

Carley Daines and Partners Limited		Page 1
11 Bridgewater Road Worsley Manchester, M28 3JE	12851 CHAIN ROAD HYDRAULIC CALCULATIONS FULL NETWORK - FOR PLANNING	
Date 11/03/2022 File 12851 - Chain Road MicroDraia...	Designed by A MULLIGAN Checked by D MIDDLETON	
Innovyze	Network 2019.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.360	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 Storm

- Indicates pipe length does not match coordinates

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
S1.000	2.000#	0.001	2000.0	0.000	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	12.500#	0.050	250.0	0.015	0.00	0.0	0.600	o	600	Pipe/Conduit	
S2.000	18.000#	0.180	100.0	0.005	5.00	0.0	0.600	o	150	Pipe/Conduit	
S3.000	15.000#	0.700	21.4	0.005	5.00	0.0	0.600	o	150	Pipe/Conduit	
S3.001	4.000#	0.040	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S2.001	13.000#	0.090	144.4	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S4.000	18.000#	0.270	66.7	0.005	5.00	0.0	0.600	o	150	Pipe/Conduit	
S2.002	3.000#	0.020	150.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S2.003	3.200#	0.060	53.3	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)
S1.000	50.00	5.12	96.200	0.000	0.0	0.0	0.0	0.28	11.3	0.0
S1.001	50.00	5.25	95.450	0.015	0.0	0.0	0.0	1.54	434.2	2.0
S2.000	50.00	5.30	96.200	0.005	0.0	0.0	0.0	1.00	17.8	0.7
S3.000	50.00	5.11	96.760	0.005	0.0	0.0	0.0	2.19	38.6	0.7
S3.001	50.00	5.18	96.060	0.005	0.0	0.0	0.0	1.00	17.8	0.7
S2.001	50.00	5.56	96.020	0.010	0.0	0.0	0.0	0.83	14.7	1.4
S4.000	50.00	5.24	96.200	0.005	0.0	0.0	0.0	1.23	21.8	0.7
S2.002	50.00	5.62	95.930	0.015	0.0	0.0	0.0	0.82	14.5	2.0
S2.003	50.00	5.66	95.910	0.015	0.0	0.0	0.0	1.38	24.4	2.0

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.002	19.800#	0.080	247.5	0.025	0.00	0.0	0.600	o	600	Pipe/Conduit	
S5.000	11.700	0.100	117.0	0.001	5.00	0.0	0.600	o	150	Pipe/Conduit	
S5.001	8.000#	0.040	200.0	0.005	0.00	0.0	0.600	o	150	Pipe/Conduit	
S5.002	6.000#	0.040	150.0	0.005	0.00	0.0	0.600	o	150	Pipe/Conduit	
S5.003	28.200#	0.200	141.0	0.005	0.00	0.0	0.600	o	150	Pipe/Conduit	
S6.000	16.000#	0.880	18.2	0.005	5.00	0.0	0.600	o	150	Pipe/Conduit	
S5.004	11.700#	0.150	78.0	0.005	0.00	0.0	0.600	o	150	Pipe/Conduit	
S7.000	16.000#	1.030	15.5	0.005	5.00	0.0	0.600	o	150	Pipe/Conduit	
S5.005	10.000#	1.000	10.0	0.005	0.00	0.0	0.600	o	150	Pipe/Conduit	
S5.006	4.000#	0.400	10.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S8.000	10.000#	0.880	11.4	0.007	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.003	9.000#	0.040	225.0	0.060	0.00	0.0	0.600	o	600	Pipe/Conduit	
S9.000	7.000#	1.020	6.9	0.015	5.00	0.0	0.600	o	150	Pipe/Conduit	
S9.001	6.000#	0.300	20.0	0.015	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.004	2.000#	0.070	28.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.002	50.00	5.87	95.400	0.055	0.0	0.0	0.0	1.54	436.4	7.4
S5.000	50.00	5.21	97.700	0.001	0.0	0.0	0.0	0.93	16.4	0.1
S5.001	50.00	5.40	97.600	0.006	0.0	0.0	0.0	0.71	12.5	0.8
S5.002	50.00	5.52	97.560	0.011	0.0	0.0	0.0	0.82	14.5	1.5
S5.003	50.00	6.08	97.520	0.016	0.0	0.0	0.0	0.84	14.9	2.2
S6.000	50.00	5.11	98.200	0.005	0.0	0.0	0.0	2.37	41.9	0.7
S5.004	50.00	6.25	97.320	0.026	0.0	0.0	0.0	1.14	20.1	3.5
S7.000	50.00	5.10	98.200	0.005	0.0	0.0	0.0	2.57	45.4	0.7
S5.005	50.00	6.30	97.170	0.036	0.0	0.0	0.0	3.20	56.6	4.9
S5.006	50.00	6.32	96.170	0.036	0.0	0.0	0.0	3.20	56.6	4.9
S8.000	50.00	5.06	96.650	0.007	0.0	0.0	0.0	3.01	53.1	0.9
S1.003	50.00	6.41	95.320	0.158	0.0	0.0	0.0	1.62	457.9	21.4
S9.000	50.00	5.03	98.000	0.015	0.0	0.0	0.0	3.87	68.4	2.0
S9.001	50.00	5.07	96.980	0.030	0.0	0.0	0.0	2.26	40.0	4.1
S1.004	50.00	6.43	95.280	0.188	0.0	0.0	0.0	1.89	33.4	25.5

