Drainage Calculations/Windes Output

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Network 1 Foul Water Design

Foul Drainage Design

FW Manhole Schedules

Network 2 Foul Water Design

Foul Drainage Design

FW Manhole Schedules

DRAINAGE LAYOUT

Drainage Network Layout

WARNING TO HOUSE-PURCHASERS
Property Misdescriptions Act 1991

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REV	DESCRIPTION	DATE	DRAWN

BARRATT
HOMES

MANCHESTER

Barratt Homes Manchester
(A division of BDW Trading Ltd)
1st Floor, Adamson House
106 Wilmslow Road
Didsbury
Manchester
M20 2YY
Tel: 0161 447 5800

Job
Chipping Lane
Longridge
Full Site

Title
Drainage Layout
Sheet 1

Design By	Date	Drawing Number	Rev
CD	Jan 2024	459/ED/201	-
C.A.D By: CD	Scale @ A0: 1:500		

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Job
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Longridge
Full Site

Title
Drainage Layout
Sheet 2

Design By	Date	Drawing Number	Rev
CD	Jan 2024	459/ED/202	-
C.A.D By: CD	Scale @ A0: 1:500		

DRAINAGE LAYOUT

SW Impermeable Areas Layout

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Network 1 Impermeable Areas

1-1.000 = 0.049 Ha of Highway
0.114 Ha of Domestic Property
1-1.001 = 0.002 Ha of Highway
0.031 Ha of Domestic Property
1-1.002 = 0.008 Ha of Highway
0.030 Ha of Domestic Property
1-1.003 = 0.030 Ha of Highway
0 Ha of Domestic Property
1-1.004 = 0.049 Ha of Highway
0 Ha of Domestic Property
1-1.005 = 0 Ha
1-1.006 = 0 Ha
1-1.007 = 0.001 Ha of Highway
0.037 Ha of Domestic Property
1-1.008 = 0.045 Ha of Highway
0.004 Ha of Domestic Property
1-1.009 = 0.025 Ha of Highway
0 Ha of Domestic Property
1-1.010 = 0 Ha of Highway
0.057 Ha of Domestic Property
1-1.011 = 0 Ha
1-1.012 = 0 Ha
1-2.000 = 0.029 Ha of Highway
0.028 Ha of Domestic Property
1-2.001 = 0.016 Ha of Highway
0 Ha of Domestic Property
1-2.002 = 0.015 Ha of Highway
0.053 Ha of Domestic Property
1-2.003 = 0.040 Ha of Highway
0.071 Ha of Domestic Property
1-3.000 = 0.042 Ha of Highway
0.044 Ha of Domestic Property
1-3.001 = 0.010 Ha of Highway
0 Ha of Domestic Property
1-4.000 = 0.028 Ha of Highway
0.015 Ha of Domestic Property
1-4.001 = 0.027 Ha of Highway
0.069 Ha of Domestic Property
1-5.000 = 0.038 Ha of Highway
0 Ha of Domestic Property
1-5.001 = 0.020 Ha of Highway
0.032 Ha of Domestic Property
1-5.002 = 0 Ha
1-5.003 = 0 Ha
1-5.004 = 0.019 Ha of Highway
0.024 Ha of Domestic Property
1-5.005 = 0.024 Ha of Highway
0 Ha of Domestic Property
1-5.006 = 0.008 Ha of Highway
0.013 Ha of Domestic Property
1-5.007 = 0.034 Ha of Highway
0 Ha of Domestic Property
1-5.008 = 0 Ha
1-5.009 = 0.014 Ha of Highway
0.056 Ha of Domestic Property
1-5.010 = 0 Ha
1-5.011 = 0.041 Ha of Highway
0 Ha of Domestic Property
1-5.012 = 0.016 Ha of Highway
0.062 Ha of Domestic Property
1-5.013 = 0.011 Ha of Highway
0 Ha of Domestic Property
1-5.014 = 0.021 Ha of Highway
0.020 Ha of Domestic Property
1-5.015 = 0.010 Ha of Highway
0.064 Ha of Domestic Property
1-5.016 = 0.011 Ha of Highway
0 Ha of Domestic Property
1-5.017 = 0.015 Ha of Highway
0 Ha of Domestic Property
1-5.018 = 0.041 Ha of Highway
0.027 Ha of Domestic Property
1-5.019 = 0.041 Ha of Highway
0.056 Ha of Domestic Property
1-5.020 = 0.042 Ha of Highway
0 Ha of Domestic Property
1-5.021 = 0 Ha
1-6.000 = 0.056 Ha of Highway
0 Ha of Domestic Property
1-6.001 = 0.029 Ha of Highway
0.033 Ha of Domestic Property
1-6.002 = 0.014 Ha of Highway
0 Ha of Domestic Property
1-6.003 = 0.029 Ha of Highway
0.054 Ha of Domestic Property
1-6.004 = 0.036 Ha of Highway
0 Ha of Domestic Property
1-6.005 = 0 Ha of Highway
0.094 Ha of Domestic Property
1-6.006 = 0 Ha
1-7.000 = 0.031 Ha of Highway
0.043 Ha of Domestic Property
1-7.001 = 0.021 Ha of Highway
0.055 Ha of Domestic Property
1-7.002 = 0.043 Ha of Highway
0.045 Ha of Domestic Property
1-8.000 = 0.048 Ha of Highway
0.050 Ha of Domestic Property
1-9.000 = 0.045 Ha of Highway
0 Ha of Domestic Property
1-9.001 = 0.050 Ha of Highway
0.044 Ha of Domestic Property
1-9.002 = 0 Ha of Highway
0.038 Ha of Domestic Property
1-9.003 = 0 Ha of Highway
0.081 Ha of Domestic Property
1-10.000 = 0.034 Ha of Highway
0.044 Ha of Domestic Property
1-11.000 = 0.034 Ha of Highway
0 Ha of Domestic Property

Network 1 Impermeable Areas + 10% Urban Creep to Domestic Property

1-1.000 = 0.049 Ha of Highway
0.125 Ha of Domestic Property
1-1.001 = 0.002 Ha of Highway
0.034 Ha of Domestic Property
1-1.002 = 0.008 Ha of Highway
0.033 Ha of Domestic Property
1-1.003 = 0.030 Ha of Highway
0 Ha of Domestic Property
1-1.004 = 0.049 Ha of Highway
0 Ha of Domestic Property
1-1.005 = 0 Ha
1-1.006 = 0 Ha
1-1.007 = 0.003 Ha of Highway
0.041 Ha of Domestic Property
1-1.008 = 0.045 Ha of Highway
0.005 Ha of Domestic Property
1-1.009 = 0.025 Ha of Highway
0 Ha of Domestic Property
1-1.010 = 0 Ha of Highway
0.063 Ha of Domestic Property
1-1.011 = 0 Ha
1-1.012 = 0 Ha
1-2.000 = 0.029 Ha of Highway
0.031 Ha of Domestic Property
1-2.001 = 0.016 Ha of Highway
0 Ha of Domestic Property
1-2.002 = 0.015 Ha of Highway
0.058 Ha of Domestic Property
1-2.003 = 0.040 Ha of Highway
0.078 Ha of Domestic Property
1-3.000 = 0.042 Ha of Highway
0.048 Ha of Domestic Property
1-3.001 = 0.010 Ha of Highway
0 Ha of Domestic Property
1-4.000 = 0.028 Ha of Highway
0.017 Ha of Domestic Property
1-4.001 = 0.027 Ha of Highway
0.076 Ha of Domestic Property
1-5.000 = 0.038 Ha of Highway
0 Ha of Domestic Property
1-5.001 = 0.020 Ha of Highway
0.035 Ha of Domestic Property
1-5.002 = 0 Ha
1-5.003 = 0 Ha
1-5.004 = 0.019 Ha of Highway
0.026 Ha of Domestic Property
1-5.005 = 0.024 Ha of Highway
0 Ha of Domestic Property
1-5.006 = 0.008 Ha of Highway
0.014 Ha of Domestic Property
1-5.007 = 0.034 Ha of Highway
0 Ha of Domestic Property
1-5.008 = 0 Ha
1-5.009 = 0.014 Ha of Highway
0.062 Ha of Domestic Property
1-5.010 = 0 Ha
1-5.011 = 0.041 Ha of Highway
0 Ha of Domestic Property
1-5.012 = 0.016 Ha of Highway
0.068 Ha of Domestic Property
1-5.013 = 0.011 Ha of Highway
0 Ha of Domestic Property
1-5.014 = 0.021 Ha of Highway
0.022 Ha of Domestic Property
1-5.015 = 0.010 Ha of Highway
0.071 Ha of Domestic Property
1-5.016 = 0.011 Ha of Highway
0 Ha of Domestic Property
1-5.017 = 0.015 Ha of Highway
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1-5.018 = 0.041 Ha of Highway
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0.049 Ha of Domestic Property
1-9.002 = 0 Ha of Highway
0.042 Ha of Domestic Property
1-9.003 = 0 Ha of Highway
0.089 Ha of Domestic Property
1-10.000 = 0.034 Ha of Highway
0.049 Ha of Domestic Property
1-11.000 = 0.034 Ha of Highway
0 Ha of Domestic Property

REV	DESCRIPTION	DATE	DRAWN

BARRATT
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MANCHESTER
Barratt Homes Manchester
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1st Floor, Adamson House
106 Wilmslow Road
Didsbury
Manchester
M20 2YY
Tel: 0161 447 5800

Job: Chipping Lane, Longridge, Full Site			
Title: Impermeable Areas Plan, Sheet 1			
Design By: CD	Date: Jan 2024	Drawing Number: 459/ED/203	Rev: -
C.A.D By: CD	Scale @ A0: 1:500		

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Network 2 Impermeable Areas

2–1.000 = 0.021 Ha of Highway
0.068 Ha of Domestic Property
2–1.001 = 0.023 Ha of Highway
0 Ha of Domestic Property
2–1.002 = 0.053 Ha of Highway
0.028 Ha of Domestic Property
2–1.003 = 0.038 Ha of Highway
0.043 Ha of Domestic Property
2–1.004 = 0 Ha of Highway
0.028 Ha of Domestic Property
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2–1.014 = 0 Ha
2–2.000 = 0.062 Ha of Highway
0 Ha of Domestic Property
2–2.001 = 0.018 Ha of Highway
0.026 Ha of Domestic Property
2–2.002 = 0.028 Ha of Highway
0 Ha of Domestic Property
2–3.000 = 0.081 Ha of Highway
0 Ha of Domestic Property
2–4.000 = 0.027 Ha of Highway
0.066 Ha of Domestic Property
2–4.001 = 0.024 Ha of Highway
0 Ha of Domestic Property
2–4.002 = 0.037 Ha of Highway
0.041 Ha of Domestic Property
2–5.000 = 0.035 Ha of Highway
0.076 Ha of Domestic Property
2–5.001 = 0.031 Ha of Highway
0.059 Ha of Domestic Property

Network 2 Impermeable Areas + 10% Urban Creep to Domestic Property

2–1.000 = 0.021 Ha of Highway
0.109 Ha of Domestic Property
2–1.001 = 0.023 Ha of Highway
0 Ha of Domestic Property
2–1.002 = 0.053 Ha of Highway
0.028 Ha of Domestic Property
2–1.003 = 0.038 Ha of Highway
0.047 Ha of Domestic Property
2–1.004 = 0 Ha of Highway
0.031 Ha of Domestic Property
2–1.005 = 0.028 Ha of Highway
0.030 Ha of Domestic Property
2–1.006 = 0.030 Ha of Highway
0 Ha of Domestic Property
2–1.007 = 0.032 Ha of Highway
0 Ha of Domestic Property
2–1.008 = 0 Ha of Highway
0.089 Ha of Domestic Property
2–1.009 = 0.066 Ha of Highway
0.041 Ha of Domestic Property
2–1.010 = 0.031 Ha of Highway
0.119 Ha of Domestic Property
2–1.011 = 0 Ha
2–1.012 = 0.008 Ha of Highway
0 Ha of Domestic Property
2–1.013 = 0.029 Ha of Highway
0.028 Ha of Domestic Property
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2–2.000 = 0.062 Ha of Highway
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2–2.001 = 0.018 Ha of Highway
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2–2.002 = 0.028 Ha of Highway
0 Ha of Domestic Property
2–3.000 = 0.081 Ha of Highway
0 Ha of Domestic Property
2–4.000 = 0.027 Ha of Highway
0.073 Ha of Domestic Property
2–4.001 = 0.024 Ha of Highway
0 Ha of Domestic Property
2–4.002 = 0.037 Ha of Highway
0.045 Ha of Domestic Property
2–5.000 = 0.035 Ha of Highway
0.084 Ha of Domestic Property
2–5.001 = 0.031 Ha of Highway
0.065 Ha of Domestic Property

Network 3 Impermeable Areas

3–1.000 = 0.052 Ha of Highway
0 Ha of Domestic Property
3–1.001 = 0.042 Ha of Highway
0.035 Ha of Domestic Property
3–1.002 = 0.017 Ha of Highway
0.077 Ha of Domestic Property
3–1.003 = 0.043 Ha of Highway
0.060 Ha of Domestic Property
3–1.004 = 0 Ha of Highway
0.042 Ha of Domestic Property
3–1.005 = 0.054 Ha of Highway
0 Ha of Domestic Property
3–1.006 = 0.023 Ha of Highway
0.028 Ha of Domestic Property
3–1.007 = 0 Ha of Highway
0.070 Ha of Domestic Property
3–1.008 = 0 Ha
3–2.000 = 0.061 Ha of Highway
0.082 Ha of Domestic Property
3–3.000 = 0.015 Ha of Highway
0 Ha of Domestic Property
3–3.001 = 0.040 Ha of Highway
0.113 Ha of Domestic Property

Network 3 Impermeable Areas + 10% Urban Creep to Domestic Property

3–1.000 = 0.052 Ha of Highway
0 Ha of Domestic Property
3–1.001 = 0.042 Ha of Highway
0.039 Ha of Domestic Property
3–1.002 = 0.017 Ha of Highway
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3–1.003 = 0.043 Ha of Highway
0.066 Ha of Domestic Property
3–1.004 = 0 Ha of Highway
0.046 Ha of Domestic Property
3–1.005 = 0.054 Ha of Highway
0 Ha of Domestic Property
3–1.006 = 0.023 Ha of Highway
0.031 Ha of Domestic Property
3–1.007 = 0 Ha of Highway
0.077 Ha of Domestic Property
3–1.008 = 0 Ha
3–2.000 = 0.061 Ha of Highway
0.090 Ha of Domestic Property
3–3.000 = 0.015 Ha of Highway
0 Ha of Domestic Property
3–3.001 = 0.040 Ha of Highway
0.124 Ha of Domestic Property

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MANCHESTER
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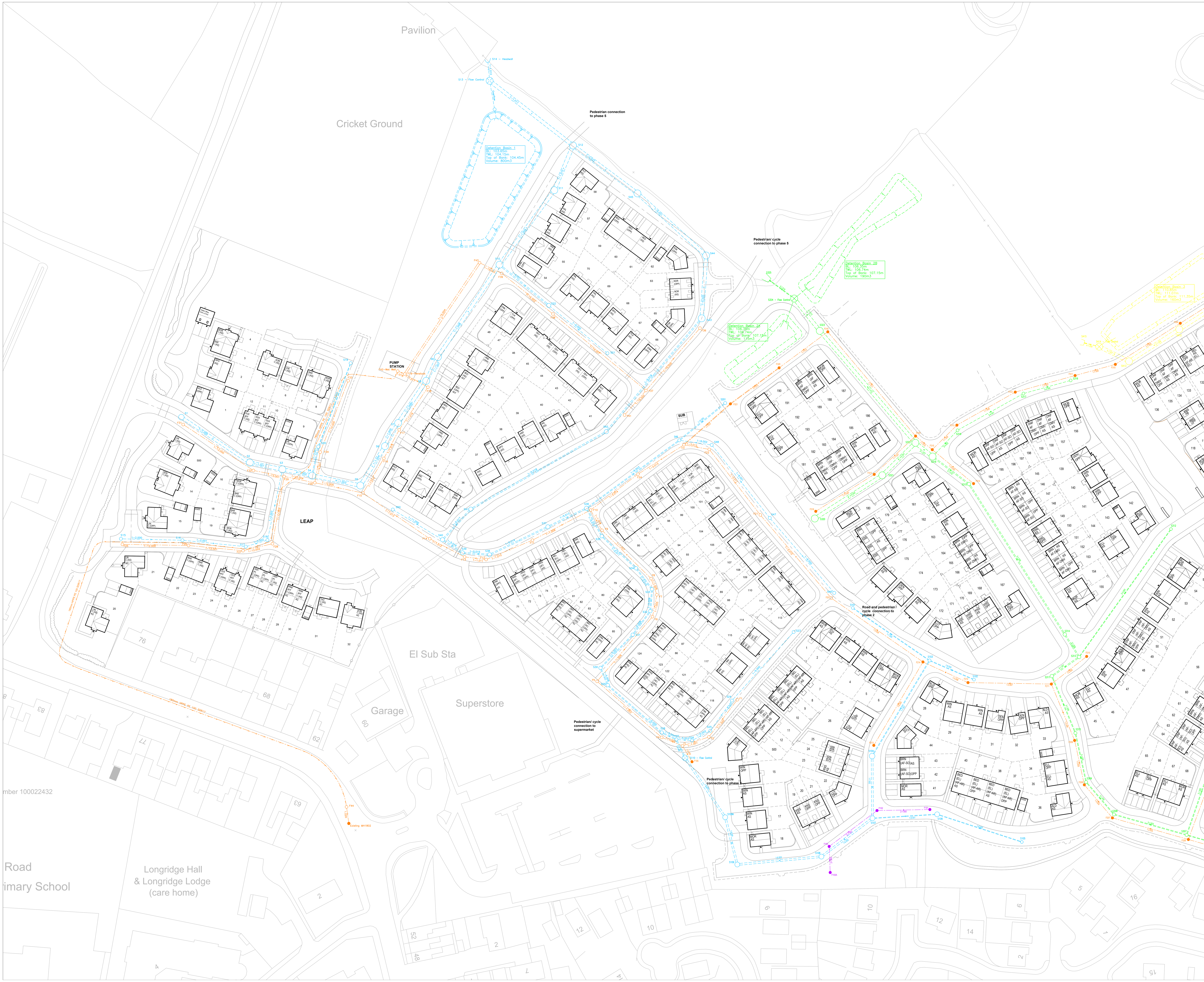
Manchester
M20 2YY
Tel: 0161 447 5800

Job: Chipping Lane, Longridge, Full Site			
Title: Impermeable Areas Plan, Sheet 2			
Design By: CD	Date: Jan 2024	Drawing Number: 459/ED/204	Rev: -
C.A.D By: CD	Scale @ A0: 1:500		

DRAINAGE LAYOUT

MicroDrainage Network Layout



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Key

- S19 — Surface Water Network 1
- S307 — Surface Water Network 2
- S402 — Surface Water Network 3
- F3 — Foul Water Network 1
- F102 — Foul Water Network 2

REV	DESCRIPTION	DATE	DRAWN

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Manchester
M20 2YY
Tel: 0161 447 5800

Job
Chipping Lane
Longridge
Full Site

Title
Drainage Network Layout
Sheet 1

Design By	Date	Drawing Number	Rev
CD	Jan 2024	459/ED/206	-
C.A.D By	Scale @ A0		
CD	1:500		

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Key

- S19 — Surface Water Network 1
- S307 — Surface Water Network 2
- S402 — Surface Water Network 3
- F3 — Foul Water Network 1
- F102 — Foul Water Network 2

REV	DESCRIPTION	DATE	DRAWN

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1st Floor, Adamson House
106 Wilmslow Road
Didsbury
Manchester
M20 2YY
Tel: 0161 447 5800

Job	Chipping Lane Longridge Full Site
Title	Drainage Network Layout Sheet 2

Design By	Date	Drawing Number	Rev
CD	Jan 2024	459/ED/207	-
C.A.D By CD	Scale @ A0 1:500		

Storm Water Network 1

STORM SEWER DESIGN

Network Design Details (1 in 2 yr) & Online Controls

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)	18.800	Add Flow / Climate Change (%)	0
Ratio R	0.281	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

