Existing Network Details 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
20.000	17.100	0.071	240.8	0.066	4.00	0.0	0.600	o	300	Pipe/Conduit
20.001	16.700	0.070	238.6	0.064	0.00	0.0	0.600	o	300	Pipe/Conduit
20.002	13.400	0.056	239.3	0.049	0.00	0.0	0.600	o	300	Pipe/Conduit
21.000	13.400	0.056	239.3	0.049	4.00	0.0	0.600	o	300	Pipe/Conduit
21.001	41.400	-0.012	-3450.0	0.175	0.00	0.0	0.600	o	375	Pipe/Conduit
20.003	22.600	0.056	403.6	0.091	0.00	0.0	0.600	o	525	Pipe/Conduit
20.004	19.500	0.049	398.0	0.078	0.00	0.0	0.600	o	525	Pipe/Conduit
20.005	10.300	0.050	206.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit
20.006	15.600	1.725	9.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
20.000	6.500	0.066	0.0	1.01	71.3
20.001	6.429	0.130	0.0	1.01	71.6
20.002	6.359	0.179	0.0	1.01	71.5
21.000	6.572	0.049	0.0	1.01	71.5
21.001	6.441	0.224	0.0	0.00	0.0
20.003	6.153	0.494	0.0	1.11	240.0
20.004	6.097	0.572	0.0	1.12	241.7
20.005	5.900	0.572	0.0	1.09	77.2
20.006	5.850	0.572	0.0	4.38	174.1

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)
20.000	o	300	S40	8.000	6.500	1.200	Open Manhole	1200
20.001	o	300	S41	8.000	6.429	1.271	Open Manhole	1200
20.002	o	300	S42	8.000	6.359	1.341	Open Manhole	1200
21.000	o	300	S43/1	8.100	6.572	1.228	Open Manhole	1200
21.001	o	375	S43/2	8.220	6.441	1.404	Open Manhole	1500
20.003	o	525	S43	8.000	6.153	1.322	Open Manhole	1800
20.004	o	525	S44	8.000	6.097	1.378	Open Manhole	1800
20.005	o	300	S45	8.000	5.900	1.800	Open Manhole	1200
20.006	o	225	S46	8.000	5.850	1.925	Open Manhole	2100

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
20.000	17.100	240.8	S41	8.000	6.429	1.271	Open Manhole	1200
20.001	16.700	238.6	S42	8.000	6.359	1.341	Open Manhole	1200
20.002	13.400	239.3	S43	8.000	6.303	1.397	Open Manhole	1800
21.000	13.400	239.3	S43/2	8.220	6.516	1.404	Open Manhole	1500
21.001	41.400	-3450.0	S43	8.000	6.453	1.172	Open Manhole	1800
20.003	22.600	403.6	S44	8.000	6.097	1.378	Open Manhole	1800
20.004	19.500	398.0	S45	8.000	6.048	1.427	Open Manhole	1200
20.005	10.300	206.0	S46	8.000	5.850	1.850	Open Manhole	2100
20.006	15.600	9.0		5.450	4.125	1.100	Open Manhole	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	0.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FEH	D1 (1km)	0.362	Summer Storms	Yes
Return Period (years)	100	D2 (1km)	0.381	Winter Storms	No
FEH Rainfall Version	1999	D3 (1km)	0.330	Cv (Summer)	0.750
Site Location		E (1km)	0.295	Cv (Winter)	0.840
C (1km)	-0.028	F (1km)	2.426	Storm Duration (mins)	30

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S46, DS/PN: 20.006, Volume (m³): 8.1

Unit Reference	MD-SHE-0035-7000-1500-7000
Design Head (m)	1.500
Design Flow (l/s)	0.7
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	35
Invert Level (m)	5.850
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	0.7	Kick-Flo®	0.312	0.4
Flush-Flo™	0.154	0.4	Mean Flow over Head Range	-	0.5

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.4	0.800	0.5	2.000	0.8	4.000	1.1	7.000	1.4
0.200	0.4	1.000	0.6	2.200	0.8	4.500	1.1	7.500	1.4
0.300	0.4	1.200	0.6	2.400	0.9	5.000	1.2	8.000	1.5
0.400	0.4	1.400	0.7	2.600	0.9	5.500	1.3	8.500	1.5
0.500	0.4	1.600	0.7	3.000	1.0	6.000	1.3	9.000	1.6
0.600	0.5	1.800	0.8	3.500	1.0	6.500	1.4	9.500	1.6

Storage Structures for Storm

Tank or Pond Manhole: S45, DS/PN: 20.005

Invert Level (m) 5.900

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	98.0	1.200	532.0	2.400	912.0	3.600	912.0	4.800	912.0
0.200	154.0	1.400	621.0	2.600	912.0	3.800	912.0	5.000	912.0
0.400	218.0	1.600	714.0	2.800	912.0	4.000	912.0		
0.600	290.0	1.800	811.0	3.000	912.0	4.200	912.0		
0.800	366.0	2.000	912.0	3.200	912.0	4.400	912.0		
1.000	447.0	2.200	912.0	3.400	912.0	4.600	912.0		

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

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

Synthetic Rainfall Details

Rainfall Model	FEH	D1 (1km) 0.362	F (1km) 2.426
FEH Rainfall Version	1999	D2 (1km) 0.381	Cv (Summer) 0.750
Site Location		D3 (1km) 0.330	Cv (Winter) 0.840
C (1km)	-0.028	E (1km) 0.295	

