CLFA DESIGN

Report Title

Drainage Technical Note

Project

CLFA142-Court Farm, Trowbridge

Report Reference

CLFA142-CLFA-00-XX-DR-0661

Client

Wainhomes Severn Valley

Date

May 2026

REPORT CONTROL SHEET

Client:	Wainhomes Severn Valley
Project:	Court Farm, Trowbridge
Job Number:	CLFA142
Report Title:	Drainage Technical Note
Report Reference:	CLFA142-CLFA-00-XX-DR-0661
Prepared By:	C LEDOUX
Reviewed and Authorised By:	F ALGUACIL MEng (Hons)

Revision	Date	Description	Prepared By	Authorised By
P01	10/11/25	FIRST ISSUE	C LEDOUX	F ALGUACIL
P02	27/04/25	REVISED LAYOUT	C LEDOUX	F ALGUACIL
P03	12/05/25	LAYOUT UPDATES	C LEDOUX	F ALGUACIL
P04	27/05/25	CULV. FREEBOARD	C LEDOUX	F ALGUACIL

CONTENTS

1. INTRODUCTION 4
2. PROPOSED DRAINAGE STRATEGY 4
1.1. FLOOD ALLEVIATION STRATEGY 4
1.2. SURFACE WATER PROPOSAL 4
1.3. WATER QUALITY 9
1.4. FIRST FLUSH 10
1.1. FOUL WATER PROPOSAL 10

1. INTRODUCTION

Wainhomes Severn Valley has commissioned CLFA Design to produce a Drainage Technical Note to support the submission of a Reserved Matters (RM) Application for the proposed residential development at Court Farm, Trowbridge. The Drainage Strategy has been based upon Teignconcult FRA Addendum (Report Ref. 447/FRA2/ADDM3 V2-17.05.22)
This information has been provided so that Lead Local Flood Authority (LLFA) can better understand the reasoning behind some slight changes to the approved drainage strategy.

2. PROPOSED DRAINAGE STRATEGY

1.1. FLOOD ALLEVIATION STRATEGY

Teignconcult Drawing FRA22 showed three flood alleviation (cut off) swales to the north-east of the site with a total capacity for 348l/s. These discharged to a piped system under the roads and eventually to the attenuation ponds to the south of the site. It is the Client's intention to offer the drainage network for adoption, however the water incumbent would not accept flood flows into their system, so these flows need to be separated.

In addition to this, it is not best practice to lay private apparatus in main roads, so this flood alleviation system will be constructed in private areas.

The total volume of water in these swales is also unknown (only flows -348l/s- are known), so it is recommended these flows don't discharge to the proposed basins.

It is therefore proposed these swales run along the site's northern development edge and discharge directly into the stream. This would mimic the existing situation. The swale details are as follows:

- Bottom width: 1.1m
- Top width: 6.5m
- Depth: 0.9m
- Side slopes 1:3
- Min. gradient: 1:500

The alignment of the cut-off swale can be seen on the Drainage Strategy drawings attached to Appendix A.

The previous scheme also included flood compensation works, and it is believed these are no longer required. The Rappor Hydraulic Modelling Note should be referred to for additional information regarding the span of the culverts under the access road and the use of the floodplain storage.

1.2. SURFACE WATER PROPOSAL

The proposed Drainage Strategy is as per the approved Outline drawings, with a slight deviation in discharge rates to comply with new Wiltshire Council Drainage and Betterment Strategy (June 2024) and with a new attenuation basin to the north-west of the site to drain the access road, which was not considered at outline Stage.

As it can be seen from the contours shown on the Teignconcult drawings, the access road from approximately Chainage +138m felt back towards the site access with no attenuation at this location.
Flows from this section of road were discharged (unattenuated) onto the main road at the front of the site, which is not considered acceptable and it is likely to increase flood risk on the main road. It is therefore proposed to construct a new attenuation basin to deal with these flows.

Wiltshire's Council requirements regarding discharge rates and volumes are as follows:

1) Post development discharges from greenfield sites to provide 30% betterment over pre-development discharges for all storm events between the 1 in 1year and 1 in 100year return period.
2) The runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event.
3) Attenuation features to either have 50% capacity available 24 hours after a 1 in 30-year + climate change storm event (i.e., half drain time < 1440mins) or have the capacity to store a subsequent 1 in 10-year storm event after a 1 in 30-year+ climate change storm event.

A comparison of the approved flows against the RM proposal is shown below. As it can be seen, the betterments are significant.

Table 1. Approved discharge rates comparison

Storage feature	Previous rate 1 in 1 year event	Previous rate 1 in 100 year event	New rate 1 in 1 year event	New rate 1 in 100 year event
Basin 1	N/A	**N/A**	0.5 l/s	**0.5 l/s**
Basin 2	N/A	**1.8 l/s**	0.5 l/s	**0.5 l/s**
Basins 3-4 and Pond 1	N/A	**13.8 l/s**	5.4 l/s	**7 l/s**
Total		**15.6 l/s**		**8 l/s**

A copy of the 1 in 1 year, 1 in 100 year and 1 in 100cc calculations can be found in Appendix B.

