

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	Foul Sewage (l/s/ha)	0.000
M5-60 (mm)	20.000	Volumetric Runoff Coeff.	0.750
Ratio R	0.400	PIMP (%)	100
Maximum Rainfall (mm/hr)	100	Add Flow / Climate Change (%)	0
Maximum Time of Concentration (mins)	30	Minimum Backdrop Height (m)	0.200
		Maximum Backdrop Height (m)	1.500
		Min Design Depth for Optimisation (m)	1.200
		Min Vel for Auto Design only (m/s)	1.00
		Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

















Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.438	4-8	0.513	8-12	0.021

Total Area Contributing (ha) = 0.972

Total Pipe Volume (m³) = 30.774

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)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	21.290	0.126	169.0	0.045	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	11.440	0.068	168.2	0.013	0.00	0.0	0.600	o	225	Pipe/Conduit	
S2.000	10.490	0.289	36.3	0.056	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.002	12.640	0.075	168.5	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.003	43.380	0.178	243.7	0.010	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.004	19.110	0.078	245.0	0.080	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.005	34.010	0.139	244.7	0.063	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.000	26.610	0.157	169.5	0.156	5.00	0.0	0.600	o	225	Pipe/Conduit	
S3.001	16.070	0.095	169.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.002	15.340	0.237	64.7	0.032	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.006	35.880	0.318	112.8	0.072	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.000	11.210	0.066	169.8	0.033	5.00	0.0	0.600	o	225	Pipe/Conduit	
S4.001	23.050	0.136	169.5	0.055	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.007	8.340	0.026	320.8	0.023	0.00	0.0	0.600	o	375	Pipe/Conduit	
S5.000	23.710	0.297	79.8	0.046	5.00	0.0	0.600	o	150	Pipe/Conduit	
S5.001	10.840	0.616	17.6	0.021	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	53.08	5.35	33.070	0.045	0.0	0.0	0.0	1.00	39.9	6.5
S1.001	52.25	5.54	32.944	0.058	0.0	0.0	0.0	1.01	40.0	8.2
S2.000	54.22	5.10	33.240	0.056	0.0	0.0	0.0	1.68	29.6	8.2
S1.002	51.36	5.75	32.876	0.114	0.0	0.0	0.0	1.00	39.9	15.9
S1.003	48.57	6.47	32.726	0.124	0.0	0.0	0.0	1.00	70.9	16.3
S1.004	47.44	6.79	32.548	0.204	0.0	0.0	0.0	1.00	70.7	26.2
S1.005	45.57	7.36	32.470	0.267	0.0	0.0	0.0	1.00	70.7	33.0
S3.000	52.68	5.44	32.895	0.156	0.0	0.0	0.0	1.00	39.8	22.3
S3.001	51.54	5.71	32.738	0.156	0.0	0.0	0.0	1.00	39.9	22.3
S3.002	51.00	5.84	32.568	0.188	0.0	0.0	0.0	1.96	138.4	26.0
S1.006	44.34	7.76	32.331	0.527	0.0	0.0	0.0	1.48	104.6	63.3
S4.000	53.83	5.19	32.290	0.033	0.0	0.0	0.0	1.00	39.8	4.8
S4.001	52.13	5.57	32.224	0.088	0.0	0.0	0.0	1.00	39.8	12.4
S1.007	43.94	7.90	31.938	0.638	0.0	0.0	0.0	1.01	111.1	75.9
S5.000	53.09	5.35	33.050	0.046	0.0	0.0	0.0	1.13	19.9	6.6
S5.001	52.76	5.43	32.753	0.067	0.0	0.0	0.0	2.41	42.6	9.6



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)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.008	27.080	0.084	322.4	0.033	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.009	19.210	0.060	320.2	0.038	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.010	6.980	0.022	317.3	0.011	0.00	0.0	0.600	o	375	Pipe/Conduit	
S6.000	18.840	0.229	82.3	0.030	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.011	13.430	0.571	23.5	0.046	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.012	24.530	1.105	22.2	0.013	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.013	11.850	0.053	223.6	0.016	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.014	5.210	0.017	306.5	0.011	0.00	0.0	0.600	o	375	Pipe/Conduit	
S7.000	29.170	0.525	55.6	0.056	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.015	5.930	0.015	395.3	0.013	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.008	42.68	8.35	31.912	0.738	0.0	0.0	0.0	1.00	110.8	85.3
S1.009	41.84	8.67	31.828	0.776	0.0	0.0	0.0	1.01	111.2	87.9
S1.010	41.54	8.78	31.768	0.787	0.0	0.0	0.0	1.01	111.7	88.5
S6.000	53.39	5.28	32.200	0.030	0.0	0.0	0.0	1.11	19.6	4.3
S1.011	41.39	8.84	31.746	0.863	0.0	0.0	0.0	3.75	414.2	96.7
S1.012	41.14	8.95	31.175	0.876	0.0	0.0	0.0	3.86	426.3	97.6
S1.013	40.76	9.11	30.070	0.892	0.0	0.0	0.0	1.21	133.4	98.5
S1.014	40.57	9.20	30.017	0.903	0.0	0.0	0.0	1.03	113.7	99.2
S7.000	53.05	5.36	30.750	0.056	0.0	0.0	0.0	1.35	23.9	8.0
S1.015	40.35	9.29	29.925	0.972	0.0	0.0	0.0	1.02	161.6	106.2

66a Church Walk
 Burgess Hill
 West Sussex RH15 9AS

HOPLANDS FARM
 HERSDEN
 PHASE 1a WEST

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Micro Drainage

Network 2018.1

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)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	34.845	1.775	Open Manhole	1200	S1.000	33.070	225				
S2	35.130	2.186	Open Manhole	1200	S1.001	32.944	225	S1.000	32.944	225	
S3	34.940	1.700	Open Manhole	1200	S2.000	33.240	150				
S4	35.000	2.124	Open Manhole	1200	S1.002	32.876	225	S1.001	32.876	225	
								S2.000	32.951	150	
S5	35.100	2.374	Open Manhole	1200	S1.003	32.726	300	S1.002	32.801	225	
S6	34.875	2.327	Open Manhole	1200	S1.004	32.548	300	S1.003	32.548	300	
S7	34.630	2.160	Open Manhole	1200	S1.005	32.470	300	S1.004	32.470	300	
S8	34.670	1.775	Open Manhole	1200	S3.000	32.895	225				
S9	34.815	2.077	Open Manhole	1200	S3.001	32.738	225	S3.000	32.738	225	
S10	34.980	2.412	Open Manhole	1200	S3.002	32.568	300	S3.001	32.643	225	
S11	34.920	2.589	Open Manhole	1200	S1.006	32.331	300	S1.005	32.331	300	
								S3.002	32.331	300	
S12	34.065	1.775	Open Manhole	1200	S4.000	32.290	225				
S13	34.205	1.981	Open Manhole	1200	S4.001	32.224	225	S4.000	32.224	225	
S14	34.460	2.522	Open Manhole	1350	S1.007	31.938	375	S1.006	32.013	300	
								S4.001	32.088	225	
S15	34.750	1.700	Open Manhole	1200	S5.000	33.050	150				
S15A	34.500	1.747	Open Manhole	1200	S5.001	32.753	150	S5.000	32.753	150	
S16	34.350	2.438	Open Manhole	1350	S1.008	31.912	375	S1.007	31.912	375	
								S5.001	32.137	150	
S17	33.995	2.167	Open Manhole	1350	S1.009	31.828	375	S1.008	31.828	375	
S19A	33.500	1.732	Open Manhole	1350	S1.010	31.768	375	S1.009	31.768	375	
S18	33.600	1.400	Open Manhole	1200	S6.000	32.200	150				
S19	33.365	1.619	Open Manhole	1350	S1.011	31.746	375	S1.010	31.746	375	
								S6.000	31.971	150	
S20	33.100	1.925	Open Manhole	1350	S1.012	31.175	375	S1.011	31.175	375	
S20A	31.995	1.925	Open Manhole	1350	S1.013	30.070	375	S1.012	30.070	375	
S21	31.670	1.653	Open Manhole	1350	S1.014	30.017	375	S1.013	30.017	375	
S22	32.150	1.400	Open Manhole	1200	S7.000	30.750	150				
S23	31.700	1.775	Open Manhole	1350	S1.015	29.925	450	S1.014	30.000	375	
								S7.000	30.225	150	
SHWALL	30.700	0.790	Open Manhole	0		OUTFALL		S1.015	29.910	450	

