

STORM SEWER DESIGN by the Modified Rational Method		
Design Criteria for Storm		
Pipe Sizes Network Manhole Sizes Standard		
FEH Rainfall Model		
Return Period (years)		2
FEH Rainfall Version		1999
Site Location	GB 495800 104050 SU 95800 04050	
C (1km)		-0.025
D1 (1km)		0.403
D2 (1km)		0.246
D3 (1km)		0.396
E (1km)		0.308
F (1km)		2.327
Maximum Rainfall (mm/hr)		50
Maximum Time of Concentration (mins)		30
Foul Sewage (l/s/ha)		0.000
Volumetric Runoff Coeff.		0.750
PIMP (%)		100
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		

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	7.249	0.075	96.7	0.027	6.00	0.0	0.600	o	150	Pipe/Conduit		
1.001	4.810	0.048	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit		
2.000	8.832	0.088	100.4	0.038	6.00	0.0	0.600	o	150	Pipe/Conduit		
2.001	12.200	0.122	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit		
1.002	45.400	0.184	246.7	0.017	0.00	0.0	0.600	o	300	Pipe/Conduit		
3.000	5.000	0.100	50.0	0.052	6.00	0.0	0.600	o	150	Pipe/Conduit		
3.001	6.000	0.254	23.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit		

Network Results Table											
PN	Rain (mm/hr)	T.C. (mins)	US/IL E (m)	I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	
1.000	50.00	6.12	8.053	0.027	0.0	0.0	0.0	1.02	18.1	3.7	
1.001	50.00	6.20	7.978	0.027	0.0	0.0	0.0	1.00	17.8	3.7	
2.000	50.00	6.15	8.140	0.038	0.0	0.0	0.0	1.00	17.7	5.1	
2.001	50.00	6.35	8.052	0.038	0.0	0.0	0.0	1.00	17.8	5.1	
1.002	47.03	7.11	7.780	0.082	0.0	0.0	0.0	1.00	70.4	10.4	
3.000	50.00	6.06	8.100	0.052	0.0	0.0	0.0	1.43	25.2	7.0	
3.001	50.00	6.10	7.925	0.052	0.0	0.0	0.0	2.70	107.5	7.0	

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Micro Drainage	Network 2018.1.1	

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
4.000	3.000	0.025	120.0	0.066	6.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	7.000	0.104	67.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	41.039	0.171	240.0	0.036	0.00	0.0	0.600	o	300	Pipe/Conduit	
5.000	10.000	0.215	46.5	0.047	6.00	0.0	0.600	o	150	Pipe/Conduit	
5.001	6.700	0.350	19.1	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
6.000	5.000	0.335	14.9	0.027	6.00	0.0	0.600	o	150	Pipe/Conduit	
6.001	3.000	0.165	18.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.004	32.806	0.134	244.8	0.049	0.00	0.0	0.600	o	300	Pipe/Conduit	
7.000	6.272	0.175	35.8	0.024	6.00	0.0	0.600	o	150	Pipe/Conduit	
7.001	4.928	0.110	44.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
7.002	12.000	0.074	162.2	0.011	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.005	10.462	0.033	317.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
8.000	5.288	0.053	99.8	0.051	6.00	0.0	0.600	o	150	Pipe/Conduit	
8.001	7.275	0.072	101.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
8.002	28.500	0.117	243.6	0.027	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.000	3.000	0.082	36.6	0.027	6.00	0.0	0.600	o	150	Pipe/Conduit	
9.001	3.000	0.085	35.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.006	30.532	0.075	407.1	0.016	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
4.000	50.00	6.05	7.875	0.066	0.0	0.0	0.0	0.92	16.2	8.9
4.001	50.00	6.13	7.775	0.066	0.0	0.0	0.0	1.60	63.5	8.9
1.003	44.48	7.79	7.596	0.236	0.0	0.0	0.0	1.01	71.4	28.4
5.000	50.00	6.11	8.140	0.047	0.0	0.0	0.0	1.48	26.1	6.4
5.001	50.00	6.16	7.925	0.047	0.0	0.0	0.0	2.31	40.9	6.4
6.000	50.00	6.03	8.075	0.027	0.0	0.0	0.0	2.62	46.3	3.7
6.001	50.00	6.05	7.740	0.027	0.0	0.0	0.0	2.37	41.9	3.7
1.004	42.66	8.33	7.425	0.359	0.0	0.0	0.0	1.00	70.7	41.5
7.000	50.00	6.06	7.800	0.024	0.0	0.0	0.0	1.69	29.8	3.2
7.001	50.00	6.10	7.550	0.024	0.0	0.0	0.0	1.96	77.9	3.2
7.002	50.00	6.30	7.440	0.035	0.0	0.0	0.0	1.02	40.7	4.7
1.005	42.13	8.50	7.216	0.394	0.0	0.0	0.0	1.01	111.8	45.0
8.000	50.00	6.09	7.650	0.051	0.0	0.0	0.0	1.01	17.8	6.9
8.001	50.00	6.18	7.522	0.051	0.0	0.0	0.0	1.30	51.7	6.9
8.002	48.98	6.65	7.375	0.078	0.0	0.0	0.0	1.00	70.9	10.3
9.000	50.00	6.03	7.575	0.027	0.0	0.0	0.0	1.67	29.5	3.7
9.001	50.00	6.06	7.493	0.027	0.0	0.0	0.0	1.70	30.0	3.7
1.006	40.65	9.01	7.108	0.515	0.0	0.0	0.0	1.00	159.3	56.7

