



DRAINAGE CALCULATIONS

**Burlow Road
Buxton
Site A**

June 2018

Designed By: Barratt Manchester
4 Brindley Road
City Park
Manchester
M16 9HQ

CONTENTS

- **Network Layout**

Proposed Drainage Areas Plan

- **Storm Sewer Design**

Storm Drainage Design (1 in 2 yr)
Storm Manhole Schedules

- **1 in 30 yr Storm Event Rainfall Simulation**

Critical Storm results for summer & winter profile, 15-360 min.

- **1 in 100 yr + 40% Storm Event Rainfall Simulation**

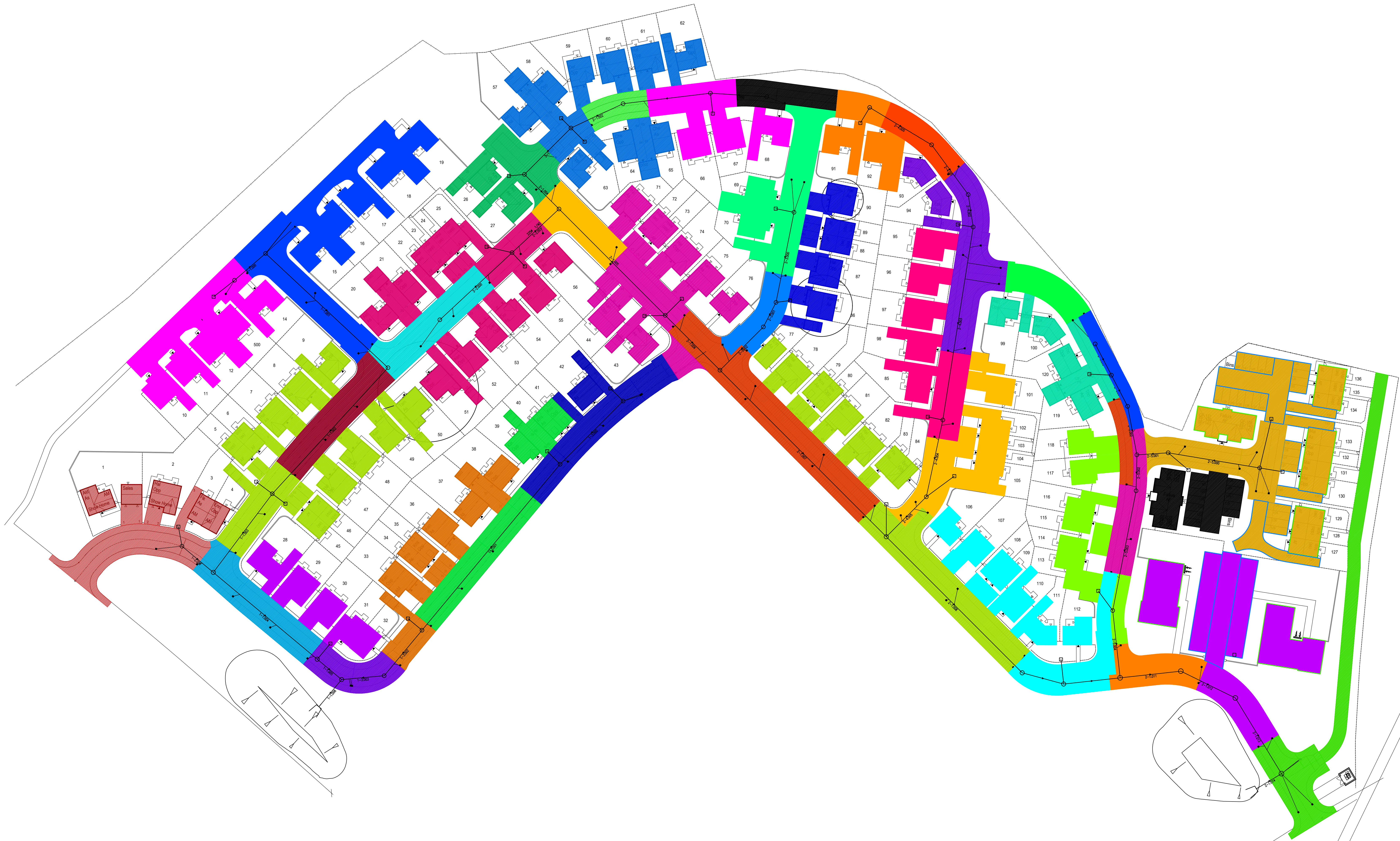
Critical Storm results for summer & winter profile, 15-360 min

- **Foul Sewer Design**

Foul Drainage Design (1 in 2 yr)
Foul Manhole Schedules

Network Layout

Proposed Drainage Areas Plan



WARNING TO HOUSE-PURCHASERS
Property Misdevelopment Act 1981
Buyers are warned that this is a working drawing and is not intended to be treated as descriptive material describing, in relation to any particular property or development, any of the specified matters prescribed by any Order made under the above Act. The contents of this drawing may be subject to change at any time and alterations and variations may occur during the progress of the works without revision of the drawing. Consequently the layout, form, content and dimensions of the finished construction may differ materially from those shown. Nor do the contents of this drawing constitute a contract, part of any contract or warranty.

