	8.194	0.888	Open Manhole	1500
S6.009	20.057	455.8	S123	9.745	8.150	1.070	Open Manhole	1500
S6.010	67.114	459.7	S22	9.429	8.004	0.900	Open Manhole	1500
S10.000	50.000	117.6	S34	9.430	8.505	0.625	Open Manhole	1200
S10.001	5.000	18.1	S22	9.429	8.229	0.900	Open Manhole	1500
S1.007	13.074	450.8	S126	9.429	7.975	0.929	Open Manhole	1500
S1.008	15.743	449.8	S127	9.400	7.940	0.935	Open Manhole	0

WSP Group Ltd		Page 8
.	Barnham South	
.		
.		
Date 09/08/2016	Designed by GB	
File 50600666-SWS-01_100+40%...	Checked by EI	
XP Solutions	Network 2015.1	

Area Summary for 5083-SWS-01-B.SWS

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.053	0.053	0.053
1.001	-	-	100	0.077	0.077	0.077
2.000	-	-	100	0.116	0.116	0.116
2.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.033	0.033	0.033
1.003	-	-	100	0.028	0.028	0.028
1.004	-	-	100	0.025	0.025	0.025
3.000	-	-	100	0.053	0.053	0.053
3.001	-	-	100	0.053	0.053	0.053
4.000	-	-	100	0.045	0.045	0.045
4.001	-	-	100	0.000	0.000	0.000
3.002	-	-	100	0.087	0.087	0.087
1.005	-	-	100	0.082	0.082	0.082
5.000	-	-	100	0.053	0.053	0.053
5.001	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.034	0.034	0.034
6.000	-	-	100	0.112	0.112	0.112
6.001	-	-	100	0.000	0.000	0.000
6.002	-	-	100	0.054	0.054	0.054
6.003	-	-	100	0.044	0.044	0.044
6.004	-	-	100	0.033	0.033	0.033
6.005	-	-	100	0.012	0.012	0.012
6.006	-	-	100	0.017	0.017	0.017
7.000	-	-	100	0.316	0.316	0.316
7.001	-	-	100	0.000	0.000	0.000
6.007	-	-	100	0.025	0.025	0.025
8.000	-	-	100	0.050	0.050	0.050
8.001	-	-	100	0.000	0.000	0.000
6.008	-	-	100	0.041	0.041	0.041
9.000	-	-	100	0.058	0.058	0.058
9.001	-	-	100	0.025	0.025	0.025
6.009	-	-	100	0.017	0.017	0.017
6.010	-	-	100	0.070	0.070	0.070
10.000	-	-	100	0.186	0.186	0.186
10.001	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				1.799	1.799	1.799

Free Flowing Outfall Details for 5083-SWS-01-B.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.008	S127	9.400	7.940	7.940	0	0

WSP Group Ltd		Page 9
. . .	Barnham South	
Date 09/08/2016	Designed by GB	
File 50600666-SWS-01_100+40%...	Checked by EI	
XP Solutions		Network 2015.1

Simulation Criteria for 5083-SWS-01-B.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /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	8
Number of Online Controls	8	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)	19.500	Storm Duration (mins)	30
Ratio R	0.350		

