

JNP Group		Page 1
3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	C85850 Bartons Road, Havant Phase 2 Surface Water Calcs	
Date 03/07/2018 15:11 File 2018.06.26 PHASE 2 STRATEGY.MDX	Designed by KM Checked by KT	
Micro Drainage	Network 2018.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	PIMP (%)	100
M5-60 (mm)	19.500	Add Flow / Climate Change (%)	0
Ratio R	0.350	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	150	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

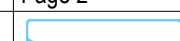
Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	5.000	0.050	100.0	0.183	5.00	0.0	0.600		o	225	Pipe/Conduit	
S1.001	53.000	0.650	81.5	0.000	0.00	0.0		0.040	\	-2	Pipe/Conduit	
S1.002	8.870	0.111	79.9	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
S2.000	19.857	1.343	14.8	0.040	5.00	0.0	0.600		o	150	Pipe/Conduit	
S2.001	15.783	0.483	32.7	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S2.002	13.288	0.361	36.8	0.114	0.00	0.0	0.600		o	150	Pipe/Conduit	
S1.003	7.052	0.116	60.8	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
S1.004	67.000	0.373	179.6	0.051	0.00	0.0		0.040	\	-3	Pipe/Conduit	
S1.005	10.100	2.360	4.3	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S3.000	6.300	0.430	14.7	0.000	5.00	0.0	0.600		o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	49.64	5.06	24.400	0.183	0.0	0.0	0.0	1.31	52.0	24.6
S1.001	47.69	5.56	24.250	0.183	0.0	0.0	0.0	1.77	7328.9	24.6
S1.002	47.32	5.66	23.600	0.183	0.0	0.0	0.0	1.46	58.2	24.6
S2.000	49.39	5.13	25.751	0.040	0.0	0.0	0.0	2.63	46.5	5.4
S2.001	48.79	5.27	24.408	0.040	0.0	0.0	0.0	1.77	31.2	5.4
S2.002	48.28	5.41	23.925	0.154	0.0	0.0	0.0	1.66	29.4	20.1
S1.003	47.06	5.73	23.489	0.337	0.0	0.0	0.0	1.68	66.8	43.0
S1.004	43.89	6.68	23.273	0.388	0.0	0.0	0.0	1.17	4451.4	46.1
S1.005	43.78	6.72	22.900	0.388	0.0	0.0	0.0	4.91	86.7	46.1
S3.000	49.80	5.03	22.200	0.000	0.0	0.0	0.0	4.13	291.8	0.0

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Micro Drainage	Network 2018.1	

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S3.001	8.800	0.040	220.0	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
S4.000	26.633	1.665	16.0	0.045	5.00	0.0	0.600		o	150	Pipe/Conduit	
S4.001	25.056	2.425	10.3	0.245	0.00	0.0	0.600		o	225	Pipe/Conduit	
S5.000	6.100	0.040	152.5	0.000	5.00	0.0	0.600		o	225	Pipe/Conduit	
S4.002	14.340	0.359	39.9	0.145	0.00	0.0	0.600		o	225	Pipe/Conduit	
S1.006	18.752	0.234	80.0	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S1.007	47.205	0.975	48.4	0.147	0.00	0.0	0.600		o	150	Pipe/Conduit	
S1.008	10.111	0.585	17.3	0.136	0.00	0.0	0.600		o	225	Pipe/Conduit	
S6.000	12.974	2.047	6.3	0.058	5.00	0.0	0.600		o	150	Pipe/Conduit	
S6.001	3.000	0.085	35.3	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S6.002	37.000	0.074	500.0	0.056	0.00	0.0	0.600		[]	-5	Pipe/Conduit	
S6.003	3.162	0.011	287.5	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
S7.000	5.000	0.033	150.0	0.000	5.00	0.0	0.600		o	300	Pipe/Conduit	
S7.001	7.569	0.053	142.8	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
S6.004	2.891	0.010	289.1	0.107	0.00	0.0	0.600		o	450	Pipe/Conduit	
S6.005	16.000	0.032	500.0	0.000	0.00	0.0	0.600		[]	-5	Pipe/Conduit	
S6.006	2.000	0.007	285.7	0.000	0.00	0.0	0.600		o	525	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S3.001	49.36	5.13	20.600	0.000	0.0	0.0	0.0	1.37	217.4	0.0
S4.000	49.19	5.18	25.064	0.045	0.0	0.0	0.0	2.53	44.7	6.0
S4.001	48.78	5.28	23.324	0.290	0.0	0.0	0.0	4.09	162.8	38.3
S5.000	49.51	5.10	20.939	0.000	0.0	0.0	0.0	1.06	42.0	0.0
S4.002	48.33	5.39	20.899	0.435	0.0	0.0	0.0	2.08	82.5	56.9
S1.006	42.95	7.00	20.540	0.823	0.0	0.0	0.0	1.12	19.9«	95.7
S1.007	41.43	7.54	20.306	0.970	0.0	0.0	0.0	1.45	25.6«	108.8
S1.008	41.29	7.59	19.256	1.106	0.0	0.0	0.0	3.16	125.8	123.7
S6.000	49.68	5.05	22.301	0.058	0.0	0.0	0.0	4.03	71.2	7.8
S6.001	49.56	5.08	20.254	0.058	0.0	0.0	0.0	1.70	30.0	7.8
S6.002	48.46	5.36	18.819	0.114	0.0	0.0	0.0	2.24	7701.6	15.0
S6.003	48.29	5.40	18.745	0.114	0.0	0.0	0.0	1.19	189.9	15.0
S7.000	49.64	5.07	18.970	0.000	0.0	0.0	0.0	1.28	90.6	0.0
S7.001	49.25	5.16	18.937	0.000	0.0	0.0	0.0	1.31	92.9	0.0
S6.004	48.14	5.44	18.734	0.221	0.0	0.0	0.0	1.19	189.4	28.8
S6.005	47.69	5.56	18.725	0.221	0.0	0.0	0.0	2.24	7701.6	28.8
S6.006	47.59	5.59	18.693	0.221	0.0	0.0	0.0	1.32	285.8	28.8

JNP Group

3rd Floor, Marlborough House
48 Holly Walk
Leamington Spa CV32 4XP

Date 03/07/2018 15:11
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C85850
Bartons Road, Havant
Phase 2 Surface Water Calcs

