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North East (Head Office) 5 Staithes, The Watermark Gateshead, NE11 9SN	AVANT HOMES SOUTH TYNE COLLEGE SW_WEST_OUTFALL	
Date 09/08/2024 09:34 File QD2117_SW_WEST 05 01 24...	Designed by N DUNWOODIE Checked by	
Innovyze	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 1

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	PIMP (%)	100
M5-60 (mm)	17.100	Add Flow / Climate Change (%)	0
Ratio R	0.345	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

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	8.823	0.300	29.4	0.081	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	27.432	0.450	61.0	0.080	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	9.465	0.100	94.7	0.047	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	18.460	0.150	123.1	0.098	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.004	59.128	0.500	118.3	0.158	0.00	0.0	0.600	o	375	Pipe/Conduit	
2.000	40.990	0.745	55.0	0.134	5.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	14.214	0.260	54.7	0.113	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.005	63.663	0.900	70.7	0.128	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.006	18.587	0.450	41.3	0.170	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	43.35	5.06	32.555	0.081	0.0	0.0	0.0	2.42	96.3	9.5
1.001	42.40	5.33	32.255	0.161	0.0	0.0	0.0	1.68	66.7	18.5
1.002	42.08	5.43	31.730	0.208	0.0	0.0	0.0	1.62	114.3	23.7
1.003	41.37	5.65	31.630	0.306	0.0	0.0	0.0	1.42	100.1	34.3
1.004	39.58	6.24	31.405	0.464	0.0	0.0	0.0	1.67	183.9	49.7
2.000	42.22	5.39	32.060	0.134	0.0	0.0	0.0	1.77	70.3	15.3
2.001	41.78	5.52	31.315	0.247	0.0	0.0	0.0	1.77	70.5	27.9
1.005	38.37	6.68	30.830	0.839	0.0	0.0	0.0	2.42	384.9	87.2
1.006	38.11	6.78	29.930	1.009	0.0	0.0	0.0	3.17	504.3	104.2

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Network Design Table for Surface Network 1

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
1.007	24.579	0.300	81.9	0.059	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.008	43.918	0.400	109.8	0.040	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.009	21.143	0.100	211.4	0.056	0.00	0.0	0.600	o	450	Pipe/Conduit	
3.000	20.071	0.435	46.1	0.101	5.00	0.0	0.600	o	225	Pipe/Conduit	
3.001	43.374	0.500	86.7	0.116	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.002	20.588	0.295	69.8	0.142	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.000	32.374	0.450	71.9	0.189	5.00	0.0	0.600	o	225	Pipe/Conduit	
3.003	10.309	0.300	34.4	0.014	0.00	0.0	0.600	o	375	Pipe/Conduit	
3.004	35.719	0.500	71.4	0.048	0.00	0.0	0.600	o	375	Pipe/Conduit	
3.005	46.578	0.200	232.9	0.094	0.00	0.0	0.600	o	375	Pipe/Conduit	
5.000	10.691	0.230	46.5	0.080	5.00	0.0	0.600	o	150	Pipe/Conduit	
5.001	82.430	0.900	91.6	0.127	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.002	55.403	0.200	277.0	0.056	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.010	11.964	0.250	47.9	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.011	7.584	0.272	27.9	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.012	8.281	0.054	153.4	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)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.007	37.64	6.96	29.480	1.068	0.0	0.0	0.0	2.25	357.5	108.9
1.008	36.71	7.34	29.180	1.108	0.0	0.0	0.0	1.94	308.5	110.2
1.009	36.11	7.59	28.780	1.164	0.0	0.0	0.0	1.39	221.8	113.8
3.000	42.95	5.17	31.335	0.101	0.0	0.0	0.0	1.93	76.8	11.7
3.001	41.52	5.60	30.825	0.217	0.0	0.0	0.0	1.69	119.4	24.4
3.002	40.95	5.78	30.325	0.359	0.0	0.0	0.0	1.88	133.2	39.8
4.000	42.35	5.35	30.555	0.189	0.0	0.0	0.0	1.54	61.4	21.7
3.003	40.77	5.84	29.955	0.562	0.0	0.0	0.0	3.10	342.4	62.1
3.004	39.94	6.12	29.655	0.610	0.0	0.0	0.0	2.15	237.0	66.0
3.005	38.12	6.77	29.155	0.704	0.0	0.0	0.0	1.18	130.7	72.7
5.000	43.13	5.12	30.375	0.080	0.0	0.0	0.0	1.48	26.1	9.3
5.001	39.91	6.13	30.070	0.207	0.0	0.0	0.0	1.37	54.3	22.4
5.002	37.27	7.11	29.095	0.263	0.0	0.0	0.0	0.94	66.4	26.5
1.010	35.96	7.66	28.600	2.131	0.0	0.0	0.0	2.94	468.3	207.5
1.011	35.84	7.71	28.350	2.131	0.0	0.0	0.0	2.49	98.9	207.5
1.012	35.55	7.84	28.078	2.131	0.0	0.0	0.0	1.05	41.9	207.5