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
10.000	20.088	0.057	352.4	0.024	6.00	0.0	0.600	o	450	Pipe/Conduit	
11.000	11.000	0.115	95.7	0.000	6.00	0.0	0.600	o	150	Pipe/Conduit	
11.001	3.600	0.052	69.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.007	3.548	0.033	107.5	0.034	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)
10.000	50.00	6.31	7.090	0.024	0.0	0.0	0.0	1.08	171.3	3.2
11.000	50.00	6.18	7.500	0.000	0.0	0.0	0.0	1.03	18.2	0.0
11.001	50.00	6.23	7.385	0.000	0.0	0.0	0.0	1.21	21.4	0.0
1.007	50.00	6.06	7.033	0.000	5.0	0.0	0.0	0.97	17.1	5.0

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		7.820	7.000	0.000	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	1.000
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 Online Controls	10	Number of Time/Area Diagrams	0
		Number of Storage Structures	10
		Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	E (1km)	0.308
Return Period (years)	2	F (1km)	2.327
FEH Rainfall Version	1999	Summer Storms	Yes
Site Location GB 495800 104050 SU 95800 04050		Winter Storms	No
C (1km)	-0.025	Cv (Summer)	0.750
D1 (1km)	0.403	Cv (Winter)	0.840
D2 (1km)	0.246	Storm Duration (mins)	30
D3 (1km)	0.396		

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Online Controls for Storm

Orifice Manhole: 3B, DS/PN: 1.001, Volume (m³): 0.3

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 7.978

Orifice Manhole: 3D, DS/PN: 2.001, Volume (m³): 0.3

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 8.052

Orifice Manhole: 4B, DS/PN: 3.001, Volume (m³): 0.4

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 7.925

Orifice Manhole: 4D, DS/PN: 4.001, Volume (m³): 1.4

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 7.775

Orifice Manhole: 10B, DS/PN: 5.001, Volume (m³): 1.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 7.925

Orifice Manhole: 10D, DS/PN: 6.001, Volume (m³): 1.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 7.740

Orifice Manhole: 32B, DS/PN: 7.001, Volume (m³): 0.4

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 7.550

Orifice Manhole: 42B, DS/PN: 8.001, Volume (m³): 0.4

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 7.522

Orifice Manhole: 7B, DS/PN: 9.001, Volume (m³): 0.3

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 7.493

Hydro-Brake® Optimum Manhole: 8, DS/PN: 1.007, Volume (m³): 10.6

Unit Reference MD-SHE-0103-5000-1200-5000	
Design Head (m)	1.200
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	103
Invert Level (m)	7.033
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)	1.200	5.0	Kick-Flo®	0.745	4.0
Flush-Flo™	0.354	5.0	Mean Flow over Head Range	-	4.4

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

Hydro-Brake® Optimum Manhole: 8, DS/PN: 1.007, Volume (m³): 10.6

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	3.4	0.800	4.1	2.000	6.3	4.000	8.8	7.000	11.5
0.200	4.7	1.000	4.6	2.200	6.6	4.500	9.3	7.500	11.8
0.300	5.0	1.200	5.0	2.400	6.9	5.000	9.8	8.000	12.2
0.400	5.0	1.400	5.4	2.600	7.2	5.500	10.2	8.500	12.6
0.500	4.9	1.600	5.7	3.000	7.7	6.000	10.7	9.000	12.9
0.600	4.7	1.800	6.0	3.500	8.3	6.500	11.1	9.500	13.3

