

M-EC		Page 0
The Old Chapel Station Road, Hugglescote Leicestershire LE67 2GB		Bicester Parcel I SWS NET2
Date 01/08/2018 File 23431 parcel I2.mdx		Designed by as Checked by
XP Solutions		Network 2015.1



STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 2

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	1
Site Location GB 457850 220300 SP 57850 20300	
C (1km)	-0.023
D1 (1km)	0.309
D2 (1km)	0.343
D3 (1km)	0.255
E (1km)	0.288
F (1km)	2.462
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
Add Flow / Climate Change (%)	0
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 Surface Network 2

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.697	4-8	0.584	8-12	0.023

Total Area Contributing (ha) = 1.304

Total Pipe Volume (m³) = 37.048

Network Design Table for Surface Network 2

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	2.628	0.033	80.0	0.086	5.00	0.0	0.600	o	150	
1.001	15.629	0.315	49.6	0.000	0.00	0.0	0.600	o	225	
2.000	2.156	0.022	98.0	0.057	5.00	0.0	0.600	o	150	
2.001	13.074	0.326	40.1	0.000	0.00	0.0	0.600	o	225	

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	5.04	80.550	0.086	0.0	0.0	0.0	1.12	19.9	11.6
1.001	50.00	5.18	80.442	0.086	0.0	0.0	0.0	1.86	74.0	11.6
2.000	50.00	5.04	80.550	0.057	0.0	0.0	0.0	1.02	17.9	7.7
2.001	50.00	5.14	80.453	0.057	0.0	0.0	0.0	2.07	82.4	7.7

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Network Design Table for Surface Network 2

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
1.002	71.562	0.555	128.9	0.047	0.00	0.0	0.600	o	225	
1.003	22.224	0.278	79.9	0.141	0.00	0.0	0.600	o	300	
1.004	23.050	0.288	80.0	0.016	0.00	0.0	0.600	o	375	
1.005	35.619	0.178	200.3	0.114	0.00	0.0	0.600	o	375	
3.000	8.134	0.236	34.5	0.101	5.00	0.0	0.600	o	150	
3.001	12.711	0.284	44.8	0.000	0.00	0.0	0.600	o	150	
3.002	11.273	1.127	10.0	0.000	0.00	0.0	0.600	o	300	
1.006	61.825	0.194	319.0	0.025	0.00	0.0	0.600	o	375	
4.000	2.334	0.104	22.4	0.039	5.00	0.0	0.600	o	150	
4.001	6.696	0.220	30.4	0.000	0.00	0.0	0.600	o	150	
4.002	25.010	0.504	49.6	0.000	0.00	0.0	0.600	o	225	
5.000	6.541	0.082	80.0	0.059	5.00	0.0	0.600	o	150	
5.001	11.300	0.271	41.7	0.000	0.00	0.0	0.600	o	150	
5.002	2.248	0.225	10.0	0.000	0.00	0.0	0.600	o	225	
4.003	30.300	0.813	37.3	0.036	0.00	0.0	0.600	o	225	
1.007	16.619	0.230	72.3	0.180	0.00	0.0	0.600	o	375	
1.008	47.334	0.657	72.0	0.000	0.00	0.0	0.600	o	375	
6.000	12.006	0.345	34.8	0.118	5.00	0.0	0.600	o	150	