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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	225	S100	34.022	32.555	1.242	Open Manhole	1350
1.001	o	225	S101	33.711	32.255	1.231	Open Manhole	1350
1.002	o	300	S102	33.550	31.730	1.520	Open Manhole	1200
1.003	o	300	S103	33.648	31.630	1.718	Open Manhole	1200
1.004	o	375	S104	33.836	31.405	2.056	Open Manhole	1200
2.000	o	225	S105	33.555	32.060	1.270	Open Manhole	1350
2.001	o	225	S106	32.834	31.315	1.294	Open Manhole	1350
1.005	o	450	S107	32.732	30.830	1.452	Open Manhole	1500
1.006	o	450	S108	31.653	29.930	1.273	Open Manhole	1350
1.007	o	450	S109	31.261	29.480	1.331	Open Manhole	1350
1.008	o	450	S110	31.023	29.180	1.393	Open Manhole	1350
1.009	o	450	S111	30.400	28.780	1.170	Open Manhole	1200
3.000	o	225	S112	32.761	31.335	1.201	Open Manhole	1200
3.001	o	300	S113	32.394	30.825	1.269	Open Manhole	1200
3.002	o	300	S114	31.901	30.325	1.276	Open Manhole	1200
4.000	o	225	S115	32.074	30.555	1.294	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	8.823	29.4	S101	33.711	32.255	1.231	Open Manhole	1350
1.001	27.432	61.0	S102	33.550	31.805	1.520	Open Manhole	1200
1.002	9.465	94.7	S103	33.648	31.630	1.718	Open Manhole	1200
1.003	18.460	123.1	S104	33.836	31.480	2.056	Open Manhole	1200
1.004	59.128	118.3	S107	32.732	30.905	1.452	Open Manhole	1500
2.000	40.990	55.0	S106	32.834	31.315	1.294	Open Manhole	1350
2.001	14.214	54.7	S107	32.732	31.055	1.452	Open Manhole	1500
1.005	63.663	70.7	S108	31.653	29.930	1.273	Open Manhole	1350
1.006	18.587	41.3	S109	31.261	29.480	1.331	Open Manhole	1350
1.007	24.579	81.9	S110	31.023	29.180	1.393	Open Manhole	1350
1.008	43.918	109.8	S111	30.400	28.780	1.170	Open Manhole	1200
1.009	21.143	211.4	S122_BASIN	30.100	28.680	0.970	Open Manhole	100
3.000	20.071	46.1	S113	32.394	30.900	1.269	Open Manhole	1200
3.001	43.374	86.7	S114	31.901	30.325	1.276	Open Manhole	1200
3.002	20.588	69.8	S116	31.693	30.030	1.363	Open Manhole	1500
4.000	32.374	71.9	S116	31.693	30.105	1.363	Open Manhole	1500

