STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes ADS-STN Manhole Sizes ADS-STD

FSR Rainfall Model - England and Wales

Return Period (years)	30	PIMP (%)	100
M5-60 (mm)	18.900	Add Flow / Climate Change (%)	0
Ratio R	0.340	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	0.900
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Inverts

Time Area Diagram for Storm at outfall Sw-OUTFALL (pipe Sw-1.003)

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.373	4-8	0.148

Total Area Contributing (ha) = 0.521

Total Pipe Volume (m³) = 13.250

Time Area Diagram at outfall Sw- (pipe Sw-6.001)

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.017	4-8	0.001

Total Area Contributing (ha) = 0.018

Total Pipe Volume (m³) = 0.462

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
Sw-1.000	12.967	0.222	58.4	0.113	4.00	0.0	0.600	o	225	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)
Sw-1.000	50.00	4.13	78.953	0.113	0.0	0.0	0.0	1.71	68.2	15.3

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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
Sw-2.000	13.519	0.085	158.4	0.115	4.00	0.0	0.600	o	225	Pipe/Conduit	
Sw-3.000	23.090	0.239	96.5	0.060	4.00	0.0	0.600	o	225	Pipe/Conduit	
Sw-3.001	49.250	0.269	182.8	0.019	0.00	0.0	0.600	o	225	Pipe/Conduit	
Sw-3.002	15.614	0.203	76.8	0.066	0.00	0.0	0.600	o	225	Pipe/Conduit	
Sw-3.003	22.570	0.243	92.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
Sw-1.001	17.539	0.143	122.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
Sw-4.000	28.043	0.280	100.3	0.020	4.00	0.0	0.600	o	150	Pipe/Conduit	
Sw-4.001	28.953	1.105	26.2	0.023	0.00	0.0	0.600	o	150	Pipe/Conduit	
Sw-5.000	29.357	0.293	100.3	0.024	4.00	0.0	0.600	o	150	Pipe/Conduit	
Sw-5.001	27.095	0.255	106.2	0.026	0.00	0.0	0.600	o	150	Pipe/Conduit	
Sw-5.002	27.823	0.836	33.3	0.028	0.00	0.0	0.600	o	150	Pipe/Conduit	
Sw-4.002	24.912	0.168	148.0	0.027	0.00	0.0	0.600	o	225	Pipe/Conduit	
Sw-1.002	10.072	0.018	573.6	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
Sw-1.003	17.779	0.209	85.1	0.000	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)
Sw-2.000	50.00	4.22	78.965	0.115	0.0	0.0	0.0	1.04	41.2	15.5
Sw-3.000	50.00	4.29	79.346	0.060	0.0	0.0	0.0	1.33	52.9	8.1
Sw-3.001	50.00	5.14	79.107	0.079	0.0	0.0	0.0	0.96	38.3	10.7
Sw-3.002	50.00	5.31	78.837	0.146	0.0	0.0	0.0	1.49	59.4	19.7
Sw-3.003	50.00	5.59	78.634	0.146	0.0	0.0	0.0	1.36	54.0	19.7
Sw-1.001	50.00	5.80	78.390	0.374	0.0	0.0	0.0	1.42	100.3	50.6
Sw-4.000	50.00	4.47	79.800	0.020	0.0	0.0	0.0	1.00	17.7	2.8
Sw-4.001	50.00	4.71	79.520	0.043	0.0	0.0	0.0	1.97	34.9	5.9
Sw-5.000	50.00	4.49	79.800	0.024	0.0	0.0	0.0	1.00	17.7	3.2
Sw-5.001	50.00	4.95	79.507	0.049	0.0	0.0	0.0	0.97	17.2	6.7
Sw-5.002	50.00	5.22	79.252	0.077	0.0	0.0	0.0	1.75	31.0	10.4
Sw-4.002	50.00	5.60	78.416	0.148	0.0	0.0	0.0	1.07	42.6	20.0
Sw-1.002	50.00	6.02	78.247	0.521	0.0	0.0	0.0	0.75	82.9	70.6
Sw-1.003	50.00	6.17	78.230	0.521	0.0	0.0	0.0	1.97	217.0	70.6