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.045	0.045	0.045
1.001	-	-	100	0.013	0.013	0.013
2.000	-	-	100	0.056	0.056	0.056
1.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.010	0.010	0.010
1.004	-	-	100	0.080	0.080	0.080
1.005	-	-	100	0.063	0.063	0.063
3.000	-	-	100	0.156	0.156	0.156
3.001	-	-	100	0.000	0.000	0.000
3.002	-	-	100	0.032	0.032	0.032
1.006	-	-	100	0.072	0.072	0.072
4.000	-	-	100	0.033	0.033	0.033
4.001	-	-	100	0.055	0.055	0.055
1.007	-	-	100	0.023	0.023	0.023
5.000	-	-	100	0.046	0.046	0.046
5.001	-	-	100	0.021	0.021	0.021
1.008	-	-	100	0.033	0.033	0.033
1.009	-	-	100	0.038	0.038	0.038
1.010	-	-	100	0.011	0.011	0.011
6.000	-	-	100	0.030	0.030	0.030
1.011	-	-	100	0.046	0.046	0.046
1.012	-	-	100	0.013	0.013	0.013
1.013	-	-	100	0.016	0.016	0.016
1.014	-	-	100	0.011	0.011	0.011
7.000	-	-	100	0.056	0.056	0.056
1.015	-	-	100	0.013	0.013	0.013
				Total	Total	Total
				0.972	0.972	0.972

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S1.015	SHWALL	30.700	29.910	0.000	0	0

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

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coefficient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 40.000 Flow per Person per Day (l/per/day) 0.000

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


Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DTS Status ON Inertia Status OFF
Analysis Timestep Fine DVD Status OFF

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

PN	US/MH Name	Storm	Return Period	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged	Flooded	Flow / Cap.	Overflow	Pipe	Status	Level
								Level (m)	Depth (m)	Volume (m ³)		Flow (l/s)	Flow (l/s)		Exceeded
S1.000	S1	15 Winter	100	100/15	Summer			34.384	1.089	0.000	0.76	27.8	SURCHARGED		
S1.001	S2	15 Winter	100	100/15	Summer			34.361	1.192	0.000	0.93	31.5	SURCHARGED		
S2.000	S3	15 Winter	100	100/15	Summer			34.585	1.195	0.000	0.99	26.3	SURCHARGED		
S1.002	S4	15 Winter	100	100/15	Summer			34.339	1.238	0.000	1.23	42.3	SURCHARGED		
S1.003	S5	15 Winter	100	100/15	Summer			34.294	1.268	0.000	0.70	46.0	SURCHARGED		
S1.004	S6	15 Winter	100	100/15	Summer			34.259	1.411	0.000	0.91	55.6	SURCHARGED		
S1.005	S7	15 Winter	100	100/15	Summer			34.212	1.442	0.000	1.14	73.8	SURCHARGED		
S3.000	S8	15 Winter	100	100/15	Summer			34.315	1.195	0.000	1.39	51.3	SURCHARGED		
S3.001	S9	15 Winter	100	100/15	Summer			34.148	1.185	0.000	1.53	53.9	SURCHARGED		
S3.002	S10	15 Winter	100	100/15	Summer			34.099	1.231	0.000	0.50	57.7	SURCHARGED		
S1.006	S11	15 Winter	100	100/15	Summer			34.068	1.437	0.000	1.36	131.5	SURCHARGED		
S4.000	S12	15 Winter	100	100/15	Summer			33.704	1.189	0.000	0.48	16.1	SURCHARGED		
S4.001	S13	15 Winter	100	100/15	Summer			33.682	1.233	0.000	1.14	41.5	SURCHARGED		
S1.007	S14	15 Winter	100	100/15	Summer			33.541	1.228	0.000	2.26	171.1	SURCHARGED		
S5.000	S15	15 Winter	100	100/15	Summer			34.069	0.869	0.000	1.12	21.1	SURCHARGED		
S5.001	S15A	15 Winter	100	100/15	Summer			33.700	0.797	0.000	0.75	28.6	SURCHARGED		
S1.008	S16	15 Winter	100	100/15	Summer			33.355	1.068	0.000	2.19	212.1	SURCHARGED		
S1.009	S17	15 Winter	100	100/15	Summer			32.962	0.759	0.000	2.44	226.2	SURCHARGED		
S1.010	S19A	15 Winter	100	100/15	Summer			32.609	0.466	0.000	3.13	228.6	SURCHARGED		
S6.000	S18	15 Winter	100	100/15	Winter			32.384	0.034	0.000	0.99	18.2	SURCHARGED		
S1.011	S19	15 Winter	100	100/15	Summer			32.267	0.146	0.000	0.87	258.2	SURCHARGED		
S1.012	S20	15 Winter	100	100/15	Summer			31.831	0.281	0.000	0.71	260.3	SURCHARGED		
S1.013	S20A	15 Winter	100	100/15	Summer			31.276	0.831	0.000	1.19	264.8	SURCHARGED		
S1.014	S21	15 Winter	100	100/15	Summer			30.818	0.698	0.000	3.51	267.7	SURCHARGED		
S7.000	S22	15 Winter	100	100/15	Summer			31.280	0.380	0.000	1.07	30.2	SURCHARGED		
S1.015	S23	15 Winter	100	100/15	Summer			30.350	0.247	0.000	2.79	300.0	SURCHARGED		

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66a Church Walk Burgess Hill West Sussex RH15 9AS	HOPLANDS FARM HERSDEN PHASE 1a PLOTS 41-44	
Date 03/09/2018 13:47 File 7178 PHASE 1A PLOTS 41-44.mdx	Designed by DMS Checked by	
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	Foul Sewage (l/s/ha)	0.000
M5-60 (mm)	20.000	Volumetric Runoff Coeff.	0.750
Ratio R	0.400	PIMP (%)	100
Maximum Rainfall (mm/hr)	100	Add Flow / Climate Change (%)	0
Maximum Time of Concentration (mins)	30	Minimum Backdrop Height (m)	0.200
		Maximum Backdrop Height (m)	1.500
		Min Design Depth for Optimisation (m)	1.200
		Min Vel for Auto Design only (m/s)	1.00
		Min Slope for Optimisation (1:X)	500

Designed with Level Soffits




Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.051	4-8	0.028

Total Area Contributing (ha) = 0.079

Total Pipe Volume (m³) = 1.771

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)	HYD SECT	DIA (mm)	Section Type	Auto Design
S16.000	41.390	0.519	79.7	0.057	5.00	0.0	0.600	o	150	Pipe/Conduit	
S16.001	42.650	1.100	38.8	0.022	0.00	0.0	0.600	o	150	Pipe/Conduit	
S16.002	16.150	0.790	20.4	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	


Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S16.000	51.95	5.61	32.319	0.057	0.0	0.0	0.0	1.13	19.9	8.0
S16.001	50.17	6.05	31.800	0.079	0.0	0.0	0.0	1.62	28.7	10.7
S16.002	49.70	6.17	30.700	0.079	0.0	0.0	0.0	2.24	39.5	10.7




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)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S56	33.950	1.631	Open Manhole	450	S16.000	32.319	150				
S57	33.250	1.450	Open Manhole	450	S16.001	31.800	150	S16.000	31.800	150	
S3	32.100	1.400	Open Manhole	1200	S16.002	30.700	150	S16.001	30.700	150	
SHWALL	505.000	475.090	Open Manhole	0		OUTFALL		S16.002	29.910	150	

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66a Church Walk Burgess Hill West Sussex RH15 9AS	HOPLANDS FARM HERSDEN PHASE 1a PLOTS 41-44	
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Micro Drainage	Network 2018.1	

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
16.000	-	-	100	0.057	0.057	0.057
16.001	-	-	100	0.022	0.022	0.022
16.002	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.079	0.079	0.079

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66a Church Walk Burgess Hill West Sussex RH15 9AS	HOPLANDS FARM HERSDEN PHASE 1a PLOTS 41-44	
Date 23.08.18 File 7178 PHASE 1A PLOTS 41-44_cdf.mdx	Designed by DMS Checked by	
Micro Drainage	Network 2015.1	

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

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coefficient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 40.000 Flow per Person per Day (l/per/day) 0.000

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


Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DTS Status ON Inertia Status OFF
Analysis Timestep Fine DVD Status OFF

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

PN	US/MH Name	Storm	Return Period	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S16.000	S56	15 Winter	100	100/15	Summer			32.864	0.395	0.000	1.20		23.1	SURCHARGED	
S16.001	S57	15 Winter	100	100/15	Summer			32.230	0.280	0.000	1.12		31.1	SURCHARGED	
S16.002	S3	15 Winter	100					30.804	-0.046	0.000	0.82		31.1	OK	

GTA Civils Ltd		Page 1
66a Church Walk Burgess Hill West Sussex RH15 9AS	HOPLANDS FARM HERSDEN PHASE 1a WESTERN POND	
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Micro Drainage Source Control 2018.1