Compliance with Wiltshire Council Guidance has been checked below:

Table 2. Condition 1 – 30% betterment over greenfield rates

Storage feature	Greenfield rate 1 in 1 year event	Greenfield rate 1 in 100 year event	Discharge rate 1 in 1 year event	Discharge rate 1 in 100 year event	Betterment provided 1 in 1 year event	Betterment provided 1 in 100 year event
Basin 1	0.2 l/s	0.7 l/s	0.5 l/s	0.5 l/s	**-150%**	**28%**
Basin 2	0.7 l/s	2.2 l/s	0.5 l/s	0.5 l/s	**28%**	**77%**
Basins 3-4 and Pond 1	14.1 l/s	44.1 l/s	5.4 l/s	7 l/s	**61%**	**84%**
Total	15 l/s	47 l/s	6.4 l/s	8 l/s	**57%**	**83%**

As it can be seen, the discharge from Basin 1 during the 1 in 1 year event would be in excess of the greenfield rate for that same event, however the discharge cannot be reduced further due to potential blockages issues. It should be noted that the overall betterment provided is well in excess of the required 30%.

A copy of the greenfield runoff calculations can be seen in Appendix C.

Table 3. Condition 2 – Greenfield Volume

Storage feature	Greenfield Volume (m³)	Discharged volume 1 in 100 year, 6 hour rainfall event (m³)	Condition met?
Basin 1	4.259	13.898	X
Basin 2	12.778	14.699	X
Basins 3-4 and Pond 1	259.229	217.229	✓
Total	276.266	245.826	✓

A copy of the greenfield volume calculations can be seen in Appendix E and a copy of the 1 in 100 year, 6 hour rainfall event calculations are shown in Appendix F.

Table 4. Condition 3 – Half Drain Times

Storage feature	Half Drain Time < 1440mins for a 1 in 30cc event (cc-Climate change 45%)
Basin 1	✓
Basin 2	✓
Basin 3	✓
Basin 4	✓
Pond 1	✓

A copy of the 1 in 30cc year calculations can be found in Appendix G.

It is recommended that the drainage system is maintained following the recommendations in the table below.

Maintenance Schedule	Required Action	Typical Frequency	Maintenance Responsibilities
Attenuation Basins and Ponds	Remove litter and debris	Monthly	By Management Company (TBC)
	Cut grass – for spillways and access routes	Monthly (during growing season), or as required	
	Cut grass- meadow grass in and around basin	Half yearly (spring – before nesting season and autumn)	
	Manage other vegetation and remove nuisance plants	Monthly (at the start, then as required)	
	Inspect inlets, outlets and overflows for blockages and clear if required	Monthly	
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly	
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies	Monthly (for first year), then annually or as required	
	Check any mechanical devices	Annually	
	Tidy all dead growth before start of growing season	Annually	
	Remove sediments from inlets and outlet	Annually (or as required)	
	Reseed areas of poor vegetation growth	As required	
	Prune and trim any trees and remove cuttings	Every 2 years, or as required	
	Remove sediments from inlets, outlets and main basin when required	Every 5 years, or as required (likely to be minimal requirements where effective upstream sources control is provided)	
	Repair erosion or other damage by reseeding re-turfing	As required	
	Repair/rehabilitation of inlets, outlets and overflows	As required	
	Relevel uneven surfaces and reinstate design levels	As required	

Maintenance Schedule	Required Action	Typical Frequency	Maintenance Responsibilities
Swales and rain gardens	Remove litter and debris	Monthly, or as required	Management Company (TBC)
	Cut grass – for spillways and access routes	Monthly (during growing season), or as required	
	Manage other vegetation and remove nuisance plants	Monthly (at the start, then as required)	
	Inspect inlets, outlets and overflows for blockages and clear if required	Monthly	
	Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where water is ponding for > 48 hours	Monthly, or as required	
	Inspect vegetation coverage	Monthly for six months, quarterly for 2 years, then half yearly	
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies	Half yearly	
	Reseed areas of poor vegetation growth	As required or if bare soil is exposed over 10% or more of the swale treatment area	
	Repair erosion or other damage by reseeding re-turfing	As required	
	Relevel uneven surfaces and reinstate design levels	As required	
	Scarify and spike topsoil to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface	As required	
	Remove and dispose of oils or petrol residues using safe standard practices	As required	
Drainage runs, chambers and flow control structures	Remove weeds and clear obstructions	Once a year or as required	Water Authority or Management Company (TBC)
	Monitor inspection chambers. Inspect silt accumulation rates and determine cleaning frequencies	Once a year or as required	

1.3. WATER QUALITY

According to the CIRIA SuDS Manual (C753 Report, 2015) and to deliver adequate treatment, the selected SuDS component should have a total pollution index (for each contaminant type) that equals or exceeds the pollution hazard index (for each contaminant type). The Table below shows that the proposed SuDS features will provide the required treatment for the new development.

