STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1
M5-60 (mm)	18.000
Ratio R	0.354
Maximum Rainfall (mm/hr)	0
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

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.803	4-8	0.438	8-12	0.001

Total Area Contributing (ha) = 1.242

Total Pipe Volume (m³) = 45.738

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
S1.000	37.227	0.372	100.1	0.047	5.00	0.0	0.600	o	150	Pipe/Conduit
S1.001	26.309	0.363	72.5	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit
S1.002	17.218	0.700	24.6	0.000	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)
S1.000	0.00	5.62	262.885	0.047	0.0	0.0	0.0	1.00	17.8	0.0
S1.001	0.00	5.99	262.513	0.047	0.0	0.0	0.0	1.18	20.9	0.0
S1.002	0.00	6.13	262.150	0.047	0.0	0.0	0.0	2.04	36.0	0.0

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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
S1.003	13.832	1.500	9.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit
S1.004	13.214	1.300	10.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit
S1.005	24.559	0.850	28.9	0.031	0.00	0.0	0.600	o	225	Pipe/Conduit
S1.006	10.694	0.300	35.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
S1.007	10.703	0.500	21.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
S1.008	53.844	6.143	8.8	0.168	0.00	0.0	0.600	o	225	Pipe/Conduit
S2.000	28.022	0.168	166.8	0.129	5.00	0.0	0.600	o	300	Pipe/Conduit
S1.009	11.740	0.070	167.7	0.085	0.00	0.0	0.600	o	300	Pipe/Conduit
S1.010	44.795	2.611	17.2	0.085	0.00	0.0	0.600	o	375	Pipe/Conduit
S3.000	13.797	0.083	166.2	0.087	5.00	0.0	0.600	o	225	Pipe/Conduit
S3.001	40.549	0.243	166.9	0.106	0.00	0.0	0.600	o	375	Pipe/Conduit
S3.002	15.041	0.090	167.1	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
S3.003	22.197	0.133	166.9	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
S1.011	15.481	0.155	99.9	0.150	0.00	0.0	0.600	o	450	Pipe/Conduit
S1.012	11.588	0.116	99.9	0.055	0.00	0.0	0.600	o	450	Pipe/Conduit
S1.013	35.269	0.806	43.8	0.081	0.00	0.0	0.600	o	450	Pipe/Conduit
S1.014	47.852	0.345	138.6	0.066	0.00	0.0	0.600	o	525	Pipe/Conduit
S1.015	10.928	0.079	138.6	0.152	0.00	0.0	0.600	o	525	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)
S1.003	0.00	6.20	261.450	0.047	0.0	0.0	0.0	3.34	59.0	0.0
S1.004	0.00	6.27	259.950	0.047	0.0	0.0	0.0	3.18	56.2	0.0
S1.005	0.00	6.44	258.575	0.078	0.0	0.0	0.0	2.44	97.1	0.0
S1.006	0.00	6.52	257.725	0.078	0.0	0.0	0.0	2.20	87.4	0.0
S1.007	0.00	6.58	257.425	0.078	0.0	0.0	0.0	2.84	112.9	0.0
S1.008	0.00	6.78	256.925	0.246	0.0	0.0	0.0	4.45	176.8	0.0
S2.000	0.00	5.38	250.875	0.129	0.0	0.0	0.0	1.21	85.9	0.0
S1.009	0.00	6.94	250.707	0.460	0.0	0.0	0.0	1.21	85.6	0.0
S1.010	0.00	7.11	250.562	0.545	0.0	0.0	0.0	4.39	485.2	0.0
S3.000	0.00	5.23	248.650	0.087	0.0	0.0	0.0	1.01	40.2	0.0
S3.001	0.00	5.71	248.417	0.193	0.0	0.0	0.0	1.40	154.6	0.0
S3.002	0.00	5.89	248.174	0.193	0.0	0.0	0.0	1.40	154.5	0.0
S3.003	0.00	6.15	248.084	0.193	0.0	0.0	0.0	1.40	154.6	0.0
S1.011	0.00	7.24	247.876	0.888	0.0	0.0	0.0	2.03	323.6	0.0
S1.012	0.00	7.33	247.721	0.943	0.0	0.0	0.0	2.03	323.5	0.0
S1.013	0.00	7.52	247.605	1.024	0.0	0.0	0.0	3.08	489.9	0.0
S1.014	0.00	7.94	246.724	1.090	0.0	0.0	0.0	1.90	411.5	0.0
S1.015	0.00	8.04	246.379	1.242	0.0	0.0	0.0	1.90	411.5	0.0

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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
S1.016	18.581	1.410	13.2	0.000	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)
S1.016	0.00	8.15	246.300	1.242	0.0	0.0	0.0	2.79	49.3	0.0