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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)
3.003	o	375	S116	31.693	29.955	1.363	Open Manhole	1500
3.004	o	375	S117	31.590	29.655	1.560	Open Manhole	1500
3.005	o	375	S118	31.073	29.155	1.543	Open Manhole	1500
5.000	o	150	S119	31.728	30.375	1.203	Open Manhole	1500
5.001	o	225	S120	31.546	30.070	1.251	Open Manhole	1500
5.002	o	300	S121	30.615	29.095	1.220	Open Manhole	1500
1.010	o	450	S122_BASIN	30.100	28.600	1.050	Open Manhole	100
1.011	o	225	S123_FC	30.200	28.350	1.625	Open Manhole	2100
1.012	o	225	C100	30.216	28.078	1.913	Open Manhole	1350

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)
3.003	10.309	34.4	S117	31.590	29.655	1.560	Open Manhole	1500
3.004	35.719	71.4	S118	31.073	29.155	1.543	Open Manhole	1500
3.005	46.578	232.9	S122_BASIN	30.100	28.955	0.770	Open Manhole	100
5.000	10.691	46.5	S120	31.546	30.145	1.251	Open Manhole	1500
5.001	82.430	91.6	S121	30.615	29.170	1.220	Open Manhole	1500
5.002	55.403	277.0	S122_BASIN	30.100	28.895	0.905	Open Manhole	100
1.010	11.964	47.9	S123_FC	30.200	28.350	1.400	Open Manhole	2100
1.011	7.584	27.9	C100	30.216	28.078	1.913	Open Manhole	1350
1.012	8.281	153.4	C101	29.787	28.024	1.538	Open Manhole	0

Free Flowing 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)
1.012	C101	29.787	28.024	28.024	0	0

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Simulation Criteria for Surface Network 1

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	17.100	Storm Duration (mins)	30
Ratio R	0.345		

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Online Controls for Surface Network 1

Hydro-Brake® Optimum Manhole: S123_FC, DS/PN: 1.011, Volume (m³): 8.1

Unit Reference	MD-SHE-0112-6400-1450-6400
Design Head (m)	1.450
Design Flow (l/s)	6.4
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	112
Invert Level (m)	28.350
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.450	6.4
Flush-Flo™	0.427	6.4
Kick-Flo®	0.889	5.1
Mean Flow over Head Range	-	5.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.9	1.200	5.9	3.000	9.0	7.000	13.5
0.200	5.8	1.400	6.3	3.500	9.7	7.500	13.9
0.300	6.3	1.600	6.7	4.000	10.3	8.000	14.3
0.400	6.4	1.800	7.1	4.500	10.9	8.500	14.8
0.500	6.4	2.000	7.4	5.000	11.5	9.000	15.2
0.600	6.3	2.200	7.8	5.500	12.0	9.500	15.6
0.800	5.7	2.400	8.1	6.000	12.5		
1.000	5.4	2.600	8.4	6.500	13.0		

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Storage Structures for Surface Network 1

Tank or Pond Manhole: S122 BASIN, DS/PN: 1.010

Invert Level (m) 28.600

Depth (m) Area (m²)		Depth (m) Area (m²)	
0.000	919.2	1.500	2095.0

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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 Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.345
 Region England and Wales Cv (Summer) 0.750
 M5-60 (mm) 17.100 Cv (Winter) 0.840

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

 Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 45

US/MH		Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level
FN	Name								(m)
1.000	S100	15 Winter	1	+0%	100/15	Summer			32.606
1.001	S101	15 Winter	1	+0%	100/15	Summer			32.335
1.002	S102	15 Winter	1	+0%	100/15	Summer			31.836
1.003	S103	15 Winter	1	+0%	100/15	Summer			31.753
1.004	S104	15 Winter	1	+0%	100/15	Summer			31.536
2.000	S105	15 Winter	1	+0%	100/15	Summer			32.133
2.001	S106	15 Winter	1	+0%	30/15	Summer			31.417
1.005	S107	15 Winter	1	+0%	100/15	Summer			30.976
1.006	S108	15 Winter	1	+0%	100/15	Summer			30.085
1.007	S109	15 Winter	1	+0%	30/15	Summer			29.662
1.008	S110	15 Winter	1	+0%	30/15	Summer			29.372
1.009	S111	15 Winter	1	+0%	30/15	Summer			29.036
3.000	S112	15 Winter	1	+0%	100/15	Summer			31.396
3.001	S113	15 Winter	1	+0%	100/15	Summer			30.917
3.002	S114	15 Winter	1	+0%	100/15	Summer			30.439
4.000	S115	15 Winter	1	+0%	100/15	Summer			30.650
3.003	S116	15 Winter	1	+0%	100/15	Summer			30.088
3.004	S117	15 Winter	1	+0%	30/15	Summer			29.793
3.005	S118	15 Winter	1	+0%	30/15	Summer			29.364

