DRAINAGE NETWORK DETAILS

Site at Waddow View, Clitheroe

For

David Wilson Homes

Rev. 2.0

9th October 2019

WADDOW VIEW, CLITHEROE

Drainage Network Details

9th October 2019

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Foul Water System Details – Network 2

Sewer Design

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 1

« - Indicates pipe capacity < flow

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
1.000	27.658	0.070	395.1	0.102	5.00	0.0	0.600	o	1050	Pipe/Conduit	
1.001	14.337	0.036	398.3	0.048	0.00	0.0	0.600	o	1050	Pipe/Conduit	
1.002	26.533	0.067	396.0	0.063	0.00	0.0	0.600	o	1050	Pipe/Conduit	
1.003	35.959	0.090	399.5	0.011	0.00	0.0	0.600	o	1050	Pipe/Conduit	
1.004	51.889	0.130	399.1	0.089	0.00	0.0	0.600	o	1050	Pipe/Conduit	
1.005	9.097	0.061	149.1	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)
1.000	50.00	5.27	71.204	0.102	0.0	0.0	0.0	1.73	1495.9	13.8
1.001	50.00	5.41	71.134	0.150	0.0	0.0	0.0	1.72	1489.9	20.3
1.002	50.00	5.66	71.098	0.213	0.0	0.0	0.0	1.73	1494.1	28.8
1.003	50.00	6.01	71.031	0.224	0.0	0.0	0.0	1.72	1487.5	30.3
1.004	50.00	6.51	70.941	0.313	0.0	0.0	0.0	1.72	1488.2	42.4
1.005	49.49	6.70	70.811	0.313	0.0	0.0	0.0	0.82	14.5«	42.4

Manhole Schedules for Surface Network 1

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)
S1.1	73.941	2.737	Open Manhole	2400	1.000	71.204	1050				
S1.2	74.555	3.421	Open Manhole	2400	1.001	71.134	1050	1.000	71.134	1050	
S1.3	74.886	3.788	Open Manhole	2400	1.002	71.098	1050	1.001	71.098	1050	
S1.4	75.325	4.294	Open Manhole	2400	1.003	71.031	1050	1.002	71.031	1050	
S1.5	74.450	3.509	Open Manhole	2400	1.004	70.941	1050	1.003	70.941	1050	
S1.6HB	73.350	2.539	Open Manhole	3660	1.005	70.811	150	1.004	70.811	1050	
S1.8 Outfall	71.800	1.050	Open Manhole	0		OUTFALL		1.005	70.750	150	

PIPELINE SCHEDULES for Surface Network 1

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	1050	S1.1	73.941	71.204	1.687	Open Manhole	2400
1.001	o	1050	S1.2	74.555	71.134	2.371	Open Manhole	2400
1.002	o	1050	S1.3	74.886	71.098	2.738	Open Manhole	2400
1.003	o	1050	S1.4	75.325	71.031	3.244	Open Manhole	2400
1.004	o	1050	S1.5	74.450	70.941	2.459	Open Manhole	2400
1.005	o	150	S1.6HB	73.350	70.811	2.389	Open Manhole	3660

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	27.658	395.1	S1.2	74.555	71.134	2.371	Open Manhole	2400
1.001	14.337	398.3	S1.3	74.886	71.098	2.738	Open Manhole	2400
1.002	26.533	396.0	S1.4	75.325	71.031	3.244	Open Manhole	2400
1.003	35.959	399.5	S1.5	74.450	70.941	2.459	Open Manhole	2400
1.004	51.889	399.1	S1.6HB	73.350	70.811	1.489	Open Manhole	3660
1.005	9.097	149.1	S1.8 Outfall	71.800	70.750	0.900	Open Manhole	0

Setting Out Information - True Coordinates (Surface Network 1)

PN	USMH Name	Dia/Len (mm)	Width (mm)	US Easting (m)	US Northing (m)	Layout (North)
1.000	S1.1	2400		373954.735	442346.048	
1.001	S1.2	2400		373977.377	442361.932	
1.002	S1.3	2400		373985.710	442373.598	
1.003	S1.4	2400		374003.104	442393.634	
1.004	S1.5	2400		373980.687	442421.749	
1.005	S1.6HB	3660		373931.809	442439.166	

PN	DSMH Name	Dia/Len (mm)	Width (mm)	DS Easting (m)	DS Northing (m)	Layout (North)
1.005	S1.8 Outfall		0	373927.236	442447.030	

Area Summary for Surface Network 1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.102	0.102	0.102
1.001	-	-	100	0.048	0.048	0.048
1.002	-	-	100	0.063	0.063	0.063
1.003	-	-	100	0.011	0.011	0.011
1.004	-	-	100	0.089	0.089	0.089
1.005	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.313	0.313	0.313

Online Controls for Surface Network 1

Hydro-Brake® Optimum Manhole: S1.6HB, DS/PN: 1.005, Volume (m³): 69.0

Unit Reference	MD-SHE-0100-5000-1400-5000
Design Head (m)	1.400
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	100
Invert Level (m)	70.811
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.400	5.0	Kick-Flo®	0.855	4.0
Flush-Flo™	0.416	5.0	Mean Flow over Head Range	-	4.4

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	3.3	0.800	4.3	2.000	5.9	4.000	8.2	7.000	10.7
0.200	4.6	1.000	4.3	2.200	6.2	4.500	8.6	7.500	11.0
0.300	4.9	1.200	4.7	2.400	6.4	5.000	9.1	8.000	11.4
0.400	5.0	1.400	5.0	2.600	6.7	5.500	9.5	8.500	11.7
0.500	5.0	1.600	5.3	3.000	7.1	6.000	9.9	9.000	12.0
0.600	4.9	1.800	5.6	3.500	7.7	6.500	10.3	9.500	12.3

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

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)	19.000
Region	England and Wales	Ratio R	0.280
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	OFF
DVD Status	OFF
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, 2
Climate Change (%)	0, 0

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)	Flooded Volume (m³)	Flow / Cap.
1.000	S1.1	15 Winter	1	+0%					71.285	-0.969	0.000	0.01
1.001	S1.2	15 Winter	1	+0%					71.244	-0.940	0.000	0.02
1.002	S1.3	15 Winter	1	+0%					71.207	-0.941	0.000	0.02
1.003	S1.4	120 Winter	1	+0%					71.192	-0.889	0.000	0.01
1.004	S1.5	120 Winter	1	+0%					71.192	-0.799	0.000	0.01
1.005	S1.6HB	120 Winter	1	+0%	1/15 Summer				71.192	0.231	0.000	0.39

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1.1		11.4	OK	
1.001	S1.2		15.4	OK	
1.002	S1.3		21.0	OK	
1.003	S1.4		9.4	OK	
1.004	S1.5		11.4	OK	
1.005	S1.6HB		5.0	SURCHARGED	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

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)	19.000
Region	England and Wales	Ratio R	0.280
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	OFF
DVD Status	OFF
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, 2
Climate Change (%)	0, 0

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)	Flooded Volume (m³)	Flow / Cap.
1.000	S1.1	15 Winter	2	+0%					71.304	-0.950	0.000	0.01
1.001	S1.2	120 Winter	2	+0%					71.258	-0.926	0.000	0.01
1.002	S1.3	120 Winter	2	+0%					71.257	-0.891	0.000	0.01
1.003	S1.4	120 Winter	2	+0%					71.257	-0.824	0.000	0.01
1.004	S1.5	120 Winter	2	+0%					71.257	-0.734	0.000	0.01
1.005	S1.6HB	120 Winter	2	+0%	1/15 Summer				71.257	0.296	0.000	0.39

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1.1		15.0	OK	
1.001	S1.2		8.4	OK	
1.002	S1.3		11.7	OK	
1.003	S1.4		11.4	OK	
1.004	S1.5		13.6	OK	
1.005	S1.6HB		5.0	SURCHARGED	

Surcharged Outfall Details for Surface Network 1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.005	S1.8 Outfall	71.800	70.750	0.000	0	0

Datum (m) 0.000 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
5	71.140	185	71.140	365	71.140	545	71.140	725	71.140	905	71.140	1085	71.140	1265	71.140
10	71.140	190	71.140	370	71.140	550	71.140	730	71.140	910	71.140	1090	71.140	1270	71.140
15	71.140	195	71.140	375	71.140	555	71.140	735	71.140	915	71.140	1095	71.140	1275	71.140
20	71.140	200	71.140	380	71.140	560	71.140	740	71.140	920	71.140	1100	71.140	1280	71.140
25	71.140	205	71.140	385	71.140	565	71.140	745	71.140	925	71.140	1105	71.140	1285	71.140
30	71.140	210	71.140	390	71.140	570	71.140	750	71.140	930	71.140	1110	71.140	1290	71.140
35	71.140	215	71.140	395	71.140	575	71.140	755	71.140	935	71.140	1115	71.140	1295	71.140
40	71.140	220	71.140	400	71.140	580	71.140	760	71.140	940	71.140	1120	71.140	1300	71.140
45	71.140	225	71.140	405	71.140	585	71.140	765	71.140	945	71.140	1125	71.140	1305	71.140
50	71.140	230	71.140	410	71.140	590	71.140	770	71.140	950	71.140	1130	71.140	1310	71.140
55	71.140	235	71.140	415	71.140	595	71.140	775	71.140	955	71.140	1135	71.140	1315	71.140
60	71.140	240	71.140	420	71.140	600	71.140	780	71.140	960	71.140	1140	71.140	1320	71.140
65	71.140	245	71.140	425	71.140	605	71.140	785	71.140	965	71.140	1145	71.140	1325	71.140
70	71.140	250	71.140	430	71.140	610	71.140	790	71.140	970	71.140	1150	71.140	1330	71.140
75	71.140	255	71.140	435	71.140	615	71.140	795	71.140	975	71.140	1155	71.140	1335	71.140
80	71.140	260	71.140	440	71.140	620	71.140	800	71.140	980	71.140	1160	71.140	1340	71.140
85	71.140	265	71.140	445	71.140	625	71.140	805	71.140	985	71.140	1165	71.140	1345	71.140
90	71.140	270	71.140	450	71.140	630	71.140	810	71.140	990	71.140	1170	71.140	1350	71.140
95	71.140	275	71.140	455	71.140	635	71.140	815	71.140	995	71.140	1175	71.140	1355	71.140
100	71.140	280	71.140	460	71.140	640	71.140	820	71.140	1000	71.140	1180	71.140	1360	71.140
105	71.140	285	71.140	465	71.140	645	71.140	825	71.140	1005	71.140	1185	71.140	1365	71.140
110	71.140	290	71.140	470	71.140	650	71.140	830	71.140	1010	71.140	1190	71.140	1370	71.140
115	71.140	295	71.140	475	71.140	655	71.140	835	71.140	1015	71.140	1195	71.140	1375	71.140
120	71.140	300	71.140	480	71.140	660	71.140	840	71.140	1020	71.140	1200	71.140	1380	71.140
125	71.140	305	71.140	485	71.140	665	71.140	845	71.140	1025	71.140	1205	71.140	1385	71.140
130	71.140	310	71.140	490	71.140	670	71.140	850	71.140	1030	71.140	1210	71.140	1390	71.140
135	71.140	315	71.140	495	71.140	675	71.140	855	71.140	1035	71.140	1215	71.140	1395	71.140
140	71.140	320	71.140	500	71.140	680	71.140	860	71.140	1040	71.140	1220	71.140	1400	71.140
145	71.140	325	71.140	505	71.140	685	71.140	865	71.140	1045	71.140	1225	71.140	1405	71.140
150	71.140	330	71.140	510	71.140	690	71.140	870	71.140	1050	71.140	1230	71.140	1410	71.140
155	71.140	335	71.140	515	71.140	695	71.140	875	71.140	1055	71.140	1235	71.140	1415	71.140
160	71.140	340	71.140	520	71.140	700	71.140	880	71.140	1060	71.140	1240	71.140	1420	71.140
165	71.140	345	71.140	525	71.140	705	71.140	885	71.140	1065	71.140	1245	71.140	1425	71.140
170	71.140	350	71.140	530	71.140	710	71.140	890	71.140	1070	71.140	1250	71.140	1430	71.140
175	71.140	355	71.140	535	71.140	715	71.140	895	71.140	1075	71.140	1255	71.140	1435	71.140
180	71.140	360	71.140	540	71.140	720	71.140	900	71.140	1080	71.140	1260	71.140	1440	71.140

Manhole Headloss for Surface Network 1

PN	US/MH Name	US/MH Headloss
1.000	S1.1	0.500
1.001	S1.2	0.500
1.002	S1.3	0.500
1.003	S1.4	0.500
1.004	S1.5	0.500
1.005	S1.6HB	0.500

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

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) 19.000	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.280	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	OFF
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)	30, 100
Climate Change (%)	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)	Flooded Volume (m³)
1.000	S1.1	240 Winter	30	+0%	100/180 Winter				71.592	-0.662	0.000
1.001	S1.2	240 Winter	30	+0%	100/180 Winter				71.592	-0.592	0.000
1.002	S1.3	240 Winter	30	+0%	100/180 Winter				71.592	-0.556	0.000
1.003	S1.4	240 Winter	30	+0%	100/120 Winter				71.592	-0.489	0.000
1.004	S1.5	240 Winter	30	+0%	100/120 Winter				71.592	-0.399	0.000
1.005	S1.6HB	240 Winter	30	+0%	30/15 Summer				71.592	0.631	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1.1	0.01		6.5	OK	
1.001	S1.2	0.01		7.6	OK	
1.002	S1.3	0.01		10.5	OK	
1.003	S1.4	0.01		8.6	OK	
1.004	S1.5	0.01		10.9	OK	
1.005	S1.6HB	0.39		5.0	SURCHARGED	

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

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)	19.000
Region	England and Wales	Ratio R	0.280
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	OFF
DVD Status	OFF
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)	30, 100
Climate Change (%)	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)	Flooded Volume (m³)
1.000	S1.1	360 Winter	100	+40%	100/180 Winter				72.495	0.241	0.000
1.001	S1.2	360 Winter	100	+40%	100/180 Winter				72.495	0.311	0.000
1.002	S1.3	360 Winter	100	+40%	100/180 Winter				72.495	0.347	0.000
1.003	S1.4	360 Winter	100	+40%	100/120 Winter				72.495	0.414	0.000
1.004	S1.5	360 Winter	100	+40%	100/120 Winter				72.495	0.504	0.000
1.005	S1.6HB	360 Winter	100	+40%	30/15 Summer				72.495	1.534	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1.1	0.01		8.9	SURCHARGED	
1.001	S1.2	0.01		9.2	SURCHARGED	
1.002	S1.3	0.01		12.8	SURCHARGED	
1.003	S1.4	0.01		9.8	SURCHARGED	
1.004	S1.5	0.01		12.8	SURCHARGED	
1.005	S1.6HB	0.39		5.0	SURCHARGED	

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 2

« - Indicates pipe capacity < flow

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
1.000	27.662	0.185	149.5	0.075	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	29.745	0.199	149.5	0.053	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	26.485	0.177	149.6	0.066	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	25.978	0.174	149.3	0.128	0.00	0.0	0.600	o	300	Pipe/Conduit	
2.000	29.559	0.197	150.0	0.073	5.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	22.889	0.153	149.6	0.053	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.002	51.808	0.346	149.7	0.068	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	8.811	0.023	383.1	0.079	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.005	12.201	0.031	393.6	0.018	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.006	23.380	0.059	396.3	0.074	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.007	15.853	0.040	396.3	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
3.000	17.803	0.119	149.6	0.086	5.00	0.0	0.600	o	225	Pipe/Conduit	
3.001	15.858	0.106	149.6	0.083	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.002	20.490	0.137	149.6	0.050	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.003	25.934	0.173	149.9	0.097	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.008	24.053	0.061	394.3	0.016	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.009	26.836	0.068	394.6	0.025	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.010	13.304	0.034	391.3	0.157	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.011	48.891	0.123	397.5	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.012	9.630	0.065	148.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.013	10.085	0.068	148.3	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)
1.000	50.00	5.43	73.032	0.075	0.0	0.0	0.0	1.07	42.4	10.2
1.001	50.00	5.90	72.847	0.128	0.0	0.0	0.0	1.07	42.4	17.3
1.002	50.00	6.31	72.648	0.194	0.0	0.0	0.0	1.07	42.4	26.3
1.003	49.65	6.65	72.456	0.322	0.0	0.0	0.0	1.28	90.8	43.3
2.000	50.00	5.46	73.053	0.073	0.0	0.0	0.0	1.07	42.3	9.9
2.001	50.00	5.82	72.856	0.126	0.0	0.0	0.0	1.07	42.4	17.1
2.002	49.71	6.63	72.703	0.194	0.0	0.0	0.0	1.07	42.4	26.1
1.004	49.29	6.77	71.982	0.595	0.0	0.0	0.0	1.24	350.1	79.4
1.005	48.78	6.93	71.959	0.613	0.0	0.0	0.0	1.22	345.3	81.0
1.006	47.85	7.25	71.928	0.687	0.0	0.0	0.0	1.22	344.1	89.0
1.007	47.25	7.47	71.869	0.687	0.0	0.0	0.0	1.22	344.1	89.0
3.000	50.00	5.28	72.739	0.086	0.0	0.0	0.0	1.07	42.4	11.6
3.001	50.00	5.53	72.620	0.169	0.0	0.0	0.0	1.07	42.4	22.9
3.002	50.00	5.79	72.439	0.219	0.0	0.0	0.0	1.28	90.7	29.7
3.003	50.00	6.13	72.302	0.316	0.0	0.0	0.0	1.28	90.6	42.8
1.008	46.37	7.80	71.829	1.019	0.0	0.0	0.0	1.22	345.0	128.0
1.009	45.43	8.17	71.768	1.044	0.0	0.0	0.0	1.22	344.9	128.4
1.010	44.98	8.35	71.700	1.201	0.0	0.0	0.0	1.22	346.3	146.3
1.011	43.42	9.02	71.366	1.201	0.0	0.0	0.0	1.22	343.6	146.3
1.012	43.09	9.17	71.243	1.201	0.0	0.0	0.0	1.07	42.6«	146.3
1.013	42.65	9.37	71.178	1.201	0.0	0.0	0.0	0.82	14.5«	146.3

