

DS_0707_15

DRAINAGE CALCULATION REPORT

FOR

RESIDENTIAL DEVELOPMENT LAND WEST OF LIDSEY ROAD WOODGATE, WEST SUSSEX

Rev. C



WILSONDEE LTD
HARBOROUGH INNOVATION CENTRE,
AIRFIELD BUSINESS PARK, LEICESTER ROAD,
MARKET HARBOROUGH, LEICESTERSHIRE, LE16 7WB



	Name	Position	Signature
Author:	Peter David Bond HNC	Design Manager	
Verifier:	Adam Marciniak MSc	Design Manager	

Revision

Revision	Date	Reason for issue
/	02.11.2024	Discharge of Reserved Matters Planning Condition.
A	18.12.2024	Drainage amended to suit revised Phase 1 site layout
B	24.02.2025	Drainage layouts revised to suit updated site layout. Surface water drainage calculation updated to FEH2022 rainfall data, CV=1, MADD=0
C	14.03.2025	Drainage layouts revised to suit updated site layout

1.0 INTRODUCTION

The objective of this report is to prepare a SuDS Maintenance Plan to identify the necessary maintenance activities required, detail those responsible for these activities, and suggest the frequency these activities should be undertaken to ensure all SuDS features incorporated within the surface water design remain functional for the lifetime of the development. This will enable a continued reduction in local flood risk through the attenuation of on-site surface water run-off.

1.1

Wilsondee Limited was commissioned by BDW Southampton, to produce a SW and FW Drainage Design Strategy for their proposed development at land west of Lidsey Road (A29), Woodgate. The drainage design we have produced follows and builds on the principles set out in the outline planning drainage strategy, the "Flood Risk and Drainage Statement" (Phase 1) produced by FortRidge Consulting Limited dated September 2021 and the "Flood Risk and Drainage Statement" (Phase 2) produced by FortRidge Consulting Limited dated April 2023.

1.2

The requirements and policies of Arun District Council (ADC), West Sussex County Council as Lead Local Flood Authority (WSCC) and the Environment Agency (EA) have been considered when considering our Drainage Design for this site.

1.3

Arun District Council is the Local Planning Authority (LPA), controlling flood risk and water environment issues, through policies and guidance presented in the ADC Strategic Flood Risk Assessment, Final report dated August 2016.

1.4

WSCC, in its role as Lead Local Flood Authority (LLFA), are a statutory consultee for all major applications. Guidance published by WSCC (Revised November 2018) and ADC have been adhered to within our designs.

1.5

Southern Water is the sewerage undertaker for the site.

1.6

The purpose of this Drainage Report is to show that our designs comply with the principles of the Flood Risk and Drainage Statements and Drainage Strategy from the Outline Consent for support of BDW Southampton's reserved matters planning application for this development.

2.0 SITE DESCRIPTION

2.1

The site is located adjacent to the settlement of Woodgate, to the west of A29, Lidsey Road. The ordnance survey reference for the site is OS X (Easting) 493694 and OS Y (Northing) 103881.

The nearest Post Code is PO20 3SU.

The site is split into two phases, Phase 1 (DECISION NOTICE Application Ref: AL/129/21/OUT) and Phase 2 (DECISION NOTICE Application Ref: AL/70/23/OUT)

2.2

PHASE 1

2.2.1

Outline planning application with all matters reserved (except access) for residential development with up to 95no. dwellings (Use Class C3), informal and formal public open space, landscaping, drainage and other associated works. This application is a Departure from the Development Plan.

2.2.2

The overall site area is approximately 3.53 hectares including open space provisions.

2.2.3

PHASE 1 TOPOGRAPHY

The site is relatively flat with levels varying from 9.66mAOD in the north of the site to 8.2mAOD in the east of the site adjacent to Lidsey Road, excluding ditch bed levels.

The land falls in an easterly direction towards Lidsey Road with part of the site falling in a westerly direction. The site is bounded on all sides by drainage ditches that are characteristic of the area.

2.3

PHASE 2

2.3.1

Outline planning application with all matters reserved except access for residential development of the site with up to 155 dwellings (Use Class C3), informal and formal public open space, landscaping, drainage, and other associated works.

2.3.2

The overall site application area is approximately 8.5 hectares including open space and access provisions.

2.3.3

PHASE 2 TOPOGRAPHY

The site is relatively flat with levels varying from 9.5mAOD in the north of the site to 8.0mAOD in the west of the site, excluding ditch bed levels.

The land generally falls in a westerly direction towards arterial watercourse west of the site.

3.0 DRAINAGE DESIGN PRINCIPLES

3.1 DESIGN GUIDANCE

The Surface Water sewers have been designed in accordance with Design and Construction Guidance v.2.3 and the requirements of the Building Regulations (Approved Document H).

3.2 DESIGN ASSUMPTIONS – SURFACE WATER SEWERS

The minimum size of an adoptable surface water sewer is given in clause C7.2.3 of DCG v.2.3 as 150mm. Adoptable storm sewers beneath the proposed highway and main lateral connections have been included in the model.

3.3 DETAILED STORM WATER DRAINAGE DESIGN

The Storm Water drainage system has been designed based on recommendations within the FRA and in line with the site Drainage Strategy.

The designs are in accordance with current Building Regulations, Design and Construction Guidance and drainage design best practice.

Surface water for the site has been split into three separate networks with three separate outfalls with varying discharge rates.

Network 3 is for phase 1 and has a restricted discharge rate of 3 l/s controlled by a proposed Hydro-Brake or similar flow control device. The outfall is into an existing ditch course that runs through the site. All surface water from the plots and estate roads drains to the attenuation pond via a piped system and during the 1 in 100yr storm event surface water will be attenuated.

Networks 1 and 2 are for phase 2 of the development. Network 2 also has a restricted discharge rate of 3 l/s and as with network 3 there is an attenuation basin to attenuated flows during the 1 in 100yr storm events. There is also a separate overflow basin to cater for the volume water that requires storage. The outfall for this network is into the same ditch course running through the site as network 3 but further downstream. Network 1 has a larger restricted discharge rate of 5 l/s as it caters for a higher percentage of the development. There are two separate attenuation basins within this network with the smaller one's discharge being controlled by a Hydro-Brake restricted to 10 l/s to avoid over capacitation of the larger attenuation basin downstream. Swales have also been utilised within this network to convey some of the water to the pond.

All discharge rates have been obtained from the FRA's.

All adoptable drainage and attenuation basins have been sized to accommodate the 1 in 100 year return period storm event including a 45% allowance for climate change and 10% for urban creep.

The site has been designed in accordance with Sustainable Drainage Systems (SUDS) techniques and in accordance with standards set out in CIRIA SuDS Manual (2015).

The SUDS Manual (CIRIA C697) states that "Sedimentation is one of the primary removal mechanisms in SUDS. Most pollution in runoff is attached to sediment particles and therefore removal of sediment results in a significant reduction in pollutant loads".

In order to remove sedimentation, the surface water drainage design utilises deep seal trapped gullies throughout and with catchpit manholes for Highway Drainage.

3.4 DETAILED FOUL WATER DRAINAGE DESIGN

It has been proposed that the foul water will drain to the existing foul main sewer network that serves Woodgate House to the north of the site. Gravity sewers will serve the part of the site closest to the existing sewer with the remainder of the site needing to be pumped from a proposed foul pumping station located within phase 1 of the development.

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APPENDIX E	CALCULATION FOR STORM WATER NETWORK

APPENDIX A

STORM WATER AND FOUL WATER DRAINAGE LAYOUT



FOR CONTINUATION SEE INSET BELOW

FOR CONTINUATION SEE MAIN DRAWING ABOVE

Key

- Foul water gravity sewer to be adopted under S104 agreement
- Storm water gravity sewer to be adopted under S104 agreement
- Foul water rising main to be adopted under S104 agreement
- Existing public foul water gravity sewer
- Proposed sewer / rising main easement
- Adoptable SW Hydro-brake chamber
- Proposed attenuation tank (shown in key NTB)

6000 1:50 13.025m 1.007

sewer diameter
sewer gradient
pipe length
drainage model pipe reference

- Notes**
- This drawing is to be read in conjunction with all the relevant contract documentation.
 - All dimensions are in m unless otherwise stated.
 - Drawings marked Preliminary are for guidance/approval only.
 - Drawing based on:
 - URBAN DESIGN GROUP - Planning Layout - Phase 2, dwg No. ST-23-01 - rev E - date revised: 05.02.2025
 - Siteline Geospatial - "Site Survey", dwg. No. 36W001A, rev A, dated January 2025
 - various documents provided by Client: Flood Risk Assessments, Drainage Strategy Layouts, sewer records, utility drawings, etc.

14.07.2024 Drawing amended to reflect site layout, Phase 2
24.02.2025 Drawing amended to reflect site layout, Phase 2
11.10.2024 Drawing amended to reflect site layout, Phase 2
11.10.2024 Drawing amended to reflect site layout, Phase 2
25.10.2024 Drawing amended to reflect site layout, Phase 2

PRELIMINARY

Barratt Homes
Land West of Lidsey Road,
Woodgate, West Sussex

**Storm Water and Foul Water
Drainage Strategy**

Designers Risk Assessment Reference:
DS_0707_15/DRA/Civils

Specification Reference:

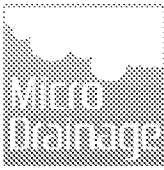
Drawn By: PDB
Checked By: AJM
Scale: 1:500@A0
Date: October 2024

Drawing No: **DS_0707_15/INF/500** **D**

Wilson Jones

APPENDIX B

CALCULATION FOR FOUL WATER NETWORK

WilsonDee Ltd		Page 1
Suite 44, HIC Market Harborough LE16 7WB	DS_0707_15 Woodgate Lidsey Road, Phase 1 and 2 FW drainage network	
Date 14/03/2025	Designed by AJM	
File DS_0707_15 FW.MDX	Checked by PDB	
Innovyze		Network 2020.1.3

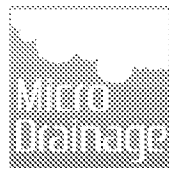
FOUL SEWERAGE DESIGN

Network Design Table for Foul Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	34.971	0.240	145.7	0.000	0	0.0	1.500	o	100	Pipe/Conduit	
1.001	15.876	0.110	144.3	0.000	0	0.0	1.500	o	100	Pipe/Conduit	
1.002	57.540	0.390	147.5	0.000	0	0.0	1.500	o	100	Pipe/Conduit	
2.000	48.189	1.590	30.3	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.003	53.391	0.370	144.3	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.004	25.905	0.180	143.9	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
3.000	9.214	0.470	19.6	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
3.001	26.123	0.180	145.1	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
3.002	21.604	0.160	135.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
3.003	49.220	1.280	38.5	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.005	46.266	0.300	154.2	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.006	46.679	0.320	145.9	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.007	69.819	0.470	148.6	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.008	6.570	0.050	131.4	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.009	29.694	0.200	148.5	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.010	18.679	0.130	143.7	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
4.000	22.313	0.150	148.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
4.001	21.003	0.140	150.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse Add	Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	7.150	0.000	0.0	0	0.0	0	0.00	0.55	4.3	0.0
1.001	6.910	0.000	0.0	0	0.0	0	0.00	0.55	4.3	0.0
1.002	6.800	0.000	0.0	0	0.0	0	0.00	0.55	4.3	0.0
2.000	8.000	0.000	0.0	0	0.0	0	0.00	1.60	28.2	0.0
1.003	6.360	0.000	0.0	0	0.0	0	0.00	0.73	12.9	0.0
1.004	5.990	0.000	0.0	0	0.0	0	0.00	0.73	12.9	0.0
3.000	7.950	0.000	0.0	0	0.0	0	0.00	1.98	35.1	0.0
3.001	7.480	0.000	0.0	0	0.0	0	0.00	0.73	12.8	0.0
3.002	7.300	0.000	0.0	0	0.0	0	0.00	0.75	13.3	0.0
3.003	7.140	0.000	0.0	0	0.0	0	0.00	1.42	25.0	0.0
1.005	5.810	0.000	0.0	0	0.0	0	0.00	0.76	12.4	0.0
1.006	5.510	0.000	0.0	0	0.0	0	0.00	0.72	12.8	0.0
1.007	5.190	0.000	0.0	0	0.0	0	0.00	0.72	12.7	0.0
1.008	4.720	0.000	0.0	0	0.0	0	0.00	0.76	13.5	0.0
1.009	4.670	0.000	0.0	0	0.0	0	0.00	0.72	12.7	0.0
1.010	4.470	0.000	0.0	0	0.0	0	0.00	0.73	12.9	0.0
4.000	7.900	0.000	0.0	0	0.0	0	0.00	0.72	12.7	0.0
4.001	7.750	0.000	0.0	0	0.0	0	0.00	0.71	12.6	0.0

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Suite 44, HIC Market Harborough LE16 7WB	DS_0707_15 Woodgate Lidsey Road, Phase 1 and 2 FW drainage network	
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FOUL SEWERAGE DESIGN

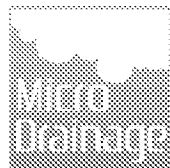
Network Design Table for Foul Network 1

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
4.002	45.604	0.310	147.1	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
4.003	61.212	0.410	149.3	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
4.004	25.426	0.170	149.6	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
4.005	21.651	0.150	144.3	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
4.006	17.836	1.460	12.2	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
4.007	7.218	0.720	10.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.011	6.262	0.050	125.2	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)
4.002	7.610	0.000	0.0	0	0.0	0.00	0.72	12.7	0.0
4.003	7.300	0.000	0.0	0	0.0	0.00	0.72	12.7	0.0
4.004	6.890	0.000	0.0	0	0.0	0.00	0.72	12.6	0.0
4.005	6.720	0.000	0.0	0	0.0	0.00	0.73	12.9	0.0
4.006	6.570	0.000	0.0	0	0.0	0.00	2.52	44.5	0.0
4.007	5.110	0.000	0.0	0	0.0	0.00	2.78	49.1	0.0
1.011	4.340	0.000	0.0	0	0.0	0.00	0.78	13.8	0.0

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Innovyze				Network 2020.1.3							
Manhole Schedules for Foul Network 1											
MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
F2.1	8.805	1.755	Open Manhole	1200	1.000	7.150	100				
F2.2	8.197	2.287	Open Manhole	1200	1.001	6.910	100	1.000	6.910	100	
F2.3	8.112	2.312	Open Manhole	1200	1.002	6.800	100	1.001	6.800	100	
F2.4	8.652	1.652	Open Manhole	1200	2.000	8.000	150				
F2.5	9.121	2.761	Open Manhole	1200	1.003	6.360	150	1.002	6.410	100	
								2.000	6.410	150	50
F2.6	8.898	2.908	Open Manhole	1200	1.004	5.990	150	1.003	5.990	150	
F2.7	8.206	1.256	Open Manhole	1350	3.000	7.950	150				
F2.8	8.173	1.693	Open Manhole	1200	3.001	7.480	150	3.000	7.480	150	
F2.9	8.628	2.328	Open Manhole	1200	3.002	7.300	150	3.001	7.300	150	
F2.10	8.820	2.680	Open Manhole	1200	3.003	7.140	150	3.002	7.140	150	
F2.11	8.228	3.418	Open Manhole	1200	1.005	5.810	150	1.004	5.810	150	
								3.003	5.860	150	50
F2.12	8.000	3.490	Open Manhole	1200	1.006	5.510	150	1.005	5.510	150	
F2.13	8.020	3.830	Open Manhole	1200	1.007	5.190	150	1.006	5.190	150	
F2.14	8.740	5.026	Open Manhole	1200	1.008	4.720	150	1.007	4.720	150	
F2.15	8.751	5.081	Open Manhole	1200	1.009	4.670	150	1.008	4.670	150	
F2.16	8.604	5.224	Open Manhole	1200	1.010	4.470	150	1.009	4.470	150	
F2.17	10.106	2.266	Open Manhole	1200	4.000	7.900	150				
F2.18	8.967	2.217	Open Manhole	1200	4.001	7.750	150	4.000	7.750	150	
F2.19	8.704	2.094	Open Manhole	1200	4.002	7.610	150	4.001	7.610	150	
F2.20	8.189	1.889	Open Manhole	1200	4.003	7.300	150	4.002	7.300	150	
F2.21	8.889	2.999	Open Manhole	1200	4.004	6.890	150	4.003	6.890	150	
F2.22	10.015	3.295	Open Manhole	1200	4.005	6.720	150	4.004	6.720	150	
F2.23	8.839	3.269	Open Manhole	1200	4.006	6.570	150	4.005	6.570	150	
F2.24	8.160	4.050	Open Manhole	1200	4.007	5.110	150	4.006	5.110	150	
F2.25	8.480	5.140	Open Manhole	1200	1.011	4.340	150	1.010	4.340	150	
								4.007	4.390	150	50
PumpStation	8.800	5.510	Open Manhole	1500		OUTFALL		1.011	4.290	150	
MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)					
F2.1	493558.078	103630.679	493558.078	103630.679	Required						
F2.2	493523.274	103634.093	493523.274	103634.093	Required						
F2.3	493507.905	103638.075	493507.905	103638.075	Required						
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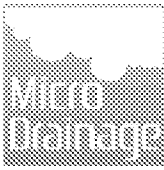
Manhole Schedules for Foul Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
F2.4	493510.733	103743.766	493510.733	103743.766	Required	●
F2.5	493509.721	103695.587	493509.721	103695.587	Required	●
F2.6	493563.087	103693.966	493563.087	103693.966	Required	●
F2.7	493680.473	103658.313	493680.473	103658.313	Required	●
F2.8	493679.895	103667.509	493679.895	103667.509	Required	●
F2.9	493653.841	103665.611	493653.841	103665.611	Required	●
F2.10	493632.266	103666.725	493632.266	103666.725	Required	●
F2.11	493588.590	103689.420	493588.590	103689.420	Required	●
F2.12	493607.479	103731.654	493607.479	103731.654	Required	●
F2.13	493640.320	103764.827	493640.320	103764.827	Required	●
F2.14	493705.447	103739.662	493705.447	103739.662	Required	●
F2.15	493711.333	103742.580	493711.333	103742.580	Required	●
F2.16	493714.195	103772.136	493714.195	103772.136	Required	●
F2.17	493521.804	103831.824	493521.804	103831.824	Required	●
F2.18	493542.755	103839.500	493542.755	103839.500	Required	●
F2.19	493563.712	103840.896	493563.712	103840.896	Required	●
F2.20	493609.008	103835.605	493609.008	103835.605	Required	●

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Manhole Schedules for Foul Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
F2.21	493669.772	103828.210	493669.772	103828.210	Required	
F2.22	493693.444	103818.933	493693.444	103818.933	Required	
F2.23	493714.874	103815.841	493714.874	103815.841	Required	
F2.24	493713.916	103798.031	493713.916	103798.031	Required	
F2.25	493714.043	103790.814	493714.043	103790.814	Required	
PumpStation	493707.781	103790.792			No Entry	