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12851 CHAIN ROAD
HYDRAULIC CALCULATIONS
FULL NETWORK - FOR PLANNING
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Designed by A MULLIGAN

Checked by D MIDDLETON

Network 2019.1

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
STANK	97.100	0.900	Open Manhole	1200	S1.000	96.200	225			
SMH100	97.340	1.890	Open Manhole	1800	S1.001	95.450	600	S1.000	96.199	225
SSWMH1	96.650	0.450	Sealed Manhole	450	S2.000	96.200	150			
SRE4	97.350	0.590	Open Manhole	450	S3.000	96.760	150			
SSWMH5	97.100	1.040	Open Manhole	450	S3.001	96.060	150	S3.000	96.060	150
SSWMH2	96.900	0.880	Sealed Manhole	450	S2.001	96.020	150	S2.000	96.020	150
								S3.001	96.020	150
SRE2	96.650	0.450	Sealed Manhole	450	S4.000	96.200	150			
SSWMH3	97.400	1.470	Open Manhole	450	S2.002	95.930	150	S2.001	95.930	150
								S4.000	95.930	150
SSWMH4	97.600	1.690	Open Manhole	450	S2.003	95.910	150	S2.002	95.910	150
SMH101	97.760	2.360	Open Manhole	1800	S1.002	95.400	600	S1.001	95.400	600
								S2.003	95.850	150
SRE7	98.100	0.400	Open Manhole	450	S5.000	97.700	150			
SSWMH5	98.080	0.480	Open Manhole	450	S5.001	97.600	150	S5.000	97.600	150
SSWMH6	98.700	1.140	Open Manhole	450	S5.002	97.560	150	S5.001	97.560	150
SSWMH7	98.900	1.380	Open Manhole	450	S5.003	97.520	150	S5.002	97.520	150
SRE5	98.800	0.600	Open Manhole	450	S6.000	98.200	150			
SSWMH8	98.950	1.630	Open Manhole	450	S5.004	97.320	150	S5.003	97.320	150
								S6.000	97.320	150
SRE6	98.800	0.600	Open Manhole	450	S7.000	98.200	150			
SSWMH9	98.750	1.580	Open Manhole	450	S5.005	97.170	150	S5.004	97.170	150
								S7.000	97.170	150
SSWMH10	98.000	1.830	Open Manhole	450	S5.006	96.170	150	S5.005	96.170	150
SRE5	97.200	0.550	Open Manhole	450	S8.000	96.650	150			
SMH102	97.920	2.600	Open Manhole	1800	S1.003	95.320	600	S1.002	95.320	600
								S5.006	95.770	150
								S8.000	95.770	150
SRE8	98.600	0.600	Open Manhole	450	S9.000	98.000	150			
SSWMH11	97.980	1.000	Open Manhole	450	S9.001	96.980	150	S9.000	96.980	150
SMH103 HB	97.650	2.370	Open Manhole	2100	S1.004	95.280	150	S1.003	95.280	600
								S9.001	96.680	150
SEXG MH	97.550	2.340	Open Manhole	0		OUTFALL		S1.004	95.210	150

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SMH100	96.270	63.281	96.270	63.281	Required	
SSWMH1	104.927	100.291			No Entry	