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	28.654	0.454	1.5	271.8	O K
30 min Summer	28.777	0.577	1.5	358.3	O K
60 min Summer	28.897	0.697	1.5	447.8	O K
120 min Summer	29.014	0.814	1.5	541.3	O K
180 min Summer	29.096	0.896	1.5	608.8	O K
240 min Summer	29.160	0.960	1.5	664.5	O K
360 min Summer	29.266	1.066	1.6	758.8	O K
480 min Summer	29.352	1.152	1.7	839.5	O K
600 min Summer	29.423	1.223	1.7	907.4	O K
720 min Summer	29.481	1.281	1.8	964.9	O K
960 min Summer	29.567	1.367	1.8	1053.0	O K
1440 min Summer	29.669	1.469	1.9	1160.7	O K
2160 min Summer	29.733	1.533	1.9	1230.6	O K
2880 min Summer	29.752	1.552	1.9	1251.8	O K
4320 min Summer	29.733	1.533	1.9	1230.6	O K
5760 min Summer	29.691	1.491	1.9	1184.6	O K
7200 min Summer	29.651	1.451	1.9	1141.2	O K
8640 min Summer	29.613	1.413	1.8	1101.1	O K
10080 min Summer	29.579	1.379	1.8	1065.0	O K
15 min Winter	28.701	0.501	1.4	304.6	O K
30 min Winter	28.836	0.636	1.5	401.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	138.845	0.0	121.4	24
30 min Summer	91.604	0.0	108.3	38
60 min Summer	57.422	0.0	220.6	68
120 min Summer	34.937	0.0	225.5	128
180 min Summer	26.346	0.0	237.0	188
240 min Summer	21.686	0.0	245.5	248
360 min Summer	16.668	0.0	258.2	368
480 min Summer	13.952	0.0	267.5	486
600 min Summer	12.161	0.0	274.2	606
720 min Summer	10.860	0.0	279.0	726
960 min Summer	9.022	0.0	284.5	966
1440 min Summer	6.824	0.0	286.2	1446
2160 min Summer	5.035	0.0	584.4	2164
2880 min Summer	4.011	0.0	580.2	2884
4320 min Summer	2.869	0.0	556.8	4320
5760 min Summer	2.251	0.0	1107.8	5016
7200 min Summer	1.862	0.0	1087.3	5760
8640 min Summer	1.594	0.0	1058.4	6488
10080 min Summer	1.398	0.0	1022.0	7264
15 min Winter	138.845	0.0	117.7	25
30 min Winter	91.604	0.0	105.9	38

66a Church Walk

HOPLANDS FARM

Burgess Hill

HERSDEN

West Sussex RH15 9AS

PHASE 1a WESTERN POND

Date 31/08/2018

Designed by DMS

File 7178 PH1aA POND.srcx

Checked by MR



Micro Drainage

Source Control 2018.1

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
60 min Winter	28.966	0.766	1.5	501.9	O K
120 min Winter	29.094	0.894	1.5	607.2	O K
180 min Winter	29.182	0.982	1.6	683.3	O K
240 min Winter	29.252	1.052	1.6	746.4	O K
360 min Winter	29.367	1.167	1.7	853.1	O K
480 min Winter	29.461	1.261	1.7	944.8	O K
600 min Winter	29.537	1.337	1.8	1022.1	O K
720 min Winter	29.600	1.400	1.8	1087.8	O K
960 min Winter	29.695	1.495	1.9	1189.0	O K
1440 min Winter	29.808	1.608	1.9	1315.0	O K
2160 min Winter	29.882	1.682	2.0	1401.4	O K
2880 min Winter	29.909	1.709	2.0	1433.4	O K
4320 min Winter	29.904	1.704	2.0	1426.6	O K
5760 min Winter	29.868	1.668	2.0	1385.3	O K
7200 min Winter	29.822	1.622	2.0	1331.1	O K
8640 min Winter	29.780	1.580	1.9	1283.5	O K
10080 min Winter	29.741	1.541	1.9	1239.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
60 min Winter	57.422	0.0	220.9	68
120 min Winter	34.937	0.0	236.7	126
180 min Winter	26.346	0.0	248.3	186
240 min Winter	21.686	0.0	256.9	244
360 min Winter	16.668	0.0	269.6	362
480 min Winter	13.952	0.0	278.7	482
600 min Winter	12.161	0.0	285.2	600
720 min Winter	10.860	0.0	289.8	718
960 min Winter	9.022	0.0	294.7	954
1440 min Winter	6.824	0.0	295.1	1426
2160 min Winter	5.035	0.0	606.7	2120
2880 min Winter	4.011	0.0	600.4	2820
4320 min Winter	2.869	0.0	573.1	4152
5760 min Winter	2.251	0.0	1158.5	5472
7200 min Winter	1.862	0.0	1134.8	6624
8640 min Winter	1.594	0.0	1104.0	6832
10080 min Winter	1.398	0.0	1067.0	7760

66a Church Walk Burgess Hill West Sussex RH15 9AS	HOPLANDS FARM HERSDEN PHASE 1a WESTERN POND
Date 31/08/2018	Designed by DMS
File 7178 PH1aA POND.srcx	Checked by MR



Micro Drainage	Source Control 2018.1
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Rainfall Details

Rainfall Model	FEH	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
FEH Rainfall Version	2013	Cv (Winter)	0.840
Site Location	GB 620427 161552	Shortest Storm (mins)	15
Data Type	Point	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.050

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From:	To:	From:	To:	From:	To:
0	4	0.507	4	8	0.524
				8	12
					0.019

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66a Church Walk Burgess Hill West Sussex RH15 9AS	HOPLANDS FARM HERSDEN PHASE 1a WESTERN POND	
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Micro Drainage Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 30.120

Tank or Pond Structure

Invert Level (m) 28.200

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	520.4	2.800	0.0	5.600	0.0	8.400	0.0
0.400	661.0	3.200	0.0	6.000	0.0	8.800	0.0
0.800	810.8	3.600	0.0	6.400	0.0	9.200	0.0
1.200	969.8	4.000	0.0	6.800	0.0	9.600	0.0
1.600	1138.1	4.400	0.0	7.200	0.0	10.000	0.0
2.000	1315.7	4.800	0.0	7.600	0.0		
2.400	0.0	5.200	0.0	8.000	0.0		

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0059-2000-1700-2000
 Design Head (m) 1.700
 Design Flow (l/s) 2.0
 Flush-Flo™ Calculated
 Objective Minimise upstream storage
 Application Surface
 Sump Available Yes
 Diameter (mm) 59
 Invert Level (m) 28.200
 Minimum Outlet Pipe Diameter (mm) 75
 Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.700	2.0	Kick-Flo®	0.527	1.2
Flush-Flo™	0.257	1.5	Mean Flow over Head Range	-	1.5

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	1.3	1.200	1.7	3.000	2.6	7.000	3.8
0.200	1.4	1.400	1.8	3.500	2.8	7.500	4.0
0.300	1.4	1.600	1.9	4.000	3.0	8.000	4.1
0.400	1.4	1.800	2.1	4.500	3.1	8.500	4.2
0.500	1.3	2.000	2.2	5.000	3.3	9.000	4.3
0.600	1.3	2.200	2.2	5.500	3.4	9.500	4.4
0.800	1.4	2.400	2.3	6.000	3.6		
1.000	1.6	2.600	2.4	6.500	3.7		



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	Foul Sewage (l/s/ha)	0.000
M5-60 (mm)	20.000	Volumetric Runoff Coeff.	0.750
Ratio R	0.400	PIMP (%)	100
Maximum Rainfall (mm/hr)	100	Add Flow / Climate Change (%)	0
Maximum Time of Concentration (mins)	30	Minimum Backdrop Height (m)	0.200
		Maximum Backdrop Height (m)	3.000
		Min Design Depth for Optimisation (m)	1.200
		Min Vel for Auto Design only (m/s)	1.00
		Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.749	4-8	0.913	8-12	0.068