Designed by KM
Checked by KT

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Micro Drainage

Network 2018.1

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S6.007	4.473	0.015	298.2	0.000	0.00	0.0	0.600		o	525	Pipe/Conduit	
S1.009	11.742	0.357	32.9	0.021	0.00	0.0	0.600		o	150	Pipe/Conduit	
S1.010	16.441	0.033	498.2	0.000	0.00	0.0	0.600		o	900	Pipe/Conduit	
S8.000	5.000	0.035	142.9	0.000	5.00	0.0	0.600		o	300	Pipe/Conduit	
S8.001	6.400	0.034	188.2	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
S1.011	42.036	0.084	500.4	0.093	0.00	0.0	0.600		o	900	Pipe/Conduit	
S9.000	22.056	0.544	40.5	0.053	5.00	0.0	0.600		o	150	Pipe/Conduit	
S9.001	23.517	0.900	26.1	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S9.002	26.161	0.551	47.5	0.026	0.00	0.0	0.600		o	150	Pipe/Conduit	
S9.003	11.495	0.259	44.4	0.048	0.00	0.0	0.600		o	150	Pipe/Conduit	
S9.004	20.722	0.678	30.6	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S10.000	49.073	1.215	40.4	0.050	5.00	0.0	0.600		o	150	Pipe/Conduit	
S9.005	9.104	0.284	32.1	0.079	0.00	0.0	0.600		o	225	Pipe/Conduit	
S9.006	33.736	1.341	25.2	0.022	0.00	0.0	0.600		o	225	Pipe/Conduit	
S9.007	55.418	0.185	299.6	0.125	0.00	0.0	0.600		o	900	Pipe/Conduit	
S1.012	48.330	0.097	498.2	0.115	0.00	0.0	0.600		o	900	Pipe/Conduit	
S1.013	206.853	1.400	147.8	0.085	0.00	0.0	0.600		o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S6.007	47.38	5.65	18.686	0.221	0.0	0.0	0.0	1.29	279.7	28.8
S1.009	41.00	7.70	18.671	1.348	0.0	0.0	0.0	1.76	31.1	149.7
S1.010	40.49	7.90	17.564	1.348	0.0	0.0	0.0	1.40	888.7	149.7
S8.000	49.64	5.06	17.600	0.000	0.0	0.0	0.0	1.31	92.8	0.0
S8.001	49.26	5.16	17.565	0.000	0.0	0.0	0.0	1.14	80.8	0.0
S1.011	39.26	8.40	17.531	1.441	0.0	0.0	0.0	1.39	886.7	153.2
S9.000	48.96	5.23	22.939	0.053	0.0	0.0	0.0	1.59	28.0	7.0
S9.001	48.19	5.43	22.395	0.053	0.0	0.0	0.0	1.98	34.9	7.0
S9.002	47.08	5.73	21.495	0.079	0.0	0.0	0.0	1.46	25.9	10.1
S9.003	46.63	5.85	20.944	0.127	0.0	0.0	0.0	1.51	26.8	16.0
S9.004	45.97	6.04	20.685	0.127	0.0	0.0	0.0	1.83	32.3	16.0
S10.000	47.87	5.51	21.222	0.050	0.0	0.0	0.0	1.59	28.1	6.5
S9.005	45.75	6.11	19.932	0.256	0.0	0.0	0.0	2.32	92.2	31.7
S9.006	45.03	6.32	19.648	0.278	0.0	0.0	0.0	2.62	104.1	33.9
S9.007	43.43	6.84	17.632	0.403	0.0	0.0	0.0	1.81	1148.4	47.4
S1.012	37.95	8.98	17.447	1.959	0.0	0.0	0.0	1.40	888.6	201.3
S1.013	32.32	12.19	17.350	2.044	0.0	0.0	0.0	1.07	42.7	201.3

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Micro Drainage	Network 2018.1	

Conduit Sections for Storm

NOTE: Diameters less than 66 refer to section numbers of hydraulic conduits. These conduits are marked by the symbols:- [] box culvert, \ / open channel, oo dual pipe, ooo triple pipe, 0 egg.

Section numbers < 0 are taken from user conduit table

Section Number	Conduit Type	Major Dimn. (mm)	Minor Dimn. (mm)	Side Slope (Deg)	Corner Splay (mm)	4*Hyd Radius (m)	XSect Area (m ²)
-2	\ /	3200	750	18.0		2.052	4.131
-3	\ /	2750	750	18.0		1.996	3.794
-5	[]	2700	1500	90.0	550	1.938	3.445

