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)	19.600	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	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

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.222	4-8	0.036

Total Area Contributing (ha) = 0.258

Total Pipe Volume (m³) = 4.869

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
1.000	16.800	0.210	80.0	0.006	4.00	0.0	0.600	o	100	Pipe/Conduit	
1.001	13.400	0.167	80.2	0.004	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.002	20.900	0.260	80.4	0.005	0.00	0.0	0.600	o	100	Pipe/Conduit	
2.000	5.500	0.375	14.7	0.008	4.00	0.0	0.600	o	150	Pipe/Conduit	
1.003	5.300	0.132	40.2	0.006	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)
1.000	50.00	4.33	99.060	0.006	0.0	0.0	0.0	0.86	6.8	0.8
1.001	50.00	4.58	98.850	0.010	0.0	0.0	0.0	0.86	6.8	1.4
1.002	50.00	4.99	98.683	0.015	0.0	0.0	0.0	0.86	6.7	2.0
2.000	50.00	4.03	98.748	0.008	0.0	0.0	0.0	2.64	46.7	1.1
1.003	50.00	5.05	98.373	0.029	0.0	0.0	0.0	1.59	28.2	3.9

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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
1.004	21.900	0.614	35.7	0.019	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.005	21.300	1.065	20.0	0.013	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.000	15.500	0.258	60.1	0.007	4.00	0.0	0.600	o	100	Pipe/Conduit	
3.001	12.500	0.470	26.6	0.006	0.00	0.0	0.600	o	100	Pipe/Conduit	
4.000	17.200	0.593	29.0	0.009	4.00	0.0	0.600	o	100	Pipe/Conduit	
3.002	1.500	0.125	12.0	0.008	0.00	0.0	0.600	o	100	Pipe/Conduit	
3.003	14.100	1.175	12.0	0.012	0.00	0.0	0.600	o	150	Pipe/Conduit	
5.000	17.800	1.213	14.7	0.011	4.00	0.0	0.600	o	150	Pipe/Conduit	
5.001	11.500	0.144	79.9	0.008	0.00	0.0	0.600	o	150	Pipe/Conduit	
5.002	4.100	0.051	80.4	0.006	0.00	0.0	0.600	o	150	Pipe/Conduit	
5.003	8.000	0.100	80.0	0.006	0.00	0.0	0.600	o	150	Pipe/Conduit	
6.000	9.600	0.120	80.0	0.004	4.00	0.0	0.600	o	100	Pipe/Conduit	
6.001	7.400	0.093	79.6	0.005	0.00	0.0	0.600	o	100	Pipe/Conduit	
6.002	8.800	0.110	80.0	0.006	0.00	0.0	0.600	o	100	Pipe/Conduit	
6.003	21.300	0.266	80.1	0.006	0.00	0.0	0.600	o	100	Pipe/Conduit	
5.004	4.600	0.057	80.7	0.007	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)
1.004	50.00	5.26	98.241	0.048	0.0	0.0	0.0	1.69	29.9	6.5
1.005	50.00	5.42	97.627	0.061	0.0	0.0	0.0	2.26	40.0	8.3
3.000	50.00	4.26	98.640	0.007	0.0	0.0	0.0	1.00	7.8	0.9
3.001	50.00	4.40	98.382	0.013	0.0	0.0	0.0	1.50	11.8	1.8
4.000	50.00	4.20	98.505	0.009	0.0	0.0	0.0	1.44	11.3	1.2
3.002	50.00	4.41	97.912	0.030	0.0	0.0	0.0	2.24	17.6	4.1
3.003	50.00	4.49	97.737	0.042	0.0	0.0	0.0	2.92	51.7	5.7
5.000	50.00	4.11	98.350	0.011	0.0	0.0	0.0	2.64	46.7	1.5
5.001	50.00	4.28	97.137	0.019	0.0	0.0	0.0	1.13	19.9	2.6
5.002	50.00	4.34	96.993	0.025	0.0	0.0	0.0	1.12	19.8	3.4
5.003	50.00	4.46	96.942	0.031	0.0	0.0	0.0	1.12	19.9	4.2
6.000	50.00	4.19	97.481	0.004	0.0	0.0	0.0	0.86	6.8	0.5
6.001	50.00	4.33	97.361	0.009	0.0	0.0	0.0	0.86	6.8	1.2
6.002	50.00	4.50	97.268	0.015	0.0	0.0	0.0	0.86	6.8	2.0
6.003	50.00	4.91	97.158	0.021	0.0	0.0	0.0	0.86	6.8	2.8
5.004	50.00	4.98	96.842	0.059	0.0	0.0	0.0	1.12	19.8	8.0