Surface Water Areas	Surface Water Areas inc. 10% Urban Creep
1-1.000 = 0.090 Ha	1-1.000 = 0.099 Ha
1-1.001 = 0.131 Ha	1-1.001 = 0.144 Ha
1-1.002 = 0.043 Ha	1-1.002 = 0.048 Ha
1-1.003 = 0.143 Ha	1-1.003 = 0.157 Ha
1-1.004 = 0.046 Ha	1-1.004 = 0.051 Ha
1-1.005 = 0.046 Ha	1-1.005 = 0.050 Ha
1-1.006 = 0 Ha	1-1.006 = 0 Ha
1-2.000 = 0.087 Ha	1-2.000 = 0.096 Ha
1-3.000 = 0.066 Ha	1-3.000 = 0.072 Ha
1-3.001 = 0.067 Ha	1-3.001 = 0.074 Ha
1-3.002 = 0.076 Ha	1-3.002 = 0.083 Ha
1-3.003 = 0.028 Ha	1-3.003 = 0.031 Ha
2-1.000 = 0.024 Ha	2-1.000 = 0.026 Ha
2-1.001 = 0.057 Ha	2-1.001 = 0.063 Ha
2-1.002 = 0.017 Ha	2-1.002 = 0.019 Ha
2-1.003 = 0.117 Ha	2-1.003 = 0.128 Ha
2-1.004 = 0.052 Ha	2-1.004 = 0.058 Ha
2-1.005 = 0.032 Ha	2-1.005 = 0.035 Ha
2-1.006 = 0.115 Ha	2-1.006 = 0.127 Ha
2-1.007 = 0.082 Ha	2-1.007 = 0.091 Ha
2-1.008 = 0.130 Ha	2-1.008 = 0.143 Ha
2-1.009 = 0 Ha	2-1.009 = 0 Ha
2-1.010 = 0.102 Ha	2-1.010 = 0.112 Ha
2-1.011 = 0 Ha	2-1.011 = 0 Ha
2-1.012 = 0.029 Ha	2-1.012 = 0.032 Ha
2-1.013 = 0.028 Ha	2-1.013 = 0.031 Ha
2-1.014 = 0.088 Ha	2-1.014 = 0.097 Ha
2-2.000 = 0.042 Ha	2-2.000 = 0.047 Ha
2-2.001 = 0.136 Ha	2-2.001 = 0.149 Ha
2-3.000 = 0.075 Ha	2-3.000 = 0.082 Ha
2-3.001 = 0.053 Ha	2-3.001 = 0.058 Ha
2-3.002 = 0.025 Ha	2-3.002 = 0.027 Ha
2-4.000 = 0.041 Ha	2-4.000 = 0.045 Ha
2-4.001 = 0.023 Ha	2-4.001 = 0.026 Ha
2-4.002 = 0 Ha	2-4.002 = 0 Ha
2-4.003 = 0.077 Ha	2-4.003 = 0.085 Ha
2-4.004 = 0.083 Ha	2-4.004 = 0.091 Ha
2-4.005 = 0.076 Ha	2-4.005 = 0.083 Ha
2-5.000 = 0.051 Ha	2-5.000 = 0.056 Ha
2-5.001 = 0.043 Ha	2-5.001 = 0.047 Ha
2-5.002 = 0.012 Ha	2-5.002 = 0.013 Ha
2-5.003 = 0.032 Ha	2-5.003 = 0.035 Ha
2-5.004 = 0.065 Ha	2-5.004 = 0.072 Ha
2-6.000 = 0.023 Ha	2-6.000 = 0.026 Ha
2-6.001 = 0.051 Ha	2-6.001 = 0.056 Ha
2-6.002 = 0.017 Ha	2-6.002 = 0.019 Ha

REV	DESCRIPTION	DATE	DRAWN
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**BARRATT
HOMES**

MANCHESTER

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Job
Burlow Road
Buxton
Site A

Title
Surface Water Impermeable Areas Plan

Design By CD	Date Mar 2018	Drawing Number 437/ED/15	Rev -
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Storm Sewer Design

Storm Drainage Design (1 in 2 yr)

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4 Brindley Road City Park Manchester M16 9HQ	Burlow Road Buxton Site A	
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Micro Drainage Network 2017.1.2		

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 1

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.280	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)	400

Designed with Level Soffits

Network Design Table for Surface Network 1

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	12.849	0.128	100.4	0.099	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	52.440	2.710	19.4	0.144	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	53.575	4.121	13.0	0.047	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	30.774	2.277	13.5	0.157	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	12.791	0.609	21.0	0.096	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.004	42.406	2.232	19.0	0.051	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.005	9.935	0.320	31.0	0.051	0.00	0.0	0.600	o	300	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	5.16	358.550	0.099	0.0	0.0	0.0	1.30	51.9	13.4
1.001	50.00	5.46	358.422	0.243	0.0	0.0	0.0	2.99	118.8	32.9
1.002	50.00	5.70	355.712	0.290	0.0	0.0	0.0	3.65	145.1	39.3
1.003	50.00	5.84	351.591	0.447	0.0	0.0	0.0	3.58	142.3	60.5
2.000	50.00	5.10	349.998	0.096	0.0	0.0	0.0	2.21	39.0	13.0
1.004	50.00	6.04	349.239	0.594	0.0	0.0	0.0	3.62	256.1	80.4
1.005	50.00	6.10	347.007	0.645	0.0	0.0	0.0	2.83	200.2	87.3

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4 Brindley Road	Burlow Road	
City Park	Buxton	
Manchester M16 9HQ	Site A	
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File SITE A - 26.02.18.MDX	Checked by	
Micro Drainage	Network 2017.1.2	

Network Design Table for Surface Network 1

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
3.000	27.955	0.280	99.8	0.073	5.00	0.0	0.600	o	150	Pipe/Conduit		🔒
3.001	67.609	1.300	52.0	0.074	0.00	0.0	0.600	o	150	Pipe/Conduit		🔓
3.002	18.522	1.029	18.0	0.084	0.00	0.0	0.600	o	150	Pipe/Conduit		🔓
3.003	13.374	0.168	79.6	0.031	0.00	0.0	0.600	o	225	Pipe/Conduit		🔓
1.006	11.094	1.087	10.2	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit		🔓
1.007	5.189	0.013	399.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		🔓

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
3.000	50.00	5.46	349.614	0.073	0.0	0.0	0.0	1.01	17.8	9.9
3.001	50.00	6.27	349.334	0.147	0.0	0.0	0.0	1.40	24.7	19.9
3.002	50.00	6.40	348.034	0.231	0.0	0.0	0.0	2.39	42.2	31.3
3.003	50.00	6.55	346.930	0.262	0.0	0.0	0.0	1.47	58.3	35.5
1.006	50.00	6.59	346.687	0.907	0.0	0.0	0.0	4.95	349.8	122.8
1.007	50.00	6.67	345.450	0.907	0.0	0.0	0.0	1.01	160.9	122.8