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Storage Structures for Storm

Complex Manhole: 3B, DS/PN: 1.001

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	15.0
Max Percolation (l/s)	20.8	Slope (1:X)	70.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	8.053	Cap Volume Depth (m)	0.400

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	3.0
Membrane Percolation (mm/hr)	1000	Length (m)	11.0
Max Percolation (l/s)	9.2	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	8.250	Cap Volume Depth (m)	0.420

Complex Manhole: 3D, DS/PN: 2.001

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.8
Membrane Percolation (mm/hr)	1000	Length (m)	20.0
Max Percolation (l/s)	32.2	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	8.140	Cap Volume Depth (m)	0.365

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.8
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	16.1	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	8.250	Cap Volume Depth (m)	0.390

Complex Manhole: 4B, DS/PN: 3.001

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	6.0
Membrane Percolation (mm/hr)	1000	Length (m)	12.5
Max Percolation (l/s)	20.8	Slope (1:X)	48.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	8.100	Cap Volume Depth (m)	0.315

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Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	6.0
Membrane Percolation (mm/hr)	1000	Length (m)	12.5
Max Percolation (l/s)	20.8	Slope (1:X)	90.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	8.125	Cap Volume Depth (m)	0.390

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	3.0
Membrane Percolation (mm/hr)	1000	Length (m)	13.5
Max Percolation (l/s)	11.3	Slope (1:X)	250.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	8.300	Cap Volume Depth (m)	0.315

Complex Manhole: 4D, DS/PN: 4.001

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.5
Membrane Percolation (mm/hr)	1000	Length (m)	20.0
Max Percolation (l/s)	25.0	Slope (1:X)	250.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	7.875	Cap Volume Depth (m)	0.790

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	3.0
Membrane Percolation (mm/hr)	1000	Length (m)	11.0
Max Percolation (l/s)	9.2	Slope (1:X)	150.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	7.875	Cap Volume Depth (m)	0.790

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	6.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	16.7	Slope (1:X)	150.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	7.950	Cap Volume Depth (m)	0.715

Complex Manhole: 10B, DS/PN: 5.001

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	6.0
Membrane Percolation (mm/hr)	1000	Length (m)	12.0
Max Percolation (l/s)	20.0	Slope (1:X)	140.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	7.980	Cap Volume Depth (m)	0.490

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Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	6.0
Membrane Percolation (mm/hr)	1000	Length (m)	12.0
Max Percolation (l/s)	20.0	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	8.140	Cap Volume Depth (m)	0.325

Complex Manhole: 10D, DS/PN: 6.001

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	3.0
Membrane Percolation (mm/hr)	1000	Length (m)	12.0
Max Percolation (l/s)	10.0	Slope (1:X)	120.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	8.075	Cap Volume Depth (m)	0.390

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	6.5
Membrane Percolation (mm/hr)	1000	Length (m)	9.0
Max Percolation (l/s)	16.3	Slope (1:X)	200.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	8.075	Cap Volume Depth (m)	0.365

Complex Manhole: 32B, DS/PN: 7.001

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.3
Membrane Percolation (mm/hr)	1000	Length (m)	8.0
Max Percolation (l/s)	9.6	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	7.635	Cap Volume Depth (m)	0.690

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	4.3
Max Percolation (l/s)	5.7	Slope (1:X)	200.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	7.800	Cap Volume Depth (m)	0.565

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	3.0
Membrane Percolation (mm/hr)	1000	Length (m)	14.0
Max Percolation (l/s)	11.7	Slope (1:X)	280.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	7.800	Cap Volume Depth (m)	0.590

Complex Manhole: 42B, DS/PN: 8.001

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	9.0
Membrane Percolation (mm/hr)	1000	Length (m)	14.0
Max Percolation (l/s)	35.0	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	7.650	Cap Volume Depth (m)	0.540

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	13.9	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	7.650	Cap Volume Depth (m)	0.640

Porous Car Park Manhole: 7B, DS/PN: 9.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	20.0
Max Percolation (l/s)	27.8	Slope (1:X)	200.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	7.575	Cap Volume Depth (m)	0.450

Complex Manhole: 8, DS/PN: 1.007

Tank or Pond

Invert Level (m) 7.033

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	95.0	1.130	248.2	1.132	248.6