PIPELINE SCHEDULES for Surface Network 2

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	225	S2.1	74.719	73.032	1.462	Open Manhole	1500
1.001	o	225	S2.2	74.667	72.847	1.595	Open Manhole	1500
1.002	o	225	S2.3	74.296	72.648	1.423	Open Manhole	1500
1.003	o	300	S2.4	74.003	72.456	1.247	Open Manhole	1500
2.000	o	225	S2.5	74.777	73.053	1.499	Open Manhole	1500
2.001	o	225	S2.6	74.405	72.856	1.324	Open Manhole	1500
2.002	o	225	S2.7	74.201	72.703	1.273	Open Manhole	1500
1.004	o	600	S2.8	74.308	71.982	1.726	Open Manhole	1800
1.005	o	600	S2.9	74.278	71.959	1.719	Open Manhole	1800
1.006	o	600	S2.10	74.047	71.928	1.519	Open Manhole	1800
1.007	o	600	S2.11	73.914	71.869	1.445	Open Manhole	1800
3.000	o	225	S2.12	74.194	72.739	1.230	Open Manhole	1500
3.001	o	225	S2.13	73.956	72.620	1.111	Open Manhole	1500
3.002	o	300	S2.14	73.758	72.439	1.019	Open Manhole	1500
3.003	o	300	S2.15	73.717	72.302	1.115	Open Manhole	1500
1.008	o	600	S2.16	74.100	71.829	1.671	Open Manhole	1800
1.009	o	600	S2.17	74.022	71.768	1.654	Open Manhole	1800
1.010	o	600	S2.18	73.666	71.700	1.366	Open Manhole	1800
1.011	o	600	S2.19 Outfall	73.250	71.366	1.284	Open Manhole	1800
1.012	o	225	S2.21 Outfall	72.250	71.243	0.782	Open Manhole	1800
1.013	o	150	S2.22 HB	72.250	71.178	0.922	Open Manhole	2400

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	27.662	149.5	S2.2	74.667	72.847	1.595	Open Manhole	1500
1.001	29.745	149.5	S2.3	74.296	72.648	1.423	Open Manhole	1500
1.002	26.485	149.6	S2.4	74.003	72.471	1.307	Open Manhole	1500
1.003	25.978	149.3	S2.8	74.308	72.282	1.726	Open Manhole	1800
2.000	29.559	150.0	S2.6	74.405	72.856	1.324	Open Manhole	1500
2.001	22.889	149.6	S2.7	74.201	72.703	1.273	Open Manhole	1500
2.002	51.808	149.7	S2.8	74.308	72.357	1.726	Open Manhole	1800
1.004	8.811	383.1	S2.9	74.278	71.959	1.719	Open Manhole	1800
1.005	12.201	393.6	S2.10	74.047	71.928	1.519	Open Manhole	1800
1.006	23.380	396.3	S2.11	73.914	71.869	1.445	Open Manhole	1800
1.007	15.853	396.3	S2.16	74.100	71.829	1.671	Open Manhole	1800
3.000	17.803	149.6	S2.13	73.956	72.620	1.111	Open Manhole	1500
3.001	15.858	149.6	S2.14	73.758	72.514	1.019	Open Manhole	1500
3.002	20.490	149.6	S2.15	73.717	72.302	1.115	Open Manhole	1500
3.003	25.934	149.9	S2.16	74.100	72.129	1.671	Open Manhole	1800
1.008	24.053	394.3	S2.17	74.022	71.768	1.654	Open Manhole	1800
1.009	26.836	394.6	S2.18	73.666	71.700	1.366	Open Manhole	1800
1.010	13.304	391.3	S2.19 Outfall	73.250	71.666	0.984	Open Manhole	1800
1.011	48.891	397.5	S2.21 Outfall	72.250	71.243	0.407	Open Manhole	1800
1.012	9.630	148.2	S2.22 HB	72.250	71.178	0.847	Open Manhole	2400
1.013	10.085	148.3	S2.23 Outfall	72.160	71.110	0.900	Open Manhole	0

Setting Out Information - True Coordinates (Surface Network 2)

PN	USMH Name	Dia/Len (mm)	Width (mm)	US Easting (m)	US Northing (m)	Layout (North)
1.000	S2.1	1500		373790.242	442195.173	
1.001	S2.2	1500		373815.086	442207.337	
1.002	S2.3	1500		373844.073	442214.008	
1.003	S2.4	1500		373870.557	442213.807	
2.000	S2.5	1500		373844.796	442156.154	
2.001	S2.6	1500		373874.176	442159.405	
2.002	S2.7	1500		373897.063	442159.684	
1.004	S2.8	1800		373896.431	442211.488	
1.005	S2.9	1800		373900.534	442219.285	
1.006	S2.10	1800		373902.108	442231.384	
1.007	S2.11	1800		373908.910	442253.753	
3.000	S2.12	1500		373837.385	442276.384	
3.001	S2.13	1500		373854.447	442271.300	
3.002	S2.14	1500		373870.035	442274.213	
3.003	S2.15	1500		373890.471	442272.724	
1.008	S2.16	1800		373915.962	442267.951	
1.009	S2.17	1800		373926.661	442289.493	
1.010	S2.18	1800		373930.963	442315.982	
1.011	S2.19 Outfall	1800		373922.268	442326.051	

Setting Out Information - True Coordinates (Surface Network 2)

PN	USMH Name	Dia/Len (mm)	Width (mm)	US Easting (m)	US Northing (m)	Layout (North)
1.012	S2.21 Outfall	1800		373898.798	442368.940	
1.013	S2.22 HB	2400		373904.242	442376.883	

PN	DSMH Name	Dia/Len (mm)	Width (mm)	DS Easting (m)	DS Northing (m)	Layout (North)
1.013	S2.23 Outfall	0		373899.820	442385.947	

Area Summary for Surface Network 2

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.075	0.075	0.075
1.001	-	-	100	0.053	0.053	0.053
1.002	-	-	100	0.066	0.066	0.066
1.003	-	-	100	0.128	0.128	0.128
2.000	-	-	100	0.073	0.073	0.073
2.001	-	-	100	0.053	0.053	0.053
2.002	-	-	100	0.068	0.068	0.068
1.004	-	-	100	0.079	0.079	0.079
1.005	-	-	100	0.018	0.018	0.018
1.006	-	-	100	0.074	0.074	0.074
1.007	-	-	100	0.000	0.000	0.000
3.000	-	-	100	0.086	0.086	0.086
3.001	-	-	100	0.083	0.083	0.083
3.002	-	-	100	0.050	0.050	0.050
3.003	-	-	100	0.097	0.097	0.097
1.008	-	-	100	0.016	0.016	0.016
1.009	-	-	100	0.025	0.025	0.025
1.010	-	-	100	0.157	0.157	0.157
1.011	-	-	100	0.000	0.000	0.000
1.012	-	-	100	0.000	0.000	0.000
1.013	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				1.201	1.201	1.201

Online Controls for Surface Network 2

Hydro-Brake® Optimum Manhole: S2.22 HB, DS/PN: 1.013, Volume (m³): 5.1

Unit Reference	MD-SHE-0100-5000-1400-5000
Design Head (m)	1.400
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	100
Invert Level (m)	71.178
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.400	5.0	Kick-Flo®	0.855	4.0
Flush-Flo™	0.416	5.0	Mean Flow over Head Range	-	4.4

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	3.3	0.800	4.3	2.000	5.9	4.000	8.2	7.000	10.7
0.200	4.6	1.000	4.3	2.200	6.2	4.500	8.6	7.500	11.0
0.300	4.9	1.200	4.7	2.400	6.4	5.000	9.1	8.000	11.4
0.400	5.0	1.400	5.0	2.600	6.7	5.500	9.5	8.500	11.7
0.500	5.0	1.600	5.3	3.000	7.1	6.000	9.9	9.000	12.0
0.600	4.9	1.800	5.6	3.500	7.7	6.500	10.3	9.500	12.3

Storage Structures for Surface Network 2

Tank or Pond Manhole: S2.21 Outfall, DS/PN: 1.012

Invert Level (m) 71.243

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1363.1	1.000	1835.5

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

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 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 19.000	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.280	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	OFF
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, 2
Climate Change (%)	0, 0

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	S2.1	15 Winter	1	+0%					73.104	-0.153
1.001	S2.2	15 Winter	1	+0%					72.939	-0.133
1.002	S2.3	15 Winter	1	+0%					72.763	-0.110
1.003	S2.4	15 Winter	1	+0%					72.587	-0.169
2.000	S2.5	15 Winter	1	+0%					73.124	-0.154
2.001	S2.6	15 Winter	1	+0%					72.948	-0.133
2.002	S2.7	15 Winter	1	+0%					72.815	-0.113
1.004	S2.8	15 Winter	1	+0%					72.220	-0.362
1.005	S2.9	15 Winter	1	+0%					72.195	-0.364
1.006	S2.10	15 Winter	1	+0%					72.165	-0.363
1.007	S2.11	15 Winter	1	+0%					72.126	-0.343
3.000	S2.12	15 Winter	1	+0%					72.818	-0.146
3.001	S2.13	15 Winter	1	+0%					72.731	-0.114
3.002	S2.14	15 Winter	1	+0%					72.549	-0.190
3.003	S2.15	15 Winter	1	+0%					72.433	-0.169
1.008	S2.16	15 Winter	1	+0%					72.096	-0.333
1.009	S2.17	15 Winter	1	+0%					72.046	-0.322
1.010	S2.18	15 Winter	1	+0%					71.995	-0.305
1.011	S2.19 Outfall	15 Winter	1	+0%					71.604	-0.362
1.012	S2.21 Outfall	960 Winter	1	+0%					71.394	-0.074
1.013	S2.22 HB	960 Winter	1	+0%	1/120 Winter				71.388	0.060

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S2.1	0.000	0.22		8.6	OK	
1.001	S2.2	0.000	0.35		13.8	OK	
1.002	S2.3	0.000	0.51		19.9	OK	
1.003	S2.4	0.000	0.39		31.8	OK	
2.000	S2.5	0.000	0.21		8.4	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
2.001	S2.6	0.000	0.35		13.6	OK	
2.002	S2.7	0.000	0.49		20.1	OK	
1.004	S2.8	0.000	0.31		58.7	OK	
1.005	S2.9	0.000	0.30		59.3	OK	
1.006	S2.10	0.000	0.24		64.3	OK	
1.007	S2.11	0.000	0.28		62.6	OK	
3.000	S2.12	0.000	0.26		9.9	OK	
3.001	S2.13	0.000	0.48		18.2	OK	
3.002	S2.14	0.000	0.29		22.9	OK	
3.003	S2.15	0.000	0.39		32.0	OK	
1.008	S2.16	0.000	0.34		91.0	OK	
1.009	S2.17	0.000	0.33		90.7	OK	
1.010	S2.18	0.000	0.48		100.4	OK	
1.011	S2.19 Outfall	0.000	0.33		100.2	OK	
1.012	S2.21 Outfall	0.000	0.13		4.6	OK	
1.013	S2.22 HB	0.000	0.36		4.6	SURCHARGED	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

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 1 Number of Real Time Controls 0

Synthetic Rainfall Details

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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, 2
Climate Change (%)	0, 0

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	S2.1	15 Winter	2	+0%					73.115	-0.142
1.001	S2.2	15 Winter	2	+0%					72.954	-0.118
1.002	S2.3	15 Winter	2	+0%					72.782	-0.091
1.003	S2.4	15 Winter	2	+0%					72.608	-0.148
2.000	S2.5	15 Winter	2	+0%					73.134	-0.144
2.001	S2.6	15 Winter	2	+0%					72.963	-0.118
2.002	S2.7	15 Winter	2	+0%					72.834	-0.094
1.004	S2.8	15 Winter	2	+0%					72.259	-0.323
1.005	S2.9	15 Winter	2	+0%					72.235	-0.324
1.006	S2.10	15 Winter	2	+0%					72.207	-0.321
1.007	S2.11	15 Winter	2	+0%					72.171	-0.298
3.000	S2.12	15 Winter	2	+0%					72.830	-0.134
3.001	S2.13	15 Winter	2	+0%					72.750	-0.095
3.002	S2.14	15 Winter	2	+0%					72.566	-0.173
3.003	S2.15	15 Winter	2	+0%					72.455	-0.147
1.008	S2.16	15 Winter	2	+0%					72.143	-0.286
1.009	S2.17	15 Winter	2	+0%					72.095	-0.273
1.010	S2.18	15 Winter	2	+0%					72.045	-0.255
1.011	S2.19 Outfall	15 Winter	2	+0%					71.640	-0.326
1.012	S2.21 Outfall	960 Winter	2	+0%					71.428	-0.040
1.013	S2.22 HB	960 Winter	2	+0%	1/120 Winter				71.422	0.094

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S2.1	0.000	0.28		11.2	OK	
1.001	S2.2	0.000	0.45		17.9	OK	
1.002	S2.3	0.000	0.66		25.7	OK	
1.003	S2.4	0.000	0.51		41.1	OK	
2.000	S2.5	0.000	0.28		10.9	OK	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
2.001	S2.6	0.000	0.45		17.6	OK	
2.002	S2.7	0.000	0.64		26.1	OK	
1.004	S2.8	0.000	0.40		75.9	OK	
1.005	S2.9	0.000	0.38		76.7	OK	
1.006	S2.10	0.000	0.31		82.9	OK	
1.007	S2.11	0.000	0.37		80.4	OK	
3.000	S2.12	0.000	0.34		12.8	OK	
3.001	S2.13	0.000	0.63		23.5	OK	
3.002	S2.14	0.000	0.37		29.6	OK	
3.003	S2.15	0.000	0.51		41.5	OK	
1.008	S2.16	0.000	0.43		117.4	OK	
1.009	S2.17	0.000	0.43		117.2	OK	
1.010	S2.18	0.000	0.63		129.7	OK	
1.011	S2.19 Outfall	0.000	0.43		129.4	OK	
1.012	S2.21 Outfall	0.000	0.13		4.8	OK	
1.013	S2.22 HB	0.000	0.37		4.8	SURCHARGED	

Surcharged Outfall Details for Surface Network 2

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.013	S2.23 Outfall	72.160	71.110	0.000	0	0

Datum (m) 0.000 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
5	71.210	185	71.210	365	71.210	545	71.210	725	71.210	905	71.210	1085	71.210	1265	71.210
10	71.210	190	71.210	370	71.210	550	71.210	730	71.210	910	71.210	1090	71.210	1270	71.210
15	71.210	195	71.210	375	71.210	555	71.210	735	71.210	915	71.210	1095	71.210	1275	71.210
20	71.210	200	71.210	380	71.210	560	71.210	740	71.210	920	71.210	1100	71.210	1280	71.210
25	71.210	205	71.210	385	71.210	565	71.210	745	71.210	925	71.210	1105	71.210	1285	71.210
30	71.210	210	71.210	390	71.210	570	71.210	750	71.210	930	71.210	1110	71.210	1290	71.210
35	71.210	215	71.210	395	71.210	575	71.210	755	71.210	935	71.210	1115	71.210	1295	71.210
40	71.210	220	71.210	400	71.210	580	71.210	760	71.210	940	71.210	1120	71.210	1300	71.210
45	71.210	225	71.210	405	71.210	585	71.210	765	71.210	945	71.210	1125	71.210	1305	71.210
50	71.210	230	71.210	410	71.210	590	71.210	770	71.210	950	71.210	1130	71.210	1310	71.210
55	71.210	235	71.210	415	71.210	595	71.210	775	71.210	955	71.210	1135	71.210	1315	71.210
60	71.210	240	71.210	420	71.210	600	71.210	780	71.210	960	71.210	1140	71.210	1320	71.210
65	71.210	245	71.210	425	71.210	605	71.210	785	71.210	965	71.210	1145	71.210	1325	71.210
70	71.210	250	71.210	430	71.210	610	71.210	790	71.210	970	71.210	1150	71.210	1330	71.210
75	71.210	255	71.210	435	71.210	615	71.210	795	71.210	975	71.210	1155	71.210	1335	71.210
80	71.210	260	71.210	440	71.210	620	71.210	800	71.210	980	71.210	1160	71.210	1340	71.210
85	71.210	265	71.210	445	71.210	625	71.210	805	71.210	985	71.210	1165	71.210	1345	71.210
90	71.210	270	71.210	450	71.210	630	71.210	810	71.210	990	71.210	1170	71.210	1350	71.210
95	71.210	275	71.210	455	71.210	635	71.210	815	71.210	995	71.210	1175	71.210	1355	71.210
100	71.210	280	71.210	460	71.210	640	71.210	820	71.210	1000	71.210	1180	71.210	1360	71.210
105	71.210	285	71.210	465	71.210	645	71.210	825	71.210	1005	71.210	1185	71.210	1365	71.210
110	71.210	290	71.210	470	71.210	650	71.210	830	71.210	1010	71.210	1190	71.210	1370	71.210
115	71.210	295	71.210	475	71.210	655	71.210	835	71.210	1015	71.210	1195	71.210	1375	71.210
120	71.210	300	71.210	480	71.210	660	71.210	840	71.210	1020	71.210	1200	71.210	1380	71.210
125	71.210	305	71.210	485	71.210	665	71.210	845	71.210	1025	71.210	1205	71.210	1385	71.210
130	71.210	310	71.210	490	71.210	670	71.210	850	71.210	1030	71.210	1210	71.210	1390	71.210
135	71.210	315	71.210	495	71.210	675	71.210	855	71.210	1035	71.210	1215	71.210	1395	71.210
140	71.210	320	71.210	500	71.210	680	71.210	860	71.210	1040	71.210	1220	71.210	1400	71.210
145	71.210	325	71.210	505	71.210	685	71.210	865	71.210	1045	71.210	1225	71.210	1405	71.210
150	71.210	330	71.210	510	71.210	690	71.210	870	71.210	1050	71.210	1230	71.210	1410	71.210
155	71.210	335	71.210	515	71.210	695	71.210	875	71.210	1055	71.210	1235	71.210	1415	71.210
160	71.210	340	71.210	520	71.210	700	71.210	880	71.210	1060	71.210	1240	71.210	1420	71.210
165	71.210	345	71.210	525	71.210	705	71.210	885	71.210	1065	71.210	1245	71.210	1425	71.210
170	71.210	350	71.210	530	71.210	710	71.210	890	71.210	1070	71.210	1250	71.210	1430	71.210
175	71.210	355	71.210	535	71.210	715	71.210	895	71.210	1075	71.210	1255	71.210	1435	71.210
180	71.210	360	71.210	540	71.210	720	71.210	900	71.210	1080	71.210	1260	71.210	1440	71.210