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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)
SRE4	146.804	81.187	146.804	81.187	Required	
SSWMH5	134.883	88.217	134.883	88.217	Required	
SSWMH2	128.769	82.410	128.769	82.410	Required	
SRE2	101.259	90.663	101.259	90.663	Required	
SSWMH3	120.669	73.086	120.669	73.086	Required	
SSWMH4	118.224	69.418	118.224	69.418	Required	
SMH101	118.848	63.281	118.848	63.281	Required	
SRE7	172.756	44.201	172.756	44.201	Required	
SSWMH5	181.697	36.636	181.697	36.636	Required	
SSWMH6	181.559	23.981	181.559	23.981	Required	
SSWMH7	175.644	16.416	175.644	16.416	Required	
SRE5	128.739	22.743	128.739	22.743	Required	
SSWMH8	152.673	20.129	152.673	20.129	Required	
SRE6	136.992	36.773	136.992	36.773	Required	
SSWMH9	155.012	34.848	155.012	34.848	Required	
SSWMH10	156.387	46.127	156.387	46.127	Required	
SRE5	153.086	72.012	153.086	72.012	Required	
SMH102	155.213	64.066	155.213	64.066	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)
SRE8	177.598	48.243	177.598	48.243	Required	
SSWMH11	170.294	54.680	170.294	54.680	Required	
SMH103 HB	171.247	63.543	171.247	63.543	Required	
SEXG MH	176.649	68.771			No Entry	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

- Indicates pipe length does not match coordinates

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	225	STANK	97.100	96.200	0.675	Open Manhole	1200
S1.001	o	600	SMH100	97.340	95.450	1.290	Open Manhole	1800
S2.000	o	150	SSWMH1	96.650	96.200	0.300	Sealed Manhole	450
S3.000	o	150	SRE4	97.350	96.760	0.440	Open Manhole	450
S3.001	o	150	SSWMH5	97.100	96.060	0.890	Open Manhole	450
S2.001	o	150	SSWMH2	96.900	96.020	0.730	Sealed Manhole	450
S4.000	o	150	SRE2	96.650	96.200	0.300	Sealed Manhole	450
S2.002	o	150	SSWMH3	97.400	95.930	1.320	Open Manhole	450
S2.003	o	150	SSWMH4	97.600	95.910	1.540	Open Manhole	450
S1.002	o	600	SMH101	97.760	95.400	1.760	Open Manhole	1800
S5.000	o	150	SRE7	98.100	97.700	0.250	Open Manhole	450
S5.001	o	150	SSWMH5	98.080	97.600	0.330	Open Manhole	450
S5.002	o	150	SSWMH6	98.700	97.560	0.990	Open Manhole	450
S5.003	o	150	SSWMH7	98.900	97.520	1.230	Open Manhole	450
S6.000	o	150	SRE5	98.800	98.200	0.450	Open Manhole	450

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	2.000#	2000.0	SMH100	97.340	96.199	0.916	Open Manhole	1800
S1.001	12.500#	250.0	SMH101	97.760	95.400	1.760	Open Manhole	1800
S2.000	18.000#	100.0	SSWMH2	96.900	96.020	0.730	Sealed Manhole	450
S3.000	15.000#	21.4	SSWMH5	97.100	96.060	0.890	Open Manhole	450
S3.001	4.000#	100.0	SSWMH2	96.900	96.020	0.730	Sealed Manhole	450
S2.001	13.000#	144.4	SSWMH3	97.400	95.930	1.320	Open Manhole	450
S4.000	18.000#	66.7	SSWMH3	97.400	95.930	1.320	Open Manhole	450
S2.002	3.000#	150.0	SSWMH4	97.600	95.910	1.540	Open Manhole	450
S2.003	3.200#	53.3	SMH101	97.760	95.850	1.760	Open Manhole	1800
S1.002	19.800#	247.5	SMH102	97.920	95.320	2.000	Open Manhole	1800
S5.000	11.700	117.0	SSWMH5	98.080	97.600	0.330	Open Manhole	450
S5.001	8.000#	200.0	SSWMH6	98.700	97.560	0.990	Open Manhole	450
S5.002	6.000#	150.0	SSWMH7	98.900	97.520	1.230	Open Manhole	450
S5.003	28.200#	141.0	SSWMH8	98.950	97.320	1.480	Open Manhole	450
S6.000	16.000#	18.2	SSWMH8	98.950	97.320	1.480	Open Manhole	450