Total Area Contributing (ha) = 1.730

Total Pipe Volume (m³) = 58.995

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)	HYD SECT	DIA (mm)	Section Type	Auto Design
S8.000	26.940	0.757	35.6	0.070	5.00	0.0	0.600	o	150	Pipe/Conduit	🚧
S9.000	22.850	0.135	169.3	0.066	5.00	0.0	0.600	o	225	Pipe/Conduit	🚧
S8.001	21.120	0.087	242.8	0.057	0.00	0.0	0.600	o	300	Pipe/Conduit	🚧
S8.002	18.150	0.075	242.0	0.022	0.00	0.0	0.600	o	300	Pipe/Conduit	🚧
S8.003	43.160	0.177	243.8	0.069	0.00	0.0	0.600	o	300	Pipe/Conduit	🚧
S10.000	21.560	0.797	27.1	0.098	5.00	0.0	0.600	o	150	Pipe/Conduit	🚧
S8.004	20.490	0.084	243.9	0.041	0.00	0.0	0.600	o	300	Pipe/Conduit	🚧
S8.005	20.950	0.086	243.6	0.024	0.00	0.0	0.600	o	300	Pipe/Conduit	🚧
S8.006	20.950	0.086	243.6	0.038	0.00	0.0	0.600	o	300	Pipe/Conduit	🚧
S8.007	9.390	1.227	7.7	0.043	0.00	0.0	0.600	o	300	Pipe/Conduit	🚧
S11.000	38.390	0.655	58.6	0.084	5.00	0.0	0.600	o	150	Pipe/Conduit	🚧
S11.001	33.700	0.199	169.3	0.035	0.00	0.0	0.600	o	225	Pipe/Conduit	🚧
S11.002	32.080	0.401	80.0	0.095	0.00	0.0	0.600	o	225	Pipe/Conduit	🚧
S11.003	27.150	0.340	79.9	0.123	0.00	0.0	0.600	o	225	Pipe/Conduit	🚧
S8.008	67.950	0.278	244.4	0.088	0.00	0.0	0.600	o	375	Pipe/Conduit	🚧
S8.009	12.030	1.572	7.7	0.099	0.00	0.0	0.600	o	375	Pipe/Conduit	🚧
S12.000	12.870	0.076	169.3	0.068	5.00	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)
S8.000	53.48	5.27	33.129	0.070	0.0	0.0	0.0	1.69	29.9	10.1
S9.000	52.96	5.38	32.432	0.066	0.0	0.0	0.0	1.00	39.8	9.5
S8.001	51.46	5.73	32.222	0.193	0.0	0.0	0.0	1.00	71.0	26.9
S8.002	50.24	6.03	32.135	0.215	0.0	0.0	0.0	1.01	71.1	29.3
S8.003	47.59	6.75	32.060	0.284	0.0	0.0	0.0	1.00	70.9	36.6
S10.000	53.84	5.18	32.830	0.098	0.0	0.0	0.0	1.94	34.3	14.3
S8.004	46.44	7.09	31.883	0.423	0.0	0.0	0.0	1.00	70.8	53.2
S8.005	45.33	7.44	31.799	0.447	0.0	0.0	0.0	1.00	70.9	54.9
S8.006	44.28	7.79	31.713	0.485	0.0	0.0	0.0	1.00	70.9	58.2
S8.007	44.20	7.81	31.627	0.528	0.0	0.0	0.0	5.72	404.1	63.2
S11.000	52.50	5.49	32.145	0.084	0.0	0.0	0.0	1.32	23.3	11.9
S11.001	50.18	6.05	31.415	0.119	0.0	0.0	0.0	1.00	39.8	16.2
S11.002	48.79	6.41	31.216	0.214	0.0	0.0	0.0	1.46	58.2	28.3
S11.003	47.69	6.72	30.815	0.337	0.0	0.0	0.0	1.46	58.2	43.5
S8.008	41.52	8.79	30.325	0.953	0.0	0.0	0.0	1.15	127.5	107.2
S8.009	41.44	8.82	30.047	1.052	0.0	0.0	0.0	6.58	727.2	118.1
S12.000	53.71	5.21	29.356	0.068	0.0	0.0	0.0	1.00	39.8	9.9

66a Church Walk
Burgess Hill
West Sussex RH15 9AS

HOPLANDS FARM
HERSDEN
PHASE 1a EAST

Date 03/09/2018 13:56
File 7178 PHASE 1A EAST.mdx

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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)	HYD SECT	DIA (mm)	Section Type	Auto Design
S12.001	30.810	0.300	102.7	0.063	0.00	0.0	0.600	o	225	Pipe/Conduit	
S12.002	14.480	0.180	80.4	0.058	0.00	0.0	0.600	o	225	Pipe/Conduit	
S12.003	13.250	0.175	75.7	0.014	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.010	9.190	0.038	241.8	0.012	0.00	0.0	0.600	o	450	Pipe/Conduit	
S8.011	10.540	0.044	239.5	0.017	0.00	0.0	0.600	o	450	Pipe/Conduit	
S8.012	38.400	0.116	331.0	0.033	0.00	0.0	0.600	o	450	Pipe/Conduit	
S8.013	19.160	1.389	13.8	0.098	0.00	0.0	0.600	o	450	Pipe/Conduit	
S13.000	22.760	1.537	14.8	0.059	5.00	0.0	0.600	o	150	Pipe/Conduit	
S14.000	20.760	0.509	40.8	0.045	5.00	0.0	0.600	o	150	Pipe/Conduit	
S14.001	19.590	0.116	168.9	0.042	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.000	31.410	0.235	133.7	0.040	5.00	0.0	0.600	o	225	Pipe/Conduit	
S14.002	21.100	0.555	38.0	0.026	0.00	0.0	0.600	o	300	Pipe/Conduit	
S14.003	53.430	1.406	38.0	0.056	0.00	0.0	0.600	o	300	Pipe/Conduit	
S14.004	30.070	0.232	129.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S14.005	48.600	0.374	129.9	0.047	0.00	0.0	0.600	o	300	Pipe/Conduit	
S8.014	27.440	3.908	7.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S12.001	51.95	5.61	29.280	0.131	0.0	0.0	0.0	1.29	51.3	18.4
S12.002	51.26	5.78	28.980	0.189	0.0	0.0	0.0	1.46	58.0	26.2
S12.003	50.67	5.92	28.800	0.203	0.0	0.0	0.0	1.50	59.8	27.9
S8.010	41.16	8.94	28.400	1.267	0.0	0.0	0.0	1.30	207.2	141.2
S8.011	40.85	9.08	28.362	1.284	0.0	0.0	0.0	1.31	208.2	142.0
S8.012	39.57	9.65	28.318	1.317	0.0	0.0	0.0	1.11	176.8	142.0
S8.013	39.44	9.71	28.202	1.415	0.0	0.0	0.0	5.50	874.1	151.2
S13.000	54.03	5.14	28.650	0.059	0.0	0.0	0.0	2.63	46.5	8.6
S14.000	53.69	5.22	32.105	0.045	0.0	0.0	0.0	1.58	27.9	6.5
S14.001	52.24	5.54	31.521	0.087	0.0	0.0	0.0	1.00	39.9	12.3
S15.000	52.59	5.46	31.640	0.040	0.0	0.0	0.0	1.13	44.9	5.7
S14.002	51.66	5.68	31.330	0.153	0.0	0.0	0.0	2.56	180.8	21.4
S14.003	50.25	6.03	30.775	0.209	0.0	0.0	0.0	2.56	180.8	28.4
S14.004	48.86	6.39	27.569	0.209	0.0	0.0	0.0	1.38	97.5	28.4
S14.005	46.80	6.98	27.337	0.256	0.0	0.0	0.0	1.38	97.4	32.4
S8.014	39.32	9.77	26.813	1.730	0.0	0.0	0.0	7.71	1226.0	184.2

