

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm Network 2

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model	
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 471702 106641 SU 71702 06641
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm Network 2

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	0.050	40.0	0.020	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	6.000	0.050	120.0	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	5.02	10.800	0.020	0.0	0.0	0.0	1.60	28.2	2.7
S1.001	50.00	5.13	9.800	0.020	0.0	0.0	0.0	0.92	16.2	2.7

Manhole Schedules for Storm Network 2

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)	Backdrop (mm)
S1	11.600	0.800	Open Manhole	1200	S1.000	10.800	150				
STank B	11.600	1.800	Open Manhole	1200	S1.001	9.800	150	S1.000	10.750	150	950
S	10.600	0.850	Open Manhole	0		OUTFALL		S1.001	9.750	150	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	471730.438	106571.282	471730.438	106571.282	Required	
STank B	471732.135	106572.341	471732.135	106572.341	Required	
S	471735.348	106577.408			No Entry	

Hampshire County Council		Page 3
DataCentre, Room 348, QE11 Court The Castle, Winchester Hampshire, SO23 8UJ	Havant Replacement Footbridge CJ009595	
Date 03/11/2025 11:48 File 20251029-HAVANT-POST-CHECK.MDX	Designed by GF Checked by DR	
Innovyze	Network 2020.1.3	

PIPELINE SCHEDULES for Storm Network 2

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	11.600	10.800	0.650	Open Manhole	1200
S1.001	o	150	STank B	11.600	9.800	1.650	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	2.000	40.0	STank B	11.600	10.750	0.700	Open Manhole	1200
S1.001	6.000	120.0	S	10.600	9.750	0.700	Open Manhole	0

Hampshire County Council		Page 4
DataCentre, Room 348, QE11 Court The Castle, Winchester Hampshire, SO23 8UJ	Havant Replacement Footbridge CJ009595	
Date 03/11/2025 11:48 File 20251029-HAVANT-POST-CHECK.MDX	Designed by GF Checked by DR	
Innovyze	Network 2020.1.3	

Area Summary for Storm Network 2

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.020	0.020	0.020
1.001	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.020	0.020	0.020

Free Flowing Outfall Details for Storm Network 2

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
---------------------	--------------	--------------	--------------	------------------	----------	--------

S1.001	S	10.600	9.750	0.000	0	0
--------	---	--------	-------	-------	---	---

Simulation Criteria for Storm Network 2

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	1	Number of Storage Structures	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	100	Winter Storms	No
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 471702 106641 SU 71702 06641	Cv (Winter)	0.840
Data Type		Point Storm Duration (mins)	30

Storage Structures for Storm Network 2

Tank or Pond Manhole: STank B, DS/PN: S1.001

Invert Level (m) 10.400

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	10.0	1.000	10.0	1.001	0.0	1.200	0.0

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

Simulation Criteria

Areal Reduction Factor 1.000

Hot Start (mins) 0

Hot Start Level (mm) 0

Manhole Headloss Coeff (Global) 0.500

Foul Sewage per hectare (l/s) 0.000

Additional Flow - % of Total Flow 0.000

MADD Factor * 10m³/ha Storage 2.000

Inlet Coefficient 0.800

Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0

Number of Offline Controls 0

Number of Time/Area Diagrams 0

Number of Online Controls 1

Number of Storage Structures 1

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model

Region England and Wales

FSR M5-60 (mm) 19.100

Cv (Summer) 0.750

Ratio R 0.350

Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep

DTS Status ON

DVD Status OFF

Fine Inertia Status OFF

Profile(s)

Duration(s) (mins)

Return Period(s) (years)

Climate Change (%)

Summer and Winter

15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

1, 2, 30, 31, 100, 101

0, 0, 0, 40, 0, 45

									Water	Surcharged	Flooded
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)
S1.000	S1	15 Winter	1	+0%					10.843	-0.107	0.000
S1.001	STank B	15 Winter	1	+0%	1/15 Summer				9.996	0.046	0.000

		Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.18			2.5	OK	
S1.001	STank B	0.16			2.2	SURCHARGED	

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

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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 19.100 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 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, 2, 30, 31, 100, 101
Climate Change (%) 0, 0, 0, 40, 0, 45