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

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 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 19.000	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.280	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	OFF
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)	30, 100
Climate Change (%)	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)
1.000	S2.1	15 Winter	30	+0%	100/15 Summer				73.152	-0.105
1.001	S2.2	15 Winter	30	+0%	30/15 Summer				73.104	0.032
1.002	S2.3	15 Winter	30	+0%	30/15 Summer				72.968	0.095
1.003	S2.4	15 Winter	30	+0%	100/15 Summer				72.703	-0.053
2.000	S2.5	15 Winter	30	+0%	100/15 Summer				73.180	-0.098
2.001	S2.6	15 Winter	30	+0%	30/15 Summer				73.133	0.052
2.002	S2.7	15 Winter	30	+0%	30/15 Summer				73.037	0.109
1.004	S2.8	15 Winter	30	+0%	100/15 Summer				72.483	-0.099
1.005	S2.9	15 Winter	30	+0%	100/15 Summer				72.468	-0.091
1.006	S2.10	15 Winter	30	+0%	100/15 Summer				72.449	-0.079
1.007	S2.11	15 Winter	30	+0%	100/15 Summer				72.421	-0.048
3.000	S2.12	15 Winter	30	+0%	100/15 Summer				72.943	-0.021
3.001	S2.13	15 Winter	30	+0%	30/15 Summer				72.896	0.051
3.002	S2.14	15 Winter	30	+0%	100/15 Summer				72.666	-0.073
3.003	S2.15	15 Winter	30	+0%	100/15 Summer				72.593	-0.009
1.008	S2.16	15 Winter	30	+0%	100/15 Summer				72.397	-0.032
1.009	S2.17	15 Winter	30	+0%	100/15 Summer				72.351	-0.017
1.010	S2.18	30 Summer	30	+0%	100/15 Summer				72.300	0.000
1.011	S2.19 Outfall	15 Winter	30	+0%	100/15 Summer				71.752	-0.214
1.012	S2.21 Outfall	1440 Winter	30	+0%	30/120 Winter				71.602	0.134
1.013	S2.22 HB	1440 Winter	30	+0%	30/15 Summer				71.596	0.268

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S2.1	0.000	0.53		21.1	OK	
1.001	S2.2	0.000	0.83		32.8	SURCHARGED	
1.002	S2.3	0.000	1.22		48.1	SURCHARGED	
1.003	S2.4	0.000	1.00		81.2	OK	
2.000	S2.5	0.000	0.51		20.3	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
2.001	S2.6	0.000	0.81		31.5	SURCHARGED	
2.002	S2.7	0.000	1.14		46.2	SURCHARGED	
1.004	S2.8	0.000	0.76		143.1	OK	
1.005	S2.9	0.000	0.72		144.3	OK	
1.006	S2.10	0.000	0.59		157.1	OK	
1.007	S2.11	0.000	0.65		142.4	OK	
3.000	S2.12	0.000	0.63		23.9	OK	
3.001	S2.13	0.000	1.24		46.6	SURCHARGED	
3.002	S2.14	0.000	0.73		58.0	OK	
3.003	S2.15	0.000	1.00		81.2	OK	
1.008	S2.16	0.000	0.77		208.2	OK	
1.009	S2.17	0.000	0.75		206.1	OK	
1.010	S2.18	0.000	1.00		207.2	OK	
1.011	S2.19 Outfall	0.000	0.73		220.6	OK	
1.012	S2.21 Outfall	0.000	0.14		5.0	SURCHARGED	
1.013	S2.22 HB	0.000	0.38		5.0	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

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 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 19.000	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.280	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	OFF
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)	30, 100
Climate Change (%)	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)
1.000	S2.1	15 Winter	100	+40%	100/15 Summer				74.122	0.865
1.001	S2.2	15 Winter	100	+40%	30/15 Summer				74.012	0.940
1.002	S2.3	15 Winter	100	+40%	30/15 Summer				73.726	0.853
1.003	S2.4	15 Winter	100	+40%	100/15 Summer				73.168	0.412
2.000	S2.5	15 Winter	100	+40%	100/15 Summer				74.110	0.832
2.001	S2.6	15 Winter	100	+40%	30/15 Summer				74.004	0.923
2.002	S2.7	15 Winter	100	+40%	30/15 Summer				73.790	0.862
1.004	S2.8	15 Winter	100	+40%	100/15 Summer				72.817	0.235
1.005	S2.9	15 Winter	100	+40%	100/15 Summer				72.792	0.233
1.006	S2.10	15 Winter	100	+40%	100/15 Summer				72.759	0.231
1.007	S2.11	15 Winter	100	+40%	100/15 Summer				72.711	0.242
3.000	S2.12	15 Winter	100	+40%	100/15 Summer				73.695	0.731
3.001	S2.13	15 Winter	100	+40%	30/15 Summer				73.586	0.741
3.002	S2.14	15 Winter	100	+40%	100/15 Summer				73.226	0.487
3.003	S2.15	15 Winter	100	+40%	100/15 Summer				73.060	0.458
1.008	S2.16	15 Winter	100	+40%	100/15 Summer				72.667	0.238
1.009	S2.17	15 Winter	100	+40%	100/15 Summer				72.538	0.170
1.010	S2.18	15 Winter	100	+40%	100/15 Summer				72.405	0.105
1.011	S2.19 Outfall	15 Winter	100	+40%	100/15 Summer				72.034	0.068
1.012	S2.21 Outfall	1440 Winter	100	+40%	30/120 Winter				71.940	0.472
1.013	S2.22 HB	1440 Winter	100	+40%	30/15 Summer				71.934	0.606

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S2.1	0.000	0.76		30.0	SURCHARGED	
1.001	S2.2	0.000	1.22		48.1	SURCHARGED	
1.002	S2.3	0.000	1.78		70.0	SURCHARGED	
1.003	S2.4	0.000	1.53		124.3	SURCHARGED	
2.000	S2.5	0.000	0.72		28.4	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
2.001	S2.6	0.000	1.18		46.0	SURCHARGED	
2.002	S2.7	0.000	1.67		67.8	SURCHARGED	
1.004	S2.8	0.000	1.12		209.9	SURCHARGED	
1.005	S2.9	0.000	1.06		213.9	SURCHARGED	
1.006	S2.10	0.000	0.87		234.0	SURCHARGED	
1.007	S2.11	0.000	1.07		234.9	SURCHARGED	
3.000	S2.12	0.000	0.98		37.2	SURCHARGED	
3.001	S2.13	0.000	1.84		69.1	SURCHARGED	
3.002	S2.14	0.000	1.11		88.3	SURCHARGED	
3.003	S2.15	0.000	1.60		129.8	SURCHARGED	
1.008	S2.16	0.000	1.33		358.4	SURCHARGED	
1.009	S2.17	0.000	1.32		363.3	SURCHARGED	
1.010	S2.18	0.000	1.94		402.7	SURCHARGED	
1.011	S2.19 Outfall	0.000	1.33		399.8	SURCHARGED	
1.012	S2.21 Outfall	0.000	0.14		5.1	SURCHARGED	
1.013	S2.22 HB	0.000	0.38		5.0	SURCHARGED	

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 3

« - Indicates pipe capacity < flow

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
1.000	27.677	0.447	61.9	0.163	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	30.864	0.206	149.8	0.087	0.00	0.0	0.600	o	300	Pipe/Conduit	
2.000	41.438	0.277	149.6	0.070	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	19.699	0.132	149.2	0.081	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	24.118	0.097	248.6	0.062	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.004	47.993	0.120	399.9	0.120	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.005	19.367	0.049	395.2	0.119	0.00	0.0	0.600	o	600	Pipe/Conduit	
3.000	21.902	0.146	150.0	0.092	5.00	0.0	0.600	o	225	Pipe/Conduit	
3.001	27.102	0.181	149.7	0.093	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.002	31.957	0.213	150.0	0.076	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.003	17.056	0.114	149.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.006	6.629	0.017	389.9	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.007	41.841	0.105	398.5	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
4.000	33.139	0.221	150.0	0.071	5.00	0.0	0.600	o	225	Pipe/Conduit	
4.001	42.582	0.284	149.9	0.115	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.002	27.762	0.186	149.3	0.071	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.003	11.693	0.105	111.4	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.008	7.000	0.018	388.9	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.009	15.524	0.097	160.0	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)
1.000	50.00	5.28	74.263	0.163	0.0	0.0	0.0	1.66	66.2	22.1
1.001	50.00	5.68	73.741	0.250	0.0	0.0	0.0	1.28	90.6	33.9
2.000	50.00	5.65	73.887	0.070	0.0	0.0	0.0	1.07	42.4	9.5
1.002	50.00	5.93	73.535	0.401	0.0	0.0	0.0	1.28	90.8	54.3
1.003	50.00	6.25	73.253	0.463	0.0	0.0	0.0	1.28	204.3	62.7
1.004	48.86	6.91	73.006	0.583	0.0	0.0	0.0	1.21	342.5	77.1
1.005	48.08	7.17	72.886	0.702	0.0	0.0	0.0	1.22	344.6	91.4
3.000	50.00	5.34	73.866	0.092	0.0	0.0	0.0	1.07	42.4	12.5
3.001	50.00	5.77	73.720	0.185	0.0	0.0	0.0	1.07	42.4	25.1
3.002	50.00	6.18	73.464	0.261	0.0	0.0	0.0	1.28	90.6	35.3
3.003	50.00	6.40	73.251	0.261	0.0	0.0	0.0	1.28	90.7	35.3
1.006	47.83	7.26	72.837	0.963	0.0	0.0	0.0	1.23	346.9	124.7
1.007	46.27	7.84	72.520	0.963	0.0	0.0	0.0	1.21	343.2	124.7
4.000	50.00	5.52	73.586	0.071	0.0	0.0	0.0	1.07	42.4	9.6
4.001	50.00	6.07	73.290	0.186	0.0	0.0	0.0	1.28	90.6	25.2
4.002	50.00	6.43	73.006	0.257	0.0	0.0	0.0	1.28	90.8	34.8
4.003	50.00	6.52	72.520	0.257	0.0	0.0	0.0	2.31	652.3	34.8
1.008	46.02	7.93	72.415	1.220	0.0	0.0	0.0	1.23	347.4	152.1
1.009	45.20	8.26	72.397	1.220	0.0	0.0	0.0	0.79	14.0«	152.1

Manhole Schedules for Surface Network 3

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)
S3.1	75.988	1.725	Open Manhole	1500	1.000	74.263	225				
S3.2	75.388	1.647	Open Manhole	1800	1.001	73.741	300	1.000	73.816	225	
S3.3	75.421	1.534	Open Manhole	1500	2.000	73.887	225				
S3.4	74.843	1.308	Open Manhole	2100	1.002	73.535	300	1.001	73.535	300	
								2.000	73.610	225	
S3.5	74.759	1.506	Open Manhole	1800	1.003	73.253	450	1.002	73.403	300	
S3.6	75.031	2.025	Open Manhole	1800	1.004	73.006	600	1.003	73.156	450	
S3.7	74.900	2.014	Open Manhole	1800	1.005	72.886	600	1.004	72.886	600	
S3.8	75.304	1.438	Open Manhole	1500	3.000	73.866	225				
S3.9	75.031	1.311	Open Manhole	1500	3.001	73.720	225	3.000	73.720	225	
S3.10	75.026	1.562	Open Manhole	1500	3.002	73.464	300	3.001	73.539	225	
S3.11	74.733	1.482	Open Manhole	1500	3.003	73.251	300	3.002	73.251	300	
S3.12	74.650	1.813	Open Manhole	1800	1.006	72.837	600	1.005	72.837	600	
								3.003	73.137	300	
S3.13 Outfall	73.915	1.395	Open Manhole	1800	1.007	72.520	600	1.006	72.820	600	300
S3.14	75.066	1.480	Open Manhole	1800	4.000	73.586	225				
S3.15	74.655	1.365	Open Manhole	1800	4.001	73.290	300	4.000	73.365	225	
S3.16	74.325	1.319	Open Manhole	1800	4.002	73.006	300	4.001	73.006	300	
S3.17 Outfall	73.915	1.395	Open Manhole	1800	4.003	72.520	600	4.002	72.820	300	
S3.18 Outfall	73.915	1.500	Open Manhole	1800	1.008	72.415	600	1.007	72.415	600	
								4.003	72.415	600	
S3.22 HB	73.910	1.513	Open Manhole	2400	1.009	72.397	150	1.008	72.397	600	
S3.23 Outfall	72.760	0.460	Open Manhole	0		OUTFALL		1.009	72.300	150	

PIPELINE SCHEDULES for Surface Network 3

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	225	S3.1	75.988	74.263	1.500	Open Manhole	1500
1.001	o	300	S3.2	75.388	73.741	1.347	Open Manhole	1800
2.000	o	225	S3.3	75.421	73.887	1.309	Open Manhole	1500
1.002	o	300	S3.4	74.843	73.535	1.008	Open Manhole	2100
1.003	o	450	S3.5	74.759	73.253	1.056	Open Manhole	1800
1.004	o	600	S3.6	75.031	73.006	1.425	Open Manhole	1800
1.005	o	600	S3.7	74.900	72.886	1.414	Open Manhole	1800
3.000	o	225	S3.8	75.304	73.866	1.213	Open Manhole	1500
3.001	o	225	S3.9	75.031	73.720	1.086	Open Manhole	1500
3.002	o	300	S3.10	75.026	73.464	1.262	Open Manhole	1500
3.003	o	300	S3.11	74.733	73.251	1.182	Open Manhole	1500
1.006	o	600	S3.12	74.650	72.837	1.213	Open Manhole	1800
1.007	o	600	S3.13 Outfall	73.915	72.520	0.795	Open Manhole	1800
4.000	o	225	S3.14	75.066	73.586	1.255	Open Manhole	1800
4.001	o	300	S3.15	74.655	73.290	1.065	Open Manhole	1800
4.002	o	300	S3.16	74.325	73.006	1.019	Open Manhole	1800
4.003	o	600	S3.17 Outfall	73.915	72.520	0.795	Open Manhole	1800
1.008	o	600	S3.18 Outfall	73.915	72.415	0.900	Open Manhole	1800
1.009	o	150	S3.22 HB	73.910	72.397	1.363	Open Manhole	2400

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	27.677	61.9	S3.2	75.388	73.816	1.347	Open Manhole	1800
1.001	30.864	149.8	S3.4	74.843	73.535	1.008	Open Manhole	2100
2.000	41.438	149.6	S3.4	74.843	73.610	1.008	Open Manhole	2100
1.002	19.699	149.2	S3.5	74.759	73.403	1.056	Open Manhole	1800
1.003	24.118	248.6	S3.6	75.031	73.156	1.425	Open Manhole	1800
1.004	47.993	399.9	S3.7	74.900	72.886	1.414	Open Manhole	1800
1.005	19.367	395.2	S3.12	74.650	72.837	1.213	Open Manhole	1800
3.000	21.902	150.0	S3.9	75.031	73.720	1.086	Open Manhole	1500
3.001	27.102	149.7	S3.10	75.026	73.539	1.262	Open Manhole	1500
3.002	31.957	150.0	S3.11	74.733	73.251	1.182	Open Manhole	1500
3.003	17.056	149.6	S3.12	74.650	73.137	1.213	Open Manhole	1800
1.006	6.629	389.9	S3.13 Outfall	73.915	72.820	0.495	Open Manhole	1800
1.007	41.841	398.5	S3.18 Outfall	73.915	72.415	0.900	Open Manhole	1800
4.000	33.139	150.0	S3.15	74.655	73.365	1.065	Open Manhole	1800
4.001	42.582	149.9	S3.16	74.325	73.006	1.019	Open Manhole	1800
4.002	27.762	149.3	S3.17 Outfall	73.915	72.820	0.795	Open Manhole	1800
4.003	11.693	111.4	S3.18 Outfall	73.915	72.415	0.900	Open Manhole	1800
1.008	7.000	388.9	S3.22 HB	73.910	72.397	0.913	Open Manhole	2400
1.009	15.524	160.0	S3.23 Outfall	72.760	72.300	0.310	Open Manhole	0

