STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm Network 18 06 14.sws

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	Add Flow / Climate Change (%)	0
M5-60 (mm)	18.700	Minimum Backdrop Height (m)	0.000
Ratio R	0.350	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm Network 18 06 14.sws

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	23.080	0.250	92.3	0.112	4.00	0.0	0.600	o	300	
2.000	18.870	0.600	31.5	0.242	4.00	0.0	0.600	o	300	
1.001	23.327	0.150	155.5	0.020	0.00	0.0	0.600	o	300	
1.002	17.300	0.750	23.1	0.037	0.00	0.0	0.600	o	300	
3.000	19.183	0.225	85.3	0.078	4.00	0.0	0.600	o	225	
4.000	13.600	0.075	181.3	0.054	4.00	0.0	0.600	o	225	
3.001	18.543	0.075	247.2	0.012	0.00	0.0	0.600	o	300	
1.003	11.214	0.050	224.3	0.031	0.00	0.0	0.600	o	300	
1.004	38.676	0.275	140.6	0.074	0.00	0.0	0.600	o	450	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	4.24	45.750	0.112	0.0	0.0	0.0	1.64	115.7	15.2
2.000	50.00	4.11	46.100	0.242	0.0	0.0	0.0	2.81	198.9	32.8
1.001	49.80	4.54	45.500	0.374	0.0	0.0	0.0	1.26	88.9	50.4
1.002	49.42	4.63	45.350	0.411	0.0	0.0	0.0	3.29	232.4	55.0
3.000	50.00	4.23	44.900	0.078	0.0	0.0	0.0	1.42	56.3	10.6
4.000	50.00	4.23	44.750	0.054	0.0	0.0	0.0	0.97	38.5	7.3
3.001	49.80	4.54	44.600	0.144	0.0	0.0	0.0	1.00	70.4	19.4
1.003	48.67	4.81	44.525	0.586	0.0	0.0	0.0	1.05	73.9«	77.2
1.004	47.17	5.19	44.325	0.660	0.0	0.0	0.0	1.71	272.3	84.3

Network Design Table for Storm Network 18 06 14.sws

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
5.000	44.710	1.150	38.9	0.224	4.00	0.0	0.600	o	225	
5.001	10.967	0.050	219.3	0.072	0.00	0.0	0.600	o	300	
5.002	13.693	0.075	182.6	0.011	0.00	0.0	0.600	o	300	
5.003	21.510	1.150	18.7	0.109	0.00	0.0	0.600	o	300	
1.005	51.687	0.175	295.4	0.138	0.00	0.0	0.600	o	1050	
1.006	25.180	0.150	167.9	0.081	0.00	0.0	0.600	o	1050	
6.000	22.470	0.150	149.8	0.099	4.00	0.0	0.600	o	225	
6.001	10.078	0.075	134.4	0.000	0.00	0.0	0.600	o	225	
6.002	37.350	0.125	298.8	0.150	0.00	0.0	0.600	o	1050	
1.007	15.759	0.100	157.6	0.201	0.00	0.0	0.600	o	1050	
1.008	15.848	0.175	90.6	0.044	0.00	0.0	0.600	o	1050	
1.009	23.333	2.317	10.1	0.000	0.00	0.0	0.600	o	450	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
5.000	50.00	4.35	46.700	0.224	0.0	0.0	0.0	2.10	83.7	30.3
5.001	49.87	4.53	45.475	0.296	0.0	0.0	0.0	1.06	74.8	40.0
5.002	49.03	4.72	45.425	0.307	0.0	0.0	0.0	1.16	82.0	40.8
5.003	48.62	4.82	45.350	0.416	0.0	0.0	0.0	3.65	258.2	54.8
1.005	45.58	5.62	43.450	1.214	0.0	0.0	0.0	2.00	1731.8	149.9
1.006	45.03	5.78	43.275	1.295	0.0	0.0	0.0	2.66	2300.8	157.9
6.000	50.00	4.35	44.300	0.099	0.0	0.0	0.0	1.07	42.4	13.4
6.001	49.99	4.50	44.150	0.099	0.0	0.0	0.0	1.13	44.8	13.4
6.002	48.66	4.81	43.250	0.249	0.0	0.0	0.0	1.99	1721.8	32.8
1.007	44.70	5.87	43.125	1.745	0.0	0.0	0.0	2.74	2375.0	211.3
1.008	44.46	5.94	43.025	1.789	0.0	0.0	0.0	3.62	3136.6	215.4
1.009	44.26	6.00	42.850	1.789	0.0	0.0	0.0	6.43	1023.4	215.4

