STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 436500 402000 SE 36500 02000
C (1km)	-0.024
D1 (1km)	0.358
D2 (1km)	0.441
D3 (1km)	0.229
E (1km)	0.296
F (1km)	2.384
Maximum Rainfall (mm/hr)	100
Maximum Time of Concentration (mins)	60
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	0.700
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

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	54.420	1.052	51.7	0.045	4.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	38.960	0.402	96.9	0.057	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	13.897	0.083	168.2	0.047	0.00	0.0	0.600	o	225	Pipe/Conduit	
S2.000	35.342	0.356	99.3	0.046	4.00	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	71.81	4.65	157.350	0.045	0.0	0.0	0.0	1.40	24.8	8.7
S1.001	67.23	5.14	156.223	0.102	0.0	0.0	0.0	1.33	52.8	18.6
S1.002	65.32	5.37	155.821	0.149	0.0	0.0	0.0	1.01	40.0	26.3
S2.000	72.46	4.58	157.500	0.046	0.0	0.0	0.0	1.01	17.8	9.0

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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
S1.003	18.564	0.110	168.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.004	28.530	0.118	241.9	0.150	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.000	38.495	0.657	58.6	0.026	4.00	0.0	0.600	o	100	Pipe/Conduit	
S3.001	29.244	0.294	99.3	0.025	0.00	0.0	0.600	o	150	Pipe/Conduit	
S4.000	37.512	0.641	58.5	0.026	4.00	0.0	0.600	o	100	Pipe/Conduit	
S3.002	6.842	0.069	99.3	0.024	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.003	12.809	0.076	167.9	0.096	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.005	46.348	0.219	211.6	0.035	0.00	0.0	0.600	o	375	Pipe/Conduit	
S5.000	38.584	0.660	58.5	0.030	4.00	0.0	0.600	o	100	Pipe/Conduit	
S5.001	33.510	0.338	99.2	0.032	0.00	0.0	0.600	o	150	Pipe/Conduit	
S6.000	39.083	0.668	58.5	0.029	4.00	0.0	0.600	o	100	Pipe/Conduit	
S5.002	12.099	0.072	168.4	0.029	0.00	0.0	0.600	o	225	Pipe/Conduit	
S5.003	30.777	0.183	168.4	0.114	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.006	36.200	1.405	25.8	0.060	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)
S1.003	62.96	5.67	155.738	0.195	0.0	0.0	0.0	1.01	40.0	33.2
S1.004	59.73	6.15	155.553	0.345	0.0	0.0	0.0	1.01	71.1	55.8
S3.000	71.92	4.64	157.650	0.026	0.0	0.0	0.0	1.01	7.9	5.1
S3.001	67.37	5.12	156.943	0.051	0.0	0.0	0.0	1.01	17.8	9.3
S4.000	72.09	4.62	157.650	0.026	0.0	0.0	0.0	1.01	7.9	5.1
S3.002	66.63	5.21	156.574	0.102	0.0	0.0	0.0	1.31	52.2	18.3
S3.003	64.90	5.42	156.505	0.197	0.0	0.0	0.0	1.01	40.0	34.6
S1.005	56.06	6.77	155.360	0.577	0.0	0.0	0.0	1.24	137.1	87.6
S5.000	71.91	4.64	157.550	0.030	0.0	0.0	0.0	1.01	7.9	5.8
S5.001	66.77	5.19	156.840	0.062	0.0	0.0	0.0	1.01	17.8	11.2
S6.000	71.83	4.65	157.550	0.029	0.0	0.0	0.0	1.01	7.9	5.7
S5.002	65.12	5.39	156.427	0.120	0.0	0.0	0.0	1.00	39.9	21.2
S5.003	61.35	5.90	156.355	0.235	0.0	0.0	0.0	1.00	39.9	39.0
S1.006	55.16	6.94	155.141	0.872	0.0	0.0	0.0	3.58	395.6	130.3