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Manhole Schedules for Storm											
MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S201	25.000	0.600	Open Manhole	1200	S1.000	24.400	225				
SSwale 1a	25.000	0.750	Junction		S1.001	24.250	-2	S1.000	24.350	225	
SSwale 1b	24.350	0.750	Junction		S1.002	23.600	225	S1.001	23.600	-2	
S202	27.401	1.650	Open Manhole	1200	S2.000	25.751	150				
S203	26.058	1.650	Open Manhole	1200	S2.001	24.408	150	S2.000	24.408	150	
S204	25.275	1.350	Open Manhole	1200	S2.002	23.925	150	S2.001	23.925	150	
S205	25.051	1.562	Open Manhole	1200	S1.003	23.489	225	S1.002	23.489	225	
								S2.002	23.564	150	
SSwale 2a	24.250	0.977	Junction		S1.004	23.273	-3	S1.003	23.373	225	
SSwale 2b	23.650	0.750	Junction		S1.005	22.900	150	S1.004	22.900	-3	
SEx Pond	22.800	0.600	Open Manhole	1200	S3.000	22.200	300				
STank 1	22.700	2.100	Open Manhole	1500	S3.001	20.600	450	S3.000	21.770	300	1020
S206	26.714	1.650	Open Manhole	1200	S4.000	25.064	150				
S207	25.049	1.725	Open Manhole	1200	S4.001	23.324	225	S4.000	23.399	150	
STank 2	23.425	2.486	Open Manhole	1200	S5.000	20.939	225				
S208	23.882	2.983	Open Manhole	1200	S4.002	20.899	225	S4.001	20.899	225	
								S5.000	20.899	225	
S209 FC2	23.411	2.871	Open Manhole	3000	S1.006	20.540	150	S1.005	20.540	150	
								S3.001	20.560	450	320
								S4.002	20.540	225	
S210	22.772	2.466	Open Manhole	1200	S1.007	20.306	150	S1.006	20.306	150	
S211	21.206	1.950	Open Manhole	1200	S1.008	19.256	225	S1.007	19.331	150	
S212	23.951	1.650	Open Manhole	1200	S6.000	22.301	150				
S213	23.011	2.757	Open Manhole	1200	S6.001	20.254	150	S6.000	20.254	150	
SBC4a	22.869	4.050	Open Manhole	1200	S6.002	18.819	-5	S6.001	20.169	150	
SBC4b	21.843	3.098	Open Manhole	1200	S6.003	18.745	450	S6.002	18.745	-5	
STank 3	21.550	2.580	Open Manhole	1200	S7.000	18.970	300				
S214	21.500	2.563	Open Manhole	1200	S7.001	18.937	300	S7.000	18.937	300	
S215	21.720	2.986	Open Manhole	1500	S6.004	18.734	450	S6.003	18.734	450	
								S7.001	18.884	300	
SBC5a	21.649	2.925	Open Manhole	1200	S6.005	18.725	-5	S6.004	18.724	450	
SBC5b	21.250	2.557	Open Manhole	1200	S6.006	18.693	525	S6.005	18.693	-5	
S216	21.191	2.505	Open Manhole	1500	S6.007	18.686	525	S6.006	18.686	525	
S217 FC3	21.153	2.482	Open Manhole	3000	S1.009	18.671	150	S1.008	18.671	225	
								S6.007	18.671	525	
S218	20.585	3.021	Open Manhole	1800	S1.010	17.564	900	S1.009	18.314	150	
STank 4	20.050	2.450	Open Manhole	1200	S8.000	17.600	300				
S219	20.150	2.585	Open Manhole	1200	S8.001	17.565	300	S8.000	17.565	300	
S220	20.116	2.585	Open Manhole	1800	S1.011	17.531	900	S1.010	17.531	900	
								S8.001	17.531	300	
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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S221	24.589	1.650	Open Manhole	1200	S9.000	22.939	150				
S222	24.045	1.650	Open Manhole	1200	S9.001	22.395	150	S9.000	22.395	150	
S223	23.145	1.650	Open Manhole	1200	S9.002	21.495	150	S9.001	21.495	150	
S224	22.594	1.650	Open Manhole	1200	S9.003	20.944	150	S9.002	20.944	150	
S225	22.335	1.650	Open Manhole	1200	S9.004	20.685	150	S9.003	20.685	150	
S226	22.872	1.650	Open Manhole	1200	S10.000	21.222	150				
S227	21.657	1.725	Open Manhole	1200	S9.005	19.932	225	S9.004	20.007	150	
								S10.000	20.007	150	
S228	21.373	1.725	Open Manhole	1200	S9.006	19.648	225	S9.005	19.648	225	
S229	20.610	2.978	Open Manhole	1800	S9.007	17.632	900	S9.006	18.307	225	
S230	19.468	2.021	Open Manhole	2100	S1.012	17.447	900	S1.011	17.447	900	
								S9.007	17.447	900	
S231 FC4	20.050	2.700	Open Manhole	2400	S1.013	17.350	225	S1.012	17.350	900	
S	21.000	5.050	Open Manhole	0		OUTFALL		S1.013	15.950	225	

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PIPELINE SCHEDULES for Storm								
Upstream Manhole								
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	225	S201	25.000	24.400	0.375	Open Manhole	1200
S1.001	\/	-2	SSwale 1a	25.000	24.250	0.000	Junction	
S1.002	o	225	SSwale 1b	24.350	23.600	0.525	Junction	
S2.000	o	150	S202	27.401	25.751	1.500	Open Manhole	1200
S2.001	o	150	S203	26.058	24.408	1.500	Open Manhole	1200
S2.002	o	150	S204	25.275	23.925	1.200	Open Manhole	1200
S1.003	o	225	S205	25.051	23.489	1.337	Open Manhole	1200
S1.004	\/	-3	SSwale 2a	24.250	23.273	0.227	Junction	
S1.005	o	150	SSwale 2b	23.650	22.900	0.600	Junction	
S3.000	o	300	SEx Pond	22.800	22.200	0.300	Open Manhole	1200
S3.001	o	450	STank 1	22.700	20.600	1.650	Open Manhole	1500
S4.000	o	150	S206	26.714	25.064	1.500	Open Manhole	1200
S4.001	o	225	S207	25.049	23.324	1.500	Open Manhole	1200
S5.000	o	225	STank 2	23.425	20.939	2.261	Open Manhole	1200
S4.002	o	225	S208	23.882	20.899	2.758	Open Manhole	1200
S1.006	o	150	S209 FC2	23.411	20.540	2.721	Open Manhole	3000
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	5.000	100.0	SSwale 1a	25.000	24.350	0.425	Junction	
S1.001	53.000	81.5	SSwale 1b	24.350	23.600	0.000	Junction	
S1.002	8.870	79.9	S205	25.051	23.489	1.337	Open Manhole	1200
S2.000	19.857	14.8	S203	26.058	24.408	1.500	Open Manhole	1200
S2.001	15.783	32.7	S204	25.275	23.925	1.200	Open Manhole	1200
S2.002	13.288	36.8	S205	25.051	23.564	1.337	Open Manhole	1200
S1.003	7.052	60.8	SSwale 2a	24.250	23.373	0.652	Junction	
S1.004	67.000	179.6	SSwale 2b	23.650	22.900	0.000	Junction	
S1.005	10.100	4.3	S209 FC2	23.411	20.540	2.721	Open Manhole	3000
S3.000	6.300	14.7	STank 1	22.700	21.770	0.630	Open Manhole	1500
S3.001	8.800	220.0	S209 FC2	23.411	20.560	2.401	Open Manhole	3000
S4.000	26.633	16.0	S207	25.049	23.399	1.500	Open Manhole	1200
S4.001	25.056	10.3	S208	23.882	20.899	2.758	Open Manhole	1200
S5.000	6.100	152.5	S208	23.882	20.899	2.758	Open Manhole	1200
S4.002	14.340	39.9	S209 FC2	23.411	20.540	2.646	Open Manhole	3000
S1.006	18.752	80.0	S210	22.772	20.306	2.316	Open Manhole	1200
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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.007	o	150	S210	22.772	20.306	2.316	Open Manhole	1200
S1.008	o	225	S211	21.206	19.256	1.725	Open Manhole	1200
S6.000	o	150	S212	23.951	22.301	1.500	Open Manhole	1200
S6.001	o	150	S213	23.011	20.254	2.607	Open Manhole	1200
S6.002	[]	-5	SBC4a	22.869	18.819	2.550	Open Manhole	1200
S6.003	o	450	SBC4b	21.843	18.745	2.648	Open Manhole	1200
S7.000	o	300	STank 3	21.550	18.970	2.280	Open Manhole	1200
S7.001	o	300	S214	21.500	18.937	2.263	Open Manhole	1200
S6.004	o	450	S215	21.720	18.734	2.536	Open Manhole	1500
S6.005	[]	-5	SBC5a	21.649	18.725	1.424	Open Manhole	1200
S6.006	o	525	SBC5b	21.250	18.693	2.032	Open Manhole	1200
S6.007	o	525	S216	21.191	18.686	1.980	Open Manhole	1500
S1.009	o	150	S217 FC3	21.153	18.671	2.332	Open Manhole	3000
S1.010	o	900	S218	20.585	17.564	2.121	Open Manhole	1800
S8.000	o	300	STank 4	20.050	17.600	2.150	Open Manhole	1200
S8.001	o	300	S219	20.150	17.565	2.285	Open Manhole	1200
S1.011	o	900	S220	20.116	17.531	1.685	Open Manhole	1800