Manhole Schedules for Storm Network 18 06 14.sws

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)
S1	47.278	1.528	Open Manhole	1200	1.000	45.750	300				
S13	47.617	1.517	Open Manhole	1200	2.000	46.100	300				
S2	47.440	1.940	Open Manhole	1200	1.001	45.500	300	1.000	45.500	300	
								2.000	45.500	300	
S3	47.153	1.803	Open Manhole	1200	1.002	45.350	300	1.001	45.350	300	
S14	46.588	1.688	Open Manhole	1200	3.000	44.900	225				
S16	46.532	1.782	Open Manhole	1200	4.000	44.750	225				
S15	46.868	2.268	Open Manhole	1200	3.001	44.600	300	3.000	44.675	225	
								4.000	44.675	225	
S4	47.180	2.655	Open Manhole	1200	1.003	44.525	300	1.002	44.600	300	75
								3.001	44.525	300	
S5	47.318	2.993	Open Manhole	1500	1.004	44.325	450	1.003	44.475	300	
S17	48.274	1.574	Open Manhole	1200	5.000	46.700	225				
S18	47.074	1.599	Open Manhole	1200	5.001	45.475	300	5.000	45.550	225	
S19	47.021	1.596	Open Manhole	1200	5.002	45.425	300	5.001	45.425	300	
S20	47.079	1.729	Open Manhole	1200	5.003	45.350	300	5.002	45.350	300	
S6	47.344	3.894	Open Manhole	2100	1.005	43.450	1050	1.004	44.050	450	
								5.003	44.200	300	
S7	45.747	2.472	Open Manhole	2100	1.006	43.275	1050	1.005	43.275	1050	
S21	45.805	1.505	Open Manhole	1200	6.000	44.300	225				
S22	45.889	1.739	Open Manhole	1200	6.001	44.150	225	6.000	44.150	225	
S23	45.851	2.601	Open Manhole	2100	6.002	43.250	1050	6.001	44.075	225	
S8	45.852	2.727	Open Manhole	2100	1.007	43.125	1050	1.006	43.125	1050	
								6.002	43.125	1050	
S9	45.718	2.693	Open Manhole	2100	1.008	43.025	1050	1.007	43.025	1050	
S10	45.300	2.450	Open Manhole	3000 x 2100	1.009	42.850	450	1.008	42.850	1050	
C1	45.246	4.713	Open Manhole	1800		OUTFALL		1.009	40.533	450	

PIPELINE SCHEDULES for Storm Network 18 06 14.sws

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	300	S1	47.278	45.750	1.228	Open Manhole	1200
2.000	o	300	S13	47.617	46.100	1.217	Open Manhole	1200
1.001	o	300	S2	47.440	45.500	1.640	Open Manhole	1200
1.002	o	300	S3	47.153	45.350	1.503	Open Manhole	1200
3.000	o	225	S14	46.588	44.900	1.463	Open Manhole	1200
4.000	o	225	S16	46.532	44.750	1.557	Open Manhole	1200
3.001	o	300	S15	46.868	44.600	1.968	Open Manhole	1200
1.003	o	300	S4	47.180	44.525	2.355	Open Manhole	1200
1.004	o	450	S5	47.318	44.325	2.543	Open Manhole	1500
5.000	o	225	S17	48.274	46.700	1.349	Open Manhole	1200
5.001	o	300	S18	47.074	45.475	1.299	Open Manhole	1200
5.002	o	300	S19	47.021	45.425	1.296	Open Manhole	1200
5.003	o	300	S20	47.079	45.350	1.429	Open Manhole	1200
1.005	o	1050	S6	47.344	43.450	2.844	Open Manhole	2100
1.006	o	1050	S7	45.747	43.275	1.422	Open Manhole	2100
6.000	o	225	S21	45.805	44.300	1.280	Open Manhole	1200
6.001	o	225	S22	45.889	44.150	1.514	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	23.080	92.3	S2	47.440	45.500	1.640	Open Manhole	1200
2.000	18.870	31.5	S2	47.440	45.500	1.640	Open Manhole	1200
1.001	23.327	155.5	S3	47.153	45.350	1.503	Open Manhole	1200
1.002	17.300	23.1	S4	47.180	44.600	2.280	Open Manhole	1200
3.000	19.183	85.3	S15	46.868	44.675	1.968	Open Manhole	1200
4.000	13.600	181.3	S15	46.868	44.675	1.968	Open Manhole	1200
3.001	18.543	247.2	S4	47.180	44.525	2.355	Open Manhole	1200
1.003	11.214	224.3	S5	47.318	44.475	2.543	Open Manhole	1500
1.004	38.676	140.6	S6	47.344	44.050	2.844	Open Manhole	2100
5.000	44.710	38.9	S18	47.074	45.550	1.299	Open Manhole	1200
5.001	10.967	219.3	S19	47.021	45.425	1.296	Open Manhole	1200
5.002	13.693	182.6	S20	47.079	45.350	1.429	Open Manhole	1200
5.003	21.510	18.7	S6	47.344	44.200	2.844	Open Manhole	2100
1.005	51.687	295.4	S7	45.747	43.275	1.422	Open Manhole	2100
1.006	25.180	167.9	S8	45.852	43.125	1.677	Open Manhole	2100
6.000	22.470	149.8	S22	45.889	44.150	1.514	Open Manhole	1200
6.001	10.078	134.4	S23	45.851	44.075	1.551	Open Manhole	2100