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4 Brindley Road City Park Manchester M16 9HQ	Burlow Road Buxton Site A																																																																									
Date 05/06/2018 10:18 File SITE A - 26.02.18.MDX	Designed by CD Checked by																																																																									
Micro Drainage		Network 2017.1.2																																																																								
<u>Online Controls for Surface Network 1</u> <u>Pump Manhole: S13, DS/PN: 1.007, Volume (m³): 2.1</u> Invert Level (m) 345.450 <table border="1"> <thead> <tr> <th>Depth (m)</th> <th>Flow (l/s)</th> <th>Depth (m)</th> <th>Flow (l/s)</th> <th>Depth (m)</th> <th>Flow (l/s)</th> <th>Depth (m)</th> <th>Flow (l/s)</th> </tr> </thead> <tbody> <tr><td>0.200</td><td>0.0000</td><td>1.800</td><td>0.0000</td><td>3.400</td><td>0.0000</td><td>5.000</td><td>0.0000</td></tr> <tr><td>0.400</td><td>0.0000</td><td>2.000</td><td>0.0000</td><td>3.600</td><td>0.0000</td><td>5.200</td><td>0.0000</td></tr> <tr><td>0.600</td><td>0.0000</td><td>2.200</td><td>0.0000</td><td>3.800</td><td>0.0000</td><td>5.400</td><td>0.0000</td></tr> <tr><td>0.800</td><td>0.0000</td><td>2.400</td><td>0.0000</td><td>4.000</td><td>0.0000</td><td>5.600</td><td>0.0000</td></tr> <tr><td>1.000</td><td>0.0000</td><td>2.600</td><td>0.0000</td><td>4.200</td><td>0.0000</td><td>5.800</td><td>0.0000</td></tr> <tr><td>1.200</td><td>0.0000</td><td>2.800</td><td>0.0000</td><td>4.400</td><td>0.0000</td><td>6.000</td><td>0.0000</td></tr> <tr><td>1.400</td><td>0.0000</td><td>3.000</td><td>0.0000</td><td>4.600</td><td>0.0000</td><td></td><td></td></tr> <tr><td>1.600</td><td>0.0000</td><td>3.200</td><td>0.0000</td><td>4.800</td><td>0.0000</td><td></td><td></td></tr> </tbody> </table>			Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.200	0.0000	1.800	0.0000	3.400	0.0000	5.000	0.0000	0.400	0.0000	2.000	0.0000	3.600	0.0000	5.200	0.0000	0.600	0.0000	2.200	0.0000	3.800	0.0000	5.400	0.0000	0.800	0.0000	2.400	0.0000	4.000	0.0000	5.600	0.0000	1.000	0.0000	2.600	0.0000	4.200	0.0000	5.800	0.0000	1.200	0.0000	2.800	0.0000	4.400	0.0000	6.000	0.0000	1.400	0.0000	3.000	0.0000	4.600	0.0000			1.600	0.0000	3.200	0.0000	4.800	0.0000		
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)																																																																			
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0.800	0.0000	2.400	0.0000	4.000	0.0000	5.600	0.0000																																																																			
1.000	0.0000	2.600	0.0000	4.200	0.0000	5.800	0.0000																																																																			
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Micro Drainage Network 2017.1.2		

Storage Structures for Surface Network 1

Infiltration Basin Manhole: S13, DS/PN: 1.007

Invert Level (m) 345.450 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 1.85040 Porosity 1.00
 Infiltration Coefficient Side (m/hr) 1.85040

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	163.1	1.000	327.2

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Burlow Road
Buxton
Site A

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Checked by

Page 1



Micro Drainage

Network 2017.1.2

Network Design Table for Surface 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
1.006	24.279	0.867	28.0	0.127	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.000	28.758	2.127	13.5	0.083	5.00	0.0	0.600	o	150	Pipe/Conduit	
3.001	8.632	0.575	15.0	0.058	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.002	19.207	1.225	15.7	0.028	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.007	73.689	3.351	22.0	0.090	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.000	22.655	0.302	75.0	0.014	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	19.300	1.485	13.0	0.025	0.00	0.0	0.600	o	150	Pipe/Conduit	
4.002	10.277	0.934	11.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
4.003	61.193	5.094	12.0	0.085	0.00	0.0	0.600	o	150	Pipe/Conduit	
4.004	24.606	2.051	12.0	0.091	0.00	0.0	0.600	o	150	Pipe/Conduit	
4.005	17.696	0.635	27.9	0.084	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.008	60.216	3.345	18.0	0.143	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.009	13.451	0.345	39.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.010	17.771	0.304	58.5	0.112	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.000	11.014	0.918	12.0	0.025	5.00	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)
1.006	50.00	6.65	350.490	0.683	0.0	0.0	0.0	2.98	210.8	92.5
3.000	50.00	5.17	353.700	0.083	0.0	0.0	0.0	2.75	48.7	11.2
3.001	50.00	5.23	351.573	0.141	0.0	0.0	0.0	2.61	46.2	19.1
3.002	50.00	5.35	350.998	0.169	0.0	0.0	0.0	2.56	45.2	22.9
1.007	50.00	7.01	349.623	0.942	0.0	0.0	0.0	3.37	238.0	127.6
4.000	50.00	5.32	356.923	0.014	0.0	0.0	0.0	1.16	20.5	1.9
4.001	50.00	5.44	356.621	0.039	0.0	0.0	0.0	2.81	49.7	5.3
4.002	50.00	5.50	355.136	0.039	0.0	0.0	0.0	3.05	54.0	5.3
4.003	50.00	5.84	354.202	0.124	0.0	0.0	0.0	2.92	51.7	16.8
4.004	50.00	5.98	349.108	0.215	0.0	0.0	0.0	2.92	51.7	29.1
4.005	50.00	6.10	346.982	0.299	0.0	0.0	0.0	2.49	98.9	40.5
1.008	50.00	7.25	346.197	1.384	0.0	0.0	0.0	4.29	473.6	187.4
1.009	50.00	7.31	342.777	1.384	0.0	0.0	0.0	3.26	519.1	187.4
1.010	49.86	7.43	342.432	1.496	0.0	0.0	0.0	2.66	423.6	202.0
5.000	50.00	5.06	350.874	0.025	0.0	0.0	0.0	2.92	51.7	3.4