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

PN	US/MH Name	Surcharged Flooded		Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)					
1.000	S100	-0.174	0.000	0.12		9.1	OK	
1.001	S101	-0.145	0.000	0.27		16.6	OK	
1.002	S102	-0.194	0.000	0.27		21.2	OK	
1.003	S103	-0.177	0.000	0.35		30.5	OK	
1.004	S104	-0.244	0.000	0.26		44.6	OK	
2.000	S105	-0.152	0.000	0.22		14.8	OK	
2.001	S106	-0.123	0.000	0.42		25.7	OK	
1.005	S107	-0.304	0.000	0.23		80.8	OK	
1.006	S108	-0.295	0.000	0.25		96.1	OK	
1.007	S109	-0.268	0.000	0.34		101.8	OK	
1.008	S110	-0.258	0.000	0.38		104.9	OK	
1.009	S111	-0.194	0.000	0.61		109.0	OK	
3.000	S112	-0.164	0.000	0.16		11.3	OK	
3.001	S113	-0.208	0.000	0.20		22.3	OK	
3.002	S114	-0.186	0.000	0.31		35.9	OK	
4.000	S115	-0.130	0.000	0.36		21.0	OK	
3.003	S116	-0.242	0.000	0.27		58.4	OK	
3.004	S117	-0.237	0.000	0.29		62.7	OK	
3.005	S118	-0.166	0.000	0.59		71.3	OK	

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North East (Head Office) 5 Staithes, The Watermark Gateshead, NE11 9SN	AVANT HOMES SOUTH TYNE COLLEGE SW_WEST_OUTFALL	
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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Surface Network 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
5.000	S119	15 Winter	1	+0%	100/15 Summer	100/15 Winter		
5.001	S120	15 Winter	1	+0%	30/15 Summer			
5.002	S121	15 Winter	1	+0%	30/15 Summer			
1.010	S122_BASIN	480 Winter	1	+0%	30/120 Winter			
1.011	S123_FC	480 Winter	1	+0%	1/15 Summer			
1.012	C100	60 Summer	1	+0%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
5.000	S119	30.440	-0.085	0.000	0.38			8.9	OK
5.001	S120	30.169	-0.126	0.000	0.38			20.3	OK
5.002	S121	29.228	-0.167	0.000	0.40			25.4	OK
1.010	S122_BASIN	28.847	-0.203	0.000	0.03			9.1	OK
1.011	S123_FC	28.846	0.271	0.000	0.09			6.4	SURCHARGED
1.012	C100	28.145	-0.158	0.000	0.20			6.4	OK

PN	US/MH Name	Level Exceeded
5.000	S119	1.
5.001	S120	
5.002	S121	
1.010	S122_BASIN	
1.011	S123_FC	
1.012	C100	

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North East (Head Office) 5 Staithes, The Watermark Gateshead, NE11 9SN	AVANT HOMES SOUTH TYNE COLLEGE SW_WEST_OUTFALL	
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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 Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.345
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 17.100 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 45