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)
1.002	50.00	6.22	80.127	0.190	0.0	0.0	0.0	1.15	45.7	25.7
1.003	50.00	6.43	79.497	0.331	0.0	0.0	0.0	1.76	124.4	44.8
1.004	50.00	6.62	79.144	0.347	0.0	0.0	0.0	2.03	223.9	47.0
1.005	50.00	7.08	78.856	0.461	0.0	0.0	0.0	1.28	141.0	62.4
3.000	50.00	5.08	80.550	0.101	0.0	0.0	0.0	1.72	30.4	13.7
3.001	50.00	5.22	80.314	0.101	0.0	0.0	0.0	1.51	26.7	13.7
3.002	50.00	5.26	79.880	0.101	0.0	0.0	0.0	5.00	353.4	13.7
1.006	46.78	8.10	78.678	0.587	0.0	0.0	0.0	1.01	111.4	74.4
4.000	50.00	5.02	80.350	0.039	0.0	0.0	0.0	2.14	37.7	5.3
4.001	50.00	5.08	80.246	0.039	0.0	0.0	0.0	1.83	32.4	5.3
4.002	50.00	5.30	79.951	0.039	0.0	0.0	0.0	1.86	74.0	5.3
5.000	50.00	5.10	80.100	0.059	0.0	0.0	0.0	1.12	19.9	8.0
5.001	50.00	5.22	80.018	0.059	0.0	0.0	0.0	1.56	27.6	8.0
5.002	50.00	5.23	79.672	0.059	0.0	0.0	0.0	4.16	165.5	8.0
4.003	50.00	5.54	79.447	0.134	0.0	0.0	0.0	2.15	85.5	18.1
1.007	46.27	8.23	78.484	0.901	0.0	0.0	0.0	2.13	235.7	112.9
1.008	44.89	8.60	78.254	0.901	0.0	0.0	0.0	2.14	236.1	112.9
6.000	50.00	5.12	79.650	0.118	0.0	0.0	0.0	1.71	30.3	16.0

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Network Design Table for Surface Network 2

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
6.001	8.067	0.150	53.8	0.000	0.00	0.0	0.600	o	150	
6.002	4.933	0.329	15.0	0.000	0.00	0.0	0.600	o	225	
7.000	2.401	0.028	85.0	0.130	5.00	0.0	0.600	o	150	
7.001	6.963	0.082	85.0	0.000	0.00	0.0	0.600	o	150	
7.002	13.896	0.163	85.0	0.000	0.00	0.0	0.600	o	150	
6.003	44.767	1.005	44.6	0.030	0.00	0.0	0.600	o	225	
1.009	13.791	0.997	13.8	0.095	0.00	0.0	0.600	o	375	
1.010	9.376	0.938	10.0	0.030	0.00	0.0	0.600	o	375	
1.011	16.342	0.160	102.1	0.000	0.00	0.0	0.600	o	375	

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)
6.001	50.00	5.21	79.305	0.118	0.0	0.0	0.0	1.37	24.3	16.0
6.002	50.00	5.24	79.080	0.118	0.0	0.0	0.0	3.40	135.1	16.0
7.000	50.00	5.04	79.100	0.130	0.0	0.0	0.0	1.09	19.3	17.6
7.001	50.00	5.14	79.072	0.130	0.0	0.0	0.0	1.09	19.3	17.6
7.002	50.00	5.36	78.990	0.130	0.0	0.0	0.0	1.09	19.3	17.6
6.003	50.00	5.74	78.751	0.278	0.0	0.0	0.0	1.96	78.1	37.6
1.009	44.72	8.65	77.596	1.274	0.0	0.0	0.0	4.89	540.5	154.3
1.010	44.63	8.68	76.599	1.304	0.0	0.0	0.0	5.76	636.1	157.6
1.011	44.09	8.83	75.661	1.304	0.0	0.0	0.0	1.79	198.0	157.6

Free Flowing Outfall Details for Surface Network 2

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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1.011 S26Exist 81.433 75.501 75.503 2100 0

Simulation Criteria for Surface Network 2

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 8 Number of Storage Structures 9 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Site Location GB 457850 220300 SP 57850 20300
Return Period (years) 1 C (1km) -0.023

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Synthetic Rainfall Details

D1 (1km)	0.309	Summer Storms	Yes
D2 (1km)	0.343	Winter Storms	Yes
D3 (1km)	0.255	Cv (Summer)	0.750
E (1km)	0.288	Cv (Winter)	0.840
F (1km)	2.462	Storm Duration (mins)	30

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Online Controls for Surface Network 2