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)
S1.007	47.205	48.4	S211	21.206	19.331	1.725	Open Manhole	1200
S1.008	10.111	17.3	S217 FC3	21.153	18.671	2.257	Open Manhole	3000
S6.000	12.974	6.3	S213	23.011	20.254	2.607	Open Manhole	1200
S6.001	3.000	35.3	SBC4a	22.869	20.169	2.550	Open Manhole	1200
S6.002	37.000	500.0	SBC4b	21.843	18.745	1.598	Open Manhole	1200
S6.003	3.162	287.5	S215	21.720	18.734	2.536	Open Manhole	1500
S7.000	5.000	150.0	S214	21.500	18.937	2.263	Open Manhole	1200
S7.001	7.569	142.8	S215	21.720	18.884	2.536	Open Manhole	1500
S6.004	2.891	289.1	SBC5a	21.649	18.724	2.475	Open Manhole	1200
S6.005	16.000	500.0	SBC5b	21.250	18.693	1.057	Open Manhole	1200
S6.006	2.000	285.7	S216	21.191	18.686	1.980	Open Manhole	1500
S6.007	4.473	298.2	S217 FC3	21.153	18.671	1.957	Open Manhole	3000
S1.009	11.742	32.9	S218	20.585	18.314	2.121	Open Manhole	1800
S1.010	16.441	498.2	S220	20.116	17.531	1.685	Open Manhole	1800
S8.000	5.000	142.9	S219	20.150	17.565	2.285	Open Manhole	1200
S8.001	6.400	188.2	S220	20.116	17.531	2.285	Open Manhole	1800
S1.011	42.036	500.4	S230	19.468	17.447	1.121	Open Manhole	2100

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3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP		C85850 Bartons Road, Havant Phase 2 Surface Water Calcs							
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PIPELINE SCHEDULES for Storm									
Upstream Manhole									
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)	
S9.000	o	150	S221	24.589	22.939	1.500	Open Manhole	1200	
S9.001	o	150	S222	24.045	22.395	1.500	Open Manhole	1200	
S9.002	o	150	S223	23.145	21.495	1.500	Open Manhole	1200	
S9.003	o	150	S224	22.594	20.944	1.500	Open Manhole	1200	
S9.004	o	150	S225	22.335	20.685	1.500	Open Manhole	1200	
S10.000	o	150	S226	22.872	21.222	1.500	Open Manhole	1200	
S9.005	o	225	S227	21.657	19.932	1.500	Open Manhole	1200	
S9.006	o	225	S228	21.373	19.648	1.500	Open Manhole	1200	
S9.007	o	900	S229	20.610	17.632	2.078	Open Manhole	1800	
S1.012	o	900	S230	19.468	17.447	1.121	Open Manhole	2100	
S1.013	o	225	S231 FC4	20.050	17.350	2.475	Open Manhole	2400	
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	22.056	40.5	S222	24.045	22.395	1.500	Open Manhole	1200	
S9.001	23.517	26.1	S223	23.145	21.495	1.500	Open Manhole	1200	
S9.002	26.161	47.5	S224	22.594	20.944	1.500	Open Manhole	1200	
S9.003	11.495	44.4	S225	22.335	20.685	1.500	Open Manhole	1200	
S9.004	20.722	30.6	S227	21.657	20.007	1.500	Open Manhole	1200	
S10.000	49.073	40.4	S227	21.657	20.007	1.500	Open Manhole	1200	
S9.005	9.104	32.1	S228	21.373	19.648	1.500	Open Manhole	1200	
S9.006	33.736	25.2	S229	20.610	18.307	2.078	Open Manhole	1800	
S9.007	55.418	299.6	S230	19.468	17.447	1.121	Open Manhole	2100	
S1.012	48.330	498.2	S231 FC4	20.050	17.350	1.800	Open Manhole	2400	
S1.013	206.853	147.8	S	21.000	15.950	4.825	Open Manhole	0	
Simulation Criteria for Storm									
Volumetric Runoff Coeff		0.750	Additional Flow - % of Total Flow		0.000				
Areal Reduction Factor		1.000	MADD Factor * 10m³/ha Storage		0.000				
Hot Start (mins)		0	Inlet 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 Offline Controls		0		Number of Time/Area Diagrams		0
Number of Online Controls		5	Number of Storage Structures		5		Number of Real Time Controls		0
Synthetic Rainfall Details									
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3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	C85850 Bartons Road, Havant Phase 2 Surface Water Calcs																					
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Micro Drainage	Network 2018.1																					
<u>Synthetic Rainfall Details</u> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Profile Type</td> <td>Summer</td> </tr> <tr> <td>Return Period (years)</td> <td>1</td> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>19.500</td> <td>Storm Duration (mins)</td> <td>30</td> </tr> <tr> <td>Ratio R</td> <td>0.350</td> <td></td> <td></td> </tr> </table>			Rainfall Model	FSR	Profile Type	Summer	Return Period (years)	1	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		
Rainfall Model	FSR	Profile Type	Summer																			
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Online Controls for Storm

Orifice Manhole: SSswale 1b, DS/PN: S1.002, Volume (m³): 219.0

Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 23.600

Orifice Manhole: SSswale 2b, DS/PN: S1.005, Volume (m³): 254.2

Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 22.900

Hydro-Brake® Optimum Manhole: S209 FC2, DS/PN: S1.006, Volume (m³): 22.0

Unit Reference MD-SHE-0091-5000-2050-5000

Design Head (m) 2.050

Design Flow (l/s) 5.0

Flush-Flo™ Calculated

Objective Minimise upstream storage

Application Surface

Sump Available Yes

Diameter (mm) 91

Invert Level (m) 20.540

Minimum Outlet Pipe Diameter (mm) 150

Suggested Manhole Diameter (mm) 1200

Control Points

Head (m)