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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)
S5.004	o	150	SSWMH8	98.950	97.320	1.480	Open Manhole	450
S7.000	o	150	SRE6	98.800	98.200	0.450	Open Manhole	450
S5.005	o	150	SSWMH9	98.750	97.170	1.430	Open Manhole	450
S5.006	o	150	SSWMH10	98.000	96.170	1.680	Open Manhole	450
S8.000	o	150	SRE5	97.200	96.650	0.400	Open Manhole	450
S1.003	o	600	SMH102	97.920	95.320	2.000	Open Manhole	1800
S9.000	o	150	SRE8	98.600	98.000	0.450	Open Manhole	450
S9.001	o	150	SSWMH11	97.980	96.980	0.850	Open Manhole	450
S1.004	o	150	SMH103 HB	97.650	95.280	2.220	Open Manhole	2100

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)
S5.004	11.700#	78.0	SSWMH9	98.750	97.170	1.430	Open Manhole	450
S7.000	16.000#	15.5	SSWMH9	98.750	97.170	1.430	Open Manhole	450
S5.005	10.000#	10.0	SSWMH10	98.000	96.170	1.680	Open Manhole	450
S5.006	4.000#	10.0	SMH102	97.920	95.770	2.000	Open Manhole	1800
S8.000	10.000#	11.4	SMH102	97.920	95.770	2.000	Open Manhole	1800
S1.003	9.000#	225.0	SMH103 HB	97.650	95.280	1.770	Open Manhole	2100
S9.000	7.000#	6.9	SSWMH11	97.980	96.980	0.850	Open Manhole	450
S9.001	6.000#	20.0	SMH103 HB	97.650	96.680	0.820	Open Manhole	2100
S1.004	2.000#	28.6	SEXG MH	97.550	95.210	2.190	Open Manhole	0

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.000	0.000	0.000
1.001	-	-	100	0.015	0.015	0.015
2.000	-	-	100	0.005	0.005	0.005
3.000	-	-	100	0.005	0.005	0.005
3.001	-	-	100	0.000	0.000	0.000
2.001	-	-	100	0.000	0.000	0.000
4.000	-	-	100	0.005	0.005	0.005
2.002	-	-	100	0.000	0.000	0.000
2.003	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.025	0.025	0.025
5.000	-	-	100	0.001	0.001	0.001
5.001	-	-	100	0.005	0.005	0.005
5.002	-	-	100	0.005	0.005	0.005
5.003	-	-	100	0.005	0.005	0.005
6.000	-	-	100	0.005	0.005	0.005
5.004	-	-	100	0.005	0.005	0.005
7.000	-	-	100	0.005	0.005	0.005
5.005	-	-	100	0.005	0.005	0.005
5.006	-	-	100	0.000	0.000	0.000
8.000	-	-	100	0.007	0.007	0.007
1.003	-	-	100	0.060	0.060	0.060
9.000	-	-	100	0.015	0.015	0.015
9.001	-	-	100	0.015	0.015	0.015
1.004	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.188	0.188	0.188

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)
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S1.004	SEXG MH	97.550	95.210	0.000	0	0
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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.360		

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Online Controls for Storm

Non Return Valve Manhole: SSWMH4, DS/PN: S2.003, Volume (m³): 0.3

Hydro-Brake® Optimum Manhole: SMH103 HB, DS/PN: S1.004, Volume (m³): 10.3

Unit Reference	MD-SHE-0103-5000-1200-5000
Design Head (m)	1.200
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	103
Invert Level (m)	95.280
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)	1.200	5.0	Kick-Flo®	0.745	4.0
Flush-Flo™	0.354	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	3.4	0.800	4.1	2.000	6.3	4.000	8.8	7.000	11.5
0.200	4.7	1.000	4.6	2.200	6.6	4.500	9.3	7.500	11.8
0.300	5.0	1.200	5.0	2.400	6.9	5.000	9.8	8.000	12.2
0.400	5.0	1.400	5.4	2.600	7.2	5.500	10.2	8.500	12.6
0.500	4.9	1.600	5.7	3.000	7.7	6.000	10.7	9.000	12.9
0.600	4.7	1.800	6.0	3.500	8.3	6.500	11.1	9.500	13.3