									Water	Surcharged	Flooded
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)
S1.000	S1	15 Winter	2	+0%					10.849	-0.101	0.000
S1.001	STank B	15 Winter	2	+0%	1/15 Summer				10.088	0.138	0.000

				Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded		
S1.000	S1	0.23			3.3	OK			
S1.001	STank B	0.20			2.7	SURCHARGED			

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

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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 19.100 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 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, 2, 30, 31, 100, 101
Climate Change (%) 0, 0, 0, 40, 0, 45

				Water Surcharged Flooded		
PN	US/MH Name	Storm	Return Climate Period Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
						Overflow Act.
S1.000	S1	15 Winter	30 +0%			10.870
S1.001	STank B	15 Winter	30 +0%	1/15 Summer		10.417
						Level (m)
						Depth (m)
						Volume (m³)

		Half Drain Pipe			Level	
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status
S1.000	S1	0.44			6.2	OK
S1.001	STank B	0.30			4.0	SURCHARGED
						Level Exceeded

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

Simulation Criteria

Areal Reduction Factor 1.000

Hot Start (mins) 0

Hot Start Level (mm) 0

Manhole Headloss Coeff (Global) 0.500

Foul Sewage per hectare (l/s) 0.000

Additional Flow - % of Total Flow 0.000

MADD Factor * 10m³/ha Storage 2.000

Inlet Coefficient 0.800

Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0

Number of Offline Controls 0

Number of Time/Area Diagrams 0

Number of Online Controls 1

Number of Storage Structures 1

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model

Region England and Wales

FSR M5-60 (mm) 19.100

Cv (Summer) 0.750

Ratio R 0.350

Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep

DTS Status ON

DVD Status OFF

Fine Inertia Status OFF

Profile(s)

Duration(s) (mins)

Return Period(s) (years)

Climate Change (%)

Summer and Winter

15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

1, 2, 30, 31, 100, 101

0, 0, 0, 40, 0, 45

									Water	Surcharged	Flooded
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)
S1.000	S1	15 Winter	31	+40%					10.887	-0.063	0.000
S1.001	STank B	15 Winter	31	+40%	1/15 Summer				10.484	0.534	0.000

				Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded		
S1.000	S1	0.62			8.7	OK			
S1.001	STank B	0.31			4.2	SURCHARGED			

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

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 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 19.100 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 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, 2, 30, 31, 100, 101
Climate Change (%) 0, 0, 0, 40, 0, 45

									Water	Surcharged	Flooded
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)
S1.000	S1	15 Winter	100	+0%					10.882	-0.068	0.000
S1.001	STank B	15 Winter	100	+0%	1/15 Summer				10.464	0.514	0.000

				Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded		
S1.000	S1	0.57			8.0	OK			
S1.001	STank B	0.31			4.2	SURCHARGED			

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

Simulation Criteria

Areal Reduction Factor 1.000

Hot Start (mins) 0

Hot Start Level (mm) 0

Manhole Headloss Coeff (Global) 0.500

Foul Sewage per hectare (l/s) 0.000

Additional Flow - % of Total Flow 0.000

MADD Factor * 10m³/ha Storage 2.000

Inlet Coefficient 0.800

Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0

Number of Offline Controls 0

Number of Time/Area Diagrams 0

Number of Online Controls 1

Number of Storage Structures 1

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model

Region England and Wales

FSR M5-60 (mm) 19.100

Cv (Summer) 0.750

Ratio R 0.350

Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep

DTS Status ON

DVD Status OFF

Fine Inertia Status OFF

Profile(s)

Duration(s) (mins)

Return Period(s) (years)

Climate Change (%)

Summer and Winter

15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

1, 2, 30, 31, 100, 101

0, 0, 0, 40, 0, 45

									Water	Surcharged	Flooded
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)
S1.000	S1	15 Winter	101	+45%					10.906	-0.044	0.000
S1.001	STank B	15 Winter	101	+45%	1/15 Summer				10.574	0.624	0.000

				Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded		
S1.000	S1	0.83			11.6	OK			
S1.001	STank B	0.33			4.5	SURCHARGED			