Setting Out Information - True Coordinates (Surface Network 3)

PN	USMH Name	Dia/Len (mm)	Width (mm)	US Easting (m)	US Northing (m)	Layout (North)
1.000	S3.1	1500		373838.783	442078.502	
1.001	S3.2	1800		373815.880	442094.041	
2.000	S3.3	1500		373768.213	442073.741	
1.002	S3.4	2100		373789.163	442109.493	
1.003	S3.5	1800		373799.103	442126.500	
1.004	S3.6	1800		373815.186	442144.472	
1.005	S3.7	1800		373783.310	442180.350	
3.000	S3.8	1500		373718.860	442104.611	
3.001	S3.9	1500		373728.139	442124.450	
3.002	S3.10	1500		373741.833	442147.838	
3.003	S3.11	1500		373757.979	442175.416	
1.006	S3.12	1800		373766.597	442190.135	
1.007	S3.13 Outfall	1800		373763.868	442196.176	
4.000	S3.14	1800		373723.081	442158.817	
4.001	S3.15	1800		373694.483	442175.560	
4.002	S3.16	1800		373715.998	442212.307	
4.003	S3.17 Outfall	1800		373741.777	442222.612	
1.008	S3.18 Outfall	1800		373745.411	442233.726	
1.009	S3.22 HB	2400		373742.812	442240.226	

Setting Out Information - True Coordinates (Surface Network 3)

PN	DSMH Name	Dia/Len (mm)	Width (mm)	DS Easting (m)	DS Northing (m)	Layout (North)
1.009	S3.23 Outfall	0		373755.244	442249.524	

Area Summary for Surface Network 3

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.163	0.163	0.163
1.001	-	-	100	0.087	0.087	0.087
2.000	-	-	100	0.070	0.070	0.070
1.002	-	-	100	0.081	0.081	0.081
1.003	-	-	100	0.062	0.062	0.062
1.004	-	-	100	0.120	0.120	0.120
1.005	-	-	100	0.119	0.119	0.119
3.000	-	-	100	0.092	0.092	0.092
3.001	-	-	100	0.093	0.093	0.093
3.002	-	-	100	0.076	0.076	0.076
3.003	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
4.000	-	-	100	0.071	0.071	0.071
4.001	-	-	100	0.115	0.115	0.115
4.002	-	-	100	0.071	0.071	0.071
4.003	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				1.220	1.220	1.220

Online Controls for Surface Network 3

Hydro-Brake® Optimum Manhole: S3.22 HB, DS/PN: 1.009, Volume (m³): 8.2

Unit Reference	MD-SHE-0100-5000-1400-5000
Design Head (m)	1.400
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	100
Invert Level (m)	72.397
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.400	5.0	Kick-Flo®	0.855	4.0
Flush-Flo™	0.416	5.0	Mean Flow over Head Range	-	4.4

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	3.3	0.800	4.3	2.000	5.9	4.000	8.2	7.000	10.7
0.200	4.6	1.000	4.3	2.200	6.2	4.500	8.6	7.500	11.0
0.300	4.9	1.200	4.7	2.400	6.4	5.000	9.1	8.000	11.4
0.400	5.0	1.400	5.0	2.600	6.7	5.500	9.5	8.500	11.7
0.500	5.0	1.600	5.3	3.000	7.1	6.000	9.9	9.000	12.0
0.600	4.9	1.800	5.6	3.500	7.7	6.500	10.3	9.500	12.3

Storage Structures for Surface Network 3

Tank or Pond Manhole: S3.18 Outfall, DS/PN: 1.008

Invert Level (m) 72.415

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	709.9	1.500	1264.5

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

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 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 19.000	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.280	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	OFF
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, 2
Climate Change (%)	0, 0

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)	Flooded Volume (m³)
1.000	S3.1	15 Winter	1	+0%					74.349	-0.139	0.000
1.001	S3.2	15 Winter	1	+0%					73.861	-0.180	0.000
2.000	S3.3	15 Winter	1	+0%					73.956	-0.156	0.000
1.002	S3.4	15 Winter	1	+0%					73.693	-0.142	0.000
1.003	S3.5	15 Winter	1	+0%					73.417	-0.286	0.000
1.004	S3.6	15 Winter	1	+0%					73.213	-0.393	0.000
1.005	S3.7	15 Winter	1	+0%					73.146	-0.340	0.000
3.000	S3.8	15 Winter	1	+0%					73.947	-0.144	0.000
3.001	S3.9	15 Winter	1	+0%					73.833	-0.112	0.000
3.002	S3.10	15 Winter	1	+0%					73.582	-0.182	0.000
3.003	S3.11	15 Winter	1	+0%					73.373	-0.178	0.000
1.006	S3.12	15 Winter	1	+0%					73.119	-0.318	0.000
1.007	S3.13 Outfall	15 Winter	1	+0%					72.744	-0.376	0.000
4.000	S3.14	15 Winter	1	+0%					73.656	-0.155	0.000
4.001	S3.15	15 Winter	1	+0%					73.388	-0.202	0.000
4.002	S3.16	15 Winter	1	+0%					73.122	-0.184	0.000
4.003	S3.17 Outfall	960 Winter	1	+0%					72.682	-0.438	0.000
1.008	S3.18 Outfall	960 Winter	1	+0%					72.682	-0.333	0.000
1.009	S3.22 HB	960 Winter	1	+0%	1/60 Summer				72.685	0.138	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S3.1	0.31		18.8	OK	
1.001	S3.2	0.33		27.5	OK	
2.000	S3.3	0.20		8.0	OK	
1.002	S3.4	0.54		42.6	OK	
1.003	S3.5	0.29		48.6	OK	
1.004	S3.6	0.19		57.2	OK	
1.005	S3.7	0.25		64.1	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
3.000	S3.8	0.27		10.6	OK	
3.001	S3.9	0.50		19.6	OK	
3.002	S3.10	0.32		26.6	OK	
3.003	S3.11	0.35		26.8	OK	
1.006	S3.12	0.45		88.3	OK	
1.007	S3.13 Outfall	0.30		87.9	OK	
4.000	S3.14	0.21		8.3	OK	
4.001	S3.15	0.23		19.4	OK	
4.002	S3.16	0.32		26.0	OK	
4.003	S3.17 Outfall	0.01		3.4	OK	
1.008	S3.18 Outfall	0.03		5.3	OK	
1.009	S3.22 HB	0.38		4.9	SURCHARGED	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

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 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 19.000	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.280	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	OFF
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, 2
Climate Change (%)	0, 0

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)	Flooded Volume (m³)
1.000	S3.1	15 Winter	2	+0%					74.363	-0.125	0.000
1.001	S3.2	15 Winter	2	+0%					73.880	-0.161	0.000
2.000	S3.3	15 Winter	2	+0%					73.966	-0.146	0.000
1.002	S3.4	15 Winter	2	+0%					73.722	-0.113	0.000
1.003	S3.5	15 Winter	2	+0%					73.443	-0.260	0.000
1.004	S3.6	15 Winter	2	+0%					73.251	-0.355	0.000
1.005	S3.7	15 Winter	2	+0%					73.191	-0.295	0.000
3.000	S3.8	15 Winter	2	+0%					73.960	-0.131	0.000
3.001	S3.9	15 Winter	2	+0%					73.853	-0.092	0.000
3.002	S3.10	15 Winter	2	+0%					73.600	-0.164	0.000
3.003	S3.11	15 Winter	2	+0%					73.391	-0.160	0.000
1.006	S3.12	15 Winter	2	+0%					73.165	-0.272	0.000
1.007	S3.13 Outfall	15 Winter	2	+0%					72.778	-0.342	0.000
4.000	S3.14	15 Winter	2	+0%					73.666	-0.145	0.000
4.001	S3.15	15 Winter	2	+0%					73.402	-0.188	0.000
4.002	S3.16	15 Winter	2	+0%					73.140	-0.166	0.000
4.003	S3.17 Outfall	960 Winter	2	+0%					72.742	-0.378	0.000
1.008	S3.18 Outfall	960 Winter	2	+0%					72.742	-0.273	0.000
1.009	S3.22 HB	960 Winter	2	+0%	1/60 Summer				72.745	0.198	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S3.1	0.40		24.4	OK	
1.001	S3.2	0.43		35.6	OK	
2.000	S3.3	0.26		10.4	OK	
1.002	S3.4	0.70		55.0	OK	
1.003	S3.5	0.37		62.8	OK	
1.004	S3.6	0.25		73.4	OK	
1.005	S3.7	0.32		82.5	OK	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
3.000	S3.8	0.35		13.7	OK	
3.001	S3.9	0.65		25.4	OK	
3.002	S3.10	0.42		34.4	OK	
3.003	S3.11	0.45		34.6	OK	
1.006	S3.12	0.58		113.8	OK	
1.007	S3.13 Outfall	0.38		113.1	OK	
4.000	S3.14	0.27		10.6	OK	
4.001	S3.15	0.30		25.0	OK	
4.002	S3.16	0.41		33.6	OK	
4.003	S3.17 Outfall	0.01		4.0	OK	
1.008	S3.18 Outfall	0.03		5.5	OK	
1.009	S3.22 HB	0.38		5.0	SURCHARGED	

Surcharged Outfall Details for Surface Network 3

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.009	S3.23 Outfall	72.760	72.300	0.000	0	0

Datum (m) 0.000 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
5	71.160	185	71.160	365	71.160	545	71.160	725	71.160	905	71.160	1085	71.160	1265	71.160
10	71.160	190	71.160	370	71.160	550	71.160	730	71.160	910	71.160	1090	71.160	1270	71.160
15	71.160	195	71.160	375	71.160	555	71.160	735	71.160	915	71.160	1095	71.160	1275	71.160
20	71.160	200	71.160	380	71.160	560	71.160	740	71.160	920	71.160	1100	71.160	1280	71.160
25	71.160	205	71.160	385	71.160	565	71.160	745	71.160	925	71.160	1105	71.160	1285	71.160
30	71.160	210	71.160	390	71.160	570	71.160	750	71.160	930	71.160	1110	71.160	1290	71.160
35	71.160	215	71.160	395	71.160	575	71.160	755	71.160	935	71.160	1115	71.160	1295	71.160
40	71.160	220	71.160	400	71.160	580	71.160	760	71.160	940	71.160	1120	71.160	1300	71.160
45	71.160	225	71.160	405	71.160	585	71.160	765	71.160	945	71.160	1125	71.160	1305	71.160
50	71.160	230	71.160	410	71.160	590	71.160	770	71.160	950	71.160	1130	71.160	1310	71.160
55	71.160	235	71.160	415	71.160	595	71.160	775	71.160	955	71.160	1135	71.160	1315	71.160
60	71.160	240	71.160	420	71.160	600	71.160	780	71.160	960	71.160	1140	71.160	1320	71.160
65	71.160	245	71.160	425	71.160	605	71.160	785	71.160	965	71.160	1145	71.160	1325	71.160
70	71.160	250	71.160	430	71.160	610	71.160	790	71.160	970	71.160	1150	71.160	1330	71.160
75	71.160	255	71.160	435	71.160	615	71.160	795	71.160	975	71.160	1155	71.160	1335	71.160
80	71.160	260	71.160	440	71.160	620	71.160	800	71.160	980	71.160	1160	71.160	1340	71.160
85	71.160	265	71.160	445	71.160	625	71.160	805	71.160	985	71.160	1165	71.160	1345	71.160
90	71.160	270	71.160	450	71.160	630	71.160	810	71.160	990	71.160	1170	71.160	1350	71.160
95	71.160	275	71.160	455	71.160	635	71.160	815	71.160	995	71.160	1175	71.160	1355	71.160
100	71.160	280	71.160	460	71.160	640	71.160	820	71.160	1000	71.160	1180	71.160	1360	71.160
105	71.160	285	71.160	465	71.160	645	71.160	825	71.160	1005	71.160	1185	71.160	1365	71.160
110	71.160	290	71.160	470	71.160	650	71.160	830	71.160	1010	71.160	1190	71.160	1370	71.160
115	71.160	295	71.160	475	71.160	655	71.160	835	71.160	1015	71.160	1195	71.160	1375	71.160
120	71.160	300	71.160	480	71.160	660	71.160	840	71.160	1020	71.160	1200	71.160	1380	71.160
125	71.160	305	71.160	485	71.160	665	71.160	845	71.160	1025	71.160	1205	71.160	1385	71.160
130	71.160	310	71.160	490	71.160	670	71.160	850	71.160	1030	71.160	1210	71.160	1390	71.160
135	71.160	315	71.160	495	71.160	675	71.160	855	71.160	1035	71.160	1215	71.160	1395	71.160
140	71.160	320	71.160	500	71.160	680	71.160	860	71.160	1040	71.160	1220	71.160	1400	71.160
145	71.160	325	71.160	505	71.160	685	71.160	865	71.160	1045	71.160	1225	71.160	1405	71.160
150	71.160	330	71.160	510	71.160	690	71.160	870	71.160	1050	71.160	1230	71.160	1410	71.160
155	71.160	335	71.160	515	71.160	695	71.160	875	71.160	1055	71.160	1235	71.160	1415	71.160
160	71.160	340	71.160	520	71.160	700	71.160	880	71.160	1060	71.160	1240	71.160	1420	71.160
165	71.160	345	71.160	525	71.160	705	71.160	885	71.160	1065	71.160	1245	71.160	1425	71.160
170	71.160	350	71.160	530	71.160	710	71.160	890	71.160	1070	71.160	1250	71.160	1430	71.160
175	71.160	355	71.160	535	71.160	715	71.160	895	71.160	1075	71.160	1255	71.160	1435	71.160
180	71.160	360	71.160	540	71.160	720	71.160	900	71.160	1080	71.160	1260	71.160	1440	71.160

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

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 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 19.000	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.280	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	OFF
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)	30, 100
Climate Change (%)	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)
1.000	S3.1	15 Winter	30	+0%	100/15 Summer				74.412	-0.076
1.001	S3.2	15 Winter	30	+0%	30/15 Winter				74.055	0.014
2.000	S3.3	15 Winter	30	+0%	100/15 Summer				74.000	-0.112
1.002	S3.4	15 Winter	30	+0%	30/15 Summer				73.921	0.086
1.003	S3.5	15 Winter	30	+0%	100/15 Summer				73.532	-0.171
1.004	S3.6	15 Winter	30	+0%	100/15 Winter				73.414	-0.192
1.005	S3.7	15 Winter	30	+0%	100/15 Summer				73.378	-0.108
3.000	S3.8	15 Winter	30	+0%	30/15 Winter				74.096	0.005
3.001	S3.9	15 Winter	30	+0%	30/15 Summer				74.035	0.090
3.002	S3.10	15 Winter	30	+0%	100/15 Summer				73.675	-0.089
3.003	S3.11	15 Winter	30	+0%	100/15 Summer				73.470	-0.081
1.006	S3.12	15 Winter	30	+0%	100/15 Summer				73.350	-0.087
1.007	S3.13 Outfall	960 Winter	30	+0%	100/15 Summer				73.027	-0.093
4.000	S3.14	15 Winter	30	+0%	100/15 Summer				73.701	-0.110
4.001	S3.15	15 Winter	30	+0%	100/15 Summer				73.467	-0.123
4.002	S3.16	15 Winter	30	+0%	100/15 Summer				73.228	-0.078
4.003	S3.17 Outfall	960 Winter	30	+0%	100/120 Winter				73.027	-0.093
1.008	S3.18 Outfall	960 Winter	30	+0%	30/720 Winter				73.027	0.012
1.009	S3.22 HB	960 Winter	30	+0%	30/15 Summer				73.062	0.515

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S3.1	0.000	0.75		46.1	OK	
1.001	S3.2	0.000	0.81		67.2	SURCHARGED	
2.000	S3.3	0.000	0.49		19.6	OK	
1.002	S3.4	0.000	1.31		103.8	SURCHARGED	
1.003	S3.5	0.000	0.69		117.2	OK	
1.004	S3.6	0.000	0.46		136.8	OK	
1.005	S3.7	0.000	0.57		146.4	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
3.000	S3.8	0.000	0.64		24.6	SURCHARGED	
3.001	S3.9	0.000	1.23		48.3	SURCHARGED	
3.002	S3.10	0.000	0.82		68.1	OK	
3.003	S3.11	0.000	0.88		67.8	OK	
1.006	S3.12	0.000	1.05		207.0	OK	
1.007	S3.13 Outfall	0.000	0.09		25.4	OK	
4.000	S3.14	0.000	0.50		20.0	OK	
4.001	S3.15	0.000	0.63		52.9	OK	
4.002	S3.16	0.000	0.89		73.0	OK	
4.003	S3.17 Outfall	0.000	0.02		6.7	OK	
1.008	S3.18 Outfall	0.000	0.05		9.3	SURCHARGED	
1.009	S3.22 HB	0.000	0.38		5.0	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