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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
S7.000	44.445	0.760	58.5	0.023	4.00	0.0	0.600	o	100	Pipe/Conduit	
S7.001	25.210	0.507	49.7	0.024	0.00	0.0	0.600	o	100	Pipe/Conduit	
S8.000	44.183	0.755	58.5	0.027	4.00	0.0	0.600	o	100	Pipe/Conduit	
S7.002	14.809	0.147	100.9	0.026	0.00	0.0	0.600	o	150	Pipe/Conduit	
S7.003	27.789	1.200	23.2	0.115	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.007	49.799	2.351	21.2	0.018	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.008	17.114	0.500	34.2	0.076	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)
S7.000	70.94	4.73	156.700	0.023	0.0	0.0	0.0	1.01	7.9	4.4
S7.001	67.39	5.12	155.940	0.047	0.0	0.0	0.0	1.10	8.6	8.6
S8.000	70.98	4.73	156.700	0.027	0.0	0.0	0.0	1.01	7.9	5.2
S7.002	65.33	5.36	155.383	0.100	0.0	0.0	0.0	1.00	17.7	17.7
S7.003	63.62	5.58	155.236	0.215	0.0	0.0	0.0	2.10	37.1	37.0
S1.007	54.08	7.15	153.736	1.105	0.0	0.0	0.0	3.95	436.5	161.8
S1.008	53.63	7.24	151.385	1.181	0.0	0.0	0.0	3.11	343.1	171.5

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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)
S1	158.200	0.850	Open Manhole	1200	S1.000	157.350	150				
S2	158.200	1.977	Open Manhole	1200	S1.001	156.223	225	S1.000	156.298	150	
S3	158.350	2.529	Open Manhole	1200	S1.002	155.821	225	S1.001	155.821	225	
S4	158.350	0.850	Open Manhole	1200	S2.000	157.500	150				
S5	158.350	2.612	Open Manhole	1200	S1.003	155.738	225	S1.002	155.738	225	
								S2.000	157.144	150	1331
S6	158.000	2.447	Open Manhole	1200	S1.004	155.553	300	S1.003	155.628	225	
S7	158.350	0.700	Open Manhole	1200	S3.000	157.650	100				
S8	158.350	1.407	Open Manhole	1200	S3.001	156.943	150	S3.000	156.993	100	
S9	158.350	0.700	Open Manhole	1200	S4.000	157.650	100				
S10	158.350	1.776	Open Manhole	1200	S3.002	156.574	225	S3.001	156.649	150	
								S4.000	157.009	100	310
S11	158.000	1.495	Open Manhole	1200	S3.003	156.505	225	S3.002	156.505	225	
S12	158.280	2.920	Open Manhole	1350	S1.005	155.360	375	S1.004	155.435	300	
								S3.003	156.428	225	918
S13	158.350	0.800	Open Manhole	1200	S5.000	157.550	100				
S14	158.350	1.510	Open Manhole	1200	S5.001	156.840	150	S5.000	156.890	100	
S15	158.350	0.800	Open Manhole	1200	S6.000	157.550	100				
S16	158.350	1.923	Open Manhole	1200	S5.002	156.427	225	S5.001	156.502	150	
								S6.000	156.882	100	330
S17	157.950	1.595	Open Manhole	1200	S5.003	156.355	225	S5.002	156.355	225	
S18	158.160	3.019	Open Manhole	1350	S1.006	155.141	375	S1.005	155.141	375	
								S5.003	156.172	225	881
S19	157.500	0.800	Open Manhole	1200	S7.000	156.700	100				
S20	157.500	1.560	Open Manhole	1200	S7.001	155.940	100	S7.000	155.940	100	
S21	157.500	0.800	Open Manhole	1200	S8.000	156.700	100				
S22	157.500	2.117	Open Manhole	1200	S7.002	155.383	150	S7.001	155.433	100	