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Storage Structures for Storm

Tank or Pond Manhole: STANK, DS/PN: S1.000

Invert Level (m) 96.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	125.0	0.400	125.0	0.401	0.0

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 2 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.360 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 1440
 Return Period(s) (years) 1, 2, 30, 100
 Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged
									Level (m)	Depth (m)
S1.000	STANK	120 Winter	1	+0%	100/30 Winter				96.200	-0.225
S1.001	SMH100	30 Winter	1	+0%	30/15 Summer				95.645	-0.405
S2.000	SSWMH1	15 Winter	1	+0%	100/15 Summer				96.218	-0.132
S3.000	SRE4	15 Winter	1	+0%					96.772	-0.138
S3.001	SSWMH5	15 Winter	1	+0%	30/30 Summer				96.081	-0.129
S2.001	SSWMH2	15 Winter	1	+0%	30/30 Summer				96.050	-0.120
S4.000	SRE2	15 Winter	1	+0%	100/15 Summer				96.217	-0.133
S2.002	SSWMH3	15 Winter	1	+0%	30/15 Winter				95.971	-0.109
S2.003	SSWMH4	15 Winter	1	+0%	30/15 Summer				95.944	-0.116
S1.002	SMH101	30 Winter	1	+0%	30/15 Summer				95.645	-0.355
S5.000	SRE7	15 Winter	1	+0%					97.706	-0.144
S5.001	SSWMH5	15 Winter	1	+0%					97.623	-0.127
S5.002	SSWMH6	15 Winter	1	+0%					97.591	-0.119
S5.003	SSWMH7	15 Winter	1	+0%					97.554	-0.116
S6.000	SRE5	15 Winter	1	+0%					98.211	-0.139
S5.004	SSWMH8	15 Winter	1	+0%					97.358	-0.112
S7.000	SRE6	15 Winter	1	+0%					98.210	-0.140
S5.005	SSWMH9	15 Winter	1	+0%					97.197	-0.123
S5.006	SSWMH10	15 Winter	1	+0%	30/30 Winter				96.201	-0.119
S8.000	SRE5	15 Winter	1	+0%					96.663	-0.137
S1.003	SMH102	30 Winter	1	+0%	30/15 Summer				95.645	-0.275
S9.000	SRE8	15 Winter	1	+0%					98.017	-0.133
S9.001	SSWMH11	15 Winter	1	+0%					97.012	-0.118
S1.004	SMH103 HB	30 Winter	1	+0%	1/15 Summer				95.645	0.215

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)		
S1.000	STANK	0.000	0.00		0.0	OK	
S1.001	SMH100	0.000	0.00		0.8	OK	

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

PN	US/MH Name	Flooded Volume (m³)	Flow / Overflow Cap.	Pipe Flow (1/s)	Status	Level Exceeded
S2.000	SSWMH1	0.000	0.04	0.6	OK	
S3.000	SRE4	0.000	0.02	0.6	OK	
S3.001	SSWMH5	0.000	0.05	0.6	OK	
S2.001	SSWMH2	0.000	0.09	1.2	OK	
S4.000	SRE2	0.000	0.03	0.6	OK	
S2.002	SSWMH3	0.000	0.17	1.8	OK	
S2.003	SSWMH4	0.000	0.12	1.8	OK	
S1.002	SMH101	0.000	0.01	2.2	OK	
S5.000	SRE7	0.000	0.01	0.1	OK	
S5.001	SSWMH5	0.000	0.06	0.6	OK	
S5.002	SSWMH6	0.000	0.09	1.1	OK	
S5.003	SSWMH7	0.000	0.11	1.6	OK	
S6.000	SRE5	0.000	0.02	0.6	OK	
S5.004	SSWMH8	0.000	0.15	2.7	OK	
S7.000	SRE6	0.000	0.01	0.6	OK	
S5.005	SSWMH9	0.000	0.08	3.8	OK	
S5.006	SSWMH10	0.000	0.10	3.8	OK	
S8.000	SRE5	0.000	0.02	0.8	OK	
S1.003	SMH102	0.000	0.02	5.3	OK	
S9.000	SRE8	0.000	0.03	1.8	OK	
S9.001	SSWMH11	0.000	0.10	3.3	OK	
S1.004	SMH103 HB	0.000	0.30	5.0	SURCHARGED	