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 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	19.000
Region	England and Wales	Ratio R	0.280
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	OFF
DVD Status	OFF
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)	30, 100
Climate Change (%)	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)
1.000	S3.1	15 Winter	100	+40%	100/15 Summer				75.285	0.797
1.001	S3.2	15 Winter	100	+40%	30/15 Winter				74.674	0.633
2.000	S3.3	15 Winter	100	+40%	100/15 Summer				74.495	0.383
1.002	S3.4	15 Winter	100	+40%	30/15 Summer				74.334	0.499
1.003	S3.5	15 Winter	100	+40%	100/15 Summer				73.761	0.058
1.004	S3.6	15 Winter	100	+40%	100/15 Winter				73.647	0.041
1.005	S3.7	15 Winter	100	+40%	100/15 Summer				73.578	0.092
3.000	S3.8	15 Winter	100	+40%	30/15 Winter				74.889	0.798
3.001	S3.9	15 Winter	100	+40%	30/15 Summer				74.739	0.794
3.002	S3.10	15 Winter	100	+40%	100/15 Summer				74.062	0.298
3.003	S3.11	15 Winter	100	+40%	100/15 Summer				73.726	0.175
1.006	S3.12	1440 Winter	100	+40%	100/15 Summer				73.558	0.121
1.007	S3.13 Outfall	1440 Winter	100	+40%	100/15 Summer				73.558	0.438
4.000	S3.14	15 Winter	100	+40%	100/15 Summer				73.912	0.101
4.001	S3.15	15 Winter	100	+40%	100/15 Summer				73.757	0.167
4.002	S3.16	1440 Winter	100	+40%	100/15 Summer				73.558	0.252
4.003	S3.17 Outfall	1440 Winter	100	+40%	100/120 Winter				73.557	0.437
1.008	S3.18 Outfall	1440 Winter	100	+40%	30/720 Winter				73.557	0.542
1.009	S3.22 HB	1440 Winter	100	+40%	30/15 Summer				73.604	1.057

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S3.1	0.000	1.16		71.4	SURCHARGED	
1.001	S3.2	0.000	1.27		104.6	SURCHARGED	
2.000	S3.3	0.000	0.75		30.3	SURCHARGED	
1.002	S3.4	0.000	2.09		164.7	SURCHARGED	
1.003	S3.5	0.000	1.09		185.2	SURCHARGED	
1.004	S3.6	0.000	0.75		225.4	SURCHARGED	
1.005	S3.7	0.000	1.03		262.6	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
3.000	S3.8	0.000	1.03		39.8	SURCHARGED	
3.001	S3.9	0.000	1.92		75.4	FLOOD RISK	
3.002	S3.10	0.000	1.28		105.7	SURCHARGED	
3.003	S3.11	0.000	1.33		102.9	SURCHARGED	
1.006	S3.12	0.000	0.17		33.2	SURCHARGED	
1.007	S3.13 Outfall	0.000	0.11		33.2	SURCHARGED	
4.000	S3.14	0.000	0.84		33.3	SURCHARGED	
4.001	S3.15	0.000	0.98		82.8	SURCHARGED	
4.002	S3.16	0.000	0.11		8.8	SURCHARGED	
4.003	S3.17 Outfall	0.000	0.02		8.5	SURCHARGED	
1.008	S3.18 Outfall	0.000	0.05		8.6	SURCHARGED	
1.009	S3.22 HB	0.000	0.38		5.0	SURCHARGED	

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 4

« - Indicates pipe capacity < flow

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
1.000	35.284	0.089	396.4	0.095	5.00	0.0	0.600	o	1200	Pipe/Conduit	
1.001	45.019	0.113	398.4	0.181	0.00	0.0	0.600	o	1200	Pipe/Conduit	
1.002	10.000	0.067	149.3	0.029	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.003	17.484	0.044	397.4	0.000	0.00	0.0	0.600	o	1200	Pipe/Conduit	
1.004	22.456	0.057	394.0	0.029	0.00	0.0	0.600	o	1200	Pipe/Conduit	
2.000	21.304	0.050	426.1	0.116	5.00	0.0	0.600	o	1200	Pipe/Conduit	
2.001	15.978	0.040	399.5	0.031	0.00	0.0	0.600	o	1200	Pipe/Conduit	
2.002	15.978	0.040	399.5	0.000	0.00	0.0	0.600	o	1200	Pipe/Conduit	
2.003	19.330	0.049	394.5	0.048	0.00	0.0	0.600	o	1200	Pipe/Conduit	
2.004	8.355	0.021	397.9	0.030	0.00	0.0	0.600	o	1200	Pipe/Conduit	
1.005	18.554	0.124	149.6	0.000	0.00	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)
1.000	50.00	5.31	74.864	0.095	0.0	0.0	0.0	1.87	2118.1	12.9
1.001	50.00	5.72	74.775	0.276	0.0	0.0	0.0	1.87	2112.9	37.4
1.002	50.00	5.92	74.662	0.305	0.0	0.0	0.0	0.82	14.5«	41.3
1.003	50.00	6.07	73.545	0.305	0.0	0.0	0.0	1.87	2115.6	41.3
1.004	50.00	6.27	73.501	0.334	0.0	0.0	0.0	1.88	2124.8	45.2
2.000	50.00	5.20	73.644	0.116	0.0	0.0	0.0	1.81	2042.6	15.7
2.001	50.00	5.34	73.594	0.147	0.0	0.0	0.0	1.87	2110.0	19.9
2.002	50.00	5.48	73.554	0.147	0.0	0.0	0.0	1.87	2110.0	19.9
2.003	50.00	5.65	73.514	0.195	0.0	0.0	0.0	1.88	2123.4	26.4
2.004	50.00	5.73	73.465	0.225	0.0	0.0	0.0	1.87	2114.3	30.5
1.005	49.91	6.56	73.444	0.559	0.0	0.0	0.0	1.07	42.4«	75.6

Manhole Schedules for Surface Network 4

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)
S4.1	79.212	4.348	Open Manhole	2400	1.000	74.864	1200				
S4.2	78.255	3.480	Open Manhole	2400	1.001	74.775	1200	1.000	74.775	1200	
S4.3 HB	77.693	3.031	Open Manhole	3000	1.002	74.662	150	1.001	74.662	1200	
S4.4	77.471	3.926	Open Manhole	2400	1.003	73.545	1200	1.002	74.595	150	
S4.5	76.706	3.205	Open Manhole	2400	1.004	73.501	1200	1.003	73.501	1200	
S4.6	76.137	2.493	Open Manhole	2400	2.000	73.644	1200				
S4.7	76.028	2.434	Open Manhole	2400	2.001	73.594	1200	2.000	73.594	1200	
S4.8	76.188	2.634	Open Manhole	2400	2.002	73.554	1200	2.001	73.554	1200	
S4.9	76.101	2.587	Open Manhole	2400	2.003	73.514	1200	2.002	73.514	1200	
S4.10	75.773	2.308	Open Manhole	2400	2.004	73.465	1200	2.003	73.465	1200	
S4.11 HB	75.598	2.154	Open Manhole	3000	1.005	73.444	225	1.004	73.444	1200	
								2.004	73.444	1200	
S4.12 Headwall	74.445	1.125	Open Manhole	0		OUTFALL		1.005	73.320	225	

PIPELINE SCHEDULES for Surface Network 4

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	1200	S4.1	79.212	74.864	3.148	Open Manhole	2400
1.001	o	1200	S4.2	78.255	74.775	2.280	Open Manhole	2400
1.002	o	150	S4.3 HB	77.693	74.662	2.881	Open Manhole	3000
1.003	o	1200	S4.4	77.471	73.545	2.726	Open Manhole	2400
1.004	o	1200	S4.5	76.706	73.501	2.005	Open Manhole	2400
2.000	o	1200	S4.6	76.137	73.644	1.293	Open Manhole	2400
2.001	o	1200	S4.7	76.028	73.594	1.234	Open Manhole	2400
2.002	o	1200	S4.8	76.188	73.554	1.434	Open Manhole	2400
2.003	o	1200	S4.9	76.101	73.514	1.387	Open Manhole	2400
2.004	o	1200	S4.10	75.773	73.465	1.108	Open Manhole	2400
1.005	o	225	S4.11 HB	75.598	73.444	1.929	Open Manhole	3000

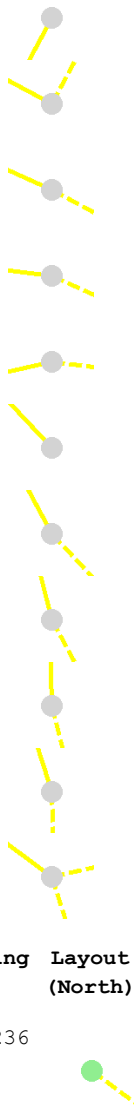
Downstream Manhole

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	35.284	396.4	S4.2	78.255	74.775	2.280	Open Manhole	2400
1.001	45.019	398.4	S4.3 HB	77.693	74.662	1.831	Open Manhole	3000
1.002	10.000	149.3	S4.4	77.471	74.595	2.726	Open Manhole	2400
1.003	17.484	397.4	S4.5	76.706	73.501	2.005	Open Manhole	2400
1.004	22.456	394.0	S4.11 HB	75.598	73.444	0.954	Open Manhole	3000
2.000	21.304	426.1	S4.7	76.028	73.594	1.234	Open Manhole	2400
2.001	15.978	399.5	S4.8	76.188	73.554	1.434	Open Manhole	2400
2.002	15.978	399.5	S4.9	76.101	73.514	1.387	Open Manhole	2400
2.003	19.330	394.5	S4.10	75.773	73.465	1.108	Open Manhole	2400
2.004	8.355	397.9	S4.11 HB	75.598	73.444	0.954	Open Manhole	3000
1.005	18.554	149.6	S4.12 Headwall	74.445	73.320	0.900	Open Manhole	0

Setting Out Information - True Coordinates (Surface Network 4)

PN	USMH Name	Dia/Len (mm)	Width (mm)	US Easting (m)	US Northing (m)	Layout (North)
1.000	S4.1	2400		374033.384	442216.682	
1.001	S4.2	2400		374016.703	442185.590	
1.002	S4.3 HB	3000		373977.033	442206.872	
1.003	S4.4	2400		373967.916	442210.983	
1.004	S4.5	2400		373950.567	442213.145	
2.000	S4.6	2400		373957.777	442135.818	
2.001	S4.7	2400		373943.198	442151.353	
2.002	S4.8	2400		373935.647	442165.433	
2.003	S4.9	2400		373931.718	442180.920	
2.004	S4.10	2400		373931.209	442200.244	
1.005	S4.11 HB	3000		373928.662	442208.201	

PN	DSMH Name	Dia/Len (mm)	Width (mm)	DS Easting (m)	DS Northing (m)	Layout (North)
1.005	S4.12 Headwall		0	373913.746	442219.236	



Area Summary for Surface Network 4

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.095	0.095	0.095
1.001	-	-	100	0.181	0.181	0.181
1.002	-	-	100	0.029	0.029	0.029
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.029	0.029	0.029
2.000	-	-	100	0.116	0.116	0.116
2.001	-	-	100	0.031	0.031	0.031
2.002	-	-	100	0.000	0.000	0.000
2.003	-	-	100	0.048	0.048	0.048
2.004	-	-	100	0.030	0.030	0.030
1.005	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.559	0.559	0.559

Online Controls for Surface Network 4

Hydro-Brake® Optimum Manhole: S4.3 HB, DS/PN: 1.002, Volume (m³): 69.3

Unit Reference	MD-SHE-0124-8000-1500-8000
Design Head (m)	1.500
Design Flow (l/s)	8.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	124
Invert Level (m)	74.662
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	8.0	Kick-Flo®	0.925	6.4
Flush-Flo™	0.444	8.0	Mean Flow over Head Range	-	7.0

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

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	4.4	0.800	7.3	2.000	9.2	4.000	12.7	7.000	16.6
0.200	7.2	1.000	6.6	2.200	9.6	4.500	13.4	7.500	17.2
0.300	7.8	1.200	7.2	2.400	10.0	5.000	14.1	8.000	17.7
0.400	8.0	1.400	7.7	2.600	10.4	5.500	14.8	8.500	18.2
0.500	8.0	1.600	8.2	3.000	11.1	6.000	15.4	9.000	18.7
0.600	7.9	1.800	8.7	3.500	11.9	6.500	16.0	9.500	19.2

Hydro-Brake® Optimum Manhole: S4.11 HB, DS/PN: 1.005, Volume (m³): 44.0

Unit Reference	MD-SHE-0148-1160-1500-1160
Design Head (m)	1.500
Design Flow (l/s)	11.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	148
Invert Level (m)	73.444
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	11.6	Kick-Flo®	0.943	9.3
Flush-Flo™	0.442	11.6	Mean Flow over Head Range	-	10.1

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	5.3	0.800	10.7	2.000	13.3	4.000	18.5	7.000	24.2
0.200	10.5	1.000	9.6	2.200	13.9	4.500	19.6	7.500	25.0
0.300	11.3	1.200	10.4	2.400	14.5	5.000	20.6	8.000	25.8
0.400	11.6	1.400	11.2	2.600	15.1	5.500	21.5	8.500	26.5
0.500	11.6	1.600	12.0	3.000	16.1	6.000	22.5	9.000	27.3
0.600	11.4	1.800	12.6	3.500	17.3	6.500	23.3	9.500	28.0

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 4

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 2 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 19.000	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.280	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	OFF
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, 2
Climate Change (%)	0, 0

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)	Flooded Volume (m³)
1.000	S4.1	60 Winter	1	+0%					75.012	-1.052	0.000
1.001	S4.2	60 Winter	1	+0%					75.012	-0.963	0.000
1.002	S4.3 HB	60 Winter	1	+0%	1/15 Summer				75.011	0.199	0.000
1.003	S4.4	120 Winter	1	+0%					73.765	-0.980	0.000
1.004	S4.5	120 Winter	1	+0%					73.764	-0.937	0.000
2.000	S4.6	120 Winter	1	+0%					73.764	-1.080	0.000
2.001	S4.7	120 Winter	1	+0%					73.764	-1.030	0.000
2.002	S4.8	120 Winter	1	+0%					73.764	-0.990	0.000
2.003	S4.9	120 Winter	1	+0%					73.764	-0.950	0.000
2.004	S4.10	120 Winter	1	+0%					73.764	-0.901	0.000
1.005	S4.11 HB	120 Winter	1	+0%	1/15 Summer				73.764	0.095	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S4.1	0.00		5.9	OK	
1.001	S4.2	0.01		14.8	OK	
1.002	S4.3 HB	0.61		7.9	SURCHARGED	
1.003	S4.4	0.01		7.8	OK	
1.004	S4.5	0.01		8.2	OK	
2.000	S4.6	0.00		5.1	OK	
2.001	S4.7	0.01		6.0	OK	
2.002	S4.8	0.00		5.1	OK	
2.003	S4.9	0.01		6.4	OK	
2.004	S4.10	0.01		6.1	OK	
1.005	S4.11 HB	0.30		11.4	SURCHARGED	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 4

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 2 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 19.000	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.280	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	OFF
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, 2
Climate Change (%)	0, 0

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)	Flooded Volume (m³)
1.000	S4.1	60 Winter	2	+0%					75.087	-0.977	0.000
1.001	S4.2	60 Winter	2	+0%					75.087	-0.888	0.000
1.002	S4.3 HB	60 Winter	2	+0%	1/15 Summer				75.087	0.275	0.000
1.003	S4.4	120 Winter	2	+0%					73.820	-0.925	0.000
1.004	S4.5	120 Winter	2	+0%					73.820	-0.881	0.000
2.000	S4.6	120 Winter	2	+0%					73.819	-1.025	0.000
2.001	S4.7	120 Winter	2	+0%					73.819	-0.975	0.000
2.002	S4.8	120 Winter	2	+0%					73.819	-0.935	0.000
2.003	S4.9	120 Winter	2	+0%					73.819	-0.895	0.000
2.004	S4.10	120 Winter	2	+0%					73.820	-0.845	0.000
1.005	S4.11 HB	120 Winter	2	+0%	1/15 Summer				73.820	0.151	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S4.1	0.00		7.2	OK	
1.001	S4.2	0.01		17.5	OK	
1.002	S4.3 HB	0.62		8.0	SURCHARGED	
1.003	S4.4	0.01		8.0	OK	
1.004	S4.5	0.01		8.4	OK	
2.000	S4.6	0.01		6.3	OK	
2.001	S4.7	0.01		7.0	OK	
2.002	S4.8	0.01		5.8	OK	
2.003	S4.9	0.01		7.4	OK	
2.004	S4.10	0.01		7.0	OK	
1.005	S4.11 HB	0.30		11.5	SURCHARGED	

Surcharged Outfall Details for Surface Network 4

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.005	S4.12 Headwall	74.445	73.320	0.000	0	0