Garastor Manhole: S202, DS/PN: 1.001, Volume (m³): 0.3

Invert Level (m) 80.442 Model 400mm Overflow

Garastor Manhole: S204, DS/PN: 2.001, Volume (m³): 0.3

Invert Level (m) 80.453 Model 400mm Overflow

Garastor Manhole: S210, DS/PN: 3.001, Volume (m³): 0.5

Invert Level (m) 80.314 Model 400mm Overflow

Garastor Manhole: S214, DS/PN: 4.001, Volume (m³): 0.3

Invert Level (m) 80.246 Model 400mm Overflow

Garastor Manhole: S217, DS/PN: 5.001, Volume (m³): 0.4

Invert Level (m) 80.018 Model 400mm Overflow

Garastor Manhole: S223, DS/PN: 6.001, Volume (m³): 0.6

Invert Level (m) 79.305 Model 400mm Overflow

Garastor Manhole: S226, DS/PN: 7.001, Volume (m³): 0.5

Invert Level (m) 79.072 Model 300mm Overflow

Complex Manhole: S230HB, DS/PN: 1.010, Volume (m³): 36.6

Hydro-Brake Optimum®

Unit Reference MD-SHE-0099-8100-4000-8100
 Design Head (m) 4.000
 Design Flow (l/s) 8.1
 Flush-Flo™ Calculated
 Objective Minimise upstream storage
 Diameter (mm) 99
 Invert Level (m) 76.599
 Minimum Outlet Pipe Diameter (mm) 150
 Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	4.000	8.1	Kick-Flo®	0.886	4.0
Flush-Flo™	0.428	5.1	Mean Flow over Head Range	-	5.9

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

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Hydro-Brake Optimum®

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	3.3	0.800	4.5	2.000	5.8	4.000	8.1	7.000	10.5
0.200	4.6	1.000	4.2	2.200	6.1	4.500	8.5	7.500	10.9
0.300	4.9	1.200	4.6	2.400	6.4	5.000	9.0	8.000	11.2
0.400	5.1	1.400	4.9	2.600	6.6	5.500	9.4	8.500	11.6
0.500	5.0	1.600	5.3	3.000	7.1	6.000	9.8	9.000	11.9
0.600	4.9	1.800	5.6	3.500	7.6	6.500	10.2	9.500	12.2

Weir

Discharge Coef 0.544 Width (m) 0.150 Invert Level (m) 81.143

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Storage Structures for Surface Network 2

Tank or Pond Manhole: S201, DS/PN: 1.000

Invert Level (m) 80.550

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	100.0	0.600	100.0	1.200	0.0	1.800	0.0	2.400	0.0
0.100	100.0	0.700	100.0	1.300	0.0	1.900	0.0	2.500	0.0
0.200	100.0	0.800	100.0	1.400	0.0	2.000	0.0		
0.300	100.0	0.900	0.0	1.500	0.0	2.100	0.0		
0.400	100.0	1.000	0.0	1.600	0.0	2.200	0.0		
0.500	100.0	1.100	0.0	1.700	0.0	2.300	0.0		

Tank or Pond Manhole: S203, DS/PN: 2.000

Invert Level (m) 80.550

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	100.0	0.600	100.0	1.200	0.0	1.800	0.0	2.400	0.0
0.100	100.0	0.700	100.0	1.300	0.0	1.900	0.0	2.500	0.0
0.200	100.0	0.800	100.0	1.400	0.0	2.000	0.0		
0.300	100.0	0.900	0.0	1.500	0.0	2.100	0.0		
0.400	100.0	1.000	0.0	1.600	0.0	2.200	0.0		
0.500	100.0	1.100	0.0	1.700	0.0	2.300	0.0		

Tank or Pond Manhole: S209, DS/PN: 3.000

Invert Level (m) 80.550

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	120.0	0.600	120.0	1.200	0.0	1.800	0.0	2.400	0.0
0.100	120.0	0.700	120.0	1.300	0.0	1.900	0.0	2.500	0.0
0.200	120.0	0.800	120.0	1.400	0.0	2.000	0.0		
0.300	120.0	0.900	0.0	1.500	0.0	2.100	0.0		
0.400	120.0	1.000	0.0	1.600	0.0	2.200	0.0		
0.500	120.0	1.100	0.0	1.700	0.0	2.300	0.0		