Network Design Table for Surface Network 1

« - Indicates pipe capacity < flow

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	34.856	0.087	400.6	0.174	5.00	0.0	0.600	o	1200	Pipe/Conduit	
1.001	14.100	0.028	503.6	0.036	0.00	0.0	0.600	o	1500	Pipe/Conduit	
2.000	26.078	0.153	170.4	0.060	5.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	26.997	0.429	62.9	0.016	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.002	9.581	0.056	171.1	0.051	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.003	30.643	0.361	84.9	0.118	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	12.868	0.026	494.9	0.041	0.00	0.0	0.600	o	1500	Pipe/Conduit	
3.000	37.925	0.181	209.5	0.090	5.00	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	5.31	103.006	0.174	0.0	0.0	0.0	1.86	2106.9	23.6
1.001	50.00	5.44	102.619	0.210	0.0	0.0	0.0	1.90	3365.7	28.4
2.000	50.00	5.44	104.865	0.060	0.0	0.0	0.0	1.00	39.7	8.1
2.001	50.00	5.71	104.712	0.076	0.0	0.0	0.0	1.65	65.7	10.3
2.002	50.00	5.87	104.283	0.127	0.0	0.0	0.0	1.00	39.6	17.2
2.003	50.00	6.23	104.226	0.245	0.0	0.0	0.0	1.42	56.5	33.2
1.002	50.00	6.34	102.591	0.496	0.0	0.0	0.0	1.92	3395.2	67.2
3.000	50.00	5.58	103.977	0.090	0.0	0.0	0.0	1.08	76.5	12.2

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
3.001	12.524	0.031	404.0	0.010	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.003	20.839	0.042	496.2	0.030	0.00	0.0	0.600	o	1500	Pipe/Conduit	
1.004	19.697	0.039	505.1	0.049	0.00	0.0	0.600	o	1500	Pipe/Conduit	
1.005	11.281	0.023	490.5	0.000	0.00	0.0	0.600	o	1500	Pipe/Conduit	
1.006	21.474	0.043	499.4	0.000	0.00	0.0	0.600	o	1500	Pipe/Conduit	
1.007	11.233	0.022	510.6	0.062	0.00	0.0	0.600	o	1500	Pipe/Conduit	
1.008	47.046	0.094	500.5	0.071	0.00	0.0	0.600	o	1500	Pipe/Conduit	
4.000	32.098	0.597	53.8	0.045	5.00	0.0	0.600	o	225	Pipe/Conduit	
4.001	27.069	0.068	398.1	0.103	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.009	39.199	0.080	490.0	0.025	0.00	0.0	0.600	o	1500	Pipe/Conduit	
1.010	20.544	0.041	501.1	0.063	0.00	0.0	0.600	o	1500	Pipe/Conduit	
5.000	31.155	0.663	47.0	0.038	5.00	0.0	0.600	o	225	Pipe/Conduit	
5.001	24.755	0.688	36.0	0.055	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.002	7.704	0.198	38.9	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.003	6.655	0.139	47.9	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
6.000	37.767	1.511	25.0	0.056	5.00	0.0	0.600	o	225	Pipe/Conduit	
6.001	27.458	1.016	27.0	0.065	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)
3.001	50.00	5.79	103.646	0.100	0.0	0.0	0.0	1.01	159.9	13.5
1.003	49.61	6.52	102.565	0.626	0.0	0.0	0.0	1.92	3390.9	84.1
1.004	49.07	6.69	102.523	0.675	0.0	0.0	0.0	1.90	3360.7	89.7
1.005	48.78	6.79	102.484	0.675	0.0	0.0	0.0	1.93	3410.6	89.7
1.006	48.22	6.98	102.461	0.675	0.0	0.0	0.0	1.91	3379.8	89.7
1.007	47.93	7.08	102.418	0.737	0.0	0.0	0.0	1.89	3342.3	95.7
1.008	46.78	7.49	102.396	0.808	0.0	0.0	0.0	1.91	3376.1	102.4
4.000	50.00	5.30	104.242	0.045	0.0	0.0	0.0	1.79	71.1	6.1
4.001	50.00	5.70	103.345	0.148	0.0	0.0	0.0	1.12	241.7	20.0
1.009	45.88	7.83	102.302	0.981	0.0	0.0	0.0	1.93	3412.3	121.9
1.010	45.42	8.00	102.222	1.044	0.0	0.0	0.0	1.91	3374.1	128.4
5.000	50.00	5.27	108.172	0.038	0.0	0.0	0.0	1.91	76.1	5.1
5.001	50.00	5.46	107.509	0.093	0.0	0.0	0.0	2.19	87.0	12.6
5.002	50.00	5.52	106.821	0.093	0.0	0.0	0.0	2.10	83.6	12.6
5.003	50.00	5.58	106.624	0.093	0.0	0.0	0.0	1.90	75.4	12.6
6.000	50.00	5.24	111.159	0.056	0.0	0.0	0.0	2.63	104.5	7.6
6.001	50.00	5.42	109.648	0.121	0.0	0.0	0.0	2.53	100.5	16.4

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
7.000	39.385	0.394	100.0	0.078	5.00	0.0	0.600	o	225	Pipe/Conduit	
8.000	20.526	1.069	19.2	0.103	5.00	0.0	0.600	o	225	Pipe/Conduit	
7.001	47.242	0.304	155.4	0.082	0.00	0.0	0.600	o	300	Pipe/Conduit	
7.002	26.364	0.195	135.2	0.093	0.00	0.0	0.600	o	750	Pipe/Conduit	
6.002	27.056	0.200	135.3	0.016	0.00	0.0	0.600	o	750	Pipe/Conduit	
6.003	35.837	0.246	145.7	0.088	0.00	0.0	0.600	o	750	Pipe/Conduit	
6.004	20.674	0.056	369.2	0.036	0.00	0.0	0.600	o	750	Pipe/Conduit	
6.005	30.374	0.335	90.7	0.103	0.00	0.0	0.600	o	750	Pipe/Conduit	
6.006	8.611	0.035	246.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.004	6.888	0.053	130.0	0.046	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.005	30.420	0.317	96.0	0.024	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.006	7.929	0.091	87.1	0.022	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.007	19.595	0.338	58.0	0.034	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.008	12.502	0.272	46.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.009	9.280	0.023	403.5	0.076	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.010	11.131	0.028	397.5	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.011	19.961	0.139	143.6	0.016	0.00	0.0	0.600	o	450	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)
7.000	50.00	5.50	108.550	0.078	0.0	0.0	0.0	1.31	52.0	10.6
8.000	50.00	5.11	110.650	0.103	0.0	0.0	0.0	3.00	119.3	13.9
7.001	50.00	6.13	108.081	0.263	0.0	0.0	0.0	1.26	89.0	35.6
7.002	50.00	6.31	107.327	0.356	0.0	0.0	0.0	2.41	1062.6	48.2
6.002	49.68	6.50	107.132	0.493	0.0	0.0	0.0	2.40	1062.2	66.3
6.003	48.88	6.76	106.932	0.581	0.0	0.0	0.0	2.32	1023.4	76.9
6.004	48.17	6.99	106.686	0.617	0.0	0.0	0.0	1.45	640.8	80.5
6.005	47.67	7.17	106.630	0.720	0.0	0.0	0.0	2.94	1298.8	93.0
6.006	47.36	7.28	106.295	0.720	0.0	0.0	0.0	1.29	205.4	93.0
5.004	47.18	7.34	106.260	0.859	0.0	0.0	0.0	1.78	283.4	109.8
5.005	46.51	7.59	106.207	0.883	0.0	0.0	0.0	2.08	330.1	111.2
5.006	46.35	7.65	105.890	0.905	0.0	0.0	0.0	2.18	346.6	113.6
5.007	46.03	7.77	105.799	0.939	0.0	0.0	0.0	2.67	425.3	117.1
5.008	45.85	7.84	105.461	0.939	0.0	0.0	0.0	3.01	477.9	117.1
5.009	45.46	7.99	105.189	1.015	0.0	0.0	0.0	1.01	160.0	125.0
5.010	45.00	8.17	105.166	1.015	0.0	0.0	0.0	1.01	161.2	125.0
5.011	44.52	8.37	105.138	1.031	0.0	0.0	0.0	1.69	269.5	125.0

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
5.012	13.450	0.157	85.7	0.062	0.00	0.0	0.600	o	450	Pipe/Conduit	
9.000	41.859	1.231	34.0	0.045	5.00	0.0	0.600	o	225	Pipe/Conduit	
9.001	39.560	1.364	29.0	0.099	0.00	0.0	0.600	o	225	Pipe/Conduit	
9.002	13.898	0.613	22.7	0.042	0.00	0.0	0.600	o	225	Pipe/Conduit	
10.000	25.064	0.135	185.7	0.083	5.00	0.0	0.600	o	375	Pipe/Conduit	
9.003	48.787	1.149	42.5	0.089	0.00	0.0	0.600	o	375	Pipe/Conduit	
5.013	18.119	0.045	402.6	0.011	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.014	27.409	0.069	397.2	0.043	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.015	14.789	0.037	399.7	0.081	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.016	6.471	0.017	380.6	0.011	0.00	0.0	0.600	o	450	Pipe/Conduit	
11.000	24.649	0.325	75.8	0.034	5.00	0.0	0.600	o	225	Pipe/Conduit	
5.017	17.659	0.044	401.3	0.015	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.018	66.144	0.165	400.9	0.094	0.00	0.0	0.600	o	525	Pipe/Conduit	
5.019	62.798	0.157	400.0	0.102	0.00	0.0	0.600	o	525	Pipe/Conduit	
5.020	26.670	0.067	398.1	0.042	0.00	0.0	0.600	o	1500	Pipe/Conduit	
5.021	39.257	0.098	400.6	0.000	0.00	0.0	0.600	o	1500	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)
5.012	44.28	8.47	104.999	1.093	0.0	0.0	0.0	2.20	349.5	131.1
9.000	50.00	5.31	108.448	0.045	0.0	0.0	0.0	2.25	89.5	6.1
9.001	50.00	5.58	107.217	0.144	0.0	0.0	0.0	2.44	97.0	19.5
9.002	50.00	5.66	105.853	0.186	0.0	0.0	0.0	2.76	109.7	25.2
10.000	50.00	5.31	105.375	0.083	0.0	0.0	0.0	1.33	146.5	11.2
9.003	50.00	5.96	105.240	0.358	0.0	0.0	0.0	2.79	307.9	48.5
5.013	43.58	8.77	104.016	1.462	0.0	0.0	0.0	1.01	160.2«	172.6
5.014	42.58	9.22	103.971	1.505	0.0	0.0	0.0	1.01	161.3«	173.6
5.015	42.07	9.47	103.902	1.586	0.0	0.0	0.0	1.01	160.7«	180.7
5.016	41.85	9.57	103.865	1.597	0.0	0.0	0.0	1.04	164.8«	181.0
11.000	50.00	5.27	104.399	0.034	0.0	0.0	0.0	1.50	59.8	4.6
5.017	41.26	9.86	103.848	1.646	0.0	0.0	0.0	1.01	160.4«	183.9
5.018	39.40	10.85	103.729	1.740	0.0	0.0	0.0	1.11	240.8	185.7
5.019	37.82	11.79	103.564	1.842	0.0	0.0	0.0	1.11	241.1	188.7
5.020	37.49	12.00	102.432	1.884	0.0	0.0	0.0	2.14	3788.4	191.3
5.021	37.02	12.31	102.365	1.884	0.0	0.0	0.0	2.14	3776.3	191.3

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
5.022	34.015	0.085	400.2	0.091	0.00	0.0	0.600	o	1500	Pipe/Conduit	
1.011	44.767	0.089	503.0	0.000	0.00	0.0	0.600	o	1500	Pipe/Conduit	
1.012	8.914	0.053	168.2	0.000	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)
5.022	36.62	12.57	102.267	1.975	0.0	0.0	0.0	2.14	3778.3	195.9
1.011	36.05	12.96	102.182	3.019	0.0	0.0	0.0	1.91	3367.6	294.8
1.012	35.88	13.09	102.093	3.019	0.0	0.0	0.0	1.21	85.5«	294.8

Online Controls for Surface Network 1

Orifice Manhole: S110, DS/PN: 6.006, Volume (m³): 21.1

Diameter (m) 0.247 Discharge Coefficient 0.600 Invert Level (m) 106.295

Hydro-Brake® Optimum Manhole: S13, DS/PN: 1.012, Volume (m³): 92.9

Unit Reference	MD-SHE-0278-5000-2200-5000
Design Head (m)	2.200
Design Flow (l/s)	50.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	278
Invert Level (m)	102.093
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	2100

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.200	50.0
Flush-Flo™	0.658	49.9
Kick-Flo®	1.428	40.6
Mean Flow over Head Range	-	43.2

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	8.7	1.200	46.4	3.000	58.1	7.000	87.6
0.200	28.7	1.400	41.7	3.500	62.6	7.500	90.6
0.300	45.2	1.600	42.9	4.000	66.7	8.000	93.5
0.400	47.9	1.800	45.4	4.500	70.7	8.500	96.3
0.500	49.3	2.000	47.7	5.000	74.4	9.000	99.0
0.600	49.9	2.200	50.0	5.500	77.9	9.500	101.6
0.800	49.6	2.400	52.1	6.000	81.3		
1.000	48.5	2.600	54.2	6.500	84.5		

Storage Structures for Surface Network 1

Tank or Pond Manhole: S13, DS/PN: 1.012

Invert Level (m) 103.650

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	947.9	0.200	1029.2	0.400	1113.4	0.600	1200.5
0.100	988.1	0.300	1070.9	0.500	1156.6	0.750	1267.7

STORM SEWER DESIGN

SW Manhole Schedules

Manhole Schedules for Surface Network 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	105.233	2.227	Open Manhole	2400	1.000	103.006	1200				
S2	105.924	3.305	Open Manhole	2400	1.001	102.619	1500	1.000	102.919	1200	
S15	106.290	1.425	Open Manhole	1350	2.000	104.865	225				
S16	106.358	1.646	Open Manhole	1350	2.001	104.712	225	2.000	104.712	225	
S17	105.854	1.571	Open Manhole	1350	2.002	104.283	225	2.001	104.283	225	
S18	105.655	1.429	Open Manhole	1500	2.003	104.226	225	2.002	104.227	225	1
S3	105.961	3.370	Open Manhole	2400	1.002	102.591	1500	1.001	102.591	1500	
								2.003	103.865	225	
S19	105.531	1.554	Open Manhole	1800	3.000	103.977	300				
S20	105.820	2.174	Open Manhole	1500	3.001	103.646	450	3.000	103.796	300	
S4	105.808	3.243	Open Manhole	2700	1.003	102.565	1500	1.002	102.565	1500	
								3.001	103.615	450	
S5	105.622	3.099	Open Manhole	2400	1.004	102.523	1500	1.003	102.523	1500	
S6	105.847	3.363	Open Manhole	2400	1.005	102.484	1500	1.004	102.484	1500	
S7	105.909	3.448	Open Manhole	2400	1.006	102.461	1500	1.005	102.461	1500	
S8	105.721	3.303	Open Manhole	2400	1.007	102.418	1500	1.006	102.418	1500	
S9	105.581	3.185	Open Manhole	2400	1.008	102.396	1500	1.007	102.396	1500	
S21	105.667	1.425	Open Manhole	1350	4.000	104.242	225				
S22	105.259	1.914	Open Manhole	1800	4.001	103.345	525	4.000	103.645	225	
S10	105.002	2.700	Open Manhole	3000	1.009	102.302	1500	1.008	102.302	1500	
								4.001	103.277	525	
S11	104.922	2.700	Open Manhole	3000	1.010	102.222	1500	1.009	102.222	1500	
S23	109.597	1.425	Open Manhole	1350	5.000	108.172	225				
S24	108.947	1.438	Open Manhole	1500	5.001	107.509	225	5.000	107.509	225	
S25	108.247	1.426	Open Manhole	1350	5.002	106.821	225	5.001	106.821	225	
S26	108.049	1.426	Open Manhole	1350	5.003	106.624	225	5.002	106.623	225	
S105	112.727	1.568	Open Manhole	1500	6.000	111.159	225				
S106	111.782	2.134	Open Manhole	1350	6.001	109.648	225	6.000	109.648	225	
S101	110.167	1.617	Open Manhole	1350	7.000	108.550	225				
S102	112.243	1.593	Open Manhole	1500	8.000	110.650	225				
S103	111.709	3.628	Open Manhole	2100	7.001	108.081	300	7.000	108.156	225	
								8.000	109.581	225	1425
S104	110.918	3.591	Open Manhole	2400	7.002	107.327	750	7.001	107.777	300	
S107	111.491	4.359	Open Manhole	2400	6.002	107.132	750	6.001	108.632	225	975
								7.002	107.132	750	
S108	111.053	4.121	Open Manhole	2400	6.003	106.932	750	6.002	106.932	750	
S109	110.539	3.853	Open Manhole	2400	6.004	106.686	750	6.003	106.686	750	
S109A	110.009	3.379	Open Manhole	1800	6.005	106.630	750	6.004	106.630	750	

Manhole Schedules for Surface Network 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S110	108.200	1.905	Open Manhole	2400	6.006	106.295	450	6.005	106.295	750	
S27	107.924	1.664	Open Manhole	1500	5.004	106.260	450	5.003	106.485	225	
								6.006	106.260	450	
S28	107.857	1.650	Open Manhole	1500	5.005	106.207	450	5.004	106.207	450	
S29	107.540	1.650	Open Manhole	1500	5.006	105.890	450	5.005	105.890	450	
S30	107.449	1.650	Open Manhole	1500	5.007	105.799	450	5.006	105.799	450	
S31	107.646	2.185	Open Manhole	1500	5.008	105.461	450	5.007	105.461	450	
S32	107.569	2.380	Open Manhole	1500	5.009	105.189	450	5.008	105.189	450	
S33	107.430	2.264	Open Manhole	1500	5.010	105.166	450	5.009	105.166	450	
S34	107.241	2.103	Open Manhole	1500	5.011	105.138	450	5.010	105.138	450	
S35	106.909	1.910	Open Manhole	1500	5.012	104.999	450	5.011	104.999	450	
S46	109.881	1.433	Open Manhole	1350	9.000	108.448	225				
S47	108.671	1.454	Open Manhole	1350	9.001	107.217	225	9.000	107.217	225	
S48	107.297	1.444	Open Manhole	1350	9.002	105.853	225	9.001	105.853	225	
S201	107.005	1.630	Open Manhole	2100	10.000	105.375	375				
S49	106.894	1.654	Open Manhole	1350	9.003	105.240	375	9.002	105.240	225	
								10.000	105.240	375	
S36	106.895	2.879	Open Manhole	1800	5.013	104.016	450	5.012	104.842	450	826
								9.003	104.091	375	
S37	106.951	2.980	Open Manhole	1800	5.014	103.971	450	5.013	103.971	450	
S38	106.608	2.706	Open Manhole	1800	5.015	103.902	450	5.014	103.902	450	
S39	106.386	2.521	Open Manhole	1800	5.016	103.865	450	5.015	103.865	450	
S50	105.824	1.425	Open Manhole	1350	11.000	104.399	225				
S40	106.262	2.414	Open Manhole	1800	5.017	103.848	450	5.016	103.848	450	
								11.000	104.074	225	1
S41	105.972	2.243	Open Manhole	1800	5.018	103.729	525	5.017	103.804	450	
S42	105.729	2.165	Open Manhole	1800	5.019	103.564	525	5.018	103.564	525	
S43	105.566	3.134	Open Manhole	2700	5.020	102.432	1500	5.019	103.407	525	
S44	105.250	2.885	Open Manhole	2700	5.021	102.365	1500	5.020	102.365	1500	
S45	104.968	2.701	Open Manhole	3000	5.022	102.267	1500	5.021	102.267	1500	
S12	104.882	2.701	Open Manhole	3000	1.011	102.182	1500	1.010	102.181	1500	
								5.022	102.182	1500	
S13	104.793	2.700	Open Manhole	3000	1.012	102.093	300	1.011	102.093	1500	
S14	102.473	0.433	Open Manhole	600		OUTFALL		1.012	102.040	300	

Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	360045.987	438005.971	360045.987	438005.971	Required	
S2	360075.017	437986.678	360075.017	437986.678	Required	
S15	360020.388	437954.416	360020.388	437954.416	Required	
S16	360046.459	437953.809	360046.459	437953.809	Required	
S17	360073.319	437951.095	360073.319	437951.095	Required	
S18	360082.491	437953.866	360082.491	437953.866	Required	
S3	360088.830	437983.846	360088.830	437983.846	Required	
S19	360117.741	438028.822	360117.741	438028.822	Required	
S20	360104.068	437993.447	360104.068	437993.447	Required	
S4	360101.424	437981.205	360101.424	437981.205	Required	
S5	360121.836	437977.010	360121.836	437977.010	Required	
S6	360132.313	437993.689	360132.313	437993.689	Required	
S7	360137.882	438003.500	360137.882	438003.500	Required	
S8	360149.776	438021.379	360149.776	438021.379	Required	
S9	360154.725	438031.463	360154.725	438031.463	Required	

Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S21	360226.587	438033.057	360226.587	438033.057	Required	
S22	360201.714	438053.346	360201.714	438053.346	Required	
S10	360180.848	438070.590	360180.848	438070.590	Required	
S11	360204.062	438102.176	360204.062	438102.176	Required	
S23	360304.757	437915.600	360304.757	437915.600	Required	
S24	360283.654	437892.680	360283.654	437892.680	Required	
S25	360269.253	437872.545	360269.253	437872.545	Required	
S26	360262.459	437868.913	360262.459	437868.913	Required	
S105	360402.238	437825.920	360402.238	437825.920	Required	
S106	360366.337	437837.645	360366.337	437837.645	Required	
S101	360330.611	437925.095	360330.611	437925.095	Required	
S102	360381.960	437894.730	360381.960	437894.730	Required	
S103	360363.102	437902.834	360363.102	437902.834	Required	
S104	360338.786	437862.331	360338.786	437862.331	Required	
S107	360338.930	437835.967	360338.930	437835.967	Required	

Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S108	360317.301	437819.712	360317.301	437819.712	Required	
S109	360281.621	437816.363	360281.621	437816.363	Required	
S109A	360276.512	437836.396	360276.512	437836.396	Required	
S110	360259.497	437861.557	360259.497	437861.557	Required	
S27	360255.818	437869.342	360255.818	437869.342	Required	
S28	360249.600	437872.305	360249.600	437872.305	Required	
S29	360226.735	437892.369	360226.735	437892.369	Required	
S30	360223.678	437899.685	360223.678	437899.685	Required	
S31	360237.326	437913.745	360237.326	437913.745	Required	
S32	360244.782	437923.780	360244.782	437923.780	Required	
S33	360245.485	437933.033	360245.485	437933.033	Required	
S34	360238.767	437941.908	360238.767	437941.908	Required	
S35	360224.192	437955.546	360224.192	437955.546	Required	
S46	360322.713	437931.499	360322.713	437931.499	Required	
S47	360295.411	437963.229	360295.411	437963.229	Required	

Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S48	360270.802	437994.203	360270.802	437994.203	Required	
S201	360276.515	438011.955	360276.515	438011.955	Required	
S49	360257.044	437996.173	360257.044	437996.173	Required	
S36	360217.700	437967.325	360217.700	437967.325	Required	
S37	360201.357	437959.502	360201.357	437959.502	Required	
S38	360176.634	437947.669	360176.634	437947.669	Required	
S39	360162.109	437950.453	360162.109	437950.453	Required	
S50	360135.634	437966.802	360135.634	437966.802	Required	
S40	360156.707	437954.016	360156.707	437954.016	Required	
S41	360168.694	437966.984	360168.694	437966.984	Required	
S42	360226.103	437999.836	360226.103	437999.836	Required	
S43	360266.544	438047.879	360266.544	438047.879	Required	
S44	360268.430	438074.482	360268.430	438074.482	Required	
S45	360239.322	438100.823	360239.322	438100.823	Required	
S12	360212.023	438121.115	360212.023	438121.115	Required	

Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S13	360176.651	438148.554	360176.651	438148.554	Required	
S14	360175.816	438157.429			No Entry	

STORM SEWER DESIGN

Rainfall Simulation

1:1 year event

Simulation Criteria for Surface Network 1

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Storage Structures	1
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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)	18.800	Storm Duration (mins)	30
Ratio R	0.281		

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	2.000
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 Storage Structures	1
Number of Online Controls	2	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 0.281
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.800	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, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1
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	1	+0%					103.084
1.001	S2	60 Winter	1	+0%					102.832
2.000	S15	15 Winter	1	+0%					104.931
2.001	S16	15 Winter	1	+0%					104.768
2.002	S17	15 Winter	1	+0%					104.383
2.003	S18	15 Winter	1	+0%					104.334
1.002	S3	60 Winter	1	+0%					102.832
3.000	S19	15 Winter	1	+0%					104.054
3.001	S20	15 Winter	1	+0%					103.746
1.003	S4	60 Winter	1	+0%					102.832
1.004	S5	60 Winter	1	+0%					102.832
1.005	S6	60 Winter	1	+0%					102.832
1.006	S7	60 Winter	1	+0%					102.832
1.007	S8	60 Winter	1	+0%					102.832
1.008	S9	60 Winter	1	+0%					102.832
4.000	S21	15 Winter	1	+0%					104.284
4.001	S22	15 Winter	1	+0%					103.442
1.009	S10	60 Winter	1	+0%					102.832
1.010	S11	60 Winter	1	+0%					102.832
5.000	S23	15 Winter	1	+0%					108.208

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1	-1.122	0.000	0.01			20.0	OK	
1.001	S2	-1.287	0.000	0.01			14.0	OK	
2.000	S15	-0.159	0.000	0.19			6.9	OK	
2.001	S16	-0.169	0.000	0.14			8.4	OK	
2.002	S17	-0.125	0.000	0.41			13.4	OK	
2.003	S18	-0.117	0.000	0.47			24.6	OK	
1.002	S3	-1.259	0.000	0.03			32.8	OK	
3.000	S19	-0.223	0.000	0.15			10.4	OK	
3.001	S20	-0.350	0.000	0.11			11.4	OK	
1.003	S4	-1.233	0.000	0.02			41.0	OK	
1.004	S5	-1.191	0.000	0.03			44.0	OK	
1.005	S6	-1.152	0.000	0.04			43.6	OK	
1.006	S7	-1.129	0.000	0.02			43.0	OK	
1.007	S8	-1.086	0.000	0.04			44.7	OK	
1.008	S9	-1.064	0.000	0.02			47.4	OK	
4.000	S21	-0.183	0.000	0.08			5.1	OK	
4.001	S22	-0.428	0.000	0.08			15.4	OK	
1.009	S10	-0.970	0.000	0.02			46.2	OK	
1.010	S11	-0.890	0.000	0.02			36.7	OK	
5.000	S23	-0.189	0.000	0.06			4.4	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
5.001	S24	15 Winter	1	+0%					107.561
5.002	S25	15 Winter	1	+0%					106.881
5.003	S26	15 Winter	1	+0%					106.690
6.000	S105	15 Winter	1	+0%					111.197
6.001	S106	15 Winter	1	+0%					109.704
7.000	S101	15 Winter	1	+0%					108.615
8.000	S102	15 Winter	1	+0%					110.700
7.001	S103	15 Winter	1	+0%					108.203
7.002	S104	15 Winter	1	+0%					107.440
6.002	S107	15 Winter	1	+0%					107.266
6.003	S108	15 Winter	1	+0%					107.069
6.004	S109	15 Winter	1	+0%					106.892
6.005	S109A	15 Winter	1	+0%					106.864
6.006	S110	15 Winter	1	+0%	1/15 Summer				106.855
5.004	S27	15 Winter	1	+0%					106.452
5.005	S28	15 Winter	1	+0%					106.353
5.006	S29	15 Winter	1	+0%					106.085
5.007	S30	15 Winter	1	+0%					105.938
5.008	S31	15 Winter	1	+0%					105.608
5.009	S32	30 Winter	1	+0%					105.489
5.010	S33	30 Winter	1	+0%					105.452
5.011	S34	30 Winter	1	+0%					105.322
5.012	S35	30 Winter	1	+0%					105.182
9.000	S46	15 Winter	1	+0%					108.484
9.001	S47	15 Winter	1	+0%					107.278
9.002	S48	15 Winter	1	+0%					105.921
10.000	S201	15 Winter	1	+0%					105.443
9.003	S49	15 Winter	1	+0%					105.330
5.013	S36	30 Winter	1	+0%					104.367
5.014	S37	30 Winter	1	+0%					104.324
5.015	S38	30 Winter	1	+0%					104.272
5.016	S39	30 Winter	1	+0%					104.224
11.000	S50	15 Winter	1	+0%					104.439
5.017	S40	30 Winter	1	+0%					104.182
5.018	S41	30 Winter	1	+0%					103.993
5.019	S42	30 Winter	1	+0%					103.831
5.020	S43	60 Winter	1	+0%					102.835
5.021	S44	60 Winter	1	+0%					102.834
5.022	S45	60 Winter	1	+0%					102.833
1.011	S12	60 Winter	1	+0%					102.832
1.012	S13	60 Winter	1	+0%	1/15 Summer				102.830

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
5.001	S24	-0.173	0.000	0.12			9.7	OK	
5.002	S25	-0.165	0.000	0.16			9.8	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
5.003	S26	-0.159	0.000	0.19			9.9	OK	
6.000	S105	-0.187	0.000	0.07			6.5	OK	
6.001	S106	-0.169	0.000	0.14			12.8	OK	
7.000	S101	-0.160	0.000	0.18			8.9	OK	
8.000	S102	-0.175	0.000	0.11			11.9	OK	
7.001	S103	-0.178	0.000	0.35			28.9	OK	
7.002	S104	-0.637	0.000	0.05			37.6	OK	
6.002	S107	-0.616	0.000	0.07			51.3	OK	
6.003	S108	-0.613	0.000	0.08			59.6	OK	
6.004	S109	-0.544	0.000	0.13			59.5	OK	
6.005	S109A	-0.516	0.000	0.07			62.9	OK	
6.006	S110	0.110	0.000	0.40			55.2	SURCHARGED	
5.004	S27	-0.258	0.000	0.38			63.6	OK	
5.005	S28	-0.304	0.000	0.23			65.1	OK	
5.006	S29	-0.255	0.000	0.39			66.5	OK	
5.007	S30	-0.311	0.000	0.21			68.5	OK	
5.008	S31	-0.303	0.000	0.23			68.5	OK	
5.009	S32	-0.150	0.000	0.77			73.0	OK	
5.010	S33	-0.164	0.000	0.73			73.1	OK	
5.011	S34	-0.266	0.000	0.35			74.0	OK	
5.012	S35	-0.267	0.000	0.35			77.4	OK	
9.000	S46	-0.189	0.000	0.06			5.1	OK	
9.001	S47	-0.164	0.000	0.16			14.9	OK	
9.002	S48	-0.157	0.000	0.20			19.0	OK	
10.000	S201	-0.307	0.000	0.07			9.5	OK	
9.003	S49	-0.285	0.000	0.13			37.2	OK	
5.013	S36	-0.099	0.000	0.83			100.7	OK	
5.014	S37	-0.097	0.000	0.74			102.0	OK	
5.015	S38	-0.080	0.000	0.99			105.0	OK	
5.016	S39	-0.091	0.000	0.99			105.3	OK	
11.000	S50	-0.185	0.000	0.07			3.9	OK	
5.017	S40	-0.116	0.000	0.90			107.2	OK	
5.018	S41	-0.261	0.000	0.50			109.8	OK	
5.019	S42	-0.258	0.000	0.51			112.7	OK	
5.020	S43	-1.097	0.000	0.05			102.6	OK	
5.021	S44	-1.031	0.000	0.04			95.8	OK	
5.022	S45	-0.934	0.000	0.03			85.5	OK	
1.011	S12	-0.850	0.000	0.03			74.7	OK	
1.012	S13	0.437	0.000	0.81			49.9	SURCHARGED	

STORM SEWER DESIGN

Rainfall Simulation

1:30 year event

Simulation Criteria for Surface Network 1

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Storage Structures	1
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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)	18.800	Storm Duration (mins)	30
Ratio R	0.281		

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	2.000
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 Storage Structures	1
Number of Online Controls	2	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 0.281
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)		18.800 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, 2160, 2880, 4320, 5760, 7200, 8640, 10080
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	180 Winter	30	+0%					103.683
1.001	S2	180 Winter	30	+0%					103.683
2.000	S15	15 Winter	30	+0%					104.973
2.001	S16	15 Winter	30	+0%					104.805
2.002	S17	15 Winter	30	+0%	30/15 Summer				104.654
2.003	S18	15 Winter	30	+0%	30/15 Summer				104.597
1.002	S3	180 Winter	30	+0%					103.683
3.000	S19	15 Winter	30	+0%					104.102
3.001	S20	15 Winter	30	+0%					103.808
1.003	S4	180 Winter	30	+0%					103.683
1.004	S5	180 Winter	30	+0%					103.683
1.005	S6	180 Winter	30	+0%					103.683
1.006	S7	180 Winter	30	+0%					103.683
1.007	S8	180 Winter	30	+0%					103.683
1.008	S9	180 Winter	30	+0%					103.683
4.000	S21	15 Winter	30	+0%					104.309
4.001	S22	180 Winter	30	+0%					103.683
1.009	S10	180 Winter	30	+0%					103.683
1.010	S11	180 Winter	30	+0%					103.682
5.000	S23	15 Winter	30	+0%					108.230

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1	-0.523	0.000	0.01			14.1	OK	
1.001	S2	-0.436	0.000	0.01			15.2	OK	
2.000	S15	-0.117	0.000	0.46			16.7	OK	
2.001	S16	-0.132	0.000	0.35			21.3	OK	
2.002	S17	0.146	0.000	1.05			34.4	SURCHARGED	
2.003	S18	0.146	0.000	1.18			62.3	SURCHARGED	
1.002	S3	-0.408	0.000	0.03			33.9	OK	
3.000	S19	-0.175	0.000	0.36			25.5	OK	
3.001	S20	-0.288	0.000	0.28			28.4	OK	
1.003	S4	-0.382	0.000	0.02			39.7	OK	
1.004	S5	-0.340	0.000	0.02			38.1	OK	
1.005	S6	-0.301	0.000	0.03			34.4	OK	
1.006	S7	-0.278	0.000	0.02			31.9	OK	
1.007	S8	-0.235	0.000	0.03			31.7	OK	
1.008	S9	-0.213	0.000	0.01			33.4	OK	
4.000	S21	-0.158	0.000	0.19			12.6	OK	
4.001	S22	-0.187	0.000	0.06			12.3	OK	
1.009	S10	-0.119	0.000	0.01			31.0	OK	
1.010	S11	-0.040	0.000	0.02			27.6	OK	
5.000	S23	-0.167	0.000	0.15			10.7	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
5.001	S24	15 Winter	30	+0%					107.600
5.002	S25	15 Winter	30	+0%					106.925
5.003	S26	15 Winter	30	+0%					106.739
6.000	S105	15 Winter	30	+0%					111.219
6.001	S106	15 Winter	30	+0%					109.745
7.000	S101	15 Winter	30	+0%					108.656
8.000	S102	15 Winter	30	+0%					110.730
7.001	S103	15 Winter	30	+0%					108.305
7.002	S104	15 Winter	30	+0%					107.518
6.002	S107	15 Winter	30	+0%					107.360
6.003	S108	30 Winter	30	+0%					107.317
6.004	S109	30 Winter	30	+0%					107.306
6.005	S109A	30 Winter	30	+0%					107.296
6.006	S110	30 Winter	30	+0%	30/15 Summer				107.283
5.004	S27	15 Winter	30	+0%					106.547
5.005	S28	15 Winter	30	+0%					106.419
5.006	S29	15 Winter	30	+0%					106.188
5.007	S30	15 Winter	30	+0%					106.002
5.008	S31	15 Winter	30	+0%					105.703
5.009	S32	15 Winter	30	+0%	30/15 Summer				105.662
5.010	S33	120 Summer	30	+0%					105.616
5.011	S34	15 Winter	30	+0%					105.426
5.012	S35	15 Winter	30	+0%					105.289
9.000	S46	15 Winter	30	+0%					108.506
9.001	S47	15 Winter	30	+0%					107.325
9.002	S48	15 Winter	30	+0%					105.976
10.000	S201	15 Winter	30	+0%					105.484
9.003	S49	15 Winter	30	+0%					105.398
5.013	S36	30 Winter	30	+0%	30/15 Summer				105.211
5.014	S37	30 Winter	30	+0%	30/15 Summer				105.059
5.015	S38	30 Winter	30	+0%	30/15 Summer				104.879
5.016	S39	30 Winter	30	+0%	30/15 Summer				104.705
11.000	S50	30 Winter	30	+0%					104.538
5.017	S40	30 Winter	30	+0%	30/15 Summer				104.528
5.018	S41	30 Winter	30	+0%	30/15 Winter				104.342
5.019	S42	30 Winter	30	+0%	30/15 Winter				104.127
5.020	S43	180 Winter	30	+0%					103.691
5.021	S44	180 Winter	30	+0%					103.689
5.022	S45	180 Winter	30	+0%					103.686
1.011	S12	180 Winter	30	+0%					103.681
1.012	S13	180 Winter	30	+0%	30/15 Summer				103.650

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
5.001	S24	-0.134	0.000	0.34			27.3	OK	
5.002	S25	-0.121	0.000	0.43			27.1	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
5.003	S26	-0.110	0.000	0.51			26.9	OK	
6.000	S105	-0.165	0.000	0.16			15.9	OK	
6.001	S106	-0.128	0.000	0.38			35.5	OK	
7.000	S101	-0.119	0.000	0.44			21.7	OK	
8.000	S102	-0.145	0.000	0.27			29.2	OK	
7.001	S103	-0.076	0.000	0.90			75.1	OK	
7.002	S104	-0.559	0.000	0.14			100.0	OK	
6.002	S107	-0.522	0.000	0.20			139.2	OK	
6.003	S108	-0.365	0.000	0.16			123.0	OK	
6.004	S109	-0.130	0.000	0.22			98.7	OK	
6.005	S109A	-0.084	0.000	0.11			103.8	OK	
6.006	S110	0.538	0.000	0.72			99.6	SURCHARGED	
5.004	S27	-0.163	0.000	0.73			122.7	OK	
5.005	S28	-0.238	0.000	0.45			127.3	OK	
5.006	S29	-0.152	0.000	0.77			131.1	OK	
5.007	S30	-0.247	0.000	0.42			137.4	OK	
5.008	S31	-0.208	0.000	0.47			136.9	OK	
5.009	S32	0.023	0.000	1.61			151.4	SURCHARGED	
5.010	S33	0.000	0.000	1.11			111.7	OK	
5.011	S34	-0.162	0.000	0.73			153.6	OK	
5.012	S35	-0.160	0.000	0.74			164.5	OK	
9.000	S46	-0.167	0.000	0.15			12.6	OK	
9.001	S47	-0.117	0.000	0.46			42.3	OK	
9.002	S48	-0.102	0.000	0.57			54.8	OK	
10.000	S201	-0.266	0.000	0.18			23.2	OK	
9.003	S49	-0.217	0.000	0.36			102.7	OK	
5.013	S36	0.745	0.000	1.87			225.7	SURCHARGED	
5.014	S37	0.638	0.000	1.68			229.7	SURCHARGED	
5.015	S38	0.527	0.000	2.25			239.7	SURCHARGED	
5.016	S39	0.390	0.000	2.26			239.6	SURCHARGED	
11.000	S50	-0.086	0.000	0.14			8.0	OK	
5.017	S40	0.230	0.000	2.05			243.7	SURCHARGED	
5.018	S41	0.088	0.000	1.14			251.5	SURCHARGED	
5.019	S42	0.038	0.000	1.18			260.1	SURCHARGED	
5.020	S43	-0.241	0.000	0.06			147.0	OK	
5.021	S44	-0.176	0.000	0.05			133.5	OK	
5.022	S45	-0.081	0.000	0.05			119.9	OK	
1.011	S12	-0.001	0.000	0.03			72.2	OK	
1.012	S13	1.257	0.000	0.81			49.9	SURCHARGED	

