Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
S1.000	37.297	0.373	100.0	0.167	15.00	0.0	0.600	o	150	Pipe/Conduit
S1.001	5.550	0.037	150.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit
S1.002	7.691	0.055	139.8	0.070	0.00	0.0	0.600	o	150	Pipe/Conduit
S1.003	15.866	0.110	144.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit
S2.000	28.472	0.512	55.6	0.072	15.00	0.0	0.600	o	150	Pipe/Conduit
S3.000	23.537	0.287	82.0	0.068	15.00	0.0	0.600	o	150	Pipe/Conduit
S2.001	3.346	0.023	145.5	0.010	0.00	0.0	0.600	o	150	Pipe/Conduit
S2.002	5.506	0.040	137.7	0.013	0.00	0.0	0.600	o	150	Pipe/Conduit
S2.003	2.434	0.020	121.7	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit
S2.004	23.870	0.160	149.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit
S2.005	8.345	0.060	139.1	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
S1.000	1.335	0.167	0.0	1.00	17.8
S1.001	0.962	0.167	0.0	0.82	14.5
S1.002	0.925	0.237	0.0	0.85	15.0
S1.003	0.870	0.237	0.0	0.83	14.7
S2.000	1.600	0.072	0.0	1.35	23.9
S3.000	1.375	0.068	0.0	1.11	19.6
S2.001	1.088	0.150	0.0	0.83	14.7
S2.002	1.065	0.163	0.0	0.85	15.1
S2.003	1.025	0.163	0.0	0.91	16.1
S2.004	1.005	0.163	0.0	0.82	14.5
S2.005	0.845	0.163	0.0	0.85	15.0

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Manhole Schedules for Storm

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	2.350	1.015	Open Manhole	600	S1.000	1.335	150				
S1A	2.145	1.183	Open Manhole	1200	S1.001	0.962	150	S1.000	0.962	150	
STANK1	2.050	1.125	Junction		S1.002	0.925	150	S1.001	0.925	150	
S2FC	2.050	1.180	Open Manhole	1200	S1.003	0.870	150	S1.002	0.870	150	
SWEST	2.130	1.370	Open Manhole	900 x 600		OUTFALL		S1.003	0.760	150	
S3	2.350	0.750	Open Manhole	600	S2.000	1.600	150				
S7	2.050	0.675	Open Manhole	600	S3.000	1.375	150				
S8	2.050	0.962	Open Manhole	600	S2.001	1.088	150	S2.000	1.088	150	
								S3.000	1.088	150	
STANK2	2.050	0.985	Junction		S2.002	1.065	150	S2.001	1.065	150	
S6FC	2.050	1.025	Open Manhole	1200	S2.003	1.025	150	S2.002	1.025	150	
S10	2.050	1.045	Open Manhole	1200	S2.004	1.005	150	S2.003	1.005	150	
S10	2.050	1.205	Open Manhole	1200	S2.005	0.845	150	S2.004	0.845	150	
SEAST	2.050	1.265	Open Manhole	600		OUTFALL		S2.005	0.785	150	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	494268.870	99109.511	494268.870	99109.511	Required	
S1A	494259.441	99145.596	494259.441	99145.596	Required	
STANK1	494258.009	99150.958			No Entry	
S2FC	494256.094	99158.407	494256.094	99158.407	Required	
SWEST	494240.743	99154.396			No Entry	
S3	494312.110	99120.810	494312.110	99120.810	Required	
S7	494298.962	99171.128	494298.962	99171.128	Required	
S8	494304.912	99148.356	494304.912	99148.356	Required	
STANK2	494308.149	99149.202			No Entry	
S6FC	494313.477	99150.594	494313.477	99150.594	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S10	494315.831	99151.210	494315.831	99151.210	Required	
S10	494310.636	99174.509	494310.636	99174.509	Required	
SEAST	494308.820	99182.654			No Entry	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	150	S1	2.350	1.335	0.865	Open Manhole	600
S1.001	o	150	S1A	2.145	0.962	1.033	Open Manhole	1200
S1.002	o	150	STANK1	2.050	0.925	0.975	Junction	
S1.003	o	150	S2FC	2.050	0.870	1.030	Open Manhole	1200
S2.000	o	150	S3	2.350	1.600	0.600	Open Manhole	600
S3.000	o	150	S7	2.050	1.375	0.525	Open Manhole	600
S2.001	o	150	S8	2.050	1.088	0.812	Open Manhole	600
S2.002	o	150	STANK2	2.050	1.065	0.835	Junction	
S2.003	o	150	S6FC	2.050	1.025	0.875	Open Manhole	1200
S2.004	o	150	S10	2.050	1.005	0.895	Open Manhole	1200
S2.005	o	150	S10	2.050	0.845	1.055	Open Manhole	1200

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)
S1.000	37.297	100.0	S1A	2.145	0.962	1.033	Open Manhole	1200
S1.001	5.550	150.0	STANK1	2.050	0.925	0.975	Junction	
S1.002	7.691	139.8	S2FC	2.050	0.870	1.030	Open Manhole	1200
S1.003	15.866	144.2	SWEST	2.130	0.760	1.220	Open Manhole	900 x 600
S2.000	28.472	55.6	S8	2.050	1.088	0.812	Open Manhole	600
S3.000	23.537	82.0	S8	2.050	1.088	0.812	Open Manhole	600
S2.001	3.346	145.5	STANK2	2.050	1.065	0.835	Junction	
S2.002	5.506	137.7	S6FC	2.050	1.025	0.875	Open Manhole	1200
S2.003	2.434	121.7	S10	2.050	1.005	0.895	Open Manhole	1200
S2.004	23.870	149.2	S10	2.050	0.845	1.055	Open Manhole	1200
S2.005	8.345	139.1	SEAST	2.050	0.785	1.115	Open Manhole	600