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Innovyze	Network 2020.1.3	

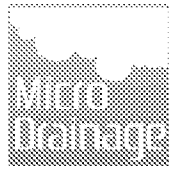
PIPELINE SCHEDULES for Foul Network 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	100	F2.1	8.985	7.150	1.655	Open Manhole	1200
1.001	o	100	F2.2	9.197	6.910	2.187	Open Manhole	1200
1.002	o	100	F2.3	9.112	6.800	2.212	Open Manhole	1200
2.000	o	150	F2.4	9.652	8.000	1.502	Open Manhole	1200
1.003	o	150	F2.5	9.121	6.360	2.611	Open Manhole	1200
1.004	o	150	F2.6	8.898	5.990	2.758	Open Manhole	1200
3.000	o	150	F2.7	9.206	7.950	1.106	Open Manhole	1350
3.001	o	150	F2.8	9.173	7.480	1.543	Open Manhole	1200
3.002	o	150	F2.9	9.628	7.300	2.178	Open Manhole	1200
3.003	o	150	F2.10	9.820	7.140	2.530	Open Manhole	1200
1.005	o	150	F2.11	9.228	5.810	3.268	Open Manhole	1200
1.006	o	150	F2.12	9.000	5.510	3.340	Open Manhole	1200
1.007	o	150	F2.13	9.020	5.190	3.680	Open Manhole	1200
1.008	o	150	F2.14	9.746	4.720	4.876	Open Manhole	1200
1.009	o	150	F2.15	9.751	4.670	4.951	Open Manhole	1200
1.010	o	150	F2.16	9.694	4.470	5.074	Open Manhole	1200
4.000	o	150	F2.17	10.166	7.900	2.116	Open Manhole	1200
4.001	o	150	F2.18	9.967	7.750	2.067	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	34.971	145.7	F2.2	9.197	6.910	2.187	Open Manhole	1200
1.001	15.876	144.3	F2.3	9.112	6.800	2.212	Open Manhole	1200
1.002	57.540	147.5	F2.5	9.121	6.410	2.611	Open Manhole	1200
2.000	48.189	30.3	F2.5	9.121	6.410	2.561	Open Manhole	1200
1.003	53.391	144.3	F2.6	8.898	5.990	2.758	Open Manhole	1200
1.004	25.905	143.9	F2.11	9.228	5.810	3.268	Open Manhole	1200
3.000	9.214	19.6	F2.8	9.173	7.480	1.543	Open Manhole	1200
3.001	26.123	145.1	F2.9	9.628	7.300	2.178	Open Manhole	1200
3.002	21.604	135.0	F2.10	9.820	7.140	2.530	Open Manhole	1200
3.003	49.220	38.5	F2.11	9.228	5.860	3.218	Open Manhole	1200
1.005	46.266	154.2	F2.12	9.000	5.510	3.340	Open Manhole	1200
1.006	46.679	145.9	F2.13	9.020	5.190	3.680	Open Manhole	1200
1.007	69.819	148.6	F2.14	9.746	4.720	4.876	Open Manhole	1200
1.008	6.570	131.4	F2.15	9.751	4.670	4.951	Open Manhole	1200
1.009	29.694	148.5	F2.16	9.694	4.470	5.074	Open Manhole	1200
1.010	18.679	143.7	F2.25	9.480	4.340	4.990	Open Manhole	1200
4.000	22.313	148.8	F2.18	9.967	7.750	2.067	Open Manhole	1200
4.001	21.003	150.0	F2.19	9.704	7.610	1.944	Open Manhole	1200

WilsonDee Ltd		Page 7
Suite 44, HIC Market Harborough LE16 7WB	DS_0707_15 Woodgate Lidsey Road, Phase 1 and 2 FW drainage network	
Date 14/03/2025 File DS_0707_15 FW.MDX	Designed by AJM Checked by PDB	
Innovyze	Network 2020.1.3	

PIPELINE SCHEDULES for Foul Network 1

Upstream Manhole

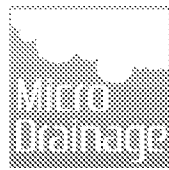
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
4.002	o	150	F2.19	9.794	7.610	1.944	Open Manhole	1200
4.003	o	150	F2.20	9.189	7.300	1.739	Open Manhole	1200
4.004	o	150	F2.21	9.889	6.890	2.849	Open Manhole	1200
4.005	o	150	F2.22	10.015	6.720	3.145	Open Manhole	1200
4.006	o	150	F2.23	9.839	6.570	3.119	Open Manhole	1200
4.007	o	150	F2.24	9.160	5.110	3.900	Open Manhole	1200
1.011	o	150	F2.25	9.480	4.340	4.990	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
4.002	45.604	147.1	F2.20	9.189	7.300	1.739	Open Manhole	1200
4.003	61.212	149.3	F2.21	9.889	6.890	2.849	Open Manhole	1200
4.004	25.426	149.6	F2.22	10.015	6.720	3.145	Open Manhole	1200
4.005	21.651	144.3	F2.23	9.839	6.570	3.119	Open Manhole	1200
4.006	17.836	12.2	F2.24	9.160	5.110	3.900	Open Manhole	1200
4.007	7.218	10.0	F2.25	9.480	4.390	4.940	Open Manhole	1200
1.011	6.262	125.2	PumpStation	9.900	4.290	5.360	Open Manhole	1500

Free Flowing Outfall Details for Foul Network 1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.011	PumpStation	9.800	4.290	0.000	1500	0

WilsonDee Ltd		Page 1
Suite 44, HIC Market Harborough LE16 7WB	DS_0707_15 Woodgate Lidsey Road, Phase 1 and 2 FW drainage network	
Date 14/03/2025 File DS_0707_15 FW.MDX	Designed by AJM Checked by PDB	
Innovyze	Network 2020.1.3	

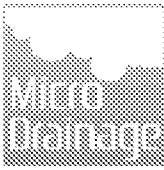
FOUL SEWERAGE DESIGN

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	28.116	0.190	148.0	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.001	56.155	0.380	147.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	
1.002	20.453	0.360	56.8	0.000	0	0.0	1.500	o	150	Pipe/Conduit	

Network Results Table

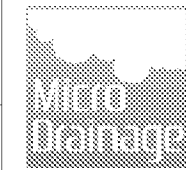
PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	8.250	0.000	0.0	0	0.0	0.00	0.72	12.7	0.0
1.001	8.060	0.000	0.0	0	0.0	0.00	0.72	12.7	0.0
1.002	7.680	0.000	0.0	0	0.0	0.00	1.16	20.6	0.0

WilsonDee Ltd		Page 2
Suite 44, HIC Market Harborough LE16 7WB	DS_0707_15 Woodgate Lidsey Road, Phase 1 and 2 FW drainage network	
Date 14/03/2025 File DS_0707_15 FW.MDX	Designed by AJM Checked by PDB	
Innovyze		Network 2020.1.3

Manhole Schedules for Foul Network 2

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out PN	Invert Level (m)	Diameter (mm)	Pipes In PN	Invert Level (m)	Diameter (mm)	Backdrop (mm)
F1.1	10.074	1.824	Open Manhole	1200	1.000	8.250	150				
F1.2	9.983	1.923	Open Manhole	1200	1.001	8.060	150	1.000	8.060	150	
F1.3	9.114	1.434	Open Manhole	1350	1.002	7.680	150	1.001	7.680	150	
Ex.MH.7903	9.349	2.028	Open Manhole	1500		OUTFALL		1.002	7.320	150	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
F1.1	493681.725	103905.782	493681.725	103905.782	Required	●
F1.2	493686.199	103933.540	493686.199	103933.540	Required	●
F1.3	493742.354	103933.603	493742.354	103933.603	Required	●
Ex.MH.7903	493744.117	103953.979			No Entry	●

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Suite 44, HIC	DS_0707_15 Woodgate	
Market Harborough	Lidsey Road, Phase 1 and 2	
LE16 7WB	FW drainage network	
Date 14/03/2025	Designed by AJM	
File DS_0707_15 FW.MDX	Checked by PDB	
Innovyze	Network 2020.1.3	

PIPELINE SCHEDULES for Foul Network 2

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	150	F1.1	9.074	8.250	1.674	Open Manhole	1200
1.001	o	150	F1.2	9.383	8.060	1.773	Open Manhole	1200
1.002	o	150	F1.3	9.114	7.680	1.284	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	28.116	148.0	F1.2	9.983	8.060	1.773	Open Manhole	1200
1.001	56.155	147.8	F1.3	9.114	7.680	1.284	Open Manhole	1350
1.002	20.453	56.8	Ex.MH.7903	9.348	7.320	1.878	Open Manhole	1500

Free Flowing Outfall Details for Foul Network 2

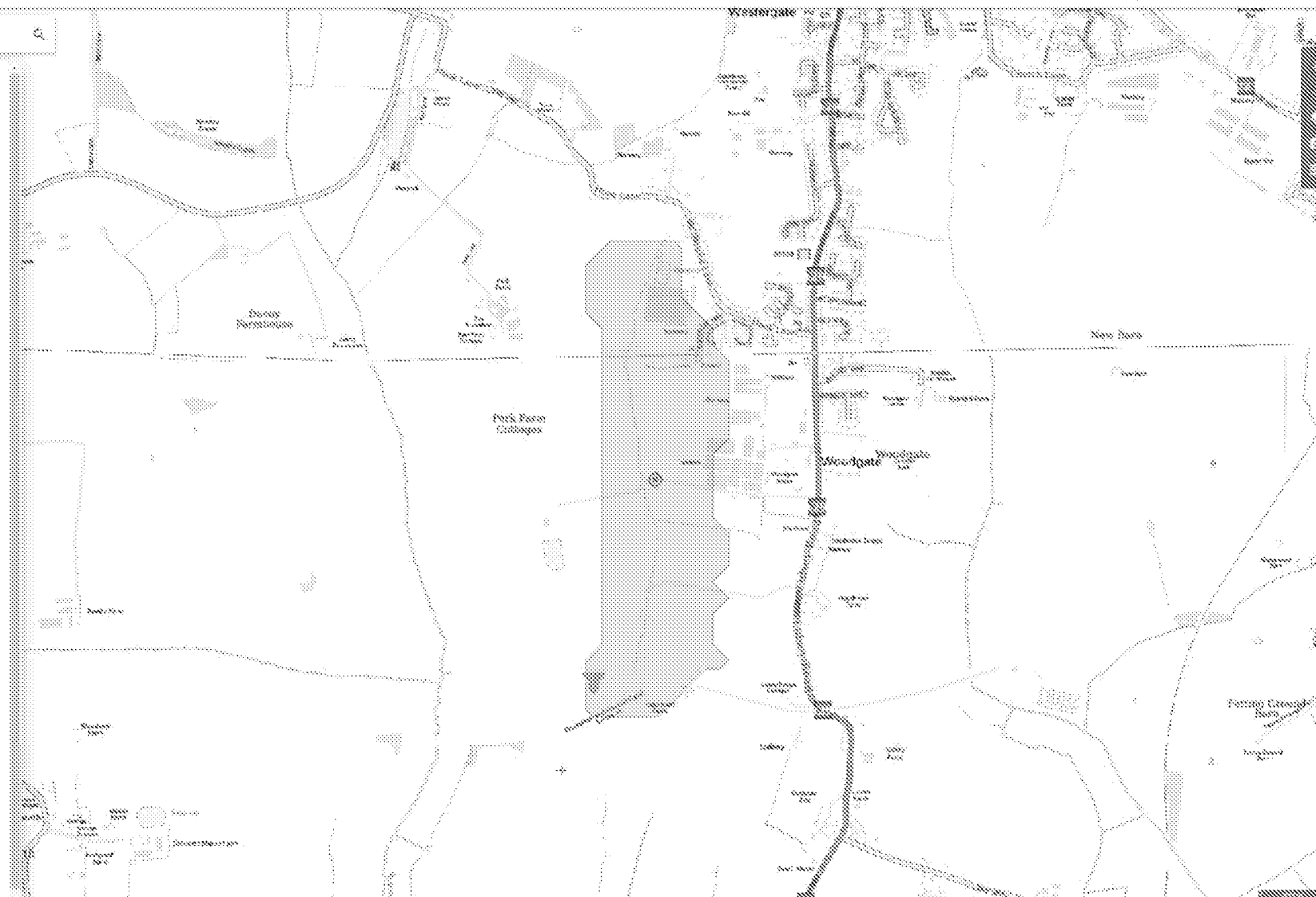
Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.002	Ex.MH.7903	9.348	7.320	0.000	1500	0

APPENDIX C

STORM WATER DESIGN PARAMETERS FOR FEH2022 RAINFALL MODEL

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2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 2681, 26

[illegible]

10.25	0.427083	30.27	40.53	47.53	54.54	58.86	64.66	69.66	73.47	79.34	83.85	100.22	114.11	161.21
10.50	0.437500	30.44	40.73	47.75	54.78	59.12	64.95	69.97	73.80	79.71	84.25	100.71	114.66	161.87
10.75	0.447917	30.61	40.93	47.96	55.01	59.37	65.23	70.27	74.12	80.07	84.64	101.20	115.20	162.51
11.00	0.458333	30.77	41.12	48.17	55.24	59.61	65.50	70.56	74.43	80.42	85.02	101.67	115.72	163.13
11.25	0.468750	30.93	41.31	48.38	55.47	59.85	65.76	70.85	74.74	80.77	85.39	102.13	116.23	163.74
11.50	0.479167	31.09	41.49	48.58	55.68	60.09	66.02	71.13	75.04	81.10	85.76	102.58	116.73	164.33
11.75	0.489583	31.24	41.67	48.78	55.90	60.32	66.28	71.41	75.34	81.43	86.11	103.02	117.21	164.90
12.00	0.500000	31.40	41.85	48.97	56.11	60.55	66.52	71.68	75.62	81.75	86.46	103.45	117.68	165.47
12.25	0.510417	31.54	42.01	49.15	56.31	60.76	66.76	71.94	75.91	82.06	86.80	103.86	118.13	166.00
12.50	0.520833	31.69	42.18	49.34	56.51	60.97	67.00	72.20	76.18	82.37	87.12	104.25	118.56	166.51
12.75	0.531250	31.83	42.34	49.51	56.71	61.18	67.22	72.45	76.45	82.67	87.44	104.64	118.99	167.02
13.00	0.541667	31.97	42.49	49.69	56.90	61.38	67.45	72.69	76.71	82.96	87.76	105.02	119.40	167.52
13.25	0.552083	32.11	42.65	49.86	57.09	61.59	67.67	72.94	76.97	83.24	88.06	105.40	119.81	168.01
13.50	0.562500	32.24	42.80	50.03	57.27	61.78	67.89	73.17	77.23	83.53	88.37	105.76	120.20	168.48
13.75	0.572917	32.38	42.95	50.20	57.46	61.98	68.10	73.41	77.48	83.80	88.66	106.12	120.59	168.95
14.00	0.583333	32.51	43.10	50.36	57.64	62.17	68.31	73.64	77.73	84.07	88.95	106.47	120.97	169.41
14.25	0.593750	32.64	43.24	50.52	57.81	62.36	68.52	73.86	77.97	84.34	89.24	106.82	121.34	169.86
14.50	0.604167	32.77	43.39	50.68	57.99	62.54	68.72	74.09	78.21	84.60	89.52	107.15	121.71	170.31
14.75	0.614583	32.89	43.53	50.84	58.16	62.72	68.92	74.30	78.44	84.86	89.80	107.49	122.07	170.74
15.00	0.625000	33.02	43.67	51.00	58.33	62.90	69.12	74.52	78.67	85.11	90.07	107.81	122.42	171.17
15.25	0.635417	33.14	43.81	51.15	58.50	63.08	69.31	74.73	78.90	85.36	90.33	108.13	122.77	171.59
15.50	0.645833	33.26	43.94	51.30	58.67	63.25	69.50	74.94	79.12	85.61	90.60	108.45	123.10	172.01
15.75	0.656250	33.39	44.08	51.45	58.83	63.43	69.69	75.15	79.35	85.85	90.86	108.76	123.44	172.42
16.00	0.666667	33.50	44.21	51.60	58.99	63.60	69.87	75.35	79.56	86.09	91.11	109.06	123.77	172.82
16.25	0.677083	33.62	44.34	51.74	59.15	63.76	70.06	75.55	79.78	86.32	91.36	109.36	124.09	173.22
16.50	0.687500	33.74	44.47	51.88	59.31	63.93	70.24	75.75	79.99	86.55	91.61	109.66	124.40	173.61
16.75	0.697917	33.86	44.60	52.03	59.46	64.09	70.42	75.94	80.20	86.78	91.85	109.95	124.71	173.99
17.00	0.708333	33.97	44.73	52.17	59.62	64.26	70.59	76.14	80.40	87.00	92.09	110.23	125.02	174.37
17.25	0.718750	34.08	44.85	52.31	59.77	64.42	70.77	76.33	80.61	87.22	92.33	110.51	125.32	174.75
17.50	0.729167	34.20	44.98	52.44	59.92	64.57	70.94	76.51	80.81	87.44	92.56	110.79	125.62	175.12
17.75	0.739583	34.31	45.10	52.58	60.07	64.73	71.11	76.70	81.00	87.66	92.79	111.06	125.91	175.49
18.00	0.750000	34.42	45.23	52.72	60.22	64.88	71.28	76.88	81.20	87.87	93.02	111.33	126.20	175.85
18.25	0.760417	34.53	45.35	52.85	60.36	65.04	71.45	77.06	81.39	88.08	93.24	111.60	126.49	176.23
18.50	0.770833	34.64	45.48	52.99	60.51	65.20	71.62	77.25	81.58	88.29	93.47	111.86	126.77	176.61
18.75	0.781250	34.75	45.61	53.12	60.66	65.35	71.78	77.42	81.77	88.49	93.69	112.12	127.05	176.98
19.00	0.791667	34.87	45.73	53.26	60.80	65.50	71.95	77.60	81.96	88.70	93.90	112.38	127.32	177.35
19.25	0.802083	34.97	45.86	53.39	60.95	65.65	72.11	77.78	82.15	88.90	94.12	112.64	127.59	177.71
19.50	0.812500	35.08	45.98	53.52	61.09	65.80	72.27	77.95	82.33	89.10	94.33	112.89	127.86	178.07
19.75	0.822917	35.19	46.10	53.65	61.23	65.95	72.43	78.12	82.51	89.29	94.54	113.13	128.13	178.43
20.00	0.833333	35.30	46.22	53.78	61.37	66.10	72.59	78.29	82.69	89.49	94.75	113.38	128.39	178.78
20.25	0.843750	35.41	46.34	53.91	61.51	66.24	72.75	78.46	82.87	89.68	94.95	113.62	128.65	179.12
20.50	0.854167	35.51	46.46	54.04	61.65	66.39	72.90	78.63	83.04	89.87	95.15	113.86	128.90	179.46
20.75	0.864583	35.62	46.58	54.17	61.79	66.53	73.06	78.79	83.22	90.06	95.35	114.10	129.15	179.79
21.00	0.875000	35.72	46.70	54.29	61.92	66.68	73.21	78.95	83.39	90.25	95.55	114.33	129.40	180.13
21.25	0.885417	35.83	46.82	54.42	62.06	66.82	73.36	79.12	83.56	90.43	95.75	114.56	129.65	180.45
21.50	0.895833	35.93	46.94	54.54	62.19	66.96	73.51	79.28	83.73	90.61	95.94	114.79	129.89	180.77
21.75	0.906250	36.03	47.05	54.67	62.33	67.10	73.66	79.44	83.90	90.80	96.14	115.01	130.13	181.09
22.00	0.916667	36.14	47.17	54.79	62.46	67.24	73.81	79.60	84.07	90.98	96.33	115.24	130.37	181.40
22.25	0.927083	36.24	47.29	54.91	62.59	67.37	73.96	79.75	84.23	91.15	96.52	115.46	130.60	181.71
22.50	0.937500	36.34	47.40	55.03	62.72	67.51	74.10	79.91	84.39	91.33	96.70	115.68	130.84	182.02
22.75	0.947917	36.44	47.51	55.15	62.85	67.65	74.25	80.06	84.56	91.50	96.89	115.89	131.07	182.32
23.00	0.958333	36.54	47.63	55.27	62.98	67.78	74.39	80.22	84.72	91.68	97.07	116.11	131.29	182.62
23.25	0.968750	36.64	47.74	55.39	63.11	67.91	74.54	80.37	84.88	91.85	97.25	116.32	131.52	182.91
23.50	0.979167	36.74	47.85	55.51	63.23	68.05	74.68	80.52	85.04	92.02	97.44	116.53	131.74	183.20