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WSP Group Ltd		Page 10															
.	Barnham South																
.																	
.																	
Date 09/08/2016	Designed by GB																
File 50600666-SWS-01_100+40%...	Checked by EI																
XP Solutions	Network 2015.1																
<u>Online Controls for 5083-SWS-01-B.SWS</u> <u>Orifice Manhole: S3, DS/PN: S2.001, Volume (m³): 1.5</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.663 <u>Orifice Manhole: S10, DS/PN: S4.001, Volume (m³): 1.3</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.681 <u>Orifice Manhole: S13, DS/PN: S5.001, Volume (m³): 1.1</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.482 <u>Orifice Manhole: S15, DS/PN: S6.001, Volume (m³): 1.5</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.835 <u>Orifice Manhole: S22, DS/PN: S7.001, Volume (m³): 1.3</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.741 <u>Orifice Manhole: S24, DS/PN: S8.001, Volume (m³): 1.4</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.672 <u>Orifice Manhole: S34, DS/PN: S10.001, Volume (m³): 4.5</u> Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 8.505 <u>Hydro-Brake Optimum® Manhole: S126, DS/PN: S1.008, Volume (m³): 5.1</u>																	
Unit Reference MD-SHE-0123-7300-1200-7300 Design Head (m) 1.200 Design Flow (l/s) 7.3 Flush-Flo™ Calculated Objective Minimise upstream storage Diameter (mm) 123 Invert Level (m) 7.975 Minimum Outlet Pipe Diameter (mm) 150 Suggested Manhole Diameter (mm) 1200																	
<table> <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>1.200</td><td>7.3</td></tr> <tr> <td>Flush-Flo™</td><td>0.352</td><td>7.3</td></tr> <tr> <td>Kick-Flo®</td><td>0.757</td><td>5.9</td></tr> <tr> <td>Mean Flow over Head Range</td><td>-</td><td>6.3</td></tr> </tbody> </table>			Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	1.200	7.3	Flush-Flo™	0.352	7.3	Kick-Flo®	0.757	5.9	Mean Flow over Head Range	-	6.3
Control Points	Head (m)	Flow (l/s)															
Design Point (Calculated)	1.200	7.3															
Flush-Flo™	0.352	7.3															
Kick-Flo®	0.757	5.9															
Mean Flow over Head Range	-	6.3															
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																	
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WSP Group Ltd		Page 11																																																																									
.		Barnham South																																																																									
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<u>Hydro-Brake Optimum® Manhole: S126, DS/PN: S1.008, Volume (m³): 5.1</u>																																																																											
Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated																																																																											
<table><tr><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td></tr><tr><td>0.100</td><td>4.4</td><td>1.200</td><td>7.3</td><td>3.000</td><td>11.2</td><td>7.000</td><td>16.8</td></tr><tr><td>0.200</td><td>6.9</td><td>1.400</td><td>7.8</td><td>3.500</td><td>12.0</td><td>7.500</td><td>17.3</td></tr><tr><td>0.300</td><td>7.2</td><td>1.600</td><td>8.3</td><td>4.000</td><td>12.8</td><td>8.000</td><td>17.9</td></tr><tr><td>0.400</td><td>7.2</td><td>1.800</td><td>8.8</td><td>4.500</td><td>13.6</td><td>8.500</td><td>18.4</td></tr><tr><td>0.500</td><td>7.1</td><td>2.000</td><td>9.2</td><td>5.000</td><td>14.3</td><td>9.000</td><td>18.9</td></tr><tr><td>0.600</td><td>6.9</td><td>2.200</td><td>9.7</td><td>5.500</td><td>14.9</td><td>9.500</td><td>19.4</td></tr><tr><td>0.800</td><td>6.0</td><td>2.400</td><td>10.1</td><td>6.000</td><td>15.6</td><td></td><td></td></tr><tr><td>1.000</td><td>6.7</td><td>2.600</td><td>10.5</td><td>6.500</td><td>16.2</td><td></td><td></td></tr></table>				Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	4.4	1.200	7.3	3.000	11.2	7.000	16.8	0.200	6.9	1.400	7.8	3.500	12.0	7.500	17.3	0.300	7.2	1.600	8.3	4.000	12.8	8.000	17.9	0.400	7.2	1.800	8.8	4.500	13.6	8.500	18.4	0.500	7.1	2.000	9.2	5.000	14.3	9.000	18.9	0.600	6.9	2.200	9.7	5.500	14.9	9.500	19.4	0.800	6.0	2.400	10.1	6.000	15.6			1.000	6.7	2.600	10.5	6.500	16.2		
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)																																																																				
0.100	4.4	1.200	7.3	3.000	11.2	7.000	16.8																																																																				
0.200	6.9	1.400	7.8	3.500	12.0	7.500	17.3																																																																				
0.300	7.2	1.600	8.3	4.000	12.8	8.000	17.9																																																																				
0.400	7.2	1.800	8.8	4.500	13.6	8.500	18.4																																																																				
0.500	7.1	2.000	9.2	5.000	14.3	9.000	18.9																																																																				
0.600	6.9	2.200	9.7	5.500	14.9	9.500	19.4																																																																				
0.800	6.0	2.400	10.1	6.000	15.6																																																																						
1.000	6.7	2.600	10.5	6.500	16.2																																																																						
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WSP Group Ltd		Page 12
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File 50600666-SWS-01_100+40%...	Checked by EI	
XP Solutions	Network 2015.1	
<u>Storage Structures for 5083-SWS-01-B.SWS</u> <u>Porous Car Park Manhole: S3, DS/PN: S2.001</u> Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 22.4 Membrane Percolation (mm/hr) 1000 Length (m) 22.5 Max Percolation (l/s) 140.0 Slope (1:X) 0.0 Safety Factor 2.0 Depression Storage (mm) 5 Porosity 0.30 Evaporation (mm/day) 3 Invert Level (m) 9.367 Cap Volume Depth (m) 9.767 <u>Porous Car Park Manhole: S10, DS/PN: S4.001</u> Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 16.2 Membrane Percolation (mm/hr) 1000 Length (m) 16.2 Max Percolation (l/s) 72.9 Slope (1:X) 0.0 Safety Factor 2.0 Depression Storage (mm) 5 Porosity 0.30 Evaporation (mm/day) 3 Invert Level (m) 9.243 Cap Volume Depth (m) 9.643 <u>Porous Car Park Manhole: S13, DS/PN: S5.001</u> Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 16.8 Membrane Percolation (mm/hr) 1000 Length (m) 16.8 Max Percolation (l/s) 78.4 Slope (1:X) 0.0 Safety Factor 2.0 Depression Storage (mm) 5 Porosity 0.30 Evaporation (mm/day) 3 Invert Level (m) 8.900 Cap Volume Depth (m) 9.300 <u>Porous Car Park Manhole: S15, DS/PN: S6.001</u> Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 24.6 Membrane Percolation (mm/hr) 1000 Length (m) 24.6 Max Percolation (l/s) 168.1 Slope (1:X) 0.0 Safety Factor 2.0 Depression Storage (mm) 5 Porosity 0.30 Evaporation (mm/day) 3 Invert Level (m) 9.541 Cap Volume Depth (m) 9.941 <u>Porous Car Park Manhole: S22, DS/PN: S7.001</u> Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 38.5 Membrane Percolation (mm/hr) 1000 Length (m) 38.5 Max Percolation (l/s) 411.7 Slope (1:X) 0.0 Safety Factor 2.0 Depression Storage (mm) 5 Porosity 0.30 Evaporation (mm/day) 3 Invert Level (m) 9.121 Cap Volume Depth (m) 9.521 <u>Porous Car Park Manhole: S24, DS/PN: S8.001</u> Infiltration Coefficient Base (m/hr) 0.00000 Max Percolation (l/s) 81.2 Membrane Percolation (mm/hr) 1000 Safety Factor 2.0		