Land use	Pollution hazard level	Total suspended solids	Metals	Hydrocarbons
Residential roofs	**Very low**	**0.2**	**0.2**	**0.05**
Residential car parking and access roads	**Low**	**0.5**	**0.4**	**0.4**
Catchment 1 – Access road				
Total pollution level		**0.5**	**0.4**	**0.4**
SuDS mitigation - swale		0.5	0.6	0.6
SuDS mitigation - basin		0.5	0.5	0.6
Total mitigation (> Total pollution level)		**1.0**	**1.1**	**1.2**
Catchment 2 – Road and bridge				
Total pollution level		**0.5**	**0.4**	**0.4**
SuDS mitigation - swale		0.5	0.6	0.6
SuDS mitigation - basin		0.5	0.5	0.6
Total mitigation (> Total pollution level)		**1.0**	**1.1**	**1.2**
Catchment 3 – Discharging to Basin 3				
Total pollution level		**0.7**	**0.6**	**0.45**
SuDS mitigation - basin		0.5	0.5	0.6
SuDS mitigation - swale		0.5	0.6	0.6
Total mitigation (> Total pollution level)		**1.0**	**1.1**	**1.2**
Catchment 4 – Discharging to Pond 4				
Total pollution level		**0.7**	**0.6**	**0.45**
SuDS mitigation – rain garden/filter drain		0.4	0.4	0.4
SuDS mitigation - basin		0.5	0.5	0.6
SuDS mitigation - swale		0.5	0.6	0.6
Total mitigation (> Total pollution level)		**1.4**	**1.5**	**1.6**
Catchment 5 – Discharging to Pond 1				
Total pollution level		**0.7**	**0.6**	**0.45**
SuDS mitigation – rain garden/filter drain		0.4	0.4	0.4
SuDS mitigation - pond		0.7	0.7	0.5
SuDS mitigation - basin		0.5	0.5	0.6
SuDS mitigation - swale		0.5	0.6	0.6
Total mitigation (> Total pollution level)		**2.1**	**2.2**	**2.1**

1.4. FIRST FLUSH

According to CIRIA, the initial runoff from a site will collect or dissolve pollutants and the 'first flush' portion of the flow may be the most contaminated as a result. As ground investigation works have shown there is no infiltration, the calculations below show the amount of water that the planting in the proposed basins, rain gardens and swales will need to absorb.

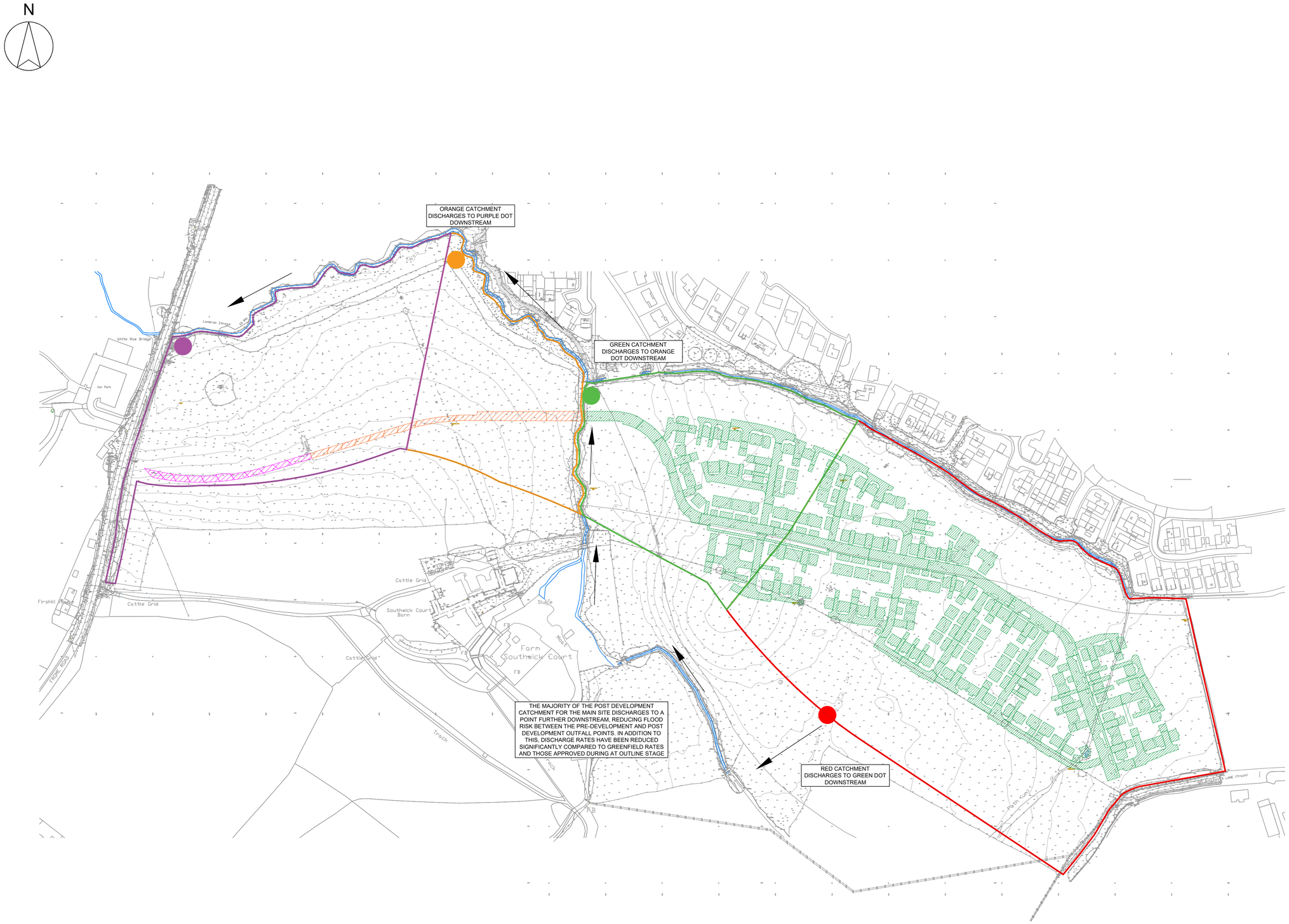
Catchment 1 – Access road			
Impermeable Area	**Volume produced by the first flush (5mm of rainfall)**	**SuDS Area (Swale and basin)**	**Ponding depth to be absorbed by proposed planting**
789 m²	3.945 m³	600 m²	6.5mm
Catchment 2 – Road and bridge			
Impermeable Area	**Volume produced by the first flush (5mm of rainfall)**	**SuDS Area (Swale and basin)**	**Ponding depth to be absorbed by proposed planting**
1500 m²	7.5 m³	710 m²	10.5 mm
Catchment 3 – Main Site			
Impermeable Area	**Volume produced by the first flush (5mm of rainfall)**	**SuDS Area (Swale , rain gardens and basins, pond excluded)**	**Ponding depth to be absorbed by proposed planting**
35236 m²	176.18 m³	2763 m²	63.7 mm