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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
7.000	20.200	0.253	79.8	0.009	4.00	0.0	0.600	o	100	Pipe/Conduit	
5.005	12.500	0.156	80.1	0.006	0.00	0.0	0.600	o	150	Pipe/Conduit	
8.000	12.300	0.204	60.3	0.009	4.00	0.0	0.600	o	100	Pipe/Conduit	
5.006	10.100	0.067	150.7	0.008	0.00	0.0	0.600	o	150	Pipe/Conduit	
9.000	10.400	0.130	80.0	0.005	4.00	0.0	0.600	o	100	Pipe/Conduit	
10.000	10.300	0.129	79.8	0.004	4.00	0.0	0.600	o	100	Pipe/Conduit	
9.001	6.900	0.086	80.2	0.009	0.00	0.0	0.600	o	100	Pipe/Conduit	
9.002	17.200	0.115	149.6	0.010	0.00	0.0	0.600	o	150	Pipe/Conduit	
11.000	9.500	0.119	79.8	0.006	4.00	0.0	0.600	o	100	Pipe/Conduit	
12.000	6.000	0.075	80.0	0.004	4.00	0.0	0.600	o	100	Pipe/Conduit	
11.001	8.800	0.110	80.0	0.006	0.00	0.0	0.600	o	100	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)
7.000	50.00	4.39	97.088	0.009	0.0	0.0	0.0	0.86	6.8	1.2
5.005	50.00	5.17	96.785	0.074	0.0	0.0	0.0	1.12	19.9	10.0
8.000	50.00	4.21	96.883	0.009	0.0	0.0	0.0	0.99	7.8	1.2
5.006	50.00	5.37	96.629	0.091	0.0	0.0	0.0	0.82	14.4	12.3
9.000	50.00	4.20	97.286	0.005	0.0	0.0	0.0	0.86	6.8	0.7
10.000	50.00	4.20	97.285	0.004	0.0	0.0	0.0	0.86	6.8	0.5
9.001	50.00	4.34	97.156	0.018	0.0	0.0	0.0	0.86	6.8	2.4
9.002	50.00	4.68	97.020	0.028	0.0	0.0	0.0	0.82	14.5	3.8
11.000	50.00	4.18	97.184	0.006	0.0	0.0	0.0	0.86	6.8	0.8
12.000	50.00	4.12	97.140	0.004	0.0	0.0	0.0	0.86	6.8	0.5
11.001	50.00	4.35	97.065	0.016	0.0	0.0	0.0	0.86	6.8	2.2

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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
9.003	10.500	0.343	30.6	0.007	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.006	1.100	0.150	7.3	0.013	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.007	3.600	0.024	150.0	0.000	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)
9.003	50.00	4.78	96.905	0.051	0.0	0.0	0.0	1.83	32.3	6.9
1.006	50.00	5.42	96.562	0.258	0.0	0.0	0.0	3.74	66.2	34.9
1.007	50.00	5.48	96.337	0.258	0.0	0.0	0.0	1.07	42.4	34.9

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)
1.007		98.000	96.313	0.000	0	0

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Online Controls for Storm

Orifice Manhole: 37, DS/PN: 1.007, Volume (m³): 0.3

Diameter (m) 0.030 Discharge Coefficient 0.600 Invert Level (m) 96.337

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Storage Structures for Storm