STORM SEWER DESIGN

Rainfall Simulation

1:30 year event with Surcharged Outfall

Surcharged Outfall Details for Surface Network 1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.012	S14	102.473	102.040	0.000	600	0

Datum (m) 101.560 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	1.000	42	1.000	83	1.000	124	1.000	165	1.000	206	1.000
2	1.000	43	1.000	84	1.000	125	1.000	166	1.000	207	1.000
3	1.000	44	1.000	85	1.000	126	1.000	167	1.000	208	1.000
4	1.000	45	1.000	86	1.000	127	1.000	168	1.000	209	1.000
5	1.000	46	1.000	87	1.000	128	1.000	169	1.000	210	1.000
6	1.000	47	1.000	88	1.000	129	1.000	170	1.000	211	1.000
7	1.000	48	1.000	89	1.000	130	1.000	171	1.000	212	1.000
8	1.000	49	1.000	90	1.000	131	1.000	172	1.000	213	1.000
9	1.000	50	1.000	91	1.000	132	1.000	173	1.000	214	1.000
10	1.000	51	1.000	92	1.000	133	1.000	174	1.000	215	1.000
11	1.000	52	1.000	93	1.000	134	1.000	175	1.000	216	1.000
12	1.000	53	1.000	94	1.000	135	1.000	176	1.000	217	1.000
13	1.000	54	1.000	95	1.000	136	1.000	177	1.000	218	1.000
14	1.000	55	1.000	96	1.000	137	1.000	178	1.000	219	1.000
15	1.000	56	1.000	97	1.000	138	1.000	179	1.000	220	1.000
16	1.000	57	1.000	98	1.000	139	1.000	180	1.000	221	1.000
17	1.000	58	1.000	99	1.000	140	1.000	181	1.000	222	1.000
18	1.000	59	1.000	100	1.000	141	1.000	182	1.000	223	1.000
19	1.000	60	1.000	101	1.000	142	1.000	183	1.000	224	1.000
20	1.000	61	1.000	102	1.000	143	1.000	184	1.000	225	1.000
21	1.000	62	1.000	103	1.000	144	1.000	185	1.000	226	1.000
22	1.000	63	1.000	104	1.000	145	1.000	186	1.000	227	1.000
23	1.000	64	1.000	105	1.000	146	1.000	187	1.000	228	1.000
24	1.000	65	1.000	106	1.000	147	1.000	188	1.000	229	1.000
25	1.000	66	1.000	107	1.000	148	1.000	189	1.000	230	1.000
26	1.000	67	1.000	108	1.000	149	1.000	190	1.000	231	1.000
27	1.000	68	1.000	109	1.000	150	1.000	191	1.000	232	1.000
28	1.000	69	1.000	110	1.000	151	1.000	192	1.000	233	1.000
29	1.000	70	1.000	111	1.000	152	1.000	193	1.000	234	1.000
30	1.000	71	1.000	112	1.000	153	1.000	194	1.000	235	1.000
31	1.000	72	1.000	113	1.000	154	1.000	195	1.000	236	1.000
32	1.000	73	1.000	114	1.000	155	1.000	196	1.000	237	1.000
33	1.000	74	1.000	115	1.000	156	1.000	197	1.000	238	1.000
34	1.000	75	1.000	116	1.000	157	1.000	198	1.000	239	1.000
35	1.000	76	1.000	117	1.000	158	1.000	199	1.000	240	1.000
36	1.000	77	1.000	118	1.000	159	1.000	200	1.000	241	1.000
37	1.000	78	1.000	119	1.000	160	1.000	201	1.000	242	1.000
38	1.000	79	1.000	120	1.000	161	1.000	202	1.000	243	1.000
39	1.000	80	1.000	121	1.000	162	1.000	203	1.000	244	1.000
40	1.000	81	1.000	122	1.000	163	1.000	204	1.000	245	1.000
41	1.000	82	1.000	123	1.000	164	1.000	205	1.000	246	1.000

Surcharged Outfall Details for Surface Network 1

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
247	1.000	266	1.000	285	1.000	304	1.000	323	1.000	342	1.000
248	1.000	267	1.000	286	1.000	305	1.000	324	1.000	343	1.000
249	1.000	268	1.000	287	1.000	306	1.000	325	1.000	344	1.000
250	1.000	269	1.000	288	1.000	307	1.000	326	1.000	345	1.000
251	1.000	270	1.000	289	1.000	308	1.000	327	1.000	346	1.000
252	1.000	271	1.000	290	1.000	309	1.000	328	1.000	347	1.000
253	1.000	272	1.000	291	1.000	310	1.000	329	1.000	348	1.000
254	1.000	273	1.000	292	1.000	311	1.000	330	1.000	349	1.000
255	1.000	274	1.000	293	1.000	312	1.000	331	1.000	350	1.000
256	1.000	275	1.000	294	1.000	313	1.000	332	1.000	351	1.000
257	1.000	276	1.000	295	1.000	314	1.000	333	1.000	352	1.000
258	1.000	277	1.000	296	1.000	315	1.000	334	1.000	353	1.000
259	1.000	278	1.000	297	1.000	316	1.000	335	1.000	354	1.000
260	1.000	279	1.000	298	1.000	317	1.000	336	1.000	355	1.000
261	1.000	280	1.000	299	1.000	318	1.000	337	1.000	356	1.000
262	1.000	281	1.000	300	1.000	319	1.000	338	1.000	357	1.000
263	1.000	282	1.000	301	1.000	320	1.000	339	1.000	358	1.000
264	1.000	283	1.000	302	1.000	321	1.000	340	1.000	359	1.000
265	1.000	284	1.000	303	1.000	322	1.000	341	1.000	360	1.000

Simulation Criteria for Surface Network 1

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Storage Structures	1
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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)	18.800	Storm Duration (mins)	30
Ratio R	0.281		

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	2.000
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 Storage Structures	1
Number of Online Controls	2	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 0.281
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)		18.800	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, 2160, 2880, 4320, 5760, 7200, 8640, 10080
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	180 Winter	30	+0%					103.714
1.001	S2	180 Winter	30	+0%					103.714
2.000	S15	15 Winter	30	+0%					104.973
2.001	S16	15 Winter	30	+0%					104.805
2.002	S17	15 Winter	30	+0%	30/15 Summer				104.654
2.003	S18	15 Winter	30	+0%	30/15 Summer				104.597
1.002	S3	180 Winter	30	+0%					103.714
3.000	S19	15 Winter	30	+0%					104.102
3.001	S20	15 Winter	30	+0%					103.808
1.003	S4	180 Winter	30	+0%					103.714
1.004	S5	180 Winter	30	+0%					103.714
1.005	S6	180 Winter	30	+0%					103.714
1.006	S7	180 Winter	30	+0%					103.714
1.007	S8	180 Winter	30	+0%					103.714
1.008	S9	180 Winter	30	+0%					103.714
4.000	S21	15 Winter	30	+0%					104.309
4.001	S22	180 Winter	30	+0%					103.713
1.009	S10	180 Winter	30	+0%					103.713
1.010	S11	180 Winter	30	+0%					103.711
5.000	S23	15 Winter	30	+0%					108.230

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1	-0.492	0.000	0.01			13.0	OK	
1.001	S2	-0.405	0.000	0.01			12.8	OK	
2.000	S15	-0.117	0.000	0.46			16.7	OK	
2.001	S16	-0.132	0.000	0.35			21.3	OK	
2.002	S17	0.146	0.000	1.05			34.4	SURCHARGED	
2.003	S18	0.146	0.000	1.18			62.3	SURCHARGED	
1.002	S3	-0.377	0.000	0.02			29.6	OK	
3.000	S19	-0.175	0.000	0.36			25.5	OK	
3.001	S20	-0.288	0.000	0.28			28.4	OK	
1.003	S4	-0.351	0.000	0.02			34.6	OK	
1.004	S5	-0.309	0.000	0.02			31.3	OK	
1.005	S6	-0.270	0.000	0.02			24.7	OK	
1.006	S7	-0.247	0.000	0.01			21.2	OK	
1.007	S8	-0.204	0.000	0.02			19.4	OK	
1.008	S9	-0.182	0.000	0.01			20.6	OK	
4.000	S21	-0.158	0.000	0.19			12.6	OK	
4.001	S22	-0.157	0.000	0.06			12.3	OK	
1.009	S10	-0.089	0.000	0.01			27.1	OK	
1.010	S11	-0.011	0.000	0.02			31.7	OK	
5.000	S23	-0.167	0.000	0.15			10.7	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
5.001	S24	15 Winter	30	+0%					107.600
5.002	S25	15 Winter	30	+0%					106.925
5.003	S26	15 Winter	30	+0%					106.739
6.000	S105	15 Winter	30	+0%					111.219
6.001	S106	15 Winter	30	+0%					109.745
7.000	S101	15 Winter	30	+0%					108.656
8.000	S102	15 Winter	30	+0%					110.730
7.001	S103	15 Winter	30	+0%					108.305
7.002	S104	15 Winter	30	+0%					107.518
6.002	S107	15 Winter	30	+0%					107.360
6.003	S108	30 Winter	30	+0%					107.317
6.004	S109	30 Winter	30	+0%					107.306
6.005	S109A	30 Winter	30	+0%					107.296
6.006	S110	30 Winter	30	+0%	30/15 Summer				107.283
5.004	S27	15 Winter	30	+0%					106.547
5.005	S28	15 Winter	30	+0%					106.419
5.006	S29	15 Winter	30	+0%					106.188
5.007	S30	15 Winter	30	+0%					106.002
5.008	S31	15 Winter	30	+0%					105.703
5.009	S32	15 Winter	30	+0%	30/15 Summer				105.662
5.010	S33	120 Summer	30	+0%					105.616
5.011	S34	15 Winter	30	+0%					105.426
5.012	S35	15 Winter	30	+0%					105.289
9.000	S46	15 Winter	30	+0%					108.506
9.001	S47	15 Winter	30	+0%					107.325
9.002	S48	15 Winter	30	+0%					105.976
10.000	S201	15 Winter	30	+0%					105.484
9.003	S49	15 Winter	30	+0%					105.398
5.013	S36	30 Winter	30	+0%	30/15 Summer				105.211
5.014	S37	30 Winter	30	+0%	30/15 Summer				105.059
5.015	S38	30 Winter	30	+0%	30/15 Summer				104.879
5.016	S39	30 Winter	30	+0%	30/15 Summer				104.705
11.000	S50	30 Winter	30	+0%					104.538
5.017	S40	30 Winter	30	+0%	30/15 Summer				104.528
5.018	S41	30 Winter	30	+0%	30/15 Winter				104.342
5.019	S42	30 Winter	30	+0%	30/15 Winter				104.127
5.020	S43	180 Winter	30	+0%					103.731
5.021	S44	180 Winter	30	+0%					103.728
5.022	S45	180 Winter	30	+0%					103.721
1.011	S12	180 Winter	30	+0%	30/120 Winter				103.706
1.012	S13	180 Winter	30	+0%	30/15 Summer				103.704

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
5.001	S24	-0.134	0.000	0.34			27.3	OK	
5.002	S25	-0.121	0.000	0.43			27.1	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
5.003	S26	-0.110	0.000	0.51			26.9	OK	
6.000	S105	-0.165	0.000	0.16			15.9	OK	
6.001	S106	-0.128	0.000	0.38			35.5	OK	
7.000	S101	-0.119	0.000	0.44			21.7	OK	
8.000	S102	-0.145	0.000	0.27			29.2	OK	
7.001	S103	-0.076	0.000	0.90			75.1	OK	
7.002	S104	-0.559	0.000	0.14			100.0	OK	
6.002	S107	-0.522	0.000	0.20			139.2	OK	
6.003	S108	-0.365	0.000	0.16			123.0	OK	
6.004	S109	-0.130	0.000	0.22			98.7	OK	
6.005	S109A	-0.084	0.000	0.11			103.8	OK	
6.006	S110	0.538	0.000	0.72			99.6	SURCHARGED	
5.004	S27	-0.163	0.000	0.73			122.7	OK	
5.005	S28	-0.238	0.000	0.45			127.3	OK	
5.006	S29	-0.152	0.000	0.77			131.1	OK	
5.007	S30	-0.247	0.000	0.42			137.4	OK	
5.008	S31	-0.208	0.000	0.47			136.9	OK	
5.009	S32	0.023	0.000	1.61			151.4	SURCHARGED	
5.010	S33	0.000	0.000	1.11			111.7	OK	
5.011	S34	-0.162	0.000	0.73			153.6	OK	
5.012	S35	-0.160	0.000	0.74			164.5	OK	
9.000	S46	-0.167	0.000	0.15			12.6	OK	
9.001	S47	-0.117	0.000	0.46			42.3	OK	
9.002	S48	-0.102	0.000	0.57			54.8	OK	
10.000	S201	-0.266	0.000	0.18			23.2	OK	
9.003	S49	-0.217	0.000	0.36			102.7	OK	
5.013	S36	0.745	0.000	1.87			225.7	SURCHARGED	
5.014	S37	0.638	0.000	1.68			229.7	SURCHARGED	
5.015	S38	0.527	0.000	2.25			239.7	SURCHARGED	
5.016	S39	0.390	0.000	2.26			239.6	SURCHARGED	
11.000	S50	-0.086	0.000	0.14			8.0	OK	
5.017	S40	0.230	0.000	2.05			243.7	SURCHARGED	
5.018	S41	0.088	0.000	1.14			251.5	SURCHARGED	
5.019	S42	0.038	0.000	1.18			260.1	SURCHARGED	
5.020	S43	-0.201	0.000	0.06			147.1	OK	
5.021	S44	-0.137	0.000	0.05			133.8	OK	
5.022	S45	-0.046	0.000	0.05			121.7	OK	
1.011	S12	0.024	0.000	0.05			113.5	SURCHARGED	
1.012	S13	1.311	0.000	0.81			49.9	SURCHARGED	

STORM SEWER DESIGN

Rainfall Simulation

1:100 year event +30% Climate Change

Simulation Criteria for Surface Network 1

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Storage Structures	1
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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)	18.800	Storm Duration (mins)	30
Ratio R	0.281		

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	2.000
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 Storage Structures	1
Number of Online Controls	2	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 0.281
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.800	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, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100
Climate Change (%)	30

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	240 Winter	100	+30%					104.157
1.001	S2	240 Winter	100	+30%	100/180 Winter				104.157
2.000	S15	15 Winter	100	+30%	100/15 Summer				105.421
2.001	S16	15 Winter	100	+30%	100/15 Summer				105.360
2.002	S17	15 Winter	100	+30%	100/15 Summer				105.276
2.003	S18	15 Winter	100	+30%	100/15 Summer				105.168
1.002	S3	240 Winter	100	+30%	100/120 Winter				104.156
3.000	S19	240 Winter	100	+30%					104.158
3.001	S20	240 Winter	100	+30%	100/120 Winter				104.157
1.003	S4	240 Winter	100	+30%	100/120 Winter				104.156
1.004	S5	240 Winter	100	+30%	100/120 Winter				104.157
1.005	S6	240 Winter	100	+30%	100/120 Winter				104.157
1.006	S7	240 Winter	100	+30%	100/120 Summer				104.157
1.007	S8	240 Winter	100	+30%	100/60 Winter				104.157
1.008	S9	240 Winter	100	+30%	100/60 Winter				104.157
4.000	S21	15 Winter	100	+30%					104.330
4.001	S22	240 Winter	100	+30%	100/60 Winter				104.157
1.009	S10	240 Winter	100	+30%	100/60 Summer				104.157
1.010	S11	240 Winter	100	+30%	100/30 Winter				104.157
5.000	S23	15 Winter	100	+30%					108.249

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1	-0.049	0.000	0.01			17.9	OK	
1.001	S2	0.038	0.000	0.01			14.8	SURCHARGED	
2.000	S15	0.331	0.000	0.65			23.9	SURCHARGED	
2.001	S16	0.423	0.000	0.53			32.5	SURCHARGED	
2.002	S17	0.768	0.000	1.48			48.6	SURCHARGED	
2.003	S18	0.717	0.000	1.72			90.6	SURCHARGED	
1.002	S3	0.065	0.000	0.03			42.3	SURCHARGED	
3.000	S19	-0.119	0.000	0.15			10.4	OK	
3.001	S20	0.061	0.000	0.11			11.5	SURCHARGED	
1.003	S4	0.091	0.000	0.03			53.1	SURCHARGED	
1.004	S5	0.134	0.000	0.03			53.0	SURCHARGED	
1.005	S6	0.173	0.000	0.04			48.3	SURCHARGED	
1.006	S7	0.196	0.000	0.03			45.5	SURCHARGED	
1.007	S8	0.239	0.000	0.04			47.0	SURCHARGED	
1.008	S9	0.261	0.000	0.02			51.6	SURCHARGED	
4.000	S21	-0.137	0.000	0.32			21.2	OK	
4.001	S22	0.287	0.000	0.08			16.2	SURCHARGED	
1.009	S10	0.355	0.000	0.03			60.5	SURCHARGED	
1.010	S11	0.435	0.000	0.04			60.5	SURCHARGED	
5.000	S23	-0.148	0.000	0.25			17.9	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
5.001	S24	15 Winter	100	+30%					107.632
5.002	S25	30 Winter	100	+30%	100/30 Winter				107.047
5.003	S26	30 Winter	100	+30%	100/30 Winter				107.029
6.000	S105	15 Winter	100	+30%					111.239
6.001	S106	15 Winter	100	+30%					109.780
7.000	S101	15 Winter	100	+30%	100/15 Summer				108.856
8.000	S102	15 Winter	100	+30%					110.757
7.001	S103	15 Winter	100	+30%	100/15 Summer				108.655
7.002	S104	30 Winter	100	+30%	100/30 Winter				108.210
6.002	S107	30 Winter	100	+30%	100/15 Winter				108.201
6.003	S108	30 Winter	100	+30%	100/15 Summer				108.189
6.004	S109	30 Winter	100	+30%	100/15 Summer				108.174
6.005	S109A	30 Winter	100	+30%	100/15 Summer				108.161
6.006	S110	30 Winter	100	+30%	100/15 Summer				108.143
5.004	S27	30 Winter	100	+30%	100/15 Winter				107.012
5.005	S28	30 Winter	100	+30%	100/15 Winter				106.970
5.006	S29	30 Winter	100	+30%	100/15 Summer				106.864
5.007	S30	30 Winter	100	+30%	100/15 Summer				106.814
5.008	S31	30 Winter	100	+30%	100/15 Summer				106.719
5.009	S32	30 Winter	100	+30%	100/15 Summer				106.647
5.010	S33	30 Winter	100	+30%	100/15 Summer				106.540
5.011	S34	30 Winter	100	+30%	100/15 Summer				106.435
5.012	S35	30 Winter	100	+30%	100/15 Summer				106.327
9.000	S46	15 Winter	100	+30%					108.525
9.001	S47	15 Winter	100	+30%					107.368
9.002	S48	30 Winter	100	+30%	100/15 Summer				106.493
10.000	S201	30 Winter	100	+30%	100/15 Summer				106.335
9.003	S49	30 Winter	100	+30%	100/15 Summer				106.321
5.013	S36	30 Winter	100	+30%	100/15 Summer				106.205
5.014	S37	30 Winter	100	+30%	100/15 Summer				105.952
5.015	S38	30 Winter	100	+30%	100/15 Summer				105.638
5.016	S39	30 Winter	100	+30%	100/15 Summer				105.339
11.000	S50	30 Winter	100	+30%	100/15 Summer				105.056
5.017	S40	30 Winter	100	+30%	100/15 Summer				105.037
5.018	S41	30 Winter	100	+30%	100/15 Summer				104.717
5.019	S42	30 Winter	100	+30%	100/15 Summer				104.324
5.020	S43	240 Winter	100	+30%	100/60 Winter				104.160
5.021	S44	240 Winter	100	+30%	100/60 Winter				104.159
5.022	S45	240 Winter	100	+30%	100/30 Winter				104.158
1.011	S12	240 Winter	100	+30%	100/30 Summer				104.157
1.012	S13	240 Winter	100	+30%	100/15 Summer				104.156