23.75	0.989583	36.83	47.96	55.63	63.36	68.18	74.82	80.67	85.19	92.19	97.61	116.73	131.96	183.48
24.00	1.000000	36.93	48.07	55.74	63.49	68.31	74.96	80.82	85.35	92.36	97.79	116.94	132.18	183.77
24.25	1.010417	37.03	48.18	55.86	63.61	68.44	75.09	80.96	85.50	92.52	97.96	117.13	132.39	184.01
24.50	1.020833	37.12	48.29	55.97	63.73	68.57	75.23	81.11	85.65	92.68	98.13	117.33	132.60	184.24
24.75	1.031250	37.21	48.39	56.09	63.85	68.69	75.37	81.25	85.80	92.84	98.30	117.52	132.80	184.48
25.00	1.041667	37.31	48.50	56.20	63.97	68.82	75.50	81.39	85.95	93.00	98.47	117.71	133.00	184.71
25.25	1.052083	37.40	48.61	56.31	64.09	68.95	75.63	81.53	86.10	93.16	98.63	117.89	133.20	184.93
25.50	1.062500	37.49	48.71	56.42	64.21	69.07	75.77	81.67	86.24	93.31	98.80	118.08	133.40	185.16
25.75	1.072917	37.58	48.81	56.53	64.33	69.19	75.90	81.81	86.39	93.47	98.96	118.27	133.60	185.38
26.00	1.083333	37.68	48.92	56.64	64.45	69.32	76.03	81.95	86.53	93.62	99.12	118.45	133.79	185.60
26.25	1.093750	37.77	49.02	56.75	64.57	69.44	76.16	82.09	86.68	93.78	99.28	118.63	133.99	185.81
26.50	1.104167	37.86	49.12	56.86	64.69	69.56	76.29	82.23	86.82	93.93	99.44	118.81	134.18	186.02
26.75	1.114583	37.95	49.22	56.97	64.80	69.68	76.42	82.36	86.96	94.08	99.60	118.99	134.37	186.23
27.00	1.125000	38.04	49.33	57.08	64.92	69.80	76.55	82.50	87.10	94.23	99.76	119.16	134.56	186.44
27.25	1.135417	38.13	49.43	57.18	65.03	69.92	76.67	82.63	87.24	94.38	99.91	119.34	134.75	186.65
27.50	1.145833	38.21	49.53	57.29	65.15	70.04	76.80	82.76	87.38	94.53	100.07	119.51	134.93	186.85
27.75	1.156250	38.30	49.63	57.40	65.26	70.16	76.93	82.90	87.52	94.67	100.22	119.69	135.12	187.05
28.00	1.166667	38.39	49.73	57.50	65.38	70.28	77.05	83.03	87.65	94.82	100.37	119.86	135.30	187.25
28.25	1.177083	38.48	49.83	57.61	65.49	70.40	77.18	83.16	87.79	94.97	100.53	120.03	135.48	187.45
28.50	1.187500	38.57	49.93	57.72	65.60	70.52	77.30	83.29	87.93	95.11	100.68	120.20	135.66	187.65
28.75	1.197917	38.65	50.02	57.82	65.71	70.63	77.42	83.42	88.06	95.25	100.83	120.36	135.84	187.84
29.00	1.208333	38.74	50.12	57.92	65.82	70.75	77.55	83.55	88.20	95.40	100.98	120.53	136.02	188.03
29.25	1.218750	38.83	50.22	58.03	65.94	70.87	77.67	83.68	88.33	95.54	101.12	120.69	136.19	188.22
29.50	1.229167	38.91	50.32	58.13	66.05	70.98	77.79	83.81	88.46	95.68	101.27	120.86	136.37	188.41
29.75	1.239583	39.00	50.41	58.23	66.16	71.10	77.91	83.93	88.60	95.82	101.42	121.02	136.54	188.59
30.00	1.250000	39.08	50.51	58.34	66.27	71.21	78.03	84.06	88.73	95.96	101.56	121.18	136.71	188.78
30.25	1.260417	39.17	50.61	58.44	66.38	71.32	78.15	84.19	88.86	96.10	101.71	121.34	136.88	188.96
30.50	1.270833	39.25	50.70	58.54	66.48	71.44	78.27	84.31	88.99	96.24	101.85	121.50	137.05	189.14
30.75	1.281250	39.34	50.80	58.64	66.59	71.55	78.39	84.44	89.12	96.37	101.99	121.66	137.22	189.32
31.00	1.291667	39.42	50.89	58.74	66.70	71.66	78.51	84.56	89.25	96.51	102.14	121.82	137.39	189.50
31.25	1.302083	39.50	50.99	58.84	66.81	71.78	78.63	84.68	89.37	96.65	102.28	121.97	137.56	189.68
31.50	1.312500	39.59	51.08	58.94	66.92	71.89	78.75	84.81	89.50	96.78	102.42	122.13	137.72	189.85
31.75	1.322917	39.67	51.17	59.04	67.02	72.00	78.86	84.93	89.63	96.92	102.56	122.28	137.89	190.03
32.00	1.333333	39.75	51.27	59.14	67.13	72.11	78.98	85.05	89.76	97.05	102.70	122.44	138.05	190.20
32.25	1.343750	39.84	51.36	59.24	67.24	72.22	79.10	85.17	89.88	97.18	102.83	122.59	138.21	190.37
32.50	1.354167	39.92	51.45	59.34	67.34	72.33	79.21	85.30	90.01	97.32	102.97	122.74	138.37	190.54
32.75	1.364583	40.00	51.55	59.44	67.45	72.44	79.33	85.42	90.13	97.45	103.11	122.89	138.53	190.71
33.00	1.375000	40.08	51.64	59.54	67.55	72.55	79.44	85.54	90.26	97.58	103.24	123.04	138.69	190.88
33.25	1.385417	40.16	51.73	59.64	67.66	72.66	79.56	85.66	90.38	97.71	103.38	123.19	138.85	191.04
33.50	1.395833	40.25	51.82	59.74	67.76	72.76	79.67	85.77	90.50	97.84	103.51	123.34	139.01	191.21
33.75	1.406250	40.33	51.91	59.83	67.86	72.87	79.78	85.89	90.63	97.97	103.65	123.49	139.17	191.37
34.00	1.416667	40.41	52.01	59.93	67.97	72.98	79.90	86.01	90.75	98.10	103.78	123.63	139.32	191.54
34.25	1.427083	40.49	52.10	60.03	68.07	73.09	80.01	86.13	90.87	98.23	103.91	123.78	139.48	191.70
34.50	1.437500	40.57	52.19	60.12	68.17	73.19	80.12	86.25	90.99	98.35	104.05	123.92	139.63	191.86
34.75	1.447917	40.65	52.28	60.22	68.28	73.30	80.23	86.36	91.11	98.48	104.18	124.07	139.78	192.02
35.00	1.458333	40.73	52.37	60.31	68.38	73.41	80.35	86.48	91.23	98.61	104.31	124.21	139.94	192.18
35.25	1.468750	40.81	52.46	60.41	68.48	73.51	80.46	86.59	91.35	98.73	104.44	124.35	140.09	192.33
35.50	1.479167	40.89	52.55	60.51	68.58	73.62	80.57	86.71	91.47	98.86	104.57	124.50	140.24	192.49
35.75	1.489583	40.97	52.64	60.60	68.68	73.72	80.68	86.82	91.59	98.98	104.70	124.64	140.39	192.64
36.00	1.500000	41.05	52.73	60.70	68.78	73.83	80.79	86.94	91.71	99.11	104.83	124.78	140.54	192.80
36.25	1.510417	41.13	52.81	60.79	68.88	73.93	80.90	87.05	91.82	99.23	104.95	124.92	140.69	192.95
36.50	1.520833	41.20	52.90	60.88	68.98	74.04	81.01	87.17	91.94	99.35	105.08	125.06	140.83	193.11
36.75	1.531250	41.28	52.99	60.98	69.08	74.14	81.12	87.28	92.06	99.48	105.21	125.19	140.98	193.26
37.00	1.541667	41.36	53.08	61.07	69.18	74.24	81.22	87.39	92.17	99.60	105.33	125.33	141.13	193.41

37.25	1.552083	41.44	53.17	61.17	69.28	74.35	81.33	87.51	92.29	99.72	105.46	125.47	141.27	193.56
37.50	1.562500	41.52	53.25	61.26	69.38	74.45	81.44	87.62	92.41	99.84	105.59	125.60	141.42	193.71
37.75	1.572917	41.60	53.34	61.35	69.48	74.55	81.55	87.73	92.52	99.96	105.71	125.74	141.56	193.85
38.00	1.583333	41.67	53.43	61.44	69.58	74.65	81.66	87.84	92.64	100.08	105.83	125.88	141.70	194.00
38.25	1.593750	41.75	53.52	61.54	69.68	74.76	81.76	87.95	92.75	100.20	105.96	126.01	141.85	194.15
38.50	1.604167	41.83	53.60	61.63	69.78	74.86	81.87	88.06	92.86	100.32	106.08	126.14	141.99	194.29
38.75	1.614583	41.90	53.69	61.72	69.87	74.96	81.98	88.17	92.98	100.44	106.20	126.28	142.13	194.44
39.00	1.625000	41.98	53.78	61.81	69.97	75.06	82.08	88.28	93.09	100.56	106.33	126.41	142.27	194.58
39.25	1.635417	42.06	53.86	61.91	70.07	75.16	82.19	88.39	93.20	100.68	106.45	126.54	142.41	194.73
39.50	1.645833	42.13	53.95	62.00	70.17	75.26	82.29	88.50	93.32	100.80	106.57	126.67	142.55	194.87
39.75	1.656250	42.21	54.03	62.09	70.26	75.36	82.40	88.61	93.43	100.91	106.69	126.80	142.69	195.01
40.00	1.666667	42.29	54.12	62.18	70.36	75.46	82.50	88.72	93.54	101.03	106.81	126.93	142.83	195.15
40.25	1.677083	42.36	54.20	62.27	70.46	75.56	82.61	88.83	93.65	101.15	106.93	127.06	142.96	195.29
40.50	1.687500	42.44	54.29	62.36	70.55	75.66	82.71	88.94	93.76	101.26	107.05	127.19	143.10	195.43
40.75	1.697917	42.51	54.38	62.45	70.65	75.76	82.81	89.04	93.87	101.38	107.17	127.32	143.24	195.57
41.00	1.708333	42.59	54.46	62.54	70.74	75.86	82.92	89.15	93.98	101.50	107.29	127.45	143.37	195.71
41.25	1.718750	42.67	54.54	62.63	70.84	75.96	83.02	89.26	94.09	101.61	107.41	127.58	143.51	195.85
41.50	1.729167	42.74	54.63	62.72	70.94	76.06	83.12	89.37	94.20	101.73	107.52	127.70	143.64	195.99
41.75	1.739583	42.82	54.71	62.81	71.03	76.16	83.23	89.47	94.31	101.84	107.64	127.83	143.78	196.12
42.00	1.750000	42.89	54.80	62.90	71.13	76.26	83.33	89.58	94.42	101.95	107.76	127.96	143.91	196.26
42.25	1.760417	42.97	54.88	62.99	71.22	76.35	83.43	89.68	94.53	102.07	107.87	128.08	144.04	196.39
42.50	1.770833	43.04	54.97	63.08	71.31	76.45	83.53	89.79	94.64	102.18	107.99	128.21	144.18	196.53
42.75	1.781250	43.12	55.05	63.17	71.41	76.55	83.64	89.90	94.75	102.29	108.11	128.33	144.31	196.66
43.00	1.791667	43.19	55.13	63.26	71.50	76.65	83.74	90.00	94.85	102.41	108.22	128.45	144.44	196.80
43.25	1.802083	43.26	55.22	63.34	71.60	76.74	83.84	90.11	94.96	102.52	108.34	128.58	144.57	196.93
43.50	1.812500	43.34	55.30	63.43	71.69	76.84	83.94	90.21	95.07	102.63	108.45	128.70	144.70	197.06
43.75	1.822917	43.41	55.38	63.52	71.78	76.94	84.04	90.31	95.18	102.74	108.57	128.82	144.83	197.19
44.00	1.833333	43.49	55.46	63.61	71.88	77.03	84.14	90.42	95.28	102.85	108.68	128.95	144.96	197.32
44.25	1.843750	43.56	55.55	63.70	71.97	77.13	84.24	90.52	95.39	102.96	108.79	129.07	145.09	197.46
44.50	1.854167	43.63	55.63	63.78	72.06	77.23	84.34	90.63	95.49	103.07	108.91	129.19	145.22	197.59
44.75	1.864583	43.71	55.71	63.87	72.16	77.32	84.44	90.73	95.60	103.18	109.02	129.31	145.34	197.72
45.00	1.875000	43.78	55.79	63.96	72.25	77.42	84.54	90.83	95.71	103.29	109.13	129.43	145.47	197.84
45.25	1.885417	43.85	55.88	64.05	72.34	77.51	84.64	90.93	95.81	103.40	109.24	129.55	145.60	197.97
45.50	1.895833	43.93	55.96	64.13	72.43	77.61	84.74	91.04	95.92	103.51	109.36	129.67	145.72	198.10
45.75	1.906250	44.00	56.04	64.22	72.53	77.70	84.84	91.14	96.02	103.62	109.47	129.79	145.85	198.23
46.00	1.916667	44.07	56.12	64.31	72.62	77.80	84.94	91.24	96.13	103.73	109.58	129.91	145.98	198.36
46.25	1.927083	44.15	56.20	64.39	72.71	77.89	85.04	91.34	96.23	103.84	109.69	130.03	146.10	198.48
46.50	1.937500	44.22	56.29	64.48	72.80	77.99	85.14	91.44	96.33	103.94	109.80	130.14	146.23	198.61
46.75	1.947917	44.29	56.37	64.57	72.89	78.08	85.23	91.54	96.44	104.05	109.91	130.26	146.35	198.74
47.00	1.958333	44.37	56.45	64.65	72.98	78.18	85.33	91.65	96.54	104.16	110.02	130.38	146.47	198.86
47.25	1.968750	44.44	56.53	64.74	73.07	78.27	85.43	91.75	96.64	104.27	110.13	130.49	146.60	198.99
47.50	1.979167	44.51	56.61	64.83	73.17	78.37	85.53	91.85	96.75	104.37	110.24	130.61	146.72	199.11
47.75	1.989583	44.58	56.69	64.91	73.26	78.46	85.62	91.95	96.85	104.48	110.35	130.73	146.84	199.24
48.00	2.000000	44.65	56.77	65.00	73.35	78.55	85.72	92.05	96.95	104.59	110.45	130.84	146.96	199.36
48.25	2.010417	44.73	56.85	65.09	73.44	78.65	85.82	92.15	97.06	104.69	110.57	130.96	147.09	199.50
48.50	2.020833	44.81	56.94	65.17	73.53	78.75	85.92	92.25	97.16	104.80	110.68	131.08	147.21	199.63
48.75	2.031250	44.88	57.02	65.26	73.63	78.84	86.02	92.36	97.26	104.91	110.78	131.20	147.33	199.77
49.00	2.041667	44.96	57.10	65.35	73.72	78.94	86.12	92.46	97.37	105.02	110.89	131.31	147.46	199.90
49.25	2.052083	45.03	57.19	65.44	73.81	79.03	86.22	92.56	97.47	105.12	111.00	131.43	147.58	200.04
49.50	2.062500	45.11	57.27	65.53	73.91	79.13	86.32	92.66	97.58	105.23	111.11	131.55	147.70	200.17
49.75	2.072917	45.18	57.35	65.62	74.00	79.22	86.42	92.76	97.68	105.34	111.22	131.66	147.82	200.31
50.00	2.083333	45.26	57.44	65.70	74.09	79.32	86.52	92.86	97.78	105.44	111.33	131.78	147.94	200.44
50.25	2.093750	45.33	57.52	65.79	74.18	79.41	86.61	92.96	97.89	105.55	111.44	131.89	148.07	200.58
50.50	2.104167	45.41	57.60	65.88	74.27	79.51	86.71	93.07	97.99	105.65	111.55	132.01	148.19	200.71