1.1. FOUL WATER PROPOSAL

A new pumping station will be required and it will be located to the south of the site. A rising main will discharge via a break chamber to the existing Wessex Water network near the site entrance.

A copy of the Wessex Water Maps can be seen in Appendix H.

APPENDIX A – PROPOSED DRAINAGE STRATEGY



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KEY:

SOLID OUTLINES INDICATE PRE-DEVELOPMENT CATCHMENTS

HATCHED AREAS INDICATE POST-DEVELOPMENT CATCHMENTS

REV	DESCRIPTION	BY	APP	DATE
P01	FIRST ISSUE	MR	FA	27/04/26

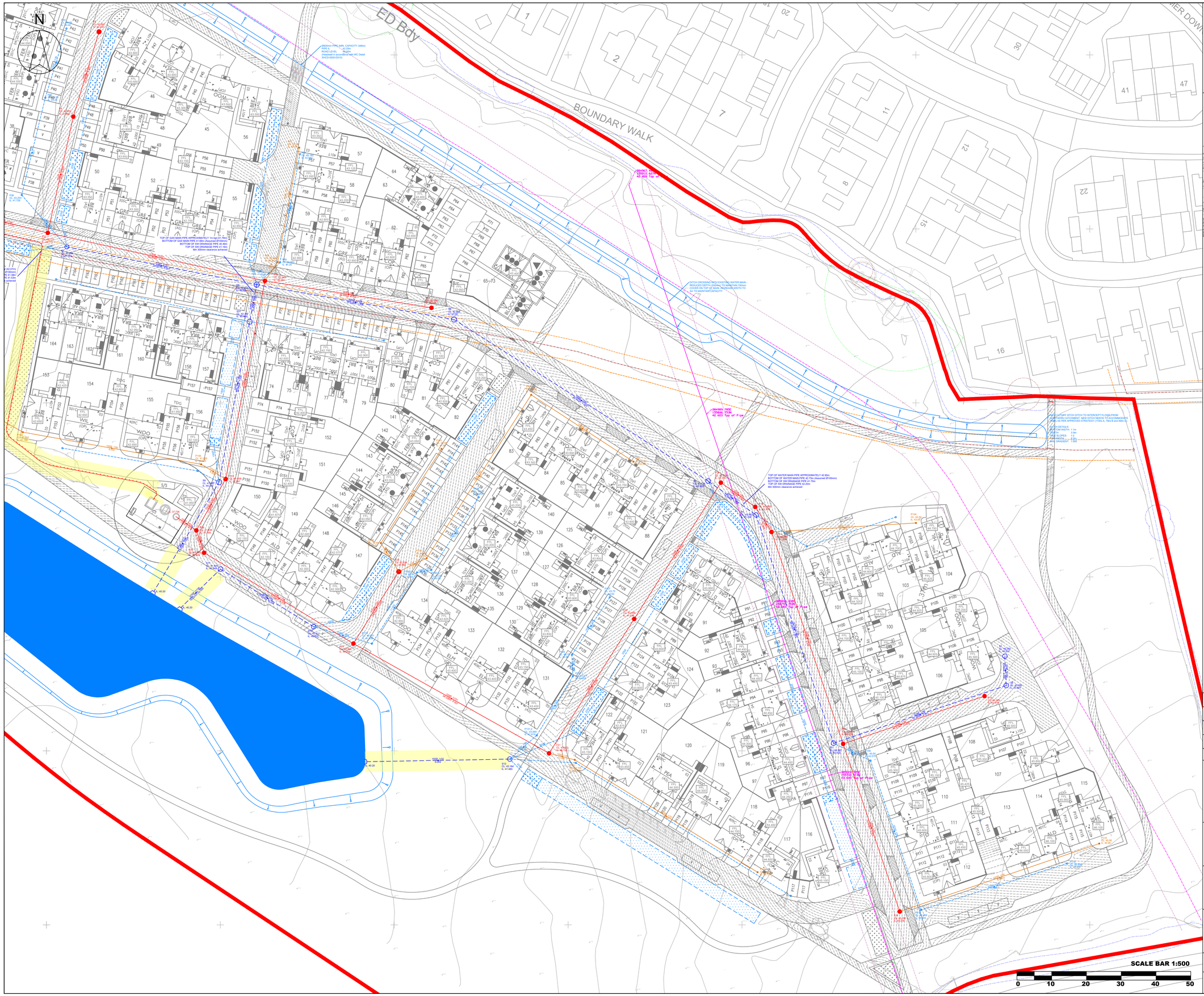
CLFA DESIGN
71-75 Shelton Street, Covent Garden
London, WC2H 9JQ