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
5.001	S24	-0.102	0.000	0.57			45.7	OK	
5.002	S25	0.001	0.000	0.59			37.3	SURCHARGED	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
5.003	S26	0.180	0.000	0.71			37.4	SURCHARGED	
6.000	S105	-0.145	0.000	0.27			26.6	OK	
6.001	S106	-0.093	0.000	0.64			59.5	OK	
7.000	S101	0.081	0.000	0.70			34.6	SURCHARGED	
8.000	S102	-0.118	0.000	0.45			49.0	OK	
7.001	S103	0.274	0.000	1.39			115.9	SURCHARGED	
7.002	S104	0.133	0.000	0.18			126.6	SURCHARGED	
6.002	S107	0.319	0.000	0.23			162.4	SURCHARGED	
6.003	S108	0.507	0.000	0.20			158.4	SURCHARGED	
6.004	S109	0.738	0.000	0.27			122.9	SURCHARGED	
6.005	S109A	0.781	0.000	0.16			142.7	SURCHARGED	
6.006	S110	1.398	0.000	0.98			135.2	FLOOD RISK	
5.004	S27	0.302	0.000	1.00			169.0	SURCHARGED	
5.005	S28	0.313	0.000	0.61			172.2	SURCHARGED	
5.006	S29	0.524	0.000	1.01			171.8	SURCHARGED	
5.007	S30	0.565	0.000	0.54			177.4	SURCHARGED	
5.008	S31	0.808	0.000	0.62			180.9	SURCHARGED	
5.009	S32	1.008	0.000	2.01			189.1	SURCHARGED	
5.010	S33	0.924	0.000	1.91			191.9	SURCHARGED	
5.011	S34	0.847	0.000	0.93			196.3	SURCHARGED	
5.012	S35	0.878	0.000	0.92			205.7	SURCHARGED	
9.000	S46	-0.148	0.000	0.25			21.2	OK	
9.001	S47	-0.074	0.000	0.77			71.0	OK	
9.002	S48	0.415	0.000	0.76			72.6	SURCHARGED	
10.000	S201	0.585	0.000	0.22			28.0	SURCHARGED	
9.003	S49	0.706	0.000	0.40			114.6	SURCHARGED	
5.013	S36	1.739	0.000	2.35			283.3	SURCHARGED	
5.014	S37	1.531	0.000	2.13			292.1	SURCHARGED	
5.015	S38	1.286	0.000	2.89			307.3	SURCHARGED	
5.016	S39	1.024	0.000	2.93			310.0	SURCHARGED	
11.000	S50	0.432	0.000	0.20			10.8	SURCHARGED	
5.017	S40	0.739	0.000	2.70			320.9	SURCHARGED	
5.018	S41	0.463	0.000	1.53			337.4	SURCHARGED	
5.019	S42	0.235	0.000	1.62			356.8	SURCHARGED	
5.020	S43	0.228	0.000	0.09			200.0	SURCHARGED	
5.021	S44	0.294	0.000	0.08			195.7	SURCHARGED	
5.022	S45	0.391	0.000	0.08			199.7	SURCHARGED	
1.011	S12	0.475	0.000	0.10			245.5	SURCHARGED	
1.012	S13	1.763	0.000	0.81			49.9	SURCHARGED	

Storm Water Network 2

STORM SEWER DESIGN

Network Design Details (1 in 2 yr), Online Controls & Storage Structures

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 2

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	18.800	Add Flow / Climate Change (%)	0
Ratio R	0.281	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

Network Design Table for Surface Network 2

« - Indicates pipe capacity < flow

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	18.574	0.113	164.4	0.129	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	21.020	0.127	165.5	0.023	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	38.591	0.234	164.9	0.082	0.00	0.0	0.600	o	300	Pipe/Conduit	
2.000	20.496	0.637	32.2	0.052	5.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	20.288	0.630	32.2	0.047	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.002	33.160	1.079	30.7	0.028	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	32.000	0.905	35.4	0.084	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.004	18.105	0.540	33.5	0.031	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.005	21.220	0.633	33.5	0.055	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	5.30	113.750	0.129	0.0	0.0	0.0	1.02	40.4	17.5
1.001	50.00	5.65	113.637	0.152	0.0	0.0	0.0	1.01	40.3	20.6
1.002	50.00	6.18	113.435	0.234	0.0	0.0	0.0	1.22	86.3	31.7
2.000	50.00	5.15	115.622	0.052	0.0	0.0	0.0	2.31	92.0	7.0
2.001	50.00	5.29	114.985	0.099	0.0	0.0	0.0	2.31	92.0	13.4
2.002	50.00	5.53	114.355	0.127	0.0	0.0	0.0	2.37	94.2	17.2
1.003	50.00	6.38	113.201	0.445	0.0	0.0	0.0	2.65	187.5	60.3
1.004	49.71	6.49	112.296	0.476	0.0	0.0	0.0	2.72	192.6	64.1
1.005	49.30	6.62	111.756	0.531	0.0	0.0	0.0	2.72	192.6	70.9

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	26.149	0.972	26.9	0.030	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.007	14.101	0.463	30.5	0.032	0.00	0.0	0.600	o	450	Pipe/Conduit	
3.000	66.749	1.420	47.0	0.081	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.008	11.314	0.343	33.0	0.089	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.009	75.598	2.291	33.0	0.107	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.010	19.351	0.586	33.0	0.150	0.00	0.0	0.600	o	450	Pipe/Conduit	
4.000	20.774	0.472	44.0	0.094	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	31.984	0.727	44.0	0.024	0.00	0.0	0.600	o	150	Pipe/Conduit	
4.002	15.379	0.349	44.1	0.087	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.011	9.311	0.023	404.8	0.000	0.00	0.0	0.600	o	1500	Pipe/Conduit	
5.000	33.973	0.085	399.7	0.120	5.00	0.0	0.600	o	1500	Pipe/Conduit	
5.001	19.633	0.049	400.7	0.096	0.00	0.0	0.600	o	1500	Pipe/Conduit	
1.012	62.392	0.156	399.9	0.058	0.00	0.0	0.600	o	1500	Pipe/Conduit	
1.013	17.480	0.044	397.3	0.054	0.00	0.0	0.600	o	1500	Pipe/Conduit	
1.014	12.998	0.078	166.6	0.000	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)
1.006	48.86	6.76	111.123	0.561	0.0	0.0	0.0	3.04	215.1	74.2
1.007	48.67	6.82	110.001	0.593	0.0	0.0	0.0	3.69	587.6	78.2
3.000	50.00	5.58	112.437	0.081	0.0	0.0	0.0	1.91	76.1	11.0
1.008	48.51	6.88	109.538	0.763	0.0	0.0	0.0	3.55	564.5	100.2
1.009	47.48	7.23	109.194	0.870	0.0	0.0	0.0	3.55	564.4	111.9
1.010	47.23	7.32	105.438	1.020	0.0	0.0	0.0	3.55	564.2	130.5
4.000	50.00	5.23	109.677	0.094	0.0	0.0	0.0	1.52	26.9	12.7
4.001	50.00	5.58	107.728	0.118	0.0	0.0	0.0	1.52	26.9	16.0
4.002	50.00	5.75	105.501	0.205	0.0	0.0	0.0	1.52	26.9«	27.8
1.011	47.02	7.40	103.802	1.225	0.0	0.0	0.0	2.13	3756.4	156.0
5.000	50.00	5.26	103.912	0.120	0.0	0.0	0.0	2.14	3780.6	16.2
5.001	50.00	5.42	103.827	0.216	0.0	0.0	0.0	2.14	3775.9	29.2
1.012	45.73	7.88	103.778	1.499	0.0	0.0	0.0	2.14	3779.3	185.7
1.013	45.39	8.02	103.622	1.553	0.0	0.0	0.0	2.15	3792.1	190.9
1.014	44.85	8.23	103.578	1.553	0.0	0.0	0.0	1.01	40.2«	190.9

Online Controls for Surface Network 2

Depth/Flow Relationship Manhole: S324, DS/PN: 1.014, Volume (m³): 48.8

Invert Level (m) 103.578

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	7.9700	0.800	34.6400	2.000	33.5200	3.800	46.2000
0.200	17.9600	1.000	32.1700	2.200	35.1600	4.200	48.5800
0.300	26.1200	1.200	30.5300	2.400	36.7200	4.600	50.8400
0.400	31.6700	1.400	29.7200	2.600	38.2200	5.000	53.0000
0.500	34.7400	1.600	29.9800	3.000	41.0500		
0.600	35.8600	1.800	31.8000	3.400	43.7000		

Storage Structures for Surface Network 2

Tank or Pond Manhole: S324, DS/PN: 1.014

Invert Level (m) 106.350

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	451.4	0.800	1004.1

STORM SEWER DESIGN

SW Manhole Schedules

Manhole Schedules for Surface Network 2

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S301	116.010	2.260	Open Manhole	1800	1.000	113.750	225				
S302	115.684	2.047	Open Manhole	1800	1.001	113.637	225	1.000	113.637	225	
S303	115.415	1.980	Open Manhole	1800	1.002	113.435	300	1.001	113.510	225	
S304	117.197	1.575	Open Manhole	1350	2.000	115.622	225				
S305	116.721	1.736	Open Manhole	1350	2.001	114.985	225	2.000	114.985	225	
S306	116.084	1.729	Open Manhole	1350	2.002	114.355	225	2.001	114.355	225	
S307	115.067	1.866	Open Manhole	1800	1.003	113.201	300	1.002	113.201	300	
								2.002	113.276	225	
S308	114.042	1.746	Open Manhole	1350	1.004	112.296	300	1.003	112.296	300	
S309	113.576	1.820	Open Manhole	1350	1.005	111.756	300	1.004	111.756	300	
S310	113.216	2.093	Open Manhole	1350	1.006	111.123	300	1.005	111.123	300	
S311	113.012	3.011	Open Manhole	1500	1.007	110.001	450	1.006	110.151	300	
S312	114.027	1.590	Open Manhole	1500	3.000	112.437	225				
S313	113.198	3.660	Open Manhole	1800	1.008	109.538	450	1.007	109.538	450	
								3.000	111.017	225	1254
S314	112.916	3.722	Open Manhole	1800	1.009	109.194	450	1.008	109.195	450	1
S315	111.041	5.603	Open Manhole	1800	1.010	105.438	450	1.009	106.903	450	1465
S316	111.170	1.493	Open Manhole	1350	4.000	109.677	150				
S317	110.773	3.045	Open Manhole	1200	4.001	107.728	150	4.000	109.205	150	1477
S318	110.263	4.762	Open Manhole	1350	4.002	105.501	150	4.001	107.001	150	1500
S319	110.208	6.406	Open Manhole	3000	1.011	103.802	1500	1.010	104.852	450	
								4.002	105.152	150	
S320	109.345	5.433	Open Manhole	3000	5.000	103.912	1500				
S321	109.856	6.029	Open Manhole	3000	5.001	103.827	1500	5.000	103.827	1500	
S322	109.780	6.002	Open Manhole	3000	1.012	103.778	1500	1.011	103.779	1500	1
								5.001	103.778	1500	
S323	107.270	3.648	Open Manhole	3000	1.013	103.622	1500	1.012	103.622	1500	
S324	106.860	3.282	Open Manhole	3000	1.014	103.578	225	1.013	103.578	1500	
S325	103.900	0.400	Open Manhole	0		OUTFALL		1.014	103.500	225	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S301	360511.561	437893.841	360511.561	437893.841	Required	

Manhole Schedules for Surface Network 2

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S302	360496.828	437882.530	360496.828	437882.530	Required	
S303	360484.705	437865.358	360484.705	437865.358	Required	
S304	360540.687	437834.207	360540.687	437834.207	Required	
S305	360524.091	437822.179	360524.091	437822.179	Required	
S306	360503.953	437819.724	360503.953	437819.724	Required	
S307	360472.084	437828.889	360472.084	437828.889	Required	
S308	360441.293	437837.603	360441.293	437837.603	Required	
S309	360429.491	437851.332	360429.491	437851.332	Required	
S310	360424.950	437872.060	360424.950	437872.060	Required	
S311	360414.973	437896.231	360414.973	437896.231	Required	
S312	360465.454	437958.539	360465.454	437958.539	Required	
S313	360426.523	437904.320	360426.523	437904.320	Required	
S314	360420.446	437913.864	360420.446	437913.864	Required	
S315	360379.843	437977.633	360379.843	437977.633	Required	
S316	360422.942	438021.553	360422.942	438021.553	Required	

Manhole Schedules for Surface Network 2

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S317	360402.923	438016.002	360402.923	438016.002	Required	
S318	360374.989	438000.425	360374.989	438000.425	Required	
S319	360364.390	437989.281	360364.390	437989.281	Required	
S320	360314.485	437963.005	360314.485	437963.005	Required	
S321	360343.099	437981.320	360343.099	437981.320	Required	
S322	360357.105	437995.079	360357.105	437995.079	Required	
S323	360316.597	438042.533	360316.597	438042.533	Required	
S324	360305.768	438056.255	360305.768	438056.255	Required	
S325	360295.300	438063.960			No Entry	

STORM SEWER DESIGN

Rainfall Simulation

1:1 year event

Simulation Criteria for Surface Network 2

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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)	18.800	Storm Duration (mins)	30
Ratio R	0.281		

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	2.000
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 Storage Structures	1
Number of Online Controls	1	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 0.281
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)		18.800 Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1
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	S301	15 Winter	1	+0%					113.851
1.001	S302	15 Winter	1	+0%					113.745
1.002	S303	15 Winter	1	+0%					113.549
2.000	S304	15 Winter	1	+0%					115.662
2.001	S305	15 Winter	1	+0%					115.039
2.002	S306	15 Winter	1	+0%					114.414
1.003	S307	15 Winter	1	+0%					113.306
1.004	S308	15 Winter	1	+0%					112.407
1.005	S309	15 Winter	1	+0%					111.872
1.006	S310	15 Winter	1	+0%					111.234
1.007	S311	15 Winter	1	+0%					110.119
3.000	S312	15 Winter	1	+0%					112.490
1.008	S313	15 Winter	1	+0%					109.684
1.009	S314	15 Winter	1	+0%					109.315
1.010	S315	15 Winter	1	+0%					105.584
4.000	S316	15 Winter	1	+0%					109.746
4.001	S317	15 Winter	1	+0%					107.805
4.002	S318	15 Winter	1	+0%					105.611
1.011	S319	60 Winter	1	+0%					104.272
5.000	S320	60 Winter	1	+0%					104.270

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S301	-0.124	0.000	0.41			14.7	OK	
1.001	S302	-0.117	0.000	0.46			16.9	OK	
1.002	S303	-0.186	0.000	0.30			24.4	OK	
2.000	S304	-0.185	0.000	0.07			6.0	OK	
2.001	S305	-0.171	0.000	0.13			10.6	OK	
2.002	S306	-0.166	0.000	0.15			13.4	OK	
1.003	S307	-0.195	0.000	0.26			45.1	OK	
1.004	S308	-0.189	0.000	0.29			47.9	OK	
1.005	S309	-0.184	0.000	0.31			53.1	OK	
1.006	S310	-0.189	0.000	0.29			56.0	OK	
1.007	S311	-0.332	0.000	0.15			58.9	OK	
3.000	S312	-0.172	0.000	0.13			9.4	OK	
1.008	S313	-0.304	0.000	0.23			75.7	OK	
1.009	S314	-0.329	0.000	0.16			85.5	OK	
1.010	S315	-0.304	0.000	0.23			98.8	OK	
4.000	S316	-0.081	0.000	0.43			10.9	OK	
4.001	S317	-0.073	0.000	0.51			13.3	OK	
4.002	S318	-0.040	0.000	0.88			21.8	OK	
1.011	S319	-1.030	0.000	0.06			78.0	OK	
5.000	S320	-1.142	0.000	0.00			5.4	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
5.001	S321	60 Winter	1	+0%					104.270
1.012	S322	60 Winter	1	+0%					104.270
1.013	S323	60 Winter	1	+0%					104.249
1.014	S324	60 Winter	1	+0%	1/15 Summer				104.243

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
5.001	S321	-1.057	0.000	0.00			7.8	OK	
1.012	S322	-1.008	0.000	0.03			72.8	OK	
1.013	S323	-0.873	0.000	0.02			44.3	OK	
1.014	S324	0.440	0.000	1.03			35.7	SURCHARGED	

STORM SEWER DESIGN

Rainfall Simulation

1:30 year event

Simulation Criteria for Surface Network 2

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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)	18.800	Storm Duration (mins)	30
Ratio R	0.281		

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	2.000
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 Storage Structures	1
Number of Online Controls	1	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 0.281
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)		18.800	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
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	S301	15 Winter	30	+0%	30/15 Winter				113.980
1.001	S302	15 Winter	30	+0%	30/15 Summer				113.878
1.002	S303	15 Winter	30	+0%					113.634
2.000	S304	15 Winter	30	+0%					115.686
2.001	S305	15 Winter	30	+0%					115.077
2.002	S306	15 Winter	30	+0%					114.458
1.003	S307	15 Winter	30	+0%					113.390
1.004	S308	15 Winter	30	+0%					112.499
1.005	S309	15 Winter	30	+0%					111.973
1.006	S310	15 Winter	30	+0%					111.328
1.007	S311	15 Winter	30	+0%					110.205
3.000	S312	15 Winter	30	+0%					112.524
1.008	S313	15 Winter	30	+0%					109.800
1.009	S314	15 Winter	30	+0%					109.405
1.010	S315	15 Winter	30	+0%					105.701
4.000	S316	15 Winter	30	+0%	30/15 Winter				109.837
4.001	S317	15 Winter	30	+0%	30/15 Summer				108.213
4.002	S318	15 Winter	30	+0%	30/15 Summer				106.824
1.011	S319	120 Winter	30	+0%	30/120 Winter				105.336
5.000	S320	120 Winter	30	+0%					105.336

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S301	0.005	0.000	0.95			34.5	SURCHARGED	
1.001	S302	0.016	0.000	1.08			39.4	SURCHARGED	
1.002	S303	-0.101	0.000	0.76			60.5	OK	
2.000	S304	-0.161	0.000	0.18			14.7	OK	
2.001	S305	-0.133	0.000	0.35			28.9	OK	
2.002	S306	-0.122	0.000	0.42			37.2	OK	
1.003	S307	-0.111	0.000	0.70			119.8	OK	
1.004	S308	-0.097	0.000	0.78			129.0	OK	
1.005	S309	-0.083	0.000	0.86			144.5	OK	
1.006	S310	-0.095	0.000	0.79			152.9	OK	
1.007	S311	-0.246	0.000	0.42			161.4	OK	
3.000	S312	-0.138	0.000	0.31			22.8	OK	
1.008	S313	-0.188	0.000	0.63			208.0	OK	
1.009	S314	-0.239	0.000	0.45			235.6	OK	
1.010	S315	-0.187	0.000	0.64			274.4	OK	
4.000	S316	0.010	0.000	1.01			25.7	SURCHARGED	
4.001	S317	0.335	0.000	1.21			31.2	SURCHARGED	
4.002	S318	1.173	0.000	2.07			51.3	SURCHARGED	
1.011	S319	0.034	0.000	0.10			127.1	SURCHARGED	
5.000	S320	-0.076	0.000	0.00			8.4	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
5.001	S321	120 Winter	30	+0%	30/120 Winter				105.335
1.012	S322	120 Winter	30	+0%	30/120 Winter				105.336
1.013	S323	120 Winter	30	+0%	30/60 Winter				105.334
1.014	S324	120 Winter	30	+0%	30/15 Summer				105.334

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
5.001	S321	0.008	0.000	0.01			10.9	SURCHARGED	
1.012	S322	0.058	0.000	0.03			96.8	SURCHARGED	
1.013	S323	0.212	0.000	0.03			49.4	SURCHARGED	
1.014	S324	1.531	0.000	1.03			35.6	SURCHARGED	