Datum (m) 0.000 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
5	73.380	185	73.380	365	73.380	545	73.380	725	73.380	905	73.380	1085	73.380	1265	73.380
10	73.380	190	73.380	370	73.380	550	73.380	730	73.380	910	73.380	1090	73.380	1270	73.380
15	73.380	195	73.380	375	73.380	555	73.380	735	73.380	915	73.380	1095	73.380	1275	73.380
20	73.380	200	73.380	380	73.380	560	73.380	740	73.380	920	73.380	1100	73.380	1280	73.380
25	73.380	205	73.380	385	73.380	565	73.380	745	73.380	925	73.380	1105	73.380	1285	73.380
30	73.380	210	73.380	390	73.380	570	73.380	750	73.380	930	73.380	1110	73.380	1290	73.380
35	73.380	215	73.380	395	73.380	575	73.380	755	73.380	935	73.380	1115	73.380	1295	73.380
40	73.380	220	73.380	400	73.380	580	73.380	760	73.380	940	73.380	1120	73.380	1300	73.380
45	73.380	225	73.380	405	73.380	585	73.380	765	73.380	945	73.380	1125	73.380	1305	73.380
50	73.380	230	73.380	410	73.380	590	73.380	770	73.380	950	73.380	1130	73.380	1310	73.380
55	73.380	235	73.380	415	73.380	595	73.380	775	73.380	955	73.380	1135	73.380	1315	73.380
60	73.380	240	73.380	420	73.380	600	73.380	780	73.380	960	73.380	1140	73.380	1320	73.380
65	73.380	245	73.380	425	73.380	605	73.380	785	73.380	965	73.380	1145	73.380	1325	73.380
70	73.380	250	73.380	430	73.380	610	73.380	790	73.380	970	73.380	1150	73.380	1330	73.380
75	73.380	255	73.380	435	73.380	615	73.380	795	73.380	975	73.380	1155	73.380	1335	73.380
80	73.380	260	73.380	440	73.380	620	73.380	800	73.380	980	73.380	1160	73.380	1340	73.380
85	73.380	265	73.380	445	73.380	625	73.380	805	73.380	985	73.380	1165	73.380	1345	73.380
90	73.380	270	73.380	450	73.380	630	73.380	810	73.380	990	73.380	1170	73.380	1350	73.380
95	73.380	275	73.380	455	73.380	635	73.380	815	73.380	995	73.380	1175	73.380	1355	73.380
100	73.380	280	73.380	460	73.380	640	73.380	820	73.380	1000	73.380	1180	73.380	1360	73.380
105	73.380	285	73.380	465	73.380	645	73.380	825	73.380	1005	73.380	1185	73.380	1365	73.380
110	73.380	290	73.380	470	73.380	650	73.380	830	73.380	1010	73.380	1190	73.380	1370	73.380
115	73.380	295	73.380	475	73.380	655	73.380	835	73.380	1015	73.380	1195	73.380	1375	73.380
120	73.380	300	73.380	480	73.380	660	73.380	840	73.380	1020	73.380	1200	73.380	1380	73.380
125	73.380	305	73.380	485	73.380	665	73.380	845	73.380	1025	73.380	1205	73.380	1385	73.380
130	73.380	310	73.380	490	73.380	670	73.380	850	73.380	1030	73.380	1210	73.380	1390	73.380
135	73.380	315	73.380	495	73.380	675	73.380	855	73.380	1035	73.380	1215	73.380	1395	73.380
140	73.380	320	73.380	500	73.380	680	73.380	860	73.380	1040	73.380	1220	73.380	1400	73.380
145	73.380	325	73.380	505	73.380	685	73.380	865	73.380	1045	73.380	1225	73.380	1405	73.380
150	73.380	330	73.380	510	73.380	690	73.380	870	73.380	1050	73.380	1230	73.380	1410	73.380
155	73.380	335	73.380	515	73.380	695	73.380	875	73.380	1055	73.380	1235	73.380	1415	73.380
160	73.380	340	73.380	520	73.380	700	73.380	880	73.380	1060	73.380	1240	73.380	1420	73.380
165	73.380	345	73.380	525	73.380	705	73.380	885	73.380	1065	73.380	1245	73.380	1425	73.380
170	73.380	350	73.380	530	73.380	710	73.380	890	73.380	1070	73.380	1250	73.380	1430	73.380
175	73.380	355	73.380	535	73.380	715	73.380	895	73.380	1075	73.380	1255	73.380	1435	73.380
180	73.380	360	73.380	540	73.380	720	73.380	900	73.380	1080	73.380	1260	73.380	1440	73.380

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 4

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 2 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 19.000	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.280	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	OFF
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)	30, 100
Climate Change (%)	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)	Flooded Volume (m³)
1.000	S4.1	120 Winter	30	+0%	100/60 Winter				75.406	-0.658	0.000
1.001	S4.2	120 Winter	30	+0%	100/60 Winter				75.406	-0.569	0.000
1.002	S4.3 HB	120 Winter	30	+0%	30/15 Summer				75.406	0.594	0.000
1.003	S4.4	180 Winter	30	+0%					74.050	-0.695	0.000
1.004	S4.5	180 Winter	30	+0%					74.050	-0.651	0.000
2.000	S4.6	180 Winter	30	+0%					74.050	-0.794	0.000
2.001	S4.7	180 Winter	30	+0%					74.050	-0.744	0.000
2.002	S4.8	180 Winter	30	+0%					74.050	-0.704	0.000
2.003	S4.9	180 Winter	30	+0%					74.050	-0.664	0.000
2.004	S4.10	180 Winter	30	+0%					74.050	-0.615	0.000
1.005	S4.11 HB	180 Winter	30	+0%	30/15 Summer				74.050	0.381	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S4.1	0.01		9.1	OK	
1.001	S4.2	0.01		19.1	OK	
1.002	S4.3 HB	0.62		8.0	SURCHARGED	
1.003	S4.4	0.01		8.1	OK	
1.004	S4.5	0.01		8.6	OK	
2.000	S4.6	0.01		9.0	OK	
2.001	S4.7	0.01		9.3	OK	
2.002	S4.8	0.01		7.2	OK	
2.003	S4.9	0.01		9.0	OK	
2.004	S4.10	0.01		8.7	OK	
1.005	S4.11 HB	0.30		11.6	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 4

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 2 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 19.000	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.280	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	OFF
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)	30, 100
Climate Change (%)	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)	Flooded Volume (m³)
1.000	S4.1	180 Winter	100	+40%	100/60 Winter				76.876	0.812	0.000
1.001	S4.2	180 Winter	100	+40%	100/60 Winter				76.876	0.901	0.000
1.002	S4.3 HB	180 Winter	100	+40%	30/15 Summer				76.876	2.064	0.000
1.003	S4.4	240 Winter	100	+40%					74.631	-0.114	0.000
1.004	S4.5	240 Winter	100	+40%					74.630	-0.071	0.000
2.000	S4.6	240 Winter	100	+40%					74.630	-0.214	0.000
2.001	S4.7	240 Winter	100	+40%					74.630	-0.164	0.000
2.002	S4.8	240 Winter	100	+40%					74.630	-0.124	0.000
2.003	S4.9	240 Winter	100	+40%					74.630	-0.084	0.000
2.004	S4.10	240 Winter	100	+40%					74.630	-0.035	0.000
1.005	S4.11 HB	240 Winter	100	+40%	30/15 Summer				74.630	0.961	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S4.1	0.01		12.7	SURCHARGED	
1.001	S4.2	0.02		23.7	SURCHARGED	
1.002	S4.3 HB	0.74		9.6	SURCHARGED	
1.003	S4.4	0.01		9.1	OK	
1.004	S4.5	0.01		9.1	OK	
2.000	S4.6	0.01		13.6	OK	
2.001	S4.7	0.01		13.1	OK	
2.002	S4.8	0.01		9.6	OK	
2.003	S4.9	0.01		12.1	OK	
2.004	S4.10	0.01		11.7	OK	
1.005	S4.11 HB	0.30		11.6	SURCHARGED	

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 5

« - Indicates pipe capacity < flow

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
1.000	39.800	0.100	398.0	0.106	5.00	0.0	0.600	o	1050	Pipe/Conduit	
2.000	33.355	0.084	397.1	0.119	5.00	0.0	0.600	o	1050	Pipe/Conduit	
1.001	10.000	0.067	149.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	46.016	0.116	396.7	0.099	0.00	0.0	0.600	o	1350	Pipe/Conduit	
3.000	45.706	0.115	397.4	0.080	5.00	0.0	0.600	o	1350	Pipe/Conduit	
1.003	17.739	0.119	149.1	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)
1.000	50.00	5.39	75.252	0.106	0.0	0.0	0.0	1.72	1490.4	14.4
2.000	50.00	5.32	75.236	0.119	0.0	0.0	0.0	1.72	1492.1	16.1
1.001	50.00	5.59	75.152	0.225	0.0	0.0	0.0	0.82	14.5«	30.5
1.002	50.00	5.97	72.735	0.324	0.0	0.0	0.0	2.01	2881.4	43.9
3.000	50.00	5.38	72.734	0.080	0.0	0.0	0.0	2.01	2878.6	10.8
1.003	50.00	6.33	72.619	0.404	0.0	0.0	0.0	0.82	14.5«	54.7

Manhole Schedules for Surface Network 5

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)
S5.1	78.545	3.293	Open Manhole	2100	1.000	75.252	1050				
S5.2	79.875	4.639	Open Manhole	2100	2.000	75.236	1050				
S5.3 HB	78.864	3.712	Open Manhole	2700	1.001	75.152	150	1.000	75.152	1050	
								2.000	75.152	1050	
S5.4	78.364	5.629	Open Manhole	2400	1.002	72.735	1350	1.001	75.085	150	1150
S5.5	76.061	3.327	Open Manhole	2400	3.000	72.734	1350				
S5.6 HB	76.450	3.831	Open Manhole	3000	1.003	72.619	150	1.002	72.619	1350	
								3.000	72.619	1350	
S5.7 Outfall	73.550	1.050	Open Manhole	0		OUTFALL		1.003	72.500	150	

PIPELINE SCHEDULES for Surface Network 5

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	1050	S5.1	78.545	75.252	2.243	Open Manhole	2100
2.000	o	1050	S5.2	79.875	75.236	3.589	Open Manhole	2100
1.001	o	150	S5.3 HB	78.864	75.152	3.562	Open Manhole	2700
1.002	o	1350	S5.4	78.364	72.735	4.279	Open Manhole	2400
3.000	o	1350	S5.5	76.061	72.734	1.977	Open Manhole	2400
1.003	o	150	S5.6 HB	76.450	72.619	3.681	Open Manhole	3000

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	39.800	398.0	S5.3 HB	78.864	75.152	2.662	Open Manhole	2700
2.000	33.355	397.1	S5.3 HB	78.864	75.152	2.662	Open Manhole	2700
1.001	10.000	149.3	S5.4	78.364	75.085	3.129	Open Manhole	2400
1.002	46.016	396.7	S5.6 HB	76.450	72.619	2.481	Open Manhole	3000
3.000	45.706	397.4	S5.6 HB	76.450	72.619	2.481	Open Manhole	3000
1.003	17.739	149.1	S5.7 Outfall	73.550	72.500	0.900	Open Manhole	0

Setting Out Information - True Coordinates (Surface Network 5)

PN	USMH Name	Dia/Len (mm)	Width (mm)	US Easting (m)	US Northing (m)	Layout (North)
1.000	S5.1	2100		373987.548	442217.452	
2.000	S5.2	2100		374035.756	442236.756	
1.001	S5.3 HB	2700		374006.363	442252.524	
1.002	S5.4	2400		373997.551	442257.252	
3.000	S5.5	2400		373935.395	442238.729	
1.003	S5.6 HB	3000		373957.002	442279.005	

PN	DSMH Name	Dia/Len (mm)	Width (mm)	DS Easting (m)	DS Northing (m)	Layout (North)
1.003	S5.7 Outfall	0		373945.933	442292.868	

Area Summary for Surface Network 5

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.106	0.106	0.106
2.000	-	-	100	0.119	0.119	0.119
1.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.099	0.099	0.099
3.000	-	-	100	0.080	0.080	0.080
1.003	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.404	0.404	0.404

Online Controls for Surface Network 5

Hydro-Brake® Optimum Manhole: S5.3 HB, DS/PN: 1.001, Volume (m³): 80.4

Unit Reference	MD-SHE-0100-5000-1400-5000
Design Head (m)	1.400
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	100
Invert Level (m)	75.152
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.400	5.0	Kick-Flo®	0.855	4.0
Flush-Flo™	0.416	5.0	Mean Flow over Head Range	-	4.4

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	3.3	0.800	4.3	2.000	5.9	4.000	8.2	7.000	10.7
0.200	4.6	1.000	4.3	2.200	6.2	4.500	8.6	7.500	11.0
0.300	4.9	1.200	4.7	2.400	6.4	5.000	9.1	8.000	11.4
0.400	5.0	1.400	5.0	2.600	6.7	5.500	9.5	8.500	11.7
0.500	5.0	1.600	5.3	3.000	7.1	6.000	9.9	9.000	12.0
0.600	4.9	1.800	5.6	3.500	7.7	6.500	10.3	9.500	12.3

Hydro-Brake® Optimum Manhole: S5.6 HB, DS/PN: 1.003, Volume (m³): 150.6

Unit Reference	MD-SHE-0111-6500-1600-6500
Design Head (m)	1.600
Design Flow (l/s)	6.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	111
Invert Level (m)	72.619
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.600	6.5	Kick-Flo®	0.981	5.2
Flush-Flo™	0.482	6.5	Mean Flow over Head Range	-	5.7

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	3.8	0.800	6.1	2.000	7.2	4.000	10.0	7.000	13.1
0.200	5.7	1.000	5.2	2.200	7.5	4.500	10.6	7.500	13.5
0.300	6.2	1.200	5.7	2.400	7.9	5.000	11.1	8.000	13.9
0.400	6.5	1.400	6.1	2.600	8.2	5.500	11.6	8.500	14.3
0.500	6.5	1.600	6.5	3.000	8.7	6.000	12.1	9.000	14.7
0.600	6.4	1.800	6.9	3.500	9.4	6.500	12.6	9.500	15.1

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 5

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 2 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 19.000	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.280	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	OFF
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, 2
Climate Change (%)	0, 0

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)	Flooded Volume (m³)
1.000	S5.1	60 Winter	1	+0%					75.457	-0.845	0.000
2.000	S5.2	60 Winter	1	+0%					75.457	-0.829	0.000
1.001	S5.3 HB	60 Winter	1	+0%	1/15 Summer				75.457	0.155	0.000
1.002	S5.4	180 Winter	1	+0%					72.952	-1.133	0.000
3.000	S5.5	180 Winter	1	+0%					72.952	-1.132	0.000
1.003	S5.6 HB	180 Winter	1	+0%	1/15 Summer				72.952	0.183	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S5.1	0.01		6.6	OK	
2.000	S5.2	0.01		7.5	OK	
1.001	S5.3 HB	0.38		4.9	SURCHARGED	
1.002	S5.4	0.00		8.0	OK	
3.000	S5.5	0.00		2.6	OK	
1.003	S5.6 HB	0.47		6.3	SURCHARGED	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 5

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 2 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 19.000	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.280	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	OFF
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, 2
Climate Change (%)	0, 0

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)	Flooded Volume (m³)
1.000	S5.1	60 Winter	2	+0%					75.523	-0.779	0.000
2.000	S5.2	60 Winter	2	+0%					75.523	-0.763	0.000
1.001	S5.3 HB	60 Winter	2	+0%	1/15 Summer				75.523	0.221	0.000
1.002	S5.4	180 Winter	2	+0%					73.008	-1.077	0.000
3.000	S5.5	180 Winter	2	+0%					73.007	-1.077	0.000
1.003	S5.6 HB	180 Winter	2	+0%	1/15 Summer				73.007	0.238	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S5.1	0.01		8.3	OK	
2.000	S5.2	0.01		9.5	OK	
1.001	S5.3 HB	0.39		5.0	SURCHARGED	
1.002	S5.4	0.00		8.9	OK	
3.000	S5.5	0.00		3.2	OK	
1.003	S5.6 HB	0.48		6.4	SURCHARGED	

Surcharged Outfall Details for Surface Network 5

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.003	S5.7 Outfall	73.550	72.500	0.000	0	0