Flow (l/s)

Design Point (Calculated)

2.050

5.0

Flush-Flo™

0.402

4.1

Control Points

Head (m)

Flow (l/s)

Kick-Flo®

0.813

3.3

Mean Flow over Head Range

-

3.9

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

Depth (m)

Flow (l/s)

Depth (m)

Flow (l/s)

Depth (m)

Flow (l/s)

Depth (m)

Flow (l/s)

0.100

2.9

1.200

3.9

3.000

6.0

7.000

8.9

0.200

3.8

1.400

4.2

3.500

6.4

7.500

9.2

0.300

4.0

1.600

4.5

4.000

6.8

8.000

9.5

0.400

4.1

1.800

4.7

4.500

7.2

8.500

9.8

0.500

4.0

2.000

4.9

5.000

7.6

9.000

10.0

0.600

3.9

2.200

5.2

5.500

7.9

9.500

10.3

0.800

3.3

2.400

5.4

6.000

8.3

1.000

3.6

2.600

5.6

6.500

8.6

Hydro-Brake® Optimum Manhole: S217 FC3, DS/PN: S1.009, Volume (m³): 18.3

Unit Reference MD-SHE-0133-9700-1750-9700

Design Head (m) 1.750

Design Flow (l/s) 9.7

Flush-Flo™ Calculated

Objective Minimise upstream storage

Application Surface

Sump Available Yes

Diameter (mm) 133

Invert Level (m) 18.671

Minimum Outlet Pipe Diameter (mm) 150

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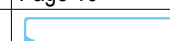
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<u>Hydro-Brake® Optimum Manhole: S217 FC3, DS/PN: S1.009, Volume (m³): 18.3</u> Suggested Manhole Diameter (mm) 1500 <table><tr><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th></tr><tr><td>Design Point (Calculated)</td><td>1.750</td><td>9.7</td><td>Kick-Flo®</td><td>1.067</td><td>7.7</td></tr><tr><td>Flush-Flo™</td><td>0.515</td><td>9.7</td><td>Mean Flow over Head Range</td><td>-</td><td>8.5</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 Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated <table><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr><tr><td>0.100</td><td>4.8</td><td>1.200</td><td>8.1</td><td>3.000</td><td>12.5</td><td>7.000</td><td>18.7</td></tr><tr><td>0.200</td><td>8.4</td><td>1.400</td><td>8.7</td><td>3.500</td><td>13.5</td><td>7.500</td><td>19.4</td></tr><tr><td>0.300</td><td>9.2</td><td>1.600</td><td>9.3</td><td>4.000</td><td>14.3</td><td>8.000</td><td>20.0</td></tr><tr><td>0.400</td><td>9.6</td><td>1.800</td><td>9.8</td><td>4.500</td><td>15.2</td><td>8.500</td><td>20.6</td></tr><tr><td>0.500</td><td>9.7</td><td>2.000</td><td>10.3</td><td>5.000</td><td>15.9</td><td>9.000</td><td>21.1</td></tr><tr><td>0.600</td><td>9.6</td><td>2.200</td><td>10.8</td><td>5.500</td><td>16.7</td><td>9.500</td><td>21.7</td></tr><tr><td>0.800</td><td>9.3</td><td>2.400</td><td>11.2</td><td>6.000</td><td>17.4</td><td></td><td></td></tr><tr><td>1.000</td><td>8.3</td><td>2.600</td><td>11.7</td><td>6.500</td><td>18.1</td><td></td><td></td></tr></table> <u>Hydro-Brake® Optimum Manhole: S231 FC4, DS/PN: S1.013, Volume (m³): 41.5</u> <table><tr><td>Unit Reference</td><td>MD-SHE-0180-1940-2050-1940</td></tr><tr><td>Design Head (m)</td><td>2.050</td></tr><tr><td>Design Flow (l/s)</td><td>19.4</td></tr><tr><td>Flush-Flo™</td><td>Calculated</td></tr><tr><td>Objective</td><td>Minimise upstream storage</td></tr><tr><td>Application</td><td>Surface</td></tr><tr><td>Sump Available</td><td>Yes</td></tr><tr><td>Diameter (mm)</td><td>180</td></tr><tr><td>Invert Level (m)</td><td>17.350</td></tr><tr><td>Minimum Outlet Pipe Diameter (mm)</td><td>225</td></tr><tr><td>Suggested Manhole Diameter (mm)</td><td>1800</td></tr></table> <table><tr><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th></tr><tr><td>Design Point (Calculated)</td><td>2.050</td><td>19.4</td><td>Kick-Flo®</td><td>1.249</td><td>15.3</td></tr><tr><td>Flush-Flo™</td><td>0.588</td><td>19.4</td><td>Mean Flow over Head Range</td><td>-</td><td>16.9</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 Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated <table><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr><tr><td>0.100</td><td>6.4</td><td>1.200</td><td>16.2</td><td>3.000</td><td>23.3</td><td>7.000</td><td>35.0</td></tr><tr><td>0.200</td><td>16.1</td><td>1.400</td><td>16.2</td><td>3.500</td><td>25.0</td><td>7.500</td><td>36.1</td></tr><tr><td>0.300</td><td>17.9</td><td>1.600</td><td>17.2</td><td>4.000</td><td>26.7</td><td>8.000</td><td>37.3</td></tr><tr><td>0.400</td><td>18.9</td><td>1.800</td><td>18.2</td><td>4.500</td><td>28.2</td><td>8.500</td><td>38.4</td></tr><tr><td>0.500</td><td>19.3</td><td>2.000</td><td>19.2</td><td>5.000</td><td>29.7</td><td>9.000</td><td>39.5</td></tr><tr><td>0.600</td><td>19.4</td><td>2.200</td><td>20.1</td><td>5.500</td><td>31.1</td><td>9.500</td><td>40.5</td></tr><tr><td>0.800</td><td>19.0</td><td>2.400</td><td>20.9</td><td>6.000</td><td>32.4</td><td></td><td></td></tr><tr><td>1.000</td><td>18.2</td><td>2.600</td><td>21.7</td><td>6.500</td><td>33.7</td><td></td><td></td></tr></table>			Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	1.750	9.7	Kick-Flo®	1.067	7.7	Flush-Flo™	0.515	9.7	Mean Flow over Head Range	-	8.5	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	4.8	1.200	8.1	3.000	12.5	7.000	18.7	0.200	8.4	1.400	8.7	3.500	13.5	7.500	19.4	0.300	9.2	1.600	9.3	4.000	14.3	8.000	20.0	0.400	9.6	1.800	9.8	4.500	15.2	8.500	20.6	0.500	9.7	2.000	10.3	5.000	15.9	9.000	21.1	0.600	9.6	2.200	10.8	5.500	16.7	9.500	21.7	0.800	9.3	2.400	11.2	6.000	17.4			1.000	8.3	2.600	11.7	6.500	18.1			Unit Reference	MD-SHE-0180-1940-2050-1940	Design Head (m)	2.050	Design Flow (l/s)	19.4	Flush-Flo™	Calculated	Objective	Minimise upstream storage	Application	Surface	Sump Available	Yes	Diameter (mm)	180	Invert Level (m)	17.350	Minimum Outlet Pipe Diameter (mm)	225	Suggested Manhole Diameter (mm)	1800	Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	2.050	19.4	Kick-Flo®	1.249	15.3	Flush-Flo™	0.588	19.4	Mean Flow over Head Range	-	16.9	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	6.4	1.200	16.2	3.000	23.3	7.000	35.0	0.200	16.1	1.400	16.2	3.500	25.0	7.500	36.1	0.300	17.9	1.600	17.2	4.000	26.7	8.000	37.3	0.400	18.9	1.800	18.2	4.500	28.2	8.500	38.4	0.500	19.3	2.000	19.2	5.000	29.7	9.000	39.5	0.600	19.4	2.200	20.1	5.500	31.1	9.500	40.5	0.800	19.0	2.400	20.9	6.000	32.4			1.000	18.2	2.600	21.7	6.500	33.7		
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<u>Storage Structures for Storm</u> <u>Tank or Pond Manhole: SEx Pond, DS/PN: S3.000</u> Invert Level (m) 22.200 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr><tr><td>0.000</td><td>77.8</td><td>0.450</td><td>77.8</td></tr></table> <u>Cellular Storage Manhole: STank 1, DS/PN: S3.001</u> Invert Level (m) 20.600 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>192.0</td><td>225.0</td><td>2.001</td><td>0.0</td><td>361.0</td></tr><tr><td>2.000</td><td>192.0</td><td>361.0</td><td></td><td></td><td></td></tr></table> <u>Cellular Storage Manhole: STank 2, DS/PN: S5.000</u> Invert Level (m) 20.939 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>51.3</td><td>0.0</td><td>1.500</td><td>51.3</td><td>0.0</td></tr><tr><td>1.000</td><td>51.3</td><td>0.0</td><td>1.501</td><td>0.0</td><td>0.0</td></tr></table> <u>Cellular Storage Manhole: STank 3, DS/PN: S7.000</u> Invert Level (m) 18.970 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>42.5</td><td>57.5</td><td>1.501</td><td>0.0</td><td>134.0</td></tr><tr><td>1.500</td><td>42.5</td><td>134.0</td><td></td><td></td><td></td></tr></table> <u>Cellular Storage Manhole: STank 4, DS/PN: S8.000</u> Invert Level (m) 17.600 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>126.0</td><td>0.0</td><td>1.501</td><td>0.0</td><td>0.0</td></tr><tr><td>1.500</td><td>126.0</td><td>0.0</td><td></td><td></td><td></td></tr></table>			Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	0.000	77.8	0.450	77.8	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	0.000	192.0	225.0	2.001	0.0	361.0	2.000	192.0	361.0				Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	0.000	51.3	0.0	1.500	51.3	0.0	1.000	51.3	0.0	1.501	0.0	0.0	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	0.000	42.5	57.5	1.501	0.0	134.0	1.500	42.5	134.0				Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	0.000	126.0	0.0	1.501	0.0	0.0	1.500	126.0	0.0			
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3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	C85850 Bartons Road, Havant Phase 2 Surface Water Calcs	
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Micro Drainage	Network 2018.1	