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<u>Online Controls for Surface Network 2</u> <u>Pump Manhole: S48, DS/PN: 1.015, Volume (m³): 5.2</u> Invert Level (m) 339.000 <table border="1"> <thead> <tr> <th>Depth (m)</th> <th>Flow (l/s)</th> <th>Depth (m)</th> <th>Flow (l/s)</th> <th>Depth (m)</th> <th>Flow (l/s)</th> <th>Depth (m)</th> <th>Flow (l/s)</th> </tr> </thead> <tbody> <tr><td>0.200</td><td>0.0000</td><td>1.800</td><td>0.0000</td><td>3.400</td><td>0.0000</td><td>5.000</td><td>0.0000</td></tr> <tr><td>0.400</td><td>0.0000</td><td>2.000</td><td>0.0000</td><td>3.600</td><td>0.0000</td><td>5.200</td><td>0.0000</td></tr> <tr><td>0.600</td><td>0.0000</td><td>2.200</td><td>0.0000</td><td>3.800</td><td>0.0000</td><td>5.400</td><td>0.0000</td></tr> <tr><td>0.800</td><td>0.0000</td><td>2.400</td><td>0.0000</td><td>4.000</td><td>0.0000</td><td>5.600</td><td>0.0000</td></tr> <tr><td>1.000</td><td>0.0000</td><td>2.600</td><td>0.0000</td><td>4.200</td><td>0.0000</td><td>5.800</td><td>0.0000</td></tr> <tr><td>1.200</td><td>0.0000</td><td>2.800</td><td>0.0000</td><td>4.400</td><td>0.0000</td><td>6.000</td><td>0.0000</td></tr> <tr><td>1.400</td><td>0.0000</td><td>3.000</td><td>0.0000</td><td>4.600</td><td>0.0000</td><td></td><td></td></tr> <tr><td>1.600</td><td>0.0000</td><td>3.200</td><td>0.0000</td><td>4.800</td><td>0.0000</td><td></td><td></td></tr> </tbody> </table>			Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.200	0.0000	1.800	0.0000	3.400	0.0000	5.000	0.0000	0.400	0.0000	2.000	0.0000	3.600	0.0000	5.200	0.0000	0.600	0.0000	2.200	0.0000	3.800	0.0000	5.400	0.0000	0.800	0.0000	2.400	0.0000	4.000	0.0000	5.600	0.0000	1.000	0.0000	2.600	0.0000	4.200	0.0000	5.800	0.0000	1.200	0.0000	2.800	0.0000	4.400	0.0000	6.000	0.0000	1.400	0.0000	3.000	0.0000	4.600	0.0000			1.600	0.0000	3.200	0.0000	4.800	0.0000		
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)																																																																			
0.200	0.0000	1.800	0.0000	3.400	0.0000	5.000	0.0000																																																																			
0.400	0.0000	2.000	0.0000	3.600	0.0000	5.200	0.0000																																																																			
0.600	0.0000	2.200	0.0000	3.800	0.0000	5.400	0.0000																																																																			
0.800	0.0000	2.400	0.0000	4.000	0.0000	5.600	0.0000																																																																			
1.000	0.0000	2.600	0.0000	4.200	0.0000	5.800	0.0000																																																																			
1.200	0.0000	2.800	0.0000	4.400	0.0000	6.000	0.0000																																																																			
1.400	0.0000	3.000	0.0000	4.600	0.0000																																																																					
1.600	0.0000	3.200	0.0000	4.800	0.0000																																																																					
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4 Brindley Road City Park Manchester M16 9HQ	Burlow Road Buxton Site A									
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Micro Drainage Network 2017.1.2										
<u>Storage Structures for Surface Network 2</u> <u>Infiltration Basin Manhole: S48, DS/PN: 1.015</u> Invert Level (m) 339.000 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 1.33560 Porosity 1.00 Infiltration Coefficient Side (m/hr) 1.33560 <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Depth (m)</th> <th>Area (m²)</th> <th>Depth (m)</th> <th>Area (m²)</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>230.7</td> <td>1.700</td> <td>587.0</td> </tr> </tbody> </table>			Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	0.000	230.7	1.700	587.0
Depth (m)	Area (m ²)	Depth (m)	Area (m ²)							
0.000	230.7	1.700	587.0							
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Storm Sewer Design

Storm Manhole Schedules



Micro
Drainage

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Micro Drainage										Network 2017.1.2	
Manhole Schedules for Surface 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)
S14	357.903	1.404	Open Manhole	1200	1.000	356.499	150				
S15	357.745	1.423	Open Manhole	1200	1.001	356.322	150	1.000	356.322	150	
S16	357.444	1.454	Open Manhole	1200	1.002	355.990	150	1.001	355.990	150	
S17	357.251	1.548	Open Manhole	1200	1.003	355.703	225	1.002	355.778	150	
S18	356.894	1.430	Open Manhole	1200	1.004	355.464	225	1.003	355.464	225	
S19	356.646	1.350	Open Manhole	1200	2.000	355.296	150				
S20	355.856	1.427	Open Manhole	1200	2.001	354.429	225	2.000	354.504	150	
S21	355.363	1.437	Open Manhole	1200	1.005	353.926	225	1.004	353.926	225	
								2.001	353.926	225	
S22	355.397	4.907	Open Manhole	1200	1.006	350.490	300	1.005	350.565	225	
S23	355.397	1.697	Open Manhole	1200	3.000	353.700	150				
S24	353.144	1.571	Open Manhole	1200	3.001	351.573	150	3.000	351.573	150	
S25	352.491	1.493	Open Manhole	1200	3.002	350.998	150	3.001	350.998	150	
S26	351.126	1.503	Open Manhole	1200	1.007	349.623	300	1.006	349.623	300	
								3.002	349.773	150	
S27	358.293	1.370	Open Manhole	1200	4.000	356.923	150				
S28	357.975	1.354	Open Manhole	1200	4.001	356.621	150	4.000	356.621	150	
S29	356.546	1.410	Open Manhole	1200	4.002	355.136	150	4.001	355.136	150	
S30	355.647	1.445	Open Manhole	1200	4.003	354.202	150	4.002	354.202	150	
S31	350.458	1.350	Open Manhole	1200	4.004	349.108	150	4.003	349.108	150	
S32	348.426	1.444	Open Manhole	1200	4.005	346.982	225	4.004	347.057	150	
S33	347.849	1.652	Open Manhole	1350	1.008	346.197	375	1.007	346.272	300	
								4.005	346.347	225	
S34	344.481	1.704	Open Manhole	1350	1.009	342.777	450	1.008	342.852	375	
S35	344.141	1.709	Open Manhole	1350	1.010	342.432	450	1.009	342.432	450	
S36	352.224	1.350	Open Manhole	1200	5.000	350.874	150				
S37	351.306	1.350	Open Manhole	1200	5.001	349.956	150	5.000	349.956	150	
S38	350.389	1.350	Open Manhole	1200	5.002	349.039	150	5.001	349.039	150	
S39	346.830	2.655	Open Manhole	1200	6.000	344.175	150				
S40	348.604	4.719	Open Manhole	1200	6.001	343.885	150	6.000	343.885	150	
S41	349.124	5.412	Open Manhole	1200	5.003	343.712	225	5.002	346.644	150	
								6.001	343.787	150	
S42	348.198	4.609	Open Manhole	1200	5.004	343.589	300	5.003	343.664	225	
S43	345.059	1.633	Open Manhole	1200	5.005	343.426	300	5.004	343.426	300	
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Manhole Schedules for Surface Network 2