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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
Sw-6.000	10.794	0.107	100.6	0.000	4.00	0.0	0.600	o	150	Pipe/Conduit	
Sw-6.001	15.350	0.153	100.5	0.018	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)
Sw-6.000	50.00	4.18	78.250	0.000	0.0	0.0	0.0	1.00	17.7	0.0
Sw-6.001	50.00	4.43	78.143	0.018	0.0	0.0	0.0	1.00	17.7	2.4

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)
Sw-1.003	Sw-OUTFALL	79.100	78.021	77.800	0	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)
Sw-6.001	Sw-	79.301	77.990	77.990	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	1
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.900	Storm Duration (mins)	30
Ratio R	0.340		

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Online Controls for Storm

Complex Manhole: Sw-ARR-TK, DS/PN: Sw-1.002, Volume (m³): 4.3

Hydro-Brake® Optimum

Unit Reference	MD-SCU-0050-2800-1075-2800
Design Head (m)	1.075
Design Flow (l/s)	2.8
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	50
Invert Level (m)	78.247
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.075	2.8
Flush-Flo™	0.073	0.9
Kick-Flo®	0.075	0.9
Mean Flow over Head Range	-	1.9

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.0	1.200	2.9	3.000	4.5	7.000	6.7
0.200	1.3	1.400	3.2	3.500	4.9	7.500	7.0
0.300	1.6	1.600	3.4	4.000	5.2	8.000	7.2
0.400	1.8	1.800	3.6	4.500	5.5	8.500	7.4
0.500	2.0	2.000	3.7	5.000	5.8	9.000	7.6
0.600	2.1	2.200	3.9	5.500	6.0	9.500	7.8
0.800	2.4	2.400	4.1	6.000	6.3		
1.000	2.7	2.600	4.2	6.500	6.5		

V-Notch Weir

Angle of V in Degrees 70.000 Discharge Coefficient 0.590 Invert Level (m) 79.192

Hydro-Brake® Optimum Manhole: Sw-08, DS/PN: Sw-6.001, Volume (m³): 1.9

Unit Reference	MD-SCL-0045-1100-1200-1100
Design Head (m)	1.200
Design Flow (l/s)	1.1
Flush-Flo™	Calculated

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Hydro-Brake® Optimum Manhole: Sw-08, DS/PN: Sw-6.001, Volume (m³): 1.9

Objective	Minimise blockage risk
Application	Surface
Sump Available	Yes
Diameter (mm)	45
Invert Level (m)	78.143
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	**Head (m)**	**Flow (l/s)**
Design Point (Calculated)	1.200	1.1
Flush-Flo™	0.184	0.8
Kick-Flo®	0.400	0.7
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)**
0.100	0.8	1.200	1.1	3.000	1.7	7.000	2.4
0.200	0.8	1.400	1.2	3.500	1.8	7.500	2.5
0.300	0.8	1.600	1.2	4.000	1.9	8.000	2.6
0.400	0.7	1.800	1.3	4.500	2.0	8.500	2.7
0.500	0.7	2.000	1.4	5.000	2.1	9.000	2.7
0.600	0.8	2.200	1.4	5.500	2.2	9.500	2.8
0.800	0.9	2.400	1.5	6.000	2.3		
1.000	1.0	2.600	1.5	6.500	2.4		

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Storage Structures for Storm

Cellular Storage Manhole: Sw-ARR-TK, DS/PN: Sw-1.002

Invert Level (m) 78.247 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	324.0	0.0	1.076	0.0	0.0
1.075	324.0	0.0			

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

Simulation Criteria

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
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