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

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m ³)	Pipe Flow (l/s)	Status
S1.000	S201		0.160	23.3	OK
S1.001	SSwale 1a		0.010	23.2	OK
S1.002	SSwale 1b		8.360	5.8	SURCHARGED*
S2.000	S202		0.033	5.1	OK
S2.001	S203		0.046	5.1	OK
S2.002	S204		0.109	17.4	OK
S1.003	S205		0.175	22.2	OK
S1.004	SSwale 2a		0.025	26.9	OK
S1.005	SSwale 2b		21.299	6.3	SURCHARGED*
S3.000	SEx Pond		0.000	0.0	OK
S3.001	STank 1		74.677	3.7	OK
S4.000	S206		0.036	5.8	OK
S4.001	S207		0.075	32.5	OK
S5.000	STank 2		2.904	0.7	OK
S4.002	S208		0.380	43.2	OK
S1.006	S209 FC2		4.664	4.1	SURCHARGED
S1.007	S210		0.150	20.1	OK
S1.008	S211		0.097	34.8	OK
S6.000	S212		0.033	7.5	OK
S6.001	S213		0.072	7.4	OK
S6.002	SBC4a		0.360	7.6	OK
S6.003	SBC4b		17.236	3.5	OK
S7.000	STank 3		6.661	1.5	OK
S7.001	S214		0.359	1.5	OK
S6.004	S215		1.305	4.2	OK

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Date 03/07/2018 15:11 File 2018.06.26 PHASE 2 STRATEGY.MDX	Designed by KM Checked by KT	
Micro Drainage	Network 2018.1	