50.75	2.114583	45.48	57.68	65.97	74.37	79.60	86.81	93.17	98.09	105.76	111.65	132.12	148.31	200.84
51.00	2.125000	45.55	57.77	66.05	74.46	79.70	86.91	93.27	98.19	105.87	111.76	132.24	148.43	200.98
51.25	2.135417	45.63	57.85	66.14	74.55	79.79	87.01	93.37	98.30	105.97	111.87	132.35	148.55	201.11
51.50	2.145833	45.70	57.93	66.23	74.64	79.89	87.10	93.47	98.40	106.08	111.98	132.47	148.66	201.24
51.75	2.156250	45.78	58.01	66.32	74.73	79.98	87.20	93.57	98.50	106.18	112.08	132.58	148.78	201.37
52.00	2.166667	45.85	58.10	66.40	74.83	80.08	87.30	93.67	98.60	106.28	112.19	132.69	148.90	201.51
52.25	2.177083	45.93	58.18	66.49	74.92	80.17	87.40	93.77	98.70	106.39	112.29	132.81	149.02	201.64
52.50	2.187500	46.00	58.26	66.58	75.01	80.26	87.49	93.87	98.80	106.49	112.40	132.92	149.14	201.77
52.75	2.197917	46.07	58.34	66.66	75.10	80.36	87.59	93.97	98.90	106.60	112.51	133.03	149.26	201.90
53.00	2.208333	46.15	58.42	66.75	75.19	80.45	87.69	94.07	99.01	106.70	112.61	133.14	149.37	202.03
53.25	2.218750	46.22	58.50	66.84	75.28	80.54	87.78	94.16	99.11	106.80	112.72	133.25	149.49	202.16
53.50	2.229167	46.30	58.59	66.92	75.37	80.64	87.88	94.26	99.21	106.91	112.82	133.37	149.61	202.29
53.75	2.239583	46.37	58.67	67.01	75.46	80.73	87.98	94.36	99.31	107.01	112.93	133.48	149.72	202.42
54.00	2.250000	46.44	58.75	67.09	75.55	80.82	88.07	94.46	99.41	107.11	113.03	133.59	149.84	202.55
54.25	2.260417	46.52	58.83	67.18	75.64	80.92	88.17	94.56	99.51	107.22	113.14	133.70	149.96	202.68
54.50	2.270833	46.59	58.91	67.27	75.73	81.01	88.27	94.66	99.61	107.32	113.24	133.81	150.07	202.81
54.75	2.281250	46.66	58.99	67.35	75.82	81.10	88.36	94.76	99.71	107.42	113.35	133.92	150.19	202.94
55.00	2.291667	46.74	59.07	67.44	75.91	81.19	88.46	94.85	99.81	107.52	113.45	134.03	150.30	203.07
55.25	2.302083	46.81	59.15	67.52	76.00	81.29	88.55	94.95	99.91	107.62	113.55	134.14	150.42	203.19
55.50	2.312500	46.88	59.23	67.61	76.09	81.38	88.65	95.05	100.00	107.73	113.66	134.25	150.53	203.32
55.75	2.322917	46.96	59.31	67.69	76.18	81.47	88.74	95.15	100.10	107.83	113.76	134.36	150.65	203.45
56.00	2.333333	47.03	59.39	67.78	76.27	81.56	88.84	95.24	100.20	107.93	113.86	134.47	150.76	203.58
56.25	2.343750	47.10	59.47	67.86	76.36	81.66	88.93	95.34	100.30	108.03	113.97	134.58	150.87	203.70
56.50	2.354167	47.18	59.55	67.95	76.45	81.75	89.03	95.44	100.40	108.13	114.07	134.69	150.99	203.83
56.75	2.364583	47.25	59.64	68.03	76.54	81.84	89.12	95.53	100.50	108.23	114.17	134.80	151.10	203.96
57.00	2.375000	47.32	59.72	68.12	76.63	81.93	89.22	95.63	100.60	108.33	114.27	134.90	151.21	204.08
57.25	2.385417	47.39	59.80	68.20	76.72	82.02	89.31	95.73	100.69	108.43	114.37	135.01	151.33	204.21
57.50	2.395833	47.47	59.88	68.29	76.81	82.11	89.41	95.82	100.79	108.53	114.48	135.12	151.44	204.34
57.75	2.406250	47.54	59.96	68.37	76.90	82.21	89.50	95.92	100.89	108.63	114.58	135.23	151.55	204.46
58.00	2.416667	47.61	60.04	68.46	76.99	82.30	89.59	96.02	100.99	108.73	114.68	135.33	151.66	204.59
58.25	2.427083	47.68	60.12	68.54	77.08	82.39	89.69	96.11	101.08	108.83	114.78	135.44	151.78	204.71
58.50	2.437500	47.76	60.19	68.63	77.16	82.48	89.78	96.21	101.18	108.93	114.88	135.55	151.89	204.84
58.75	2.447917	47.83	60.27	68.71	77.25	82.57	89.88	96.30	101.28	109.03	114.98	135.65	152.00	204.96
59.00	2.458333	47.90	60.35	68.80	77.34	82.66	89.97	96.40	101.38	109.13	115.08	135.76	152.11	205.09
59.25	2.468750	47.97	60.43	68.88	77.43	82.75	90.06	96.50	101.47	109.23	115.18	135.87	152.22	205.21
59.50	2.479167	48.05	60.51	68.96	77.52	82.84	90.16	96.59	101.57	109.33	115.28	135.97	152.33	205.34
59.75	2.489583	48.12	60.59	69.05	77.61	82.93	90.25	96.69	101.67	109.43	115.39	136.08	152.44	205.46
60.00	2.500000	48.19	60.67	69.13	77.69	83.02	90.34	96.78	101.76	109.53	115.49	136.18	152.55	205.58
60.25	2.510417	48.26	60.75	69.22	77.78	83.11	90.44	96.88	101.86	109.62	115.59	136.29	152.66	205.71
60.50	2.520833	48.33	60.83	69.30	77.87	83.20	90.53	96.97	101.96	109.72	115.68	136.40	152.77	205.83
60.75	2.531250	48.41	60.91	69.38	77.96	83.29	90.62	97.07	102.05	109.82	115.78	136.50	152.88	205.95
61.00	2.541667	48.48	60.99	69.47	78.04	83.38	90.71	97.16	102.15	109.92	115.88	136.60	152.99	206.07
61.25	2.552083	48.55	61.07	69.55	78.13	83.47	90.81	97.25	102.24	110.02	115.98	136.71	153.10	206.20
61.50	2.562500	48.62	61.15	69.63	78.22	83.56	90.90	97.35	102.34	110.11	116.08	136.81	153.21	206.32
61.75	2.572917	48.69	61.22	69.72	78.31	83.65	90.99	97.44	102.43	110.21	116.18	136.92	153.32	206.44
62.00	2.583333	48.76	61.30	69.80	78.39	83.74	91.08	97.54	102.53	110.31	116.28	137.02	153.42	206.56
62.25	2.593750	48.84	61.38	69.88	78.48	83.83	91.18	97.63	102.62	110.41	116.38	137.13	153.53	206.68
62.50	2.604167	48.91	61.46	69.97	78.57	83.92	91.27	97.73	102.72	110.50	116.48	137.23	153.64	206.81
62.75	2.614583	48.98	61.54	70.05	78.66	84.01	91.36	97.82	102.81	110.60	116.57	137.33	153.75	206.93
63.00	2.625000	49.05	61.62	70.13	78.74	84.10	91.45	97.91	102.91	110.70	116.67	137.44	153.85	207.05
63.25	2.635417	49.12	61.70	70.22	78.83	84.19	91.54	98.01	103.00	110.79	116.77	137.54	153.96	207.17
63.50	2.645833	49.19	61.77	70.30	78.92	84.28	91.63	98.10	103.10	110.89	116.87	137.64	154.07	207.29
63.75	2.656250	49.26	61.85	70.38	79.00	84.36	91.73	98.19	103.19	110.99	116.97	137.74	154.18	207.41
64.00	2.666667	49.34	61.93	70.46	79.09	84.45	91.82	98.29	103.29	111.08	117.06	137.85	154.28	207.53

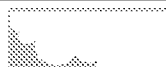
64.25	2.677083	49.41	62.01	70.55	79.18	84.54	91.91	98.38	103.38	111.18	117.16	137.95	154.39	207.65
64.50	2.687500	49.48	62.09	70.63	79.26	84.63	92.00	98.47	103.48	111.27	117.26	138.05	154.49	207.77
64.75	2.697917	49.55	62.16	70.71	79.35	84.72	92.09	98.56	103.57	111.37	117.35	138.15	154.60	207.89
65.00	2.708333	49.62	62.24	70.79	79.44	84.81	92.18	98.66	103.66	111.46	117.45	138.25	154.71	208.01
65.25	2.718750	49.69	62.32	70.88	79.52	84.90	92.27	98.75	103.76	111.56	117.55	138.36	154.81	208.13
65.50	2.729167	49.76	62.40	70.96	79.61	84.98	92.36	98.84	103.85	111.66	117.64	138.46	154.92	208.25
65.75	2.739583	49.83	62.48	71.04	79.69	85.07	92.45	98.93	103.94	111.75	117.74	138.56	155.02	208.37
66.00	2.750000	49.90	62.55	71.12	79.78	85.16	92.54	99.03	104.04	111.85	117.84	138.66	155.13	208.48
66.25	2.760417	49.97	62.63	71.20	79.87	85.25	92.63	99.12	104.13	111.94	117.93	138.76	155.23	208.60
66.50	2.770833	50.05	62.71	71.29	79.95	85.34	92.72	99.21	104.22	112.04	118.03	138.86	155.34	208.72
66.75	2.781250	50.12	62.79	71.37	80.04	85.42	92.81	99.30	104.32	112.13	118.13	138.96	155.44	208.84
67.00	2.791667	50.19	62.86	71.45	80.12	85.51	92.91	99.39	104.41	112.22	118.22	139.06	155.55	208.96
67.25	2.802083	50.26	62.94	71.53	80.21	85.60	93.00	99.49	104.50	112.32	118.32	139.16	155.65	209.07
67.50	2.812500	50.33	63.02	71.61	80.29	85.69	93.09	99.58	104.60	112.41	118.41	139.26	155.75	209.19
67.75	2.822917	50.40	63.10	71.70	80.38	85.77	93.17	99.67	104.69	112.51	118.51	139.36	155.86	209.31
68.00	2.833333	50.47	63.17	71.78	80.46	85.86	93.26	99.76	104.78	112.60	118.60	139.46	155.96	209.43
68.25	2.843750	50.54	63.25	71.86	80.55	85.95	93.35	99.85	104.87	112.69	118.70	139.56	156.07	209.54
68.50	2.854167	50.61	63.33	71.94	80.64	86.04	93.44	99.94	104.97	112.79	118.79	139.66	156.17	209.66
68.75	2.864583	50.68	63.40	72.02	80.72	86.12	93.53	100.03	105.06	112.88	118.89	139.76	156.27	209.78
69.00	2.875000	50.75	63.48	72.10	80.81	86.21	93.62	100.13	105.15	112.98	118.98	139.86	156.37	209.89
69.25	2.885417	50.82	63.56	72.18	80.89	86.30	93.71	100.22	105.24	113.07	119.08	139.96	156.48	210.01
69.50	2.895833	50.89	63.63	72.27	80.98	86.38	93.80	100.31	105.33	113.16	119.17	140.06	156.58	210.13
69.75	2.906250	50.96	63.71	72.35	81.06	86.47	93.89	100.40	105.42	113.26	119.26	140.15	156.68	210.24
70.00	2.916667	51.03	63.79	72.43	81.15	86.56	93.98	100.49	105.52	113.35	119.36	140.25	156.78	210.36
70.25	2.927083	51.10	63.86	72.51	81.23	86.64	94.07	100.58	105.61	113.44	119.45	140.35	156.89	210.47
70.50	2.937500	51.17	63.94	72.59	81.31	86.73	94.16	100.67	105.70	113.53	119.55	140.45	156.99	210.59
70.75	2.947917	51.24	64.02	72.67	81.40	86.82	94.25	100.76	105.79	113.63	119.64	140.55	157.09	210.70
71.00	2.958333	51.31	64.09	72.75	81.48	86.90	94.34	100.85	105.88	113.72	119.73	140.64	157.19	210.82
71.25	2.968750	51.38	64.17	72.83	81.57	86.99	94.42	100.94	105.97	113.81	119.83	140.74	157.29	210.93
71.50	2.979167	51.45	64.25	72.91	81.65	87.08	94.51	101.03	106.06	113.90	119.92	140.84	157.39	211.05
71.75	2.989583	51.52	64.32	72.99	81.74	87.16	94.60	101.12	106.16	114.00	120.01	140.94	157.50	211.16
72.00	3.000000	51.59	64.40	73.08	81.82	87.25	94.69	101.21	106.25	114.09	120.11	141.03	157.60	211.28
72.25	3.010417	51.66	64.48	73.16	81.91	87.34	94.78	101.30	106.34	114.18	120.20	141.13	157.70	211.39
72.50	3.020833	51.73	64.55	73.24	81.99	87.42	94.87	101.39	106.43	114.27	120.29	141.23	157.80	211.51
72.75	3.031250	51.80	64.63	73.32	82.07	87.51	94.95	101.48	106.52	114.37	120.39	141.33	157.90	211.62
73.00	3.041667	51.87	64.71	73.40	82.16	87.59	95.04	101.57	106.61	114.46	120.48	141.42	158.00	211.73
73.25	3.052083	51.94	64.78	73.48	82.24	87.68	95.13	101.66	106.70	114.55	120.57	141.52	158.10	211.85
73.50	3.062500	52.01	64.86	73.56	82.33	87.76	95.22	101.75	106.79	114.64	120.66	141.61	158.20	211.96
73.75	3.072917	52.08	64.93	73.64	82.41	87.85	95.31	101.84	106.88	114.73	120.76	141.71	158.30	212.08
74.00	3.083333	52.15	65.01	73.72	82.49	87.94	95.39	101.93	106.97	114.82	120.85	141.81	158.40	212.19
74.25	3.093750	52.22	65.09	73.80	82.58	88.02	95.48	102.02	107.06	114.91	120.94	141.90	158.50	212.30
74.50	3.104167	52.29	65.16	73.88	82.66	88.11	95.57	102.10	107.15	115.01	121.03	142.00	158.60	212.42
74.75	3.114583	52.36	65.24	73.96	82.74	88.19	95.66	102.19	107.24	115.10	121.12	142.09	158.70	212.53
75.00	3.125000	52.43	65.31	74.04	82.83	88.28	95.74	102.28	107.33	115.19	121.22	142.19	158.80	212.64
75.25	3.135417	52.49	65.39	74.12	82.91	88.36	95.83	102.37	107.42	115.28	121.31	142.29	158.89	212.75
75.50	3.145833	52.56	65.46	74.20	82.99	88.45	95.92	102.46	107.51	115.37	121.40	142.38	158.99	212.87
75.75	3.156250	52.63	65.54	74.28	83.08	88.53	96.01	102.55	107.60	115.46	121.49	142.48	159.09	212.98
76.00	3.166667	52.70	65.62	74.36	83.16	88.62	96.09	102.64	107.69	115.55	121.58	142.57	159.19	213.09
76.25	3.177083	52.77	65.69	74.44	83.24	88.70	96.18	102.73	107.78	115.64	121.67	142.67	159.29	213.20
76.50	3.187500	52.84	65.77	74.52	83.33	88.79	96.27	102.81	107.87	115.73	121.76	142.76	159.39	213.31
76.75	3.197917	52.91	65.84	74.60	83.41	88.87	96.35	102.90	107.95	115.82	121.86	142.86	159.49	213.43
77.00	3.208333	52.98	65.92	74.68	83.49	88.96	96.44	102.99	108.04	115.91	121.95	142.95	159.58	213.54
77.25	3.218750	53.05	65.99	74.76	83.58	89.04	96.53	103.08	108.13	116.00	122.04	143.04	159.68	213.65
77.50	3.229167	53.12	66.07	74.84	83.66	89.13	96.62	103.17	108.22	116.09	122.13	143.14	159.78	213.76

77.75	3.239583	53.19	66.14	74.92	83.74	89.21	96.70	103.26	108.31	116.18	122.22	143.23	159.88	213.87
78.00	3.250000	53.26	66.22	75.00	83.83	89.30	96.79	103.34	108.40	116.27	122.31	143.33	159.97	213.98
78.25	3.260417	53.32	66.30	75.08	83.91	89.38	96.88	103.43	108.49	116.36	122.40	143.42	160.07	214.09
78.50	3.270833	53.39	66.37	75.15	83.99	89.47	96.96	103.52	108.58	116.45	122.49	143.52	160.17	214.20
78.75	3.281250	53.46	66.45	75.23	84.07	89.55	97.05	103.61	108.67	116.54	122.58	143.61	160.27	214.31
79.00	3.291667	53.53	66.52	75.31	84.16	89.64	97.13	103.69	108.75	116.63	122.67	143.70	160.36	214.42
79.25	3.302083	53.60	66.60	75.39	84.24	89.72	97.22	103.78	108.84	116.72	122.76	143.80	160.46	214.54
79.50	3.312500	53.67	66.67	75.47	84.32	89.80	97.31	103.87	108.93	116.81	122.85	143.89	160.56	214.65
79.75	3.322917	53.74	66.75	75.55	84.40	89.89	97.39	103.96	109.02	116.90	122.94	143.98	160.65	214.76
80.00	3.333333	53.81	66.82	75.63	84.49	89.97	97.48	104.04	109.11	116.99	123.03	144.08	160.75	214.87
80.25	3.343750	53.87	66.90	75.71	84.57	90.06	97.57	104.13	109.19	117.08	123.12	144.17	160.85	214.98
80.50	3.354167	53.94	66.97	75.79	84.65	90.14	97.65	104.22	109.28	117.16	123.21	144.26	160.94	215.08
80.75	3.364583	54.01	67.05	75.87	84.73	90.22	97.74	104.31	109.37	117.25	123.30	144.35	161.04	215.19
81.00	3.375000	54.08	67.12	75.95	84.82	90.31	97.82	104.39	109.46	117.34	123.39	144.45	161.13	215.30
81.25	3.385417	54.15	67.20	76.03	84.90	90.39	97.91	104.48	109.55	117.43	123.48	144.54	161.23	215.41
81.50	3.395833	54.22	67.27	76.10	84.98	90.48	98.00	104.57	109.63	117.52	123.57	144.63	161.33	215.52
81.75	3.406250	54.29	67.34	76.18	85.06	90.56	98.08	104.65	109.72	117.61	123.66	144.73	161.42	215.63
82.00	3.416667	54.35	67.42	76.26	85.15	90.64	98.17	104.74	109.81	117.70	123.75	144.82	161.52	215.74
82.25	3.427083	54.42	67.49	76.34	85.23	90.73	98.25	104.83	109.90	117.78	123.83	144.91	161.61	215.85
82.50	3.437500	54.49	67.57	76.42	85.31	90.81	98.34	104.91	109.98	117.87	123.92	145.00	161.71	215.96
82.75	3.447917	54.56	67.64	76.50	85.39	90.90	98.42	105.00	110.07	117.96	124.01	145.09	161.80	216.07
83.00	3.458333	54.63	67.72	76.58	85.47	90.98	98.51	105.09	110.16	118.05	124.10	145.19	161.90	216.18
83.25	3.468750	54.70	67.79	76.65	85.56	91.06	98.59	105.17	110.25	118.14	124.19	145.28	161.99	216.28
83.50	3.479167	54.76	67.87	76.73	85.64	91.15	98.68	105.26	110.33	118.22	124.28	145.37	162.09	216.39
83.75	3.489583	54.83	67.94	76.81	85.72	91.23	98.76	105.35	110.42	118.31	124.37	145.46	162.18	216.50
84.00	3.500000	54.90	68.02	76.89	85.80	91.31	98.85	105.43	110.51	118.40	124.45	145.55	162.28	216.61
84.25	3.510417	54.97	68.09	76.97	85.88	91.40	98.93	105.52	110.59	118.49	124.54	145.64	162.37	216.72
84.50	3.520833	55.04	68.16	77.05	85.96	91.48	99.02	105.61	110.68	118.58	124.63	145.73	162.47	216.82
84.75	3.531250	55.11	68.24	77.13	86.05	91.56	99.10	105.69	110.77	118.66	124.72	145.83	162.56	216.93
85.00	3.541667	55.17	68.31	77.20	86.13	91.65	99.19	105.78	110.85	118.75	124.81	145.92	162.65	217.04
85.25	3.552083	55.24	68.39	77.28	86.21	91.73	99.27	105.86	110.94	118.84	124.90	146.01	162.75	217.15
85.50	3.562500	55.31	68.46	77.36	86.29	91.81	99.36	105.95	111.03	118.93	124.98	146.10	162.84	217.25
85.75	3.572917	55.38	68.54	77.44	86.37	91.89	99.44	106.04	111.11	119.01	125.07	146.19	162.94	217.36
86.00	3.583333	55.45	68.61	77.52	86.45	91.98	99.53	106.12	111.20	119.10	125.16	146.28	163.03	217.47
86.25	3.593750	55.51	68.68	77.59	86.53	92.06	99.61	106.21	111.29	119.19	125.25	146.37	163.12	217.58
86.50	3.604167	55.58	68.76	77.67	86.62	92.14	99.70	106.29	111.37	119.27	125.33	146.46	163.22	217.68
86.75	3.614583	55.65	68.83	77.75	86.70	92.23	99.78	106.38	111.46	119.36	125.42	146.55	163.31	217.79
87.00	3.625000	55.72	68.91	77.83	86.78	92.31	99.87	106.46	111.55	119.45	125.51	146.64	163.40	217.90
87.25	3.635417	55.79	68.98	77.91	86.86	92.39	99.95	106.55	111.63	119.54	125.60	146.73	163.50	218.00
87.50	3.645833	55.85	69.05	77.99	86.94	92.47	100.04	106.64	111.72	119.62	125.68	146.82	163.59	218.11
87.75	3.656250	55.92	69.13	78.06	87.02	92.56	100.12	106.72	111.80	119.71	125.77	146.91	163.68	218.22
88.00	3.666667	55.99	69.20	78.14	87.10	92.64	100.20	106.81	111.89	119.80	125.86	147.00	163.78	218.32
88.25	3.677083	56.06	69.28	78.22	87.18	92.72	100.29	106.89	111.98	119.88	125.94	147.09	163.87	218.43
88.50	3.687500	56.13	69.35	78.30	87.26	92.80	100.37	106.98	112.06	119.97	126.03	147.18	163.96	218.53
88.75	3.697917	56.19	69.42	78.37	87.35	92.89	100.46	107.06	112.15	120.05	126.12	147.27	164.05	218.64
89.00	3.708333	56.26	69.50	78.45	87.43	92.97	100.54	107.15	112.23	120.14	126.21	147.36	164.15	218.75
89.25	3.718750	56.33	69.57	78.53	87.51	93.05	100.63	107.23	112.32	120.23	126.29	147.45	164.24	218.85
89.50	3.729167	56.40	69.65	78.61	87.59	93.13	100.71	107.32	112.41	120.31	126.38	147.54	164.33	218.96
89.75	3.739583	56.47	69.72	78.69	87.67	93.22	100.79	107.40	112.49	120.40	126.47	147.63	164.42	219.06
90.00	3.750000	56.53	69.79	78.76	87.75	93.30	100.88	107.49	112.58	120.49	126.55	147.72	164.52	219.17
90.25	3.760417	56.60	69.87	78.84	87.83	93.38	100.96	107.57	112.66	120.57	126.64	147.81	164.61	219.27
90.50	3.770833	56.67	69.94	78.92	87.91	93.46	101.04	107.66	112.75	120.66	126.73	147.90	164.70	219.38
90.75	3.781250	56.74	70.01	79.00	87.99	93.55	101.13	107.74	112.83	120.74	126.81	147.99	164.79	219.48
91.00	3.791667	56.80	70.09	79.07	88.07	93.63	101.21	107.83	112.92	120.83	126.90	148.07	164.88	219.59