US/MH		Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level
FN	Name								(m)
1.000	S100	15 Winter	30	+0%	100/15 Summer				32.638
1.001	S101	15 Winter	30	+0%	100/15 Summer				32.400
1.002	S102	15 Winter	30	+0%	100/15 Summer				31.931
1.003	S103	15 Winter	30	+0%	100/15 Summer				31.887
1.004	S104	15 Winter	30	+0%	100/15 Summer				31.653
2.000	S105	15 Winter	30	+0%	100/15 Summer				32.180
2.001	S106	15 Winter	30	+0%	30/15 Summer				31.586
1.005	S107	15 Winter	30	+0%	100/15 Summer				31.096
1.006	S108	15 Winter	30	+0%	100/15 Summer				30.222
1.007	S109	15 Winter	30	+0%	30/15 Summer				30.006
1.008	S110	15 Winter	30	+0%	30/15 Summer				29.762
1.009	S111	15 Winter	30	+0%	30/15 Summer				29.365
3.000	S112	15 Winter	30	+0%	100/15 Summer				31.434
3.001	S113	15 Winter	30	+0%	100/15 Summer				30.985
3.002	S114	15 Winter	30	+0%	100/15 Summer				30.545
4.000	S115	15 Winter	30	+0%	100/15 Summer				30.723
3.003	S116	15 Winter	30	+0%	100/15 Summer				30.208
3.004	S117	15 Winter	30	+0%	30/15 Summer				30.067
3.005	S118	15 Winter	30	+0%	30/15 Summer				29.781

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

PN	US/MH Name	Surcharged Flooded		Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)					
1.000	S100	-0.142	0.000	0.29		22.3	OK	
1.001	S101	-0.080	0.000	0.73		45.3	OK	
1.002	S102	-0.099	0.000	0.74		58.5	OK	
1.003	S103	-0.043	0.000	0.99		85.7	OK	
1.004	S104	-0.127	0.000	0.75		128.7	OK	
2.000	S105	-0.105	0.000	0.54		36.1	OK	
2.001	S106	0.046	0.000	1.09		67.0	SURCHARGED	
1.005	S107	-0.184	0.000	0.64		228.2	OK	
1.006	S108	-0.158	0.000	0.72		270.7	OK	
1.007	S109	0.076	0.000	0.91		271.4	SURCHARGED	
1.008	S110	0.132	0.000	1.00		275.8	SURCHARGED	
1.009	S111	0.135	0.000	1.59		284.1	SURCHARGED	
3.000	S112	-0.126	0.000	0.40		27.8	OK	
3.001	S113	-0.140	0.000	0.55		60.8	OK	
3.002	S114	-0.080	0.000	0.87		101.4	OK	
4.000	S115	-0.057	0.000	0.89		51.1	OK	
3.003	S116	-0.122	0.000	0.72		153.9	OK	
3.004	S117	0.037	0.000	0.76		162.8	SURCHARGED	
3.005	S118	0.251	0.000	1.52		182.6	SURCHARGED	

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North East (Head Office)	AVANT HOMES	
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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Surface Network 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow Overflow	Overflow Act.
5.000	S119	15 Winter	30	+0%	100/15 Summer	100/15 Winter		
5.001	S120	15 Winter	30	+0%	30/15 Summer			
5.002	S121	15 Winter	30	+0%	30/15 Summer			
1.010	S122_BASIN	960 Winter	30	+0%	30/120 Winter			
1.011	S123_FC	360 Summer	30	+0%	1/15 Summer			
1.012	C100	480 Summer	30	+0%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
5.000	S119	30.523	-0.002	0.000	0.88			20.7	OK
5.001	S120	30.350	0.055	0.000	1.01			53.2	SURCHARGED
5.002	S121	29.404	0.009	0.000	1.03			64.6	SURCHARGED
1.010	S122_BASIN	29.230	0.180	0.000	0.06			16.7	SURCHARGED
1.011	S123_FC	29.407	0.832	0.000	0.09			6.4	SURCHARGED
1.012	C100	28.145	-0.158	0.000	0.20			6.4	OK

PN	US/MH Name	Level Exceeded
5.000	S119	1.
5.001	S120	
5.002	S121	
1.010	S122_BASIN	
1.011	S123_FC	
1.012	C100	

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North East (Head Office) 5 Staithes, The Watermark Gateshead, NE11 9SN	AVANT HOMES SOUTH TYNE COLLEGE SW_WEST_OUTFALL	
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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 Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.345
 Region England and Wales Cv (Summer) 0.750
 M5-60 (mm) 17.100 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 45

