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	Greenbridge Lane Halewood Rev A BBE Development Ltd	
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Innovyze	Network 2020.1.3	

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)	2	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.400	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)	1.200
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 Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.147	4-8	0.297

Total Area Contributing (ha) = 0.444

Total Pipe Volume (m³) = 463.581

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	10.189	0.038	268.1	0.075	4.00	0.0	0.600		o	300	Pipe/Conduit	
1.001	22.017	0.082	268.5	0.060	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.002	27.544	0.102	270.0	0.045	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.003	16.361	0.061	268.2	0.019	0.00	0.0	0.600		o	300	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)
1.000	50.00	4.18	7.600	0.075	0.0	0.0	0.0	0.96	67.5	10.2
1.001	50.00	4.56	7.562	0.135	0.0	0.0	0.0	0.95	67.5	18.3
1.002	50.00	5.04	7.480	0.180	0.0	0.0	0.0	0.95	67.3	24.4
1.003	50.00	5.33	7.378	0.199	0.0	0.0	0.0	0.96	67.5	26.9

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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)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
2.000	25.657	0.095	270.1	0.066	4.00	0.0	0.600		o	300	Pipe/Conduit	
2.001	8.913	0.033	270.1	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.004	30.161	0.112	269.3	0.105	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.005	38.580	0.143	269.8	0.074	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.006	9.696	0.036	269.3	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.007	19.848	0.040	496.2	0.000	0.00	0.0		0.070	→_/		Pond/Tank	
1.008	12.954	0.047	275.6	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)
2.000	50.00	4.45	7.400	0.066	0.0	0.0	0.0	0.95	67.3	8.9
2.001	50.00	4.61	7.305	0.066	0.0	0.0	0.0	0.95	67.3	8.9
1.004	50.00	5.86	7.272	0.370	0.0	0.0	0.0	0.95	67.4	50.1
1.005	50.00	6.53	7.160	0.444	0.0	0.0	0.0	0.95	67.3	60.1
1.006	50.00	6.70	7.017	0.444	0.0	0.0	0.0	0.95	67.4	60.1
1.007	50.00	7.17	6.906	0.444	0.0	0.0	0.0	0.70	15381.1	60.1
1.008	50.00	7.53	6.866	0.444	0.0	0.0	0.0	0.60	10.6	60.1

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
1	9.230	1.630	Open Manhole	1350	1.000	7.600	300				
2	9.065	1.503	Open Manhole	1350	1.001	7.562	300	1.000	7.562	300	
3	9.275	1.795	Open Manhole	1350	1.002	7.480	300	1.001	7.480	300	
4	9.977	2.599	Open Manhole	1350	1.003	7.378	300	1.002	7.378	300	
5	8.600	1.200	Open Manhole	1350	2.000	7.400	300				
6	8.850	1.545	Open Manhole	1350	2.001	7.305	300	2.000	7.305	300	
7	9.925	2.653	Open Manhole	1350	1.004	7.272	300	1.003	7.317	300	
								2.001	7.272	300	
8	8.890	1.730	Open Manhole	1350	1.005	7.160	300	1.004	7.160	300	
9	9.285	2.268	Open Manhole	1350	1.006	7.017	300	1.005	7.017	300	
headwall	8.500	1.594	Open Manhole	1800	1.007	6.906		1.006	6.981	300	
10	8.500	1.634	Open Manhole	1800	1.008	6.866	150	1.007	6.866		
	8.500	1.681	Open Manhole	0		OUTFALL		1.008	6.819	150	

No coordinates have been specified, layout information cannot be produced.

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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		1	9.230	7.600	1.330	Open Manhole	1350
1.001	o	300	2	9.065	7.562	1.203	Open Manhole	1350
1.002	o	300	3	9.275	7.480	1.495	Open Manhole	1350
1.003	o	300	4	9.977	7.378	2.299	Open Manhole	1350
2.000	o	300	5	8.600	7.400	0.900	Open Manhole	1350
2.001	o	300	6	8.850	7.305	1.245	Open Manhole	1350
1.004	o	300	7	9.925	7.272	2.353	Open Manhole	1350
1.005	o	300	8	8.890	7.160	1.430	Open Manhole	1350
1.006	o	300	9	9.285	7.017	1.968	Open Manhole	1350
1.007	→_/		headwall	8.500	6.906	0.000	Open Manhole	1800
1.008	o	150	10	8.500	6.866	1.484	Open Manhole	1800