91.25	3.802083	56.87	70.16	79.15	88.15	93.71	101.30	107.91	113.00	120.92	126.98	148.16	164.98	219.70
91.50	3.812500	56.94	70.24	79.23	88.23	93.79	101.38	108.00	113.09	121.00	127.07	148.25	165.07	219.80
91.75	3.822917	57.01	70.31	79.31	88.31	93.87	101.46	108.08	113.17	121.09	127.16	148.34	165.16	219.90
92.00	3.833333	57.07	70.38	79.38	88.39	93.96	101.55	108.17	113.26	121.17	127.24	148.43	165.25	220.01
92.25	3.843750	57.14	70.46	79.46	88.47	94.04	101.63	108.25	113.34	121.26	127.33	148.52	165.34	220.11
92.50	3.854167	57.21	70.53	79.54	88.55	94.12	101.71	108.33	113.43	121.34	127.41	148.61	165.43	220.22
92.75	3.864583	57.28	70.60	79.61	88.64	94.20	101.80	108.42	113.51	121.43	127.50	148.69	165.52	220.32
93.00	3.875000	57.34	70.68	79.69	88.72	94.28	101.88	108.50	113.60	121.51	127.59	148.78	165.62	220.43
93.25	3.885417	57.41	70.75	79.77	88.80	94.36	101.96	108.59	113.68	121.60	127.67	148.87	165.71	220.53
93.50	3.895833	57.48	70.82	79.85	88.88	94.45	102.05	108.67	113.77	121.69	127.76	148.96	165.80	220.64
93.75	3.906250	57.55	70.90	79.92	88.96	94.53	102.13	108.76	113.85	121.77	127.84	149.05	165.89	220.74
94.00	3.916667	57.61	70.97	80.00	89.04	94.61	102.21	108.84	113.94	121.86	127.93	149.13	165.98	220.84
94.25	3.927083	57.68	71.04	80.08	89.12	94.69	102.30	108.92	114.02	121.94	128.01	149.22	166.07	220.95
94.50	3.937500	57.75	71.12	80.16	89.20	94.77	102.38	109.01	114.11	122.03	128.10	149.31	166.16	221.05
94.75	3.947917	57.82	71.19	80.23	89.28	94.85	102.46	109.09	114.19	122.11	128.18	149.40	166.25	221.16
95.00	3.958333	57.88	71.26	80.31	89.36	94.94	102.55	109.18	114.28	122.20	128.27	149.49	166.34	221.26
95.25	3.968750	57.95	71.34	80.39	89.44	95.02	102.63	109.26	114.36	122.28	128.35	149.57	166.43	221.36
95.50	3.979167	58.02	71.41	80.46	89.52	95.10	102.71	109.34	114.45	122.37	128.44	149.66	166.52	221.47
95.75	3.989583	58.08	71.48	80.54	89.60	95.18	102.79	109.43	114.53	122.45	128.52	149.75	166.61	221.57
96.00	4.000000	58.15	71.56	80.62	89.68	95.26	102.88	109.51	114.61	122.54	128.61	149.84	166.70	221.67

APPENDIX D

STORM WATER NETWORK DETAILS

WilsonDee Ltd		Page 1
Suite 44, HIC	DS_0707_15 Woodgate	
Market Harborough	Lidsey Road	
LE16 7WB	FEH2022 rainfall model	
Date 14/03/2025	Designed by AJM	
File DS_0707_15 FEH2022.MDX	Checked by PDB	
Innovyze	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 1

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	2013
Site Location GB 493100 103250 SU 93100 03250	
Data Type	Catchment
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Surface Network 1

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.050	4-8	0.863	8-12	0.796	12-16	0.030

Total Area Contributing (ha) = 1.739

Total Pipe Volume (m³) = 199.570

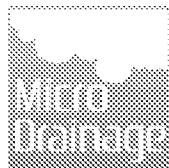
Network Design Table for Surface Network 1

« - 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	23.950	0.096	249.5	0.083	5.00	0.0	0.600	o	300	Pipe/Conduit	
1.001	22.777	0.091	250.3	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.002	48.741	0.195	250.0	0.080	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL E (m)	I.Area (ha)	E 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	8.005	0.083	0.0	0.0	0.0	0.99	70.0	11.2
1.001	50.00	5.79	7.909	0.083	0.0	0.0	0.0	0.99	69.9	11.2
1.002	50.00	6.61	7.818	0.163	0.0	0.0	0.0	0.99	70.0	22.1

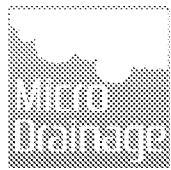
WilsonDee Ltd		Page 2
Suite 44, HIC Market Harborough LE16 7WB	DS_0707_15 Woodgate Lidsey Road FEH2022 rainfall model	
Date 14/03/2025	Designed by AJM	
File DS_0707_15 FEH2022.MDX	Checked by PDB	
Innovyze	Network 2020.1.3	

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
1.003	40.060	0.097	413.0	0.128	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.004	34.326	0.083	413.6	0.149	0.00	0.0	0.600	o	450	Pipe/Conduit	
2.000	37.903	0.152	249.4	0.138	5.00	0.0	0.600	o	300	Pipe/Conduit	
1.005	23.346	0.048	486.4	0.039	0.00	0.0	0.600	o	525	Pipe/Conduit	
3.000	18.871	0.075	251.6	0.086	5.00	0.0	0.600	o	300	Pipe/Conduit	
1.006	52.366	0.105	498.7	0.059	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.007	22.900	0.046	497.8	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.008	10.852	0.022	493.3	0.154	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.009	53.303	0.104	512.5	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
4.000	79.322	0.191	415.3	0.229	5.00	0.0	0.600	o	450	Pipe/Conduit	
5.000	25.348	0.101	251.0	0.054	5.00	0.0	0.600	o	300	Pipe/Conduit	
4.001	25.811	0.062	416.3	0.061	0.00	0.0	0.600	o	450	Pipe/Conduit	
4.002	16.935	0.041	413.0	0.126	0.00	0.0	0.600	o	450	Pipe/Conduit	
4.003	13.756	0.030	458.5	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
6.000	28.117	0.112	251.0	0.068	5.00	0.0	0.600	o	300	Pipe/Conduit	
6.001	19.973	0.080	249.7	0.050	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	I.Area (ha)	Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.003	50.00	7.28	7.473	0.291	0.0	0.0	0.0	0.99	158.1	39.4
1.004	50.00	7.85	7.376	0.440	0.0	0.0	0.0	0.99	158.0	59.6
2.000	50.00	5.64	7.595	0.138	0.0	0.0	0.0	0.99	70.1	18.7
1.005	50.00	8.24	7.219	0.617	0.0	0.0	0.0	1.01	218.4	83.5
3.000	50.00	5.32	7.471	0.086	0.0	0.0	0.0	0.99	69.7	11.6
1.006	49.65	9.05	7.096	0.762	0.0	0.0	0.0	1.08	306.4	102.5
1.007	48.69	9.40	6.991	0.762	0.0	0.0	0.0	1.08	306.7	102.5
1.008	48.25	9.56	6.945	0.916	0.0	0.0	0.0	1.09	308.1	119.7
1.009	46.18	10.39	6.924	0.916	0.0	0.0	0.0	1.07	302.2	119.7
4.000	50.00	6.33	7.524	0.229	0.0	0.0	0.0	0.99	157.7	31.0
5.000	50.00	5.43	7.594	0.054	0.0	0.0	0.0	0.99	69.8	7.3
4.001	50.00	6.77	7.933	0.344	0.0	0.0	0.0	0.99	157.5	46.6
4.002	50.00	7.05	7.271	0.470	0.0	0.0	0.0	0.99	158.1	63.6
4.003	50.00	7.25	7.230	0.470	0.0	0.0	0.0	1.13	319.7	63.6
6.000	50.00	5.47	7.723	0.068	0.0	0.0	0.0	0.99	69.8	9.2
6.001	50.00	5.81	7.610	0.118	0.0	0.0	0.0	0.99	70.0	16.0

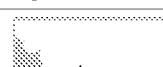
WilsonDee Ltd		Page 3
Suite 44, HIC Market Harborough LE16 7WB	DS_0707_15 Woodgate Lidsey Road FEH2022 rainfall model	
Date 14/03/2025	Designed by AJM	
File DS_0707_15 FEH2022.MDX	Checked by PDB	
Innovyze	Network 2020.1.3	

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
6.002	48.943	0.118	414.8	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
6.003	9.291	0.022	422.3	0.069	0.00	0.0	0.600	o	450	Pipe/Conduit	
6.004	12.022	0.040	300.6	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
4.004	12.310	0.025	492.4	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
4.005	103.468	0.230	449.9	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
4.006	11.032	0.031	355.9	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
7.000	15.377	0.291	52.8	0.050	5.00	0.0	0.600	o	300	Pipe/Conduit	
4.007	19.388	0.039	497.1	0.116	0.00	0.0	0.600	o	600	Pipe/Conduit	
4.008	29.537	0.050	590.7	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.010	9.894	0.020	494.7	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.011	16.172	0.060	269.5	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.012	117.468	0.250	469.9	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.013	20.908	0.080	261.4	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

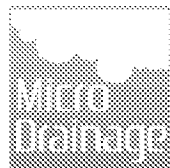
Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
6.002	50.00	6.63	7.380	0.118	0.0	0.0	0.0	0.99	157.8	16.0
6.003	50.00	6.79	7.262	0.187	0.0	0.0	0.0	0.98	156.3	25.3
6.004	50.00	6.96	7.240	0.187	0.0	0.0	0.0	1.17	185.7	25.3
4.004	50.00	7.44	7.200	0.657	0.0	0.0	0.0	1.09	308.4	89.0
4.005	49.91	8.95	7.170	0.657	0.0	0.0	0.0	1.14	322.8	89.0
4.006	49.51	9.10	6.940	0.657	0.0	0.0	0.0	1.29	363.3	89.0
7.000	50.00	5.12	7.500	0.050	0.0	0.0	0.0	2.17	153.2	6.8
4.007	48.70	9.39	6.900	0.823	0.0	0.0	0.0	1.09	306.9	108.5
4.008	47.41	9.89	6.870	0.823	0.0	0.0	0.0	0.99	281.2	108.5
1.010	45.83	10.55	6.820	1.739	0.0	0.0	0.0	1.09	307.6	215.8
1.011	45.41	10.73	6.800	1.739	0.0	0.0	0.0	1.48	418.0	215.8
1.012	41.81	12.48	6.740	1.739	0.0	0.0	0.0	1.12	315.8	215.8
1.013	41.15	12.84	6.490	1.739	0.0	0.0	0.0	0.97	281.2	215.8

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Manhole Schedules for Surface Network 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S4.12	8.243	1.244	Open Manhole	1350	1.000	8.605	300				
S4.13	8.658	1.750	Open Manhole	1350	1.001	7.909	300	1.000	7.909	300	
S4.14	8.771	1.953	Open Manhole	1200	1.002	7.818	300	1.001	7.818	300	
S4.15	8.224	1.751	Open Manhole	1350	1.003	7.473	450	1.002	7.623	300	
S4.16	8.760	1.384	Open Manhole	1350	1.004	7.376	450	1.003	7.376	450	
S4.17	8.546	1.951	Open Manhole	1200	2.000	7.595	300				
S4.18	8.675	1.856	Open Manhole	1500	1.005	7.219	525	1.004	7.293	450	
								2.000	7.443	300	
S4.19	8.860	1.529	Open Manhole	1350	3.000	7.471	300				
S4.20	8.881	1.745	Open Manhole	1500	1.006	7.896	600	1.005	7.171	525	
								3.000	7.396	300	
S4.21	8.500	1.509	Open Manhole	1500	1.007	6.991	600	1.006	6.991	600	
S4.22	8.500	1.555	Open Manhole	1500	1.008	6.945	600	1.007	6.945	600	
HW4.5	8.500	1.577	Open Manhole	1500	1.009	6.924	600	1.008	6.923	600	
S4.1	8.120	1.596	Open Manhole	1350	4.000	7.524	450				
S4.2	8.504	1.920	Open Manhole	1200	5.000	7.584	300				
S4.3	8.177	1.844	Open Manhole	1350	4.001	7.333	450	4.000	7.333	450	
								5.000	7.483	300	
S4.4	8.967	1.716	Open Manhole	1350	4.002	7.271	450	4.001	7.271	450	
HW4.1	8.076	1.846	Open Manhole	1500	4.003	7.230	600	4.002	7.230	450	
S4.5	8.392	1.669	Open Manhole	1350	6.000	7.723	300				
S4.6	8.262	1.652	Open Manhole	1350	6.001	7.610	300	6.000	7.611	300	1
S4.7	8.277	1.897	Open Manhole	1350	6.002	7.360	450	6.001	7.530	300	
S4.8	8.000	1.738	Open Manhole	1350	6.003	7.262	450	6.002	7.262	450	
HW4.2	8.076	1.836	Open Manhole	1350	6.004	7.240	450	6.003	7.240	450	
HW4.3	8.076	1.876	Open Manhole	1500	4.004	7.200	600	4.003	7.200	600	
								6.004	7.200	450	
HB4.1	8.000	1.830	Open Manhole	2400	4.005	7.170	600	4.004	7.175	600	5
S4.9	8.098	2.158	Open Manhole	1500	4.006	6.949	600	4.005	6.940	600	
S4.10	8.364	1.864	Open Manhole	1200	7.000	7.500	300				
S4.11	8.181	2.272	Open Manhole	1500	4.007	6.909	600	4.006	6.909	600	
								7.000	7.209	300	
HW4.4	8.810	1.940	Open Manhole	1500	4.008	6.870	600	4.007	6.870	600	
HW4.6	8.810	1.990	Open Manhole	1500	1.010	6.820	600	1.009	6.820	600	
								4.008	6.820	600	
HB4.2	8.800	2.000	Open Manhole	2400	1.011	6.800	600	1.010	6.800	600	
HW4.7	8.500	1.760	Open Manhole	1500	1.012	6.740	600	1.011	6.740	600	
HW4.8	7.500	1.010	Open Manhole	1500	1.013	6.490	600	1.012	6.490	600	
outfall14	7.500	1.090	Open Manhole	0		OUTFALL		1.013	6.410	300	

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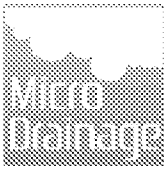
Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S4.12	493676.096	103665.155	493676.096	103665.155	Required	●
S4.13	493652.177	103663.924	493652.177	103663.924	Required	●
S4.14	493629.471	103665.713	493629.471	103665.713	Required	●
S4.15	493586.389	103688.508	493586.389	103688.508	Required	●
S4.16	493546.605	103693.202	493546.605	103693.202	Required	●
S4.17	493513.195	103731.999	493513.195	103731.999	Required	●
S4.18	493512.291	103694.107	493512.291	103694.107	Required	●
S4.19	493510.581	103651.930	493510.581	103651.930	Required	●
S4.20	493511.700	103670.768	493511.700	103670.768	Required	●
S4.21	493459.345	103671.802	493459.345	103671.802	Required	●
S4.22	493438.036	103663.415	493438.036	103663.415	Required	●
HW4.5	493436.421	103652.683	493436.421	103652.683	Required	●
S4.1	493533.700	103635.339	493533.700	103635.339	Required	●
S4.2	493619.189	103651.317	493619.189	103651.317	Required	●
S4.3	493612.567	103626.849	493612.567	103626.849	Required	●
S4.4	493610.038	103601.162	493610.038	103601.162	Required	●
HW4.1	493617.772	103586.096	493617.772	103586.096	Required	●

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Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S4.5	493676.511	103640.685	493676.511	103640.685	Required	●
S4.6	493669.712	103613.403	493669.712	103613.403	Required	●
S4.7	493676.764	103594.716	493676.764	103594.716	Required	●
S4.8	493634.163	103570.620	493634.163	103570.620	Required	●
HW4.2	493625.458	103573.867	493625.458	103573.867	Required	●
HW4.3	493613.466	103573.031	493613.466	103573.031	Required	●
HB4.1	493602.408	103567.621	493602.408	103567.621	Required	●
S4.9	493500.259	103584.088	493500.259	103584.088	Required	●
S4.10	493499.393	103609.338	493499.393	103609.338	Required	●
S4.11	493496.118	103594.314	493496.118	103594.314	Required	●
HW4.4	493477.145	103598.302	493477.145	103598.302	Required	●
HW4.6	493447.697	103600.586	493447.697	103600.586	Required	●
HB4.2	493437.806	103600.315	493437.806	103600.315	Required	●
HW4.7	493421.649	103599.635	493421.649	103599.635	Required	●
HW4.8	493305.578	103617.700	493305.578	103617.700	Required	●
outfall14	493285.008	103621.442			No Entry	●

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PIPELINE SCHEDULES for Surface Network 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	300	S4.12	9.249	8.005	0.944	Open Manhole	1350
1.001	o	300	S4.13	9.639	7.909	1.450	Open Manhole	1350
1.002	o	300	S4.14	9.771	7.818	1.653	Open Manhole	1200
1.003	o	450	S4.15	9.224	7.473	1.301	Open Manhole	1350
1.004	o	450	S4.16	8.760	7.376	0.934	Open Manhole	1350
2.000	o	300	S4.17	9.546	7.595	1.651	Open Manhole	1200
1.005	o	525	S4.18	9.075	7.219	1.331	Open Manhole	1500
3.000	o	300	S4.19	9.000	7.471	1.229	Open Manhole	1350
1.006	o	600	S4.20	8.841	7.096	1.145	Open Manhole	1500
1.007	o	600	S4.21	8.500	6.991	0.909	Open Manhole	1500
1.008	o	600	S4.22	8.500	6.945	0.955	Open Manhole	1500
1.009	o	600	HW4.5	8.500	6.924	0.976	Open Manhole	1500
4.000	o	450	S4.1	9.120	7.524	1.146	Open Manhole	1350
5.000	o	300	S4.2	9.504	7.564	1.620	Open Manhole	1200
4.001	o	450	S4.3	9.177	7.333	1.394	Open Manhole	1350
4.002	o	450	S4.4	8.987	7.271	1.266	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	23.950	249.5	S4.13	9.639	7.909	1.450	Open Manhole	1350
1.001	22.777	250.3	S4.14	9.771	7.818	1.653	Open Manhole	1200
1.002	48.741	250.0	S4.15	9.224	7.623	1.301	Open Manhole	1350
1.003	40.060	413.0	S4.16	8.760	7.376	0.934	Open Manhole	1350
1.004	34.326	413.6	S4.18	9.075	7.293	1.332	Open Manhole	1500
2.000	37.903	249.4	S4.18	9.075	7.443	1.332	Open Manhole	1500
1.005	23.346	486.4	S4.20	8.841	7.171	1.145	Open Manhole	1500
3.000	18.871	251.6	S4.20	8.841	7.396	1.145	Open Manhole	1500
1.006	52.366	498.7	S4.21	8.500	6.991	0.909	Open Manhole	1500
1.007	22.900	497.8	S4.22	8.500	6.945	0.955	Open Manhole	1500
1.008	10.852	493.3	HW4.5	8.500	6.923	0.977	Open Manhole	1500
1.009	53.303	512.5	HW4.6	8.510	6.820	1.390	Open Manhole	1500
4.000	79.322	415.3	S4.3	9.177	7.333	1.394	Open Manhole	1350
5.000	25.348	251.0	S4.3	9.177	7.483	1.394	Open Manhole	1350
4.001	25.811	416.3	S4.4	8.987	7.271	1.266	Open Manhole	1350
4.002	16.935	413.0	HW4.1	8.976	7.230	1.396	Open Manhole	1500

