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Gateshead		
Tyne & Wear NE9 5BF		
Date 03/02/2016 13:03	Designed by mthrumble	
File Church Lane - 100 yr + ...	Checked by	
XP Solutions	Network 2015.1	

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)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	17.100	Minimum Backdrop Height (m)	0.900
Ratio R	0.346	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.350
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

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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 * 10m ³ /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	0.346
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			OFF
DVD Status			ON
Inertia 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, 30	

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	30 Winter	1	+0%	30/15 Summer			
S2.000	S2	15 Winter	1	+0%	100/15 Summer			
S2.001	S3	15 Winter	1	+0%	30/15 Summer	100/60 Winter		
S1.001	S2	30 Winter	1	+0%	1/15 Summer			
S1.002	S2	30 Winter	1	+0%	1/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	17.187	-0.083	0.000	0.20	2.8	OK	
S2.000	S2	17.364	-0.203	0.000	0.02	0.8	OK	
S2.001	S3	17.194	-0.171	0.000	0.13	4.5	OK	2
S1.001	S2	17.176	0.092	0.000	0.36	4.8	SURCHARGED	
S1.002	S2	17.158	0.167	0.000	0.39	4.8	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 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 0.346
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 OFF
DVD Status ON
Inertia 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, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1 60	Winter	30	+0%	30/15 Summer			
S2.000	S2 60	Winter	30	+0%	100/15 Summer			
S2.001	S3 60	Winter	30	+0%	30/15 Summer	100/60 Winter		
S1.001	S2 60	Winter	30	+0%	1/15 Summer			
S1.002	S2 60	Winter	30	+0%	1/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow		Pipe Flow (l/s)	Status	Level Exceeded
					Cap.	(l/s)			
S1.000	S1	17.503	0.233	0.000	0.24		3.4	SURCHARGED	
S2.000	S2	17.496	-0.071	0.000	0.04		1.3	OK	
S2.001	S3	17.494	0.129	0.000	0.16		5.5	SURCHARGED	2
S1.001	S2	17.491	0.407	0.000	0.35		4.7	SURCHARGED	
S1.002	S2	17.474	0.484	0.000	0.40		4.9	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 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 0.346
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 OFF
DVD Status ON
Inertia 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, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	60 Winter	100	+30%	30/15 Summer			
S2.000	S2	60 Winter	100	+30%	100/15 Summer			
S2.001	S3	60 Winter	100	+30%	30/15 Summer	100/60 Winter		
S1.001	S2	60 Winter	100	+30%	1/15 Summer			
S1.002	S2	60 Winter	100	+30%	1/15 Summer			

PN	US/MH Name	Water			Surcharged		Flooded		Pipe		Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status			
S1.000	S1	18.528	1.258	0.000	0.36		5.1	FLOOD RISK			
S2.000	S2	18.503	0.936	0.000	0.04		1.5	FLOOD RISK			
S2.001	S3	18.501	1.136	0.944	0.28		9.6	FLOOD		2	
S1.001	S2	18.504	1.420	0.000	0.43		5.7	FLOOD RISK			
S1.002	S2	18.487	1.497	0.000	0.42		5.2	FLOOD RISK			