Free Flowing Outfall Details for Surface Network 2

1.015	Dummy2	340.935	338.987	0.000	0	0
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1 in 30yr Rainfall Simulation

Critical Storm results for summer & winter profile, 15-360 min.

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4 Brindley Road City Park Manchester M16 9HQ	Burlow Road Buxton Site A	
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Micro Drainage Network 2017.1.2		
<u>Simulation Criteria for Surface Network 1</u> Volumetric Runoff Coeff 0.750 Additional Flow - % of Total Flow 0.000 Areal Reduction Factor 1.000 MADD Factor * 10m³/ha Storage 1.000 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 <u>Synthetic Rainfall Details</u> Rainfall Model FSR Profile Type Summer Return Period (years) 2 Cv (Summer) 0.750 Region England and Wales Cv (Winter) 0.840 M5-60 (mm) 20.000 Storm Duration (mins) 30 Ratio R 0.280		
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4 Brindley Road City Park Manchester M16 9HQ	Burlow Road Buxton Site A	
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Micro Drainage Network 2017.1.2		

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 1.000
 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 Ratio R 0.280
 Region England and Wales Cv (Summer) 0.750
 M5-60 (mm) 20.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360
 Return Period(s) (years) 30
 Climate Change (%) 0

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	S1	15 Winter	30	+0%					358.686
1.001	S2	15 Winter	30	+0%					358.558
1.002	S3	15 Winter	30	+0%					355.846
1.003	S4	15 Winter	30	+0%	30/15 Summer				351.951
2.000	S5	15 Winter	30	+0%					350.102
1.004	S6	15 Winter	30	+0%					349.436
1.005	S7	15 Winter	30	+0%	30/15 Summer				347.593
3.000	S8	15 Winter	30	+0%	30/15 Summer				350.734
3.001	S9	15 Winter	30	+0%	30/15 Summer				350.493
3.002	S10	15 Winter	30	+0%	30/15 Summer				348.683
3.003	S11	15 Winter	30	+0%	30/15 Summer				347.181
1.006	S12	15 Winter	30	+0%					346.921
1.007	S13	30 Winter	30	+0%	30/30 Winter				345.901

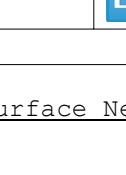
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4 Brindley Road City Park Manchester M16 9HQ	Burlow Road Buxton Site A	
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Micro Drainage		Network 2017.1.2

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Pipe	Status	Level
	Name	Depth (m)	Volume (m³)			Flow (l/s)		Exceeded
1.000	S1	-0.089	0.000	0.67		30.0		OK
1.001	S2	-0.089	0.000	0.67		76.0		OK
1.002	S3	-0.091	0.000	0.65		90.8		OK
1.003	S4	0.135	0.000	1.03		136.4	SURCHARGED	
2.000	S5	-0.046	0.000	0.82		29.0		OK
1.004	S6	-0.103	0.000	0.75		179.5		OK
1.005	S7	0.286	0.000	1.38		195.8	SURCHARGED	
3.000	S8	0.970	0.000	0.95		16.1	FLOOD RISK	
3.001	S9	1.009	0.000	1.19		28.9	SURCHARGED	
3.002	S10	0.499	0.000	1.20		47.5	SURCHARGED	
3.003	S11	0.026	0.000	1.10		55.4	SURCHARGED	
1.006	S12	-0.066	0.000	0.96		251.4		OK
1.007	S13	0.001	0.000	0.00		0.0	SURCHARGED	

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4 Brindley Road City Park Manchester M16 9HQ	Burlow Road Buxton Site A	
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Micro Drainage Network 2017.1.2		
<u>Simulation Criteria for Surface Network 2</u> Volumetric Runoff Coeff 0.750 Additional Flow - % of Total Flow 0.000 Areal Reduction Factor 1.000 MADD Factor * 10m³/ha Storage 1.000 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 <u>Synthetic Rainfall Details</u> Rainfall Model FSR Profile Type Summer Return Period (years) 2 Cv (Summer) 0.750 Region England and Wales Cv (Winter) 0.840 M5-60 (mm) 20.000 Storm Duration (mins) 30 Ratio R 0.280		
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4 Brindley Road City Park Manchester M16 9HQ	Burlow Road Buxton Site A	
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Micro Drainage Network 2017.1.2		

Summary of Critical Results by Maximum Level (Rank 1) for Surface 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	1.000
Hot Start Level (mm)	0	Inlet Coeffiecient	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	Ratio R	0.280
Region England and Wales	Cv (Summer)		0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360
Return Period(s) (years)	30
Climate Change (%)	0

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	S14	15 Winter	30	+0%	30/15 Summer				357.363
1.001	S15	15 Winter	30	+0%	30/15 Summer				357.250
1.002	S16	15 Winter	30	+0%	30/15 Summer				356.614
1.003	S17	15 Winter	30	+0%	30/15 Summer				356.075
1.004	S18	15 Winter	30	+0%					355.586
2.000	S19	15 Winter	30	+0%					355.372
2.001	S20	15 Winter	30	+0%	30/15 Summer				354.800
1.005	S21	15 Winter	30	+0%	30/15 Summer				354.563
1.006	S22	15 Winter	30	+0%	30/15 Summer				350.949
3.000	S23	15 Winter	30	+0%					353.779
3.001	S24	15 Winter	30	+0%	30/15 Summer				352.048
3.002	S25	15 Winter	30	+0%	30/15 Summer				351.544
1.007	S26	15 Winter	30	+0%	30/15 Summer				350.218
4.000	S27	15 Winter	30	+0%					356.971
4.001	S28	15 Winter	30	+0%					356.673
4.002	S29	15 Winter	30	+0%					355.187