Tank or Pond Manhole: S213, DS/PN: 4.000

Invert Level (m) 80.350

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	100.0	0.600	100.0	1.200	0.0	1.800	0.0	2.400	0.0
0.100	100.0	0.700	100.0	1.300	0.0	1.900	0.0	2.500	0.0
0.200	100.0	0.800	100.0	1.400	0.0	2.000	0.0		
0.300	100.0	0.900	0.0	1.500	0.0	2.100	0.0		
0.400	100.0	1.000	0.0	1.600	0.0	2.200	0.0		
0.500	100.0	1.100	0.0	1.700	0.0	2.300	0.0		

Tank or Pond Manhole: S216, DS/PN: 5.000

Invert Level (m) 80.100

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Tank or Pond Manhole: S216, DS/PN: 5.000

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	100.0	0.600	100.0	1.200	0.0	1.800	0.0	2.400	0.0
0.100	100.0	0.700	100.0	1.300	0.0	1.900	0.0	2.500	0.0
0.200	100.0	0.800	100.0	1.400	0.0	2.000	0.0		
0.300	100.0	0.900	0.0	1.500	0.0	2.100	0.0		
0.400	100.0	1.000	0.0	1.600	0.0	2.200	0.0		
0.500	100.0	1.100	0.0	1.700	0.0	2.300	0.0		

Tank or Pond Manhole: S219, DS/PN: 4.003

Invert Level (m) 80.650

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	80.0	1.200	0.0	2.400	0.0	3.600	0.0	4.800	0.0
0.200	80.0	1.400	0.0	2.600	0.0	3.800	0.0	5.000	0.0
0.400	80.0	1.600	0.0	2.800	0.0	4.000	0.0		
0.600	80.0	1.800	0.0	3.000	0.0	4.200	0.0		
0.800	80.0	2.000	0.0	3.200	0.0	4.400	0.0		
1.000	0.0	2.200	0.0	3.400	0.0	4.600	0.0		

Tank or Pond Manhole: S222, DS/PN: 6.000

Invert Level (m) 79.650

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	160.0	0.600	160.0	1.200	160.0	1.800	0.0	2.400	0.0
0.100	160.0	0.700	160.0	1.300	0.0	1.900	0.0	2.500	0.0
0.200	160.0	0.800	160.0	1.400	0.0	2.000	0.0		
0.300	160.0	0.900	160.0	1.500	0.0	2.100	0.0		
0.400	160.0	1.000	160.0	1.600	0.0	2.200	0.0		
0.500	160.0	1.100	160.0	1.700	0.0	2.300	0.0		

Tank or Pond Manhole: S225, DS/PN: 7.000

Invert Level (m) 79.100

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	200.0	0.600	200.0	1.200	200.0	1.800	0.0	2.400	0.0
0.100	200.0	0.700	200.0	1.300	0.0	1.900	0.0	2.500	0.0
0.200	200.0	0.800	200.0	1.400	0.0	2.000	0.0		
0.300	200.0	0.900	200.0	1.500	0.0	2.100	0.0		
0.400	200.0	1.000	200.0	1.600	0.0	2.200	0.0		
0.500	200.0	1.100	200.0	1.700	0.0	2.300	0.0		

Tank or Pond Manhole: S229, DS/PN: 1.009

Invert Level (m) 80.400

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	90.0	0.800	90.0	1.600	0.0	2.400	0.0	3.200	0.0
0.200	90.0	1.000	0.0	1.800	0.0	2.600	0.0	3.400	0.0
0.400	90.0	1.200	0.0	2.000	0.0	2.800	0.0	3.600	0.0
0.600	90.0	1.400	0.0	2.200	0.0	3.000	0.0	3.800	0.0

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Tank or Pond Manhole: S229, DS/PN: 1.009

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
4.000	0.0	4.400	0.0	4.800	0.0				
4.200	0.0	4.600	0.0	5.000	0.0				

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10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