Datum (m) 0.000 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
5	72.600	185	72.600	365	72.600	545	72.600	725	72.600	905	72.600	1085	72.600	1265	72.600
10	72.600	190	72.600	370	72.600	550	72.600	730	72.600	910	72.600	1090	72.600	1270	72.600
15	72.600	195	72.600	375	72.600	555	72.600	735	72.600	915	72.600	1095	72.600	1275	72.600
20	72.600	200	72.600	380	72.600	560	72.600	740	72.600	920	72.600	1100	72.600	1280	72.600
25	72.600	205	72.600	385	72.600	565	72.600	745	72.600	925	72.600	1105	72.600	1285	72.600
30	72.600	210	72.600	390	72.600	570	72.600	750	72.600	930	72.600	1110	72.600	1290	72.600
35	72.600	215	72.600	395	72.600	575	72.600	755	72.600	935	72.600	1115	72.600	1295	72.600
40	72.600	220	72.600	400	72.600	580	72.600	760	72.600	940	72.600	1120	72.600	1300	72.600
45	72.600	225	72.600	405	72.600	585	72.600	765	72.600	945	72.600	1125	72.600	1305	72.600
50	72.600	230	72.600	410	72.600	590	72.600	770	72.600	950	72.600	1130	72.600	1310	72.600
55	72.600	235	72.600	415	72.600	595	72.600	775	72.600	955	72.600	1135	72.600	1315	72.600
60	72.600	240	72.600	420	72.600	600	72.600	780	72.600	960	72.600	1140	72.600	1320	72.600
65	72.600	245	72.600	425	72.600	605	72.600	785	72.600	965	72.600	1145	72.600	1325	72.600
70	72.600	250	72.600	430	72.600	610	72.600	790	72.600	970	72.600	1150	72.600	1330	72.600
75	72.600	255	72.600	435	72.600	615	72.600	795	72.600	975	72.600	1155	72.600	1335	72.600
80	72.600	260	72.600	440	72.600	620	72.600	800	72.600	980	72.600	1160	72.600	1340	72.600
85	72.600	265	72.600	445	72.600	625	72.600	805	72.600	985	72.600	1165	72.600	1345	72.600
90	72.600	270	72.600	450	72.600	630	72.600	810	72.600	990	72.600	1170	72.600	1350	72.600
95	72.600	275	72.600	455	72.600	635	72.600	815	72.600	995	72.600	1175	72.600	1355	72.600
100	72.600	280	72.600	460	72.600	640	72.600	820	72.600	1000	72.600	1180	72.600	1360	72.600
105	72.600	285	72.600	465	72.600	645	72.600	825	72.600	1005	72.600	1185	72.600	1365	72.600
110	72.600	290	72.600	470	72.600	650	72.600	830	72.600	1010	72.600	1190	72.600	1370	72.600
115	72.600	295	72.600	475	72.600	655	72.600	835	72.600	1015	72.600	1195	72.600	1375	72.600
120	72.600	300	72.600	480	72.600	660	72.600	840	72.600	1020	72.600	1200	72.600	1380	72.600
125	72.600	305	72.600	485	72.600	665	72.600	845	72.600	1025	72.600	1205	72.600	1385	72.600
130	72.600	310	72.600	490	72.600	670	72.600	850	72.600	1030	72.600	1210	72.600	1390	72.600
135	72.600	315	72.600	495	72.600	675	72.600	855	72.600	1035	72.600	1215	72.600	1395	72.600
140	72.600	320	72.600	500	72.600	680	72.600	860	72.600	1040	72.600	1220	72.600	1400	72.600
145	72.600	325	72.600	505	72.600	685	72.600	865	72.600	1045	72.600	1225	72.600	1405	72.600
150	72.600	330	72.600	510	72.600	690	72.600	870	72.600	1050	72.600	1230	72.600	1410	72.600
155	72.600	335	72.600	515	72.600	695	72.600	875	72.600	1055	72.600	1235	72.600	1415	72.600
160	72.600	340	72.600	520	72.600	700	72.600	880	72.600	1060	72.600	1240	72.600	1420	72.600
165	72.600	345	72.600	525	72.600	705	72.600	885	72.600	1065	72.600	1245	72.600	1425	72.600
170	72.600	350	72.600	530	72.600	710	72.600	890	72.600	1070	72.600	1250	72.600	1430	72.600
175	72.600	355	72.600	535	72.600	715	72.600	895	72.600	1075	72.600	1255	72.600	1435	72.600
180	72.600	360	72.600	540	72.600	720	72.600	900	72.600	1080	72.600	1260	72.600	1440	72.600

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 5

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 2 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm) 19.000	Cv (Summer) 0.750
Region	England and Wales	Ratio R 0.280	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	OFF
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)	30, 100
Climate Change (%)	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)	Flooded Volume (m³)
1.000	S5.1	120 Winter	30	+0%	100/60 Summer				75.838	-0.464	0.000
2.000	S5.2	120 Winter	30	+0%	100/60 Summer				75.838	-0.448	0.000
1.001	S5.3 HB	120 Winter	30	+0%	30/15 Summer				75.838	0.536	0.000
1.002	S5.4	360 Winter	30	+0%					73.253	-0.832	0.000
3.000	S5.5	360 Winter	30	+0%					73.253	-0.831	0.000
1.003	S5.6 HB	360 Winter	30	+0%	30/15 Summer				73.253	0.484	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S5.1	0.01		10.6	OK	
2.000	S5.2	0.01		12.1	OK	
1.001	S5.3 HB	0.39		5.0	SURCHARGED	
1.002	S5.4	0.00		9.8	OK	
3.000	S5.5	0.00		3.8	OK	
1.003	S5.6 HB	0.48		6.5	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 5

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 2 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	19.000
Region	England and Wales	Ratio R	0.280
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	OFF
DVD Status	OFF
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)	30, 100
Climate Change (%)	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)	Flooded Volume (m³)
1.000	S5.1	180 Winter	100	+40%	100/60 Summer				77.849	1.547	0.000
2.000	S5.2	180 Winter	100	+40%	100/60 Summer				77.850	1.564	0.000
1.001	S5.3 HB	180 Winter	100	+40%	30/15 Summer				77.850	2.548	0.000
1.002	S5.4	360 Winter	100	+40%					73.884	-0.201	0.000
3.000	S5.5	360 Winter	100	+40%					73.883	-0.201	0.000
1.003	S5.6 HB	360 Winter	100	+40%	30/15 Summer				73.884	1.115	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S5.1	0.01		14.7	SURCHARGED	
2.000	S5.2	0.02		16.8	SURCHARGED	
1.001	S5.3 HB	0.53		6.8	SURCHARGED	
1.002	S5.4	0.01		13.3	OK	
3.000	S5.5	0.00		7.0	OK	
1.003	S5.6 HB	0.48		6.5	SURCHARGED	

FOUL SEWERAGE DESIGN

Network Design Table for Foul Network 2

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	53.678	0.671	80.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
2.000	27.538	0.345	79.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.001	31.956	0.213	150.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.002	13.526	0.091	148.6	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.003	18.234	0.122	149.5	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.004	27.583	0.184	149.9	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.005	24.662	0.165	149.5	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.006	22.209	0.149	149.1	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.007	17.678	0.118	149.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.008	13.980	0.094	148.7	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.009	13.088	0.088	148.7	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
3.000	29.355	1.248	23.5	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
3.001	18.004	0.600	30.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
3.002	38.012	1.600	23.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
3.003	50.565	0.412	122.7	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
3.004	17.918	0.120	149.3	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
3.005	7.750	0.052	149.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
4.000	35.284	0.879	40.1	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
4.001	50.667	0.645	78.6	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
4.002	14.116	0.484	29.2	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
4.003	12.729	0.652	19.5	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
4.004	15.464	0.787	19.6	0.000	0	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	72.850	0.000	0.0	0	0.0	0	0.00	0.98	17.3	0.0
2.000	73.307	0.000	0.0	0	0.0	0	0.00	0.98	17.3	0.0
1.001	72.179	0.000	0.0	0	0.0	0	0.00	0.71	12.6	0.0
1.002	71.966	0.000	0.0	0	0.0	0	0.00	0.72	12.7	0.0
1.003	71.875	0.000	0.0	0	0.0	0	0.00	0.72	12.6	0.0
1.004	71.753	0.000	0.0	0	0.0	0	0.00	0.71	12.6	0.0
1.005	71.569	0.000	0.0	0	0.0	0	0.00	0.72	12.6	0.0
1.006	71.404	0.000	0.0	0	0.0	0	0.00	0.72	12.7	0.0
1.007	71.255	0.000	0.0	0	0.0	0	0.00	0.71	12.6	0.0
1.008	71.137	0.000	0.0	0	0.0	0	0.00	0.72	12.7	0.0
1.009	71.043	0.000	0.0	0	0.0	0	0.00	0.72	12.7	0.0
3.000	77.748	0.000	0.0	0	0.0	0	0.00	1.81	32.0	0.0
3.001	76.500	0.000	0.0	0	0.0	0	0.00	1.60	28.3	0.0
3.002	75.900	0.000	0.0	0	0.0	0	0.00	1.80	31.9	0.0
3.003	74.300	0.000	0.0	0	0.0	0	0.00	0.79	14.0	0.0
3.004	73.888	0.000	0.0	0	0.0	0	0.00	0.72	12.7	0.0
3.005	72.676	0.000	0.0	0	0.0	0	0.00	0.72	12.7	0.0
4.000	76.997	0.000	0.0	0	0.0	0	0.00	1.39	24.5	0.0
4.001	76.118	0.000	0.0	0	0.0	0	0.00	0.99	17.5	0.0
4.002	75.473	0.000	0.0	0	0.0	0	0.00	1.63	28.7	0.0
4.003	74.989	0.000	0.0	0	0.0	0	0.00	1.99	35.1	0.0
4.004	74.337	0.000	0.0	0	0.0	0	0.00	1.98	35.0	0.0

FOUL SEWERAGE DESIGN

Network Design Table for Foul Network 2

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
5.000	20.551	0.257	80.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
5.001	5.000	0.040	125.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
5.002	10.529	0.085	123.9	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
5.003	5.000	0.040	125.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
5.004	14.481	0.116	124.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
5.005	8.658	0.070	123.7	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
5.006	7.468	0.060	124.5	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
5.007	8.105	0.065	124.7	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
3.006	4.074	0.028	145.5	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
3.007	19.805	0.132	150.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
3.008	9.460	0.064	147.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
6.000	27.462	0.807	34.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
6.001	29.507	0.296	99.7	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
6.002	13.210	0.089	148.4	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
6.003	20.843	0.139	149.9	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
6.004	29.317	0.196	149.6	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
7.000	18.351	0.230	79.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
7.001	11.337	0.142	79.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
7.002	14.199	0.178	79.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
6.005	10.725	0.072	149.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
6.006	23.049	0.154	149.7	0.000	0	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
5.000	74.504	0.000	0.0	0	0.0	0	0.00	0.98	17.3	0.0
5.001	74.247	0.000	0.0	0	0.0	0	0.00	0.78	13.8	0.0
5.002	74.207	0.000	0.0	0	0.0	0	0.00	0.79	13.9	0.0
5.003	74.122	0.000	0.0	0	0.0	0	0.00	0.78	13.8	0.0
5.004	74.082	0.000	0.0	0	0.0	0	0.00	0.78	13.8	0.0
5.005	73.966	0.000	0.0	0	0.0	0	0.00	0.79	13.9	0.0
5.006	73.896	0.000	0.0	0	0.0	0	0.00	0.78	13.9	0.0
5.007	73.836	0.000	0.0	0	0.0	0	0.00	0.78	13.9	0.0
3.006	72.624	0.000	0.0	0	0.0	0	0.00	0.73	12.8	0.0
3.007	72.596	0.000	0.0	0	0.0	0	0.00	0.71	12.6	0.0
3.008	72.464	0.000	0.0	0	0.0	0	0.00	0.72	12.7	0.0
6.000	71.800	0.000	0.0	0	0.0	0	0.00	1.51	26.6	0.0
6.001	70.993	0.000	0.0	0	0.0	0	0.00	0.88	15.5	0.0
6.002	70.697	0.000	0.0	0	0.0	0	0.00	0.72	12.7	0.0
6.003	70.608	0.000	0.0	0	0.0	0	0.00	0.71	12.6	0.0
6.004	70.469	0.000	0.0	0	0.0	0	0.00	0.72	12.6	0.0
7.000	72.043	0.000	0.0	0	0.0	0	0.00	0.98	17.3	0.0
7.001	71.813	0.000	0.0	0	0.0	0	0.00	0.98	17.3	0.0
7.002	71.671	0.000	0.0	0	0.0	0	0.00	0.98	17.3	0.0
6.005	70.273	0.000	0.0	0	0.0	0	0.00	0.72	12.7	0.0
6.006	70.201	0.000	0.0	0	0.0	0	0.00	0.71	12.6	0.0

FOUL SEWERAGE DESIGN

Network Design Table for Foul Network 2

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
6.007	14.034	0.094	149.3	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
6.008	10.711	0.072	148.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.010	49.315	0.329	149.9	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.011	10.846	0.073	148.6	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
8.000	27.805	0.594	46.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
8.001	27.389	0.548	50.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
9.000	41.450	0.728	56.9	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
8.002	19.686	0.132	149.1	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
8.003	17.391	0.116	149.9	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
8.004	23.244	0.155	150.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
8.005	40.215	0.269	149.5	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
8.006	15.354	0.103	149.1	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.012	5.785	0.039	148.3	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.013	4.786	0.032	149.6	0.000	0	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
6.007	70.047	0.000	0.0	0	0.0	0	0.00	0.72	12.7	0.0
6.008	69.953	0.000	0.0	0	0.0	0	0.00	0.72	12.7	0.0
1.010	69.881	0.000	0.0	0	0.0	0	0.00	0.71	12.6	0.0
1.011	69.552	0.000	0.0	0	0.0	0	0.00	0.72	12.7	0.0
8.000	73.910	0.000	0.0	0	0.0	0	0.00	1.28	22.7	0.0
8.001	73.316	0.000	0.0	0	0.0	0	0.00	1.24	21.9	0.0
9.000	73.496	0.000	0.0	0	0.0	0	0.00	1.16	20.5	0.0
8.002	72.768	0.000	0.0	0	0.0	0	0.00	0.72	12.7	0.0
8.003	72.636	0.000	0.0	0	0.0	0	0.00	0.71	12.6	0.0
8.004	72.520	0.000	0.0	0	0.0	0	0.00	0.71	12.6	0.0
8.005	72.365	0.000	0.0	0	0.0	0	0.00	0.72	12.6	0.0
8.006	72.096	0.000	0.0	0	0.0	0	0.00	0.72	12.7	0.0
1.012	69.479	0.000	0.0	0	0.0	0	0.00	0.72	12.7	0.0
1.013	69.440	0.000	0.0	0	0.0	0	0.00	0.72	12.6	0.0

Manhole Schedules for Foul Network 2

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)
F1.1	74.692	1.842	Open Manhole	1500	1.000	72.850	150				
F2.1	75.067	1.760	Open Manhole	1500	2.000	73.307	150				
F1.2	75.020	2.841	Open Manhole	1500	1.001	72.179	150	1.000	72.179	150	
								2.000	72.962	150	783
F1.3	74.763	2.797	Open Manhole	1500	1.002	71.966	150	1.001	71.966	150	
F1.4	74.592	2.717	Open Manhole	1500	1.003	71.875	150	1.002	71.875	150	
F1.5	74.615	2.862	Open Manhole	1500	1.004	71.753	150	1.003	71.753	150	
F1.6	74.751	3.182	Open Manhole	1500	1.005	71.569	150	1.004	71.569	150	
F1.7	74.441	3.037	Open Manhole	1500	1.006	71.404	150	1.005	71.404	150	
F1.8	74.155	2.900	Open Manhole	1500	1.007	71.255	150	1.006	71.255	150	
F1.9	73.986	2.849	Open Manhole	1500	1.008	71.137	150	1.007	71.137	150	
F1.10	74.078	3.035	Open Manhole	1500	1.009	71.043	150	1.008	71.043	150	
F3.1	79.898	2.150	Open Manhole	1500	3.000	77.748	150				
F3.2	78.951	2.451	Open Manhole	1500	3.001	76.500	150	3.000	76.500	150	
F3.3	78.050	2.150	Open Manhole	1500	3.002	75.900	150	3.001	75.900	150	
F3.4	76.450	2.150	Open Manhole	1500	3.003	74.300	150	3.002	74.300	150	
F3.5	76.050	2.162	Open Manhole	1500	3.004	73.888	150	3.003	73.888	150	
F3.6	75.500	2.824	Open Manhole	1500	3.005	72.676	150	3.004	73.768	150	1092
F4.1	79.147	2.150	Open Manhole	1500	4.000	76.997	150				
F4.2	78.268	2.150	Open Manhole	1500	4.001	76.118	150	4.000	76.118	150	
F4.3	77.623	2.150	Open Manhole	1500	4.002	75.473	150	4.001	75.473	150	
F4.4	77.139	2.150	Open Manhole	1500	4.003	74.989	150	4.002	74.989	150	
F4.5	76.487	2.150	Open Manhole	1500	4.004	74.337	150	4.003	74.337	150	
F5.1	76.154	1.650	Open Manhole	1500	5.000	74.504	150				
F5.2	76.000	1.753	Open Manhole	1500	5.001	74.247	150	5.000	74.247	150	
F5.3	76.037	1.830	Open Manhole	1500	5.002	74.207	150	5.001	74.207	150	
F5.4	76.159	2.037	Open Manhole	1500	5.003	74.122	150	5.002	74.122	150	
F5.5	76.180	2.098	Open Manhole	1500	5.004	74.082	150	5.003	74.082	150	
F5.6	76.070	2.104	Open Manhole	1500	5.005	73.966	150	5.004	73.966	150	
F5.7	75.927	2.031	Open Manhole	1500	5.006	73.896	150	5.005	73.896	150	
F5.8	75.872	2.036	Open Manhole	1500	5.007	73.836	150	5.006	73.836	150	
F3.7	75.700	3.076	Open Manhole	1500	3.006	72.624	150	3.005	72.624	150	
								4.004	73.550	150	926
								5.007	73.771	150	1147
F3.8	75.493	2.897	Open Manhole	1500	3.007	72.596	150	3.006	72.596	150	
F3.9	74.618	2.154	Open Manhole	1500	3.008	72.464	150	3.007	72.464	150	
F6.1	74.480	2.680	Open Manhole	1500	6.000	71.800	150				
F6.2	73.880	2.887	Open Manhole	1500	6.001	70.993	150	6.000	70.993	150	
F6.3	73.596	2.899	Open Manhole	1500	6.002	70.697	150	6.001	70.697	150	
F6.4	73.761	3.153	Open Manhole	1500	6.003	70.608	150	6.002	70.608	150	
F6.5	73.996	3.527	Open Manhole	1500	6.004	70.469	150	6.003	70.469	150	
F7.1	73.722	1.679	Open Manhole	1500	7.000	72.043	150				
F7.2	73.748	1.935	Open Manhole	1500	7.001	71.813	150	7.000	71.813	150	
F7.3	73.897	2.226	Open Manhole	1500	7.002	71.671	150	7.001	71.671	150	
F6.6	74.039	3.766	Open Manhole	1500	6.005	70.273	150	6.004	70.273	150	
								7.002	71.493	150	1220