Porous Car Park Manhole: 31, DS/PN: 9.002

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	29.8
Membrane Percolation (mm/hr)	1000	Length (m)	29.8
Max Percolation (l/s)	246.7	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	97.250	Cap Volume Depth (m)	0.325

Cellular Storage Manhole: 36, DS/PN: 1.006

Invert Level (m)	96.562	Safety Factor	3.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	115.5	115.5	0.801	0.0	149.9
0.800	115.5	149.9			

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1 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 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 2
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.400
Region England and Wales Cv (Summer) 1.000
M5-60 (mm) 19.600 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
Duration(s) (mins) 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	30 Summer	1	+0%					99.086
1.001	2	30 Summer	1	+0%	100/30 Summer				98.883
1.002	3	30 Summer	1	+0%	100/30 Summer				98.723
2.000	6	30 Summer	1	+0%					98.766
1.003	7	30 Summer	1	+0%	100/30 Summer				98.417
1.004	8	30 Summer	1	+0%	100/30 Summer				98.291
1.005	9	30 Summer	1	+0%	100/30 Summer				97.675
3.000	10	30 Summer	1	+0%					98.666
3.001	11	30 Summer	1	+0%	100/30 Summer				98.410
4.000	12	30 Summer	1	+0%					98.530
3.002	13	30 Summer	1	+0%	30/30 Summer				97.960
3.003	14	30 Summer	1	+0%	100/120 Summer				97.773
5.000	15	30 Summer	1	+0%					98.370
5.001	16	30 Summer	1	+0%	30/30 Summer				97.178
5.002	17	30 Summer	1	+0%	30/30 Summer				97.045
5.003	18	30 Summer	1	+0%	30/30 Summer				96.994
6.000	19	30 Summer	1	+0%	100/30 Summer				97.503
6.001	20	30 Summer	1	+0%	30/30 Summer				97.393
6.002	21	30 Summer	1	+0%	30/30 Summer				97.309

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.074	0.000	0.15		1.0	OK	
1.001	2	-0.067	0.000	0.24		1.5	OK	
1.002	3	-0.060	0.000	0.34		2.2	OK	
2.000	6	-0.132	0.000	0.03		1.3	OK	
1.003	7	-0.106	0.000	0.19		4.2	OK	
1.004	8	-0.100	0.000	0.24		6.8	OK	
1.005	9	-0.102	0.000	0.23		8.5	OK	
3.000	10	-0.074	0.000	0.15		1.2	OK	
3.001	11	-0.072	0.000	0.18		2.0	OK	
4.000	12	-0.075	0.000	0.14		1.5	OK	
3.002	13	-0.052	0.000	0.46		4.6	OK	
3.003	14	-0.114	0.000	0.13		6.2	OK	
5.000	15	-0.130	0.000	0.04		1.8	OK	
5.001	16	-0.109	0.000	0.16		2.9	OK	
5.002	17	-0.098	0.000	0.27		3.7	OK	
5.003	18	-0.098	0.000	0.26		4.5	OK	
6.000	19	-0.078	0.000	0.11		0.7	OK	
6.001	20	-0.068	0.000	0.22		1.3	OK	
6.002	21	-0.059	0.000	0.34		2.2	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
6.003	22	30 Summer	1	+0%	30/30 Summer				97.205
5.004	23	30 Summer	1	+0%	30/30 Summer				96.923
7.000	24	30 Summer	1	+0%	30/30 Summer				97.121
5.005	25	30 Summer	1	+0%	30/30 Summer				96.868
8.000	26	30 Summer	1	+0%	30/30 Summer				96.914
5.006	27	240 Winter	1	+0%	1/60 Summer				96.854
9.000	28	30 Summer	1	+0%	100/30 Summer				97.310
10.000	29	30 Summer	1	+0%	100/30 Summer				97.307
9.001	30	30 Summer	1	+0%	30/30 Summer				97.203
9.002	31	30 Summer	1	+0%	30/120 Summer				97.066
11.000	32	30 Summer	1	+0%	100/30 Summer				97.211
12.000	33	30 Summer	1	+0%	30/240 Summer				97.162
11.001	34	30 Summer	1	+0%	30/120 Summer				97.109
9.003	35	30 Summer	1	+0%	30/60 Summer				96.952
1.006	36	240 Winter	1	+0%	1/30 Summer				96.852
1.007	37	240 Winter	1	+0%	1/30 Summer				97.039