CLIENT:
Wain HOMES

PROJECT:
SOUTHWICK COURT FARM
TROWBRIDGE

DRAWING:
SW CATCHMENT PLAN

PROJECT NUMBER:	DRAWING NUMBER:	
CLFA142	CLFA142-CLFA-00-XX-DR-C-0501	
STATUS: S2	SCALE @ A1 NOT TO SCALE	REV: P01



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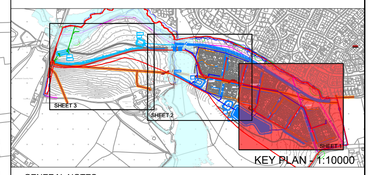

KEY PLAN - 1:10000

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LEGEND:

- PROPOSED ADOPTABLE S104 FOUL DRAINAGE
- PROPOSED PRIVATE FOUL DRAINAGE
- PROPOSED ADOPTABLE S104 FOUL RISING MAIN
- PROPOSED ADOPTABLE S104 SURFACE WATER DRAINAGE
- PROPOSED PRIVATE SURFACE WATER DRAINAGE
- PROPOSED HIGHWAYS SURFACE WATER DRAINAGE
- EXISTING GAS MAIN AND EASEMENT
- EXISTING WATER MAIN AND EASEMENT
- EXISTING FW DRAINAGE
- POST DEVELOPMENT 1 IN 100CC FLOOD OUTLINES (Refer to Rappor April 2026 Hydraulic Modelling Note for details)
- SITE BOUNDARY
- ADOPTABLE SEWER EASEMENT (3m min unless otherwise shown)
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REV	DESCRIPTION	BY	APP	DATE
P04	MINOR UPDATES TO REAR FENCES	CL	FA	27/05/26
P03	MINOR SITE LAYOUT UPDATES	CL	FA	12/05/26
P02	SITE LAYOUT UPDATED	CL	FA	27/04/26
P01	WIP FOR COMMENTS 06/10/25	CL	FA	10/11/25

CLFA DESIGN

71-75 Shelton Street, Covent Garden
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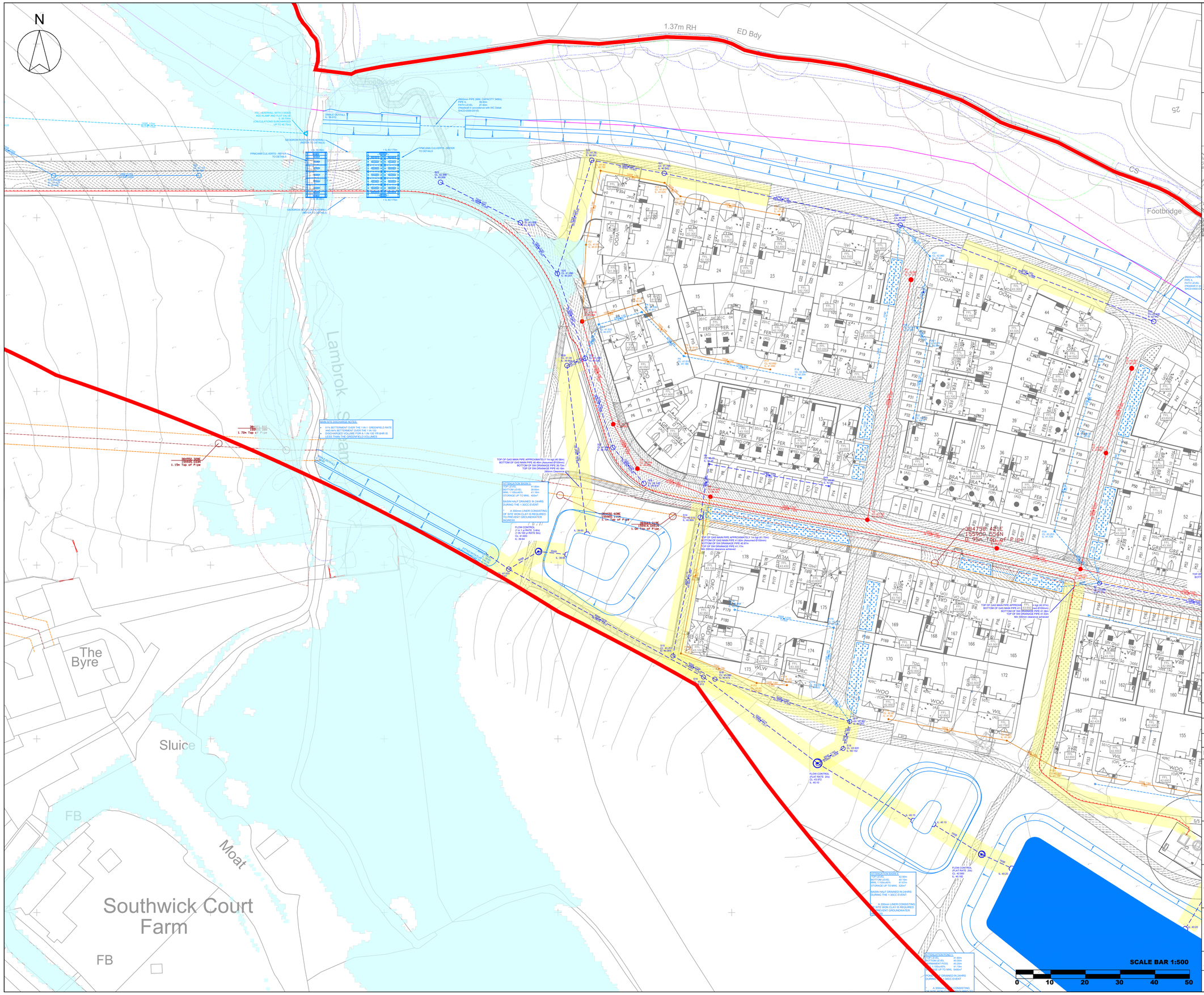
CLIENT:

Wain HOMES

PROJECT:
SOUTHWICK COURT FARM
TROWBRIDGE

DRAWING:
DRAINAGE STRATEGY FOR PLANNING
SHEET 1

PROJECT NUMBER:	DRAWING NUMBER:	
CLFA142	CLFA142-CLFA-00-XX-DR-C-0512.1	
STATUS: S2	SCALE @ A1 1:500	REV: P04



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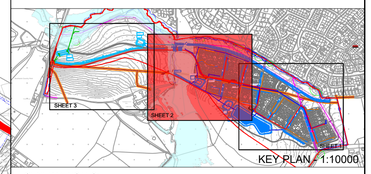

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REV	DESCRIPTION	BY	APP	DATE
P04	ACCESS ROAD LEVELS UPDATED TO PROVIDE 600mm FREEBOARD ON CULVERTS. DRAINAGE COVER LEVELS ADJUSTED TO SUIT	CL	FA	27/05/26
P03	MINOR SITE LAYOUT UPDATES	CL	FA	12/05/26
P02	SITE LAYOUT UPDATED	CL	FA	27/04/26
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DRAWING:
DRAINAGE STRATEGY FOR PLANNING
SHEET 2

PROJECT NUMBER:	DRAWING NUMBER:	
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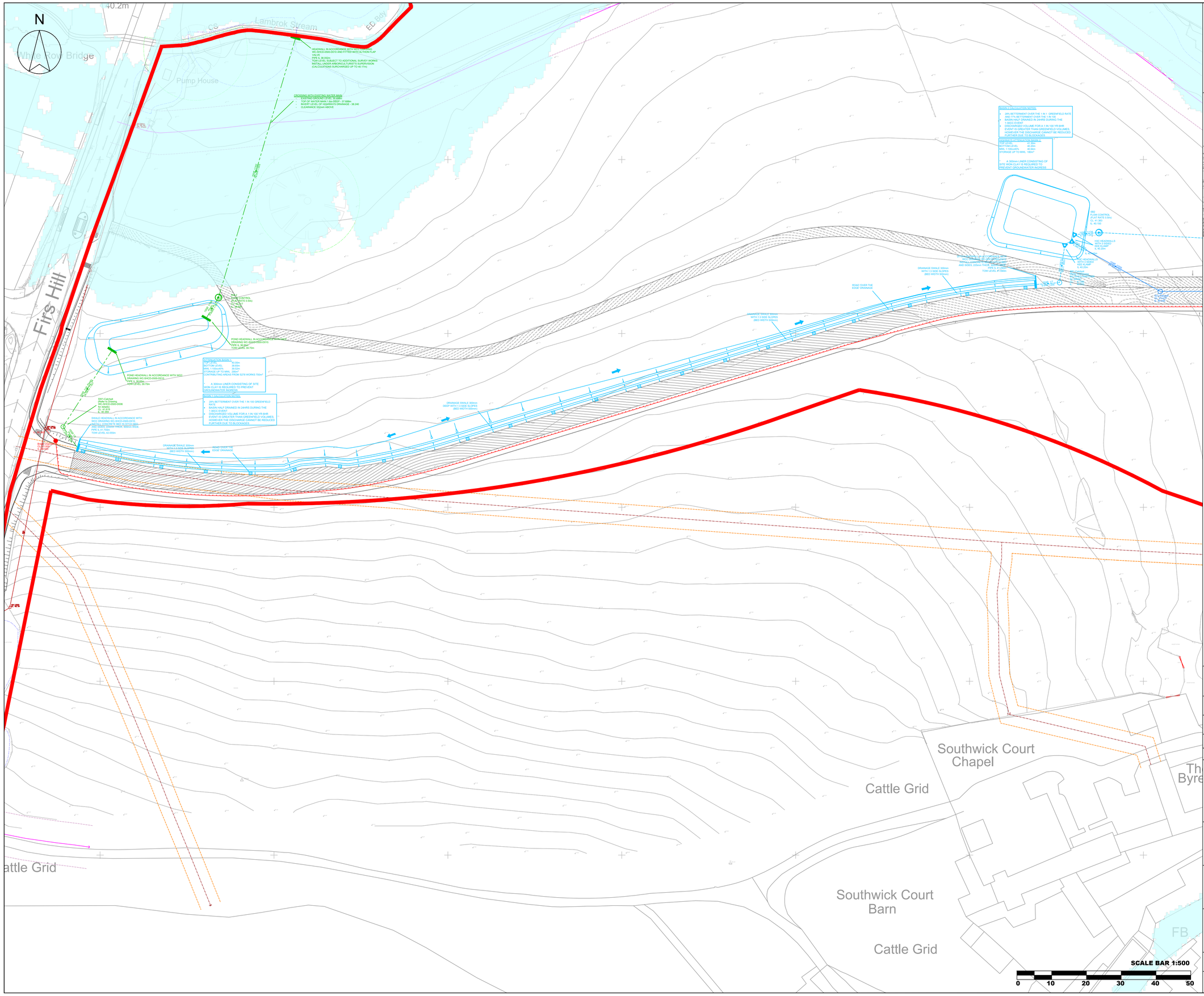
STATUS: S2	SCALE @ A1 1:500	REV: P04