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 Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 8 Number of Storage Structures 9 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D3 (1km) 0.255
Site Location GB 457850 220300 SP 57850 20300 E (1km) 0.288
C (1km) -0.023 F (1km) 2.462
D1 (1km) 0.309 Cv (Summer) 0.750
D2 (1km) 0.343 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 10, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH		Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Surcharged	
	Name	Storm							Level (m)	Depth (m)
1.000	S201	120 Winter	10	+0%	30/15 Winter				80.694	-0.006
1.001	S202	120 Winter	10	+0%	10/30 Summer				80.788	0.121
2.000	S203	120 Winter	10	+0%	100/15 Summer				80.640	-0.060
2.001	S204	120 Winter	10	+0%	30/30 Winter				80.655	-0.023
1.002	S205	60 Winter	10	+0%	30/15 Summer				80.236	-0.116
1.003	S206	60 Winter	10	+0%	10/15 Winter	100/15 Summer			80.223	0.426
1.004	S207	60 Winter	10	+0%	10/15 Summer	100/15 Winter			80.212	0.693
1.005	S208	60 Winter	10	+0%	10/15 Summer				80.205	0.974
3.000	S209	120 Winter	10	+0%	30/30 Winter				80.683	-0.017
3.001	S210	120 Winter	10	+0%	10/15 Summer				80.692	0.228
3.002	S211	60 Winter	10	+0%	10/60 Winter				80.194	0.014
1.006	S212	60 Winter	10	+0%	10/15 Summer				80.193	1.141
4.000	S213	60 Winter	10	+0%	100/15 Summer				80.406	-0.094
4.001	S214	60 Winter	10	+0%	10/15 Winter				80.419	0.023
4.002	S215	60 Winter	10	+0%	10/60 Winter				80.184	0.008
5.000	S216	120 Winter	10	+0%	30/30 Winter				80.194	-0.056
5.001	S217	120 Winter	10	+0%	10/15 Winter				80.192	0.024
5.002	S218	60 Winter	10	+0%	10/15 Winter				80.183	0.286
4.003	S219	60 Winter	10	+0%	10/15 Summer				80.183	0.511
1.007	S220	60 Winter	10	+0%	10/15 Summer				80.176	1.318
1.008	S221	60 Winter	10	+0%	10/15 Summer				80.160	1.531
6.000	S222	120 Winter	10	+0%	10/60 Winter				79.868	0.068
6.001	S223	120 Winter	10	+0%	10/15 Summer				79.897	0.442
6.002	S224	60 Winter	10	+0%	10/15 Summer				79.961	0.656
7.000	S225	480 Winter	10	+0%	10/15 Summer				79.744	0.494
7.001	S226	480 Winter	10	+0%	10/15 Summer				79.743	0.522

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10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for
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PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
1.000	S201	0.000	0.12	1.4		OK	
1.001	S202	0.000	0.02	1.0	SURCHARGED		
2.000	S203	0.000	0.08	0.8		OK	
2.001	S204	0.000	0.01	0.8		OK	
1.002	S205	0.000	0.17	7.5		OK	
1.003	S206	0.000	0.23	25.6	SURCHARGED		2
1.004	S207	0.000	0.13	25.8	SURCHARGED		1
1.005	S208	0.000	0.28	36.0	SURCHARGED		
3.000	S209	0.000	0.05	1.3		OK	
3.001	S210	0.000	0.05	1.2	SURCHARGED		
3.002	S211	0.000	0.01	1.9	SURCHARGED		
1.006	S212	0.000	0.30	31.5	SURCHARGED		
4.000	S213	0.000	0.04	0.8		OK	
4.001	S214	0.000	0.03	0.7	SURCHARGED		
4.002	S215	0.000	0.02	1.3	SURCHARGED		
5.000	S216	0.000	0.05	0.8		OK	
5.001	S217	0.000	0.03	0.8	SURCHARGED		
5.002	S218	0.000	0.02	1.1	SURCHARGED		
4.003	S219	0.000	0.07	6.0	SURCHARGED		
1.007	S220	0.000	0.23	43.5	SURCHARGED		
1.008	S221	0.000	0.16	35.2	SURCHARGED		
6.000	S222	0.000	0.30	8.2	SURCHARGED		
6.001	S223	0.000	0.39	8.2	SURCHARGED		
6.002	S224	0.000	0.10	7.8	SURCHARGED		
7.000	S225	0.000	0.58	6.3	SURCHARGED		
7.001	S226	0.000	0.39	6.4	SURCHARGED		