Manhole Schedules for Foul Network 2

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)
F6.7	73.916	3.715	Open Manhole	1500	6.006	70.201	150	6.005	70.201	150	
F6.8	74.051	4.004	Open Manhole	1500	6.007	70.047	150	6.006	70.047	150	
F6.9	74.291	4.338	Open Manhole	1500	6.008	69.953	150	6.007	69.953	150	
F1.11	74.350	4.469	Open Manhole	1500	1.010	69.881	150	1.009	70.955	150	1074
								3.008	72.400	150	2519
								6.008	69.881	150	
F1.12	74.226	4.674	Open Manhole	1500	1.011	69.552	150	1.010	69.552	150	
F8.1	75.960	2.050	Open Manhole	1500	8.000	73.910	150				
F8.2	75.366	2.050	Open Manhole	1500	8.001	73.316	150	8.000	73.316	150	
F9.1	75.396	1.900	Open Manhole	1500	9.000	73.496	150				
F8.3	74.818	2.050	Open Manhole	1500	8.002	72.768	150	8.001	72.768	150	
								9.000	72.768	150	
F8.4	74.778	2.142	Open Manhole	1500	8.003	72.636	150	8.002	72.636	150	
F8.5	74.991	2.471	Open Manhole	1500	8.004	72.520	150	8.003	72.520	150	
F8.6	74.948	2.583	Open Manhole	1500	8.005	72.365	150	8.004	72.365	150	
F8.8	74.432	2.336	Open Manhole	1500	8.006	72.096	150	8.005	72.096	150	
F1.13	74.429	4.950	Open Manhole	1500	1.012	69.479	150	1.011	69.479	150	
								8.006	71.993	150	2514
F1.14	74.500	5.060	Open Manhole	1800	1.013	69.440	150	1.012	69.440	150	
F1.15FWPS	74.500	5.092	Open Manhole	3000		OUTFALL		1.013	69.408	150	

PIPELINE SCHEDULES for Foul Network 2

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	150	F1.1	74.692	72.850	1.692	Open Manhole	1500
2.000	o	150	F2.1	75.067	73.307	1.610	Open Manhole	1500
1.001	o	150	F1.2	75.020	72.179	2.691	Open Manhole	1500
1.002	o	150	F1.3	74.763	71.966	2.647	Open Manhole	1500
1.003	o	150	F1.4	74.592	71.875	2.567	Open Manhole	1500
1.004	o	150	F1.5	74.615	71.753	2.712	Open Manhole	1500
1.005	o	150	F1.6	74.751	71.569	3.032	Open Manhole	1500
1.006	o	150	F1.7	74.441	71.404	2.887	Open Manhole	1500
1.007	o	150	F1.8	74.155	71.255	2.750	Open Manhole	1500
1.008	o	150	F1.9	73.986	71.137	2.699	Open Manhole	1500
1.009	o	150	F1.10	74.078	71.043	2.885	Open Manhole	1500
3.000	o	150	F3.1	79.898	77.748	2.000	Open Manhole	1500
3.001	o	150	F3.2	78.951	76.500	2.301	Open Manhole	1500
3.002	o	150	F3.3	78.050	75.900	2.000	Open Manhole	1500
3.003	o	150	F3.4	76.450	74.300	2.000	Open Manhole	1500
3.004	o	150	F3.5	76.050	73.888	2.012	Open Manhole	1500
3.005	o	150	F3.6	75.500	72.676	2.674	Open Manhole	1500
4.000	o	150	F4.1	79.147	76.997	2.000	Open Manhole	1500
4.001	o	150	F4.2	78.268	76.118	2.000	Open Manhole	1500
4.002	o	150	F4.3	77.623	75.473	2.000	Open Manhole	1500
4.003	o	150	F4.4	77.139	74.989	2.000	Open Manhole	1500
4.004	o	150	F4.5	76.487	74.337	2.000	Open Manhole	1500

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	53.678	80.0	F1.2	75.020	72.179	2.691	Open Manhole	1500
2.000	27.538	79.8	F1.2	75.020	72.962	1.908	Open Manhole	1500
1.001	31.956	150.0	F1.3	74.763	71.966	2.647	Open Manhole	1500
1.002	13.526	148.6	F1.4	74.592	71.875	2.567	Open Manhole	1500
1.003	18.234	149.5	F1.5	74.615	71.753	2.712	Open Manhole	1500
1.004	27.583	149.9	F1.6	74.751	71.569	3.032	Open Manhole	1500
1.005	24.662	149.5	F1.7	74.441	71.404	2.887	Open Manhole	1500
1.006	22.209	149.1	F1.8	74.155	71.255	2.750	Open Manhole	1500
1.007	17.678	149.8	F1.9	73.986	71.137	2.699	Open Manhole	1500
1.008	13.980	148.7	F1.10	74.078	71.043	2.885	Open Manhole	1500
1.009	13.088	148.7	F1.11	74.350	70.955	3.245	Open Manhole	1500
3.000	29.355	23.5	F3.2	78.951	76.500	2.301	Open Manhole	1500
3.001	18.004	30.0	F3.3	78.050	75.900	2.000	Open Manhole	1500
3.002	38.012	23.8	F3.4	76.450	74.300	2.000	Open Manhole	1500
3.003	50.565	122.7	F3.5	76.050	73.888	2.012	Open Manhole	1500
3.004	17.918	149.3	F3.6	75.500	73.768	1.582	Open Manhole	1500
3.005	7.750	149.0	F3.7	75.700	72.624	2.926	Open Manhole	1500
4.000	35.284	40.1	F4.2	78.268	76.118	2.000	Open Manhole	1500
4.001	50.667	78.6	F4.3	77.623	75.473	2.000	Open Manhole	1500
4.002	14.116	29.2	F4.4	77.139	74.989	2.000	Open Manhole	1500
4.003	12.729	19.5	F4.5	76.487	74.337	2.000	Open Manhole	1500
4.004	15.464	19.6	F3.7	75.700	73.550	2.000	Open Manhole	1500

PIPELINE SCHEDULES for Foul Network 2

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)
5.000	o	150	F5.1	76.154	74.504	1.500	Open Manhole	1500
5.001	o	150	F5.2	76.000	74.247	1.603	Open Manhole	1500
5.002	o	150	F5.3	76.037	74.207	1.680	Open Manhole	1500
5.003	o	150	F5.4	76.159	74.122	1.887	Open Manhole	1500
5.004	o	150	F5.5	76.180	74.082	1.948	Open Manhole	1500
5.005	o	150	F5.6	76.070	73.966	1.954	Open Manhole	1500
5.006	o	150	F5.7	75.927	73.896	1.881	Open Manhole	1500
5.007	o	150	F5.8	75.872	73.836	1.886	Open Manhole	1500
3.006	o	150	F3.7	75.700	72.624	2.926	Open Manhole	1500
3.007	o	150	F3.8	75.493	72.596	2.747	Open Manhole	1500
3.008	o	150	F3.9	74.618	72.464	2.004	Open Manhole	1500
6.000	o	150	F6.1	74.480	71.800	2.530	Open Manhole	1500
6.001	o	150	F6.2	73.880	70.993	2.737	Open Manhole	1500
6.002	o	150	F6.3	73.596	70.697	2.749	Open Manhole	1500
6.003	o	150	F6.4	73.761	70.608	3.003	Open Manhole	1500
6.004	o	150	F6.5	73.996	70.469	3.377	Open Manhole	1500
7.000	o	150	F7.1	73.722	72.043	1.529	Open Manhole	1500
7.001	o	150	F7.2	73.748	71.813	1.785	Open Manhole	1500
7.002	o	150	F7.3	73.897	71.671	2.076	Open Manhole	1500
6.005	o	150	F6.6	74.039	70.273	3.616	Open Manhole	1500
6.006	o	150	F6.7	73.916	70.201	3.565	Open Manhole	1500

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)
5.000	20.551	80.0	F5.2	76.000	74.247	1.603	Open Manhole	1500
5.001	5.000	125.0	F5.3	76.037	74.207	1.680	Open Manhole	1500
5.002	10.529	123.9	F5.4	76.159	74.122	1.887	Open Manhole	1500
5.003	5.000	125.0	F5.5	76.180	74.082	1.948	Open Manhole	1500
5.004	14.481	124.8	F5.6	76.070	73.966	1.954	Open Manhole	1500
5.005	8.658	123.7	F5.7	75.927	73.896	1.881	Open Manhole	1500
5.006	7.468	124.5	F5.8	75.872	73.836	1.886	Open Manhole	1500
5.007	8.105	124.7	F3.7	75.700	73.771	1.779	Open Manhole	1500
3.006	4.074	145.5	F3.8	75.493	72.596	2.747	Open Manhole	1500
3.007	19.805	150.0	F3.9	74.618	72.464	2.004	Open Manhole	1500
3.008	9.460	147.8	F1.11	74.350	72.400	1.800	Open Manhole	1500
6.000	27.462	34.0	F6.2	73.880	70.993	2.737	Open Manhole	1500
6.001	29.507	99.7	F6.3	73.596	70.697	2.749	Open Manhole	1500
6.002	13.210	148.4	F6.4	73.761	70.608	3.003	Open Manhole	1500
6.003	20.843	149.9	F6.5	73.996	70.469	3.377	Open Manhole	1500
6.004	29.317	149.6	F6.6	74.039	70.273	3.616	Open Manhole	1500
7.000	18.351	79.8	F7.2	73.748	71.813	1.785	Open Manhole	1500
7.001	11.337	79.8	F7.3	73.897	71.671	2.076	Open Manhole	1500
7.002	14.199	79.8	F6.6	74.039	71.493	2.396	Open Manhole	1500
6.005	10.725	149.0	F6.7	73.916	70.201	3.565	Open Manhole	1500
6.006	23.049	149.7	F6.8	74.051	70.047	3.854	Open Manhole	1500

PIPELINE SCHEDULES for Foul Network 2

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)
6.007	o	150	F6.8	74.051	70.047	3.854	Open Manhole	1500
6.008	o	150	F6.9	74.291	69.953	4.188	Open Manhole	1500
1.010	o	150	F1.11	74.350	69.881	4.319	Open Manhole	1500
1.011	o	150	F1.12	74.226	69.552	4.524	Open Manhole	1500
8.000	o	150	F8.1	75.960	73.910	1.900	Open Manhole	1500
8.001	o	150	F8.2	75.366	73.316	1.900	Open Manhole	1500
9.000	o	150	F9.1	75.396	73.496	1.750	Open Manhole	1500
8.002	o	150	F8.3	74.818	72.768	1.900	Open Manhole	1500
8.003	o	150	F8.4	74.778	72.636	1.992	Open Manhole	1500
8.004	o	150	F8.5	74.991	72.520	2.321	Open Manhole	1500
8.005	o	150	F8.6	74.948	72.365	2.433	Open Manhole	1500
8.006	o	150	F8.8	74.432	72.096	2.186	Open Manhole	1500
1.012	o	150	F1.13	74.429	69.479	4.800	Open Manhole	1500
1.013	o	150	F1.14	74.500	69.440	4.910	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)
6.007	14.034	149.3	F6.9	74.291	69.953	4.188	Open Manhole	1500
6.008	10.711	148.8	F1.11	74.350	69.881	4.319	Open Manhole	1500
1.010	49.315	149.9	F1.12	74.226	69.552	4.524	Open Manhole	1500
1.011	10.846	148.6	F1.13	74.429	69.479	4.800	Open Manhole	1500
8.000	27.805	46.8	F8.2	75.366	73.316	1.900	Open Manhole	1500
8.001	27.389	50.0	F8.3	74.818	72.768	1.900	Open Manhole	1500
9.000	41.450	56.9	F8.3	74.818	72.768	1.900	Open Manhole	1500
8.002	19.686	149.1	F8.4	74.778	72.636	1.992	Open Manhole	1500
8.003	17.391	149.9	F8.5	74.991	72.520	2.321	Open Manhole	1500
8.004	23.244	150.0	F8.6	74.948	72.365	2.433	Open Manhole	1500
8.005	40.215	149.5	F8.8	74.432	72.096	2.186	Open Manhole	1500
8.006	15.354	149.1	F1.13	74.429	71.993	2.286	Open Manhole	1500
1.012	5.785	148.3	F1.14	74.500	69.440	4.910	Open Manhole	1800
1.013	4.786	149.6	F1.15FWPS	74.500	69.408	4.942	Open Manhole	3000

Setting Out Information - True Coordinates (Foul Network 2)

PN	USMH Name	Dia/Len (mm)	Width (mm)	US Easting (m)	US Northing (m)	Layout (North)
1.000	F1.1	1500		373696.062	442172.319	
2.000	F2.1	1500		373728.470	442121.434	
1.001	F1.2	1500		373742.384	442145.198	
1.002	F1.3	1500		373758.530	442172.775	
1.003	F1.4	1500		373767.565	442182.841	
1.004	F1.5	1500		373784.587	442189.379	
1.005	F1.6	1500		373808.688	442202.795	
1.006	F1.7	1500		373832.212	442210.201	
1.007	F1.8	1500		373854.292	442212.588	
1.008	F1.9	1500		373871.965	442212.150	
1.009	F1.10	1500		373885.828	442210.346	
3.000	F3.1	1500		374033.137	442236.106	
3.001	F3.2	1500		374007.270	442249.984	
3.002	F3.3	1500		373991.405	442258.495	
3.003	F3.4	1500		373957.909	442276.465	
3.004	F3.5	1500		373934.004	442231.907	
3.005	F3.6	1500		373931.562	442214.156	
4.000	F4.1	1500		374034.202	442213.974	
4.001	F4.2	1500		374017.521	442182.882	

Setting Out Information - True Coordinates (Foul Network 2)

PN	USMH Name	Dia/Len (mm)	Width (mm)	US Easting (m)	US Northing (m)	Layout (North)
4.002	F4.3	1500		373972.873	442206.834	
4.003	F4.4	1500		373959.246	442210.517	
4.004	F4.5	1500		373946.517	442210.474	
5.000	F5.1	1500		373960.463	442135.596	
5.001	F5.2	1500		373946.273	442150.462	
5.002	F5.3	1500		373943.392	442154.548	
5.003	F5.4	1500		373938.416	442163.827	
5.004	F5.5	1500		373936.606	442168.488	
5.005	F5.6	1500		373933.424	442182.615	
5.006	F5.7	1500		373933.196	442191.270	
5.007	F5.8	1500		373934.070	442198.687	
3.006	F3.7	1500		373931.598	442206.406	
3.007	F3.8	1500		373927.668	442205.334	
3.008	F3.9	1500		373907.945	442207.135	
6.000	F6.1	1500		373974.325	442361.897	
6.001	F6.2	1500		373952.006	442345.897	
6.002	F6.3	1500		373934.045	442322.486	
6.003	F6.4	1500		373931.928	442309.447	
6.004	F6.5	1500		373928.587	442288.874	

Setting Out Information - True Coordinates (Foul Network 2)

PN	USMH Name	Dia/Len (mm)	Width (mm)	US Easting (m)	US Northing (m)	Layout (North)
7.000	F7.1	1500		373873.384	442272.353	
7.001	F7.2	1500		373891.686	442271.019	
7.002	F7.3	1500		373902.829	442268.933	
6.005	F6.6	1500		373915.546	442262.617	
6.006	F6.7	1500		373910.775	442253.012	
6.007	F6.8	1500		373904.070	442230.960	
6.008	F6.9	1500		373902.259	442217.043	
1.010	F1.11	1500		373898.486	442207.019	
1.011	F1.12	1500		373899.087	442157.708	
8.000	F8.1	1500		373838.625	442080.941	
8.001	F8.2	1500		373815.593	442096.519	
9.000	F9.1	1500		373770.947	442074.459	
8.002	F8.3	1500		373791.884	442110.232	
8.003	F8.4	1500		373801.840	442127.215	
8.004	F8.5	1500		373813.437	442140.175	
8.005	F8.6	1500		373832.935	442152.828	
8.006	F8.8	1500		373872.889	442157.394	
1.012	F1.13	1500		373888.242	442157.576	
1.013	F1.14	1800		373888.313	442151.791	

Setting Out Information - True Coordinates (Foul Network 2)

PN	DSMH Name	Dia/Len (mm)	Width (mm)	DS Easting (m)	DS Northing (m)	Layout (North)
1.013	F1.15FWPS	3000		373888.371	442147.005