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.047	0.047	0.047
1.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.031	0.031	0.031
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.168	0.168	0.168
2.000	-	-	100	0.129	0.129	0.129
1.009	-	-	100	0.085	0.085	0.085
1.010	-	-	100	0.085	0.085	0.085
3.000	-	-	100	0.087	0.087	0.087
3.001	-	-	100	0.106	0.106	0.106
3.002	-	-	100	0.000	0.000	0.000
3.003	-	-	100	0.000	0.000	0.000
1.011	-	-	100	0.150	0.150	0.150
1.012	-	-	100	0.055	0.055	0.055
1.013	-	-	100	0.081	0.081	0.081
1.014	-	-	100	0.066	0.066	0.066
1.015	-	-	100	0.152	0.152	0.152
1.016	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				1.242	1.242	1.242

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)
S1.016	SEx MH	247.700	244.890	244.890	1200	0

Simulation Criteria for Storm

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	0.000
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Region	England and Wales
Return Period (years)	30	M5-60 (mm)	18.000

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Synthetic Rainfall Details

Ratio R	0.354	Cv (Winter)	0.840
Profile Type	Summer	Storm Duration (mins)	15
Cv (Summer)	0.750		

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S16, DS/PN: S1.016, Volume (m³): 5.0

Unit Reference	MD-SHE-0059-2000-1700-2000
Design Head (m)	1.700
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	59
Invert Level (m)	246.300
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.700	2.0
Flush-Flo™	0.257	1.5
Kick-Flo®	0.527	1.2
Mean Flow over Head Range	-	1.5

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)
0.100	1.3	1.200	1.7	3.000	2.6	7.000	3.8
0.200	1.4	1.400	1.8	3.500	2.8	7.500	4.0
0.300	1.4	1.600	1.9	4.000	3.0	8.000	4.1
0.400	1.4	1.800	2.1	4.500	3.1	8.500	4.2
0.500	1.3	2.000	2.2	5.000	3.3	9.000	4.3
0.600	1.3	2.200	2.2	5.500	3.4	9.500	4.4
0.800	1.4	2.400	2.3	6.000	3.6		
1.000	1.6	2.600	2.4	6.500	3.7		

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Storage Structures for Storm

Tank or Pond Manhole: S16, DS/PN: S1.016

Invert Level (m) 246.800

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	624.0	1.200	1178.0

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Summary of Results for 15 minute 30 year Summer (Storm)

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	262.984	-0.051	0.000	0.75			12.9	OK
S1.001	S2	262.601	-0.062	0.000	0.64			12.8	OK
S1.002	S3	262.214	-0.086	0.000	0.38			12.7	OK
S1.003	S4	261.499	-0.101	0.000	0.24			12.8	OK
S1.004	S5	260.001	-0.099	0.000	0.25			12.8	OK
S1.005	S1	258.650	-0.150	0.000	0.23			20.5	OK
S1.006	S2	257.807	-0.143	0.000	0.28			20.5	OK
S1.007	S3	257.496	-0.154	0.000	0.22			20.5	OK
S1.008	S3	257.028	-0.122	0.000	0.42			70.6	OK
S2.000	S4	251.253	0.078	0.000	0.47			36.2	SURCHARGED
S1.009	S5	251.210	0.203	0.000	1.96			129.7	SURCHARGED
S1.010	S6	250.717	-0.220	0.000	0.35			154.7	OK
S3.000	S7	248.789	-0.086	0.000	0.69			24.3	OK
S3.001	S8	248.584	-0.208	0.000	0.40			56.1	OK
S3.002	S9	248.459	-0.090	0.000	0.50			58.8	OK
S3.003	S10	248.431	-0.028	0.000	0.48			62.7	OK
S1.011	S11	248.399	0.073	0.000	1.05			232.3	SURCHARGED
S1.012	S12	248.227	0.056	0.000	1.28			245.1	SURCHARGED
S1.013	S13	247.863	-0.192	0.000	0.62			264.8	OK
S1.014	S14	247.245	-0.004	0.000	0.75			272.4	OK
S1.015	S15	247.057	0.153	0.000	1.19			295.0	SURCHARGED
S1.016	S16	247.005	0.555	0.000	0.03			1.4	SURCHARGED

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Summary of Results for 30 minute 30 year Summer (Storm)

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	262.978	-0.057	0.000	0.70			11.9	OK
S1.001	S2	262.597	-0.066	0.000	0.60			11.9	OK
S1.002	S3	262.212	-0.088	0.000	0.35			11.9	OK
S1.003	S4	261.497	-0.103	0.000	0.22			11.9	OK
S1.004	S5	259.999	-0.101	0.000	0.23			11.8	OK
S1.005	S1	258.646	-0.154	0.000	0.21			18.9	OK
S1.006	S2	257.804	-0.146	0.000	0.26			18.8	OK
S1.007	S3	257.494	-0.156	0.000	0.20			19.0	OK
S1.008	S3	257.021	-0.129	0.000	0.37			62.7	OK
S2.000	S4	251.190	0.015	0.000	0.43			33.0	SURCHARGED
S1.009	S5	251.151	0.144	0.000	1.79			118.3	SURCHARGED
S1.010	S6	250.707	-0.230	0.000	0.32			140.9	OK
S3.000	S7	248.781	-0.094	0.000	0.64			22.4	OK
S3.001	S8	248.574	-0.218	0.000	0.36			50.7	OK
S3.002	S9	248.400	-0.149	0.000	0.42			48.9	OK
S3.003	S10	248.376	-0.083	0.000	0.41			54.6	OK
S1.011	S11	248.350	0.024	0.000	0.97			215.3	SURCHARGED
S1.012	S12	248.200	0.029	0.000	1.19			228.3	SURCHARGED
S1.013	S13	247.852	-0.203	0.000	0.57			246.5	OK
S1.014	S14	247.241	-0.008	0.000	0.69			251.6	OK
S1.015	S15	247.083	0.179	0.000	1.11			275.0	SURCHARGED
S1.016	S16	247.071	0.621	0.000	0.03			1.4	SURCHARGED