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10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)
7.002	S227	60 Winter	10	+0%	10/15 Summer				79.846	0.707	0.000
6.003	S228	60 Winter	10	+0%	10/15 Summer				79.986	1.010	0.000
1.009	S229	60 Winter	10	+0%	10/15 Summer				80.136	2.165	0.000
1.010	S230HB	60 Winter	10	+0%	10/15 Summer				80.133	3.159	0.000
1.011	S231	60 Winter	10	+0%					75.714	-0.322	0.000

PN	US/MH Name	Flow / Cap.	Pipe		Status	Level Exceeded
			Flow (l/s)	Overflow (l/s)		
7.002	S227	0.03		0.4	SURCHARGED	
6.003	S228	0.06		4.6	SURCHARGED	
1.009	S229	0.05		21.3	SURCHARGED	
1.010	S230HB	0.02		7.6	SURCHARGED	
1.011	S231	0.05		7.6	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

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 Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 8 Number of Storage Structures 9 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D3 (1km) 0.255
 Site Location GB 457850 220300 SP 57850 20300 E (1km) 0.288
 C (1km) -0.023 F (1km) 2.462
 D1 (1km) 0.309 Cv (Summer) 0.750
 D2 (1km) 0.343 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 10, 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)	Surcharged Depth (m)
1.000	S201	120	Winter	30	+0%	30/15	Winter		80.748	0.048
1.001	S202	120	Winter	30	+0%	10/30	Summer		80.860	0.193
2.000	S203	120	Winter	30	+0%	100/15	Summer		80.679	-0.021
2.001	S204	120	Winter	30	+0%	30/30	Winter		80.764	0.086
1.002	S205	30	Winter	30	+0%	30/15	Summer		80.662	0.310
1.003	S206	30	Winter	30	+0%	10/15	Winter	100/15 Summer	80.641	0.844
1.004	S207	30	Winter	30	+0%	10/15	Summer	100/15 Winter	80.618	1.099
1.005	S208	30	Winter	30	+0%	10/15	Summer		80.604	1.373
3.000	S209	120	Winter	30	+0%	30/30	Winter		80.729	0.029
3.001	S210	120	Winter	30	+0%	10/15	Summer		80.721	0.257
3.002	S211	60	Winter	30	+0%	10/60	Winter		80.583	0.403
1.006	S212	60	Winter	30	+0%	10/15	Summer		80.582	1.529
4.000	S213	60	Winter	30	+0%	100/15	Summer		80.450	-0.050
4.001	S214	60	Winter	30	+0%	10/15	Winter		80.493	0.097
4.002	S215	60	Winter	30	+0%	10/60	Winter		80.519	0.343
5.000	S216	60	Winter	30	+0%	30/30	Winter		80.324	0.074
5.001	S217	60	Winter	30	+0%	10/15	Winter		80.446	0.278
5.002	S218	60	Winter	30	+0%	10/15	Winter		80.510	0.613
4.003	S219	60	Winter	30	+0%	10/15	Summer		80.524	0.852
1.007	S220	60	Winter	30	+0%	10/15	Summer		80.552	1.693
1.008	S221	60	Winter	30	+0%	10/15	Summer		80.530	1.901
6.000	S222	120	Winter	30	+0%	10/60	Winter		80.058	0.258
6.001	S223	120	Winter	30	+0%	10/15	Summer		80.102	0.647
6.002	S224	60	Winter	30	+0%	10/15	Summer		80.243	0.938
7.000	S225	480	Winter	30	+0%	10/15	Summer		79.985	0.735
7.001	S226	480	Winter	30	+0%	10/15	Summer		79.987	0.765