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	3.0
Membrane Percolation (mm/hr)	1000	Length (m)	12.0
Max Percolation (l/s)	10.0	Slope (1:X)	200.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	7.500	Cap Volume Depth (m)	0.580

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

				Pipe		
	US/MH	Flow /	Overflow	Flow		Level
PN	Name	Cap.	(l/s)	(l/s)	Status	Exceeded
1.000	3A	0.16		2.5		OK
1.001	3B	0.13		1.7		OK
2.000	3C	0.24		3.7		OK
2.001	3D	0.10		1.7		OK
1.002	3	0.07		4.6		OK
3.000	4A	0.24		4.8		OK
3.001	4B	0.04		2.5	SURCHARGED	
4.000	4C	0.59		6.4		OK
4.001	4D	0.05		2.1		OK
1.003	4	0.18		11.9		OK
5.000	10A	0.20		4.6		OK
5.001	10B	0.05		1.8		OK
6.000	10C	0.07		2.6		OK
6.001	10D	0.09		2.2	SURCHARGED	
1.004	5	0.30		19.4		OK
7.000	32A	0.09		2.3		OK
7.001	32B	0.04		1.7		OK
7.002	32	0.07		2.6		OK
1.005	6	0.13		10.2		OK
8.000	42A	0.34		4.9		OK
8.001	42B	0.06		2.1		OK
8.002	42	0.07		4.4		OK
9.000	7A	0.14		2.6		OK
9.001	7B	0.09		1.6		OK
1.006	7	0.10		13.1		OK
10.000	8A	0.00		0.5		OK
11.000	8B	0.00		0.0		OK
11.001	8C	0.00		0.0		OK

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

US/MH		Storm	Return Period	Climate Change	First (X) SurchARGE	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth	Flooded Volume	Flow /
PN	Name								(m)	(m)	(m³)	Cap.
1.007	8 240 Winter		1	+0%	1/15 Summer				7.360	0.177	0.000	0.44

US/MH		Pipe		Status	Level Exceeded
PN	Name	Overflow (l/s)	Flow (l/s)		
1.007	8		5.0	SURCHARGED	

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	1.000
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 Online Controls	10	Number of Storage Structures	10
		Number of Time/Area Diagrams	0
		Number of Real Time Controls	0

Synthetic Rainfall Details			
Rainfall Model	FEH	D3 (1km)	0.396
FEH Rainfall Version	1999	E (1km)	0.308
Site Location GB 495800 104050 SU 95800 04050		F (1km)	2.327
C (1km)	-0.025	Cv (Summer)	0.750
D1 (1km)	0.403	Cv (Winter)	0.840
D2 (1km)	0.246		

Margin for Flood Risk Warning (mm)	450.0
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

									Water	Surcharged	Flooded
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)
1.000	3A	15 Winter	30	+0%	30/15 Summer				8.262	0.059	0.000
1.001	3B	15 Winter	30	+0%	30/15 Summer				8.251	0.123	0.000
2.000	3C	15 Winter	30	+0%	100/15 Summer				8.285	-0.005	0.000
2.001	3D	30 Winter	30	+0%	30/15 Summer				8.267	0.065	0.000
1.002	3	15 Winter	30	+0%	100/120 Winter				7.858	-0.222	0.000
3.000	4A	15 Winter	30	+0%	30/15 Summer				8.346	0.096	0.000
3.001	4B	30 Winter	30	+0%	1/15 Summer				8.326	0.176	0.000
4.000	4C	15 Winter	30	+0%	30/15 Summer				8.118	0.093	0.000
4.001	4D	60 Winter	30	+0%	30/15 Summer				8.087	0.087	0.000
1.003	4	360 Winter	30	+0%	100/60 Summer				7.853	-0.043	0.000
5.000	10A	15 Winter	30	+0%	100/15 Summer				8.244	-0.046	0.000
5.001	10B	30 Winter	30	+0%	30/15 Summer				8.227	0.152	0.000
6.000	10C	15 Winter	30	+0%	100/15 Summer				8.165	-0.060	0.000
6.001	10D	15 Winter	30	+0%	1/15 Summer				8.156	0.266	0.000
1.004	5	360 Winter	30	+0%	30/120 Winter				7.850	0.125	0.000
7.000	32A	15 Winter	30	+0%	100/60 Winter				7.856	-0.094	0.000
7.001	32B	360 Winter	30	+0%	30/15 Summer				7.855	0.080	0.000
7.002	32	360 Winter	30	+0%	30/60 Winter				7.846	0.181	0.000
1.005	6	360 Winter	30	+0%	30/60 Summer				7.846	0.255	0.000
8.000	42A	480 Winter	30	+0%	30/15 Summer				7.862	0.062	0.000
8.001	42B	480 Winter	30	+0%	30/15 Summer				7.861	0.114	0.000
8.002	42	360 Winter	30	+0%	30/60 Winter				7.845	0.170	0.000
9.000	7A	480 Winter	30	+0%	30/120 Winter				7.852	0.127	0.000
9.001	7B	480 Winter	30	+0%	30/15 Summer				7.852	0.209	0.000
1.006	7	360 Winter	30	+0%	30/30 Winter				7.845	0.287	0.000
10.000	8A	360 Winter	30	+0%	30/30 Winter				7.843	0.303	0.000
11.000	8B	360 Winter	30	+0%	30/60 Winter				7.843	0.193	0.000
11.001	8C	360 Winter	30	+0%	30/30 Winter				7.843	0.308	0.000