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Summary of Results for 60 minute 30 year Summer (Storm)

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	262.963	-0.072	0.000	0.51			8.7	OK
S1.001	S2	262.584	-0.079	0.000	0.44			8.8	OK
S1.002	S3	262.202	-0.098	0.000	0.26			8.8	OK
S1.003	S4	261.490	-0.110	0.000	0.16			8.9	OK
S1.004	S5	259.991	-0.109	0.000	0.17			8.9	OK
S1.005	S1	258.636	-0.164	0.000	0.16			14.4	OK
S1.006	S2	257.793	-0.157	0.000	0.20			14.4	OK
S1.007	S3	257.483	-0.167	0.000	0.15			14.4	OK
S1.008	S3	257.007	-0.143	0.000	0.28			46.9	OK
S2.000	S4	251.081	-0.094	0.000	0.31			24.1	OK
S1.009	S5	251.052	0.045	0.000	1.29			85.3	SURCHARGED
S1.010	S6	250.686	-0.251	0.000	0.23			101.2	OK
S3.000	S7	248.760	-0.115	0.000	0.47			16.5	OK
S3.001	S8	248.550	-0.242	0.000	0.26			36.5	OK
S3.002	S9	248.321	-0.228	0.000	0.31			36.6	OK
S3.003	S10	248.232	-0.227	0.000	0.28			37.3	OK
S1.011	S11	248.178	-0.148	0.000	0.75			167.4	OK
S1.012	S12	248.069	-0.102	0.000	0.93			179.0	OK
S1.013	S13	247.819	-0.236	0.000	0.45			194.3	OK
S1.014	S14	247.147	-0.102	0.000	0.56			203.4	OK
S1.015	S15	247.141	0.237	0.000	0.91			225.4	SURCHARGED
S1.016	S16	247.140	0.690	0.000	0.03			1.5	SURCHARGED

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Summary of Results for 180 minute 30 year Summer (Storm)

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	262.938	-0.097	0.000	0.27			4.7	OK
S1.001	S2	262.562	-0.101	0.000	0.23			4.6	OK
S1.002	S3	262.187	-0.113	0.000	0.14			4.6	OK
S1.003	S4	261.480	-0.120	0.000	0.09			4.6	OK
S1.004	S5	259.981	-0.119	0.000	0.09			4.6	OK
S1.005	S1	258.620	-0.180	0.000	0.09			7.7	OK
S1.006	S2	257.774	-0.176	0.000	0.10			7.6	OK
S1.007	S3	257.468	-0.182	0.000	0.08			7.6	OK
S1.008	S3	256.982	-0.168	0.000	0.14			24.5	OK
S2.000	S4	250.957	-0.218	0.000	0.17			12.9	OK
S1.009	S5	250.892	-0.115	0.000	0.69			45.7	OK
S1.010	S6	250.649	-0.288	0.000	0.12			54.1	OK
S3.000	S7	248.726	-0.149	0.000	0.25			8.8	OK
S3.001	S8	248.509	-0.283	0.000	0.14			19.3	OK
S3.002	S9	248.276	-0.273	0.000	0.16			19.2	OK
S3.003	S10	248.180	-0.279	0.000	0.14			19.1	OK
S1.011	S11	248.074	-0.252	0.000	0.40			88.0	OK
S1.012	S12	247.945	-0.226	0.000	0.48			93.1	OK
S1.013	S13	247.754	-0.301	0.000	0.24			100.9	OK
S1.014	S14	247.256	0.007	0.000	0.29			105.6	SURCHARGED
S1.015	S15	247.253	0.350	0.000	0.48			118.2	SURCHARGED
S1.016	S16	247.253	0.803	0.000	0.03			1.5	SURCHARGED

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Summary of Results for 360 minute 30 year Summer (Storm)