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for
Surface Network 2

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
1.000	S201	0.000	0.19	2.2	SURCHARGED		
1.001	S202	0.000	0.02	1.5	SURCHARGED		
2.000	S203	0.000	0.13	1.4	OK		
2.001	S204	0.000	0.01	1.0	SURCHARGED		
1.002	S205	0.000	0.34	14.9	SURCHARGED		
1.003	S206	0.000	0.47	51.8	SURCHARGED		2
1.004	S207	0.000	0.25	48.6	SURCHARGED		1
1.005	S208	0.000	0.54	69.0	SURCHARGED		
3.000	S209	0.000	0.10	2.7	SURCHARGED		
3.001	S210	0.000	0.11	2.7	SURCHARGED		
3.002	S211	0.000	0.01	3.8	SURCHARGED		
1.006	S212	0.000	0.36	38.1	SURCHARGED		
4.000	S213	0.000	0.05	1.0	OK		
4.001	S214	0.000	0.03	0.9	SURCHARGED		
4.002	S215	0.000	0.03	2.0	SURCHARGED		
5.000	S216	0.000	0.12	2.0	SURCHARGED		
5.001	S217	0.000	0.06	1.4	SURCHARGED		
5.002	S218	0.000	0.02	1.6	SURCHARGED		
4.003	S219	0.000	0.09	7.0	SURCHARGED		
1.007	S220	0.000	0.29	53.9	SURCHARGED		
1.008	S221	0.000	0.24	53.1	SURCHARGED		
6.000	S222	0.000	0.34	9.3	SURCHARGED		
6.001	S223	0.000	0.44	9.3	SURCHARGED		
6.002	S224	0.000	0.13	10.5	SURCHARGED		
7.000	S225	0.000	0.50	5.5	SURCHARGED		
7.001	S226	0.000	0.35	5.8	SURCHARGED		

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)
7.002	S227	60 Winter	30	+0%	10/15 Summer				80.081	0.941	0.000
6.003	S228	60 Winter	30	+0%	10/15 Summer				80.281	1.305	0.000
1.009	S229	60 Winter	30	+0%	10/15 Summer				80.499	2.528	0.000
1.010	S230HB	60 Winter	30	+0%	10/15 Summer				80.496	3.522	0.000
1.011	S231	60 Winter	30	+0%					75.715	-0.321	0.000

PN	US/MH Name	Flow / Cap.	Pipe		Status	Level Exceeded
			Flow (l/s)	Overflow (l/s)		
7.002	S227	0.03		0.5	SURCHARGED	
6.003	S228	0.06		4.7	SURCHARGED	
1.009	S229	0.06		24.2	SURCHARGED	
1.010	S230HB	0.02		8.0	SURCHARGED	
1.011	S231	0.05		8.0	OK	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

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 Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 8 Number of Storage Structures 9 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D3 (1km) 0.255
 Site Location GB 457850 220300 SP 57850 20300 E (1km) 0.288
 C (1km) -0.023 F (1km) 2.462
 D1 (1km) 0.309 Cv (Summer) 0.750
 D2 (1km) 0.343 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 10, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	S201	60 Winter	100	+40%	30/15 Winter				81.040	0.340
1.001	S202	30 Winter	100	+40%	10/30 Summer				81.220	0.552
2.000	S203	60 Winter	100	+40%	100/15 Summer				80.999	0.299
2.001	S204	960 Winter	100	+40%	30/30 Winter				81.195	0.517
1.002	S205	15 Winter	100	+40%	30/15 Summer				81.866	1.514
1.003	S206	15 Winter	100	+40%	10/15 Winter	100/15 Summer			81.947	2.150
1.004	S207	15 Winter	100	+40%	10/15 Summer	100/15 Winter			81.852	2.333
1.005	S208	15 Winter	100	+40%	10/15 Summer				81.830	2.599
3.000	S209	60 Winter	100	+40%	30/30 Winter				81.026	0.326
3.001	S210	30 Winter	100	+40%	10/15 Summer				81.057	0.593
3.002	S211	15 Winter	100	+40%	10/60 Winter				81.594	1.414
1.006	S212	15 Winter	100	+40%	10/15 Summer				81.632	2.580
4.000	S213	480 Winter	100	+40%	100/15 Summer				80.822	0.322
4.001	S214	60 Winter	100	+40%	10/15 Winter				80.833	0.437
4.002	S215	30 Winter	100	+40%	10/60 Winter				80.897	0.721
5.000	S216	480 Winter	100	+40%	30/30 Winter				80.824	0.574
5.001	S217	480 Winter	100	+40%	10/15 Winter				80.824	0.656
5.002	S218	30 Winter	100	+40%	10/15 Winter				80.917	1.020
4.003	S219	30 Winter	100	+40%	10/15 Summer				80.946	1.274
1.007	S220	15 Winter	100	+40%	10/15 Summer				81.317	2.458
1.008	S221	15 Winter	100	+40%	10/15 Summer				81.159	2.530
6.000	S222	480 Winter	100	+40%	10/60 Winter				80.816	1.016
6.001	S223	480 Winter	100	+40%	10/15 Summer				80.816	1.361
6.002	S224	480 Winter	100	+40%	10/15 Summer				80.817	1.512
7.000	S225	480 Winter	100	+40%	10/15 Summer				80.828	1.578
7.001	S226	480 Winter	100	+40%	10/15 Summer				80.827	1.605