PIPELINE SCHEDULES for Storm Network 18 06 14.sws

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
6.002	o	1050	S23	45.851	43.250	1.551	Open Manhole	2100
1.007	o	1050	S8	45.852	43.125	1.677	Open Manhole	2100
1.008	o	1050	S9	45.718	43.025	1.643	Open Manhole	2100
1.009	o	450	S10	45.300	42.850	2.000	Open Manhole	3000 x 2100

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)
6.002	37.350	298.8	S8	45.852	43.125	1.677	Open Manhole	2100
1.007	15.759	157.6	S9	45.718	43.025	1.643	Open Manhole	2100
1.008	15.848	90.6	S10	45.300	42.850	1.400	Open Manhole	3000 x 2100
1.009	23.333	10.1	C1	45.246	40.533	4.263	Open Manhole	1800

Free Flowing Outfall Details for Storm Network 18 06 14.sws

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.009	C1	45.246	40.533	0.000	1800	0

Simulation Criteria for Storm Network 18 06 14.sws

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.700	Storm Duration (mins)	30
Ratio R	0.350		

Online Controls for Storm Network 18 06 14.sws

Hydro-Brake Optimum® Manhole: S10, DS/PN: 1.009, Volume (m³): 26.9

Unit Reference	MD-SHE-0420-1300-2450-1300
Design Head (m)	2.450
Design Flow (l/s)	130.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	420
Invert Level (m)	42.850
Minimum Outlet Pipe Diameter (mm)	450
Suggested Manhole Diameter (mm)	Site Specific Design (Contact Hydro International)

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.450	128.7	Kick-Flo®	1.688	107.4
Flush-Flo™	0.782	128.5	Mean Flow over Head Range	-	109.5

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)	Depth (m)	Flow (l/s)
0.100	11.3	0.800	128.5	2.000	116.6	4.000	163.4	7.000	214.9
0.200	40.9	1.000	127.2	2.200	122.1	4.500	173.1	7.500	222.3
0.300	80.0	1.200	124.8	2.400	127.4	5.000	182.2	8.000	229.4
0.400	116.0	1.400	120.9	2.600	132.5	5.500	190.9	8.500	236.3
0.500	124.1	1.600	113.2	3.000	142.0	6.000	199.2	9.000	243.0
0.600	126.9	1.800	110.8	3.500	153.1	6.500	207.2	9.500	249.6

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm Network 18 06 14.sws

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	18.700
Region	England and Wales	Ratio R	0.350
Cv (Summer)	0.750		
Cv (Winter)	0.840		

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

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	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Summer	1	0%	30/15 Summer				
2.000	15 Summer	1	0%	100/15 Summer				
1.001	15 Winter	1	0%	30/15 Summer				
1.002	15 Winter	1	0%	100/15 Summer				
3.000	15 Summer	1	0%	30/15 Summer				
4.000	15 Winter	1	0%	30/15 Summer				
3.001	15 Winter	1	0%	30/15 Summer				
1.003	15 Winter	1	0%	1/15 Summer				
1.004	15 Winter	1	0%	100/15 Summer				
5.000	15 Winter	1	0%	100/15 Summer				
5.001	15 Winter	1	0%	30/15 Summer				
5.002	15 Winter	1	0%	30/15 Summer				
5.003	15 Winter	1	0%	100/15 Summer				
1.005	15 Winter	1	0%	30/30 Winter				
1.006	15 Winter	1	0%	30/15 Winter				
6.000	15 Winter	1	0%	30/30 Winter				
6.001	15 Winter	1	0%	30/30 Winter				
6.002	15 Winter	1	0%	30/15 Winter				
1.007	15 Winter	1	0%	30/15 Winter				
1.008	15 Winter	1	0%	30/15 Winter				
1.009	15 Winter	1	0%	1/15 Summer	100/15 Summer			8