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2 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 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 Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 2 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.360 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 1440
 Return Period(s) (years) 1, 2, 30, 100
 Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged
									Level (m)	Depth (m)
S1.000	STANK	120 Winter	2	+0%	100/30 Winter				96.200	-0.225
S1.001	SMH100	30 Winter	2	+0%	30/15 Summer				95.751	-0.299
S2.000	SSWMH1	15 Winter	2	+0%	100/15 Summer				96.221	-0.129
S3.000	SRE4	15 Winter	2	+0%					96.775	-0.135
S3.001	SSWMH5	15 Winter	2	+0%	30/30 Summer				96.084	-0.126
S2.001	SSWMH2	15 Winter	2	+0%	30/30 Summer				96.054	-0.116
S4.000	SRE2	15 Winter	2	+0%	100/15 Summer				96.219	-0.131
S2.002	SSWMH3	15 Winter	2	+0%	30/15 Winter				95.978	-0.102
S2.003	SSWMH4	15 Winter	2	+0%	30/15 Summer				95.949	-0.111
S1.002	SMH101	30 Winter	2	+0%	30/15 Summer				95.751	-0.249
S5.000	SRE7	15 Winter	2	+0%					97.708	-0.142
S5.001	SSWMH5	15 Winter	2	+0%					97.627	-0.123
S5.002	SSWMH6	15 Winter	2	+0%					97.595	-0.115
S5.003	SSWMH7	15 Winter	2	+0%					97.559	-0.111
S6.000	SRE5	15 Winter	2	+0%					98.214	-0.136
S5.004	SSWMH8	15 Winter	2	+0%					97.365	-0.105
S7.000	SRE6	15 Winter	2	+0%					98.213	-0.137
S5.005	SSWMH9	15 Winter	2	+0%					97.201	-0.119
S5.006	SSWMH10	15 Winter	2	+0%	30/30 Winter				96.205	-0.115
S8.000	SRE5	15 Winter	2	+0%					96.666	-0.134
S1.003	SMH102	30 Winter	2	+0%	30/15 Summer				95.751	-0.169
S9.000	SRE8	15 Winter	2	+0%					98.019	-0.131
S9.001	SSWMH11	15 Winter	2	+0%					97.016	-0.114
S1.004	SMH103 HB	30 Winter	2	+0%	1/15 Summer				95.750	0.320

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)		
S1.000	STANK	0.000	0.00		0.0	OK	
S1.001	SMH100	0.000	0.00		0.8	OK	

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

PN	US/MH Name	Flooded Volume (m³)	Flow / Overflow Cap.	Pipe Flow (1/s)	Status	Level Exceeded
S2.000	SSWMH1	0.000	0.05	0.8	OK	
S3.000	SRE4	0.000	0.02	0.8	OK	
S3.001	SSWMH5	0.000	0.06	0.8	OK	
S2.001	SSWMH2	0.000	0.12	1.6	OK	
S4.000	SRE2	0.000	0.04	0.8	OK	
S2.002	SSWMH3	0.000	0.22	2.3	OK	
S2.003	SSWMH4	0.000	0.15	2.3	OK	
S1.002	SMH101	0.000	0.01	2.3	OK	
S5.000	SRE7	0.000	0.01	0.2	OK	
S5.001	SSWMH5	0.000	0.07	0.8	OK	
S5.002	SSWMH6	0.000	0.12	1.5	OK	
S5.003	SSWMH7	0.000	0.15	2.1	OK	
S6.000	SRE5	0.000	0.02	0.8	OK	
S5.004	SSWMH8	0.000	0.19	3.5	OK	
S7.000	SRE6	0.000	0.02	0.8	OK	
S5.005	SSWMH9	0.000	0.10	4.9	OK	
S5.006	SSWMH10	0.000	0.12	4.9	OK	
S8.000	SRE5	0.000	0.02	1.1	OK	
S1.003	SMH102	0.000	0.02	5.5	OK	
S9.000	SRE8	0.000	0.04	2.3	OK	
S9.001	SSWMH11	0.000	0.13	4.3	OK	
S1.004	SMH103 HB	0.000	0.30	5.0	SURCHARGED	