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WSP Group Ltd				Page 14																																																																																																																																																																																																																																
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<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 5083-SWS-01-B.SWS</u>																																																																																																																																																																																																																																				
<u>Simulation Criteria</u>																																																																																																																																																																																																																																				
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 8																																																																																																																																																																																																																																				
Number of Online Controls 8 Number of Time/Area Diagrams 0																																																																																																																																																																																																																																				
Number of Offline Controls 0 Number of Real Time Controls 0																																																																																																																																																																																																																																				
<u>Synthetic Rainfall Details</u>																																																																																																																																																																																																																																				
Rainfall Model FSR Ratio R 0.350																																																																																																																																																																																																																																				
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 DVD Status OFF																																																																																																																																																																																																																																				
Analysis Timestep Fine Inertia Status OFF																																																																																																																																																																																																																																				
DTS Status ON																																																																																																																																																																																																																																				
Profile(s) Summer and Winter																																																																																																																																																																																																																																				
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440																																																																																																																																																																																																																																				
Return Period(s) (years) 100																																																																																																																																																																																																																																				
Climate Change (%) 40																																																																																																																																																																																																																																				
<table><tr><th>PN</th><th>US/MH Name</th><th>Storm</th><th>Return Period</th><th>Climate Change</th><th>First (X) Surchage</th><th>First (Y) Flood</th><th>First (Z) Overflow</th><th>Overflow Act.</th><th>Water Level (m)</th></tr><tr><td>S1.000</td><td>S1</td><td>960 Winter</td><td>100</td><td>+40%</td><td>100/60 Winter</td><td></td><td></td><td></td><td>9.303</td></tr><tr><td>S1.001</td><td>S102</td><td>960 Winter</td><td>100</td><td>+40%</td><td>100/60 Summer</td><td></td><td></td><td></td><td>9.303</td></tr><tr><td>S2.000</td><td>S3</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>9.636</td></tr><tr><td>S2.001</td><td>S3</td><td>60 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>9.514</td></tr><tr><td>S1.002</td><td>S103</td><td>960 Winter</td><td>100</td><td>+40%</td><td>100/15 Winter</td><td></td><td></td><td></td><td>9.303</td></tr><tr><td>S1.003</td><td>S104</td><td>960 Winter</td><td>100</td><td>+40%</td><td>100/15 Winter</td><td></td><td></td><td></td><td>9.303</td></tr><tr><td>S1.004</td><td>S105</td><td>960 Winter</td><td>100</td><td>+40%</td><td>100/15 Winter</td><td></td><td></td><td></td><td>9.302</td></tr><tr><td>S3.000</td><td>S106</td><td>960 Winter</td><td>100</td><td>+40%</td><td>100/60 Summer</td><td></td><td></td><td></td><td>9.302</td></tr><tr><td>S3.001</td><td>S107</td><td>960 Winter</td><td>100</td><td>+40%</td><td>100/60 Summer</td><td></td><td></td><td></td><td>9.302</td></tr><tr><td>S4.000</td><td>S10</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>9.423</td></tr><tr><td>S4.001</td><td>S10</td><td>960 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>9.308</td></tr><tr><td>S3.002</td><td>S108</td><td>960 Winter</td><td>100</td><td>+40%</td><td>100/30 Winter</td><td></td><td></td><td></td><td>9.302</td></tr><tr><td>S1.005</td><td>S109</td><td>960 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>9.302</td></tr><tr><td>S5.000</td><td>S13</td><td>960 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>9.309</td></tr><tr><td>S5.001</td><td>S13</td><td>960 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>9.308</td></tr><tr><td>S1.006</td><td>S112</td><td>960 