STORM SEWER DESIGN

Rainfall Simulation

1:30 year event with Surcharged Outfall

Surcharged Outfall Details for Surface Network 2

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.014	S325	103.900	103.500	103.500	0	0

Datum (m) 103.400 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	1.000	42	1.000	83	1.000	124	1.000	165	1.000	206	1.000
2	1.000	43	1.000	84	1.000	125	1.000	166	1.000	207	1.000
3	1.000	44	1.000	85	1.000	126	1.000	167	1.000	208	1.000
4	1.000	45	1.000	86	1.000	127	1.000	168	1.000	209	1.000
5	1.000	46	1.000	87	1.000	128	1.000	169	1.000	210	1.000
6	1.000	47	1.000	88	1.000	129	1.000	170	1.000	211	1.000
7	1.000	48	1.000	89	1.000	130	1.000	171	1.000	212	1.000
8	1.000	49	1.000	90	1.000	131	1.000	172	1.000	213	1.000
9	1.000	50	1.000	91	1.000	132	1.000	173	1.000	214	1.000
10	1.000	51	1.000	92	1.000	133	1.000	174	1.000	215	1.000
11	1.000	52	1.000	93	1.000	134	1.000	175	1.000	216	1.000
12	1.000	53	1.000	94	1.000	135	1.000	176	1.000	217	1.000
13	1.000	54	1.000	95	1.000	136	1.000	177	1.000	218	1.000
14	1.000	55	1.000	96	1.000	137	1.000	178	1.000	219	1.000
15	1.000	56	1.000	97	1.000	138	1.000	179	1.000	220	1.000
16	1.000	57	1.000	98	1.000	139	1.000	180	1.000	221	1.000
17	1.000	58	1.000	99	1.000	140	1.000	181	1.000	222	1.000
18	1.000	59	1.000	100	1.000	141	1.000	182	1.000	223	1.000
19	1.000	60	1.000	101	1.000	142	1.000	183	1.000	224	1.000
20	1.000	61	1.000	102	1.000	143	1.000	184	1.000	225	1.000
21	1.000	62	1.000	103	1.000	144	1.000	185	1.000	226	1.000
22	1.000	63	1.000	104	1.000	145	1.000	186	1.000	227	1.000
23	1.000	64	1.000	105	1.000	146	1.000	187	1.000	228	1.000
24	1.000	65	1.000	106	1.000	147	1.000	188	1.000	229	1.000
25	1.000	66	1.000	107	1.000	148	1.000	189	1.000	230	1.000
26	1.000	67	1.000	108	1.000	149	1.000	190	1.000	231	1.000
27	1.000	68	1.000	109	1.000	150	1.000	191	1.000	232	1.000
28	1.000	69	1.000	110	1.000	151	1.000	192	1.000	233	1.000
29	1.000	70	1.000	111	1.000	152	1.000	193	1.000	234	1.000
30	1.000	71	1.000	112	1.000	153	1.000	194	1.000	235	1.000
31	1.000	72	1.000	113	1.000	154	1.000	195	1.000	236	1.000
32	1.000	73	1.000	114	1.000	155	1.000	196	1.000	237	1.000
33	1.000	74	1.000	115	1.000	156	1.000	197	1.000	238	1.000
34	1.000	75	1.000	116	1.000	157	1.000	198	1.000	239	1.000
35	1.000	76	1.000	117	1.000	158	1.000	199	1.000	240	1.000
36	1.000	77	1.000	118	1.000	159	1.000	200	1.000	241	1.000
37	1.000	78	1.000	119	1.000	160	1.000	201	1.000	242	1.000
38	1.000	79	1.000	120	1.000	161	1.000	202	1.000	243	1.000
39	1.000	80	1.000	121	1.000	162	1.000	203	1.000	244	1.000
40	1.000	81	1.000	122	1.000	163	1.000	204	1.000	245	1.000
41	1.000	82	1.000	123	1.000	164	1.000	205	1.000	246	1.000

Surcharged Outfall Details for Surface Network 2

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
247	1.000	266	1.000	285	1.000	304	1.000	323	1.000	342	1.000
248	1.000	267	1.000	286	1.000	305	1.000	324	1.000	343	1.000
249	1.000	268	1.000	287	1.000	306	1.000	325	1.000	344	1.000
250	1.000	269	1.000	288	1.000	307	1.000	326	1.000	345	1.000
251	1.000	270	1.000	289	1.000	308	1.000	327	1.000	346	1.000
252	1.000	271	1.000	290	1.000	309	1.000	328	1.000	347	1.000
253	1.000	272	1.000	291	1.000	310	1.000	329	1.000	348	1.000
254	1.000	273	1.000	292	1.000	311	1.000	330	1.000	349	1.000
255	1.000	274	1.000	293	1.000	312	1.000	331	1.000	350	1.000
256	1.000	275	1.000	294	1.000	313	1.000	332	1.000	351	1.000
257	1.000	276	1.000	295	1.000	314	1.000	333	1.000	352	1.000
258	1.000	277	1.000	296	1.000	315	1.000	334	1.000	353	1.000
259	1.000	278	1.000	297	1.000	316	1.000	335	1.000	354	1.000
260	1.000	279	1.000	298	1.000	317	1.000	336	1.000	355	1.000
261	1.000	280	1.000	299	1.000	318	1.000	337	1.000	356	1.000
262	1.000	281	1.000	300	1.000	319	1.000	338	1.000	357	1.000
263	1.000	282	1.000	301	1.000	320	1.000	339	1.000	358	1.000
264	1.000	283	1.000	302	1.000	321	1.000	340	1.000	359	1.000
265	1.000	284	1.000	303	1.000	322	1.000	341	1.000	360	1.000

Simulation Criteria for Surface Network 2

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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)	18.800	Storm Duration (mins)	30
Ratio R	0.281		

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	2.000
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 Storage Structures	1
Number of Online Controls	1	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 0.281
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)		18.800	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
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	S301	15 Winter	30	+0%	30/15 Winter				113.980
1.001	S302	15 Winter	30	+0%	30/15 Summer				113.878
1.002	S303	15 Winter	30	+0%					113.634
2.000	S304	15 Winter	30	+0%					115.686
2.001	S305	15 Winter	30	+0%					115.077
2.002	S306	15 Winter	30	+0%					114.458
1.003	S307	15 Winter	30	+0%					113.390
1.004	S308	15 Winter	30	+0%					112.499
1.005	S309	15 Winter	30	+0%					111.973
1.006	S310	15 Winter	30	+0%					111.328
1.007	S311	15 Winter	30	+0%					110.205
3.000	S312	15 Winter	30	+0%					112.524
1.008	S313	15 Winter	30	+0%					109.800
1.009	S314	15 Winter	30	+0%					109.405
1.010	S315	180 Winter	30	+0%	30/120 Winter				106.490
4.000	S316	15 Winter	30	+0%	30/15 Winter				109.837
4.001	S317	15 Winter	30	+0%	30/15 Summer				108.213
4.002	S318	15 Winter	30	+0%	30/15 Summer				106.824
1.011	S319	240 Winter	30	+0%	30/60 Winter				106.400
5.000	S320	240 Winter	30	+0%	30/60 Winter				106.399

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S301	0.005	0.000	0.95			34.5	SURCHARGED	
1.001	S302	0.016	0.000	1.08			39.4	SURCHARGED	
1.002	S303	-0.101	0.000	0.76			60.5	OK	
2.000	S304	-0.161	0.000	0.18			14.7	OK	
2.001	S305	-0.133	0.000	0.35			28.9	OK	
2.002	S306	-0.122	0.000	0.42			37.2	OK	
1.003	S307	-0.111	0.000	0.70			119.8	OK	
1.004	S308	-0.097	0.000	0.78			129.0	OK	
1.005	S309	-0.083	0.000	0.86			144.5	OK	
1.006	S310	-0.095	0.000	0.79			152.9	OK	
1.007	S311	-0.246	0.000	0.42			161.4	OK	
3.000	S312	-0.138	0.000	0.31			22.8	OK	
1.008	S313	-0.188	0.000	0.63			208.0	OK	
1.009	S314	-0.239	0.000	0.45			235.6	OK	
1.010	S315	0.602	0.000	0.20			84.1	SURCHARGED	
4.000	S316	0.010	0.000	1.01			25.7	SURCHARGED	
4.001	S317	0.335	0.000	1.21			31.2	SURCHARGED	
4.002	S318	1.173	0.000	2.07			51.3	SURCHARGED	
1.011	S319	1.098	0.000	0.06			79.2	SURCHARGED	
5.000	S320	0.987	0.000	0.00			5.3	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
5.001	S321	240 Winter	30	+0%	30/60 Winter				106.400
1.012	S322	240 Winter	30	+0%	30/60 Winter				106.400
1.013	S323	240 Winter	30	+0%	30/60 Winter				106.400
1.014	S324	240 Winter	30	+0%	30/15 Summer				106.399

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
5.001	S321	1.073	0.000	0.01			13.0	SURCHARGED	
1.012	S322	1.122	0.000	0.03			74.4	SURCHARGED	
1.013	S323	1.278	0.000	0.03			62.7	SURCHARGED	
1.014	S324	2.596	0.000	1.03			35.8	SURCHARGED	

STORM SEWER DESIGN

Rainfall Simulation

1:100 year event +30% Climate Change

Simulation Criteria for Surface Network 2

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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)	18.800	Storm Duration (mins)	30
Ratio R	0.281		

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	2.000
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 Storage Structures	1
Number of Online Controls	1	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 0.281
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.800	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100
Climate Change (%)	30

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	S301	15 Winter	100	+30%	100/15 Summer				114.517
1.001	S302	15 Winter	100	+30%	100/15 Summer				114.306
1.002	S303	15 Winter	100	+30%	100/15 Summer				114.023
2.000	S304	15 Winter	100	+30%					115.706
2.001	S305	15 Winter	100	+30%					115.109
2.002	S306	15 Winter	100	+30%					114.497
1.003	S307	15 Winter	100	+30%	100/15 Summer				113.773
1.004	S308	15 Winter	100	+30%	100/15 Summer				112.918
1.005	S309	15 Winter	100	+30%	100/15 Summer				112.322
1.006	S310	15 Winter	100	+30%	100/15 Summer				111.506
1.007	S311	15 Winter	100	+30%					110.242
3.000	S312	15 Winter	100	+30%					112.553
1.008	S313	15 Winter	100	+30%					109.870
1.009	S314	15 Winter	100	+30%					109.461
1.010	S315	180 Winter	100	+30%	100/30 Summer				106.936
4.000	S316	15 Winter	100	+30%	100/15 Summer				110.526
4.001	S317	15 Winter	100	+30%	100/15 Summer				109.687
4.002	S318	15 Winter	100	+30%	100/15 Summer				108.016
1.011	S319	180 Winter	100	+30%	100/15 Winter				106.756
5.000	S320	180 Winter	100	+30%	100/15 Winter				106.759

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S301	0.542	0.000	1.40			51.0	SURCHARGED	
1.001	S302	0.444	0.000	1.60			58.7	SURCHARGED	
1.002	S303	0.288	0.000	1.06			85.1	SURCHARGED	
2.000	S304	-0.141	0.000	0.30			24.7	OK	
2.001	S305	-0.101	0.000	0.58			48.4	OK	
2.002	S306	-0.083	0.000	0.71			62.4	OK	
1.003	S307	0.272	0.000	0.96			164.9	SURCHARGED	
1.004	S308	0.322	0.000	1.05			174.0	SURCHARGED	
1.005	S309	0.266	0.000	1.13			191.5	SURCHARGED	
1.006	S310	0.083	0.000	1.05			201.7	SURCHARGED	
1.007	S311	-0.209	0.000	0.56			213.3	OK	
3.000	S312	-0.109	0.000	0.52			38.3	OK	
1.008	S313	-0.118	0.000	0.88			291.4	OK	
1.009	S314	-0.183	0.000	0.65			341.8	OK	
1.010	S315	1.048	0.000	0.33			140.5	SURCHARGED	
4.000	S316	0.699	0.000	1.47			37.3	SURCHARGED	
4.001	S317	1.809	0.000	1.62			41.9	SURCHARGED	
4.002	S318	2.365	0.000	2.77			68.8	SURCHARGED	
1.011	S319	1.454	0.000	0.12			160.1	SURCHARGED	
5.000	S320	1.347	0.000	0.01			14.2	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
5.001	S321	180 Winter	100	+30%	100/15 Winter				106.759
1.012	S322	180 Winter	100	+30%	100/15 Winter				106.756
1.013	S323	180 Winter	100	+30%	100/15 Summer				106.739
1.014	S324	180 Winter	100	+30%	100/15 Summer				106.739

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
5.001	S321	1.432	0.000	0.01			23.0	SURCHARGED	
1.012	S322	1.478	0.000	0.07			187.8	SURCHARGED	
1.013	S323	1.617	0.000	0.10			193.2	SURCHARGED	
1.014	S324	2.936	0.000	1.20			41.8	FLOOD RISK	

Storm Water Network 3

STORM SEWER DESIGN

Network Design Details (1 in 2 yr), Online Controls & Storage Structures

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 3

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	18.800	Add Flow / Climate Change (%)	0
Ratio R	0.281	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

Network Design Table for Surface Network 3

« - Indicates pipe capacity < flow

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	44.626	0.915	48.8	0.052	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	62.713	1.492	42.0	0.081	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	55.083	0.334	164.9	0.152	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	78.483	2.116	37.1	0.102	0.00	0.0	0.600	o	375	Pipe/Conduit	
3.000	21.967	0.295	74.5	0.015	5.00	0.0	0.600	o	225	Pipe/Conduit	
3.001	23.540	0.316	74.5	0.164	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	46.945	2.235	21.0	0.110	0.00	0.0	0.600	o	375	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	5.40	116.777	0.052	0.0	0.0	0.0	1.88	74.7	7.0
1.001	50.00	5.91	115.862	0.133	0.0	0.0	0.0	2.02	80.5	18.0
2.000	50.00	5.90	114.704	0.152	0.0	0.0	0.0	1.02	40.4	20.6
1.002	50.00	6.35	114.220	0.387	0.0	0.0	0.0	2.98	329.5	52.4
3.000	50.00	5.24	112.865	0.015	0.0	0.0	0.0	1.52	60.3	2.0
3.001	50.00	5.50	112.570	0.179	0.0	0.0	0.0	1.52	60.3	24.2
1.003	49.52	6.55	112.104	0.676	0.0	0.0	0.0	3.97	438.3	90.7

Network Design Table for Surface Network 3

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	20.767	0.052	399.4	0.046	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.005	31.022	0.078	397.7	0.054	0.00	0.0	0.600	o	1500	Pipe/Conduit	
1.006	25.220	0.063	400.3	0.054	0.00	0.0	0.600	o	1500	Pipe/Conduit	
1.007	14.107	0.035	403.1	0.077	0.00	0.0	0.600	o	1500	Pipe/Conduit	
1.008	6.573	0.047	139.9	0.000	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)
1.004	48.47	6.89	109.794	0.722	0.0	0.0	0.0	1.01	160.8	94.8
1.005	47.77	7.13	108.692	0.776	0.0	0.0	0.0	2.14	3790.0	100.4
1.006	47.22	7.33	108.614	0.830	0.0	0.0	0.0	2.14	3777.6	106.1
1.007	46.91	7.44	108.551	0.907	0.0	0.0	0.0	2.13	3764.7	115.2
1.008	46.64	7.54	108.516	0.907	0.0	0.0	0.0	1.10	43.9«	115.2

Online Controls for Surface Network 3

Depth/Flow Relationship Manhole: S414, DS/PN: 1.008, Volume (m³): 38.0

Invert Level (m) 108.516

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.3600	0.800	20.7500	2.000	23.3300	3.200	29.5100
0.200	13.6600	1.000	19.4100	2.200	24.4700	3.400	30.4200
0.300	18.9100	1.200	18.8000	2.400	25.5600	3.600	31.3000
0.400	21.8000	1.400	19.5200	2.600	26.6000	3.800	32.1600
0.500	22.7900	1.600	20.8700	2.800	27.6000		
0.600	22.5500	1.800	22.1300	3.000	28.5700		

Storage Structures for Surface Network 3

Tank or Pond Manhole: S414, DS/PN: 1.008

Invert Level (m) 110.850

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	586.3	0.500	777.8

STORM SEWER DESIGN

SW Manhole Schedules

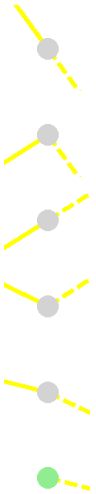
Manhole Schedules for Surface Network 3

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S401	118.355	1.578	Open Manhole	1350	1.000	116.777	225				
S402	118.935	3.073	Open Manhole	1500	1.001	115.862	225	1.000	115.862	225	
S404	116.328	1.624	Open Manhole	1350	2.000	114.704	225				
S405	116.856	2.636	Open Manhole	1800	1.002	114.220	375	1.001	114.370	225	
								2.000	114.370	225	
S407	114.456	1.591	Open Manhole	1350	3.000	112.865	225				
S408	114.523	1.953	Open Manhole	1350	3.001	112.570	225	3.000	112.570	225	
S409	114.256	2.152	Open Manhole	1800	1.003	112.104	375	1.002	112.104	375	
								3.001	112.254	225	
S410	112.505	2.711	Open Manhole	1500	1.004	109.794	450	1.003	109.869	375	
S411	111.719	3.027	Open Manhole	3000	1.005	108.692	1500	1.004	109.742	450	
S412	111.859	3.245	Open Manhole	3000	1.006	108.614	1500	1.005	108.614	1500	
S413	111.580	3.029	Open Manhole	3000	1.007	108.551	1500	1.006	108.551	1500	
S414	111.120	2.604	Open Manhole	3000	1.008	108.516	225	1.007	108.516	1500	
S415	108.700	0.231	Open Manhole	0		OUTFALL		1.008	108.469	225	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S401	360582.948	437865.029	360582.948	437865.029	Required	
S402	360618.846	437891.540	360618.846	437891.540	Required	
S404	360537.418	437909.396	360537.418	437909.396	Required	
S405	360581.742	437942.099	360581.742	437942.099	Required	
S407	360497.984	437978.850	360497.984	437978.850	Required	
S408	360516.085	437991.296	360516.085	437991.296	Required	
S409	360535.078	438005.203	360535.078	438005.203	Required	

Manhole Schedules for Surface Network 3

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S410	360507.343	438043.080	360507.343	438043.080	Required	
S411	360495.124	438059.871	360495.124	438059.871	Required	
S412	360468.964	438043.196	360468.964	438043.196	Required	
S413	360447.697	438029.641	360447.697	438029.641	Required	
S414	360435.030	438035.851	360435.030	438035.851	Required	
S415	360428.660	438037.473			No Entry	



STORM SEWER DESIGN

Rainfall Simulation

1:1 year event

Simulation Criteria for Surface Network 3

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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)	18.800	Storm Duration (mins)	30
Ratio R	0.281		

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

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 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 Storage Structures	1
Number of Online Controls	1	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 0.281
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)		18.800 Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1
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	S401	15 Winter	1	+0%					116.821
1.001	S402	15 Winter	1	+0%					115.926
2.000	S404	15 Winter	1	+0%					114.811
1.002	S405	15 Winter	1	+0%					114.310
3.000	S407	15 Winter	1	+0%					112.891
3.001	S408	15 Winter	1	+0%					112.658
1.003	S409	15 Winter	1	+0%					112.208
1.004	S410	15 Winter	1	+0%					110.036
1.005	S411	60 Winter	1	+0%					109.141
1.006	S412	60 Winter	1	+0%					109.137
1.007	S413	60 Winter	1	+0%					109.133
1.008	S414	60 Winter	1	+0%	1/15 Summer				109.130

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S401	-0.181	0.000	0.08			5.9	OK	
1.001	S402	-0.161	0.000	0.18			14.0	OK	