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	262.926	-0.109	0.000	0.17			2.8	OK
S1.001	S2	262.550	-0.113	0.000	0.14			2.8	OK
S1.002	S3	262.179	-0.121	0.000	0.08			2.8	OK
S1.003	S4	261.472	-0.128	0.000	0.05			2.8	OK
S1.004	S5	259.973	-0.127	0.000	0.06			2.8	OK
S1.005	S1	258.608	-0.192	0.000	0.05			4.7	OK
S1.006	S2	257.762	-0.188	0.000	0.06			4.7	OK
S1.007	S3	257.457	-0.193	0.000	0.05			4.7	OK
S1.008	S3	256.970	-0.180	0.000	0.09			14.9	OK
S2.000	S4	250.938	-0.237	0.000	0.10			7.8	OK
S1.009	S5	250.842	-0.165	0.000	0.42			27.8	OK
S1.010	S6	250.629	-0.308	0.000	0.07			33.0	OK
S3.000	S7	248.708	-0.167	0.000	0.15			5.3	OK
S3.001	S8	248.489	-0.303	0.000	0.08			11.7	OK
S3.002	S9	248.253	-0.296	0.000	0.10			11.7	OK
S3.003	S10	248.159	-0.300	0.000	0.09			11.7	OK
S1.011	S11	248.025	-0.301	0.000	0.24			53.7	OK
S1.012	S12	247.888	-0.283	0.000	0.30			57.1	OK
S1.013	S13	247.718	-0.337	0.000	0.14			62.0	OK
S1.014	S14	247.321	0.072	0.000	0.18			65.3	SURCHARGED
S1.015	S15	247.319	0.415	0.000	0.30			73.6	SURCHARGED
S1.016	S16	247.319	0.869	0.000	0.03			1.6	SURCHARGED

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Summary of Results for 600 minute 30 year Summer (Storm)

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	262.918	-0.117	0.000	0.11			1.9	OK
S1.001	S2	262.544	-0.119	0.000	0.10			1.9	OK
S1.002	S3	262.173	-0.127	0.000	0.06			1.9	OK
S1.003	S4	261.468	-0.132	0.000	0.04			1.9	OK
S1.004	S5	259.969	-0.131	0.000	0.04			1.9	OK
S1.005	S1	258.602	-0.198	0.000	0.04			3.2	OK
S1.006	S2	257.755	-0.195	0.000	0.04			3.2	OK
S1.007	S3	257.452	-0.198	0.000	0.03			3.2	OK
S1.008	S3	256.960	-0.190	0.000	0.06			10.2	OK
S2.000	S4	250.926	-0.249	0.000	0.07			5.3	OK
S1.009	S5	250.816	-0.191	0.000	0.29			19.0	OK
S1.010	S6	250.616	-0.321	0.000	0.05			22.5	OK
S3.000	S7	248.698	-0.177	0.000	0.10			3.6	OK
S3.001	S8	248.474	-0.318	0.000	0.06			8.0	OK
S3.002	S9	248.238	-0.311	0.000	0.07			8.0	OK
S3.003	S10	248.143	-0.316	0.000	0.06			8.0	OK
S1.011	S11	247.998	-0.328	0.000	0.17			36.7	OK
S1.012	S12	247.858	-0.313	0.000	0.20			39.0	OK
S1.013	S13	247.699	-0.356	0.000	0.10			42.3	OK
S1.014	S14	247.366	0.117	0.000	0.12			44.6	SURCHARGED
S1.015	S15	247.365	0.461	0.000	0.20			50.4	SURCHARGED
S1.016	S16	247.364	0.914	0.000	0.04			1.6	SURCHARGED

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Summary of Results for 1440 minute 30 year Summer (Storm)

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	262.908	-0.127	0.000	0.06			1.0	OK
S1.001	S2	262.535	-0.128	0.000	0.05			1.0	OK
S1.002	S3	262.167	-0.133	0.000	0.03			1.0	OK
S1.003	S4	261.463	-0.137	0.000	0.02			1.0	OK
S1.004	S5	259.964	-0.136	0.000	0.02			1.0	OK
S1.005	S1	258.595	-0.205	0.000	0.02			1.7	OK
S1.006	S2	257.748	-0.202	0.000	0.02			1.7	OK
S1.007	S3	257.444	-0.206	0.000	0.02			1.7	OK
S1.008	S3	256.951	-0.199	0.000	0.03			5.3	OK
S2.000	S4	250.911	-0.264	0.000	0.04			2.8	OK
S1.009	S5	250.784	-0.223	0.000	0.15			9.8	OK
S1.010	S6	250.602	-0.335	0.000	0.03			11.6	OK
S3.000	S7	248.683	-0.192	0.000	0.05			1.9	OK
S3.001	S8	248.459	-0.333	0.000	0.03			4.1	OK
S3.002	S9	248.219	-0.330	0.000	0.04			4.1	OK
S3.003	S10	248.127	-0.332	0.000	0.03			4.1	OK
S1.011	S11	247.964	-0.362	0.000	0.09			19.0	OK
S1.012	S12	247.818	-0.353	0.000	0.10			20.1	OK
S1.013	S13	247.670	-0.385	0.000	0.05			21.9	OK
S1.014	S14	247.411	0.162	0.000	0.06			23.0	SURCHARGED
S1.015	S15	247.411	0.507	0.000	0.10			26.1	SURCHARGED
S1.016	S16	247.410	0.960	0.000	0.04			1.6	SURCHARGED

