

Andrew Gough Development Consultant		Page 1
9 Joyce Way Whitchurch Shropshire SY13 1TZ	1 in 5 year base design Highway Drainage	
Date 18.04.17 File 1 in 5 year base hway c...	Designed by ag Checked by	
Micro Drainage	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)	5	Add Flow / Climate Change (%)	0
M5-60 (mm)	18.000	Minimum Backdrop Height (m)	0.200
Ratio R	0.392	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
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

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.051	4-8	0.010

Total Area Contributing (ha) = 0.061

Total Pipe Volume (m³) = 13.439

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)	Auto Design
1.000	33.071	1.449	22.8	0.026	2.00	0.0	0.600	o	225	
1.001	26.000	0.065	400.0	0.035	0.00	0.0	0.600	oo	44	
1.002	11.333	0.057	198.8	0.000	0.00	0.0	0.600	o	150	
1.003	32.569	0.416	78.3	0.000	0.00	0.0	0.600	o	150	
1.004	5.088	0.175	29.1	0.000	0.00	0.0	0.600	o	150	

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	2.20	16.812	0.026	0.0	0.0	0.0	2.75	109.4	3.5
1.001	50.00	2.59	15.063	0.061	0.0	0.0	0.0	1.11	482.3	8.3
1.002	50.00	2.27	14.998	0.000	5.0	0.0	0.0	0.71	12.5	5.0
1.003	50.00	2.74	14.941	0.000	5.0	0.0	0.0	1.14	20.1	5.0
1.004	50.00	2.79	14.525	0.000	5.0	0.0	0.0	1.87	33.1	5.0

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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)
1.000	o	225	1	18.237	16.812	1.200	Open Manhole	1200
1.001	oo	44	2	16.747	15.063	1.159	Open Manhole	1200
1.002	o	150	3	16.936	14.998	1.788	Open Manhole	1200
1.003	o	150	4	16.800	14.941	1.709	Open Manhole	1200
1.004	o	150	5	15.950	14.525	1.275	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	33.071	22.8	2	16.747	15.363	1.159	Open Manhole	1200
1.001	26.000	400.0	3	16.936	14.998	1.413	Open Manhole	1200
1.002	11.333	198.8	4	16.800	14.941	1.709	Open Manhole	1200
1.003	32.569	78.3	5	15.950	14.525	1.275	Open Manhole	1200
1.004	5.088	29.1		15.850	14.350	1.350	Open Manhole	1200

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)
1.004		15.850	14.350	0.000	1200	0