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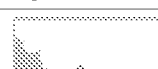
PIPELINE SCHEDULES for Surface Network 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
4.003	o	600	HW4.1	9.076	7.230	1.246	Open Manhole	1500
6.000	o	600	S4.5	9.392	7.723	1.369	Open Manhole	1350
6.001	o	600	S4.6	9.262	7.610	1.352	Open Manhole	1350
6.002	o	450	S4.7	9.277	7.380	1.447	Open Manhole	1350
6.003	o	450	S4.8	9.690	7.262	1.288	Open Manhole	1350
6.004	o	450	HW4.2	9.076	7.240	1.386	Open Manhole	1350
4.004	o	600	HW4.3	9.076	7.200	1.276	Open Manhole	1500
4.005	o	600	HB4.1	9.600	7.170	1.230	Open Manhole	2400
4.006	o	600	S4.9	9.698	6.940	1.558	Open Manhole	1500
7.000	o	600	S4.10	9.364	7.560	1.564	Open Manhole	1200
4.007	o	600	S4.11	9.181	6.309	1.672	Open Manhole	1500
4.008	o	600	HW4.4	8.810	6.870	1.340	Open Manhole	1500
1.010	o	600	HW4.6	8.810	6.820	1.390	Open Manhole	1500
1.011	o	600	HB4.2	8.860	6.800	1.400	Open Manhole	2400
1.012	o	600	HW4.7	8.500	6.740	1.160	Open Manhole	1500
1.013	o	300	HW4.8	7.500	6.490	0.710	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
4.003	13.756	458.5	HW4.3	9.076	7.200	1.276	Open Manhole	1500
6.000	28.117	251.0	S4.6	9.262	7.611	1.351	Open Manhole	1350
6.001	19.973	249.7	S4.7	9.277	7.530	1.447	Open Manhole	1350
6.002	48.943	414.8	S4.8	9.690	7.262	1.288	Open Manhole	1350
6.003	9.291	422.3	HW4.2	9.076	7.240	1.386	Open Manhole	1350
6.004	12.022	300.6	HW4.3	9.076	7.200	1.426	Open Manhole	1500
4.004	12.310	492.4	HB4.1	9.600	7.175	1.225	Open Manhole	2400
4.005	103.468	449.9	S4.9	9.698	6.940	1.558	Open Manhole	1500
4.006	11.032	355.9	S4.11	9.181	6.909	1.672	Open Manhole	1500
7.000	15.377	52.8	S4.11	9.181	7.209	1.672	Open Manhole	1500
4.007	19.388	497.1	HW4.4	8.810	6.870	1.340	Open Manhole	1500
4.008	29.537	590.7	HW4.6	8.810	6.820	1.390	Open Manhole	1500
1.010	9.894	494.7	HB4.2	8.860	6.800	1.400	Open Manhole	2400
1.011	16.172	269.5	HW4.7	8.500	6.740	1.160	Open Manhole	1500
1.012	117.468	469.9	HW4.8	7.500	6.490	0.410	Open Manhole	1500
1.013	20.908	261.4	outfall14	7.500	6.410	0.790	Open Manhole	0

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Free Flowing 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)
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1.013	outfall14	7.500	6.410	0.000	0	0
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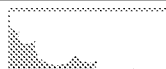
Simulation Criteria for Surface Network 1

Volumetric Runoff Coeff	1.000	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	0.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	2	Number of Storage Structures	2	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	2
FEH Rainfall Version	2013
Site Location	GB 493100 103250 SU 93100 03250
Data Type	Catchment
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	1.000
Storm Duration (mins)	30

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Online Controls for Surface Network 1

Hydro-Brake® Optimum Manhole: HB4.1, DS/PN: 4.005, Volume (m³): 11.2

Unit Reference MD-SHE-0143-1000-1200-1000

Design Head (m) 1.200

Design Flow (l/s) 10.0

Flush-Flo™ Calculated

Objective Minimise upstream storage

Application Surface

Sump Available Yes

Diameter (mm) 143

Invert Level (m) 7.170

Minimum Outlet Pipe Diameter (mm) 225

Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	10.0	Kick-Flo®	0.778	8.2
Flush-Flo™	0.357	10.0	Mean Flow over Head Range	-	8.7

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)	Depth (m)	Flow (l/s)
0.100	5.1	0.800	8.3	2.000	12.7	4.000	17.7	7.000	23.2
0.200	9.4	1.000	9.2	2.200	13.3	4.500	18.7	7.500	23.9
0.300	9.9	1.200	10.0	2.400	13.9	5.000	19.7	8.000	24.7
0.400	10.0	1.400	10.8	2.600	14.4	5.500	20.6	8.500	25.4
0.500	9.8	1.600	11.5	3.000	15.4	6.000	21.5	9.000	26.1
0.600	9.5	1.800	12.1	3.500	16.6	6.500	22.3	9.500	26.8

Hydro-Brake® Optimum Manhole: HB4.2, DS/PN: 1.011, Volume (m³): 11.3

Unit Reference MD-SHE-0095-5000-1700-5000

Design Head (m) 1.700

Design Flow (l/s) 5.0

Flush-Flo™ Calculated

Objective Minimise upstream storage

Application Surface

Sump Available Yes

Diameter (mm) 95

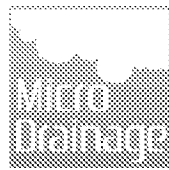
Invert Level (m) 6.800

Minimum Outlet Pipe Diameter (mm) 150

Suggested Manhole Diameter (mm) 1200

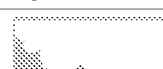
Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.700	5.0	Kick-Flo®	0.851	3.6
Flush-Flo™	0.417	4.5	Mean Flow over Head Range	-	4.1

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

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Hydro-Brake® Optimum Manhole: HB4.2, DS/PN: 1.011, Volume (m³): 11.3

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.1	0.800	3.9	2.000	5.4	4.000	7.5	7.000	9.7
0.200	4.2	1.000	3.9	2.200	5.6	4.500	7.9	7.500	10.1
0.300	4.5	1.200	4.3	2.400	5.9	5.000	8.3	8.000	10.4
0.400	4.5	1.400	4.6	2.600	6.1	5.500	8.7	8.500	10.7
0.500	4.5	1.600	4.9	3.000	6.5	6.000	9.0	9.000	11.0
0.600	4.4	1.800	5.1	3.500	7.0	6.500	9.4	9.500	11.3

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Storage Structures for Surface Network 1

Tank or Pond Manhole: HW4.3, DS/PN: 4.004

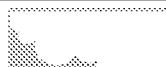
Invert Level (m) 7.200

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	97.1	0.500	169.3	1.000	251.9	1.500	344.7	2.000	447.6
0.100	110.5	0.600	185.0	1.100	269.7	1.600	364.5		
0.200	124.6	0.700	201.2	1.200	287.8	1.700	384.7		
0.300	139.1	0.800	217.7	1.300	306.4	1.800	405.2		
0.400	154.0	0.900	234.6	1.400	325.3	1.900	426.2		

Tank or Pond Manhole: HW4.6, DS/PN: 1.010

Invert Level (m) 6.820

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	480.0	0.500	603.6	1.000	741.3	1.500	893.1	2.000	1059.1
0.100	503.6	0.600	630.0	1.100	770.5	1.600	925.2	2.100	1094.0
0.200	527.7	0.700	657.0	1.200	800.3	1.700	957.8	2.133	1105.6
0.300	552.4	0.800	684.5	1.300	830.7	1.800	991.0		
0.400	577.7	0.900	712.6	1.400	861.6	1.900	1024.8		

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 2

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	2013
Site Location	GB 493100 103250 SU 93100 03250
Data Type	Catchment
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Surface Network 2

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.391	4-8	0.567	8-12	0.016

Total Area Contributing (ha) = 0.975

Total Pipe Volume (m³) = 69.179

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	33.382	0.080	417.3	0.097	5.00	0.0	0.600	o	450	Pipe/Conduit	
1.001	32.515	0.080	406.4	0.117	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.002	50.652	0.130	389.6	0.105	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL E (m)	I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.56	8.000	0.097	0.0	0.0	0.0	0.99	157.3	13.1
1.001	50.00	6.10	7.920	0.214	0.0	0.0	0.0	1.00	159.4	29.0
1.002	50.00	6.93	7.840	0.319	0.0	0.0	0.0	1.02	162.8	43.2

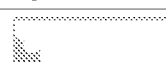
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Network Design Table for Surface Network 2

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
1.003	83.936	0.207	405.5	0.126	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.004	2.904	0.003	968.0	0.096	0.00	0.0	0.600	o	450	Pipe/Conduit	
2.000	14.024	0.056	250.4	0.102	5.00	0.0	0.600	o	300	Pipe/Conduit	
2.001	17.891	0.072	248.5	0.041	0.00	0.0	0.600	o	300	Pipe/Conduit	
2.002	20.680	0.083	249.2	0.138	0.00	0.0	0.600	o	300	Pipe/Conduit	
2.003	48.097	0.116	414.6	0.063	0.00	0.0	0.600	o	450	Pipe/Conduit	
3.000	18.240	0.182	100.2	0.000	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.000	11.710	0.050	234.2	0.000	5.00	0.0	0.600	o	600	Pipe/Conduit	
2.004	13.536	0.032	423.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
2.005	49.968	0.070	713.8	0.090	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.005	12.804	0.023	556.7	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.006	6.431	0.037	173.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

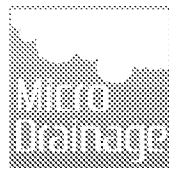
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.003	50.00	8.32	7.710	0.445	0.0	0.0	0.0	1.00	159.6	60.3
1.004	50.00	8.40	7.503	0.541	0.0	0.0	0.0	0.65	102.6	73.3
2.000	50.00	5.24	8.226	0.102	0.0	0.0	0.0	0.99	69.9	13.8
2.001	50.00	5.54	8.170	0.143	0.0	0.0	0.0	0.99	70.2	19.4
2.002	50.00	5.88	8.039	0.281	0.0	0.0	0.0	0.99	70.1	38.1
2.003	50.00	6.69	7.866	0.344	0.0	0.0	0.0	0.99	157.8	46.6
3.000	50.00	5.30	8.232	0.000	0.0	0.0	0.0	1.00	17.7	0.0
4.000	50.00	5.12	7.659	0.000	0.0	0.0	0.0	1.59	448.7	0.0
2.004	50.00	6.88	7.600	0.344	0.0	0.0	0.0	1.18	333.0	46.6
2.005	50.00	7.81	7.570	0.434	0.0	0.0	0.0	0.90	255.5	58.8
1.005	50.00	8.61	7.500	0.975	0.0	0.0	0.0	1.02	289.8	132.0
1.006	50.00	8.71	7.477	0.975	0.0	0.0	0.0	0.99	350.4	132.0

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Manhole Schedules for Surface Network 2

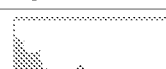
MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S2.1	9.472	1.472	Open Manhole	1350	1.000	8.000	450				
S2.2	9.927	2.007	Open Manhole	1350	1.001	7.920	450	1.000	7.920	450	
S2.3	10.075	2.235	Open Manhole	1350	1.002	7.840	450	1.001	7.840	450	
S2.4	9.422	1.712	Open Manhole	1350	1.003	7.710	450	1.002	7.710	450	
HW2.1	8.981	1.478	Open Manhole	1350	1.004	7.503	450	1.003	7.503	450	
S2.5	9.521	1.295	Open Manhole	1350	2.000	8.226	300				
S2.6	9.691	1.521	Open Manhole	1350	2.001	8.170	300	2.000	8.170	300	
S2.7	9.908	1.810	Open Manhole	1200	2.002	8.098	300	2.001	8.098	300	
S2.8	9.673	1.807	Open Manhole	1350	2.003	7.966	450	2.002	8.016	300	
S2.10	9.324	1.092	Open Manhole	1350	3.000	8.292	150				
HW2.2	9.300	1.650	Open Manhole	1500	4.000	7.650	600				
S2.9	9.186	1.586	Open Manhole	1500	2.004	7.600	600	2.003	7.750	450	
								3.000	8.050	150	
								4.000	7.600	600	
HW2.3	8.981	1.413	Open Manhole	1500	2.005	7.579	600	2.004	7.568	600	
HW2.4	9.300	1.800	Open Manhole	1500	1.005	7.500	600	1.004	7.500	450	
								2.005	7.500	600	
HB2	9.000	1.523	Open Manhole	2400	1.006	7.477	225	1.005	7.477	600	
outfall12	8.973	1.533	Open Manhole	0		OUTFALL		1.006	7.440	225	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S2.1	493452.977	103838.990	493452.977	103838.990	Required	
S2.2	493486.283	103836.735	493486.283	103836.735	Required	
S2.3	493518.465	103832.102	493518.465	103832.102	Required	
S2.4	493521.284	103781.529	493521.284	103781.529	Required	
HW2.1	493605.053	103776.243	493605.053	103776.243	Required	
S2.5	493541.960	103874.664	493541.960	103874.664	Required	
S2.6	493540.538	103860.712	493540.538	103860.712	Required	

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Manhole Schedules for Surface Network 2

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S2.7	493544.910	103843.363	493544.910	103843.363	Required	
S2.8	493565.590	103843.433	493565.590	103843.433	Required	
S2.10	493631.435	103835.386	493631.435	103835.386	Required	
HW2.2	493614.453	103849.014	493614.453	103849.014	Required	
S2.9	493613.301	103837.361	493613.301	103837.361	Required	
HW2.3	493615.484	103824.002	493615.484	103824.002	Required	
HW2.4	493607.498	103774.676	493607.498	103774.676	Required	
HB2	493599.345	103764.804	493599.345	103764.804	Required	
outfall2	493597.056	103758.795			No Entry	

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PIPELINE SCHEDULES for Surface Network 2

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	450	S2.1	9.472	8.000	1.022	Open Manhole	1350
1.001	o	450	S2.2	9.927	7.920	1.557	Open Manhole	1350
1.002	o	450	S2.3	10.075	7.840	1.785	Open Manhole	1350
1.003	o	450	S2.4	9.422	7.710	1.262	Open Manhole	1350
1.004	o	450	HW2.1	8.981	7.503	1.028	Open Manhole	1350
2.000	o	300	S2.5	9.521	8.226	0.995	Open Manhole	1350
2.001	o	300	S2.6	9.691	8.170	1.221	Open Manhole	1350
2.002	o	300	S2.7	9.908	8.098	1.509	Open Manhole	1200
2.003	o	450	S2.8	9.673	7.866	1.357	Open Manhole	1350
3.000	o	150	S2.10	9.924	8.232	0.942	Open Manhole	1350
4.000	o	600	HW2.2	9.300	7.650	1.050	Open Manhole	1500
2.004	o	600	S2.9	9.186	7.600	0.986	Open Manhole	1500
2.005	o	600	HW2.3	8.981	7.570	0.811	Open Manhole	1500
1.005	o	600	HW2.4	9.300	7.500	1.200	Open Manhole	1500
1.006	o	225	HB2	9.000	7.477	1.298	Open Manhole	2400

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	33.382	417.3	S2.2	9.927	7.920	1.557	Open Manhole	1350
1.001	32.515	406.4	S2.3	10.075	7.840	1.785	Open Manhole	1350
1.002	50.652	389.6	S2.4	9.422	7.710	1.262	Open Manhole	1350
1.003	83.936	405.5	HW2.1	8.981	7.503	1.028	Open Manhole	1350
1.004	2.904	968.0	HW2.4	9.300	7.500	1.350	Open Manhole	1500
2.000	14.024	250.4	S2.6	9.691	8.170	1.221	Open Manhole	1350
2.001	17.891	248.5	S2.7	9.908	8.098	1.510	Open Manhole	1200
2.002	20.680	249.2	S2.8	9.673	8.016	1.357	Open Manhole	1350
2.003	48.097	414.6	S2.9	9.186	7.750	0.986	Open Manhole	1500
3.000	18.240	100.2	S2.9	9.186	8.050	0.986	Open Manhole	1500
4.000	11.710	234.2	S2.9	9.186	7.600	0.986	Open Manhole	1500
2.004	13.536	423.0	HW2.3	8.981	7.568	0.813	Open Manhole	1500
2.005	49.968	713.8	HW2.4	9.300	7.500	1.200	Open Manhole	1500
1.005	12.804	556.7	HB2	9.000	7.477	0.923	Open Manhole	2400
1.006	6.431	173.3	outfall2	8.973	7.440	1.308	Open Manhole	0

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Free Flowing 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)
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1.006	outfall12	8.973	7.440	0.000	0	0
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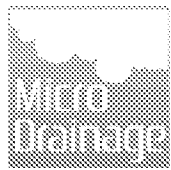
Simulation Criteria for Surface Network 2

Volumetric Runoff Coeff	1.000	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	0.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	2	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	2
FEH Rainfall Version	2013
Site Location	GB 493100 103250 SU 93100 03250
Data Type	Catchment
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	1.000
Storm Duration (mins)	30

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Online Controls for Surface Network 2

Hydro-Brake® Optimum Manhole: HB2, DS/PN: 1.006, Volume (m³): 10.0

Unit Reference	MD-SHE-0078-3000-1300-3000
Design Head (m)	1.300
Design Flow (l/s)	3.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	78
Invert Level (m)	7.477
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.300	3.0	Kick-Flo®	0.695	2.2
Flush-Flo™	0.341	2.8	Mean Flow over Head Range	-	2.5

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)	Depth (m)	Flow (l/s)
0.100	2.2	0.800	2.4	2.000	3.7	4.000	5.0	7.000	6.6
0.200	2.7	1.000	2.7	2.200	3.8	4.500	5.3	7.500	6.8
0.300	2.8	1.200	2.9	2.400	4.0	5.000	5.6	8.000	7.0
0.400	2.8	1.400	3.1	2.600	4.1	5.500	5.9	8.500	7.2
0.500	2.7	1.600	3.3	3.000	4.4	6.000	6.1	9.000	7.4
0.600	2.6	1.800	3.5	3.500	4.7	6.500	6.3	9.500	7.6

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Storage Structures for Surface Network 2

Tank or Pond Manhole: HW2.2, DS/PN: 4.000

Invert Level (m) 7.650

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	122.1	0.300	236.9	0.600	360.1	0.900	490.8	1.200	629.1
0.100	159.0	0.400	277.1	0.700	402.8	1.000	536.0	1.300	676.8
0.200	197.5	0.500	318.2	0.800	446.4	1.100	582.1	1.350	701.0

Tank or Pond Manhole: HW2.4, DS/PN: 1.005

Invert Level (m) 7.500

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	103.0	0.400	266.8	0.800	446.3	1.200	640.5
0.100	142.0	0.500	310.3	0.900	493.4	1.300	691.4
0.200	182.7	0.600	354.7	1.000	541.5	1.400	743.1
0.300	224.3	0.700	400.0	1.100	590.5	1.500	795.9

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 3

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	2013
Site Location	GB 493100 103250 SU 93100 03250
Data Type	Catchment
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	0.000
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Surface Network 3