66a Church Walk
 Burgess Hill
 West Sussex RH15 9AS

HOPLANDS FARM
 HERSDEN
 PHASE 1a EAST

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Micro Drainage

Network 2018.1

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S24	34.420	1.291	Open Manhole	450	S8.000	33.129	150				
S25	34.050	1.618	Open Manhole	1200	S9.000	32.432	225				
S26	34.100	1.878	Open Manhole	1200	S8.001	32.222	300	S8.000	32.372	150	
								S9.000	32.297	225	
S27	34.290	2.155	Open Manhole	1200	S8.002	32.135	300	S8.001	32.135	300	
S27A	34.540	2.480	Open Manhole	1200	S8.003	32.060	300	S8.002	32.060	300	
S28	34.530	1.700	Open Manhole	1200	S10.000	32.830	150				
S29	34.240	2.357	Open Manhole	1200	S8.004	31.883	300	S8.003	31.883	300	
								S10.000	32.033	150	
S30	34.230	2.431	Open Manhole	1200	S8.005	31.799	300	S8.004	31.799	300	
S31	34.165	2.452	Open Manhole	1200	S8.006	31.713	300	S8.005	31.713	300	
S32	34.430	2.803	Open Manhole	1200	S8.007	31.627	300	S8.006	31.627	300	
S33	33.845	1.700	Open Manhole	1200	S11.000	32.145	150				
S34	33.465	2.050	Open Manhole	1200	S11.001	31.415	225	S11.000	31.490	150	
S35	33.600	2.384	Open Manhole	1200	S11.002	31.216	225	S11.001	31.216	225	
S36	33.980	3.165	Open Manhole	1200	S11.003	30.815	225	S11.002	30.815	225	
S37	34.305	3.980	Open Manhole	1350	S8.008	30.325	375	S8.007	30.400	300	
								S11.003	30.475	225	
S38	32.575	2.528	Open Manhole	1350	S8.009	30.047	375	S8.008	30.047	375	
S39	31.400	2.044	Open Manhole	1200	S12.000	29.356	225				
S40	31.625	2.345	Open Manhole	1200	S12.001	29.280	225	S12.000	29.280	225	
S41	32.000	3.020	Open Manhole	1200	S12.002	28.980	225	S12.001	28.980	225	
S42	32.200	3.400	Open Manhole	1200	S12.003	28.800	225	S12.002	28.800	225	
S43	32.375	3.975	Open Manhole	1350	S8.010	28.400	450	S8.009	28.475	375	
								S12.003	28.625	225	
S44	32.150	3.788	Open Manhole	1350	S8.011	28.362	450	S8.010	28.362	450	
S45	31.805	3.487	Open Manhole	1350	S8.012	28.318	450	S8.011	28.318	450	
S46	30.585	2.383	Open Manhole	1350	S8.013	28.202	450	S8.012	28.202	450	
S47	30.350	1.700	Open Manhole	1200	S13.000	28.650	150				
S48	33.805	1.700	Open Manhole	1200	S14.000	32.105	150				
S49	33.540	2.019	Open Manhole	1200	S14.001	31.521	225	S14.000	31.596	150	
S50	33.415	1.775	Open Manhole	1200	S15.000	31.640	225				
S51	33.180	1.850	Open Manhole	1200	S14.002	31.330	300	S14.001	31.405	225	
								S15.000	31.405	225	
S52	32.625	1.850	Open Manhole	1200	S14.003	30.775	300	S14.002	30.775	300	
S53	30.600	3.031	Open Manhole	1200	S14.004	27.569	300	S14.003	29.369	300	1800
S54	29.000	1.663	Open Manhole	1200	S14.005	27.337	300	S14.004	27.337	300	
S33	28.935	2.122	Open Manhole	1350	S8.014	26.813	450	S8.013	26.813	450	
								S13.000	27.113	150	
								S14.005	26.963	300	
SHWALL	23.650	0.745	Open Manhole	0		OUTFALL		S8.014	22.905	450	

66a Church Walk
 Burgess Hill
 West Sussex RH15 9AS

HOPLANDS FARM
 HERSDEN
 PHASE 1a EAST

Date 03/09/2018 13:56
 File 7178 PHASE 1A EAST.mdx

Designed by DMS
 Checked by



Micro Drainage

Network 2018.1

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
8.000	-	-	100	0.070	0.070	0.070
9.000	-	-	100	0.066	0.066	0.066
8.001	-	-	100	0.057	0.057	0.057
8.002	-	-	100	0.022	0.022	0.022
8.003	-	-	100	0.069	0.069	0.069
10.000	-	-	100	0.098	0.098	0.098
8.004	-	-	100	0.041	0.041	0.041
8.005	-	-	100	0.024	0.024	0.024
8.006	-	-	100	0.038	0.038	0.038
8.007	-	-	100	0.043	0.043	0.043
11.000	-	-	100	0.084	0.084	0.084
11.001	-	-	100	0.035	0.035	0.035
11.002	-	-	100	0.095	0.095	0.095
11.003	-	-	100	0.123	0.123	0.123
8.008	-	-	100	0.088	0.088	0.088
8.009	-	-	100	0.099	0.099	0.099
12.000	-	-	100	0.068	0.068	0.068
12.001	-	-	100	0.063	0.063	0.063
12.002	-	-	100	0.058	0.058	0.058
12.003	-	-	100	0.014	0.014	0.014
8.010	-	-	100	0.012	0.012	0.012
8.011	-	-	100	0.017	0.017	0.017
8.012	-	-	100	0.033	0.033	0.033
8.013	-	-	100	0.098	0.098	0.098
13.000	-	-	100	0.059	0.059	0.059
14.000	-	-	100	0.045	0.045	0.045
14.001	-	-	100	0.042	0.042	0.042
15.000	-	-	100	0.040	0.040	0.040
14.002	-	-	100	0.026	0.026	0.026
14.003	-	-	100	0.056	0.056	0.056
14.004	-	-	100	0.000	0.000	0.000
14.005	-	-	100	0.047	0.047	0.047
8.014	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				1.730	1.730	1.730

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S8.014	SHWALL	23.650	22.905	0.000	0	0

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

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coefficient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 40.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 6 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DTS Status ON Inertia Status OFF
Analysis Timestep Fine DVD Status OFF

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

PN	US/MH Name	Storm	Return Period	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S8.000	S24	15 Winter	100	100/15	Summer			33.774	0.495	0.000	0.84		24.1	SURCHARGED	
S9.000	S25	15 Winter	100	100/15	Summer			33.503	0.846	0.000	0.96		34.9	SURCHARGED	
S8.001	S26	15 Winter	100	100/15	Summer			33.467	0.945	0.000	1.00		62.1	SURCHARGED	
S8.002	S27	15 Winter	100	100/15	Summer			33.440	1.005	0.000	1.08		66.1	SURCHARGED	
S8.003	S27A	15 Winter	100	100/15	Summer			33.413	1.053	0.000	1.15		76.1	SURCHARGED	
S10.000	S28	15 Winter	100	100/15	Summer			33.799	0.819	0.000	1.01		32.6	SURCHARGED	
S8.004	S29	15 Winter	100	100/15	Summer			33.273	1.090	0.000	1.88		116.3	SURCHARGED	
S8.005	S30	15 Winter	100	100/15	Summer			33.052	0.953	0.000	1.95		121.3	SURCHARGED	
S8.006	S31	15 Winter	100	100/15	Summer			32.773	0.760	0.000	2.13		132.1	SURCHARGED	
S8.007	S32	15 Winter	100	100/15	Summer			32.385	0.458	0.000	0.56		154.4	SURCHARGED	
S11.000	S33	15 Winter	100	100/15	Summer			33.142	0.847	0.000	0.99		22.2	SURCHARGED	
S11.001	S34	15 Winter	100	100/15	Summer			32.777	1.137	0.000	1.44		54.0	SURCHARGED	
S11.002	S35	15 Winter	100	100/15	Summer			32.767	1.326	0.000	1.07		58.2	SURCHARGED	
S11.003	S36	15 Winter	100	100/15	Summer			32.720	1.680	0.000	1.53		82.5	SURCHARGED	
S8.008	S37	15 Winter	100	100/15	Summer			32.005	1.305	0.000	2.26		272.1	SURCHARGED	
S8.009	S38	15 Winter	100	100/15	Summer			30.645	0.223	0.000	0.60		293.4	SURCHARGED	
S12.000	S39	15 Winter	100	100/15	Summer			30.767	1.186	0.000	1.05		36.2	SURCHARGED	
S12.001	S40	15 Winter	100	100/15	Summer			30.729	1.224	0.000	0.87		41.7	SURCHARGED	
S12.002	S41	15 Winter	100	100/15	Summer			30.543	1.338	0.000	1.12		56.8	SURCHARGED	
S12.003	S42	15 Winter	100	100/15	Summer			30.312	1.287	0.000	1.19		61.4	SURCHARGED	
S8.010	S43	15 Winter	100	100/15	Summer			30.080	1.230	0.000	2.52		355.9	SURCHARGED	
S8.011	S44	15 Winter	100	100/15	Summer			29.686	0.874	0.000	2.45		359.9	SURCHARGED	
S8.012	S45	15 Winter	100	100/15	Summer			29.278	0.510	0.000	2.35		367.2	SURCHARGED	
S8.013	S46	15 Winter	100					28.457	-0.195	0.000	0.60		399.4	OK	
S13.000	S47	15 Winter	100					28.756	-0.044	0.000	0.83		36.6	OK	
S14.000	S48	15 Winter	100	100/15	Summer			32.393	0.138	0.000	1.02		26.8	SURCHARGED	
S14.001	S49	15 Winter	100	100/15	Summer			31.874	0.128	0.000	1.45		52.2	SURCHARGED	
S15.000	S50	15 Winter	100					31.765	-0.100	0.000	0.58		24.3	OK	
S14.002	S51	15 Winter	100					31.498	-0.132	0.000	0.58		92.4	OK	
S14.003	S52	15 Winter	100					30.927	-0.148	0.000	0.50		128.2	OK	
S14.004	S53	15 Winter	100	100/15	Summer			28.674	0.805	0.000	1.37		121.7	SURCHARGED	
S14.005	S54	15 Winter	100	100/15	Summer			28.233	0.596	0.000	1.58		144.9	SURCHARGED	
S8.014	S33	15 Winter	100					27.046	-0.217	0.000	0.52		576.2	OK	