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1
M5-60 (mm)	18.000
Ratio R	0.354
Maximum Rainfall (mm/hr)	0
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

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.803	4-8	0.438	8-12	0.001

Total Area Contributing (ha) = 1.242

Total Pipe Volume (m³) = 45.738

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
S1.000	37.227	0.372	100.1	0.047	5.00	0.0	0.600	o	150	Pipe/Conduit
S1.001	26.309	0.363	72.5	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit
S1.002	17.218	0.700	24.6	0.000	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)
S1.000	0.00	5.62	262.885	0.047	0.0	0.0	0.0	1.00	17.8	0.0
S1.001	0.00	5.99	262.513	0.047	0.0	0.0	0.0	1.18	20.9	0.0
S1.002	0.00	6.13	262.150	0.047	0.0	0.0	0.0	2.04	36.0	0.0

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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
S1.003	13.832	1.500	9.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit
S1.004	13.214	1.300	10.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit
S1.005	24.559	0.850	28.9	0.031	0.00	0.0	0.600	o	225	Pipe/Conduit
S1.006	10.694	0.300	35.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
S1.007	10.703	0.500	21.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
S1.008	53.844	6.143	8.8	0.168	0.00	0.0	0.600	o	225	Pipe/Conduit
S2.000	28.022	0.168	166.8	0.129	5.00	0.0	0.600	o	300	Pipe/Conduit
S1.009	11.740	0.070	167.7	0.085	0.00	0.0	0.600	o	300	Pipe/Conduit
S1.010	44.795	2.611	17.2	0.085	0.00	0.0	0.600	o	375	Pipe/Conduit
S3.000	13.797	0.083	166.2	0.087	5.00	0.0	0.600	o	225	Pipe/Conduit
S3.001	40.549	0.243	166.9	0.106	0.00	0.0	0.600	o	375	Pipe/Conduit
S3.002	15.041	0.090	167.1	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
S3.003	22.197	0.133	166.9	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
S1.011	15.481	0.155	99.9	0.150	0.00	0.0	0.600	o	450	Pipe/Conduit
S1.012	11.588	0.116	99.9	0.055	0.00	0.0	0.600	o	450	Pipe/Conduit
S1.013	35.269	0.806	43.8	0.081	0.00	0.0	0.600	o	450	Pipe/Conduit
S1.014	47.852	0.345	138.6	0.066	0.00	0.0	0.600	o	525	Pipe/Conduit
S1.015	10.928	0.079	138.6	0.152	0.00	0.0	0.600	o	525	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)
S1.003	0.00	6.20	261.450	0.047	0.0	0.0	0.0	3.34	59.0	0.0
S1.004	0.00	6.27	259.950	0.047	0.0	0.0	0.0	3.18	56.2	0.0
S1.005	0.00	6.44	258.575	0.078	0.0	0.0	0.0	2.44	97.1	0.0
S1.006	0.00	6.52	257.725	0.078	0.0	0.0	0.0	2.20	87.4	0.0
S1.007	0.00	6.58	257.425	0.078	0.0	0.0	0.0	2.84	112.9	0.0
S1.008	0.00	6.78	256.925	0.246	0.0	0.0	0.0	4.45	176.8	0.0
S2.000	0.00	5.38	250.875	0.129	0.0	0.0	0.0	1.21	85.9	0.0
S1.009	0.00	6.94	250.707	0.460	0.0	0.0	0.0	1.21	85.6	0.0
S1.010	0.00	7.11	250.562	0.545	0.0	0.0	0.0	4.39	485.2	0.0
S3.000	0.00	5.23	248.650	0.087	0.0	0.0	0.0	1.01	40.2	0.0
S3.001	0.00	5.71	248.417	0.193	0.0	0.0	0.0	1.40	154.6	0.0
S3.002	0.00	5.89	248.174	0.193	0.0	0.0	0.0	1.40	154.5	0.0
S3.003	0.00	6.15	248.084	0.193	0.0	0.0	0.0	1.40	154.6	0.0
S1.011	0.00	7.24	247.876	0.888	0.0	0.0	0.0	2.03	323.6	0.0
S1.012	0.00	7.33	247.721	0.943	0.0	0.0	0.0	2.03	323.5	0.0
S1.013	0.00	7.52	247.605	1.024	0.0	0.0	0.0	3.08	489.9	0.0
S1.014	0.00	7.94	246.724	1.090	0.0	0.0	0.0	1.90	411.5	0.0
S1.015	0.00	8.04	246.379	1.242	0.0	0.0	0.0	1.90	411.5	0.0

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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
S1.016	18.581	1.410	13.2	0.000	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)
S1.016	0.00	8.15	246.300	1.242	0.0	0.0	0.0	2.79	49.3	0.0