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PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)		
1.000	S201	0.000	0.86		9.7	SURCHARGED	
1.001	S202	0.000	0.15		9.7	SURCHARGED	
2.000	S203	0.000	0.74		8.0	SURCHARGED	
2.001	S204	0.000	0.09		6.5	SURCHARGED	
1.002	S205	0.000	0.58		25.6	SURCHARGED	
1.003	S206	1.427	0.79		87.1	FLOOD	2
1.004	S207	1.092	0.47		90.1	FLOOD	1
1.005	S208	0.000	1.21		153.4	SURCHARGED	
3.000	S209	0.000	0.44		11.6	SURCHARGED	
3.001	S210	0.000	0.46		11.3	SURCHARGED	
3.002	S211	0.000	0.04		10.6	SURCHARGED	
1.006	S212	0.000	1.22		127.5	SURCHARGED	
4.000	S213	0.000	0.06		1.2	SURCHARGED	
4.001	S214	0.000	0.17		4.6	SURCHARGED	
4.002	S215	0.000	0.04		2.8	SURCHARGED	
5.000	S216	0.000	0.09		1.5	SURCHARGED	
5.001	S217	0.000	0.06		1.5	SURCHARGED	
5.002	S218	0.000	0.01		0.6	SURCHARGED	
4.003	S219	0.000	0.14		11.6	SURCHARGED	
1.007	S220	0.000	0.91		170.4	SURCHARGED	
1.008	S221	0.000	0.75		162.9	SURCHARGED	
6.000	S222	0.000	0.07		2.0	SURCHARGED	
6.001	S223	0.000	0.09		2.0	SURCHARGED	
6.002	S224	0.000	0.02		2.0	SURCHARGED	
7.000	S225	0.000	0.37		4.0	SURCHARGED	
7.001	S226	0.000	0.25		4.0	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
7.002	S227	480	Winter	100	+40%	10/15	Summer		80.823	1.683
6.003	S228	480	Winter	100	+40%	10/15	Summer		80.818	1.842
1.009	S229	30	Winter	100	+40%	10/15	Summer		81.085	3.113
1.010	S230HB	30	Winter	100	+40%	10/15	Summer		81.082	4.108
1.011	S231	30	Winter	100	+40%				75.717	-0.319

Flooded				Pipe			Level
PN	US/MH Name	Volume (m³)	Flow / Overflow Cap. (l/s)	Flow (l/s)	Status	Exceeded	
7.002	S227	0.000	0.22	3.9	SURCHARGED		
6.003	S228	0.000	0.03	2.1	SURCHARGED		
1.009	S229	0.000	0.13	51.6	SURCHARGED		
1.010	S230HB	0.000	0.02	8.5	SURCHARGED		
1.011	S231	0.000	0.05	8.5	OK		