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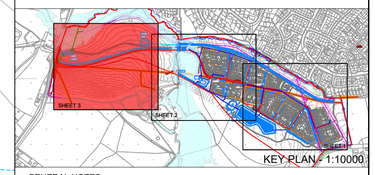

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SOUTHWICK COURT FARM
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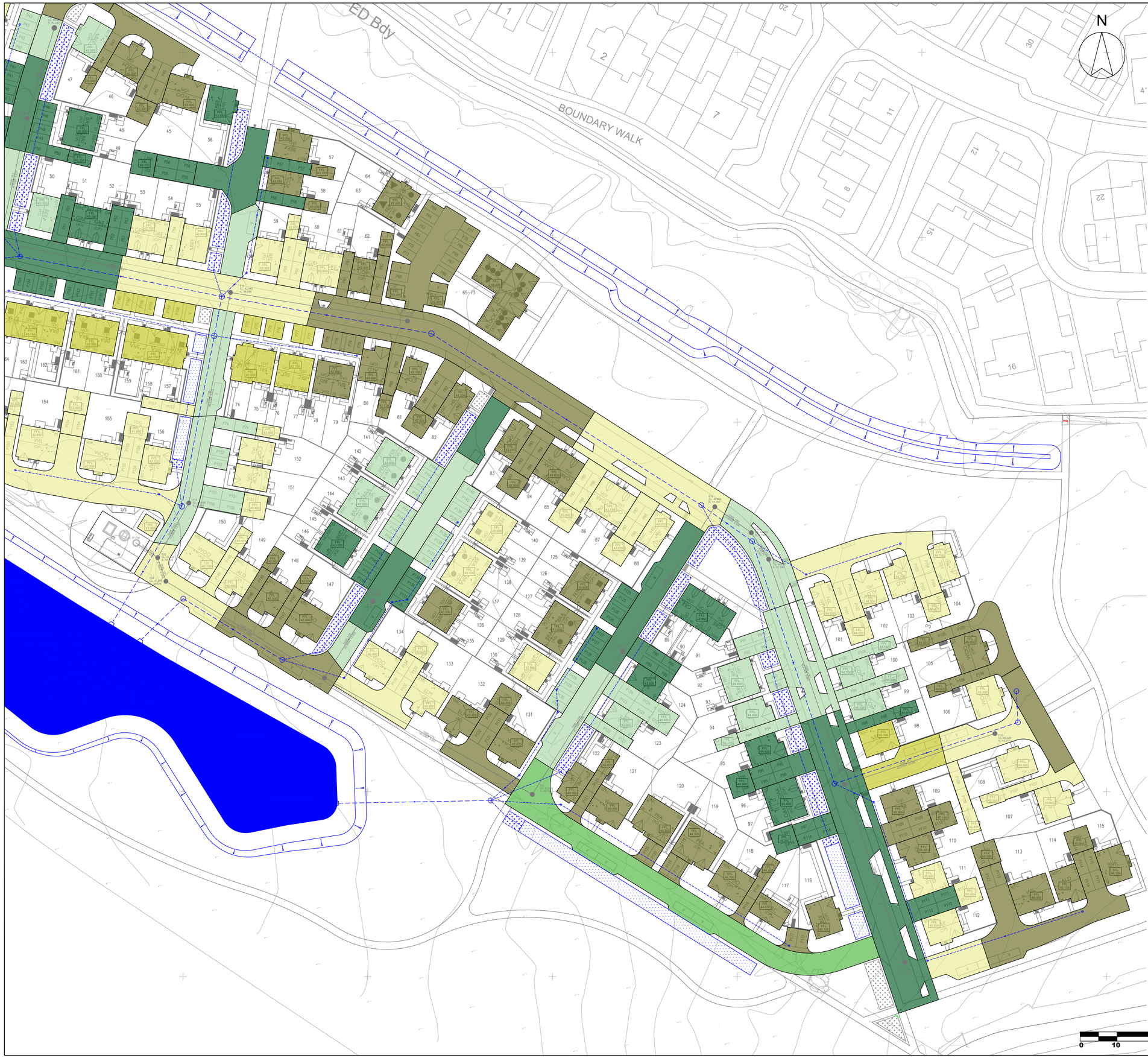
DRAWING:
DRAINAGE STRATEGY FOR PLANNING
SHEET 2

