

The Civil Engineering Practice		Page 1
11 Tungsten Building George Street Fishersgate BN41 1RA	Manor Nursery Angmering West Sussex	
Date 28/06/2019 File Planning Network File.MDX	Designed by S Burgess Checked by SRD	
Innovyze Network 2017.1.2		

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for NETWORK 5.SWS

Pipe Sizes NETWORK 9 Manhole Sizes NETWORK 9

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	19.600	Add Flow / Climate Change (%)	0
Ratio R	0.350	Minimum Backdrop Height (m)	0.500
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.000
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)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for NETWORK 5.SWS

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
1.000	15.965	0.155	103.0	0.010	5.00	0.0	0.600	o	100	Pipe/Conduit	
1.001	1.175	0.011	103.1	0.005	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.002	11.160	0.108	103.0	0.007	0.00	0.0	0.600	o	100	Pipe/Conduit	
2.000	11.548	0.125	92.5	0.004	5.00	0.0	0.600	o	100	Pipe/Conduit	
1.003	3.658	0.036	103.0	0.002	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.004	6.654	0.065	103.0	0.002	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.005	10.148	0.099	103.0	0.000	0.00	0.0	0.600	o	100	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)
1.000	50.00	5.35	15.950	0.010	0.0	0.0	0.0	0.76	5.9	1.4
1.001	50.00	5.38	15.795	0.015	0.0	0.0	0.0	0.76	5.9	2.0
1.002	50.00	5.62	15.784	0.022	0.0	0.0	0.0	0.76	6.0	3.0
2.000	50.00	5.24	15.800	0.004	0.0	0.0	0.0	0.80	6.3	0.5
1.003	50.00	5.70	15.675	0.028	0.0	0.0	0.0	0.76	5.9	3.8
1.004	50.00	5.85	15.640	0.030	0.0	0.0	0.0	0.76	5.9	4.1
1.005	50.00	6.07	15.575	0.030	0.0	0.0	0.0	0.76	5.9	4.1

©1982-2017 XP Solutions

The Civil Engineering Practice		Page 2
11 Tungsten Building George Street Fishersgate BN41 1RA	Manor Nursery Angmering West Sussex	
Date 28/06/2019 File Planning Network File.MDX	Designed by S Burgess Checked by SRD	
Innovyze	Network 2017.1.2	

PIPELINE SCHEDULES for NETWORK 5.SWS

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)
1.000	o	100	1	16.550	15.950	0.500	Open Manhole	1200
1.001	o	100	2	16.550	15.795	0.655	Open Manhole	1200
1.002	o	100	3	16.400	15.784	0.516	Open Manhole	1200
2.000	o	100	8	16.400	15.800	0.500	Open Manhole	1200
1.003	o	100	4	16.400	15.675	0.625	Open Manhole	1200
1.004	o	100	5	16.400	15.640	0.660	Open Manhole	1200
1.005	o	100	6	16.400	15.575	0.725	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)
1.000	15.965	103.0	2	16.550	15.795	0.655	Open Manhole	1200
1.001	1.175	103.1	3	16.400	15.784	0.516	Open Manhole	1200
1.002	11.160	103.0	4	16.400	15.675	0.625	Open Manhole	1200
2.000	11.548	92.5	4	16.400	15.675	0.625	Open Manhole	1200
1.003	3.658	103.0	5	16.400	15.640	0.660	Open Manhole	1200
1.004	6.654	103.0	6	16.400	15.575	0.725	Open Manhole	1200
1.005	10.148	103.0	7	16.300	15.477	0.724	Open Manhole	0

The Civil Engineering Practice		Page 3
11 Tungsten Building George Street Fishersgate BN41 1RA	Manor Nursery Angmering West Sussex	
Date 28/06/2019 File Planning Network File.MDX	Designed by S Burgess Checked by SRD	
Innovyze Network 2017.1.2		

Summary of Critical Results by Maximum Level (Rank 1) for NETWORK 5.SWS

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 0
 Number of Online Controls 0 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 0.350
 Region England and Wales Cv (Summer) 0.750
 M5-60 (mm) 19.500 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, 240, 360, 480, 960, 1440
 Return Period(s) (years) 100
 Climate Change (%) 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1 15	Winter	100	+40%	100/15	Summer			16.328
1.001	2 15	Winter	100	+40%	100/15	Summer			16.259
1.002	3 15	Winter	100	+40%	100/15	Summer			16.226
2.000	8 15	Winter	100	+40%	100/15	Summer			16.076
1.003	4 15	Winter	100	+40%	100/15	Summer			16.066
1.004	5 15	Winter	100	+40%	100/15	Summer			15.969
1.005	6 15	Winter	100	+40%	100/15	Summer			15.806

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)					
1.000	1	0.278	0.000	0.65		3.7	FLOOD RISK	
1.001	2	0.364	0.000	1.28		5.1	FLOOD RISK	
1.002	3	0.343	0.000	1.26		7.0	FLOOD RISK	
2.000	8	0.176	0.000	0.23		1.4	SURCHARGED	
1.003	4	0.291	0.000	1.67		8.3	SURCHARGED	
1.004	5	0.229	0.000	1.60		8.6	SURCHARGED	
1.005	6	0.131	0.000	1.54		8.5	SURCHARGED	

©1982-2017 XP Solutions