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Margin for Flood Risk Warning (mm) 100.0 DVD Status ON
Analysis Timestep Fine Inertia Status OFF
DTS Status OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600
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
Sw-1.000	Sw-Q-MAX350 LD-02	15 Summer	1	+0%		
Sw-2.000	Sw-Q-MAX350 LD-01	15 Summer	1	+0%		
Sw-3.000	Sw-Q-MAX350 TP-CP	15 Winter	1	+0%	100/15 Summer	
Sw-3.001	Sw-01	15 Winter	1	+0%	100/15 Summer	
Sw-3.002	Sw-02	15 Winter	1	+0%	100/15 Summer	
Sw-3.003	Sw-03	15 Winter	1	+0%	30/15 Summer	
Sw-1.001	Sw-06	15 Winter	1	+0%	30/15 Summer	
Sw-4.000	Sw-DRP-03	15 Winter	1	+0%		
Sw-4.001	Sw-DRP-04	15 Winter	1	+0%		
Sw-5.000	Sw-DRP-01	15 Winter	1	+0%		
Sw-5.001	Sw-DRP-02	15 Winter	1	+0%		
Sw-5.002	Sw-04	15 Winter	1	+0%	100/15 Summer	
Sw-4.002	Sw-05	600 Winter	1	+0%	30/15 Summer	
Sw-1.002	Sw-ARR-TK	600 Winter	1	+0%	30/60 Winter	
Sw-1.003	Sw-07	600 Winter	1	+0%		
Sw-6.000	Sw-12	30 Winter	1	+0%	30/15 Summer	100/30 Winter
Sw-6.001	Sw-08	30 Winter	1	+0%	1/15 Summer	

PN	US/MH Name	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)
Sw-1.000	Sw-Q-MAX350 LD-02			79.024	-0.154	0.000	0.22	
Sw-2.000	Sw-Q-MAX350 LD-01			79.058	-0.132	0.000	0.36	
Sw-3.000	Sw-Q-MAX350 TP-CP			79.406	-0.165	0.000	0.16	

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

PN	US/MH Name	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)
Sw-3.001	Sw-01			79.185	-0.147	0.000	0.25	
Sw-3.002	Sw-02			78.922	-0.140	0.000	0.30	
Sw-3.003	Sw-03			78.721	-0.138	0.000	0.32	
Sw-1.001	Sw-06			78.544	-0.146	0.000	0.51	
Sw-4.000	Sw-DRP-03			79.839	-0.111	0.000	0.15	
Sw-4.001	Sw-DRP-04			79.559	-0.112	0.000	0.15	
Sw-5.000	Sw-DRP-01			79.841	-0.109	0.000	0.17	
Sw-5.001	Sw-DRP-02			79.566	-0.091	0.000	0.32	
Sw-5.002	Sw-04			79.307	-0.096	0.000	0.28	
Sw-4.002	Sw-05			78.527	-0.114	0.000	0.06	
Sw-1.002	Sw-ARR-TK			78.526	-0.097	0.000	0.03	
Sw-1.003	Sw-07			78.245	-0.360	0.000	0.01	
Sw-6.000	Sw-12			78.347	-0.053	0.000	0.00	
Sw-6.001	Sw-08			78.347	0.055	0.000	0.05	

PN	US/MH Name	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
Sw-1.000	Sw-Q-MAX350 LD-02		14.6	OK*	
Sw-2.000	Sw-Q-MAX350 LD-01		14.8	OK*	
Sw-3.000	Sw-Q-MAX350 TP-CP		7.7	OK	
Sw-3.001	Sw-01		9.3	OK	
Sw-3.002	Sw-02		16.0	OK	
Sw-3.003	Sw-03		15.9	OK	
Sw-1.001	Sw-06		43.5	OK	
Sw-4.000	Sw-DRP-03		2.6	OK	
Sw-4.001	Sw-DRP-04		4.9	OK	
Sw-5.000	Sw-DRP-01		3.0	OK*	
Sw-5.001	Sw-DRP-02		5.5	OK*	
Sw-5.002	Sw-04		8.4	OK	
Sw-4.002	Sw-05		2.4	OK	
Sw-1.002	Sw-ARR-TK	660	1.5	OK	
Sw-1.003	Sw-07		1.5	OK	
Sw-6.000	Sw-12		0.0	OK	6
Sw-6.001	Sw-08		0.8	SURCHARGED	

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

Simulation Criteria

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
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