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Micro Drainage Source Control 2018.1

Cascade Summary of Results for 7178 PH1aB POND.srcx

Upstream Structures		Outflow To		Overflow To	
7178 PH1aA POND.srcx		(None)	(None)		
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	22.111	0.711	24.4	427.2	O K
30 min Summer	22.281	0.881	24.4	556.5	O K
60 min Summer	22.429	1.029	24.4	677.8	O K
120 min Summer	22.542	1.142	24.4	776.0	O K
180 min Summer	22.601	1.201	24.4	829.6	O K
240 min Summer	22.638	1.238	24.4	863.8	O K
360 min Summer	22.682	1.282	24.4	904.6	O K
480 min Summer	22.714	1.314	24.4	935.0	O K
600 min Summer	22.735	1.335	24.4	955.9	O K
720 min Summer	22.749	1.349	24.4	969.0	O K
960 min Summer	22.755	1.355	24.4	974.7	O K
1440 min Summer	22.717	1.317	24.4	938.2	O K
2160 min Summer	22.603	1.203	24.4	831.1	O K
2880 min Summer	22.459	1.059	24.4	703.5	O K
4320 min Summer	22.099	0.699	24.4	418.7	O K
5760 min Summer	21.840	0.440	24.4	243.4	O K
7200 min Summer	21.680	0.280	23.8	147.3	O K
8640 min Summer	21.594	0.194	22.6	99.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	138.845	0.0	571.6	22
30 min Summer	91.604	0.0	702.4	37
60 min Summer	57.422	0.0	965.4	66
120 min Summer	34.937	0.0	1132.1	124
180 min Summer	26.346	0.0	1262.5	184
240 min Summer	21.686	0.0	1371.0	242
360 min Summer	16.668	0.0	1555.8	346
480 min Summer	13.952	0.0	1715.7	406
600 min Summer	12.161	0.0	1852.1	474
720 min Summer	10.860	0.0	1969.9	540
960 min Summer	9.022	0.0	2157.4	678
1440 min Summer	6.824	0.0	2411.3	958
2160 min Summer	5.035	0.0	2936.3	1380
2880 min Summer	4.011	0.0	3078.1	1792
4320 min Summer	2.869	0.0	3236.7	2472
5760 min Summer	2.251	0.0	3911.2	3120
7200 min Summer	1.862	0.0	3985.9	3752
8640 min Summer	1.594	0.0	4036.7	4416

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Cascade Summary of Results for 7178 PH1aB POND.srcx

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
10080 min Summer	21.559	0.159	21.0	80.7	O K
15 min Winter	22.183	0.783	24.4	480.9	O K
30 min Winter	22.370	0.970	24.4	628.3	O K
60 min Winter	22.532	1.132	24.4	766.8	O K
120 min Winter	22.659	1.259	24.4	883.3	O K
180 min Winter	22.729	1.329	24.4	950.3	O K
240 min Winter	22.776	1.376	24.4	995.4	O K
360 min Winter	22.835	1.435	24.4	1054.5	O K
480 min Winter	22.871	1.471	24.4	1091.1	O K
600 min Winter	22.889	1.489	24.4	1110.0	O K
720 min Winter	22.903	1.503	24.4	1124.5	O K
960 min Winter	22.903	1.503	24.4	1124.2	O K
1440 min Winter	22.838	1.438	24.4	1057.7	O K
2160 min Winter	22.665	1.265	24.4	889.2	O K
2880 min Winter	22.444	1.044	24.4	690.4	O K
4320 min Winter	21.905	0.505	24.4	285.5	O K
5760 min Winter	21.630	0.230	23.2	119.2	O K
7200 min Winter	21.554	0.154	20.5	78.0	O K
8640 min Winter	21.530	0.130	17.9	65.2	O K
10080 min Winter	21.514	0.114	15.8	57.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Summer	1.398	0.0	4070.1	5136
15 min Winter	138.845	0.0	621.9	22
30 min Winter	91.604	0.0	771.3	37
60 min Winter	57.422	0.0	1055.4	66
120 min Winter	34.937	0.0	1252.1	122
180 min Winter	26.346	0.0	1396.9	180
240 min Winter	21.686	0.0	1517.4	236
360 min Winter	16.668	0.0	1722.9	348
480 min Winter	13.952	0.0	1900.7	452
600 min Winter	12.161	0.0	2052.4	500
720 min Winter	10.860	0.0	2183.6	570
960 min Winter	9.022	0.0	2392.4	728
1440 min Winter	6.824	0.0	2675.2	1040
2160 min Winter	5.035	0.0	3240.9	1496
2880 min Winter	4.011	0.0	3398.1	1936
4320 min Winter	2.869	0.0	3574.7	2552
5760 min Winter	2.251	0.0	4298.5	3112
7200 min Winter	1.862	0.0	4381.3	3680
8640 min Winter	1.594	0.0	4439.8	4408
10080 min Winter	1.398	0.0	4480.9	5136

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Micro Drainage	Source Control 2018.1
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Cascade Rainfall Details for 7178 PH1aB POND.srcx

Rainfall Model	FEH	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
FEH Rainfall Version	2013	Cv (Winter)	0.840
Site Location	GB 620427 161552	Shortest Storm (mins)	15
Data Type	Point	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.730

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area	
From:	To:	From:	To:	From:	To:	
0	4	0.757	4	8	0.906	
				8	12	0.067

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Cascade Model Details for 7178 PH1aB POND.srcx

Storage is Online Cover Level (m) 23.130

Tank or Pond Structure

Invert Level (m) 21.400

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	480.9	2.800	0.0	5.600	0.0	8.400	0.0
0.400	615.8	3.200	0.0	6.000	0.0	8.800	0.0
0.800	760.7	3.600	0.0	6.400	0.0	9.200	0.0
1.200	915.7	4.000	0.0	6.800	0.0	9.600	0.0
1.600	1080.8	4.400	0.0	7.200	0.0	10.000	0.0
2.000	1255.8	4.800	0.0	7.600	0.0		
2.400	0.0	5.200	0.0	8.000	0.0		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0208-2440-1600-2440
Design Head (m)	1.600
Design Flow (l/s)	24.4
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	208
Invert Level (m)	21.350
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)	1.600	24.4	Kick-Flo®	1.050	20.0
Flush-Flo™	0.482	24.4	Mean Flow over Head Range	-	21.1

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	7.1	1.200	21.3	3.000	33.0	7.000	49.6
0.200	20.1	1.400	22.9	3.500	35.5	7.500	51.3
0.300	23.5	1.600	24.4	4.000	37.9	8.000	52.9
0.400	24.2	1.800	25.8	4.500	40.1	8.500	54.5
0.500	24.4	2.000	27.1	5.000	42.2	9.000	56.1
0.600	24.2	2.200	28.4	5.500	44.2	9.500	57.6
0.800	23.3	2.400	29.6	6.000	46.1		
1.000	21.1	2.600	30.8	6.500	47.9		



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	Foul Sewage (l/s/ha)	0.000	Maximum Backdrop Height (m)	1.500
M5-60 (mm)	20.000	Volumetric Runoff Coeff.	0.750	Min Design Depth for Optimisation (m)	1.200
Ratio R	0.400	PIMP (%)	100	Min Vel for Auto Design only (m/s)	1.00
Maximum Rainfall (mm/hr)	100	Add Flow / Climate Change (%)	0	Min Slope for Optimisation (1:X)	500
Maximum Time of Concentration (mins)	30	Minimum Backdrop Height (m)	0.200		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.304	4-8	0.388	8-12	0.005