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
2.000	S404	-0.118	0.000	0.46			17.7	OK	
1.002	S405	-0.285	0.000	0.13			40.7	OK	
3.000	S407	-0.199	0.000	0.03			1.7	OK	
3.001	S408	-0.137	0.000	0.32			17.8	OK	
1.003	S409	-0.271	0.000	0.17			68.9	OK	
1.004	S410	-0.208	0.000	0.56			73.2	OK	
1.005	S411	-1.051	0.000	0.02			48.4	OK	
1.006	S412	-0.977	0.000	0.02			37.8	OK	
1.007	S413	-0.918	0.000	0.02			30.2	OK	
1.008	S414	0.389	0.000	0.74			22.7	SURCHARGED	

STORM SEWER DESIGN

Rainfall Simulation

1:30 year event

Simulation Criteria for Surface Network 3

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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)	18.800	Storm Duration (mins)	30
Ratio R	0.281		

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

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 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 Storage Structures	1
Number of Online Controls	1	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 0.281
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)		18.800	Cv (Winter) 0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
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	S401	15 Winter	30	+0%					116.847
1.001	S402	15 Winter	30	+0%					115.975
2.000	S404	15 Winter	30	+0%	30/15 Summer				114.967
1.002	S405	15 Winter	30	+0%					114.372
3.000	S407	15 Winter	30	+0%					112.907
3.001	S408	15 Winter	30	+0%					112.747
1.003	S409	15 Winter	30	+0%					112.288
1.004	S410	15 Winter	30	+0%	30/15 Summer				110.305
1.005	S411	120 Winter	30	+0%	30/120 Winter				110.252
1.006	S412	120 Winter	30	+0%	30/60 Winter				110.252
1.007	S413	120 Winter	30	+0%	30/60 Winter				110.252
1.008	S414	120 Winter	30	+0%	30/15 Summer				110.252

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S401	-0.155	0.000	0.20			14.5	OK	
1.001	S402	-0.112	0.000	0.49			38.3	OK	

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
2.000	S404	0.038	0.000	1.07			41.5	SURCHARGED	
1.002	S405	-0.223	0.000	0.34			106.2	OK	
3.000	S407	-0.183	0.000	0.08			4.2	OK	
3.001	S408	-0.048	0.000	0.97			53.9	OK	
1.003	S409	-0.191	0.000	0.47			188.0	OK	
1.004	S410	0.061	0.000	1.56			204.4	SURCHARGED	
1.005	S411	0.060	0.000	0.03			78.3	SURCHARGED	
1.006	S412	0.138	0.000	0.02			52.2	SURCHARGED	
1.007	S413	0.201	0.000	0.02			34.9	SURCHARGED	
1.008	S414	1.511	0.000	0.74			22.7	SURCHARGED	

STORM SEWER DESIGN

Rainfall Simulation

1:30 year event with Surcharged Outfall

Surcharged Outfall Details for Surface Network 3

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.008	S415	108.700	108.469	0.000	0	0

Datum (m) 108.370 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	1.000	42	1.000	83	1.000	124	1.000	165	1.000	206	1.000
2	1.000	43	1.000	84	1.000	125	1.000	166	1.000	207	1.000
3	1.000	44	1.000	85	1.000	126	1.000	167	1.000	208	1.000
4	1.000	45	1.000	86	1.000	127	1.000	168	1.000	209	1.000
5	1.000	46	1.000	87	1.000	128	1.000	169	1.000	210	1.000
6	1.000	47	1.000	88	1.000	129	1.000	170	1.000	211	1.000
7	1.000	48	1.000	89	1.000	130	1.000	171	1.000	212	1.000
8	1.000	49	1.000	90	1.000	131	1.000	172	1.000	213	1.000
9	1.000	50	1.000	91	1.000	132	1.000	173	1.000	214	1.000
10	1.000	51	1.000	92	1.000	133	1.000	174	1.000	215	1.000
11	1.000	52	1.000	93	1.000	134	1.000	175	1.000	216	1.000
12	1.000	53	1.000	94	1.000	135	1.000	176	1.000	217	1.000
13	1.000	54	1.000	95	1.000	136	1.000	177	1.000	218	1.000
14	1.000	55	1.000	96	1.000	137	1.000	178	1.000	219	1.000
15	1.000	56	1.000	97	1.000	138	1.000	179	1.000	220	1.000
16	1.000	57	1.000	98	1.000	139	1.000	180	1.000	221	1.000
17	1.000	58	1.000	99	1.000	140	1.000	181	1.000	222	1.000
18	1.000	59	1.000	100	1.000	141	1.000	182	1.000	223	1.000
19	1.000	60	1.000	101	1.000	142	1.000	183	1.000	224	1.000
20	1.000	61	1.000	102	1.000	143	1.000	184	1.000	225	1.000
21	1.000	62	1.000	103	1.000	144	1.000	185	1.000	226	1.000
22	1.000	63	1.000	104	1.000	145	1.000	186	1.000	227	1.000
23	1.000	64	1.000	105	1.000	146	1.000	187	1.000	228	1.000
24	1.000	65	1.000	106	1.000	147	1.000	188	1.000	229	1.000
25	1.000	66	1.000	107	1.000	148	1.000	189	1.000	230	1.000
26	1.000	67	1.000	108	1.000	149	1.000	190	1.000	231	1.000
27	1.000	68	1.000	109	1.000	150	1.000	191	1.000	232	1.000
28	1.000	69	1.000	110	1.000	151	1.000	192	1.000	233	1.000
29	1.000	70	1.000	111	1.000	152	1.000	193	1.000	234	1.000
30	1.000	71	1.000	112	1.000	153	1.000	194	1.000	235	1.000
31	1.000	72	1.000	113	1.000	154	1.000	195	1.000	236	1.000
32	1.000	73	1.000	114	1.000	155	1.000	196	1.000	237	1.000
33	1.000	74	1.000	115	1.000	156	1.000	197	1.000	238	1.000
34	1.000	75	1.000	116	1.000	157	1.000	198	1.000	239	1.000
35	1.000	76	1.000	117	1.000	158	1.000	199	1.000	240	1.000
36	1.000	77	1.000	118	1.000	159	1.000	200	1.000	241	1.000
37	1.000	78	1.000	119	1.000	160	1.000	201	1.000	242	1.000
38	1.000	79	1.000	120	1.000	161	1.000	202	1.000	243	1.000
39	1.000	80	1.000	121	1.000	162	1.000	203	1.000	244	1.000
40	1.000	81	1.000	122	1.000	163	1.000	204	1.000	245	1.000
41	1.000	82	1.000	123	1.000	164	1.000	205	1.000	246	1.000

Surcharged Outfall Details for Surface Network 3

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
247	1.000	266	1.000	285	1.000	304	1.000	323	1.000	342	1.000
248	1.000	267	1.000	286	1.000	305	1.000	324	1.000	343	1.000
249	1.000	268	1.000	287	1.000	306	1.000	325	1.000	344	1.000
250	1.000	269	1.000	288	1.000	307	1.000	326	1.000	345	1.000
251	1.000	270	1.000	289	1.000	308	1.000	327	1.000	346	1.000
252	1.000	271	1.000	290	1.000	309	1.000	328	1.000	347	1.000
253	1.000	272	1.000	291	1.000	310	1.000	329	1.000	348	1.000
254	1.000	273	1.000	292	1.000	311	1.000	330	1.000	349	1.000
255	1.000	274	1.000	293	1.000	312	1.000	331	1.000	350	1.000
256	1.000	275	1.000	294	1.000	313	1.000	332	1.000	351	1.000
257	1.000	276	1.000	295	1.000	314	1.000	333	1.000	352	1.000
258	1.000	277	1.000	296	1.000	315	1.000	334	1.000	353	1.000
259	1.000	278	1.000	297	1.000	316	1.000	335	1.000	354	1.000
260	1.000	279	1.000	298	1.000	317	1.000	336	1.000	355	1.000
261	1.000	280	1.000	299	1.000	318	1.000	337	1.000	356	1.000
262	1.000	281	1.000	300	1.000	319	1.000	338	1.000	357	1.000
263	1.000	282	1.000	301	1.000	320	1.000	339	1.000	358	1.000
264	1.000	283	1.000	302	1.000	321	1.000	340	1.000	359	1.000
265	1.000	284	1.000	303	1.000	322	1.000	341	1.000	360	1.000

Simulation Criteria for Surface Network 3

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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)	18.800	Storm Duration (mins)	30
Ratio R	0.281		

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

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 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 Storage Structures	1
Number of Online Controls	1	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 0.281
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.800	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
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	S401	15 Winter	30	+0%					116.847
1.001	S402	15 Winter	30	+0%					115.975
2.000	S404	15 Winter	30	+0%	30/15 Summer				114.967
1.002	S405	15 Winter	30	+0%					114.372
3.000	S407	15 Winter	30	+0%					112.907
3.001	S408	15 Winter	30	+0%					112.747
1.003	S409	15 Winter	30	+0%					112.288
1.004	S410	180 Winter	30	+0%	30/15 Summer				110.902
1.005	S411	180 Winter	30	+0%	30/60 Winter				110.895
1.006	S412	180 Winter	30	+0%	30/60 Summer				110.895
1.007	S413	180 Winter	30	+0%	30/60 Summer				110.895
1.008	S414	180 Winter	30	+0%	30/15 Summer				110.894

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S401	-0.155	0.000	0.20			14.5	OK	
1.001	S402	-0.112	0.000	0.49			38.3	OK	

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
2.000	S404	0.038	0.000	1.07			41.5	SURCHARGED	
1.002	S405	-0.223	0.000	0.34			106.2	OK	
3.000	S407	-0.183	0.000	0.08			4.2	OK	
3.001	S408	-0.048	0.000	0.97			53.9	OK	
1.003	S409	-0.191	0.000	0.47			188.0	OK	
1.004	S410	0.658	0.000	0.45			58.6	SURCHARGED	
1.005	S411	0.703	0.000	0.03			60.6	SURCHARGED	
1.006	S412	0.781	0.000	0.02			48.7	SURCHARGED	
1.007	S413	0.844	0.000	0.03			50.8	SURCHARGED	
1.008	S414	2.153	0.000	0.74			22.7	FLOOD RISK	

STORM SEWER DESIGN

Rainfall Simulation

1:100 year event +30% Climate Change

Simulation Criteria for Surface Network 3

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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)	18.800	Storm Duration (mins)	30
Ratio R	0.281		

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

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 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 Storage Structures	1
Number of Online Controls	1	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 0.281
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.800	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100
Climate Change (%)	30

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	S401	15 Winter	100	+30%					116.869
1.001	S402	15 Winter	100	+30%					116.022
2.000	S404	15 Winter	100	+30%	100/15 Summer				115.571
1.002	S405	15 Winter	100	+30%					114.421
3.000	S407	15 Winter	100	+30%	100/15 Summer				113.211
3.001	S408	15 Winter	100	+30%	100/15 Summer				113.199
1.003	S409	15 Winter	100	+30%					112.351
1.004	S410	120 Winter	100	+30%	100/15 Summer				111.081
1.005	S411	120 Winter	100	+30%	100/15 Summer				111.072
1.006	S412	120 Winter	100	+30%	100/15 Summer				111.072
1.007	S413	120 Winter	100	+30%	100/15 Summer				111.072
1.008	S414	120 Winter	100	+30%	100/15 Summer				111.071

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S401	-0.133	0.000	0.34			24.3	OK	
1.001	S402	-0.065	0.000	0.82			63.6	OK	

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
2.000	S404	0.642	0.000	1.66			64.5	SURCHARGED	
1.002	S405	-0.174	0.000	0.54			170.2	OK	
3.000	S407	0.121	0.000	0.19			10.5	SURCHARGED	
3.001	S408	0.404	0.000	1.49			82.7	SURCHARGED	
1.003	S409	-0.128	0.000	0.75			302.6	OK	
1.004	S410	0.837	0.000	0.96			125.3	SURCHARGED	
1.005	S411	0.880	0.000	0.06			134.1	SURCHARGED	
1.006	S412	0.958	0.000	0.06			142.5	SURCHARGED	
1.007	S413	1.021	0.000	0.10			154.1	SURCHARGED	
1.008	S414	2.330	0.000	0.86			26.4	FLOOD RISK	

Foul Water Network 1

FOUL SEWER DESIGN

Foul Design Details

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)	225.00	Maximum Backdrop Height (m)	0.000
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)	0.75
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Foul Network 1

« - Indicates pipe capacity < flow

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	21.577	0.755	28.6	0.000	6	0.0	1.500	o	150	Pipe/Conduit	
1.001	10.136	0.507	20.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
2.000	7.840	0.093	84.3	0.000	12	0.0	1.500	o	150	Pipe/Conduit	
1.002	9.531	0.071	134.2	0.000	6	0.0	1.500	o	150	Pipe/Conduit	
1.003	36.247	0.324	111.9	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.004	36.094	0.690	52.3	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.005	9.292	0.069	134.7	0.000	3	0.0	1.500	o	150	Pipe/Conduit	
1.006	7.293	0.054	135.1	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.007	29.244	0.491	59.6	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.008	9.888	0.482	20.5	0.000	8	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	107.117	0.000	0.0	6	0.0	11	0.50	1.64	29.0	0.3
1.001	106.362	0.000	0.0	6	0.0	10	0.57	1.97	34.7	0.3
2.000	106.033	0.000	0.0	12	0.0	19	0.43	0.95	16.9	0.6
1.002	105.855	0.000	0.0	24	0.0	30	0.45	0.76	13.3	1.1
1.003	105.784	0.000	0.0	24	0.0	28	0.48	0.83	14.6	1.1
1.004	105.460	0.000	0.0	24	0.0	24	0.63	1.21	21.4	1.1
1.005	104.770	0.000	0.0	27	0.0	31	0.47	0.75	13.3	1.3
1.006	104.701	0.000	0.0	27	0.0	32	0.47	0.75	13.3	1.3
1.007	104.647	0.000	0.0	27	0.0	26	0.63	1.14	20.1	1.3
1.008	104.156	0.000	0.0	35	0.0	23	0.98	1.94	34.3	1.6

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
3.000	19.011	0.190	100.1	0.000	8	0.0	1.500	o	150	Pipe/Conduit	
3.001	17.079	0.127	134.5	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
3.002	41.497	0.384	108.1	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
4.000	23.674	0.696	34.0	0.000	3	0.0	1.500	o	150	Pipe/Conduit	
4.001	30.655	1.482	20.7	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
3.003	33.461	0.903	37.1	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
3.004	18.096	0.136	133.1	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
3.005	20.738	0.143	145.0	0.000	3	0.0	1.500	o	150	Pipe/Conduit	
3.006	25.847	0.897	28.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
5.000	19.008	0.190	100.0	0.000	15	0.0	1.500	o	150	Pipe/Conduit	
3.007	35.335	0.262	134.9	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
3.008	21.005	1.541	13.6	0.000	6	0.0	1.500	o	150	Pipe/Conduit	
6.000	41.037	0.304	135.0	0.000	9	0.0	1.500	o	150	Pipe/Conduit	
3.009	47.405	0.627	75.6	0.000	12	0.0	1.500	o	150	Pipe/Conduit	
3.010	46.275	1.361	34.0	0.000	200	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)
3.000	113.450	0.000	0.0	8	0.0	16	0.36	0.88	15.5	0.4
3.001	113.260	0.000	0.0	8	0.0	18	0.32	0.75	13.3	0.4
3.002	113.133	0.000	0.0	13	0.0	21	0.41	0.84	14.9	0.6
4.000	114.927	0.000	0.0	3	0.0	8	0.37	1.51	26.6	0.1
4.001	114.231	0.000	0.0	3	0.0	7	0.44	1.93	34.1	0.1
3.003	112.749	0.000	0.0	21	0.0	20	0.68	1.44	25.5	1.0
3.004	111.846	0.000	0.0	25	0.0	30	0.46	0.76	13.4	1.2
3.005	111.710	0.000	0.0	28	0.0	33	0.46	0.73	12.8	1.3
3.006	111.567	0.000	0.0	28	0.0	22	0.82	1.64	28.9	1.3
5.000	110.860	0.000	0.0	15	0.0	22	0.44	0.88	15.5	0.7
3.007	110.670	0.000	0.0	43	0.0	40	0.54	0.75	13.3	2.0
3.008	110.408	0.000	0.0	49	0.0	24	1.26	2.38	42.1	2.3
6.000	109.171	0.000	0.0	9	0.0	19	0.33	0.75	13.3	0.4
3.009	108.867	0.000	0.0	70	0.0	44	0.77	1.01	17.8	3.3
3.010	108.240	0.000	0.0	270	0.0	73	1.49	1.51	26.6	12.7

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
3.011	35.226	1.761	20.0	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
3.012	10.901	0.081	134.6	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
7.000	60.334	0.603	100.1	0.000	7	0.0	1.500	o	150	Pipe/Conduit	
8.000	56.779	2.969	19.1	0.000	6	0.0	1.500	o	150	Pipe/Conduit	
7.001	75.976	2.250	33.8	0.000	12	0.0	1.500	o	150	Pipe/Conduit	
9.000	28.239	0.466	60.6	0.000	13	0.0	1.500	o	150	Pipe/Conduit	
7.002	46.479	1.343	34.6	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
7.003	24.445	0.707	34.6	0.000	6	0.0	1.500	o	150	Pipe/Conduit	
7.004	31.403	0.908	34.6	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
7.005	32.574	0.937	34.8	0.000	2	0.0	1.500	o	150	Pipe/Conduit	
7.006	17.710	0.131	135.2	0.000	7	0.0	1.500	o	150	Pipe/Conduit	
7.007	26.316	0.195	135.0	0.000	3	0.0	1.500	o	150	Pipe/Conduit	
7.008	28.432	0.211	134.7	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
7.009	14.716	0.154	95.6	0.000	9	0.0	1.500	o	150	Pipe/Conduit	
10.000	22.656	2.248	10.1	0.000	15	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)
3.011	106.879	0.000	0.0	275	0.0	63	1.82	1.96	34.7	12.9
3.012	105.118	0.000	0.0	280	0.0	121	0.86	0.75	13.3	13.1
7.000	114.507	0.000	0.0	7	0.0	15	0.34	0.88	15.5	0.3
8.000	116.873	0.000	0.0	6	0.0	10	0.57	2.01	35.5	0.3
7.001	113.904	0.000	0.0	25	0.0	22	0.75	1.51	26.7	1.2
9.000	112.120	0.000	0.0	13	0.0	18	0.49	1.13	19.9	0.6
7.002	111.654	0.000	0.0	43	0.0	28	0.87	1.49	26.4	2.0
7.003	110.311	0.000	0.0	49	0.0	30	0.91	1.49	26.4	2.3
7.004	109.604	0.000	0.0	49	0.0	30	0.91	1.49	26.4	2.3
7.005	108.696	0.000	0.0	51	0.0	31	0.92	1.49	26.3	2.4
7.006	107.759	0.000	0.0	58	0.0	46	0.59	0.75	13.3	2.7
7.007	107.628	0.000	0.0	61	0.0	47	0.60	0.75	13.3	2.9
7.008	107.433	0.000	0.0	61	0.0	47	0.60	0.75	13.3	2.9
7.009	107.222	0.000	0.0	70	0.0	46	0.70	0.90	15.8	3.3
10.000	109.317	0.000	0.0	15	0.0	13	0.96	2.77	49.0	0.7