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.167	0.167	0.167
1.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.070	0.070	0.070
1.003	-	-	100	0.000	0.000	0.000
2.000	-	-	100	0.072	0.072	0.072
3.000	-	-	100	0.068	0.068	0.068
2.001	-	-	100	0.010	0.010	0.010
2.002	-	-	100	0.013	0.013	0.013
2.003	-	-	100	0.000	0.000	0.000
2.004	-	-	100	0.000	0.000	0.000
2.005	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.400	0.400	0.400

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.003	SWEST	2.130	0.760	0.000	900	600

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S2.005	SEAST	2.050	0.785	0.000	600	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	10	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Storm Duration (mins)	30
Ratio R	0.350		

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S2FC, DS/PN: S1.003, Volume (m³): 1.5

Unit Reference	MD-SHE-0114-6000-1100-6000
Design Head (m)	1.100
Design Flow (l/s)	6.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	114
Invert Level (m)	0.870
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)	1.100	6.0	Kick-Flo®	0.698	4.9
Flush-Flo™	0.325	6.0	Mean Flow over Head Range	-	5.2

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	4.0	0.800	5.2	2.000	7.9	4.000	11.0	7.000	14.4
0.200	5.8	1.000	5.7	2.200	8.3	4.500	11.6	7.500	14.9
0.300	6.0	1.200	6.2	2.400	8.6	5.000	12.2	8.000	15.3
0.400	5.9	1.400	6.7	2.600	9.0	5.500	12.8	8.500	15.8
0.500	5.8	1.600	7.1	3.000	9.6	6.000	13.4	9.000	16.2
0.600	5.5	1.800	7.6	3.500	10.3	6.500	13.9	9.500	16.6

Hydro-Brake® Optimum Manhole: S6FC, DS/PN: S2.003, Volume (m³): 1.2

Unit Reference	MD-SHE-0107-5000-0900-5000
Design Head (m)	0.900
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	107
Invert Level (m)	1.025
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)	0.900	5.0	Kick-Flo®	0.590	4.1
Flush-Flo™	0.271	5.0	Mean Flow over Head Range	-	4.3

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	3.6	0.400	4.9	0.800	4.7	1.400	6.1	2.000	7.2
0.200	4.9	0.500	4.6	1.000	5.2	1.600	6.5	2.200	7.6
0.300	5.0	0.600	4.1	1.200	5.7	1.800	6.9	2.400	7.9

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Hydro-Brake® Optimum Manhole: S6FC, DS/PN: S2.003, Volume (m^3): 1.2

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)
2.600	8.2	4.000	10.1	5.500	11.7	7.000	13.1	8.500	14.4
3.000	8.8	4.500	10.6	6.000	12.2	7.500	13.6	9.000	14.8
3.500	9.4	5.000	11.2	6.500	12.7	8.000	14.0	9.500	15.2

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Storage Structures for Storm

Cellular Storage Manhole: STANK1, DS/PN: S1.002

Invert Level (m) 0.925 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	45.0	0.0	0.500	45.0	0.0	0.501	0.0	0.0

Cellular Storage Manhole: STANK2, DS/PN: S2.002

Invert Level (m) 1.065 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	24.0	0.0	0.500	24.0	0.0	0.501	0.0	0.0

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 2 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 0.350 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320
Return Period(s) (years) 10
Climate Change (%) 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)
S1.000	S1	60 Winter	10	+0%	10/15 Summer				1.901	0.416	0.000
S1.001	S1A	60 Winter	10	+0%	10/15 Summer				1.871	0.759	0.000
S1.002	STANK1	60 Winter	10	+0%	10/15 Summer				1.426	0.351	0.000
S1.003	S2FC	60 Winter	10	+0%	10/15 Summer				1.848	0.828	0.000
S2.000	S3	60 Winter	10	+0%	10/30 Winter				2.020	0.270	0.000
S3.000	S7	60 Winter	10	+0%	10/15 Winter				2.018	0.493	0.000
S2.001	S8	60 Winter	10	+0%	10/15 Summer				2.007	0.769	0.000
S2.002	STANK2	60 Winter	10	+0%	10/15 Summer				1.566	0.351	0.000
S2.003	S6FC	60 Winter	10	+0%	10/15 Summer				1.991	0.816	0.000
S2.004	S10	60 Winter	10	+0%					1.068	-0.087	0.000
S2.005	S10	60 Winter	10	+0%					0.909	-0.086	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.97			16.7	SURCHARGED	
S1.001	S1A	1.34			16.0	FLOOD RISK	
S1.002	STANK1	0.51		58	7.4	SURCHARGED*	
S1.003	S2FC	0.44			6.0	FLOOD RISK	
S2.000	S3	0.36			8.1	SURCHARGED	
S3.000	S7	0.37			6.9	FLOOD RISK	
S2.001	S8	1.35			14.6	FLOOD RISK	
S2.002	STANK2	0.48		50	6.1	SURCHARGED*	
S2.003	S6FC	0.47			5.0	FLOOD RISK	
S2.004	S10	0.37			5.0	OK	
S2.005	S10	0.38			5.0	OK	

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