Total Area Contributing (ha) = 0.697


Total Pipe Volume (m³) = 43.473

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)	HYD SECT	DIA (mm)	Section Type	Auto Design
S17.000	26.830	0.582	46.1	0.108	5.00	0.0	0.600	o	225	Pipe/Conduit	🚰
S18.000	12.290	0.051	241.0	0.048	5.00	0.0	0.600	o	300	Pipe/Conduit	🚰
S18.001	36.790	0.151	243.6	0.031	0.00	0.0	0.600	o	300	Pipe/Conduit	🚰
S17.001	15.440	0.064	241.3	0.020	0.00	0.0	0.600	o	300	Pipe/Conduit	🚰
S17.002	34.740	0.284	122.3	0.069	0.00	0.0	0.600	o	300	Pipe/Conduit	🚰
S17.003	12.840	0.040	321.0	0.016	0.00	0.0	0.600	o	375	Pipe/Conduit	🚰
S17.004	34.710	0.107	324.4	0.021	0.00	0.0	0.600	o	375	Pipe/Conduit	🚰
S17.005	29.520	0.091	324.4	0.068	0.00	0.0	0.600	o	375	Pipe/Conduit	🚰
S19.000	23.140	0.290	79.8	0.060	5.00	0.0	0.600	o	150	Pipe/Conduit	🚰
S19.001	34.980	0.438	79.9	0.029	0.00	0.0	0.600	o	150	Pipe/Conduit	🚰
S19.002	14.960	0.187	80.0	0.020	0.00	0.0	0.600	o	225	Pipe/Conduit	🚰
S19.003	13.100	0.643	20.4	0.029	0.00	0.0	0.600	o	225	Pipe/Conduit	🚰
S17.006	27.390	1.208	22.7	0.029	0.00	0.0	0.600	o	375	Pipe/Conduit	🚰
S20.000	21.760	0.218	99.8	0.050	5.00	0.0	0.600	o	150	Pipe/Conduit	🚰
S21.000	22.530	1.028	21.9	0.057	5.00	0.0	0.600	o	150	Pipe/Conduit	🚰
S20.001	54.060	0.221	244.6	0.019	0.00	0.0	0.600	o	300	Pipe/Conduit	🚰
S20.002	18.480	0.057	324.2	0.023	0.00	0.0	0.600	o	375	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)
S17.000	53.63	5.23	29.005	0.108	0.0	0.0	0.0	1.93	76.8	15.7
S18.000	53.76	5.20	28.550	0.048	0.0	0.0	0.0	1.01	71.3	7.0
S18.001	51.11	5.81	28.499	0.079	0.0	0.0	0.0	1.00	70.9	10.9
S17.001	50.09	6.07	28.348	0.207	0.0	0.0	0.0	1.01	71.2	28.1
S17.002	48.56	6.48	28.284	0.276	0.0	0.0	0.0	1.42	100.4	36.3
S17.003	47.80	6.69	27.925	0.292	0.0	0.0	0.0	1.01	111.1	37.8
S17.004	45.86	7.27	27.885	0.313	0.0	0.0	0.0	1.00	110.5	38.9
S17.005	44.35	7.76	27.778	0.381	0.0	0.0	0.0	1.00	110.5	45.8
S19.000	53.13	5.34	29.470	0.060	0.0	0.0	0.0	1.13	19.9	8.6
S19.001	50.93	5.86	29.180	0.089	0.0	0.0	0.0	1.13	19.9	12.3
S19.002	50.24	6.03	28.667	0.109	0.0	0.0	0.0	1.46	58.2	14.8
S19.003	49.95	6.11	28.480	0.138	0.0	0.0	0.0	2.91	115.8	18.7
S17.006	44.00	7.88	27.687	0.548	0.0	0.0	0.0	3.82	421.8	65.3
S20.000	53.05	5.36	27.200	0.050	0.0	0.0	0.0	1.01	17.8	7.2
S21.000	53.89	5.17	28.010	0.057	0.0	0.0	0.0	2.16	38.2	8.3
S20.001	49.36	6.26	26.832	0.126	0.0	0.0	0.0	1.00	70.7	16.8
S20.002	48.23	6.57	26.536	0.149	0.0	0.0	0.0	1.00	110.5	19.5

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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)	HYD SECT	DIA (mm)	Section Type	Auto Design
S17.007	14.600	0.045	324.4	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S17.008	87.420	5.579	15.7	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S17.009	34.380	4.710	7.3	0.000	0.00	0.0	0.600	o	375	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)
S17.007	43.31	8.12	26.479	0.697	0.0	0.0	0.0	1.00	110.5	81.7
S17.008	42.44	8.44	26.434	0.697	0.0	0.0	0.0	4.60	507.7	81.7
S17.009	42.21	8.52	20.855	0.697	0.0	0.0	0.0	6.74	744.6	81.7

66a Church Walk
 Burgess Hill
 West Sussex RH15 9AS

HOPLANDS FARM
 HERSDEN
 PHASE 1b

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Micro Drainage

Network 2018.1

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S56	30.780	1.775	Open Manhole	1200	S17.000	29.005	225				
S57	30.400	1.850	Open Manhole	1200	S18.000	28.550	300				
S58	30.365	1.866	Open Manhole	1200	S18.001	28.499	300	S18.000	28.499	300	
S59	30.500	2.152	Open Manhole	1200	S17.001	28.348	300	S17.000	28.423	225	
								S18.001	28.348	300	
S60	30.240	1.956	Open Manhole	1200	S17.002	28.284	300	S17.001	28.284	300	
S61	29.850	1.925	Open Manhole	1350	S17.003	27.925	375	S17.002	28.000	300	
S62	30.000	2.115	Open Manhole	1350	S17.004	27.885	375	S17.003	27.885	375	
S63	30.440	2.662	Open Manhole	1350	S17.005	27.778	375	S17.004	27.778	375	
S64	31.170	1.700	Open Manhole	1200	S19.000	29.470	150				
S65	31.400	2.220	Open Manhole	1200	S19.001	29.180	150	S19.000	29.180	150	
S66	30.970	2.303	Open Manhole	1200	S19.002	28.667	225	S19.001	28.742	150	
S67	30.775	2.295	Open Manhole	1200	S19.003	28.480	225	S19.002	28.480	225	
S68	30.350	2.663	Open Manhole	1350	S17.006	27.687	375	S17.005	27.687	375	
								S19.003	27.837	225	
S69	28.900	1.700	Open Manhole	1200	S20.000	27.200	150				
S70	29.710	1.700	Open Manhole	1200	S21.000	28.010	150				
S71	29.180	2.348	Open Manhole	1200	S20.001	26.832	300	S20.000	26.982	150	
								S21.000	26.982	150	
S72	29.700	3.164	Open Manhole	1350	S20.002	26.536	375	S20.001	26.611	300	
S73	29.950	3.471	Open Manhole	1350	S17.007	26.479	375	S17.006	26.479	375	
								S20.002	26.479	375	
S74	29.720	3.286	Open Manhole	1350	S17.008	26.434	375	S17.007	26.434	375	
S20	22.780	1.925	Open Manhole	1350	S17.009	20.855	375	S17.008	20.855	375	
SHWALL	21.765	5.620	Open Manhole	0		OUTFALL		S17.009	16.145	375	

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
17.000	-	-	100	0.108	0.108	0.108
18.000	-	-	100	0.048	0.048	0.048
18.001	-	-	100	0.031	0.031	0.031
17.001	-	-	100	0.020	0.020	0.020
17.002	-	-	100	0.069	0.069	0.069
17.003	-	-	100	0.016	0.016	0.016
17.004	-	-	100	0.021	0.021	0.021
17.005	-	-	100	0.068	0.068	0.068
19.000	-	-	100	0.060	0.060	0.060
19.001	-	-	100	0.029	0.029	0.029
19.002	-	-	100	0.020	0.020	0.020
19.003	-	-	100	0.029	0.029	0.029
17.006	-	-	100	0.029	0.029	0.029
20.000	-	-	100	0.050	0.050	0.050
21.000	-	-	100	0.057	0.057	0.057
20.001	-	-	100	0.019	0.019	0.019
20.002	-	-	100	0.023	0.023	0.023
17.007	-	-	100	0.000	0.000	0.000
17.008	-	-	100	0.000	0.000	0.000
17.009	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.697	0.697	0.697

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S17.009	SHWALL	21.765	16.145	0.000	0	0

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

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coefficient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 40.000 Flow per Person per Day (l/per/day) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DTS Status ON Inertia Status OFF
Analysis Timestep Fine DVD Status OFF