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet 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 Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 2 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.360 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 1440
 Return Period(s) (years) 1, 2, 30, 100
 Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged
									Level (m)	Depth (m)
S1.000	STANK	60 Winter	30	+0%	100/30 Winter				96.248	-0.177
S1.001	SMH100	60 Winter	30	+0%	30/15 Summer				96.401	0.351
S2.000	SSWMH1	60 Winter	30	+0%	100/15 Summer				96.303	-0.047
S3.000	SRE4	15 Winter	30	+0%					96.780	-0.130
S3.001	SSWMH5	60 Winter	30	+0%	30/30 Summer				96.302	0.092
S2.001	SSWMH2	60 Winter	30	+0%	30/30 Summer				96.302	0.132
S4.000	SRE2	60 Winter	30	+0%	100/15 Summer				96.301	-0.049
S2.002	SSWMH3	60 Winter	30	+0%	30/15 Winter				96.308	0.228
S2.003	SSWMH4	60 Winter	30	+0%	30/15 Summer				96.397	0.337
S1.002	SMH101	60 Winter	30	+0%	30/15 Summer				96.404	0.404
S5.000	SRE7	15 Winter	30	+0%					97.714	-0.136
S5.001	SSWMH5	15 Winter	30	+0%					97.642	-0.108
S5.002	SSWMH6	15 Winter	30	+0%					97.614	-0.096
S5.003	SSWMH7	15 Winter	30	+0%					97.581	-0.089
S6.000	SRE5	15 Winter	30	+0%					98.219	-0.131
S5.004	SSWMH8	15 Winter	30	+0%					97.390	-0.080
S7.000	SRE6	15 Winter	30	+0%					98.218	-0.132
S5.005	SSWMH9	15 Winter	30	+0%					97.218	-0.102
S5.006	SSWMH10	60 Winter	30	+0%	30/30 Winter				96.413	0.093
S8.000	SRE5	15 Winter	30	+0%					96.670	-0.130
S1.003	SMH102	60 Winter	30	+0%	30/15 Summer				96.407	0.487
S9.000	SRE8	15 Winter	30	+0%					98.027	-0.123
S9.001	SSWMH11	15 Winter	30	+0%					97.033	-0.097
S1.004	SMH103 HB	60 Winter	30	+0%	1/15 Summer				96.406	0.976

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Cap. (1/s)	Flow (1/s)	Overflow (1/s)		
S1.000	STANK	0.000	0.09	2.7		OK	
S1.001	SMH100	0.000	0.01	2.9		SURCHARGED	

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

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
S2.000	SSWMH1	0.000	0.05	0.8		OK	
S3.000	SRE4	0.000	0.04	1.5		OK	
S3.001	SSWMH5	0.000	0.06	0.8		SURCHARGED	
S2.001	SSWMH2	0.000	0.12	1.6		SURCHARGED*	
S4.000	SRE2	0.000	0.04	0.8		OK	
S2.002	SSWMH3	0.000	0.22	2.3		SURCHARGED	
S2.003	SSWMH4	0.000	0.15	2.3		SURCHARGED	
S1.002	SMH101	0.000	0.01	3.6		SURCHARGED	
S5.000	SRE7	0.000	0.02	0.3		OK	
S5.001	SSWMH5	0.000	0.17	1.9		OK	
S5.002	SSWMH6	0.000	0.29	3.4		OK	
S5.003	SSWMH7	0.000	0.34	4.9		OK	
S6.000	SRE5	0.000	0.04	1.5		OK	
S5.004	SSWMH8	0.000	0.43	7.8		OK	
S7.000	SRE6	0.000	0.04	1.5		OK	
S5.005	SSWMH9	0.000	0.21	10.7		OK	
S5.006	SSWMH10	0.000	0.14	5.6		SURCHARGED	
S8.000	SRE5	0.000	0.04	2.1		OK	
S1.003	SMH102	0.000	0.02	5.7		SURCHARGED	
S9.000	SRE8	0.000	0.08	4.4		OK	
S9.001	SSWMH11	0.000	0.27	9.1		OK	
S1.004	SMH103 HB	0.000	0.30	5.0		SURCHARGED	