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
7.010	9.126	0.091	100.3	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
11.000	29.446	0.260	113.3	0.000	8	0.0	1.500	o	150	Pipe/Conduit	
11.001	23.998	0.213	112.7	0.000	8	0.0	1.500	o	150	Pipe/Conduit	
7.011	57.766	1.457	39.6	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
7.012	25.668	0.190	135.1	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
7.013	25.667	0.145	177.0	0.000	3	0.0	1.500	o	225	Pipe/Conduit	
7.014	26.249	0.141	186.2	0.000	4	0.0	1.500	o	225	Pipe/Conduit	
3.013	23.107	0.138	167.4	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
3.014	25.222	1.225	20.6	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
1.009	27.745	0.166	167.1	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
1.010	21.277	0.127	167.5	0.000	3	0.0	1.500	o	225	Pipe/Conduit	
1.011	9.211	0.055	167.5	0.000	7	0.0	1.500	o	225	Pipe/Conduit	
1.012	16.634	0.100	166.3	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
1.013	34.291	1.463	23.4	0.000	2	0.0	1.500	o	225	Pipe/Conduit	
12.000	28.025	0.208	134.7	0.000	2	0.0	1.500	o	150	Pipe/Conduit	
12.001	23.238	0.332	70.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
12.002	12.851	0.643	20.0	0.000	4	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)
7.010	107.068	0.000	0.0	85	0.0	52	0.73	0.87	15.5	4.0
11.000	107.450	0.000	0.0	8	0.0	17	0.34	0.82	14.5	0.4
11.001	107.190	0.000	0.0	16	0.0	23	0.43	0.82	14.6	0.8
7.011	106.977	0.000	0.0	101	0.0	45	1.07	1.39	24.6	4.7
7.012	105.520	0.000	0.0	101	0.0	62	0.69	0.75	13.3	4.7
7.013	105.255	0.000	0.0	104	0.0	57	0.61	0.86	34.3	4.9
7.014	105.110	0.000	0.0	108	0.0	59	0.60	0.84	33.4	5.1
3.013	104.962	0.000	0.0	388	0.0	115	0.89	0.89	35.2	18.2
3.014	104.824	0.000	0.0	388	0.0	65	1.92	2.54	100.8	18.2
1.009	103.599	0.000	0.0	423	0.0	121	0.91	0.89	35.3	19.8
1.010	103.433	0.000	0.0	426	0.0	121	0.91	0.89	35.2	20.0
1.011	103.306	0.000	0.0	433	0.0	122	0.92	0.89	35.2	20.3
1.012	103.251	0.000	0.0	433	0.0	122	0.92	0.89	35.3	20.3
1.013	103.151	0.000	0.0	435	0.0	71	1.90	2.38	94.5	20.4
12.000	104.652	0.000	0.0	2	0.0	9	0.21	0.75	13.3	0.1
12.001	104.444	0.000	0.0	2	0.0	8	0.26	1.05	18.5	0.1
12.002	104.112	0.000	0.0	6	0.0	10	0.57	1.97	34.7	0.3

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
12.003	28.939	1.453	19.9	0.000	7	0.0	1.500	o	150	Pipe/Conduit	
13.000	35.578	0.404	88.1	0.000	7	0.0	1.500	o	150	Pipe/Conduit	
13.001	13.249	0.104	127.4	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
12.004	13.280	0.099	134.1	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
14.000	32.509	1.086	29.9	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
14.001	13.165	0.664	19.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
12.005	20.894	0.155	134.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.014	17.155	0.103	166.6	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
1.015	13.743	0.082	167.6	0.000	2	0.0	1.500	o	225	Pipe/Conduit	
1.016	21.770	0.130	167.5	0.000	0	0.0	1.500	o	225	Pipe/Conduit	
1.017	11.274	0.071	158.8	0.000	8	0.0	1.500	o	225	Pipe/Conduit	
15.000	34.974	0.259	135.0	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
16.000	13.792	0.521	26.5	0.000	8	0.0	1.500	o	150	Pipe/Conduit	
15.001	51.228	0.379	135.2	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)
12.003	103.469	0.000	0.0	13	0.0	14	0.73	1.97	34.8	0.6
13.000	102.524	0.000	0.0	7	0.0	15	0.36	0.93	16.5	0.3
13.001	102.120	0.000	0.0	11	0.0	20	0.36	0.78	13.7	0.5
12.004	102.016	0.000	0.0	28	0.0	32	0.48	0.76	13.4	1.3
14.000	103.667	0.000	0.0	4	0.0	9	0.43	1.61	28.4	0.2
14.001	102.581	0.000	0.0	4	0.0	8	0.49	1.97	34.9	0.2
12.005	101.917	0.000	0.0	32	0.0	34	0.50	0.75	13.3	1.5
1.014	101.687	0.000	0.0	467	0.0	128	0.94	0.89	35.3	21.9
1.015	101.584	0.000	0.0	469	0.0	129	0.93	0.89	35.2	22.0
1.016	101.502	0.000	0.0	469	0.0	129	0.93	0.89	35.2	22.0
1.017	101.372	0.000	0.0	477	0.0	128	0.96	0.91	36.2	22.4
15.000	103.029	0.000	0.0	5	0.0	14	0.28	0.75	13.3	0.2
16.000	103.291	0.000	0.0	8	0.0	12	0.56	1.71	30.2	0.4
15.001	102.770	0.000	0.0	13	0.0	22	0.38	0.75	13.3	0.6

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
15.002	27.732	0.590	47.0	0.000	13	0.0	1.500	o	150	Pipe/Conduit	
15.003	10.422	0.077	135.4	0.000	5	0.0	1.500	o	150	Pipe/Conduit	
15.004	56.806	0.421	135.0	0.000	0	0.0	1.500	o	750	Pipe/Conduit	
1.018	3.254	0.024	135.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.019	185.986	-4.304	-43.2	0.000	0	0.0	1.500	o	300	Pipe/Conduit	
1.020	7.073	0.022	321.5	0.000	0	0.0	1.500	o	300	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)
15.002	102.391	0.000	0.0	26	0.0	24	0.67	1.28	22.6	1.2
15.003	101.801	0.000	0.0	31	0.0	34	0.49	0.75	13.3	1.5
15.004	101.723	0.000	0.0	31	0.0	22	0.39	2.15	950.7	1.5
1.018	101.302	0.000	0.0	508	0.0	150	0.75	0.75	13.3«	23.8
1.019	101.278	0.000	0.0	508	0.0	300	0.14	0.14	9.6«	23.8
1.020	105.582	0.000	0.0	508	0.0	139	0.75	0.77	54.5	23.8

FOUL SEWER DESIGN

Foul Manhole Schedules

Manhole Schedules for Foul Network 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
1	108.762	1.645	Open Manhole	1350	1.000	107.117	150				
2	108.164	1.802	Open Manhole	1200	1.001	106.362	150	1.000	106.362	150	
F105	108.250	2.217	Open Manhole	1200	2.000	106.033	150				
3	107.960	2.105	Open Manhole	1350	1.002	105.855	150	1.001	105.855	150	
								2.000	105.940	150	85
4	107.858	2.074	Open Manhole	1200	1.003	105.784	150	1.002	105.784	150	
5	107.505	2.045	Open Manhole	1200	1.004	105.460	150	1.003	105.460	150	
6	107.578	2.808	Open Manhole	1200	1.005	104.770	150	1.004	104.770	150	
7	107.447	2.746	Open Manhole	1200	1.006	104.701	150	1.005	104.701	150	
8	107.337	2.690	Open Manhole	1200	1.007	104.647	150	1.006	104.647	150	
9	106.880	2.724	Open Manhole	1200	1.008	104.156	150	1.007	104.156	150	
F201	116.004	2.554	Open Manhole	1200	3.000	113.450	150				
F202	113.260	0.000	Open Manhole	1200	3.001	113.260	150	3.000	113.260	150	
F203	115.449	2.316	Open Manhole	1200	3.002	113.133	150	3.001	113.133	150	
F204	116.727	1.800	Open Manhole	1200	4.000	114.927	150				
F205	116.037	1.806	Open Manhole	1200	4.001	114.231	150	4.000	114.231	150	
F206	115.110	2.361	Open Manhole	1200	3.003	112.749	150	3.002	112.749	150	
								4.001	112.749	150	
F207	114.027	2.181	Open Manhole	1200	3.004	111.846	150	3.003	111.846	150	
F208	113.592	1.882	Open Manhole	1200	3.005	111.710	150	3.004	111.710	150	
F209	113.271	1.704	Open Manhole	1200	3.006	111.567	150	3.005	111.567	150	
F210	113.209	2.349	Open Manhole	1200	5.000	110.860	150				
F211	112.960	2.290	Open Manhole	1200	3.007	110.670	150	3.006	110.670	150	
								5.000	110.670	150	
F212	112.258	1.850	Open Manhole	1200	3.008	110.408	150	3.007	110.408	150	
F213	110.962	1.791	Open Manhole	1200	6.000	109.171	150				
F214	111.576	2.709	Open Manhole	1200	3.009	108.867	150	3.008	108.867	150	
								6.000	108.867	150	
20	109.898	1.658	Open Manhole	1200	3.010	108.240	150	3.009	108.240	150	
21	108.550	1.671	Open Manhole	1200	3.011	106.879	150	3.010	106.879	150	
22	107.328	2.210	Open Manhole	1350	3.012	105.118	150	3.011	105.118	150	
F301	116.381	1.874	Open Manhole	1200	7.000	114.507	150				
F302	118.700	1.827	Open Manhole	1200	8.000	116.873	150				
F303	116.825	2.921	Open Manhole	1200	7.001	113.904	150	7.000	113.904	150	
								8.000	113.904	150	
F305	114.524	2.404	Open Manhole	1200	9.000	112.120	150				
F306	114.309	2.655	Open Manhole	1200	7.002	111.654	150	7.001	111.654	150	
								9.000	111.654	150	

Manhole Schedules for Foul Network 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
F307	112.576	2.265	Open Manhole	1200	7.003	110.311	150	7.002	110.311	150	
F308	111.640	2.036	Open Manhole	1200	7.004	109.604	150	7.003	109.604	150	
F309	111.857	3.161	Open Manhole	1200	7.005	108.696	150	7.004	108.696	150	
F310	111.492	3.733	Open Manhole	1200	7.006	107.759	150	7.005	107.759	150	
F311	111.216	3.588	Open Manhole	1200	7.007	107.628	150	7.006	107.628	150	
F312	110.710	3.277	Open Manhole	1200	7.008	107.433	150	7.007	107.433	150	
F313	110.267	3.045	Open Manhole	1200	7.009	107.222	150	7.008	107.222	150	
F314	111.086	1.769	Open Manhole	1200	10.000	109.317	150				
F315	110.112	3.044	Open Manhole	1200	7.010	107.068	150	7.009	107.068	150	
								10.000	107.069	150	1
F316	109.169	1.719	Open Manhole	1200	11.000	107.450	150				
F317	109.853	2.663	Open Manhole	1200	11.001	107.190	150	11.000	107.190	150	
F318	109.682	2.705	Open Manhole	1200	7.011	106.977	150	7.010	106.977	150	
								11.001	106.977	150	
F319	107.323	1.803	Open Manhole	1200	7.012	105.520	150	7.011	105.520	150	
F320	107.336	2.081	Open Manhole	1200	7.013	105.255	225	7.012	105.330	150	
F321	106.984	1.874	Open Manhole	1200	7.014	105.110	225	7.013	105.110	225	
23	106.952	1.990	Open Manhole	1200	3.013	104.962	225	3.012	105.037	150	
								7.014	104.969	225	7
24	106.615	1.791	Open Manhole	1200	3.014	104.824	225	3.013	104.824	225	
10	106.852	3.253	Open Manhole	1200	1.009	103.599	225	1.008	103.674	150	
								3.014	103.599	225	
11	106.898	3.465	Open Manhole	1200	1.010	103.433	225	1.009	103.433	225	
12	106.549	3.243	Open Manhole	1200	1.011	103.306	225	1.010	103.306	225	
13	106.397	3.146	Open Manhole	1200	1.012	103.251	225	1.011	103.251	225	
14	106.160	3.009	Open Manhole	1350	1.013	103.151	225	1.012	103.151	225	
25	106.302	1.650	Open Manhole	1200	12.000	104.652	150				
26	106.321	1.877	Open Manhole	1200	12.001	104.444	150	12.000	104.444	150	
27	105.875	1.763	Open Manhole	1200	12.002	104.112	150	12.001	104.112	150	
28	105.655	2.186	Open Manhole	1200	12.003	103.469	150	12.002	103.469	150	
31	105.283	2.759	Open Manhole	1200	13.000	102.524	150				
32	105.918	3.798	Open Manhole	1200	13.001	102.120	150	13.000	102.120	150	
29	105.942	3.926	Open Manhole	1200	12.004	102.016	150	12.003	102.016	150	
								13.001	102.016	150	
33	105.617	1.950	Open Manhole	1200	14.000	103.667	150				
34	105.795	3.214	Open Manhole	1200	14.001	102.581	150	14.000	102.581	150	
30	105.781	3.864	Open Manhole	1200	12.005	101.917	150	12.004	101.917	150	
								14.001	101.917	150	

Manhole Schedules for Foul Network 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
15	105.682	3.995	Open Manhole	1350	1.014	101.687	225	1.013	101.688	225	
								12.005	101.762	150	
16	105.764	4.180	Open Manhole	1350	1.015	101.584	225	1.014	101.584	225	
17	105.885	4.383	Open Manhole	1200	1.016	101.502	225	1.015	101.502	225	
18	105.724	4.352	Open Manhole	1500	1.017	101.372	225	1.016	101.372	225	
36	105.595	2.566	Open Manhole	1200	15.000	103.029	150				
41	105.841	2.550	Open Manhole	1200	16.000	103.291	150				
37	106.021	3.251	Open Manhole	1200	15.001	102.770	150	15.000	102.770	150	
								16.000	102.770	150	
38	105.301	2.910	Open Manhole	1350	15.002	102.391	150	15.001	102.391	150	
39	104.996	3.195	Open Manhole	1200	15.003	101.801	150	15.002	101.801	150	
43	105.000	3.277	Open Manhole	2100	15.004	101.723	750	15.003	101.724	150	
19	105.800	4.499	Open Manhole	2400	1.018	101.302	150	1.017	101.301	225	
								15.004	101.302	750	
42	105.800	4.522	Open Manhole	1200	1.019	101.278	300	1.018	101.278	150	
44	108.350	2.768	Open Manhole	1200	1.020	105.582	300	1.019	105.582	300	
UU1802	108.570	3.010	Open Manhole	0		OUTFALL		1.020	105.560	300	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
1	360281.301	437886.514	360281.301	437886.514	Required	
2	360268.183	437869.383	360268.183	437869.383	Required	
F105	360262.433	437859.940	360262.433	437859.940	Required	
3	360258.416	437866.673	360258.416	437866.673	Required	
4	360249.583	437870.253	360249.583	437870.253	Required	
5	360222.195	437893.996	360222.195	437893.996	Required	

Manhole Schedules for Foul Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
6	360245.683	437921.403	360245.683	437921.403	Required	
7	360247.541	437930.684	360247.541	437930.684	Required	
8	360245.096	437937.547	360245.096	437937.547	Required	
9	360224.281	437958.037	360224.281	437958.037	Required	
F201	360511.445	437892.161	360511.445	437892.161	Required	
F202	360496.874	437879.950	360496.874	437879.950	Required	
F203	360487.094	437865.949	360487.094	437865.949	Required	
F204	360525.779	437821.377	360525.779	437821.377	Required	
F205	360502.279	437818.513	360502.279	437818.513	Required	
F206	360472.818	437826.985	360472.818	437826.985	Required	
F207	360440.629	437836.123	360440.629	437836.123	Required	
F208	360439.119	437854.156	360439.119	437854.156	Required	
F209	360424.604	437868.968	360424.604	437868.968	Required	
F210	360429.710	437904.575	360429.710	437904.575	Required	
F211	360414.742	437892.859	360414.742	437892.859	Required	

Manhole Schedules for Foul Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
F212	360379.412	437893.476	360379.412	437893.476	Required	
F213	360339.489	437866.868	360339.489	437866.868	Required	
F214	360360.317	437902.228	360360.317	437902.228	Required	
20	360321.419	437929.324	360321.419	437929.324	Required	
21	360291.392	437964.530	360291.392	437964.530	Required	
22	360269.741	437992.322	360269.741	437992.322	Required	
F301	360534.166	437908.238	360534.166	437908.238	Required	
F302	360616.360	437898.324	360616.360	437898.324	Required	
F303	360582.715	437944.060	360582.715	437944.060	Required	
F305	360514.794	437988.492	360514.794	437988.492	Required	
F306	360537.578	438005.175	360537.578	438005.175	Required	
F307	360510.027	438042.608	360510.027	438042.608	Required	
F308	360495.925	438062.576	360495.925	438062.576	Required	
F309	360469.391	438045.780	360469.391	438045.780	Required	
F310	360441.868	438028.358	360441.868	438028.358	Required	

Manhole Schedules for Foul Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
F311	360424.672	438023.883	360424.672	438023.883	Required	
F312	360399.443	438016.594	360399.443	438016.594	Required	
F313	360374.699	438002.590	360374.699	438002.590	Required	
F314	360381.744	437977.857	360381.744	437977.857	Required	
F315	360364.270	437992.207	360364.270	437992.207	Required	
F316	360314.887	437966.073	360314.887	437966.073	Required	
F317	360339.658	437981.726	360339.658	437981.726	Required	
F318	360357.194	437997.970	360357.194	437997.970	Required	
F319	360319.984	438042.155	360319.984	438042.155	Required	
F320	360299.418	438026.796	360299.418	438026.796	Required	
F321	360278.689	438011.623	360278.689	438011.623	Required	
23	360259.016	437994.275	360259.016	437994.275	Required	
24	360239.547	437981.829	360239.547	437981.829	Required	
10	360219.437	437966.606	360219.437	437966.606	Required	
11	360194.803	437953.840	360194.803	437953.840	Required	

Manhole Schedules for Foul Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
12	360175.171	437945.636	360175.171	437945.636	Required	
13	360166.029	437946.757	360166.029	437946.757	Required	
14	360151.279	437954.447	360151.279	437954.447	Required	
25	360020.997	437952.070	360020.997	437952.070	Required	
26	360049.018	437951.589	360049.018	437951.589	Required	
27	360072.136	437949.382	360072.136	437949.382	Required	
28	360084.608	437952.334	360084.608	437952.334	Required	
31	360046.764	438002.858	360046.764	438002.858	Required	
32	360076.540	437983.386	360076.540	437983.386	Required	
29	360089.544	437980.849	360089.544	437980.849	Required	
33	360116.695	438021.430	360116.695	438021.430	Required	
34	360104.848	437991.157	360104.848	437991.157	Required	
30	360102.556	437978.193	360102.556	437978.193	Required	
15	360122.977	437973.824	360122.977	437973.824	Required	
16	360131.839	437988.513	360131.839	437988.513	Required	

Manhole Schedules for Foul Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
17	360138.321	438000.631	360138.321	438000.631	Required	
18	360150.497	438018.677	360150.497	438018.677	Required	
36	360265.815	438043.726	360265.815	438043.726	Required	
41	360233.867	438006.887	360233.867	438006.887	Required	
37	360242.927	438017.281	360242.927	438017.281	Required	
38	360203.507	438049.698	360203.507	438049.698	Required	
39	360181.776	438066.920	360181.776	438066.920	Required	
43	360172.378	438071.426	360172.378	438071.426	Required	
19	360140.707	438024.267	360140.707	438024.267	Required	
42	360137.695	438025.499	360137.695	438025.499	Required	
44	360116.005	437840.782	360116.005	437840.782	Required	
UU1802	360116.953	437833.831			No Entry	

Foul Water Network 2

FOUL SEWER DESIGN

Foul Design Details

FOUL SEWERAGE DESIGN

Design Criteria for Foul Network 2

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 2

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	22.412	0.252	88.9	0.000	4	0.0	1.500	o	150	Pipe/Conduit	
1.001	25.354	0.384	66.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.002	11.061	0.471	23.5	0.000	4	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	109.907	0.000	0.0	4	0.0	12	0.30	0.93	16.4	0.2
1.001	109.655	0.000	0.0	4	0.0	11	0.33	1.08	19.1	0.2
1.002	109.271	0.000	0.0	8	0.0	12	0.58	1.81	32.0	0.4

FOUL SEWER DESIGN

Foul Manhole Schedules

Manhole Schedules for Foul Network 2

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
F101	111.707	1.800	Open Manhole	1200	1.000	109.907	150				
F102	111.472	1.817	Open Manhole	1200	1.001	109.655	150	1.000	109.655	150	
F103	111.031	1.760	Open Manhole	1200	1.002	109.271	150	1.001	109.271	150	
F103A	110.576	1.776	Open Manhole	1350		OUTFALL		1.002	108.800	150	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
F101	360363.256	437839.674	360363.256	437839.674	Required	
F102	360340.848	437839.250	360340.848	437839.250	Required	
F103	360320.568	437824.034	360320.568	437824.034	Required	
F103A	360321.008	437812.982			No Entry