Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.024	4-8	0.006

Total Area Contributing (ha) = 0.030

Total Pipe Volume (m³) = 0.753

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)
CWIC06	18.610	0.790	Open Manhole	500 x 400	1.000	17.820	100				
CWIC05	20.260	2.970	Open Manhole	500 x 400	1.001	17.290	100	1.000	17.290	100	
SWIC01	18.560	1.500	Open Manhole	500	2.000	17.060	150				
SWHBMH	19.150	3.150	Open Manhole	1500	2.001	16.000	150	2.000	16.000	150	
CWIC04	19.200	3.510	Open Manhole	500 x 400	1.002	15.690	150	1.001	15.690	100	
								2.001	15.690	150	
OF	19.000	3.357	Open Manhole	0		OUTFALL		1.002	15.643	150	

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)
1.000	o	100	CWIC06	18.610	17.820	0.690	Open Manhole	500 x 400
1.001	o	100	CWIC05	20.260	17.290	2.870	Open Manhole	500 x 400
2.000	o	150	SWIC01	18.560	17.060	1.350	Open Manhole	500
2.001	o	150	SWHBMH	19.150	16.000	3.000	Open Manhole	1500
1.002	o	150	CWIC04	19.200	15.690	3.360	Open Manhole	500 x 400

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)
1.000	9.016	17.0	CWIC05	20.260	17.290	2.870	Open Manhole	500 x 400
1.001	20.416	12.8	CWIC04	19.200	15.690	3.410	Open Manhole	500 x 400
2.000	21.051	19.9	SWHBMH	19.150	16.000	3.000	Open Manhole	1500
2.001	3.829	12.4	CWIC04	19.200	15.690	3.360	Open Manhole	500 x 400
1.002	4.658	100.0	OF	19.000	15.643	3.207	Open Manhole	0

Online Controls for Storm

Hydro-Brake Optimum® Manhole: SWHBMH, DS/PN: 2.001, Volume (m³): 5.9

Unit Reference	MD-SHE-0038-1100-3000-1100
Design Head (m)	3.000
Design Flow (l/s)	1.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	38
Invert Level (m)	16.000
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)	3.000	1.1	Kick-Flo®	0.338	0.4
Flush-Flo™	0.169	0.5	Mean Flow over Head Range	-	0.8

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	0.5	0.800	0.6	2.000	0.9	4.000	1.3	7.000	1.6
0.200	0.5	1.000	0.7	2.200	1.0	4.500	1.3	7.500	1.7
0.300	0.5	1.200	0.7	2.400	1.0	5.000	1.4	8.000	1.7
0.400	0.5	1.400	0.8	2.600	1.0	5.500	1.4	8.500	1.8
0.500	0.5	1.600	0.8	3.000	1.1	6.000	1.5	9.000	1.8
0.600	0.5	1.800	0.9	3.500	1.2	6.500	1.6	9.500	1.9

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

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.800
Region	England and Wales	Ratio R	0.438
Cv (Summer)	0.750		
Cv (Winter)	0.840		

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 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) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	CWIC06	15 Winter	1	+0%					17.832	-0.088
1.001	CWIC05	15 Winter	1	+0%					17.309	-0.081
2.000	SWIC01	15 Winter	1	+0%	30/15 Winter	100/30 Winter			17.088	-0.122
2.001	SWHBMH	30 Winter	1	+0%	1/15 Summer				16.539	0.389
1.002	CWIC04	15 Winter	1	+0%					15.726	-0.114

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	CWIC06	0.000	0.03		0.4	OK	
1.001	CWIC05	0.000	0.08		1.3	OK	
2.000	SWIC01	0.000	0.08		3.0	OK	4
2.001	SWHBMH	0.000	0.01		0.5	SURCHARGED	
1.002	CWIC04	0.000	0.13		1.8	OK	

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

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.800
Region	England and Wales	Ratio R	0.438
Cv (Summer)	0.750		
Cv (Winter)	0.840		

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 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) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	CWIC06	15 Winter	30	+0%					17.839	-0.081
1.001	CWIC05	15 Winter	30	+0%					17.323	-0.067
2.000	SWIC01	60 Winter	30	+0%	30/15 Winter	100/30 Winter			17.568	0.358
2.001	SWHBMH	60 Winter	30	+0%	1/15 Summer				17.564	1.414
1.002	CWIC04	15 Winter	30	+0%					15.749	-0.091

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	CWIC06	0.000	0.08		1.1	OK	
1.001	CWIC05	0.000	0.23		3.8	OK	
2.000	SWIC01	0.000	0.10		3.7	SURCHARGED	4
2.001	SWHBMH	0.000	0.02		0.8	SURCHARGED	
1.002	CWIC04	0.000	0.32		4.4	OK	

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

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.800
Region	England and Wales	Ratio R	0.438
Cv (Summer)	0.750		
Cv (Winter)	0.840		

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 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) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	CWIC06	15 Winter	100	+30%					17.845	-0.075
1.001	CWIC05	15 Winter	100	+30%					17.334	-0.056
2.000	SWIC01	60 Winter	100	+30%	30/15 Winter	100/30 Winter			18.561	1.351
2.001	SWHBMH	30 Winter	100	+30%	1/15 Summer				18.558	2.408
1.002	CWIC04	15 Winter	100	+30%					15.769	-0.071

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	CWIC06	0.000	0.14		1.9	OK	
1.001	CWIC05	0.000	0.39		6.5	OK	
2.000	SWIC01	0.882	0.13		5.0	FLOOD	4
2.001	SWHBMH	0.000	0.03		1.0	SURCHARGED	
1.002	CWIC04	0.000	0.53		7.2	OK	