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

PN	US/MH Name	Storm	Return Period	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged	Flooded	Flow / Overflow Cap.	Pipe	Status	Level Exceeded
								Level (m)	Depth (m)	Volume (m ³)		Flow (l/s)		
S17.000	S56	15 Winter	100	100/15	Summer			29.835	0.605	0.000	0.79	56.1	SURCHARGED	
S18.000	S57	15 Winter	100	100/15	Summer			29.536	0.686	0.000	0.42	24.5	SURCHARGED	
S18.001	S58	15 Winter	100	100/15	Summer			29.517	0.718	0.000	0.57	37.4	SURCHARGED	
S17.001	S59	15 Winter	100	100/15	Summer			29.468	0.820	0.000	1.70	101.8	SURCHARGED	
S17.002	S60	15 Winter	100	100/15	Summer			29.288	0.704	0.000	1.43	131.6	SURCHARGED	
S17.003	S61	15 Winter	100	100/15	Summer			28.692	0.392	0.000	1.65	138.0	SURCHARGED	
S17.004	S62	15 Winter	100	100/15	Summer			28.568	0.308	0.000	1.46	145.0	SURCHARGED	
S17.005	S63	15 Winter	100	100/15	Summer			28.337	0.184	0.000	1.73	168.5	SURCHARGED	
S19.000	S64	15 Winter	100	100/15	Summer			30.234	0.614	0.000	1.15	21.7	SURCHARGED	
S19.001	S65	15 Winter	100	100/15	Summer			29.938	0.608	0.000	1.53	29.4	SURCHARGED	
S19.002	S66	15 Winter	100					28.821	-0.071	0.000	0.79	40.2	OK	
S19.003	S67	15 Winter	100					28.606	-0.099	0.000	0.59	58.7	OK	
S17.006	S68	15 Winter	100					27.906	-0.156	0.000	0.63	233.4	OK	
S20.000	S69	15 Winter	100	100/15	Summer			28.137	0.787	0.000	1.51	25.3	SURCHARGED	
S21.000	S70	15 Winter	100	100/15	Summer			28.370	0.210	0.000	0.88	31.9	SURCHARGED	
S20.001	S71	15 Winter	100	100/15	Summer			27.632	0.500	0.000	0.94	62.6	SURCHARGED	
S20.002	S72	15 Winter	100	100/15	Summer			27.436	0.525	0.000	0.78	71.7	SURCHARGED	
S17.007	S73	15 Winter	100	100/15	Summer			27.393	0.539	0.000	3.57	302.0	SURCHARGED	
S17.008	S74	15 Winter	100					26.650	-0.159	0.000	0.63	303.2	OK	
S17.009	S20	15 Winter	100	100/15	Summer			21.840	0.610	0.000	3.17	299.8	SURCHARGED	

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Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
15 min Summer	15.369	0.469	5.1	176.8	O K
30 min Summer	15.489	0.589	5.1	231.6	O K
60 min Summer	15.599	0.699	5.1	285.6	O K
120 min Summer	15.699	0.799	5.1	337.9	O K
180 min Summer	15.762	0.862	5.1	372.1	O K
240 min Summer	15.808	0.908	5.1	398.0	O K
360 min Summer	15.876	0.976	5.1	437.8	O K
480 min Summer	15.927	1.027	5.1	468.1	O K
600 min Summer	15.962	1.062	5.1	489.7	O K
720 min Summer	15.986	1.086	5.1	504.5	O K
960 min Summer	16.009	1.109	5.1	518.8	O K
1440 min Summer	16.013	1.113	5.1	521.8	O K
2160 min Summer	15.977	1.077	5.1	499.1	O K
2880 min Summer	15.926	1.026	5.1	467.8	O K
4320 min Summer	15.810	0.910	5.1	399.2	O K
5760 min Summer	15.683	0.783	5.1	329.1	O K
7200 min Summer	15.534	0.634	5.1	253.4	O K
8640 min Summer	15.415	0.515	5.1	197.1	O K
10080 min Summer	15.315	0.415	5.1	153.4	O K
15 min Winter	15.418	0.518	5.1	198.4	O K
30 min Winter	15.548	0.648	5.1	260.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
15 min Summer	138.845	0.0	178.4	23
30 min Summer	91.604	0.0	235.5	37
60 min Summer	57.422	0.0	298.7	68
120 min Summer	34.937	0.0	363.6	126
180 min Summer	26.346	0.0	411.3	186
240 min Summer	21.686	0.0	451.3	246
360 min Summer	16.668	0.0	520.1	364
480 min Summer	13.952	0.0	580.1	484
600 min Summer	12.161	0.0	631.3	602
720 min Summer	10.860	0.0	675.3	720
960 min Summer	9.022	0.0	741.6	876
1440 min Summer	6.824	0.0	753.0	1126
2160 min Summer	5.035	0.0	946.3	1520
2880 min Summer	4.011	0.0	1004.7	1936
4320 min Summer	2.869	0.0	1076.8	2768
5760 min Summer	2.251	0.0	1129.1	3584
7200 min Summer	1.862	0.0	1167.3	4256
8640 min Summer	1.594	0.0	1199.1	4928
10080 min Summer	1.398	0.0	1226.4	5552
15 min Winter	138.845	0.0	199.9	23
30 min Winter	91.604	0.0	263.7	37

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Micro Drainage Source Control 2018.1

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
60 min Winter	15.669	0.769	5.1	322.0	O K
120 min Winter	15.779	0.879	5.1	381.5	O K
180 min Winter	15.848	0.948	5.1	421.0	O K
240 min Winter	15.899	0.999	5.1	451.5	O K
360 min Winter	15.977	1.077	5.1	499.3	O K
480 min Winter	16.036	1.136	5.1	536.6	O K
600 min Winter	16.079	1.179	5.1	564.2	O K
720 min Winter	16.110	1.210	5.1	584.3	O K
960 min Winter	16.141	1.241	5.1	605.7	O K
1440 min Winter	16.142	1.242	5.1	606.1	O K
2160 min Winter	16.096	1.196	5.1	575.5	O K
2880 min Winter	16.027	1.127	5.1	530.4	O K
4320 min Winter	15.863	0.963	5.1	429.8	O K
5760 min Winter	15.671	0.771	5.1	322.7	O K
7200 min Winter	15.447	0.547	5.1	212.0	O K
8640 min Winter	15.283	0.383	5.1	139.8	O K
10080 min Winter	15.169	0.269	5.0	93.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
60 min Winter	57.422	0.0	334.6	66
120 min Winter	34.937	0.0	407.2	124
180 min Winter	26.346	0.0	460.6	182
240 min Winter	21.686	0.0	505.4	240
360 min Winter	16.668	0.0	582.2	356
480 min Winter	13.952	0.0	648.8	472
600 min Winter	12.161	0.0	705.0	586
720 min Winter	10.860	0.0	751.2	698
960 min Winter	9.022	0.0	787.0	916
1440 min Winter	6.824	0.0	765.5	1184
2160 min Winter	5.035	0.0	1059.8	1628
2880 min Winter	4.011	0.0	1125.1	2104
4320 min Winter	2.869	0.0	1205.1	2988
5760 min Winter	2.251	0.0	1264.7	3872
7200 min Winter	1.862	0.0	1307.5	4464
8640 min Winter	1.594	0.0	1343.2	5096
10080 min Winter	1.398	0.0	1373.9	5648

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Rainfall Details

Rainfall Model	FEH	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
FEH Rainfall Version	2013	Cv (Winter)	0.840
Site Location	GB 620427 161552	Shortest Storm (mins)	15
Data Type	Point	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.697

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From:	To: (ha)	From:	To: (ha)	From:	To: (ha)
0	4 0.261	4	8 0.424	8	12 0.012

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Model Details

Storage is Online Cover Level (m) 16.500

Tank or Pond Structure

Invert Level (m) 14.900

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	315.1	2.800	0.0	5.600	0.0	8.400	0.0
0.400	421.9	3.200	0.0	6.000	0.0	8.800	0.0
0.800	537.8	3.600	0.0	6.400	0.0	9.200	0.0
1.200	662.6	4.000	0.0	6.800	0.0	9.600	0.0
1.600	796.4	4.400	0.0	7.200	0.0	10.000	0.0
2.000	939.3	4.800	0.0	7.600	0.0		
2.400	0.0	5.200	0.0	8.000	0.0		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0103-5100-1250-5100
Design Head (m)	1.250
Design Flow (l/s)	5.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	103
Invert Level (m)	14.900
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.250	5.1
Flush-Flo™	0.368	5.1
Kick-Flo®	0.772	4.1
Mean Flow over Head Range	-	4.5

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	3.4	1.000	4.6	2.400	6.9	5.500	10.2
0.200	4.8	1.200	5.0	2.600	7.2	6.000	10.7
0.300	5.1	1.400	5.4	3.000	7.7	6.500	11.1
0.400	5.1	1.600	5.7	3.500	8.3	7.000	11.5
0.500	5.0	1.800	6.0	4.000	8.8	7.500	11.9
0.600	4.8	2.000	6.3	4.500	9.3	8.000	12.2
0.800	4.1	2.200	6.6	5.000	9.8	8.500	12.6

66a Church Walk
Burgess Hill
West Sussex RH15 9AS

HOPLANDS FARM
HERSDEN
PHASE 1b POND



Date 31/08/2018
File 7178 PH1b POND.srcx

Designed by DMS
Checked by MR

Micro Drainage Source Control 2018.1

Hydro-Brake® Optimum Outflow Control

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
9.000	12.9	9.500	13.3				