								S8.000	155.945	100	512
S23	158.200	2.964	Open Manhole	1200	S7.003	155.236	150	S7.002	155.236	150	
S24	157.000	3.264	Open Manhole	1350	S1.007	153.736	375	S1.006	153.736	375	
								S7.003	154.036	150	75
S25	154.500	3.115	Open Manhole	1350	S1.008	151.385	375	S1.007	151.385	375	
S	154.000	3.115	Open Manhole	0		OUTFALL		S1.008	150.885	375	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	150	S1	158.200	157.350	0.700	Open Manhole	1200
S1.001	o	225	S2	158.200	156.223	1.752	Open Manhole	1200
S1.002	o	225	S3	158.350	155.821	2.304	Open Manhole	1200
S2.000	o	150	S4	158.350	157.500	0.700	Open Manhole	1200
S1.003	o	225	S5	158.350	155.738	2.387	Open Manhole	1200
S1.004	o	300	S6	158.000	155.553	2.147	Open Manhole	1200
S3.000	o	100	S7	158.350	157.650	0.600	Open Manhole	1200
S3.001	o	150	S8	158.350	156.943	1.257	Open Manhole	1200
S4.000	o	100	S9	158.350	157.650	0.600	Open Manhole	1200
S3.002	o	225	S10	158.350	156.574	1.551	Open Manhole	1200
S3.003	o	225	S11	158.000	156.505	1.270	Open Manhole	1200
S1.005	o	375	S12	158.280	155.360	2.545	Open Manhole	1350
S5.000	o	100	S13	158.350	157.550	0.700	Open Manhole	1200
S5.001	o	150	S14	158.350	156.840	1.360	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	54.420	51.7	S2	158.200	156.298	1.752	Open Manhole	1200
S1.001	38.960	96.9	S3	158.350	155.821	2.304	Open Manhole	1200
S1.002	13.897	168.2	S5	158.350	155.738	2.387	Open Manhole	1200
S2.000	35.342	99.3	S5	158.350	157.144	1.056	Open Manhole	1200
S1.003	18.564	168.2	S6	158.000	155.628	2.147	Open Manhole	1200
S1.004	28.530	241.9	S12	158.280	155.435	2.545	Open Manhole	1350
S3.000	38.495	58.6	S8	158.350	156.993	1.257	Open Manhole	1200
S3.001	29.244	99.3	S10	158.350	156.649	1.551	Open Manhole	1200
S4.000	37.512	58.5	S10	158.350	157.009	1.241	Open Manhole	1200
S3.002	6.842	99.3	S11	158.000	156.505	1.270	Open Manhole	1200
S3.003	12.809	167.9	S12	158.280	156.428	1.627	Open Manhole	1350
S1.005	46.348	211.6	S18	158.160	155.141	2.644	Open Manhole	1350
S5.000	38.584	58.5	S14	158.350	156.890	1.360	Open Manhole	1200
S5.001	33.510	99.2	S16	158.350	156.502	1.698	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S6.000	o	100	S15	158.350	157.550	0.700	Open Manhole	1200
S5.002	o	225	S16	158.350	156.427	1.698	Open Manhole	1200
S5.003	o	225	S17	157.950	156.355	1.370	Open Manhole	1200
S1.006	o	375	S18	158.160	155.141	2.644	Open Manhole	1350
S7.000	o	100	S19	157.500	156.700	0.700	Open Manhole	1200
S7.001	o	100	S20	157.500	155.940	1.460	Open Manhole	1200
S8.000	o	100	S21	157.500	156.700	0.700	Open Manhole	1200
S7.002	o	150	S22	157.500	155.383	1.967	Open Manhole	1200
S7.003	o	150	S23	158.200	155.236	2.814	Open Manhole	1200
S1.007	o	375	S24	157.000	153.736	2.889	Open Manhole	1350
S1.008	o	375	S25	154.500	151.385	2.740	Open Manhole	1350