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>9.301</td></tr><tr><td>S6.000</td><td>S15</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>9.783</td></tr><tr><td>S6.001</td><td>S15</td><td>60 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>9.655</td></tr><tr><td>S6.002</td><td>S113</td><td>960 Winter</td><td>100</td><td>+40%</td><td>100/120 Summer</td><td></td><td></td><td></td><td>9.307</td></tr><tr><td>S6.003</td><td>S114</td><td>960 Winter</td><td>100</td><td>+40%</td><td>100/120 Summer</td><td></td><td></td><td></td><td>9.306</td></tr><tr><td>S6.004</td><td>S115</td><td>960 Winter</td><td>100</td><td>+40%</td><td>100/60 Winter</td><td></td><td></td><td></td><td>9.306</td></tr></table>									PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	S1.000	S1	960 Winter	100	+40%	100/60 Winter				9.303	S1.001	S102	960 Winter	100	+40%	100/60 Summer				9.303	S2.000	S3	15 Winter	100	+40%	100/15 Summer				9.636	S2.001	S3	60 Winter	100	+40%	100/15 Summer				9.514	S1.002	S103	960 Winter	100	+40%	100/15 Winter				9.303	S1.003	S104	960 Winter	100	+40%	100/15 Winter				9.303	S1.004	S105	960 Winter	100	+40%	100/15 Winter				9.302	S3.000	S106	960 Winter	100	+40%	100/60 Summer				9.302	S3.001	S107	960 Winter	100	+40%	100/60 Summer				9.302	S4.000	S10	15 Winter	100	+40%	100/15 Summer				9.423	S4.001	S10	960 Winter	100	+40%	100/15 Summer				9.308	S3.002	S108	960 Winter	100	+40%	100/30 Winter				9.302	S1.005	S109	960 Winter	100	+40%	100/15 Summer				9.302	S5.000	S13	960 Winter	100	+40%	100/15 Summer				9.309	S5.001	S13	960 Winter	100	+40%	100/15 Summer				9.308	S1.006	S112	960 Winter	100	+40%	100/15 Summer				9.301	S6.000	S15	15 Winter	100	+40%	100/15 Summer				9.783	S6.001	S15	60 Winter	100	+40%	100/15 Summer				9.655	S6.002	S113	960 Winter	100	+40%	100/120 Summer				9.307	S6.003	S114	960 Winter	100	+40%	100/120 Summer				9.306	S6.004	S115	960 Winter	100	+40%	100/60 Winter				9.306
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)																																																																																																																																																																																																																											
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S2.000	S3	15 Winter	100	+40%	100/15 Summer				9.636																																																																																																																																																																																																																											
S2.001	S3	60 Winter	100	+40%	100/15 Summer				9.514																																																																																																																																																																																																																											
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S3.000	S106	960 Winter	100	+40%	100/60 Summer				9.302																																																																																																																																																																																																																											
S3.001	S107	960 Winter	100	+40%	100/60 Summer				9.302																																																																																																																																																																																																																											
S4.000	S10	15 Winter	100	+40%	100/15 Summer				9.423																																																																																																																																																																																																																											
S4.001	S10	960 Winter	100	+40%	100/15 Summer				9.308																																																																																																																																																																																																																											
S3.002	S108	960 Winter	100	+40%	100/30 Winter				9.302																																																																																																																																																																																																																											
S1.005	S109	960 Winter	100	+40%	100/15 Summer				9.302																																																																																																																																																																																																																											
S5.000	S13	960 Winter	100	+40%	100/15 Summer				9.309																																																																																																																																																																																																																											
S5.001	S13	960 Winter	100	+40%	100/15 Summer				9.308																																																																																																																																																																																																																											
S1.006	S112	960 Winter	100	+40%	100/15 Summer				9.301																																																																																																																																																																																																																											
S6.000	S15	15 Winter	100	+40%	100/15 Summer				9.783																																																																																																																																																																																																																											
S6.001	S15	60 Winter	100	+40%	100/15 Summer				9.655																																																																																																																																																																																																																											
S6.002	S113	960 Winter	100	+40%	100/120 Summer				9.307																																																																																																																																																																																																																											
S6.003	S114	960 Winter	100	+40%	100/120 Summer				9.306																																																																																																																																																																																																																											
S6.004	S115	960 Winter	100	+40%	100/60 Winter				9.306																																																																																																																																																																																																																											
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WSP Group Ltd		Page 15
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 5083-SWS-01-B.SWS