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	10.189	268.1	2	9.065	7.562	1.203	Open Manhole	1350
1.001	22.017	268.5	3	9.275	7.480	1.495	Open Manhole	1350
1.002	27.544	270.0	4	9.977	7.378	2.299	Open Manhole	1350
1.003	16.361	268.2	7	9.925	7.317	2.308	Open Manhole	1350
2.000	25.657	270.1	6	8.850	7.305	1.245	Open Manhole	1350
2.001	8.913	270.1	7	9.925	7.272	2.353	Open Manhole	1350
1.004	30.161	269.3	8	8.890	7.160	1.430	Open Manhole	1350
1.005	38.580	269.8	9	9.285	7.017	1.968	Open Manhole	1350
1.006	9.696	269.3	headwall	8.500	6.981	1.219	Open Manhole	1800
1.007	19.848	496.2	10	8.500	6.866	0.040	Open Manhole	1800
1.008	12.954	275.6		8.500	6.819	1.531	Open Manhole	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)
1.008		8.500	6.819	0.000	0	0

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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 Coefficient	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	8
Number of Online Controls	1	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)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.400		

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<u>Online Controls for Storm</u>																																																																										
<u>Hydro-Brake® Optimum Manhole: 10, DS/PN: 1.008, Volume (m³): 413.3</u>																																																																										
Unit Reference MD-SHE-0103-6000-1800-6000																																																																										
Design Head (m) 1.800																																																																										
Design Flow (l/s) 6.0																																																																										
Flush-Flo™ Calculated																																																																										
Objective Minimise upstream storage																																																																										
Application Surface																																																																										
Sump Available Yes																																																																										
Diameter (mm) 103																																																																										
Invert Level (m) 6.866																																																																										
Minimum Outlet Pipe Diameter (mm) 150																																																																										
Suggested Manhole Diameter (mm) 1200																																																																										
Control Points Head (m) Flow (l/s)																																																																										
Design Point (Calculated) 1.800 6.0																																																																										
Flush-Flo™ 0.453 5.5																																																																										
Kick-Flo® 0.920 4.4																																																																										
Mean Flow over Head Range - 5.0																																																																										
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																																																																										
<table><tr><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td></tr><tr><td>0.100</td><td>3.5</td><td>1.200</td><td>5.0</td><td>3.000</td><td>7.6</td><td>7.000</td><td>11.4</td></tr><tr><td>0.200</td><td>4.9</td><td>1.400</td><td>5.3</td><td>3.500</td><td>8.2</td><td>7.500</td><td>11.8</td></tr><tr><td>0.300</td><td>5.3</td><td>1.600</td><td>5.7</td><td>4.000</td><td>8.7</td><td>8.000</td><td>12.1</td></tr><tr><td>0.400</td><td>5.5</td><td>1.800</td><td>6.0</td><td>4.500</td><td>9.2</td><td>8.500</td><td>12.5</td></tr><tr><td>0.500</td><td>5.5</td><td>2.000</td><td>6.3</td><td>5.000</td><td>9.7</td><td>9.000</td><td>12.8</td></tr><tr><td>0.600</td><td>5.4</td><td>2.200</td><td>6.6</td><td>5.500</td><td>10.2</td><td>9.500</td><td>13.2</td></tr><tr><td>0.800</td><td>5.0</td><td>2.400</td><td>6.9</td><td>6.000</td><td>10.6</td><td></td><td></td></tr><tr><td>1.000</td><td>4.6</td><td>2.600</td><td>7.1</td><td>6.500</td><td>11.0</td><td></td><td></td></tr></table>			Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	3.5	1.200	5.0	3.000	7.6	7.000	11.4	0.200	4.9	1.400	5.3	3.500	8.2	7.500	11.8	0.300	5.3	1.600	5.7	4.000	8.7	8.000	12.1	0.400	5.5	1.800	6.0	4.500	9.2	8.500	12.5	0.500	5.5	2.000	6.3	5.000	9.7	9.000	12.8	0.600	5.4	2.200	6.6	5.500	10.2	9.500	13.2	0.800	5.0	2.400	6.9	6.000	10.6			1.000	4.6	2.600	7.1	6.500	11.0		
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)																																																																			
0.100	3.5	1.200	5.0	3.000	7.6	7.000	11.4																																																																			
0.200	4.9	1.400	5.3	3.500	8.2	7.500	11.8																																																																			
0.300	5.3	1.600	5.7	4.000	8.7	8.000	12.1																																																																			
0.400	5.5	1.800	6.0	4.500	9.2	8.500	12.5																																																																			
0.500	5.5	2.000	6.3	5.000	9.7	9.000	12.8																																																																			
0.600	5.4	2.200	6.6	5.500	10.2	9.500	13.2																																																																			
0.800	5.0	2.400	6.9	6.000	10.6																																																																					
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Storage Structures for Storm