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)
S6.000	39.083	58.5	S16	158.350	156.882	1.368	Open Manhole	1200
S5.002	12.099	168.4	S17	157.950	156.355	1.370	Open Manhole	1200
S5.003	30.777	168.4	S18	158.160	156.172	1.763	Open Manhole	1350
S1.006	36.200	25.8	S24	157.000	153.736	2.889	Open Manhole	1350
S7.000	44.445	58.5	S20	157.500	155.940	1.460	Open Manhole	1200
S7.001	25.210	49.7	S22	157.500	155.433	1.967	Open Manhole	1200
S8.000	44.183	58.5	S22	157.500	155.945	1.455	Open Manhole	1200
S7.002	14.809	100.9	S23	158.200	155.236	2.814	Open Manhole	1200
S7.003	27.789	23.2	S24	157.000	154.036	2.814	Open Manhole	1350
S1.007	49.799	21.2	S25	154.500	151.385	2.740	Open Manhole	1350
S1.008	17.114	34.2	S	154.000	150.885	2.740	Open Manhole	0

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.045	0.045	0.045
1.001	User	-	100	0.057	0.057	0.057
1.002	User	-	100	0.047	0.047	0.047
2.000	User	-	100	0.046	0.046	0.046
1.003	-	-	100	0.000	0.000	0.000
1.004	User	-	100	0.150	0.150	0.150
3.000	User	-	100	0.026	0.026	0.026
3.001	User	-	100	0.025	0.025	0.025
4.000	User	-	100	0.026	0.026	0.026
3.002	User	-	100	0.024	0.024	0.024
3.003	User	-	100	0.096	0.096	0.096
1.005	User	-	100	0.035	0.035	0.035
5.000	User	-	100	0.030	0.030	0.030
5.001	User	-	100	0.032	0.032	0.032
6.000	User	-	100	0.029	0.029	0.029
5.002	User	-	100	0.029	0.029	0.029
5.003	User	-	100	0.114	0.114	0.114
1.006	User	-	100	0.060	0.060	0.060
7.000	User	-	100	0.023	0.023	0.023
7.001	User	-	100	0.024	0.024	0.024
8.000	User	-	100	0.027	0.027	0.027
7.002	User	-	100	0.026	0.026	0.026
7.003	User	-	100	0.115	0.115	0.115
1.007	User	-	100	0.018	0.018	0.018
1.008	User	-	100	0.076	0.076	0.076
				Total	Total	Total
				1.181	1.181	1.181

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)
S1.008	S	154.000	150.885	152.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	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 Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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Simulation Criteria for Storm

Rainfall Model	FEH
Return Period (years)	2
FEH Rainfall Version	1999
Site Location	GB 436500 402000 SE 36500 02000
C (1km)	-0.024
D1 (1km)	0.358
D2 (1km)	0.441
D3 (1km)	0.229
E (1km)	0.296
F (1km)	2.384
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

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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	0
Number of Online Controls	0	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	0.356
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	15 Winter	1	+0%	100/15 Summer			
S1.001	S2	15 Winter	1	+0%	30/15 Summer			
S1.002	S3	15 Winter	1	+0%	30/15 Summer			
S2.000	S4	15 Winter	1	+0%	100/15 Summer			
S1.003	S5	15 Winter	1	+0%	30/15 Summer			
S1.004	S6	15 Winter	1	+0%	30/15 Summer			
S3.000	S7	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
S3.001	S8	15 Winter	1	+0%	30/15 Summer			
S4.000	S9	15 Winter	1	+0%	30/15 Summer			
S3.002	S10	15 Winter	1	+0%	30/15 Summer			
S3.003	S11	15 Winter	1	+0%	30/15 Summer			
S1.005	S12	15 Winter	1	+0%	30/15 Summer			
S5.000	S13	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
S5.001	S14	15 Winter	1	+0%	30/15 Summer			
S6.000	S15	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
S5.002	S16	15 Winter	1	+0%	30/15 Summer			
S5.003	S17	15 Winter	1	+0%	30/15 Summer			
S1.006	S18	15 Winter	1	+0%	100/15 Summer			
S7.000	S19	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
S7.001	S20	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
S8.000	S21	15 Winter	1	+0%	30/15 Summer	100/15 Summer		

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	157.401	-0.099	0.000	0.25		6.1	OK	
S1.001	S2	156.298	-0.150	0.000	0.24		12.2	OK	
S1.002	S3	155.932	-0.114	0.000	0.49		17.0	OK	
S2.000	S4	157.562	-0.088	0.000	0.36		6.2	OK	
S1.003	S5	155.869	-0.094	0.000	0.63		22.7	OK	
S1.004	S6	155.721	-0.132	0.000	0.59		37.9	OK	
S3.000	S7	157.698	-0.052	0.000	0.46		3.5	OK	2
S3.001	S8	157.006	-0.087	0.000	0.36		6.2	OK	
S4.000	S9	157.697	-0.053	0.000	0.45		3.5	OK	
S3.002	S10	156.664	-0.135	0.000	0.33		12.3	OK	
S3.003	S11	156.638	-0.092	0.000	0.65		22.5	OK	
S1.005	S12	155.549	-0.186	0.000	0.50		62.5	OK	
S5.000	S13	157.601	-0.049	0.000	0.51		4.0	OK	4
S5.001	S14	156.909	-0.081	0.000	0.43		7.4	OK	
S6.000	S15	157.601	-0.049	0.000	0.51		4.0	OK	2
S5.002	S16	156.532	-0.120	0.000	0.42		14.4	OK	
S5.003	S17	156.495	-0.085	0.000	0.70		26.3	OK	
S1.006	S18	155.271	-0.245	0.000	0.26		94.1	OK	
S7.000	S19	156.744	-0.056	0.000	0.39		3.0	OK	5
S7.001	S20	156.000	-0.040	0.000	0.67		5.6	OK	4
S8.000	S21	156.748	-0.052	0.000	0.47		3.6	OK	4