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

				Pipe		
	US/MH	Flow /	Overflow	Flow		Level
PN	Name	Cap.	(l/s)	(l/s)	Status	Exceeded
1.000	3A	0.52		8.0	FLOOD RISK	
1.001	3B	0.19		2.6	FLOOD RISK	
2.000	3C	0.74		11.5	OK	
2.001	3D	0.14		2.3	SURCHARGED	
1.002	3	0.15		9.8	OK	
3.000	4A	0.79		15.7	SURCHARGED	
3.001	4B	0.05		3.2	SURCHARGED	
4.000	4C	1.85		20.1	SURCHARGED	
4.001	4D	0.06		2.8	SURCHARGED	
1.003	4	0.15		10.3	OK	
5.000	10A	0.62		14.4	OK	
5.001	10B	0.08		2.7	SURCHARGED	
6.000	10C	0.22		8.0	OK	
6.001	10D	0.13		3.3	SURCHARGED	
1.004	5	0.25		15.9	SURCHARGED	
7.000	32A	0.30		7.4	OK	
7.001	32B	0.02		1.2	SURCHARGED	
7.002	32	0.05		1.6	SURCHARGED	
1.005	6	0.22		17.5	SURCHARGED	
8.000	42A	0.15		2.1	SURCHARGED	
8.001	42B	0.05		1.9	SURCHARGED	
8.002	42	0.05		3.3	SURCHARGED	
9.000	7A	0.06		1.1	SURCHARGED	
9.001	7B	0.07		1.2	SURCHARGED	
1.006	7	0.17		22.8	SURCHARGED	
10.000	8A	0.01		1.0	FLOOD RISK	
11.000	8B	0.00		0.0	SURCHARGED	
11.001	8C	0.01		0.1	FLOOD RISK	

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

		US/MH	Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Water	Surcharged	Flooded		
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	
1.007	8 360	Winter	30	+0%	1/15	Summer			7.843	0.660	0.000	0.44	
		US/MH	Overflow	Pipe	Flow				Level				
PN	Name	(1/s)	(1/s)	Status	Exceeded								
1.007	8		5.0	FLOOD RISK									