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
6.003	22	-0.053	0.000	0.45		3.0	OK	
5.004	23	-0.069	0.000	0.56		8.4	OK	
7.000	24	-0.067	0.000	0.23		1.5	OK	
5.005	25	-0.067	0.000	0.59		10.6	OK	
8.000	26	-0.069	0.000	0.20		1.5	OK	
5.006	27	0.075	0.000	0.23		2.9	SURCHARGED	
9.000	28	-0.076	0.000	0.13		0.8	OK	
10.000	29	-0.078	0.000	0.10		0.7	OK	
9.001	30	-0.053	0.000	0.45		2.7	OK	
9.002	31	-0.104	0.000	0.20		2.7	OK	
11.000	32	-0.073	0.000	0.16		1.0	OK	
12.000	33	-0.078	0.000	0.11		0.7	OK	
11.001	34	-0.056	0.000	0.40		2.5	OK	
9.003	35	-0.103	0.000	0.21		6.0	OK	
1.006	36	0.140	0.000	0.07		1.6	SURCHARGED	
1.007	37	0.477	0.000	0.05		1.3	SURCHARGED	

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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 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 2
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.400
Region England and Wales Cv (Summer) 1.000
M5-60 (mm) 19.600 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
Duration(s) (mins) 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	30 Summer	30	+0%					99.103
1.001	2	30 Summer	30	+0%	100/30 Summer				98.908
1.002	3	30 Summer	30	+0%	100/30 Summer				98.759
2.000	6	30 Summer	30	+0%					98.778
1.003	7	30 Summer	30	+0%	100/30 Summer				98.449
1.004	8	30 Summer	30	+0%	100/30 Summer				98.333
1.005	9	30 Summer	30	+0%	100/30 Summer				97.715
3.000	10	30 Summer	30	+0%					98.683
3.001	11	30 Summer	30	+0%	100/30 Summer				98.431
4.000	12	30 Summer	30	+0%					98.545
3.002	13	30 Summer	30	+0%	30/30 Summer				98.066
3.003	14	30 Summer	30	+0%	100/120 Summer				97.798
5.000	15	30 Summer	30	+0%					98.382
5.001	16	30 Summer	30	+0%	30/30 Summer				97.317
5.002	17	30 Summer	30	+0%	30/30 Summer				97.298
5.003	18	30 Summer	30	+0%	30/30 Summer				97.288
6.000	19	30 Summer	30	+0%	100/30 Summer				97.516
6.001	20	30 Summer	30	+0%	30/30 Summer				97.482
6.002	21	30 Summer	30	+0%	30/30 Summer				97.466