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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.
S7.002	S22	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
S7.003	S23	15 Winter	1	+0%	30/15 Summer			
S1.007	S24	15 Winter	1	+0%	100/15 Summer			
S1.008	S25	15 Winter	1	+0%	30/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S7.002	S22	155.479	-0.054	0.000	0.73		12.0	OK	2
S7.003	S23	155.328	-0.058	0.000	0.68		24.1	OK	
S1.007	S24	153.875	-0.236	0.000	0.29		118.7	OK	
S1.008	S25	151.562	-0.198	0.000	0.45		125.6	OK	

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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	0
Number of Online Controls	0	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 0.356
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	15 Winter	30	+0%	100/15 Summer			
S1.001	S2	15 Winter	30	+0%	30/15 Summer			
S1.002	S3	15 Winter	30	+0%	30/15 Summer			
S2.000	S4	15 Winter	30	+0%	100/15 Summer			
S1.003	S5	15 Winter	30	+0%	30/15 Summer			
S1.004	S6	15 Winter	30	+0%	30/15 Summer			
S3.000	S7	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
S3.001	S8	15 Winter	30	+0%	30/15 Summer			
S4.000	S9	15 Winter	30	+0%	30/15 Summer			
S3.002	S10	15 Winter	30	+0%	30/15 Summer			
S3.003	S11	15 Winter	30	+0%	30/15 Summer			
S1.005	S12	15 Winter	30	+0%	30/15 Summer			
S5.000	S13	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
S5.001	S14	15 Winter	30	+0%	30/15 Summer			
S6.000	S15	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
S5.002	S16	15 Winter	30	+0%	30/15 Summer			
S5.003	S17	15 Winter	30	+0%	30/15 Summer			
S1.006	S18	15 Winter	30	+0%	100/15 Summer			
S7.000	S19	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
S7.001	S20	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
S8.000	S21	15 Winter	30	+0%	30/15 Summer	100/15 Summer		

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	157.435	-0.065	0.000	0.60		14.6	OK	
S1.001	S2	156.546	0.098	0.000	0.61		30.3	SURCHARGED	
S1.002	S3	156.424	0.378	0.000	1.17		40.9	SURCHARGED	
S2.000	S4	157.610	-0.040	0.000	0.89		15.3	OK	
S1.003	S5	156.318	0.354	0.000	1.47		52.9	SURCHARGED	
S1.004	S6	156.091	0.238	0.000	1.40		89.9	SURCHARGED	
S3.000	S7	157.784	0.034	0.000	0.99		7.7	SURCHARGED	2
S3.001	S8	157.135	0.042	0.000	0.88		15.1	SURCHARGED	
S4.000	S9	157.773	0.023	0.000	1.02		7.9	SURCHARGED	
S3.002	S10	156.915	0.116	0.000	0.84		31.1	SURCHARGED	
S3.003	S11	156.878	0.149	0.000	1.71		58.9	SURCHARGED	
S1.005	S12	155.844	0.109	0.000	1.23		155.3	SURCHARGED	
S5.000	S13	157.825	0.175	0.000	0.96		7.5	SURCHARGED	4
S5.001	S14	157.251	0.261	0.000	0.93		16.0	SURCHARGED	
S6.000	S15	157.743	0.093	0.000	1.06		8.3	SURCHARGED	2
S5.002	S16	156.976	0.324	0.000	0.98		33.4	SURCHARGED	
S5.003	S17	156.920	0.339	0.000	1.69		63.1	SURCHARGED	
S1.006	S18	155.364	-0.152	0.000	0.65		232.6	OK	
S7.000	S19	156.993	0.193	0.000	0.79		6.2	SURCHARGED	5
S7.001	S20	156.839	0.799	0.000	1.27		10.6	SURCHARGED	4
S8.000	S21	156.911	0.111	0.000	0.98		7.6	SURCHARGED	4

