

Andrew Gough Development Consultant		Page 1
9 Joyce Way Whitchurch Shropshire SY13 1TZ	Penley 2 1 in 1 year design	
Date 28/08/2019 File 1 in 1 year base design...	Designed by ag Checked by	
Micro Drainage	Network 2018.1.1	

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)	1	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.313	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
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)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.104	4-8	0.073	8-12	0.052	12-16	0.018

Total Area Contributing (ha) = 0.247

Total Pipe Volume (m³) = 2.924

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)	Section Type	Auto Design
1.000	8.000	0.053	150.9	0.026	2.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	10.617	0.072	147.5	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	9.279	0.076	122.1	0.021	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	13.300	0.103	129.1	0.155	12.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	5.306	0.041	129.4	0.036	0.00	0.0	0.600	o	225	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	2.13	64.081	0.026	0.0	0.0	0.0	1.06	42.2	3.5
1.001	50.00	2.29	64.028	0.035	0.0	0.0	0.0	1.07	42.7	4.7
1.002	50.00	2.42	63.956	0.056	0.0	0.0	0.0	1.18	47.0	7.6
2.000	28.63	12.19	63.983	0.155	0.0	0.0	0.0	1.15	45.7	12.0
1.003	28.53	12.27	63.880	0.247	0.0	0.0	0.0	1.15	45.6	19.1

Andrew Gough Development Consultant		Page 2
9 Joyce Way Whitchurch Shropshire SY13 1TZ	Penley 2 1 in 1 year design	
Date 28/08/2019 File 1 in 1 year base design...	Designed by ag Checked by	
Micro Drainage	Network 2018.1.1	

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)	Section Type	Auto Design
1.004	10.917	0.084	130.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.005	42.900	0.338	126.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.006	7.000	0.047	148.9	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)
1.004	50.00	2.21	63.839	0.000	3.2	0.0	0.0	0.88	15.5	3.2
1.005	50.00	3.01	63.755	0.000	3.2	0.0	0.0	0.89	15.7	3.2
1.006	50.00	3.15	63.417	0.000	3.2	0.0	0.0	0.82	14.5	3.2

Andrew Gough Development Consultant		Page 3
9 Joyce Way Whitchurch Shropshire SY13 1TZ	Penley 2 1 in 1 year design	
Date 28/08/2019 File 1 in 1 year base design...	Designed by ag Checked by	
Micro Drainage	Network 2018.1.1	

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	65.150	64.081	0.844	Open Manhole	1200
1.001	o	225	2	65.300	64.028	1.047	Open Manhole	1200
1.002	o	225	3	65.350	63.956	1.169	Open Manhole	1200
2.000	o	225	4	65.850	63.983	1.642	Open Manhole	1200
1.003	o	225	5	65.500	63.880	1.395	Open Manhole	1200
1.004	o	150	6	65.500	63.839	1.511	Open Manhole	3000
1.005	o	150	7	65.375	63.755	1.470	Open Manhole	1200
1.006	o	150	8	64.500	63.417	0.933	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	8.000	150.9	2	65.300	64.028	1.047	Open Manhole	1200
1.001	10.617	147.5	3	65.350	63.956	1.169	Open Manhole	1200
1.002	9.279	122.1	5	65.500	63.880	1.395	Open Manhole	1200
2.000	13.300	129.1	5	65.500	63.880	1.395	Open Manhole	1200
1.003	5.306	129.4	6	65.500	63.839	1.436	Open Manhole	3000
1.004	10.917	130.0	7	65.375	63.755	1.470	Open Manhole	1200
1.005	42.900	126.9	8	64.500	63.417	0.933	Open Manhole	1200
1.006	7.000	148.9		64.475	63.370	0.955	Open Manhole	0

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)
1.006		64.475	63.370	0.000	0	0