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.057	0.000	0.37		2.4	OK	
1.001	2	-0.042	0.000	0.63		4.0	OK	
1.002	3	-0.024	0.000	0.92		6.0	OK	
2.000	6	-0.120	0.000	0.09		3.3	OK	
1.003	7	-0.074	0.000	0.51		11.5	OK	
1.004	8	-0.058	0.000	0.67		19.1	OK	
1.005	9	-0.062	0.000	0.64		24.2	OK	
3.000	10	-0.057	0.000	0.38		2.8	OK	
3.001	11	-0.051	0.000	0.47		5.2	OK	
4.000	12	-0.060	0.000	0.34		3.7	OK	
3.002	13	0.054	0.000	1.21		11.9	SURCHARGED	
3.003	14	-0.089	0.000	0.35		16.6	OK	
5.000	15	-0.118	0.000	0.10		4.5	OK	
5.001	16	0.030	0.000	0.42		7.5	SURCHARGED	
5.002	17	0.155	0.000	0.55		7.7	SURCHARGED	
5.003	18	0.196	0.000	0.47		8.0	SURCHARGED	
6.000	19	-0.065	0.000	0.26		1.6	OK	
6.001	20	0.021	0.000	0.57		3.5	SURCHARGED	
6.002	21	0.098	0.000	0.79		4.9	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
6.003	22	30 Summer	30	+0%	30/30 Summer				97.428
5.004	23	240 Winter	30	+0%	30/30 Summer				97.276
7.000	24	240 Winter	30	+0%	30/30 Summer				97.276
5.005	25	240 Winter	30	+0%	30/30 Summer				97.274
8.000	26	240 Winter	30	+0%	30/30 Summer				97.272
5.006	27	240 Winter	30	+0%	1/60 Summer				97.271
9.000	28	30 Summer	30	+0%	100/30 Summer				97.325
10.000	29	30 Summer	30	+0%	100/30 Summer				97.320
9.001	30	30 Summer	30	+0%	30/30 Summer				97.281
9.002	31	360 Winter	30	+0%	30/120 Summer				97.264
11.000	32	360 Winter	30	+0%	100/30 Summer				97.267
12.000	33	360 Winter	30	+0%	30/240 Summer				97.267
11.001	34	360 Winter	30	+0%	30/120 Summer				97.267
9.003	35	360 Winter	30	+0%	30/60 Summer				97.266
1.006	36	240 Winter	30	+0%	1/30 Summer				97.268
1.007	37	360 Winter	30	+0%	1/30 Summer				97.449

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
6.003	22	0.170	0.000	0.88		5.7	SURCHARGED	
5.004	23	0.284	0.000	0.27		4.0	SURCHARGED	
7.000	24	0.088	0.000	0.10		0.7	SURCHARGED	
5.005	25	0.339	0.000	0.26		4.8	SURCHARGED	
8.000	26	0.289	0.000	0.08		0.6	SURCHARGED	
5.006	27	0.492	0.000	0.44		5.7	SURCHARGED	
9.000	28	-0.061	0.000	0.32		2.0	OK	
10.000	29	-0.065	0.000	0.26		1.6	OK	
9.001	30	0.025	0.000	1.14		7.0	SURCHARGED	
9.002	31	0.094	0.000	0.09		1.2	SURCHARGED	
11.000	32	-0.017	0.000	0.05		0.3	OK	
12.000	33	0.027	0.000	0.04		0.2	SURCHARGED	
11.001	34	0.102	0.000	0.14		0.9	SURCHARGED	
9.003	35	0.211	0.000	0.07		2.1	SURCHARGED	
1.006	36	0.556	0.000	0.09		2.1	SURCHARGED	
1.007	37	0.887	0.000	0.06		1.8	SURCHARGED	

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100 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 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 2
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.400
Region England and Wales Cv (Summer) 1.000
M5-60 (mm) 19.600 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
Duration(s) (mins) 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	30 Summer	100	+40%					99.153
1.001	2	30 Summer	100	+40%	100/30 Summer				99.101
1.002	3	30 Summer	100	+40%	100/30 Summer				98.985
2.000	6	30 Summer	100	+40%					98.788
1.003	7	30 Summer	100	+40%	100/30 Summer				98.598
1.004	8	30 Summer	100	+40%	100/30 Summer				98.534
1.005	9	120 Summer	100	+40%	100/30 Summer				97.955
3.000	10	30 Summer	100	+40%					98.712
3.001	11	30 Summer	100	+40%	100/30 Summer				98.621
4.000	12	30 Summer	100	+40%					98.569
3.002	13	30 Summer	100	+40%	30/30 Summer				98.374
3.003	14	120 Summer	100	+40%	100/120 Summer				97.922
5.000	15	30 Summer	100	+40%					98.394
5.001	16	120 Summer	100	+40%	30/30 Summer				97.999
5.002	17	120 Summer	100	+40%	30/30 Summer				97.991
5.003	18	120 Summer	100	+40%	30/30 Summer				97.986
6.000	19	30 Summer	100	+40%	100/30 Summer				98.032
6.001	20	30 Summer	100	+40%	30/30 Summer				98.026
6.002	21	30 Summer	100	+40%	30/30 Summer				98.012