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)					
S1.000	S1	0.383	0.000	0.01		2.0	FLOOD RISK	
S1.001	S102	0.453	0.000	0.03		4.9	SURCHARGED	
S2.000	S3	0.713	0.000	2.10		62.8	SURCHARGED	
S2.001	S3	0.626	0.000	0.21		9.9	SURCHARGED	
S1.002	S103	0.525	0.000	0.08		10.8	SURCHARGED	
S1.003	S104	0.556	0.000	0.08		11.8	SURCHARGED	
S1.004	S105	0.569	0.000	0.09		12.8	SURCHARGED	
S3.000	S106	0.424	0.000	0.01		2.0	SURCHARGED	
S3.001	S107	0.459	0.000	0.02		4.0	FLOOD RISK	
S4.000	S10	0.557	0.000	2.08		24.4	SURCHARGED	
S4.001	S10	0.477	0.000	0.14		1.6	SURCHARGED	
S3.002	S108	0.506	0.000	0.04		9.0	SURCHARGED	
S1.005	S109	0.605	0.000	0.13		24.9	FLOOD RISK	
S5.000	S13	0.642	0.000	0.18		2.1	FLOOD RISK	
S5.001	S13	0.676	0.000	0.15		1.8	FLOOD RISK	
S1.006	S112	0.704	0.000	0.13		25.2	FLOOD RISK	
S6.000	S15	0.688	0.000	2.03		60.7	FLOOD RISK	
S6.001	S15	0.595	0.000	0.34		10.3	SURCHARGED	
S6.002	S113	0.282	0.000	0.05		6.4	SURCHARGED	
S6.003	S114	0.300	0.000	0.05		8.0	SURCHARGED	
S6.004	S115	0.345	0.000	0.05		9.1	SURCHARGED	

WSP Group Ltd				Page 16				
.				Barnham South				
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Date 09/08/2016				Designed by GB				
File 50600666-SWS-01_100+40%...				Checked by EI				
XP Solutions				Network 2015.1				
<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 5083-SWS-01-B.SWS</u>								