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.047	0.047	0.047
1.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.031	0.031	0.031
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.168	0.168	0.168
2.000	-	-	100	0.129	0.129	0.129
1.009	-	-	100	0.085	0.085	0.085
1.010	-	-	100	0.085	0.085	0.085
3.000	-	-	100	0.087	0.087	0.087
3.001	-	-	100	0.106	0.106	0.106
3.002	-	-	100	0.000	0.000	0.000
3.003	-	-	100	0.000	0.000	0.000
1.011	-	-	100	0.150	0.150	0.150
1.012	-	-	100	0.055	0.055	0.055
1.013	-	-	100	0.081	0.081	0.081
1.014	-	-	100	0.066	0.066	0.066
1.015	-	-	100	0.152	0.152	0.152
1.016	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				1.242	1.242	1.242

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)
S1.016	SEx MH	247.700	244.890	244.890	1200	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	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	0.000
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Region	England and Wales
Return Period (years)	30	M5-60 (mm)	18.000

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Synthetic Rainfall Details

Ratio R	0.354	Cv (Winter)	0.840
Profile Type	Winter Storm	Duration (mins)	15
Cv (Summer)	0.750		

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S16, DS/PN: S1.016, Volume (m³): 5.0

Unit Reference	MD-SHE-0059-2000-1700-2000
Design Head (m)	1.700
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	59
Invert Level (m)	246.300
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.700	2.0
Flush-Flo™	0.257	1.5
Kick-Flo®	0.527	1.2
Mean Flow over Head Range	-	1.5

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)
0.100	1.3	1.200	1.7	3.000	2.6	7.000	3.8
0.200	1.4	1.400	1.8	3.500	2.8	7.500	4.0
0.300	1.4	1.600	1.9	4.000	3.0	8.000	4.1
0.400	1.4	1.800	2.1	4.500	3.1	8.500	4.2
0.500	1.3	2.000	2.2	5.000	3.3	9.000	4.3
0.600	1.3	2.200	2.2	5.500	3.4	9.500	4.4
0.800	1.4	2.400	2.3	6.000	3.6		
1.000	1.6	2.600	2.4	6.500	3.7		

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Storage Structures for Storm

Tank or Pond Manhole: S16, DS/PN: S1.016

Invert Level (m) 246.800

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	624.0	1.200	1178.0

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Summary of Results for 15 minute 30 year Winter (Storm)

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	262.988	-0.047	0.000	0.79			13.5	OK
S1.001	S2	262.604	-0.059	0.000	0.67			13.4	OK
S1.002	S3	262.216	-0.084	0.000	0.40			13.3	OK
S1.003	S4	261.501	-0.099	0.000	0.25			13.3	OK
S1.004	S5	260.002	-0.098	0.000	0.26			13.4	OK
S1.005	S1	258.651	-0.149	0.000	0.24			21.3	OK
S1.006	S2	257.808	-0.142	0.000	0.29			21.3	OK
S1.007	S3	257.497	-0.153	0.000	0.22			21.2	OK
S1.008	S3	257.028	-0.122	0.000	0.42			71.7	OK
S2.000	S4	251.267	0.092	0.000	0.49			37.6	SURCHARGED
S1.009	S5	251.222	0.215	0.000	2.00			132.7	SURCHARGED
S1.010	S6	250.719	-0.218	0.000	0.35			157.9	OK
S3.000	S7	248.794	-0.081	0.000	0.73			25.5	OK
S3.001	S8	248.586	-0.206	0.000	0.41			57.2	OK
S3.002	S9	248.481	-0.068	0.000	0.50			58.9	OK
S3.003	S10	248.452	-0.007	0.000	0.50			65.4	OK
S1.011	S11	248.420	0.094	0.000	1.07			238.3	SURCHARGED
S1.012	S12	248.238	0.067	0.000	1.31			251.8	SURCHARGED
S1.013	S13	247.868	-0.187	0.000	0.63			272.1	OK
S1.014	S14	247.279	0.030	0.000	0.77			281.6	SURCHARGED
S1.015	S15	247.087	0.183	0.000	1.24			307.8	SURCHARGED
S1.016	S16	247.030	0.580	0.000	0.03			1.4	SURCHARGED

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Summary of Results for 30 minute 30 year Winter (Storm)

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	262.972	-0.063	0.000	0.63			10.9	OK
S1.001	S2	262.592	-0.071	0.000	0.54			10.8	OK
S1.002	S3	262.208	-0.092	0.000	0.32			10.8	OK
S1.003	S4	261.495	-0.105	0.000	0.20			10.8	OK
S1.004	S5	259.997	-0.103	0.000	0.21			10.8	OK
S1.005	S1	258.643	-0.157	0.000	0.20			17.5	OK
S1.006	S2	257.800	-0.150	0.000	0.24			17.5	OK
S1.007	S3	257.490	-0.160	0.000	0.19			17.6	OK
S1.008	S3	257.015	-0.135	0.000	0.33			56.5	OK
S2.000	S4	251.138	-0.037	0.000	0.39			29.9	OK
S1.009	S5	251.103	0.096	0.000	1.60			106.2	SURCHARGED
S1.010	S6	250.698	-0.239	0.000	0.28			126.0	OK
S3.000	S7	248.773	-0.102	0.000	0.58			20.3	OK
S3.001	S8	248.564	-0.228	0.000	0.32			45.2	OK
S3.002	S9	248.356	-0.193	0.000	0.37			44.0	OK
S3.003	S10	248.324	-0.135	0.000	0.34			45.1	OK
S1.011	S11	248.299	-0.027	0.000	0.90			198.9	OK
S1.012	S12	248.173	0.002	0.000	1.10			210.5	SURCHARGED
S1.013	S13	247.839	-0.216	0.000	0.53			227.4	OK
S1.014	S14	247.224	-0.025	0.000	0.64			234.0	OK
S1.015	S15	247.104	0.200	0.000	1.04			257.6	SURCHARGED
S1.016	S16	247.103	0.653	0.000	0.03			1.4	SURCHARGED