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)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
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)	Surcharged Depth (m)
20.000	S40	4320 Winter	1	+0%	30/15 Summer				6.581	-0.219
20.001	S41	4320 Winter	1	+0%	30/15 Summer				6.581	-0.148
20.002	S42	4320 Winter	1	+0%	30/15 Summer				6.581	-0.078
21.000	S43/1	15 Winter	1	+0%	30/15 Summer				6.654	-0.218
21.001	S43/2	15 Winter	1	+0%	30/15 Summer				6.636	-0.180
20.003	S43	4320 Winter	1	+0%	30/180 Winter				6.581	-0.097
20.004	S44	4320 Winter	1	+0%	30/120 Winter				6.581	-0.041
20.005	S45	4320 Winter	1	+0%	1/60 Summer				6.581	0.381
20.006	S46	4320 Winter	1	+0%	1/15 Summer				6.580	0.505

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
20.000	S40	0.000	0.00		0.3	OK	
20.001	S41	0.000	0.01		0.6	OK	
20.002	S42	0.000	0.01		0.8	OK	
21.000	S43/1	0.000	0.11		6.4	OK	
21.001	S43/2	0.000	0.47		24.5	OK	
20.003	S43	0.000	0.01		2.2	OK	
20.004	S44	0.000	0.01		2.4	OK	
20.005	S45	0.000	0.01		0.5	SURCHARGED	
20.006	S46	0.000	0.00		0.5	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	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

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

Synthetic Rainfall Details

Rainfall Model	FEH	D1 (1km) 0.362	F (1km) 2.426
FEH Rainfall Version	1999	D2 (1km) 0.381	Cv (Summer) 0.750
Site Location		D3 (1km) 0.330	Cv (Winter) 0.840
C (1km)	-0.028	E (1km) 0.295	

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)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
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)	Surcharged Depth (m)
20.000	S40	4320 Winter	30	+0%	30/15 Summer				7.009	0.209
20.001	S41	4320 Winter	30	+0%	30/15 Summer				7.009	0.280
20.002	S42	4320 Winter	30	+0%	30/15 Summer				7.009	0.350
21.000	S43/1	4320 Winter	30	+0%	30/15 Summer				7.009	0.137
21.001	S43/2	4320 Winter	30	+0%	30/15 Summer				7.009	0.193
20.003	S43	4320 Winter	30	+0%	30/180 Winter				7.009	0.331
20.004	S44	4320 Winter	30	+0%	30/120 Winter				7.009	0.387
20.005	S45	4320 Winter	30	+0%	1/60 Summer				7.009	0.809
20.006	S46	4320 Winter	30	+0%	1/15 Summer				7.009	0.934

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
20.000	S40	0.000	0.01		0.5	SURCHARGED	
20.001	S41	0.000	0.02		1.0	SURCHARGED	
20.002	S42	0.000	0.02		1.4	SURCHARGED	
21.000	S43/1	0.000	0.01		0.4	SURCHARGED	
21.001	S43/2	0.000	0.03		1.8	SURCHARGED	
20.003	S43	0.000	0.02		4.0	SURCHARGED	
20.004	S44	0.000	0.02		4.5	SURCHARGED	
20.005	S45	0.000	0.01		0.6	SURCHARGED	
20.006	S46	0.000	0.00		0.6	SURCHARGED	

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

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

Synthetic Rainfall Details

Rainfall Model	FEH	D1 (1km) 0.362	F (1km) 2.426
FEH Rainfall Version	1999	D2 (1km) 0.381	Cv (Summer) 0.750
Site Location		D3 (1km) 0.330	Cv (Winter) 0.840
C (1km) -0.028		E (1km) 0.295	

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)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
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)	Surcharged Depth (m)
20.000	S40	15 Winter	100	+40%	30/15 Summer				7.782	0.982
20.001	S41	15 Winter	100	+40%	30/15 Summer				7.703	0.974
20.002	S42	5760 Winter	100	+40%	30/15 Summer				7.528	0.869
21.000	S43/1	15 Winter	100	+40%	30/15 Summer				7.674	0.802
21.001	S43/2	15 Winter	100	+40%	30/15 Summer				7.597	0.781
20.003	S43	5760 Winter	100	+40%	30/180 Winter				7.528	0.850
20.004	S44	5760 Winter	100	+40%	30/120 Winter				7.528	0.906
20.005	S45	5760 Winter	100	+40%	1/60 Summer				7.528	1.328
20.006	S46	5760 Winter	100	+40%	1/15 Summer				7.528	1.453

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
20.000	S40	0.000	0.85		51.7	FLOOD RISK	
20.001	S41	0.000	1.68		102.5	FLOOD RISK	
20.002	S42	0.000	0.03		1.9	SURCHARGED	
21.000	S43/1	0.000	0.66		39.0	SURCHARGED	
21.001	S43/2	0.000	3.40		175.9	SURCHARGED	
20.003	S43	0.000	0.03		5.3	SURCHARGED	
20.004	S44	0.000	0.03		6.2	SURCHARGED	
20.005	S45	0.000	0.01		0.7	SURCHARGED	
20.006	S46	0.000	0.00		0.7	SURCHARGED	