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Micro Drainage	Network 2017.1.2	

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

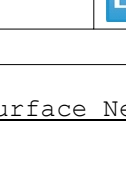
PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)					
1.000	S14	0.714	0.000	0.82		13.6	SURCHARGED	
1.001	S15	0.778	0.000	1.39		26.0	SURCHARGED	
1.002	S16	0.474	0.000	1.69		30.5	SURCHARGED	
1.003	S17	0.147	0.000	1.27		64.5	SURCHARGED	
1.004	S18	-0.103	0.000	0.55		80.9	OK	
2.000	S19	-0.074	0.000	0.50		13.8	OK	
2.001	S20	0.146	0.000	0.79		58.7	SURCHARGED	
1.005	S21	0.412	0.000	1.04		138.8	SURCHARGED	
1.006	S22	0.159	0.000	0.92		172.5	SURCHARGED	
3.000	S23	-0.071	0.000	0.54		25.1	OK	
3.001	S24	0.325	0.000	0.95		38.3	SURCHARGED	
3.002	S25	0.396	0.000	1.05		44.3	SURCHARGED	
1.007	S26	0.295	0.000	1.04		238.0	SURCHARGED	
4.000	S27	-0.102	0.000	0.21		4.2	OK	
4.001	S28	-0.098	0.000	0.26		12.2	OK	
4.002	S29	-0.099	0.000	0.25		12.2	OK	

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Micro Drainage		Network 2017.1.2							
Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2									
Water									
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)
4.003	S30	15 Winter	30	+0%					354.303
4.004	S31	15 Winter	30	+0%	30/15 Summer				350.145
4.005	S32	15 Winter	30	+0%					347.156
1.008	S33	15 Winter	30	+0%					346.458
1.009	S34	15 Winter	30	+0%	30/15 Summer				343.557
1.010	S35	15 Winter	30	+0%	30/15 Summer				343.148
5.000	S36	15 Winter	30	+0%					350.915
5.001	S37	15 Winter	30	+0%					350.036
5.002	S38	15 Winter	30	+0%					349.113
6.000	S39	15 Winter	30	+0%	30/15 Summer				344.667
6.001	S40	15 Winter	30	+0%	30/15 Summer				344.419
5.003	S41	15 Winter	30	+0%	30/15 Summer				344.128
5.004	S42	15 Winter	30	+0%	30/15 Summer				343.900
5.005	S43	15 Winter	30	+0%					343.557
1.011	S44	15 Winter	30	+0%	30/15 Summer				342.666
1.012	S45	15 Winter	30	+0%					342.202
1.013	S46	15 Winter	30	+0%					341.455
1.014	S47	60 Winter	30	+0%	30/15 Summer				339.895
1.015	S48	60 Winter	30	+0%	30/15 Summer				339.881
Surcharged Flooded									
PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded	
4.003	S30	-0.049	0.000	0.78		39.4	OK		
4.004	S31	0.887	0.000	1.19		58.2	SURCHARGED		
4.005	S32	-0.051	0.000	0.92		81.8	OK		
1.008	S33	-0.114	0.000	0.81		359.6	OK		
1.009	S34	0.330	0.000	1.09		360.0	SURCHARGED		
1.010	S35	0.266	0.000	1.26		391.2	SURCHARGED		
5.000	S36	-0.109	0.000	0.16		7.6	OK		
5.001	S37	-0.070	0.000	0.55		25.6	OK		
5.002	S38	-0.076	0.000	0.49		31.7	OK		
6.000	S39	0.342	0.000	0.92		15.7	SURCHARGED		
6.001	S40	0.384	0.000	1.76		27.7	SURCHARGED		
5.003	S41	0.191	0.000	2.14		61.3	SURCHARGED		
5.004	S42	0.011	0.000	1.04		69.4	SURCHARGED		
5.005	S43	-0.169	0.000	0.39		89.0	OK		
1.011	S44	0.088	0.000	1.38		478.2	SURCHARGED		
1.012	S45	-0.263	0.000	0.60		485.3	OK		
1.013	S46	-0.354	0.000	0.35		493.7	OK		
1.014	S47	0.069	0.000	0.72		341.2	SURCHARGED		
1.015	S48	0.281	0.000	0.00		0.0	SURCHARGED		
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1 in 100 yr + 40% Rainfall Simulation

Critical Storm results for summer & winter profile, 15-360 min.

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Micro Drainage		Network 2017.1.2
<u>Simulation Criteria for Surface Network 1</u> Volumetric Runoff Coeff 0.750 Additional Flow - % of Total Flow 0.000 Areal Reduction Factor 1.000 MADD Factor * 10m³/ha Storage 1.000 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 <u>Synthetic Rainfall Details</u> Rainfall Model FSR Profile Type Summer Return Period (years) 2 Cv (Summer) 0.750 Region England and Wales Cv (Winter) 0.840 M5-60 (mm) 20.000 Storm Duration (mins) 30 Ratio R 0.280		
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Micro Drainage Network 2017.1.2		

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Simulation Criteria

Areal Reduction Factor 1.000	Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0	MADD Factor * 10m³/ha Storage 1.000
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	Ratio R 0.280
Region England and Wales Cv (Summer)	0.750	
M5-60 (mm)	20.000 Cv (Winter)	0.840

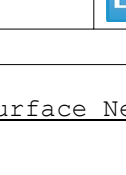
Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep 2.5 Second Increment (Extended)	
DTS Status	ON
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360	
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	S1 15	Winter	100	+40%	100/15	Summer			359.769
1.001	S2 15	Winter	100	+40%	100/15	Summer			359.628
1.002	S3 15	Winter	100	+40%	100/15	Summer			356.912
1.003	S4 15	Winter	100	+40%	100/15	Summer	100/15	Summer	353.175
2.000	S5 15	Winter	100	+40%	100/15	Summer			351.158
1.004	S6 15	Winter	100	+40%	100/15	Summer			350.206
1.005	S7 15	Winter	100	+40%	100/15	Summer			348.328
3.000	S8 30	Winter	100	+40%	100/15	Summer	100/15	Summer	350.977
3.001	S9 15	Winter	100	+40%	100/15	Summer	100/15	Summer	351.231
3.002	S10 15	Winter	100	+40%	100/15	Summer	100/15	Summer	349.402
3.003	S11 15	Winter	100	+40%	100/15	Summer			347.678
1.006	S12 30	Winter	100	+40%	100/15	Summer			347.406
1.007	S13 60	Winter	100	+40%	100/15	Summer			346.298