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.456	4-8	0.859	8-12	0.013

Total Area Contributing (ha) = 1.328

Total Pipe Volume (m³) = 95.611

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	19.157	0.046	416.5	0.090	5.00	0.0	0.600	o	450	Pipe/Conduit	
1.001	44.499	0.107	415.9	0.222	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.002	60.355	0.121	498.8	0.198	0.00	0.0	0.600	o	600	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL E (m)	I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.32	8.479	0.090	0.0	0.0	0.0	0.99	157.4	12.2
1.001	50.00	6.07	8.433	0.312	0.0	0.0	0.0	0.99	157.6	42.2
1.002	50.00	7.00	8.176	0.510	0.0	0.0	0.0	1.08	306.4	69.1

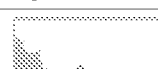
WilsonDee Ltd		Page 2
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Network Design Table for Surface Network 3

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
1.003	48.199	0.096	502.1	0.104	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.004	19.135	0.019	1007.1	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
2.000	13.339	0.032	416.8	0.130	5.00	0.0	0.600	o	450	Pipe/Conduit	
2.001	14.436	0.035	412.5	0.149	0.00	0.0	0.600	o	450	Pipe/Conduit	
2.002	30.763	0.074	415.7	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
2.003	12.235	0.024	509.8	0.163	0.00	0.0	0.600	o	600	Pipe/Conduit	
2.004	47.164	0.030	1572.1	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
3.000	17.353	0.042	413.2	0.092	5.00	0.0	0.600	o	450	Pipe/Conduit	
3.001	23.486	0.057	412.0	0.092	0.00	0.0	0.600	o	450	Pipe/Conduit	
3.002	12.105	0.029	417.4	0.088	0.00	0.0	0.600	o	450	Pipe/Conduit	
3.003	33.208	0.030	1106.9	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.005	15.567	0.020	778.4	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.006	15.102	0.070	215.7	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

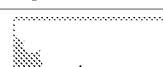
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.003	50.00	7.74	8.055	0.614	0.0	0.0	0.0	1.08	305.3	83.1
1.004	50.00	8.16	7.959	0.614	0.0	0.0	0.0	0.76	214.6	83.1
2.000	50.00	5.22	8.285	0.130	0.0	0.0	0.0	0.99	157.4	17.6
2.001	50.00	5.47	8.259	0.279	0.0	0.0	0.0	0.99	158.2	37.8
2.002	50.00	5.98	8.218	0.279	0.0	0.0	0.0	0.99	157.6	37.8
2.003	50.00	6.17	7.934	0.442	0.0	0.0	0.0	1.07	303.0	59.9
2.004	50.00	7.47	7.970	0.442	0.0	0.0	0.0	0.61	171.1	59.9
3.000	50.00	5.29	8.078	0.092	0.0	0.0	0.0	0.99	158.1	12.5
3.001	50.00	5.68	8.036	0.184	0.0	0.0	0.0	1.00	158.3	24.9
3.002	50.00	5.89	7.979	0.272	0.0	0.0	0.0	0.99	157.3	36.8
3.003	50.00	6.65	7.970	0.272	0.0	0.0	0.0	0.72	204.5	36.8
1.005	50.00	8.46	7.340	1.328	0.0	0.0	0.0	0.86	244.6	179.8
1.006	50.00	8.70	7.920	1.328	0.0	0.0	0.0	1.07	75.4	179.8

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Manhole Schedules for Surface Network 3

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1.1	8.842	1.363	Open Manhole	1350	1.000	8.473	450				
S1.2	8.934	1.501	Open Manhole	1350	1.001	8.433	450	1.000	8.433	450	
S1.3	10.193	2.017	Open Manhole	1500	1.002	8.176	600	1.001	8.326	450	
S1.4	9.819	1.764	Open Manhole	1500	1.003	8.055	600	1.002	8.055	600	
HW1.1	9.300	1.341	Open Manhole	1500	1.004	7.959	600	1.003	7.959	600	
S1.5	9.881	1.396	Open Manhole	1350	2.000	8.283	450				
S1.6	9.805	1.552	Open Manhole	1350	2.001	8.253	450	2.000	8.253	450	
S1.7	9.920	1.702	Open Manhole	1350	2.002	8.218	450	2.001	8.218	450	
S1.8	9.692	1.638	Open Manhole	1500	2.003	7.934	600	2.002	8.144	450	
HW1.2	9.298	1.268	Open Manhole	1500	2.004	7.970	600	2.003	7.970	600	
S1.9	9.889	1.761	Open Manhole	1350	3.000	8.079	450				
S1.10	9.779	1.737	Open Manhole	1350	3.001	8.036	450	3.000	8.036	450	
S1.11	9.629	1.650	Open Manhole	1350	3.002	7.979	450	3.001	7.979	450	
HW1.3	9.250	1.288	Open Manhole	1500	3.003	7.970	600	3.002	7.950	450	
HW1.4	9.298	1.298	Open Manhole	1500	1.005	7.940	600	1.004	7.940	600	
								2.004	7.940	600	
								3.003	7.940	600	
HB1	9.900	1.380	Open Manhole	2400	1.006	7.920	300	1.005	7.920	600	
outfall1	9.000	1.150	Open Manhole	0		OUTFALL		1.006	7.850	300	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1.1	493702.924	103935.058	493702.924	103935.058	Required	
S1.2	493683.767	103935.127	493683.767	103935.127	Required	
S1.3	493676.885	103891.164	493676.885	103891.164	Required	
S1.4	493667.010	103831.622	493667.010	103831.622	Required	
HW1.1	493674.278	103783.975	493674.278	103783.975	Required	
S1.5	493730.479	103816.121	493730.479	103816.121	Required	
S1.6	493717.164	103815.327	493717.164	103815.327	Required	

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Manhole Schedules for Surface Network 3

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1.7	493716.517	103800.905	493716.517	103800.905	Required	●
S1.8	493715.714	103770.153	493715.714	103770.153	Required	●
HW1.2	493703.483	103769.839	493703.483	103769.839	Required	●
S1.9	493720.009	103736.042	493720.009	103736.042	Required	●
S1.10	493702.779	103738.103	493702.779	103738.103	Required	●
S1.11	493680.937	103746.736	493680.937	103746.736	Required	●
HW1.3	493684.654	103758.257	493684.654	103758.257	Required	●
HW1.4	493656.760	103776.276	493656.760	103776.276	Required	●
HB1	493641.244	103775.021	493641.244	103775.021	Required	●
outfall1	493628.844	103766.400			No Entry	●

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PIPELINE SCHEDULES for Surface Network 3

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	450	S1.1	9.842	8.479	0.913	Open Manhole	1350
1.001	o	450	S1.2	9.934	8.433	1.051	Open Manhole	1350
1.002	o	600	S1.3	10.193	8.176	1.417	Open Manhole	1500
1.003	o	600	S1.4	9.819	8.055	1.164	Open Manhole	1500
1.004	o	600	HW1.1	9.300	7.959	0.741	Open Manhole	1500
2.000	o	450	S1.5	9.691	8.265	0.946	Open Manhole	1350
2.001	o	450	S1.6	9.895	8.253	1.102	Open Manhole	1350
2.002	o	450	S1.7	9.920	8.218	1.252	Open Manhole	1350
2.003	o	600	S1.8	9.692	7.994	1.038	Open Manhole	1500
2.004	o	600	HW1.2	9.238	7.970	0.668	Open Manhole	1500
3.000	o	450	S1.9	9.899	8.078	1.311	Open Manhole	1350
3.001	o	450	S1.10	9.773	8.036	1.287	Open Manhole	1350
3.002	o	450	S1.11	9.629	7.979	1.200	Open Manhole	1350
3.003	o	600	HW1.3	9.238	7.970	0.668	Open Manhole	1500
1.005	o	600	HW1.4	9.238	7.940	0.698	Open Manhole	1500
1.006	o	900	HB1	9.300	7.920	1.090	Open Manhole	2400

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	19.157	416.5	S1.2	9.934	8.433	1.051	Open Manhole	1350
1.001	44.499	415.9	S1.3	10.193	8.326	1.417	Open Manhole	1500
1.002	60.355	498.8	S1.4	9.819	8.055	1.164	Open Manhole	1500
1.003	48.199	502.1	HW1.1	9.300	7.959	0.741	Open Manhole	1500
1.004	19.135	1007.1	HW1.4	9.238	7.940	0.698	Open Manhole	1500
2.000	13.339	416.8	S1.6	9.895	8.253	1.102	Open Manhole	1350
2.001	14.436	412.5	S1.7	9.920	8.218	1.252	Open Manhole	1350
2.002	30.763	415.7	S1.8	9.692	8.144	1.038	Open Manhole	1500
2.003	12.235	509.8	HW1.2	9.238	7.970	0.668	Open Manhole	1500
2.004	47.164	1572.1	HW1.4	9.238	7.940	0.698	Open Manhole	1500
3.000	17.353	413.2	S1.10	9.773	8.036	1.287	Open Manhole	1350
3.001	23.486	412.0	S1.11	9.629	7.979	1.200	Open Manhole	1350
3.002	12.105	417.4	HW1.3	9.238	7.950	0.838	Open Manhole	1500
3.003	33.208	1106.9	HW1.4	9.238	7.940	0.698	Open Manhole	1500
1.005	15.567	778.4	HB1	9.300	7.920	0.780	Open Manhole	2400
1.006	15.102	215.7	outfall11	9.300	7.850	0.850	Open Manhole	0

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Free Flowing 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)
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1.006	outfall11	9.000	7.850	0.000	0	0
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Simulation Criteria for Surface Network 3

Volumetric Runoff Coeff	1.000	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	0.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	2
FEH Rainfall Version	2013
Site Location	GB 493100 103250 SU 93100 03250
Data Type	Catchment
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	1.000
Storm Duration (mins)	30

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Online Controls for Surface Network 3

Hydro-Brake® Optimum Manhole: HB1, DS/PN: 1.006, Volume (m³): 10.1

Unit Reference	MD-SHE-0081-3000-1100-3000
Design Head (m)	1.100
Design Flow (l/s)	3.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	81
Invert Level (m)	7.920
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.100	3.0	Kick-Flo®	0.682	2.4
Flush-Flo™	0.333	3.0	Mean Flow over Head Range	-	2.6

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)	Depth (m)	Flow (l/s)
0.100	2.4	0.800	2.6	2.000	4.0	4.000	5.5	7.000	7.1
0.200	2.9	1.000	2.9	2.200	4.1	4.500	5.8	7.500	7.3
0.300	3.0	1.200	3.1	2.400	4.3	5.000	6.1	8.000	7.6
0.400	3.0	1.400	3.4	2.600	4.5	5.500	6.3	8.500	7.8
0.500	2.9	1.600	3.6	3.000	4.8	6.000	6.6	9.000	8.0
0.600	2.7	1.800	3.8	3.500	5.1	6.500	6.9	9.500	8.2

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Storage Structures for Surface Network 3

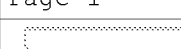
Tank or Pond Manhole: HW1.4, DS/PN: 1.005

Invert Level (m) 7.940

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	961.0	0.400	1123.4	0.800	1295.5	1.200	1476.6	1.600	1666.6
0.100	1000.2	0.500	1165.6	0.900	1340.0	1.300	1523.2	1.700	1715.4
0.200	1040.7	0.600	1208.4	1.000	1384.9	1.400	1570.4	1.800	1764.9
0.300	1081.8	0.700	1251.7	1.100	1430.5	1.500	1618.2	1.860	1794.8

APPENDIX E

CALCULATION FOR STORM WATER NETWORK

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2 year Return Period 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 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

 Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 2 Number of Storage Structures 2 Number of Real Time Controls 0

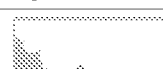
Synthetic Rainfall Details

Rainfall Model FEH Data Type Catchment
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 493100 103250 SU 93100 03250 Cv (Winter) 1.000

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

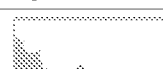
Profile(s) Summer and Winter
 Duration(s) (mins) 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440,
 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 0, 0, 45

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Pipe Flow (l/s)	Status
1.000	S4.12	60 minute 2 year Summer I+0%	9.249	8.094	-0.211	0.000	12.1	OK
1.001	S4.13	60 minute 2 year Summer I+0%	9.659	7.999	-0.210	0.000	12.0	OK
1.002	S4.14	60 minute 2 year Summer I+0%	9.771	7.939	-0.179	0.000	22.6	OK
1.003	S4.15	60 minute 2 year Summer I+0%	9.224	7.650	-0.273	0.000	39.0	OK
1.004	S4.16	60 minute 2 year Summer I+0%	8.760	7.579	-0.247	0.000	57.4	OK
2.000	S4.17	60 minute 2 year Summer I+0%	9.546	7.709	-0.186	0.000	20.1	OK
1.005	S4.18	60 minute 2 year Summer I+0%	9.075	7.472	-0.272	0.000	80.0	OK
3.000	S4.19	60 minute 2 year Summer I+0%	9.000	7.563	-0.208	0.000	12.5	OK
1.006	S4.20	720 minute 2 year Winter I+0%	8.841	7.442	-0.254	0.000	15.8	OK
1.007	S4.21	720 minute 2 year Winter I+0%	8.500	7.442	-0.149	0.000	14.8	OK
1.008	S4.22	720 minute 2 year Winter I+0%	8.500	7.441	-0.104	0.000	17.5	OK
1.009	HW4.5	720 minute 2 year Winter I+0%	8.500	7.441	-0.083	0.000	17.2	OK
4.000	S4.1	180 minute 2 year Summer I+0%	9.120	7.677	-0.297	0.000	19.6	OK
5.000	S4.2	180 minute 2 year Summer I+0%	9.504	7.675	-0.209	0.000	4.7	OK
4.001	S4.3	180 minute 2 year Summer I+0%	9.177	7.674	-0.109	0.000	25.6	OK
4.002	S4.4	180 minute 2 year Summer I+0%	8.987	7.667	-0.054	0.000	34.4	OK
4.003	HW4.1	180 minute 2 year Summer I+0%	9.076	7.660	-0.170	0.000	32.7	OK
6.000	S4.5	60 minute 2 year Summer I+0%	9.392	7.802	-0.221	0.000	9.9	OK
6.001	S4.6	60 minute 2 year Summer I+0%	9.262	7.716	-0.194	0.000	16.6	OK
6.002	S4.7	180 minute 2 year Summer I+0%	9.277	7.661	-0.169	0.000	9.8	OK
6.003	S4.8	180 minute 2 year Summer I+0%	9.000	7.660	-0.052	0.000	11.3	OK
6.004	HW4.2	180 minute 2 year Summer I+0%	9.076	7.659	-0.031	0.000	10.4	OK
4.004	HW4.3	180 minute 2 year Summer I+0%	9.076	7.658	-0.142	0.000	12.1	OK

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

US/MH				US/CL		Water	Surcharged	Flooded	Pipe		
PN	Name	Event		(m)	(m)	Level	Depth	Volume	Flow	Status	
							(m)	(m³)	(l/s)		
4.005	HB4.1	180 minute	2 year Summer	I+0%	9.000	7.655	-0.115	0.000	10.0	OK	
4.006	S4.9	720 minute	2 year Winter	I+0%	9.098	7.444	-0.096	0.000	8.3	OK	
7.000	S4.10	60 minute	2 year Summer	I+0%	9.364	7.546	-0.254	0.000	7.3	OK	
4.007	S4.11	720 minute	2 year Winter	I+0%	9.181	7.444	-0.065	0.000	11.3	OK	
4.008	HW4.4	720 minute	2 year Winter	I+0%	8.810	7.443	-0.027	0.000	10.9	OK	
1.010	HW4.6	720 minute	2 year Winter	I+0%	8.810	7.440	0.020	0.000	6.5	SURCHARGED	
1.011	HB4.2	720 minute	2 year Winter	I+0%	8.800	7.451	0.051	0.000	4.5	SURCHARGED	
1.012	HW4.7	10080 minute	2 year Summer	I+0%	8.500	6.783	-0.557	0.000	4.5	OK	
1.013	HW4.8	10080 minute	2 year Summer	I+0%	7.500	6.544	-0.246	0.000	4.5	OK	

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LE16 7WB	FEH2022 rainfall model	
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Innovyze	Network 2020.1.3	

30 year Return Period 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 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 2 Number of Real Time Controls 0

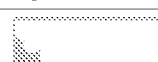
Synthetic Rainfall Details

Rainfall Model FEH Data Type Catchment
FEH Rainfall Version 2013 Cv (Summer) 1.000
Site Location GB 493100 103250 SU 93100 03250 Cv (Winter) 1.000

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

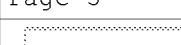
Profile(s) Summer and Winter
Duration(s) (mins) 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440,
2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 45

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Pipe Flow (l/s)	Status
1.000	S4.12	60 minute 30 year Summer I+0%	9.249	8.141	-0.164	0.000	26.4	OK
1.001	S4.13	60 minute 30 year Summer I+0%	9.659	8.061	-0.148	0.000	26.1	OK
1.002	S4.14	60 minute 30 year Summer I+0%	9.771	8.025	-0.093	0.000	49.8	OK
1.003	S4.15	60 minute 30 year Summer I+0%	9.224	7.922	-0.001	0.000	82.6	OK
1.004	S4.16	960 minute 30 year Winter I+0%	8.760	7.841	0.015	0.000	11.8	SURCHARGED
2.000	S4.17	960 minute 30 year Winter I+0%	9.546	7.841	-0.054	0.000	3.8	OK
1.005	S4.18	960 minute 30 year Winter I+0%	9.075	7.841	0.097	0.000	15.9	SURCHARGED
3.000	S4.19	960 minute 30 year Winter I+0%	9.000	7.841	0.070	0.000	2.4	SURCHARGED
1.006	S4.20	960 minute 30 year Winter I+0%	8.841	7.841	0.145	0.000	19.0	SURCHARGED
1.007	S4.21	960 minute 30 year Winter I+0%	8.500	7.841	0.250	0.000	18.5	SURCHARGED
1.008	S4.22	960 minute 30 year Winter I+0%	8.500	7.841	0.296	0.000	22.3	SURCHARGED
1.009	HW4.5	960 minute 30 year Winter I+0%	8.500	7.841	0.317	0.000	22.3	SURCHARGED
4.000	S4.1	180 minute 30 year Winter I+0%	9.120	8.141	0.167	0.000	24.4	SURCHARGED
5.000	S4.2	180 minute 30 year Winter I+0%	9.504	8.140	0.256	0.000	5.8	SURCHARGED
4.001	S4.3	180 minute 30 year Winter I+0%	9.177	8.139	0.356	0.000	36.5	SURCHARGED
4.002	S4.4	180 minute 30 year Winter I+0%	8.987	8.137	0.416	0.000	47.9	SURCHARGED
4.003	HW4.1	180 minute 30 year Winter I+0%	9.076	8.134	0.304	0.000	46.7	SURCHARGED
6.000	S4.5	180 minute 30 year Winter I+0%	9.392	8.138	0.115	0.000	7.3	SURCHARGED
6.001	S4.6	180 minute 30 year Winter I+0%	9.262	8.137	0.227	0.000	12.1	SURCHARGED
6.002	S4.7	180 minute 30 year Winter I+0%	9.277	8.135	0.305	0.000	11.5	SURCHARGED
6.003	S4.8	180 minute 30 year Winter I+0%	9.000	8.134	0.422	0.000	18.1	SURCHARGED
6.004	HW4.2	180 minute 30 year Winter I+0%	9.076	8.134	0.444	0.000	17.1	SURCHARGED
4.004	HW4.3	180 minute 30 year Winter I+0%	9.076	8.133	0.333	0.000	12.6	SURCHARGED