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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.
S7.002	S22	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
S7.003	S23	15 Winter	30	+0%	30/15 Summer			
S1.007	S24	15 Winter	30	+0%	100/15 Summer			
S1.008	S25	15 Winter	30	+0%	30/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S7.002	S22	156.436	0.903	0.000	1.44		23.4	SURCHARGED	2
S7.003	S23	156.268	0.882	0.000	1.31		46.4	SURCHARGED	
S1.007	S24	153.970	-0.141	0.000	0.70		283.2	OK	
S1.008	S25	151.834	0.074	0.000	1.08		299.6	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	0
Number of Online Controls	0	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	0.356
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	15 Winter	100	+30%	100/15 Summer			
S1.001	S2	15 Winter	100	+30%	30/15 Summer			
S1.002	S3	15 Winter	100	+30%	30/15 Summer			
S2.000	S4	15 Winter	100	+30%	100/15 Summer			
S1.003	S5	15 Winter	100	+30%	30/15 Summer			
S1.004	S6	15 Winter	100	+30%	30/15 Summer			
S3.000	S7	15 Winter	100	+30%	30/15 Summer		100/15 Summer	
S3.001	S8	15 Winter	100	+30%	30/15 Summer			
S4.000	S9	15 Winter	100	+30%	30/15 Summer			
S3.002	S10	15 Winter	100	+30%	30/15 Summer			
S3.003	S11	15 Winter	100	+30%	30/15 Summer			
S1.005	S12	15 Winter	100	+30%	30/15 Summer			
S5.000	S13	15 Winter	100	+30%	30/15 Summer		100/15 Summer	
S5.001	S14	15 Winter	100	+30%	30/15 Summer			
S6.000	S15	15 Winter	100	+30%	30/15 Summer		100/15 Summer	
S5.002	S16	15 Winter	100	+30%	30/15 Summer			
S5.003	S17	15 Winter	100	+30%	30/15 Summer			
S1.006	S18	15 Winter	100	+30%	100/15 Summer			
S7.000	S19	30 Winter	100	+30%	30/15 Summer		100/15 Summer	
S7.001	S20	15 Winter	100	+30%	30/15 Summer		100/15 Summer	
S8.000	S21	15 Winter	100	+30%	30/15 Summer		100/15 Summer	

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	158.083	0.583	0.000	0.81		19.7	FLOOD RISK	
S1.001	S2	157.710	1.262	0.000	0.80		40.0	SURCHARGED	
S1.002	S3	157.495	1.449	0.000	1.57		54.7	SURCHARGED	
S2.000	S4	157.928	0.278	0.000	1.33		22.8	FLOOD RISK	
S1.003	S5	157.292	1.329	0.000	2.16		77.5	SURCHARGED	
S1.004	S6	156.849	0.996	0.000	2.09		134.4	SURCHARGED	
S3.000	S7	158.350	0.600	0.174	1.23		9.5	FLOOD	2
S3.001	S8	157.596	0.503	0.000	1.18		20.1	SURCHARGED	
S4.000	S9	158.270	0.520	0.000	1.31		10.2	FLOOD RISK	
S3.002	S10	157.236	0.438	0.000	1.13		41.9	SURCHARGED	
S3.003	S11	157.161	0.431	0.000	2.55		88.1	SURCHARGED	
S1.005	S12	156.324	0.589	0.000	1.84		232.1	SURCHARGED	
S5.000	S13	158.351	0.701	1.089	1.33		10.3	FLOOD	4
S5.001	S14	158.050	1.060	0.000	1.17		20.0	FLOOD RISK	
S6.000	S15	158.350	0.700	0.451	1.35		10.5	FLOOD	2
S5.002	S16	157.616	0.964	0.000	1.26		43.1	SURCHARGED	
S5.003	S17	157.518	0.938	0.000	2.46		91.9	FLOOD RISK	
S1.006	S18	155.675	0.159	0.000	0.92		327.6	SURCHARGED	
S7.000	S19	157.502	0.702	2.407	1.10		8.5	FLOOD	5
S7.001	S20	157.502	1.462	1.876	1.53		12.8	FLOOD	4
S8.000	S21	157.502	0.702	2.080	1.34		10.4	FLOOD	4

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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.
S7.002	S22	15 Winter	100	+30%	30/15 Summer	100/15 Summer		
S7.003	S23	15 Winter	100	+30%	30/15 Summer			
S1.007	S24	15 Winter	100	+30%	100/15 Summer			
S1.008	S25	15 Winter	100	+30%	30/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S7.002	S22	157.501	1.968	1.097	1.82		29.6	FLOOD	2
S7.003	S23	157.535	2.149	0.000	1.63		57.8	SURCHARGED	
S1.007	S24	154.463	0.352	0.000	0.96		386.0	SURCHARGED	
S1.008	S25	152.347	0.587	0.000	1.48		408.5	SURCHARGED	

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