US/MH		Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level
PN	Name								(m)
1.000	S100	15 Winter	100	+45%	100/15 Summer				33.267
1.001	S101	15 Winter	100	+45%	100/15 Summer				33.219
1.002	S102	15 Winter	100	+45%	100/15 Summer				32.796
1.003	S103	15 Winter	100	+45%	100/15 Summer				32.705
1.004	S104	15 Winter	100	+45%	100/15 Summer				32.454
2.000	S105	15 Winter	100	+45%	100/15 Summer				32.963
2.001	S106	15 Winter	100	+45%	30/15 Summer				32.509
1.005	S107	15 Winter	100	+45%	100/15 Summer				31.966
1.006	S108	15 Winter	100	+45%	100/15 Summer				31.320
1.007	S109	15 Winter	100	+45%	30/15 Summer				30.911
1.008	S110	15 Winter	100	+45%	30/15 Summer				30.427
1.009	S111	1440 Winter	100	+45%	30/15 Summer				29.774
3.000	S112	15 Winter	100	+45%	100/15 Summer				32.038
3.001	S113	15 Winter	100	+45%	100/15 Summer				31.893
3.002	S114	15 Winter	100	+45%	100/15 Summer				31.604
4.000	S115	15 Winter	100	+45%	100/15 Summer				31.939
3.003	S116	15 Winter	100	+45%	100/15 Summer				31.175
3.004	S117	15 Winter	100	+45%	30/15 Summer				30.876
3.005	S118	15 Winter	100	+45%	30/15 Summer				30.300

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

PN	US/MH Name	Surcharged Flooded		Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)					
1.000	S100	0.487	0.000	0.44		34.0	SURCHARGED	
1.001	S101	0.739	0.000	1.01		62.6	SURCHARGED	
1.002	S102	0.766	0.000	1.04		82.6	SURCHARGED	
1.003	S103	0.775	0.000	1.42		122.5	SURCHARGED	
1.004	S104	0.674	0.000	1.12		192.8	SURCHARGED	
2.000	S105	0.678	0.000	0.82		54.7	SURCHARGED	
2.001	S106	0.969	0.000	1.63		100.7	SURCHARGED	
1.005	S107	0.686	0.000	0.87		309.8	SURCHARGED	
1.006	S108	0.940	0.000	0.95		361.0	SURCHARGED	
1.007	S109	0.981	0.000	1.26		375.8	SURCHARGED	
1.008	S110	0.797	0.000	1.40		387.8	SURCHARGED	
1.009	S111	0.544	0.000	0.18		32.8	SURCHARGED	
3.000	S112	0.478	0.000	0.68		47.2	SURCHARGED	
3.001	S113	0.768	0.000	0.81		90.1	SURCHARGED	
3.002	S114	0.979	0.000	1.20		139.2	FLOOD RISK	
4.000	S115	1.159	0.000	1.29		74.4	FLOOD RISK	
3.003	S116	0.845	0.000	1.00		215.0	SURCHARGED	
3.004	S117	0.848	0.000	1.08		230.8	SURCHARGED	
3.005	S118	0.770	0.000	2.19		263.8	SURCHARGED	

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North East (Head Office)	AVANT HOMES	
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
5.000	S119	15 Winter	100	+45%	100/15 Summer	100/15 Winter	
5.001	S120	15 Winter	100	+45%	30/15 Summer		
5.002	S121	1440 Winter	100	+45%	30/15 Summer		
1.010	S122_BASIN	1440 Winter	100	+45%	30/120 Winter		
1.011	S123_FC	1440 Winter	100	+45%	1/15 Summer		
1.012	C100	15 Winter	100	+45%			

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
5.000	S119		31.729	1.204	0.637	1.49			35.0
5.001	S120		31.476	1.181	0.000	1.39			73.7
5.002	S121		29.774	0.379	0.000	0.12			7.4
1.010	S122_BASIN		29.772	0.722	0.000	0.15			41.7
1.011	S123_FC		29.818	1.243	0.000	0.09			6.4
1.012	C100		28.145	-0.158	0.000	0.19			6.4

PN	US/MH Name	Status	Level Exceeded
5.000	S119	FLOOD	1
5.001	S120	FLOOD RISK	
5.002	S121	SURCHARGED	
1.010	S122_BASIN	SURCHARGED	
1.011	S123_FC	SURCHARGED	
1.012	C100	OK	