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Summary of Results for 60 minute 30 year Winter (Storm)

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	262.954	-0.081	0.000	0.43			7.3	OK
S1.001	S2	262.576	-0.087	0.000	0.37			7.3	OK
S1.002	S3	262.197	-0.103	0.000	0.22			7.3	OK
S1.003	S4	261.487	-0.113	0.000	0.14			7.3	OK
S1.004	S5	259.987	-0.113	0.000	0.14			7.3	OK
S1.005	S1	258.630	-0.170	0.000	0.14			12.1	OK
S1.006	S2	257.786	-0.164	0.000	0.16			12.1	OK
S1.007	S3	257.478	-0.172	0.000	0.13			12.1	OK
S1.008	S3	256.998	-0.152	0.000	0.23			38.4	OK
S2.000	S4	251.031	-0.144	0.000	0.26			20.0	OK
S1.009	S5	251.007	0.000	0.000	1.07			71.2	OK
S1.010	S6	250.674	-0.263	0.000	0.19			84.4	OK
S3.000	S7	248.747	-0.128	0.000	0.39			13.6	OK
S3.001	S8	248.535	-0.257	0.000	0.21			30.1	OK
S3.002	S9	248.303	-0.246	0.000	0.26			30.2	OK
S3.003	S10	248.206	-0.253	0.000	0.23			30.3	OK
S1.011	S11	248.136	-0.190	0.000	0.62			138.2	OK
S1.012	S12	248.015	-0.156	0.000	0.76			146.5	OK
S1.013	S13	247.793	-0.262	0.000	0.37			158.6	OK
S1.014	S14	247.187	-0.062	0.000	0.45			166.1	OK
S1.015	S15	247.180	0.276	0.000	0.75			185.5	SURCHARGED
S1.016	S16	247.179	0.729	0.000	0.03			1.5	SURCHARGED

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Summary of Results for 180 minute 30 year Winter (Storm)

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	262.931	-0.104	0.000	0.21			3.5	OK
S1.001	S2	262.555	-0.108	0.000	0.18			3.5	OK
S1.002	S3	262.182	-0.118	0.000	0.10			3.5	OK
S1.003	S4	261.475	-0.125	0.000	0.07			3.5	OK
S1.004	S5	259.976	-0.124	0.000	0.07			3.5	OK
S1.005	S1	258.612	-0.188	0.000	0.07			5.8	OK
S1.006	S2	257.767	-0.183	0.000	0.08			5.8	OK
S1.007	S3	257.461	-0.189	0.000	0.06			5.8	OK
S1.008	S3	256.974	-0.176	0.000	0.11			18.4	OK
S2.000	S4	250.945	-0.230	0.000	0.12			9.7	OK
S1.009	S5	250.861	-0.146	0.000	0.52			34.5	OK
S1.010	S6	250.638	-0.299	0.000	0.09			40.8	OK
S3.000	S7	248.715	-0.160	0.000	0.19			6.5	OK
S3.001	S8	248.497	-0.295	0.000	0.10			14.5	OK
S3.002	S9	248.261	-0.288	0.000	0.12			14.5	OK
S3.003	S10	248.167	-0.292	0.000	0.11			14.5	OK
S1.011	S11	248.044	-0.282	0.000	0.30			66.5	OK
S1.012	S12	247.910	-0.261	0.000	0.37			70.6	OK
S1.013	S13	247.733	-0.322	0.000	0.18			76.6	OK
S1.014	S14	247.308	0.059	0.000	0.22			80.6	SURCHARGED
S1.015	S15	247.305	0.402	0.000	0.37			90.8	SURCHARGED
S1.016	S16	247.305	0.855	0.000	0.03			1.6	SURCHARGED

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Summary of Results for 360 minute 30 year Winter (Storm)