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.007	0.000	0.68		4.4	OK	
1.001	2	0.151	0.000	0.87		5.6	SURCHARGED	
1.002	3	0.202	0.000	1.27		8.3	SURCHARGED	
2.000	6	-0.110	0.000	0.16		6.0	OK	
1.003	7	0.075	0.000	0.74		16.9	SURCHARGED	
1.004	8	0.143	0.000	1.00		28.1	SURCHARGED	
1.005	9	0.178	0.000	0.56		21.3	SURCHARGED	
3.000	10	-0.028	0.000	0.69		5.2	OK	
3.001	11	0.139	0.000	0.76		8.4	SURCHARGED	
4.000	12	-0.036	0.000	0.62		6.7	OK	
3.002	13	0.362	0.000	1.97		19.4	SURCHARGED	
3.003	14	0.035	0.000	0.31		14.6	SURCHARGED	
5.000	15	-0.106	0.000	0.19		8.2	OK	
5.001	16	0.712	0.000	0.30		5.3	FLOOD RISK	
5.002	17	0.848	0.000	0.45		6.4	FLOOD RISK	
5.003	18	0.894	0.000	0.44		7.6	FLOOD RISK	
6.000	19	0.451	0.000	0.33		2.1	FLOOD RISK	
6.001	20	0.565	0.000	0.59		3.7	FLOOD RISK	
6.002	21	0.644	0.000	0.78		4.9	FLOOD RISK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
6.003	22	120 Summer	100	+40%	30/30 Summer				97.999
5.004	23	120 Summer	100	+40%	30/30 Summer				97.975
7.000	24	120 Summer	100	+40%	30/30 Summer				97.975
5.005	25	120 Summer	100	+40%	30/30 Summer				97.963
8.000	26	120 Summer	100	+40%	30/30 Summer				97.944
5.006	27	120 Summer	100	+40%	1/60 Summer				97.934
9.000	28	480 Winter	100	+40%	100/30 Summer				97.558
10.000	29	480 Winter	100	+40%	100/30 Summer				97.558
9.001	30	480 Winter	100	+40%	30/30 Summer				97.558
9.002	31	480 Winter	100	+40%	30/120 Summer				97.557
11.000	32	120 Summer	100	+40%	100/30 Summer				97.715
12.000	33	120 Summer	100	+40%	30/240 Summer				97.712
11.001	34	120 Summer	100	+40%	30/120 Summer				97.709
9.003	35	120 Summer	100	+40%	30/60 Summer				97.696
1.006	36	120 Summer	100	+40%	1/30 Summer				97.900
1.007	37	120 Summer	100	+40%	1/30 Summer				97.896

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
6.003	22	0.741	0.000	0.65		4.3	FLOOD RISK	
5.004	23	0.983	0.000	0.83		12.4	FLOOD RISK	
7.000	24	0.787	0.000	0.31		2.0	FLOOD RISK	
5.005	25	1.028	0.000	0.86		15.6	FLOOD RISK	
8.000	26	0.961	0.000	0.30		2.2	FLOOD RISK	
5.006	27	1.155	0.000	1.51		19.5	FLOOD RISK	
9.000	28	0.172	0.000	0.06		0.4	FLOOD RISK	
10.000	29	0.173	0.000	0.05		0.3	FLOOD RISK	
9.001	30	0.302	0.000	0.23		1.4	FLOOD RISK	
9.002	31	0.387	0.000	0.14		1.9	FLOOD RISK	
11.000	32	0.431	0.000	0.31		2.0	FLOOD RISK	
12.000	33	0.472	0.000	0.20		1.2	FLOOD RISK	
11.001	34	0.544	0.000	0.69		4.3	FLOOD RISK	
9.003	35	0.641	0.000	0.34		9.7	SURCHARGED	
1.006	36	1.188	0.000	0.11		2.7	SURCHARGED	
1.007	37	1.334	0.000	0.08		2.3	FLOOD RISK	

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