Porous Car Park Manhole: 1, DS/PN: 1.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	26.2
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	72.8	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	8.750	Membrane Depth (mm)	120

Porous Car Park Manhole: 2, DS/PN: 1.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	14.6
Max Percolation (l/s)	40.6	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	8.500	Membrane Depth (mm)	120

Porous Car Park Manhole: 3, DS/PN: 1.002

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	9.3
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	25.8	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	8.750	Membrane Depth (mm)	120

Porous Car Park Manhole: 6, DS/PN: 2.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	20.5
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	56.9	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	8.300	Membrane Depth (mm)	120

Porous Car Park Manhole: 7, DS/PN: 1.004

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	6.4
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	17.8	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	9.400	Membrane Depth (mm)	120

Porous Car Park Manhole: 8, DS/PN: 1.005

Infiltration Coefficient Base (m/hr)	0.00000	Max Percolation (l/s)	55.8
Membrane Percolation (mm/hr)	1000	Safety Factor	2.0

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<u>Porous Car Park Manhole: 8, DS/PN: 1.005</u> <table><tr><td>Porosity</td><td>0.30</td><td>Slope (1:X)</td><td>500.0</td></tr><tr><td>Invert Level (m)</td><td>8.350</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Width (m)</td><td>10.0</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Length (m)</td><td>20.1</td><td>Membrane Depth (mm)</td><td>120</td></tr></table> <u>Porous Car Park Manhole: 9, DS/PN: 1.006</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Width (m)</td><td>9.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>10.0</td></tr><tr><td>Max Percolation (l/s)</td><td>25.0</td><td>Slope (1:X)</td><td>500.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>8.750</td><td>Membrane Depth (mm)</td><td>120</td></tr></table> <u>Tank or Pond Pipe: 1.007</u> Manning's N 0.070 Invert Level (m) 6.906 <table><tr><td>Depth (m)</td><td>Area (m²)</td><td>Depth (m)</td><td>Area (m²)</td></tr><tr><td>0.000</td><td>165.3</td><td>1.494</td><td>368.1</td></tr></table> <u>Volume Summary (Static)</u> Length Calculations based on True Length <table><tr><th>Pipe Number</th><th>USMH Name</th><th>Manhole Volume (m³)</th><th>Pipe Volume (m³)</th><th>Storage Structure Volume (m³)</th><th>Total Volume (m³)</th></tr><tr><td>1.000</td><td>1</td><td>2.333</td><td>0.625</td><td>28.296</td><td>31.254</td></tr><tr><td>1.001</td><td>2</td><td>2.151</td><td>1.461</td><td>19.491</td><td>23.103</td></tr><tr><td>1.002</td><td>3</td><td>2.569</td><td>1.852</td><td>11.300</td><td>15.720</td></tr><tr><td>1.003</td><td>4</td><td>3.720</td><td>1.061</td><td>0.000</td><td>4.781</td></tr><tr><td>2.000</td><td>5</td><td>1.718</td><td>1.718</td><td>0.000</td><td>3.436</td></tr><tr><td>2.001</td><td>6</td><td>2.211</td><td>0.535</td><td>26.445</td><td>29.191</td></tr><tr><td>1.004</td><td>7</td><td>3.797</td><td>2.037</td><td>7.776</td><td>13.610</td></tr><tr><td>1.005</td><td>8</td><td>2.476</td><td>2.632</td><td>25.326</td><td>30.434</td></tr><tr><td>1.006</td><td>9</td><td>3.246</td><td>0.574</td><td>11.205</td><td>15.025</td></tr><tr><td>1.007</td><td>headwall</td><td>4.056</td><td>409.175</td><td>0.000</td><td>413.231</td></tr><tr><td>1.008</td><td>10</td><td>4.158</td><td>0.213</td><td>0.000</td><td>4.371</td></tr><tr><td>Total</td><td></td><td>32.438</td><td>421.881</td><td>129.839</td><td>584.157</td></tr></table>						Porosity	0.30	Slope (1:X)	500.0	Invert Level (m)	8.350	Depression Storage (mm)	5	Width (m)	10.0	Evaporation (mm/day)	3	Length (m)	20.1	Membrane Depth (mm)	120	Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	9.0	Membrane Percolation (mm/hr)	1000	Length (m)	10.0	Max Percolation (l/s)	25.0	Slope (1:X)	500.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	8.750	Membrane Depth (mm)	120	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	165.3	1.494	368.1	Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage Structure Volume (m³)	Total Volume (m³)	1.000	1	2.333	0.625	28.296	31.254	1.001	2	2.151	1.461	19.491	23.103	1.002	3	2.569	1.852	11.300	15.720	1.003	4	3.720	1.061	0.000	4.781	2.000	5	1.718	1.718	0.000	3.436	2.001	6	2.211	0.535	26.445	29.191	1.004	7	3.797	2.037	7.776	13.610	1.005	8	2.476	2.632	25.326	30.434	1.006	9	3.246	0.574	11.205	15.025	1.007	headwall	4.056	409.175	0.000	413.231	1.008	10	4.158	0.213	0.000	4.371	Total		32.438	421.881	129.839	584.157
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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 Storage Structures	8
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