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<u>Simulation Criteria for Surface Network 2</u> Volumetric Runoff Coeff 0.750 Additional Flow - % of Total Flow 0.000 Areal Reduction Factor 1.000 MADD Factor * 10m³/ha Storage 1.000 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 <u>Synthetic Rainfall Details</u> Rainfall Model FSR Profile Type Summer Return Period (years) 2 Cv (Summer) 0.750 Region England and Wales Cv (Winter) 0.840 M5-60 (mm) 20.000 Storm Duration (mins) 30 Ratio R 0.280		
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Summary of Critical Results by Maximum Level (Rank 1) for Surface 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	1.000
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	Ratio R	0.280
Region England and Wales Cv	(Summer)		0.750
M5-60 (mm)	20.000 Cv	(Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360
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	S14	15 Winter	100	+40%	100/15 Summer	100/15 Summer			357.906
1.001	S15	15 Winter	100	+40%	100/15 Summer	100/15 Summer			357.751
1.002	S16	15 Winter	100	+40%	100/15 Summer	100/15 Summer			357.445
1.003	S17	15 Winter	100	+40%	100/15 Summer				357.177
1.004	S18	15 Winter	100	+40%	100/15 Summer				356.408
2.000	S19	15 Winter	100	+40%	100/15 Summer				356.405
2.001	S20	15 Winter	100	+40%	100/15 Summer	100/15 Summer			355.860
1.005	S21	15 Winter	100	+40%	100/15 Summer	100/15 Summer			355.382
1.006	S22	15 Summer	100	+40%	100/15 Summer				352.176
3.000	S23	15 Winter	100	+40%	100/15 Summer				354.668
3.001	S24	15 Winter	100	+40%	100/15 Summer	100/15 Summer			353.149
3.002	S25	30 Winter	100	+40%	100/15 Summer	100/15 Summer			352.494
1.007	S26	15 Winter	100	+40%	100/15 Summer	100/15 Summer			351.132
4.000	S27	15 Winter	100	+40%					356.989
4.001	S28	15 Winter	100	+40%					356.694
4.002	S29	15 Winter	100	+40%	100/15 Summer				355.811

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Micro
Drainage

Foul Sewer Design

Foul Drainage Design (1 in 2 yr)

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FOUL SEWERAGE DESIGN

Design Criteria for Foul Network 1

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	0
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.200
Flow Per Person (l/per/day)	222.00	Maximum Backdrop Height (m)	1.500
Persons per House	3.00	Min Design Depth for Optimisation (m)	1.200
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Foul Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	9.525	0.095	100.3	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
1.001	52.526	2.558	20.5	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
1.002	50.898	4.206	12.1	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.003	31.032	2.296	13.5	0.000	11	0.0	1.500	o	150	Pipe/Conduit	
2.000	10.845	0.614	17.7	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
1.004	42.258	2.392	17.7	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.005	11.574	0.066	175.4	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
1.006	11.132	0.066	168.7	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.007	20.036	0.148	135.4	0.000	0	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	358.250	0.000	0.0	5	0.0	13	0.31	0.87	15.5	0.2
1.001	358.155	0.000	0.0	10	0.0	13	0.66	1.94	34.3	0.5
1.002	355.597	0.000	0.0	10	0.0	11	0.79	2.53	44.7	0.5
1.003	351.391	0.000	0.0	21	0.0	16	0.96	2.39	42.3	1.0
2.000	349.709	0.000	0.0	4	0.0	8	0.51	2.09	37.0	0.2
1.004	349.095	0.000	0.0	25	0.0	18	0.93	2.09	37.0	1.2
1.005	346.703	0.000	0.0	30	0.0	35	0.44	0.66	11.7	1.4
1.006	346.637	0.000	0.0	30	0.0	35	0.45	0.67	11.9	1.4
1.007	346.571	0.000	0.0	30	0.0	33	0.48	0.75	13.3	1.4

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Network Design Table for Foul Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.012	77.439	0.574	135.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
6.000	22.167	0.426	52.0	0.000	2	0.0	1.500	o	150	Pipe/Conduit	
6.001	17.586	1.353	13.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
6.002	13.406	1.117	12.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
6.003	58.494	4.875	12.0	0.000	2	0.0	1.500	o	150	Pipe/Conduit	
6.004	27.441	2.287	12.0	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
6.005	15.732	1.971	8.0	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
1.013	57.061	2.900	19.7	0.000	8	0.0	1.500	o	150	Pipe/Conduit	
1.014	11.715	0.087	134.7	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.015	17.087	0.127	134.5	0.000	7	0.0	1.500	o	150	Pipe/Conduit	
7.000	9.156	0.763	12.0	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
7.001	14.607	5.252	2.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
8.000	29.074	0.215	135.0	0.000	16	0.0	1.500	o	150	Pipe/Conduit	
8.001	14.058	0.104	135.2	0.000	6	0.0	1.500	o	150	Pipe/Conduit	
7.002	14.866	0.110	135.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.012	345.205	0.000	0.0	81	0.0	55	0.65	0.75	13.3	3.7
6.000	356.660	0.000	0.0	2	0.0	7	0.28	1.22	21.5	0.1
6.001	356.234	0.000	0.0	2	0.0	5	0.45	2.44	43.1	0.1
6.002	354.881	0.000	0.0	2	0.0	5	0.46	2.54	44.9	0.1
6.003	353.764	0.000	0.0	4	0.0	7	0.58	2.54	44.9	0.2
6.004	348.889	0.000	0.0	9	0.0	11	0.76	2.54	44.9	0.4
6.005	346.602	0.000	0.0	14	0.0	12	1.01	3.11	55.0	0.6
1.013	344.631	0.000	0.0	103	0.0	38	1.38	1.98	35.0	4.8
1.014	341.731	0.000	0.0	103	0.0	62	0.69	0.75	13.3	4.8
1.015	341.644	0.000	0.0	110	0.0	64	0.70	0.75	13.3	5.1
7.000	349.571	0.000	0.0	4	0.0	7	0.58	2.54	44.9	0.2
7.001	348.808	0.000	0.0	4	0.0	5	0.95	5.28	93.3	0.2
8.000	343.875	0.000	0.0	16	0.0	24	0.40	0.75	13.3	0.7
8.001	343.660	0.000	0.0	22	0.0	28	0.44	0.75	13.3	1.0
7.002	343.556	0.000	0.0	26	0.0	31	0.46	0.75	13.3	1.2