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Margin for Flood Risk Warning (mm) 100.0 DVD Status ON
Analysis Timestep Fine Inertia Status OFF
DTS Status OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood
Sw-1.000	Sw-Q-MAX350 LD-02	15 Winter	30	+0%		
Sw-2.000	Sw-Q-MAX350 LD-01	15 Summer	30	+0%		
Sw-3.000	Sw-Q-MAX350 TP-CP	15 Winter	30	+0%	100/15 Summer	
Sw-3.001	Sw-01	15 Winter	30	+0%	100/15 Summer	
Sw-3.002	Sw-02	15 Winter	30	+0%	100/15 Summer	
Sw-3.003	Sw-03	15 Winter	30	+0%	30/15 Summer	
Sw-1.001	Sw-06	600 Winter	30	+0%	30/15 Summer	
Sw-4.000	Sw-DRP-03	15 Winter	30	+0%		
Sw-4.001	Sw-DRP-04	15 Winter	30	+0%		
Sw-5.000	Sw-DRP-01	15 Winter	30	+0%		
Sw-5.001	Sw-DRP-02	15 Winter	30	+0%		
Sw-5.002	Sw-04	15 Winter	30	+0%	100/15 Summer	
Sw-4.002	Sw-05	600 Winter	30	+0%	30/15 Summer	
Sw-1.002	Sw-ARR-TK	600 Winter	30	+0%	30/60 Winter	
Sw-1.003	Sw-07	600 Winter	30	+0%		
Sw-6.000	Sw-12	60 Winter	30	+0%	30/15 Summer	100/30 Winter
Sw-6.001	Sw-08	30 Winter	30	+0%	1/15 Summer	

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

PN	US/MH Name	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)
Sw-1.000	Sw-Q-MAX350 LD-02			79.070	-0.108	0.000	0.54	
Sw-2.000	Sw-Q-MAX350 LD-01			79.129	-0.061	0.000	0.88	
Sw-3.000	Sw-Q-MAX350 TP-CP			79.443	-0.128	0.000	0.39	
Sw-3.001	Sw-01			79.243	-0.089	0.000	0.65	
Sw-3.002	Sw-02			79.039	-0.023	0.000	0.78	
Sw-3.003	Sw-03			78.911	0.053	0.000	0.86	
Sw-1.001	Sw-06			78.897	0.207	0.000	0.15	
Sw-4.000	Sw-DRP-03			79.864	-0.086	0.000	0.37	
Sw-4.001	Sw-DRP-04			79.587	-0.083	0.000	0.41	
Sw-5.000	Sw-DRP-01			79.867	-0.083	0.000	0.41	
Sw-5.001	Sw-DRP-02			79.618	-0.040	0.000	0.87	
Sw-5.002	Sw-04			79.355	-0.047	0.000	0.79	
Sw-4.002	Sw-05			78.897	0.256	0.000	0.13	
Sw-1.002	Sw-ARR-TK			78.895	0.273	0.000	0.04	
Sw-1.003	Sw-07			78.252	-0.353	0.000	0.01	
Sw-6.000	Sw-12			79.141	0.741	0.000	0.03	
Sw-6.001	Sw-08			79.154	0.861	0.000	0.06	

PN	US/MH Name	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
Sw-1.000	Sw-Q-MAX350 LD-02		35.6	OK*	
Sw-2.000	Sw-Q-MAX350 LD-01		36.1	OK*	
Sw-3.000	Sw-Q-MAX350 TP-CP		18.9	OK	
Sw-3.001	Sw-01		23.8	OK	
Sw-3.002	Sw-02		40.9	OK	
Sw-3.003	Sw-03		42.6	SURCHARGED	
Sw-1.001	Sw-06		12.6	SURCHARGED	
Sw-4.000	Sw-DRP-03		6.3	OK	
Sw-4.001	Sw-DRP-04		13.6	OK	
Sw-5.000	Sw-DRP-01		7.3	OK*	
Sw-5.001	Sw-DRP-02		14.9	OK*	
Sw-5.002	Sw-04		23.4	OK	
Sw-4.002	Sw-05		5.0	SURCHARGED	
Sw-1.002	Sw-ARR-TK		2.2	SURCHARGED	
Sw-1.003	Sw-07		2.2	OK	
Sw-6.000	Sw-12		0.5	FLOOD RISK	6
Sw-6.001	Sw-08		1.0	SURCHARGED	

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

Simulation Criteria

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
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

