20229555 – Tatton Arms, Boat Lane, Northenden, Manchester, M22 4HR

Mirodrainage Calculations

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)
S1	29.600	0.650	Open Manhole	600	S1.000	28.950	150			
S2	29.607	0.822	Open Manhole	600	S1.001	28.785	225	S1.000	28.785	150
S3	29.600	1.058	Open Manhole	600	S1.002	28.542	225	S1.001	28.542	225
S4	30.250	1.802	Open Manhole	600	S1.003	28.448	225	S1.002	28.448	225
S5	29.850	0.650	Open Manhole	600	S2.000	29.200	150			
S6	30.500	1.416	Open Manhole	600	S2.001	29.084	225	S2.000	29.084	150
S7	28.900	0.650	Open Manhole	600	S2.002	28.250	300	S2.001	28.250	225
S8	28.900	0.791	Open Manhole	600	S2.003	28.109	300	S2.002	28.109	300
S5	28.900	2.000	Open Manhole	2100	S1.004	26.900	150	S1.003	26.900	225
								S2.003	27.985	300
SOutfall	29.575	2.898	Open Manhole	1800		OUTFALL		S1.004	26.677	150

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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	29.600	28.950	0.500	Open Manhole	600
S1.001	o	225	S2	29.607	28.785	0.597	Open Manhole	600
S1.002	o	225	S3	29.600	28.542	0.833	Open Manhole	600
S1.003	o	225	S4	30.250	28.448	1.577	Open Manhole	600
S2.000	o	150	S5	29.850	29.200	0.500	Open Manhole	600
S2.001	o	225	S6	30.500	29.084	1.191	Open Manhole	600
S2.002	o	300	S7	28.900	28.250	0.350	Open Manhole	600
S2.003	o	300	S8	28.900	28.109	0.491	Open Manhole	600
S1.004	o	150	S5	28.900	26.900	1.850	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)
S1.000	24.748	150.0	S2	29.607	28.785	0.672	Open Manhole	600
S1.001	36.435	149.9	S3	29.600	28.542	0.833	Open Manhole	600
S1.002	14.079	149.8	S4	30.250	28.448	1.577	Open Manhole	600
S1.003	24.837	16.0	S5	28.900	26.900	1.775	Open Manhole	2100
S2.000	17.348	149.6	S6	30.500	29.084	1.266	Open Manhole	600
S2.001	7.996	9.6	S7	28.900	28.250	0.425	Open Manhole	600
S2.002	21.036	149.2	S8	28.900	28.109	0.491	Open Manhole	600
S2.003	18.691	150.7	S5	28.900	27.985	0.615	Open Manhole	2100
S1.004	33.499	150.2	SOutfall	29.575	26.677	2.748	Open Manhole	1800

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Setting Out Information - True Coordinates (Storm)

PN	USMH Name	Dia/Len (mm)	Width (mm)	US Easting (m)	US Northing (m)	Layout (North)
S1.000	S1	600		383235.888	390209.391	
S1.001	S2	600		383250.689	390229.225	
S1.002	S3	600		383280.322	390208.026	
S1.003	S4	600		383271.687	390196.905	
S2.000	S5	600		383244.794	390196.507	
S2.001	S6	600		383258.452	390185.810	
S2.002	S7	600		383263.652	390179.737	
S2.003	S8	600		383280.504	390167.146	
S1.004	S5	2100		383291.661	390182.142	

PN	DSMH Name	Dia/Len (mm)	Width (mm)	DS Easting (m)	DS Northing (m)	Layout (North)
S1.004	SOutfall	1800		383322.755	390169.680	

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.005	0.005	0.005
	User	-	100	0.004	0.004	0.009
1.001	User	-	100	0.034	0.034	0.034
	User	-	100	0.020	0.020	0.054
	User	-	100	0.005	0.005	0.059
	User	-	100	0.003	0.003	0.062
1.002	User	-	100	0.043	0.043	0.043
1.003	User	-	100	0.010	0.010	0.010
	User	-	100	0.028	0.028	0.038
	User	-	100	0.019	0.019	0.057
2.000	User	-	100	0.005	0.005	0.005
	User	-	100	0.004	0.004	0.008
2.001	User	-	100	0.008	0.008	0.008
	User	-	100	0.013	0.013	0.020
2.002	User	-	100	0.002	0.002	0.002
	User	-	100	0.011	0.011	0.013
	User	-	100	0.003	0.003	0.016
2.003	User	-	100	0.010	0.010	0.010
1.004	User	-	100	0.015	0.015	0.015
				Total	Total	Total
				0.241	0.241	0.241

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)
S1.004	SOutfall	29.575	26.677	26.677	1800	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	40.000
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 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	M5-60 (mm) 18.000
Return Period (years)		100	Ratio R 0.358
Region	England and Wales	Profile Type	Summer