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 2 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.360 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 1440
 Return Period(s) (years) 1, 2, 30, 100
 Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged
									Level (m)	Depth (m)
S1.000	STANK	120 Winter	100	+40%	100/30 Winter				96.527	0.102
S1.001	SMH100	15 Winter	100	+40%	30/15 Summer				96.687	0.637
S2.000	SSWMH1	30 Winter	100	+40%	100/15 Summer				96.650	0.300
S3.000	SRE4	15 Winter	100	+40%					96.787	-0.123
S3.001	SSWMH5	30 Winter	100	+40%	30/30 Summer				96.647	0.437
S2.001	SSWMH2	30 Winter	100	+40%	30/30 Summer				96.643	0.473
S4.000	SRE2	30 Winter	100	+40%	100/15 Summer				96.637	0.287
S2.002	SSWMH3	30 Winter	100	+40%	30/15 Winter				96.628	0.548
S2.003	SSWMH4	30 Winter	100	+40%	30/15 Summer				96.620	0.560
S1.002	SMH101	15 Winter	100	+40%	30/15 Summer				96.710	0.710
S5.000	SRE7	15 Winter	100	+40%					97.718	-0.132
S5.001	SSWMH5	15 Winter	100	+40%					97.660	-0.090
S5.002	SSWMH6	15 Winter	100	+40%					97.637	-0.073
S5.003	SSWMH7	15 Winter	100	+40%					97.607	-0.063
S6.000	SRE5	15 Winter	100	+40%					98.226	-0.124
S5.004	SSWMH8	15 Winter	100	+40%					97.422	-0.048
S7.000	SRE6	15 Winter	100	+40%					98.225	-0.125
S5.005	SSWMH9	15 Winter	100	+40%					97.236	-0.084
S5.006	SSWMH10	15 Winter	100	+40%	30/30 Winter				96.818	0.498
S8.000	SRE5	15 Winter	100	+40%					96.744	-0.056
S1.003	SMH102	15 Winter	100	+40%	30/15 Summer				96.733	0.813
S9.000	SRE8	15 Winter	100	+40%					98.037	-0.113
S9.001	SSWMH11	15 Winter	100	+40%					97.055	-0.075
S1.004	SMH103 HB	15 Winter	100	+40%	1/15 Summer				96.735	1.305

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)		
S1.000	STANK	0.000	0.24		6.8	SURCHARGED	
S1.001	SMH100	0.000	0.02		6.4	SURCHARGED	

Carley Daines and Partners Limited		Page 18
11 Bridgewater Road Worsley Manchester, M28 3JE	12851 CHAIN ROAD HYDRAULIC CALCULATIONS FULL NETWORK - FOR PLANNING	
Date 11/03/2022 File 12851 - Chain Road MicroDraia...	Designed by A MULLIGAN Checked by D MIDDLETON	
Innovyze	Network 2019.1	

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

PN	US/MH Name	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S2.000	SSWMH1	0.000	0.12	2.1	FLOOD RISK*	
S3.000	SRE4	0.000	0.07	2.7	OK	
S3.001	SSWMH5	0.000	0.15	1.9	SURCHARGED	
S2.001	SSWMH2	0.000	0.28	3.8	FLOOD RISK*	
S4.000	SRE2	0.000	0.10	2.1	FLOOD RISK*	
S2.002	SSWMH3	0.000	0.54	5.7	SURCHARGED	
S2.003	SSWMH4	0.000	0.37	5.7	SURCHARGED	
S1.002	SMH101	0.000	0.02	6.1	SURCHARGED	
S5.000	SRE7	0.000	0.04	0.5	OK	
S5.001	SSWMH5	0.000	0.31	3.4	OK	
S5.002	SSWMH6	0.000	0.52	6.2	OK	
S5.003	SSWMH7	0.000	0.62	8.8	OK	
S6.000	SRE5	0.000	0.07	2.7	OK	
S5.004	SSWMH8	0.000	0.77	14.1	OK	
S7.000	SRE6	0.000	0.06	2.7	OK	
S5.005	SSWMH9	0.000	0.38	19.4	OK	
S5.006	SSWMH10	0.000	0.45	18.0	SURCHARGED	
S8.000	SRE5	0.000	0.08	3.7	OK	
S1.003	SMH102	0.000	0.05	13.2	SURCHARGED	
S9.000	SRE8	0.000	0.14	8.0	OK	
S9.001	SSWMH11	0.000	0.49	16.5	OK	
S1.004	SMH103 HB	0.000	0.33	5.4	SURCHARGED	