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Margin for Flood Risk Warning (mm) 100.0 DVD Status ON
Analysis Timestep Fine Inertia Status OFF
DTS Status OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood
Sw-1.000	Sw-Q-MAX350 LD-02	15 Summer	100	+40%		
Sw-2.000	Sw-Q-MAX350 LD-01	15 Summer	100	+40%		
Sw-3.000	Sw-Q-MAX350 TP-CP	15 Winter	100	+40%	100/15 Summer	
Sw-3.001	Sw-01	15 Winter	100	+40%	100/15 Summer	
Sw-3.002	Sw-02	15 Winter	100	+40%	100/15 Summer	
Sw-3.003	Sw-03	15 Winter	100	+40%	30/15 Summer	
Sw-1.001	Sw-06	600 Winter	100	+40%	30/15 Summer	
Sw-4.000	Sw-DRP-03	15 Winter	100	+40%		
Sw-4.001	Sw-DRP-04	15 Winter	100	+40%		
Sw-5.000	Sw-DRP-01	15 Summer	100	+40%		
Sw-5.001	Sw-DRP-02	15 Summer	100	+40%		
Sw-5.002	Sw-04	15 Winter	100	+40%	100/15 Summer	
Sw-4.002	Sw-05	480 Winter	100	+40%	30/15 Summer	
Sw-1.002	Sw-ARR-TK	480 Winter	100	+40%	30/60 Winter	
Sw-1.003	Sw-07	600 Winter	100	+40%		
Sw-6.000	Sw-12	60 Winter	100	+40%	30/15 Summer	100/30 Winter
Sw-6.001	Sw-08	15 Winter	100	+40%	1/15 Summer	

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PN	US/MH Name	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)
Sw-1.000	Sw-Q-MAX350 LD-02			79.178	0.000	0.000	0.89	
Sw-2.000	Sw-Q-MAX350 LD-01			79.190	0.000	0.000	1.58	
Sw-3.000	Sw-Q-MAX350 TP-CP			80.193	0.622	0.000	0.60	
Sw-3.001	Sw-01			80.107	0.776	0.000	0.94	
Sw-3.002	Sw-02			79.851	0.789	0.000	1.20	
Sw-3.003	Sw-03			79.541	0.682	0.000	1.29	
Sw-1.001	Sw-06			79.411	0.721	0.000	0.26	
Sw-4.000	Sw-DRP-03			79.891	-0.059	0.000	0.68	
Sw-4.001	Sw-DRP-04			79.617	-0.054	0.000	0.73	
Sw-5.000	Sw-DRP-01			79.950	0.000	0.000	0.65	
Sw-5.001	Sw-DRP-02			79.657	0.000	0.000	1.20	
Sw-5.002	Sw-04			79.930	0.528	0.000	1.06	
Sw-4.002	Sw-05			79.413	0.772	0.000	0.27	
Sw-1.002	Sw-ARR-TK			79.411	0.788	0.000	0.19	
Sw-1.003	Sw-07			78.300	-0.304	0.000	0.06	
Sw-6.000	Sw-12			79.149	0.749	2.493	0.06	
Sw-6.001	Sw-08			79.225	0.933	0.000	0.06	

PN	US/MH Name	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
Sw-1.000	Sw-Q-MAX350 LD-02		59.2	SURCHARGED*	
Sw-2.000	Sw-Q-MAX350 LD-01		65.0	SURCHARGED*	
Sw-3.000	Sw-Q-MAX350 TP-CP		29.0	SURCHARGED	
Sw-3.001	Sw-01		34.6	SURCHARGED	
Sw-3.002	Sw-02		62.8	SURCHARGED	
Sw-3.003	Sw-03		63.5	SURCHARGED	
Sw-1.001	Sw-06		22.1	SURCHARGED	
Sw-4.000	Sw-DRP-03		11.5	OK	
Sw-4.001	Sw-DRP-04		24.5	OK	
Sw-5.000	Sw-DRP-01		11.4	SURCHARGED*	
Sw-5.001	Sw-DRP-02		20.7	SURCHARGED*	
Sw-5.002	Sw-04		31.5	SURCHARGED	
Sw-4.002	Sw-05		10.5	SURCHARGED	
Sw-1.002	Sw-ARR-TK		9.6	SURCHARGED	
Sw-1.003	Sw-07		11.4	OK	
Sw-6.000	Sw-12		1.0	FLOOD	6
Sw-6.001	Sw-08		1.0	SURCHARGED	

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