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	262.920	-0.115	0.000	0.12			2.1	OK
S1.001	S2	262.545	-0.118	0.000	0.11			2.1	OK
S1.002	S3	262.174	-0.126	0.000	0.06			2.1	OK
S1.003	S4	261.469	-0.131	0.000	0.04			2.1	OK
S1.004	S5	259.969	-0.131	0.000	0.04			2.1	OK
S1.005	S1	258.604	-0.196	0.000	0.04			3.5	OK
S1.006	S2	257.756	-0.194	0.000	0.05			3.5	OK
S1.007	S3	257.453	-0.197	0.000	0.04			3.5	OK
S1.008	S3	256.962	-0.188	0.000	0.07			11.1	OK
S2.000	S4	250.929	-0.246	0.000	0.07			5.8	OK
S1.009	S5	250.822	-0.185	0.000	0.31			20.7	OK
S1.010	S6	250.618	-0.319	0.000	0.06			24.6	OK
S3.000	S7	248.700	-0.175	0.000	0.11			3.9	OK
S3.001	S8	248.477	-0.315	0.000	0.06			8.7	OK
S3.002	S9	248.241	-0.308	0.000	0.07			8.7	OK
S3.003	S10	248.147	-0.312	0.000	0.07			8.7	OK
S1.011	S11	248.004	-0.322	0.000	0.18			40.0	OK
S1.012	S12	247.864	-0.307	0.000	0.22			42.5	OK
S1.013	S13	247.703	-0.352	0.000	0.11			46.1	OK
S1.014	S14	247.381	0.132	0.000	0.13			48.6	SURCHARGED
S1.015	S15	247.379	0.476	0.000	0.22			54.9	SURCHARGED
S1.016	S16	247.379	0.929	0.000	0.04			1.6	SURCHARGED

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Summary of Results for 600 minute 30 year Winter (Storm)

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	262.914	-0.121	0.000	0.08			1.4	OK
S1.001	S2	262.539	-0.124	0.000	0.07			1.4	OK
S1.002	S3	262.170	-0.130	0.000	0.04			1.4	OK
S1.003	S4	261.466	-0.134	0.000	0.03			1.4	OK
S1.004	S5	259.967	-0.133	0.000	0.03			1.4	OK
S1.005	S1	258.599	-0.201	0.000	0.03			2.4	OK
S1.006	S2	257.751	-0.199	0.000	0.03			2.4	OK
S1.007	S3	257.449	-0.201	0.000	0.03			2.4	OK
S1.008	S3	256.955	-0.195	0.000	0.04			7.6	OK
S2.000	S4	250.918	-0.257	0.000	0.05			4.0	OK
S1.009	S5	250.801	-0.206	0.000	0.21			14.2	OK
S1.010	S6	250.609	-0.328	0.000	0.04			16.8	OK
S3.000	S7	248.691	-0.184	0.000	0.08			2.7	OK
S3.001	S8	248.466	-0.326	0.000	0.04			5.9	OK
S3.002	S9	248.228	-0.321	0.000	0.05			5.9	OK
S3.003	S10	248.135	-0.324	0.000	0.05			5.9	OK
S1.011	S11	247.980	-0.346	0.000	0.12			27.3	OK
S1.012	S12	247.837	-0.334	0.000	0.15			29.0	OK
S1.013	S13	247.685	-0.370	0.000	0.07			31.5	OK
S1.014	S14	247.431	0.182	0.000	0.09			33.2	SURCHARGED
S1.015	S15	247.430	0.526	0.000	0.15			37.5	SURCHARGED
S1.016	S16	247.430	0.980	0.000	0.04			1.7	SURCHARGED

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Summary of Results for 1440 minute 30 year Winter (Storm)

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	262.905	-0.130	0.000	0.04			0.7	OK
S1.001	S2	262.532	-0.131	0.000	0.04			0.7	OK
S1.002	S3	262.165	-0.135	0.000	0.02			0.7	OK
S1.003	S4	261.460	-0.140	0.000	0.01			0.7	OK
S1.004	S5	259.960	-0.140	0.000	0.01			0.7	OK
S1.005	S1	258.590	-0.210	0.000	0.01			1.2	OK
S1.006	S2	257.743	-0.207	0.000	0.02			1.2	OK
S1.007	S3	257.439	-0.211	0.000	0.01			1.2	OK
S1.008	S3	256.948	-0.202	0.000	0.02			3.9	OK
S2.000	S4	250.907	-0.268	0.000	0.03			2.1	OK
S1.009	S5	250.773	-0.234	0.000	0.11			7.3	OK
S1.010	S6	250.597	-0.340	0.000	0.02			8.7	OK
S3.000	S7	248.679	-0.196	0.000	0.04			1.4	OK
S3.001	S8	248.455	-0.337	0.000	0.02			3.1	OK
S3.002	S9	248.214	-0.335	0.000	0.03			3.1	OK
S3.003	S10	248.123	-0.336	0.000	0.02			3.1	OK
S1.011	S11	247.949	-0.377	0.000	0.06			14.1	OK
S1.012	S12	247.804	-0.367	0.000	0.08			15.0	OK
S1.013	S13	247.661	-0.394	0.000	0.04			16.3	OK
S1.014	S14	247.495	0.246	0.000	0.05			17.2	SURCHARGED
S1.015	S15	247.494	0.591	0.000	0.08			19.5	SURCHARGED
S1.016	S16	247.494	1.044	0.000	0.04			1.7	SURCHARGED

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