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Margin for Flood Risk Warning (mm) 300.0      DVD Status ON
      Analysis Timestep    Fine Inertia Status ON
      DTS Status          OFF
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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, 45

PN	US/MH		Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water
	Name									Level (m)
1.000	1	15	Winter	1	+0%	30/15	Summer			7.700
1.001	2	15	Winter	1	+0%	30/15	Summer			7.676
1.002	3	15	Winter	1	+0%	30/15	Summer			7.607
1.003	4	15	Winter	1	+0%	30/15	Summer			7.513
2.000	5	15	Winter	1	+0%	30/15	Summer			7.486
2.001	6	15	Winter	1	+0%	30/15	Summer			7.457
1.004	7	15	Winter	1	+0%	30/15	Summer			7.453
1.005	8	15	Winter	1	+0%	30/15	Summer			7.355
1.006	9	15	Winter	1	+0%	30/15	Summer			7.234
1.007	headwall	120	Winter	1	+0%					7.097
1.008	10	120	Winter	1	+0%	1/15	Winter			7.097

PN	US/MH Name	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Half Drain	Pipe	Status	Level Exceeded
		Depth (m)	Volume (m³)			Time (mins)	Flow (l/s)		
1.000	1	-0.200	0.000	0.21		6	11.1		OK
1.001	2	-0.186	0.000	0.30		7	17.8		OK

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

PN	US/MH Name	Surcharged Flooded		Flow / Overflow		Half Drain	Pipe	Status	Level Exceeded
		Depth (m)	Volume (m³)	Cap.	(l/s)	Time (mins)	Flow (l/s)		
1.002	3	-0.173	0.000	0.37		6	22.3	OK	
1.003	4	-0.165	0.000	0.41			23.7	OK	
2.000	5	-0.214	0.000	0.16			9.6	OK	
2.001	6	-0.148	0.000	0.15		5	7.5	OK	
1.004	7	-0.119	0.000	0.66		6	40.4	OK	
1.005	8	-0.105	0.000	0.74		6	46.1	OK	
1.006	9	-0.083	0.000	0.87		6	45.5	OK	
1.007	headwall	-1.403	0.000	0.00			19.9	OK	
1.008	10	0.081	0.000	0.53			5.1	SURCHARGED	

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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 Storage Structures	8
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

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Margin for Flood Risk Warning (mm) 300.0      DVD Status ON
      Analysis Timestep    Fine Inertia Status ON
      DTS Status          OFF
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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, 45