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Network Design Table for Foul Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
7.003	37.062	0.275	135.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
7.004	17.700	1.654	10.7	0.000	6	0.0	1.500	o	150	Pipe/Conduit	
1.016	19.675	0.146	134.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.017	22.592	0.167	135.3	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.018	46.433	1.857	25.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
7.003	343.446	0.000	0.0	26	0.0	31	0.46	0.75	13.3
7.004	343.171	0.000	0.0	32	0.0	18	1.19	2.69	47.5
1.016	341.517	0.000	0.0	142	0.0	74	0.75	0.75	13.3
1.017	341.371	0.000	0.0	142	0.0	74	0.75	0.75	13.3
1.018	341.204	0.000	0.0	142	0.0	47	1.39	1.76	31.0

Foul Sewer Design

Foul Manhole Schedules

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<u>Manhole Schedules for Foul Network 1</u>											
MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
F1	361.775	3.525	Open Manhole	1200	1.000	358.250	150				
F2	361.627	3.472	Open Manhole	1200	1.001	358.155	150	1.000	358.155	150	
F3	357.197	1.600	Open Manhole	1200	1.002	355.597	150	1.001	355.597	150	
F4	353.355	1.964	Open Manhole	1200	1.003	351.391	150	1.002	351.391	150	
F5	351.359	1.650	Open Manhole	1200	2.000	349.709	150				
F6	350.867	1.772	Open Manhole	1200	1.004	349.095	150	1.003	349.095	150	
								2.000	349.095	150	
F7	348.676	1.973	Open Manhole	1200	1.005	346.703	150	1.004	346.703	150	
F8	348.215	1.578	Open Manhole	1200	1.006	346.637	150	1.005	346.637	150	
F9	348.400	1.829	Open Manhole	1200	1.007	346.571	150	1.006	346.571	150	
F10	349.508	3.085	Open Manhole	1200	1.008	346.423	150	1.007	346.423	150	
F11	351.254	5.333	Open Manhole	1200	1.009	345.921	150	1.008	345.921	150	
F12	351.013	5.511	Open Manhole	1200	1.010	345.502	150	1.009	345.502	150	
F13	357.665	1.727	Open Manhole	1200	3.000	355.938	150				
F14	357.393	1.753	Open Manhole	1200	3.001	355.640	150	3.000	355.640	150	
F15	357.240	1.767	Open Manhole	1200	3.002	355.473	150	3.001	355.473	150	
F16	356.734	1.653	Open Manhole	1200	3.003	355.081	150	3.002	355.081	150	
F17	355.961	1.650	Open Manhole	1200	4.000	354.311	150				
F18	355.545	1.969	Open Manhole	1200	3.004	353.576	150	3.003	353.576	150	
								4.000	353.576	150	
F19	352.300	2.055	Open Manhole	1200	3.005	350.245	150	3.004	350.245	150	
F20	351.598	6.332	Open Manhole	1200	1.011	345.266	150	1.010	345.266	150	
								3.005	345.266	150	
F21	355.273	1.730	Open Manhole	1200	5.000	353.543	150				
F22	353.207	1.860	Open Manhole	1200	5.001	351.347	150	5.000	351.347	150	
F23	352.559	1.769	Open Manhole	1200	5.002	350.790	150	5.001	350.790	150	
F24	351.239	6.034	Open Manhole	1200	1.012	345.205	150	1.011	345.205	150	
								5.002	345.205	150	
F25	358.328	1.668	Open Manhole	1200	6.000	356.660	150				
F26	357.887	1.653	Open Manhole	1200	6.001	356.234	150	6.000	356.234	150	
F27	356.610	1.729	Open Manhole	1200	6.002	354.881	150	6.001	354.881	150	
F28	355.524	1.760	Open Manhole	1200	6.003	353.764	150	6.002	353.764	150	
F29	350.564	1.675	Open Manhole	1200	6.004	348.889	150	6.003	348.889	150	
F30	348.358	1.756	Open Manhole	1200	6.005	346.602	150	6.004	346.602	150	
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<u>Manhole Schedules for Foul Network 1</u>											
MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
F31	347.776	3.145	Open Manhole	1200	1.013	344.631	150	1.012	344.631	150	
								6.005	344.631	150	
F32	344.564	2.833	Open Manhole	1200	1.014	341.731	150	1.013	341.731	150	
F33	344.213	2.569	Open Manhole	1200	1.015	341.644	150	1.014	341.644	150	
F34	351.221	1.650	Open Manhole	1200	7.000	349.571	150				
F35	350.460	1.652	Open Manhole	1200	7.001	348.808	150	7.000	348.808	150	
F36	346.932	3.057	Open Manhole	1200	8.000	343.875	150				
F37	348.473	4.813	Open Manhole	1200	8.001	343.660	150	8.000	343.660	150	
F38	349.216	5.660	Open Manhole	1200	7.002	343.556	150	7.001	343.556	150	
								8.001	343.556	150	
F39	347.967	4.521	Open Manhole	1200	7.003	343.446	150	7.002	343.446	150	
F40	344.928	1.757	Open Manhole	1200	7.004	343.171	150	7.003	343.171	150	
F41	344.032	2.515	Open Manhole	1200	1.016	341.517	150	1.015	341.517	150	
								7.004	341.517	150	
F42	343.853	2.482	Open Manhole	1200	1.017	341.371	150	1.016	341.371	150	
F43	343.139	1.935	Open Manhole	1200	1.018	341.204	150	1.017	341.204	150	
F44	340.740	1.393	Open Manhole	1200		OUTFALL		1.018	339.347	150	
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