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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	1.000
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 Online Controls	10	Number of Time/Area Diagrams	0
		Number of Storage Structures	10
		Number of Real Time Controls	0
Synthetic Rainfall Details			
Rainfall Model	FEH	D3 (1km)	0.396
FEH Rainfall Version	1999	E (1km)	0.308
Site Location GB 495800 104050 SU 95800 04050		F (1km)	2.327
C (1km)	-0.025	Cv (Summer)	0.750
D1 (1km)	0.403	Cv (Winter)	0.840
D2 (1km)	0.246		
Margin for Flood Risk Warning (mm)			450.0
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	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
1.000	3A	15 Winter	100	+30%	30/15 Summer			8.387	0.184	0.000
1.001	3B	30 Winter	100	+30%	30/15 Summer			8.363	0.235	0.000
2.000	3C	15 Winter	100	+30%	100/15 Summer			8.485	0.195	0.000
2.001	3D	30 Winter	100	+30%	30/15 Summer			8.379	0.177	0.000
1.002	3	480 Winter	100	+30%	100/120 Winter			8.255	0.175	0.000
3.000	4A	15 Winter	100	+30%	30/15 Summer			8.613	0.363	0.000
3.001	4B	30 Winter	100	+30%	1/15 Summer			8.472	0.322	0.000
4.000	4C	15 Winter	100	+30%	30/15 Summer			8.499	0.474	0.000
4.001	4D	480 Winter	100	+30%	30/15 Summer			8.300	0.300	0.000
1.003	4	480 Winter	100	+30%	100/60 Summer			8.254	0.358	0.000
5.000	10A	15 Winter	100	+30%	100/15 Summer			8.557	0.267	0.000
5.001	10B	60 Winter	100	+30%	30/15 Summer			8.390	0.315	0.000
6.000	10C	15 Winter	100	+30%	100/15 Summer			8.282	0.057	0.000
6.001	10D	15 Winter	100	+30%	1/15 Summer			8.268	0.378	0.000
1.004	5	480 Winter	100	+30%	30/120 Winter			8.251	0.526	0.000
7.000	32A	480 Winter	100	+30%	100/60 Winter			8.258	0.308	0.000
7.001	32B	480 Winter	100	+30%	30/15 Summer			8.258	0.483	0.000
7.002	32	480 Winter	100	+30%	30/60 Winter			8.247	0.582	0.000
1.005	6	480 Winter	100	+30%	30/60 Summer			8.246	0.655	0.000
8.000	42A	480 Winter	100	+30%	30/15 Summer			8.275	0.475	0.000
8.001	42B	480 Winter	100	+30%	30/15 Summer			8.274	0.527	0.000
8.002	42	480 Winter	100	+30%	30/60 Winter			8.246	0.571	0.000
9.000	7A	480 Winter	100	+30%	30/120 Winter			8.269	0.544	0.000
9.001	7B	480 Winter	100	+30%	30/15 Summer			8.272	0.629	0.000
1.006	7	480 Winter	100	+30%	30/30 Winter			8.245	0.687	0.000
10.000	8A	480 Winter	100	+30%	30/30 Winter			8.243	0.703	0.000
11.000	8B	480 Winter	100	+30%	30/60 Winter			8.243	0.593	0.000
11.001	8C	480 Winter	100	+30%	30/30 Winter			8.243	0.708	0.000

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

		US/MH		Flow / Overflow		Pipe	Level	
PN	Name	Cap.	(l/s)	(l/s)	Status	Exceeded		
1.000	3A	1.04		16.2	FLOOD RISK			
1.001	3B	0.23		3.1	FLOOD RISK			
2.000	3C	1.47		22.9	FLOOD RISK			
2.001	3D	0.18		2.9	FLOOD RISK			
1.002	3	0.08		5.1	SURCHARGED			
3.000	4A	1.58		31.2	FLOOD RISK			
3.001	4B	0.05		3.8	FLOOD RISK			
4.000	4C	3.57		38.8	SURCHARGED			
4.001	4D	0.05		2.5	SURCHARGED			
1.003	4	0.18		12.2	SURCHARGED			
5.000	10A	1.16		27.0	FLOOD RISK			
5.001	10B	0.10		3.5	SURCHARGED			
6.000	10C	0.44		15.9	SURCHARGED			
6.001	10D	0.15		3.7	SURCHARGED			
1.004	5	0.30		19.6	SURCHARGED			
7.000	32A	0.07		1.7	FLOOD RISK			
7.001	32B	0.02		1.1	FLOOD RISK			
7.002	32	0.05		1.7	FLOOD RISK			
1.005	6	0.25		20.1	SURCHARGED			
8.000	42A	0.26		3.7	FLOOD RISK			
8.001	42B	0.05		1.9	FLOOD RISK			
8.002	42	0.05		3.3	FLOOD RISK			
9.000	7A	0.11		1.9	FLOOD RISK			
9.001	7B	0.07		1.4	FLOOD RISK			
1.006	7	0.17		23.0	FLOOD RISK			
10.000	8A	0.01		1.6	FLOOD RISK			
11.000	8B	0.00		0.0	FLOOD RISK			
11.001	8C	0.00		0.0	FLOOD RISK			

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

US/MH		Storm	Return Period	Climate Change	First (X) SurchARGE	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth	Flooded Volume	Flow /
PN	Name								(m)	(m)	(m³)	Cap.
1.007	8 480	Winter	100	+30%	1/15 Summer				8.243	1.060	0.000	0.44

US/MH		Pipe		Status	Level Exceeded
PN	Name	Overflow (l/s)	Flow (l/s)		
1.007	8		5.0	FLOOD RISK	