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

PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S6.005	SBC5a	60 minute 1 year Winter I+0%	60	21.649	19.143	-1.082	0.000	0.00
S6.006	SBC5b	60 minute 1 year Winter I+0%	60	21.250	19.143	-0.075	0.000	0.03
S6.007	S216	60 minute 1 year Winter I+0%	60	21.191	19.143	-0.068	0.000	0.03
S1.009	S217 FC3	60 minute 1 year Winter I+0%	60	21.153	19.143	0.322	0.000	0.34
S1.010	S218	60 minute 1 year Winter I+0%	60	20.585	17.842	-0.622	0.000	0.02
S8.000	STank 4	120 minute 1 year Winter I+0%	120	20.050	17.745	-0.155	0.000	0.07
S8.001	S219	60 minute 1 year Winter I+0%	60	20.150	17.785	-0.080	0.000	0.08
S1.011	S220	60 minute 1 year Winter I+0%	60	20.116	17.841	-0.590	0.000	0.02
S9.000	S221	15 minute 1 year Winter I+0%	15	24.589	22.991	-0.098	0.000	0.26
S9.001	S222	15 minute 1 year Winter I+0%	15	24.045	22.441	-0.104	0.000	0.20
S9.002	S223	15 minute 1 year Winter I+0%	15	23.145	21.560	-0.085	0.000	0.39
S9.003	S224	15 minute 1 year Winter I+0%	15	22.594	21.030	-0.064	0.000	0.61
S9.004	S225	15 minute 1 year Winter I+0%	15	22.335	20.759	-0.076	0.000	0.49
S10.000	S226	15 minute 1 year Winter I+0%	15	22.872	21.271	-0.101	0.000	0.23
S9.005	S227	15 minute 1 year Winter I+0%	15	21.657	20.030	-0.127	0.000	0.39
S9.006	S228	15 minute 1 year Winter I+0%	15	21.373	19.737	-0.136	0.000	0.33
S9.007	S229	60 minute 1 year Winter I+0%	60	20.610	17.843	-0.689	0.000	0.03
S1.012	S230	60 minute 1 year Winter I+0%	60	19.468	17.841	-0.506	0.000	0.04
S1.013	S231 FC4	60 minute 1 year Winter I+0%	60	20.050	17.839	0.264	0.000	0.45

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
S6.005	SBC5a	0.680	4.2	OK	
S6.006	SBC5b	9.125	5.3	OK	
S6.007	S216	0.912	5.3	OK	
S1.009	S217 FC3	3.901	9.6	SURCHARGED	
S1.010	S218	0.694	9.9	OK	
S8.000	STank 4	17.520	4.1	OK	
S8.001	S219	0.414	4.4	OK	
S1.011	S220	2.837	14.4	OK	
S9.000	S221	0.053	6.8	OK	
S9.001	S222	0.055	6.7	OK	
S9.002	S223	0.077	9.6	OK	
S9.003	S224	0.111	14.8	OK	
S9.004	S225	0.093	14.8	OK	
S10.000	S226	0.050	6.3	OK	
S9.005	S227	0.107	29.6	OK	
S9.006	S228	0.111	32.0	OK	
S9.007	S229	0.523	27.3	OK	
S1.012	S230	18.643	25.8	OK	
S1.013	S231 FC4	14.567	19.1	SURCHARGED	

JNP Group

3rd Floor, Marlborough House
48 Holly Walk
Leamington Spa CV32 4XP

Date 03/07/2018 15:11
File 2018.06.26 PHASE 2 STRATEGY.MDX

Micro Drainage

C85850
Bartons Road, Havant
Phase 2 Surface Water Calcs

Designed by KM
Checked by KT

Network 2018.1

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

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 0.000

Hot Start Level (mm) 0

Inlet 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 Offline Controls 0

Number of Time/Area Diagrams 0

Number of Online Controls 5

Number of Storage Structures 5

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)

19.300 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)

300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status

OFF

DVD Status

OFF

Inertia Status

OFF

Profile(s)

Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440

Return Period(s) (years) 1, 30, 100

Climate Change (%) 0, 0, 30

PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S201	15 minute 30 year Winter I+0%	15	25.000	24.736	0.111	0.000
S1.001	SSwale 1a	15 minute 30 year Winter I+0%	15	25.000	24.286	-0.714	0.000
S1.002	SSwale 1b	60 minute 30 year Winter I+0%	60	24.350	24.009	0.184	0.000
S2.000	S202	15 minute 30 year Winter I+0%	15	27.401	25.806	-0.095	0.000
S2.001	S203	15 minute 30 year Winter I+0%	15	26.058	24.806	0.248	0.000
S2.002	S204	15 minute 30 year Winter I+0%	15	25.275	24.741	0.666	0.000
S1.003	S205	15 minute 30 year Winter I+0%	15	25.051	23.716	0.002	0.000
S1.004	SSwale 2a	15 minute 30 year Winter I+0%	15	24.250	23.342	-0.681	0.000
S1.005	SSwale 2b	120 minute 30 year Winter I+0%	120	23.650	23.332	0.282	0.000
S3.000	SEx Pond	60 minute 30 year Winter I+0%	60	22.800	22.200	-0.300	0.000
S3.001	STank 1	480 minute 30 year Winter I+0%	480	22.700	21.701	0.651	0.000
S4.000	S206	15 minute 30 year Winter I+0%	15	26.714	25.124	-0.090	0.000
S4.001	S207	15 minute 30 year Winter I+0%	15	25.049	23.456	-0.093	0.000
S5.000	STank 2	480 minute 30 year Winter I+0%	480	23.425	21.701	0.537	0.000
S4.002	S208	480 minute 30 year Winter I+0%	480	23.882	21.701	0.577	0.000
S1.006	S209 FC2	480 minute 30 year Winter I+0%	480	23.411	21.701	1.011	0.000
S1.007	S210	15 minute 30 year Winter I+0%	15	22.772	22.010	1.554	0.000
S1.008	S211	15 minute 30 year Winter I+0%	15	21.206	19.641	0.160	0.000
S6.000	S212	15 minute 30 year Winter I+0%	15	23.951	22.355	-0.096	0.000
S6.001	S213	15 minute 30 year Winter I+0%	15	23.011	20.384	-0.020	0.000
S6.002	SBC4a	240 minute 30 year Winter I+0%	240	22.869	19.617	-0.702	0.000
S6.003	SBC4b	240 minute 30 year Winter I+0%	240	21.843	19.617	0.422	0.000
S7.000	STank 3	240 minute 30 year Winter I+0%	240	21.550	19.617	0.347	0.000
S7.001	S214	240 minute 30 year Winter I+0%	240	21.500	19.617	0.380	0.000
S6.004	S215	240 minute 30 year Winter I+0%	240	21.720	19.617	0.433	0.000