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	45.826	-0.224	0.000	0.15	0.0	14.9	OK
2.000	S13	46.187	-0.213	0.000	0.19	0.0	32.2	OK
1.001	S2	45.672	-0.128	0.000	0.62	0.0	48.6	OK
1.002	S3	45.455	-0.195	0.000	0.26	0.0	52.2	OK
3.000	S14	44.969	-0.156	0.000	0.20	0.0	10.4	OK
4.000	S16	44.890	-0.085	0.000	0.20	0.0	6.7	OK
3.001	S15	44.878	-0.022	0.000	0.27	0.0	16.4	OK
1.003	S4	44.839	0.014	0.000	1.16	0.0	68.8	SURCHARGED
1.004	S5	44.500	-0.275	0.000	0.32	0.0	76.5	OK

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm Network 18 06 14.sws

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
5.000	S17	46.795	-0.130	0.000	0.37	0.0	29.7	OK
5.001	S18	45.648	-0.127	0.000	0.62	0.0	37.1	OK
5.002	S19	45.588	-0.137	0.000	0.56	0.0	38.2	OK
5.003	S20	45.445	-0.205	0.000	0.22	0.0	49.8	OK
1.005	S6	43.673	-0.827	0.000	0.10	0.0	136.8	OK
1.006	S7	43.512	-0.813	0.000	0.10	0.0	142.5	OK
6.000	S21	44.390	-0.135	0.000	0.34	0.0	13.1	OK
6.001	S22	44.242	-0.133	0.000	0.35	0.0	13.0	OK
6.002	S23	43.482	-0.818	0.000	0.02	0.0	27.7	OK
1.007	S8	43.480	-0.695	0.000	0.12	0.0	160.8	OK
1.008	S9	43.468	-0.607	0.000	0.11	0.0	148.6	OK
1.009	S10	43.455	0.155	0.000	0.15	0.0	127.0	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm Network 18 06 14.sws

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	18.700
Region	England and Wales	Ratio R	0.350
Cv (Summer)	0.750		
Cv (Winter)	0.840		

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

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	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	0%	30/15 Summer				
2.000	15 Winter	30	0%	100/15 Summer				
1.001	15 Winter	30	0%	30/15 Summer				
1.002	15 Winter	30	0%	100/15 Summer				
3.000	15 Winter	30	0%	30/15 Summer				
4.000	15 Winter	30	0%	30/15 Summer				
3.001	15 Winter	30	0%	30/15 Summer				
1.003	15 Winter	30	0%	1/15 Summer				
1.004	30 Winter	30	0%	100/15 Summer				
5.000	15 Winter	30	0%	100/15 Summer				
5.001	15 Summer	30	0%	30/15 Summer				
5.002	15 Summer	30	0%	30/15 Summer				
5.003	15 Summer	30	0%	100/15 Summer				
1.005	30 Winter	30	0%	30/30 Winter				
1.006	30 Winter	30	0%	30/15 Winter				
6.000	30 Winter	30	0%	30/30 Winter				
6.001	30 Winter	30	0%	30/30 Winter				
6.002	30 Winter	30	0%	30/15 Winter				
1.007	30 Winter	30	0%	30/15 Winter				
1.008	30 Winter	30	0%	30/15 Winter				
1.009	30 Winter	30	0%	1/15 Summer	100/15 Summer			8

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	46.082	0.032	0.000	0.33	0.0	34.1	SURCHARGED
2.000	S13	46.242	-0.158	0.000	0.46	0.0	78.8	OK
1.001	S2	45.964	0.164	0.000	1.46	0.0	114.9	SURCHARGED
1.002	S3	45.534	-0.116	0.000	0.63	0.0	124.7	OK
3.000	S14	45.378	0.253	0.000	0.43	0.0	22.0	SURCHARGED
4.000	S16	45.350	0.375	0.000	0.45	0.0	15.0	SURCHARGED
3.001	S15	45.323	0.423	0.000	0.65	0.0	39.3	SURCHARGED
1.003	S4	45.241	0.416	0.000	2.91	0.0	171.6	SURCHARGED
1.004	S5	44.717	-0.058	0.000	0.65	0.0	156.7	OK