Synthetic Rainfall Details

Cv (Summer)	0.750	Storm Duration (mins)	30
Cv (Winter)	0.840		

Online Controls for Storm

Hydro-Brake Optimum® Manhole: S5, DS/PN: S1.004, Volume (m³): 9.1

Unit Reference	MD-SHE-0105-5000-1000-5000
Design Head (m)	1.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	105
Invert Level (m)	26.900
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	5.0
Flush-Flo™	0.296	5.0
Kick-Flo®	0.637	4.1
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)
0.100	3.6	1.200	5.4	3.000	8.4	7.000	12.5
0.200	4.8	1.400	5.8	3.500	9.0	7.500	12.9
0.300	5.0	1.600	6.2	4.000	9.6	8.000	13.3
0.400	4.9	1.800	6.6	4.500	10.1	8.500	13.7
0.500	4.7	2.000	6.9	5.000	10.6	9.000	14.1
0.600	4.3	2.200	7.2	5.500	11.1	9.500	14.5
0.800	4.5	2.400	7.5	6.000	11.6		
1.000	5.0	2.600	7.8	6.500	12.1		

Storage Structures for Storm

Cellular Storage Manhole: S5, DS/PN: S1.004

Invert Level (m)	26.900	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)
0.000	150.0	150.0	1.001	0.0	150.0
1.000	150.0	150.0			

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	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	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	0.360
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.000	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, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 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)
S1.000	S1	15 Winter	1	+0%	100/15 Summer				28.985
S1.001	S2	15 Winter	1	+0%	100/15 Summer				28.864
S1.002	S3	15 Winter	1	+0%	30/15 Summer				28.648
S1.003	S4	15 Winter	1	+0%	100/15 Summer				28.517
S2.000	S5	15 Winter	1	+0%					29.233
S2.001	S6	15 Winter	1	+0%					29.111
S2.002	S7	15 Winter	1	+0%	100/180 Winter				28.309
S2.003	S8	15 Winter	1	+0%	100/180 Winter				28.174
S1.004	S5	120 Winter	1	+0%	1/60 Winter				27.069

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.115	0.000	0.12		1.7	OK	
S1.001	S2	-0.146	0.000	0.26		10.5	OK	
S1.002	S3	-0.119	0.000	0.45		16.5	OK	
S1.003	S4	-0.156	0.000	0.20		24.5	OK	
S2.000	S5	-0.117	0.000	0.11		1.5	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S2.001	S6	-0.198	0.000	0.03		4.4	OK	
S2.002	S7	-0.241	0.000	0.08		6.7	OK	
S2.003	S8	-0.235	0.000	0.10		8.2	OK	
S1.004	S5	0.019	0.000	0.34		4.7	SURCHARGED	

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	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	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	0.360
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.000	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, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 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)
S1.000	S1	15 Winter	30	+0%	100/15 Summer				29.006
S1.001	S2	15 Winter	30	+0%	100/15 Summer				28.957
S1.002	S3	15 Winter	30	+0%	30/15 Summer				28.820
S1.003	S4	15 Winter	30	+0%	100/15 Summer				28.574
S2.000	S5	15 Winter	30	+0%					29.253
S2.001	S6	15 Winter	30	+0%					29.131
S2.002	S7	15 Winter	30	+0%	100/180 Winter				28.351
S2.003	S8	15 Winter	30	+0%	100/180 Winter				28.223
S1.004	S5	180 Winter	30	+0%	1/60 Winter				27.401

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.094	0.000	0.30		4.1	OK	
S1.001	S2	-0.053	0.000	0.74		29.7	OK	
S1.002	S3	0.053	0.000	1.28		47.3	SURCHARGED	
S1.003	S4	-0.099	0.000	0.58		69.5	OK	
S2.000	S5	-0.097	0.000	0.27		3.7	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S2.001	S6	-0.178	0.000	0.10		12.6	OK	
S2.002	S7	-0.199	0.000	0.25		19.7	OK	
S2.003	S8	-0.186	0.000	0.31		23.9	OK	
S1.004	S5	0.351	0.000	0.36		4.9	SURCHARGED	

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	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	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	0.360
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.000	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, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 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)
S1.000	S1	15 Winter	100	+40%	100/15 Summer				29.592
S1.001	S2	15 Winter	100	+40%	100/15 Summer				29.559
S1.002	S3	15 Winter	100	+40%	30/15 Summer				29.171
S1.003	S4	15 Winter	100	+40%	100/15 Summer				28.725
S2.000	S5	15 Winter	100	+40%					29.275
S2.001	S6	15 Winter	100	+40%					29.147
S2.002	S7	180 Winter	100	+40%	100/180 Winter				28.690
S2.003	S8	180 Winter	100	+40%	100/180 Winter				28.689
S1.004	S5	180 Winter	100	+40%	1/60 Winter				28.687

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.492	0.000	0.52		7.2	FLOOD RISK	
S1.001	S2	0.549	0.000	1.25		49.9	FLOOD RISK	
S1.002	S3	0.404	0.000	2.16		79.9	SURCHARGED	
S1.003	S4	0.052	0.000	0.99		119.1	SURCHARGED	
S2.000	S5	-0.075	0.000	0.49		6.7	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S2.001	S6	-0.162	0.000	0.18		22.8	OK	
S2.002	S7	0.140	0.000	0.11		8.6	FLOOD RISK	
S2.003	S8	0.280	0.000	0.14		10.6	FLOOD RISK	
S1.004	S5	1.637	0.000	0.47		6.5	FLOOD RISK	