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

US/MH						Water	Surcharged	Flooded	Pipe		
PN	Name	Event		US/CL	Level	Depth	Volume	Flow		Status	
				(m)	(m)	(m)	(m³)	(l/s)			
4.005	HB4.1	180 minute	30 year Winter I+0%	9.000	8.137	0.367	0.000	10.0		SURCHARGED	
4.006	S4.9	960 minute	30 year Winter I+0%	9.098	7.841	0.301	0.000	8.1		SURCHARGED	
7.000	S4.10	960 minute	30 year Winter I+0%	9.364	7.841	0.041	0.000	1.4		SURCHARGED	
4.007	S4.11	960 minute	30 year Winter I+0%	9.181	7.841	0.332	0.000	11.6		SURCHARGED	
4.008	HW4.4	960 minute	30 year Winter I+0%	8.810	7.841	0.371	0.000	11.4		SURCHARGED	
1.010	HW4.6	960 minute	30 year Winter I+0%	8.810	7.841	0.421	0.000	7.2		SURCHARGED	
1.011	HB4.2	960 minute	30 year Winter I+0%	8.800	7.857	0.457	0.000	4.5		SURCHARGED	
1.012	HW4.7	8640 minute	30 year Winter I+0%	8.500	6.783	-0.557	0.000	4.5		OK	
1.013	HW4.8	10080 minute	30 year Winter I+0%	7.500	6.544	-0.246	0.000	4.5		OK	

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Innovyze	Network 2020.1.3	

100 year Return Period 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 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 2 Number of Storage Structures 2 Number of Real Time Controls 0

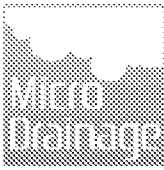
Synthetic Rainfall Details

Rainfall Model FEH Data Type Catchment
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 493100 103250 SU 93100 03250 Cv (Winter) 1.000

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

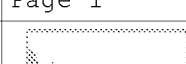
Profile(s) Summer and Winter
 Duration(s) (mins) 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440,
 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 0, 0, 45

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Pipe Flow (l/s)	Status
1.000	S4.12	60 minute 100 year Summer I+45%	9.249	9.201	0.896	0.000	43.4	FLOOD RISK
1.001	S4.13	60 minute 100 year Summer I+45%	9.659	9.123	0.914	0.000	44.3	SURCHARGED
1.002	S4.14	60 minute 100 year Summer I+45%	9.771	9.043	0.927	0.000	80.5	SURCHARGED
1.003	S4.15	60 minute 100 year Summer I+45%	9.224	8.740	0.817	0.000	142.8	SURCHARGED
1.004	S4.16	60 minute 100 year Summer I+45%	8.760	8.635	0.809	0.000	219.9	FLOOD RISK
2.000	S4.17	60 minute 100 year Summer I+45%	9.546	8.623	0.734	0.000	76.4	SURCHARGED
1.005	S4.18	1440 minute 100 year Winter I+45%	9.075	8.512	0.768	0.000	21.3	SURCHARGED
3.000	S4.19	1440 minute 100 year Winter I+45%	9.000	8.511	0.740	0.000	3.0	SURCHARGED
1.006	S4.20	1440 minute 100 year Winter I+45%	8.841	8.511	0.815	0.000	25.8	SURCHARGED
1.007	S4.21	1440 minute 100 year Winter I+45%	8.500	8.511	0.920	11.354	25.7	FLOOD
1.008	S4.22	1440 minute 100 year Winter I+45%	8.500	8.511	0.966	11.257	31.0	FLOOD
1.009	HW4.5	1440 minute 100 year Winter I+45%	8.500	8.511	0.987	11.010	30.8	FLOOD
4.000	S4.1	240 minute 100 year Winter I+45%	9.120	8.882	0.908	0.000	34.6	FLOOD RISK
5.000	S4.2	240 minute 100 year Winter I+45%	9.504	8.881	0.997	0.000	7.9	SURCHARGED
4.001	S4.3	240 minute 100 year Winter I+45%	9.177	8.879	1.096	0.000	51.4	FLOOD RISK
4.002	S4.4	240 minute 100 year Winter I+45%	8.987	8.877	1.156	0.000	70.2	FLOOD RISK
4.003	HW4.1	240 minute 100 year Winter I+45%	9.076	8.874	1.044	0.000	69.6	FLOOD RISK
6.000	S4.5	240 minute 100 year Winter I+45%	9.392	8.879	0.856	0.000	10.0	SURCHARGED
6.001	S4.6	240 minute 100 year Winter I+45%	9.262	8.877	0.967	0.000	17.1	SURCHARGED
6.002	S4.7	240 minute 100 year Winter I+45%	9.277	8.875	1.045	0.000	16.6	SURCHARGED
6.003	S4.8	240 minute 100 year Winter I+45%	9.000	8.874	1.162	0.000	26.7	FLOOD RISK
6.004	HW4.2	240 minute 100 year Winter I+45%	9.076	8.874	1.184	0.000	26.3	FLOOD RISK
4.004	HW4.3	240 minute 100 year Winter I+45%	9.076	8.873	1.073	0.000	13.0	FLOOD RISK

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Innovyze	Network 2020.1.3	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

US/MH				Water		Surcharged	Flooded	Pipe	Status
PN	Name	Event		US/CL (m)	Level (m)	Depth (m)	Volume (m³)	Flow (l/s)	
4.005	HB4.1	240 minute	100 year Winter I+45%	9.000	8.877	1.107	0.000	10.0	FLOOD RISK
4.006	S4.9	1440 minute	100 year Winter I+45%	9.098	8.513	0.973	0.000	8.9	SURCHARGED
7.000	S4.10	1440 minute	100 year Winter I+45%	9.364	8.512	0.712	0.000	1.7	SURCHARGED
4.007	S4.11	1440 minute	100 year Winter I+45%	9.181	8.512	1.003	0.000	14.5	SURCHARGED
4.008	HW4.4	1440 minute	100 year Winter I+45%	8.810	8.512	1.042	0.000	14.4	FLOOD RISK
1.010	HW4.6	1440 minute	100 year Winter I+45%	8.810	8.511	1.091	0.000	6.5	FLOOD RISK
1.011	HB4.2	1440 minute	100 year Winter I+45%	8.800	8.518	1.118	0.000	5.0	FLOOD RISK
1.012	HW4.7	1440 minute	100 year Winter I+45%	8.500	6.788	-0.552	0.000	5.0	OK
1.013	HW4.8	1440 minute	100 year Winter I+45%	7.500	6.548	-0.242	0.000	5.0	OK

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Innovyze	Network 2020.1.3	

2 year Return Period 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 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

 Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

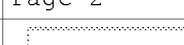
Synthetic Rainfall Details

Rainfall Model FEH Data Type Catchment
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 493100 103250 SU 93100 03250 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 0, 0, 45

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Pipe Flow (l/s)	Status
1.000	S2.1	60 minute 2 year Summer I+0%	9.472	8.116	-0.334	0.000	14.0	OK
1.001	S2.2	60 minute 2 year Summer I+0%	9.927	8.072	-0.298	0.000	29.1	OK
1.002	S2.3	600 minute 2 year Winter I+0%	10.075	8.053	-0.237	0.000	7.6	OK
1.003	HW2.4	600 minute 2 year Winter I+0%	9.422	8.053	-0.107	0.000	10.1	OK
1.004	HW2.1	600 minute 2 year Winter I+0%	8.981	8.053	0.100	0.000	11.2	SURCHARGED
2.000	S2.5	60 minute 2 year Summer I+0%	9.521	8.340	-0.186	0.000	14.8	OK
2.001	S2.6	60 minute 2 year Summer I+0%	9.691	8.308	-0.162	0.000	20.1	OK
2.002	S2.7	60 minute 2 year Summer I+0%	9.908	8.272	-0.127	0.000	38.7	OK
2.003	S2.8	600 minute 2 year Winter I+0%	9.673	8.053	-0.263	0.000	8.3	OK
3.000	S2.10	60 minute 2 year Summer I+0%	9.324	8.232	-0.150	0.000	0.0	OK
4.000	HW2.2	600 minute 2 year Winter I+0%	9.300	8.053	-0.197	0.000	1.3	OK
2.004	S2.9	600 minute 2 year Winter I+0%	9.186	8.053	-0.147	0.000	3.0	OK
2.005	HW2.3	600 minute 2 year Winter I+0%	8.981	8.053	-0.117	0.000	3.9	OK
1.005	HW2.4	600 minute 2 year Winter I+0%	9.300	8.053	-0.047	0.000	6.8	OK
1.006	HB2	600 minute 2 year Winter I+0%	9.000	8.052	0.350	0.000	2.8	SURCHARGED

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Innovyze	Network 2020.1.3	

30 year Return Period 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 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

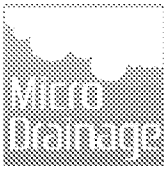
Synthetic Rainfall Details

Rainfall Model FEH Data Type Catchment
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 493100 103250 SU 93100 03250 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440,
 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 0, 0, 45

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Pipe Flow (l/s)	Status
1.000	S2.1	720 minute 30 year Winter I+0%	9.472	8.340	-0.110	0.000	3.4	OK
1.001	S2.2	720 minute 30 year Winter I+0%	9.927	8.340	-0.030	0.000	7.0	OK
1.002	S2.3	720 minute 30 year Winter I+0%	10.075	8.340	0.050	0.000	10.3	SURCHARGED
1.003	S2.4	720 minute 30 year Winter I+0%	9.422	8.340	0.180	0.000	14.3	SURCHARGED
1.004	HW2.1	720 minute 30 year Winter I+0%	8.981	8.340	0.387	0.000	17.3	SURCHARGED
2.000	S2.5	60 minute 30 year Summer I+0%	9.521	8.640	0.114	0.000	32.3	SURCHARGED
2.001	S2.6	60 minute 30 year Summer I+0%	9.691	8.561	0.091	0.000	45.2	SURCHARGED
2.002	S2.7	60 minute 30 year Summer I+0%	9.908	8.479	0.080	0.000	88.9	SURCHARGED
2.003	S2.8	720 minute 30 year Winter I+0%	9.673	8.339	0.023	0.000	12.1	SURCHARGED
3.000	S2.10	720 minute 30 year Winter I+0%	9.324	8.340	-0.042	0.000	0.0	OK
4.000	HW2.2	720 minute 30 year Winter I+0%	9.300	8.339	0.089	0.000	1.6	SURCHARGED
2.004	S2.9	720 minute 30 year Winter I+0%	9.186	8.339	0.139	0.000	2.1	SURCHARGED
2.005	HW2.3	720 minute 30 year Winter I+0%	8.981	8.339	0.169	0.000	2.7	SURCHARGED
1.005	HW2.4	720 minute 30 year Winter I+0%	9.300	8.340	0.240	0.000	6.5	SURCHARGED
1.006	HB2	720 minute 30 year Winter I+0%	9.000	8.342	0.640	0.000	2.8	SURCHARGED

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Suite 44, HIC Market Harborough LE16 7WB	DS_0707_15 Woodgate Lidsey Road FEH2022 rainfall model	
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Innovyze	Network 2020.1.3	

100 year Return Period 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 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

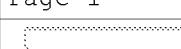
Synthetic Rainfall Details

Rainfall Model FEH Data Type Catchment
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 493100 103250 SU 93100 03250 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440,
 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 0, 0, 45

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Pipe Flow (l/s)	Status
1.000	S2.1	60 minute 100 year Summer I+45%	9.472	9.205	0.755	0.000	53.1	FLOOD RISK
1.001	S2.2	60 minute 100 year Summer I+45%	9.927	9.181	0.811	0.000	115.7	SURCHARGED
1.002	S2.3	60 minute 100 year Summer I+45%	10.075	9.127	0.837	0.000	159.1	SURCHARGED
1.003	S2.4	60 minute 100 year Summer I+45%	9.422	8.959	0.799	0.000	224.0	SURCHARGED
1.004	HW2.1	960 minute 100 year Winter I+45%	8.981	8.758	0.805	0.000	26.4	FLOOD RISK
2.000	S2.5	60 minute 100 year Summer I+45%	9.521	9.230	0.704	0.000	58.7	FLOOD RISK
2.001	S2.6	60 minute 100 year Summer I+45%	9.691	9.152	0.682	0.000	82.4	SURCHARGED
2.002	S2.7	60 minute 100 year Summer I+45%	9.908	9.019	0.619	0.000	150.4	SURCHARGED
2.003	S2.8	960 minute 100 year Winter I+45%	9.673	8.758	0.442	0.000	16.9	SURCHARGED
3.000	S2.10	960 minute 100 year Winter I+45%	9.324	8.758	0.376	0.000	0.0	SURCHARGED
4.000	HW2.2	960 minute 100 year Winter I+45%	9.300	8.758	0.508	0.000	1.6	SURCHARGED
2.004	S2.9	960 minute 100 year Winter I+45%	9.186	8.758	0.558	0.000	2.8	SURCHARGED
2.005	HW2.3	960 minute 100 year Winter I+45%	8.981	8.758	0.588	0.000	3.5	FLOOD RISK
1.005	HW2.4	960 minute 100 year Winter I+45%	9.300	8.758	0.658	0.000	6.9	SURCHARGED
1.006	HB2	960 minute 100 year Winter I+45%	9.000	8.760	1.058	0.000	3.0	FLOOD RISK

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2 year Return Period 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 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

 Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

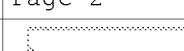
Synthetic Rainfall Details

Rainfall Model FEH Data Type Catchment
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 493100 103250 SU 93100 03250 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 0, 0, 45

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Pipe Flow (l/s)	Status
1.000	S1.1	60 minute 2 year Summer I+0%	9.842	8.619	-0.310	0.000	13.0	OK
1.001	S1.2	60 minute 2 year Summer I+0%	9.934	8.602	-0.281	0.000	42.4	OK
1.002	S1.3	60 minute 2 year Summer I+0%	10.193	8.415	-0.361	0.000	66.1	OK
1.003	S1.4	60 minute 2 year Summer I+0%	9.819	8.356	-0.299	0.000	72.1	OK
1.004	HW1.1	60 minute 2 year Summer I+0%	9.300	8.319	-0.240	0.000	69.7	OK
2.000	S1.5	60 minute 2 year Summer I+0%	9.681	8.460	-0.275	0.000	18.9	OK
2.001	S1.6	60 minute 2 year Summer I+0%	9.805	8.445	-0.258	0.000	38.7	OK
2.002	S1.7	60 minute 2 year Summer I+0%	9.920	8.381	-0.287	0.000	38.5	OK
2.003	S1.8	960 minute 2 year Winter I+0%	9.632	8.280	-0.314	0.000	7.3	OK
2.004	HW1.2	960 minute 2 year Winter I+0%	9.238	8.280	-0.290	0.000	7.2	OK
3.000	S1.9	960 minute 2 year Winter I+0%	9.839	8.280	-0.248	0.000	1.5	OK
3.001	S1.10	960 minute 2 year Winter I+0%	9.773	8.280	-0.206	0.000	3.0	OK
3.002	S1.11	960 minute 2 year Winter I+0%	9.629	8.280	-0.149	0.000	4.3	OK
3.003	HW1.3	960 minute 2 year Winter I+0%	9.238	8.280	-0.290	0.000	4.2	OK
1.005	HW1.4	960 minute 2 year Winter I+0%	9.238	8.280	-0.260	0.000	4.3	OK
1.006	HBI	720 minute 2 year Summer I+0%	9.300	8.286	0.066	0.000	3.0	SURCHARGED

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30 year Return Period 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 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

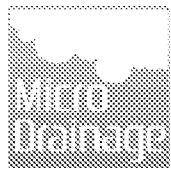
Synthetic Rainfall Details

Rainfall Model FEH Data Type Catchment
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 493100 103250 SU 93100 03250 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440,
 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 0, 0, 45

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Pipe Flow (l/s)	Status
1.000	S1.1	60 minute 30 year Summer I+0%	9.842	8.864	-0.065	0.000	28.6	OK
1.001	S1.2	60 minute 30 year Summer I+0%	9.934	8.830	-0.053	0.000	98.7	OK
1.002	S1.3	60 minute 30 year Summer I+0%	10.193	8.761	-0.015	0.000	144.2	OK
1.003	S1.4	60 minute 30 year Summer I+0%	9.819	8.655	0.000	0.000	142.3	OK
1.004	S1.1	60 minute 30 year Summer I+0%	9.842	8.558	0.000	0.000	140.6	OK
2.000	S1.5	60 minute 30 year Summer I+0%	9.681	8.597	-0.138	0.000	41.4	OK
2.001	S1.6	60 minute 30 year Summer I+0%	9.805	8.580	-0.123	0.000	89.4	OK
2.002	S1.7	960 minute 30 year Winter I+0%	9.920	8.525	-0.143	0.000	7.7	OK
2.003	S1.8	960 minute 30 year Winter I+0%	9.632	8.525	-0.069	0.000	12.0	OK
2.004	HW1.2	960 minute 30 year Winter I+0%	9.238	8.525	-0.045	0.000	11.8	OK
3.000	S1.9	960 minute 30 year Winter I+0%	9.839	8.525	-0.003	0.000	2.5	OK
3.001	S1.10	960 minute 30 year Winter I+0%	9.773	8.525	0.039	0.000	4.9	SURCHARGED
3.002	S1.11	960 minute 30 year Winter I+0%	9.629	8.525	0.096	0.000	7.0	SURCHARGED
3.003	HW1.3	960 minute 30 year Winter I+0%	9.238	8.525	-0.045	0.000	6.8	OK
1.005	HW1.4	960 minute 30 year Winter I+0%	9.238	8.524	-0.016	0.000	4.1	OK
1.006	HB1	960 minute 30 year Winter I+0%	9.300	8.523	0.303	0.000	3.0	SURCHARGED

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100 year Return Period 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 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

 Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Catchment
 FEH Rainfall Version 2013 Cv (Summer) 1.000
 Site Location GB 493100 103250 SU 93100 03250 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
 Duration(s) (mins) 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440,
 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 0, 0, 45

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Pipe Flow (l/s)	Status
1.000	S1.1	60 minute 100 year Summer I+45%	9.842	9.090	0.161	0.000	51.8	SURCHARGED
1.001	S1.2	60 minute 100 year Summer I+45%	9.834	9.070	0.187	0.000	180.1	SURCHARGED
1.002	S1.3	2160 minute 100 year Winter I+45%	10.193	9.011	0.235	0.000	12.4	SURCHARGED
1.003	S1.4	2160 minute 100 year Winter I+45%	9.819	9.011	0.356	0.000	14.7	SURCHARGED
1.004	HW1.1	2160 minute 100 year Winter I+45%	9.300	9.011	0.452	0.000	14.7	FLOOD RISK
2.000	S1.5	2160 minute 100 year Winter I+45%	9.681	9.011	0.276	0.000	3.3	SURCHARGED
2.001	S1.6	2160 minute 100 year Winter I+45%	9.805	9.011	0.308	0.000	7.0	SURCHARGED
2.002	S1.7	2160 minute 100 year Winter I+45%	9.920	9.011	0.343	0.000	7.0	SURCHARGED
2.003	S1.8	2160 minute 100 year Winter I+45%	9.632	9.011	0.417	0.000	11.0	SURCHARGED
2.004	HW1.2	2160 minute 100 year Winter I+45%	9.238	9.011	0.441	0.000	11.0	FLOOD RISK
3.000	S1.9	2160 minute 100 year Winter I+45%	9.839	9.011	0.483	0.000	2.3	SURCHARGED
3.001	S1.10	2160 minute 100 year Winter I+45%	9.773	9.011	0.525	0.000	4.6	SURCHARGED
3.002	S1.11	2160 minute 100 year Winter I+45%	9.629	9.011	0.582	0.000	6.7	SURCHARGED
3.003	HW1.3	2160 minute 100 year Winter I+45%	9.238	9.011	0.441	0.000	6.7	FLOOD RISK
1.005	HW1.4	2160 minute 100 year Winter I+45%	9.238	9.011	0.471	0.000	9.6	FLOOD RISK
1.006	HB1	2160 minute 100 year Winter I+45%	9.300	9.064	0.844	0.000	3.0	FLOOD RISK