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

PN	US/MH Name	Flow / Cap.	Overflow (1/s)	Maximum Vol (m³)	Pipe Flow (1/s)	Status
S1.000	S201	1.81		0.374	57.0	FLOOD RISK
S1.001	SSwale 1a	0.01		0.031	57.0	OK
S1.002	SSwale 1b	0.17		27.566	8.1	SURCHARGED*
S2.000	S202	0.29		0.057	12.6	OK
S2.001	S203	0.48		0.522	14.0	SURCHARGED
S2.002	S204	1.67		1.175	45.0	SURCHARGED
S1.003	S205	1.03		0.539	49.5	SURCHARGED
S1.004	SSwale 2a	0.01		0.064	61.8	OK
S1.005	SSwale 2b	0.10		60.053	8.4	SURCHARGED*
S3.000	SEx Pond	0.00		0.000	0.0	OK
S3.001	STank 1	0.02		202.745	2.8	SURCHARGED
S4.000	S206	0.33		0.062	14.2	OK
S4.001	S207	0.64		0.147	96.5	OK
S5.000	STank 2	0.03		37.984	0.8	SURCHARGED
S4.002	S208	0.20		1.364	14.5	SURCHARGED
S1.006	S209 FC2	0.22		9.770	4.1	SURCHARGED
S1.007	S210	1.54		2.216	38.4	SURCHARGED
S1.008	S211	0.75		0.621	78.8	SURCHARGED
S6.000	S212	0.28		0.056	18.3	OK
S6.001	S213	0.99		0.146	18.0	OK
S6.002	SBC4a	0.00		0.897	7.3	OK
S6.003	SBC4b	0.02		59.501	2.9	SURCHARGED
S7.000	STank 3	0.02		26.840	1.4	SURCHARGED
S7.001	S214	0.02		1.032	1.4	SURCHARGED
S6.004	S215	0.03		2.280	4.2	SURCHARGED

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Micro Drainage	Network 2018.1	

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

PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S6.005	SBC5a	240 minute 30 year Winter I+0%	240	21.649	19.617	-0.608	0.000
S6.006	SBC5b	240 minute 30 year Winter I+0%	240	21.250	19.617	0.399	0.000
S6.007	S216	240 minute 30 year Winter I+0%	240	21.191	19.617	0.406	0.000
S1.009	S217 FC3	240 minute 30 year Winter I+0%	240	21.153	19.617	0.796	0.000
S1.010	S218	120 minute 30 year Winter I+0%	120	20.585	18.152	-0.312	0.000
S8.000	STank 4	120 minute 30 year Winter I+0%	120	20.050	18.150	0.250	0.000
S8.001	S219	120 minute 30 year Winter I+0%	120	20.150	18.150	0.285	0.000
S1.011	S220	120 minute 30 year Winter I+0%	120	20.116	18.151	-0.280	0.000
S9.000	S221	15 minute 30 year Winter I+0%	15	24.589	23.026	-0.063	0.000
S9.001	S222	15 minute 30 year Winter I+0%	15	24.045	22.471	-0.074	0.000
S9.002	S223	15 minute 30 year Winter I+0%	15	23.145	21.930	0.285	0.000
S9.003	S224	15 minute 30 year Winter I+0%	15	22.594	21.485	0.391	0.000
S9.004	S225	15 minute 30 year Winter I+0%	15	22.335	20.970	0.135	0.000
S10.000	S226	15 minute 30 year Winter I+0%	15	22.872	21.304	-0.068	0.000
S9.005	S227	15 minute 30 year Winter I+0%	15	21.657	20.111	-0.046	0.000
S9.006	S228	15 minute 30 year Winter I+0%	15	21.373	19.805	-0.068	0.000
S9.007	S229	120 minute 30 year Winter I+0%	120	20.610	18.151	-0.381	0.000
S1.012	S230	120 minute 30 year Winter I+0%	120	19.468	18.151	-0.196	0.000
S1.013	S231 FC4	120 minute 30 year Winter I+0%	120	20.050	18.149	0.574	0.000

PN	US/MH Name	Flow / Overflow Cap. (l/s)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
S6.005	SBC5a	0.00	1.250	4.2	OK
S6.006	SBC5b	0.03	27.277	5.6	SURCHARGED
S6.007	S216	0.03	1.777	5.5	SURCHARGED
S1.009	S217 FC3	0.34	7.450	9.6	SURCHARGED
S1.010	S218	0.02	1.483	9.1	OK
S8.000	STank 4	0.08	66.414	4.8	SURCHARGED
S8.001	S219	0.08	0.925	4.8	SURCHARGED
S1.011	S220	0.02	7.544	14.2	OK
S9.000	S221	0.63	0.093	16.7	OK
S9.001	S222	0.50	0.095	16.5	OK
S9.002	S223	0.90	0.642	22.1	SURCHARGED
S9.003	S224	1.41	0.974	34.2	SURCHARGED
S9.004	S225	1.10	0.458	33.4	SURCHARGED
S10.000	S226	0.56	0.087	15.4	OK
S9.005	S227	0.97	0.242	72.5	OK
S9.006	S228	0.81	0.233	79.3	OK
S9.007	S229	0.05	1.307	42.9	OK
S1.012	S230	0.03	45.037	23.9	OK
S1.013	S231 FC4	0.46	28.079	19.3	SURCHARGED

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

PN	US/MH Name	Flow / Cap.	Overflow (1/s)	Maximum Vol (m³)	Pipe Flow (1/s)	Status
S1.000	S201	2.95		0.958	93.1	FLOOD
S1.001	SSwale 1a	0.01		0.053	92.8	OK
S1.002	SSwale 1b	0.20		54.567	9.6	FLOOD RISK*
S2.000	S202	0.48		0.096	20.9	OK
S2.001	S203	0.72		1.521	20.9	SURCHARGED
S2.002	S204	2.04		5.943	55.0	FLOOD
S1.003	S205	1.29		0.713	61.9	SURCHARGED
S1.004	SSwale 2a	0.01		0.309	30.1	OK
S1.005	SSwale 2b	0.12		116.288	10.1	FLOOD RISK*
S3.000	SEx Pond	0.01		29.567	1.4	FLOOD RISK
S3.001	STank 1	0.03		364.049	4.6	FLOOD RISK
S4.000	S206	0.56		0.087	23.8	OK
S4.001	S207	1.01		1.798	151.7	SURCHARGED
S5.000	STank 2	0.03		74.965	0.9	SURCHARGED
S4.002	S208	0.17		2.702	12.3	SURCHARGED
S1.006	S209 FC2	0.27		16.005	5.0	SURCHARGED
S1.007	S210	1.76		9.368	43.9	FLOOD
S1.008	S211	0.25		2.178	26.1	SURCHARGED
S6.000	S212	0.47		0.077	30.7	OK
S6.001	S213	1.66		0.361	30.4	SURCHARGED
S6.002	SBC4a	0.00		1.881	9.1	SURCHARGED
S6.003	SBC4b	0.15		123.322	18.2	SURCHARGED
S7.000	STank 3	0.08		61.763	5.1	SURCHARGED
S7.001	S214	0.07		1.984	4.6	SURCHARGED
S6.004	S215	0.18		3.767	21.7	SURCHARGED