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm Network 18 06 14.sws

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
5.000	S17	46.885	-0.040	0.000	0.90	0.0	71.8	OK
5.001	S18	45.946	0.171	0.000	1.58	0.0	93.9	SURCHARGED
5.002	S19	45.798	0.073	0.000	1.44	0.0	97.6	SURCHARGED
5.003	S20	45.517	-0.133	0.000	0.57	0.0	129.3	OK
1.005	S6	44.631	0.131	0.000	0.20	0.0	279.8	SURCHARGED
1.006	S7	44.626	0.301	0.000	0.14	0.0	192.5	SURCHARGED
6.000	S21	44.638	0.113	0.000	0.63	0.0	24.4	SURCHARGED
6.001	S22	44.627	0.252	0.000	0.66	0.0	24.5	SURCHARGED
6.002	S23	44.621	0.321	0.000	0.04	0.0	52.2	SURCHARGED
1.007	S8	44.621	0.446	0.000	0.13	0.0	179.9	SURCHARGED
1.008	S9	44.616	0.541	0.000	0.11	0.0	160.2	SURCHARGED
1.009	S10	44.610	1.310	0.000	0.15	0.0	128.5	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm Network 18 06 14.sws

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.700 Cv (Summer) 0.750
Region England and Wales Ratio R 0.350 Cv (Winter) 0.840

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

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	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%	30/15 Summer				
2.000	15 Winter	100	+30%	100/15 Summer				
1.001	15 Winter	100	+30%	30/15 Summer				
1.002	15 Winter	100	+30%	100/15 Summer				
3.000	15 Winter	100	+30%	30/15 Summer				
4.000	15 Winter	100	+30%	30/15 Summer				
3.001	15 Winter	100	+30%	30/15 Summer				
1.003	15 Winter	100	+30%	1/15 Summer				
1.004	15 Winter	100	+30%	100/15 Summer				
5.000	15 Winter	100	+30%	100/15 Summer				
5.001	15 Winter	100	+30%	30/15 Summer				
5.002	15 Winter	100	+30%	30/15 Summer				
5.003	15 Winter	100	+30%	100/15 Summer				
1.005	15 Winter	100	+30%	30/30 Winter				
1.006	15 Winter	100	+30%	30/15 Winter				
6.000	30 Winter	100	+30%	30/30 Winter				
6.001	30 Winter	100	+30%	30/30 Winter				
6.002	15 Winter	100	+30%	30/15 Winter				
1.007	15 Winter	100	+30%	30/15 Winter				
1.008	60 Winter	100	+30%	30/15 Winter				
1.009	60 Winter	100	+30%	1/15 Summer	100/15 Summer			8

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	47.128	1.078	0.000	0.45	0.0	45.8	FLOOD RISK
2.000	S13	47.211	0.811	0.000	0.60	0.0	103.9	SURCHARGED
1.001	S2	47.042	1.242	0.000	1.95	0.0	154.1	SURCHARGED
1.002	S3	46.655	1.005	0.000	0.83	0.0	164.0	SURCHARGED
3.000	S14	46.413	1.288	0.000	0.67	0.0	34.0	FLOOD RISK
4.000	S16	46.403	1.428	0.000	0.68	0.0	22.6	FLOOD RISK
3.001	S15	46.374	1.474	0.000	0.95	0.0	57.9	SURCHARGED
1.003	S4	46.296	1.471	0.000	3.90	0.0	230.4	SURCHARGED
1.004	S5	45.796	1.021	0.000	1.04	0.0	251.0	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm Network 18 06 14.sws

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
5.000	S17	48.088	1.163	0.000	1.25	0.0	99.5	FLOOD RISK
5.001	S18	46.378	0.603	0.000	2.23	0.0	132.7	SURCHARGED
5.002	S19	46.213	0.488	0.000	2.02	0.0	137.2	SURCHARGED
5.003	S20	46.045	0.395	0.000	0.82	0.0	186.6	SURCHARGED
1.005	S6	45.592	1.092	0.000	0.33	0.0	458.3	SURCHARGED
1.006	S7	45.565	1.240	0.000	0.30	0.0	417.8	FLOOD RISK
6.000	S21	45.734	1.209	0.000	1.03	0.0	39.9	FLOOD RISK
6.001	S22	45.645	1.270	0.000	0.98	0.0	36.6	FLOOD RISK
6.002	S23	45.550	1.250	0.000	0.08	0.0	102.4	SURCHARGED
1.007	S8	45.536	1.361	0.000	0.37	0.0	519.0	SURCHARGED
1.008	S9	45.462	1.387	0.000	0.30	0.0	419.0	FLOOD RISK
1.009	S10	45.456	2.156	155.870	0.16	0.0	132.6	FLOOD