PN	US/MH		Storm	Return Period	Climate Change	First (X) SurchARGE	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water
	Name									Level (m)
1.000	1	15	Winter	30	+0%	30/15	Summer			8.229
1.001	2	15	Winter	30	+0%	30/15	Summer			8.218
1.002	3	15	Winter	30	+0%	30/15	Summer			8.139
1.003	4	15	Winter	30	+0%	30/15	Summer			8.059
2.000	5	15	Winter	30	+0%	30/15	Summer			8.013
2.001	6	15	Winter	30	+0%	30/15	Summer			7.994
1.004	7	15	Winter	30	+0%	30/15	Summer			7.985
1.005	8	15	Winter	30	+0%	30/15	Summer			7.778
1.006	9	180	Winter	30	+0%	30/15	Summer			7.423
1.007	headwall	180	Winter	30	+0%					7.420
1.008	10	180	Winter	30	+0%	1/15	Winter			7.419

PN	US/MH Name	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Half Drain	Pipe	Status	Level Exceeded
		Depth (m)	Volume (m ³)			Time (mins)	Flow (l/s)		
1.000	1	0.329	0.000	0.48		5	25.5	SURCHARGED	
1.001	2	0.356	0.000	0.71		6	42.2	SURCHARGED	

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

PN	US/MH Name	Surcharged Flooded		Flow / Overflow		Half Drain	Pipe	Status	Level Exceeded
		Depth (m)	Volume (m³)	Cap.	(l/s)	Time (mins)	Flow (l/s)		
1.002	3	0.359	0.000	0.76		7	46.1	SURCHARGED	
1.003	4	0.381	0.000	0.77			43.9	SURCHARGED	
2.000	5	0.313	0.000	0.30			17.9	SURCHARGED	
2.001	6	0.389	0.000	0.32		8	16.5	SURCHARGED	
1.004	7	0.413	0.000	1.33		8	81.5	SURCHARGED	
1.005	8	0.318	0.000	1.55		11	96.6	SURCHARGED	
1.006	9	0.106	0.000	0.65		141	34.0	SURCHARGED	
1.007	headwall	-1.080	0.000	0.00			33.3	OK	
1.008	10	0.403	0.000	0.57			5.5	SURCHARGED	

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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	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 Storage Structures	8
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

```
Margin for Flood Risk Warning (mm) 300.0      DVD Status ON
      Analysis Timestep    Fine Inertia Status ON
      DTS Status          OFF
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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, 45

										Water
	US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level
PN	Name	Storm	Period	Change		Surcharge	Flood	Overflow	Act.	(m)
1.000	1	15	Winter	100	+45%	30/15	Summer			8.758
1.001	2	15	Winter	100	+45%	30/15	Summer			8.744
1.002	3	15	Winter	100	+45%	30/15	Summer			8.699
1.003	4	15	Winter	100	+45%	30/15	Summer			8.598
2.000	5	15	Winter	100	+45%	30/15	Summer			8.591
2.001	6	15	Winter	100	+45%	30/15	Summer			8.522
1.004	7	15	Winter	100	+45%	30/15	Summer			8.521
1.005	8	15	Summer	100	+45%	30/15	Summer			8.244
1.006	9	240	Winter	100	+45%	30/15	Summer			7.915
1.007	headwall	240	Winter	100	+45%					7.912
1.008	10	240	Winter	100	+45%	1/15	Winter			7.912

PN	US/MH Name	Surcharged	Flooded	Flow / Cap.	Overflow (1/s)	Half Drain	Pipe	Status	Level Exceeded
		Depth (m)	Volume (m³)			Time (mins)	Flow (1/s)		
1.000	1	0.858	0.000	0.92		9	48.7	SURCHARGED	
1.001	2	0.882	0.000	0.74		7	44.2	SURCHARGED	

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

PN	US/MH Name	Surcharged Flooded		Flow / Overflow		Half Drain	Pipe	Status	Level Exceeded
		Depth (m)	Volume (m³)	Cap.	(l/s)	Time (mins)	Flow (l/s)		
1.002	3	0.919	0.000	0.94		13	57.3	SURCHARGED	
1.003	4	0.920	0.000	1.13			64.8	SURCHARGED	
2.000	5	0.891	0.000	0.66			39.6	FLOOD RISK	
2.001	6	0.917	0.000	0.90		7	46.1	SURCHARGED	
1.004	7	0.949	0.000	1.77		17	108.2	SURCHARGED	
1.005	8	0.784	0.000	2.12		24	132.1	SURCHARGED	
1.006	9	0.598	0.000	0.94		596	49.0	SURCHARGED	
1.007	headwall	-0.588	0.000	0.00			48.6	OK	
1.008	10	0.896	0.000	0.57			5.5	SURCHARGED	