PROJECT NUMBER:	DRAWING NUMBER:	
CLFA142	CLFA142-CLFA-00-XX-DR-C-0512.3	
STATUS: S2	SCALE @ A1 1:500	REV: P04



MANHOLE CATCHMENT		
MANHOLE ID	IMPERMEABLE AREA (m²)	INCLUDING URBAN CREEP 10% (m²)
ACCESS ROAD		
SWALE	578	578
TOTAL		**578**
ROAD AND BRIDGE		
SB1	285	285
SB2	590	590
SWALE	859	859
TOTAL		**1735**
MAIN SITE		
P114	772	796
P112	309	323
P109	265	279
S1	493	502
S2	586	610
S3	500	507
Swale P116	1418	1435
Swale P90	1119	1147
S4	996	1022
S5	878	894
S6	2547	2629
P43	154	169
P40	96	106
P38	399	439
Swale P47	206	214
Swale P48	483	492
Swale P50	265	272
S7	1821	1859
Swale P56	489	496
Swale P55	127	127
P57	177	190
P59	0	0
S8	991	1024
S9	1758	1803
Swale P82	110	110
Swale P141	642	663
Swale P146	360	369
Swale P147	67	67
P139	208	228
P135.1	87	96
P135.2	0	0
P134	391	408
S10	538	554
S11	420	436
S12	0	0
Swale P89	685	704
Swale P122	481	487
P127	208	228
P129	87	96
P131.1	0	0
P131.2	0	0
S13	2218	2293
P179	503	503
P175	0	0
P174	0	0
Swale P169	229	229
P14	0	0
P8	300	300
S14	1041	1059
S15	214	231
S16	0	0
S17	1026	1059
S18	0	0
S19	0	0
Swale P14.1	192	198
Swale P14.2	849	861
Swale P21	0	0
P32	0	0
P28.1	183	183
P28.2	0	0
P27	0	0
S20	1151	1194
S21	510	524
S22	0	0
S23	447	447
S24	203	203
S25	389	403
P18	96	106
P5	654	663
P4.1	0	0
P4.2	0	0
S26	227	237
S27	0	0
S28	1031	1055
S29	0	0
S30	920	942
S31	798	861
TOTAL		**35299**

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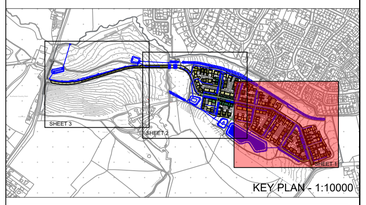

KEY PLAN - 1:10000

GREEN AREAS SHOW DEVELOPMENT BEING DRAINED TO RAIN GARDENS. YELLOW AREAS SHOW DEVELOPMENT BEING DRAINED A TO CONVENTIONAL NETWORK

REV	DESCRIPTION	BY	APP	DATE
P04	MINOR UPDATES TO REAR FENCES	CL	FA	27/05/26
P03	MINOR SITE LAYOUT UPDATES	CL	FA	12/05/26
P02	SITE LAYOUT UPDATED	CL	FA	27/04/26
P01	FIRST ISSUE	CL	FA	10/11/25

CLFA DESIGN
71-75 Shelton Street, Covent Garden
London, WC2H 9JQ

CLIENT:
Wain HOMES

PROJECT:
COURT FARM
TROWBRIDGE

DRAWING:
IMPERMEABLE AREAS PLAN
SHEET 1

PROJECT NUMBER:	DRAWING NUMBER:	
CLFA152	CLFA142-CLFA-00-XX-DR-C-0681.1	
STATUS: S2	SCALE @ A1 1:500	REV: P04

MANHOLE CATCHMENT		
MANHOLE ID	IMPERMEABLE AREA (m^2)	INCLUDING URBAN CREEP 10% (m^2)
ACCESS ROAD		
SWALE	578	578
TOTAL		**578**
ROAD AND BRIDGE		
SB1	285	285
SB2	590	590
SWALE	859	859
TOTAL		**1735**
MAIN SITE		
P114	772	796
P112	309	323
P109	265	279
S1	493	502
S2	586	610
S3	500	507
Swale P116	1418	1435
Swale P90	1119	1147
S4	996	1022
S5	878	894
S6	2547	2629
P43	154	169
P40	96	106
P38	399	439
Swale P47	206	214
Swale P48	483	492
Swale P50	265	272
S7	1821	1859
Swale P56	489	496
Swale P55	127	127
P57	177	190
P59	0	0
S8	991	1024
S9	1758	1803
Swale P82	110	110
Swale P141	642	663
Swale P146	360	369
Swale P147	67	67
P139	208	228
P135.1	87	96
P135.2	0	0
P134	391	408
S10	538	554
S11	420	436
S12	0	0
Swale P89	685	704
Swale P122	481	487
P127	208	228
P129	87	96
P131.1	0	0
P131.2	0	0
S13	2218	2293
P179	503	503
P175	0	0
P174	0	0
Swale P169	229	229
P14	0	0
P8	300	300
S14	1041	1059
S15	214	231
S16	0	0
S17	1026	1059
S18	0	0
S19	0	0
Swale P14.1	192	198
Swale P14.2	849	861
Swale P21	0	0
P32	0	0
P28.1	183	183
P28.2	0	0
P27	0	0
S20	1151	1194
S21	510	524
S22	0	0
S23	447	447
S24	203	203
S25	389	403
P18	96	106
P5	654	663
P4.1	0	0
P4.2	0	0
S26	227	237
S27	0	0
S28	1031	1055
S29	0	0
S30	920	942
S31	798	861
TOTAL		**35299**

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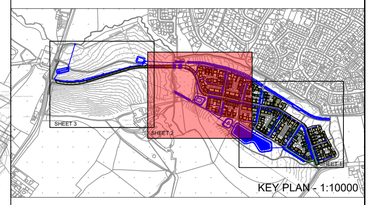

KEY PLAN - 1:10000

REV	DESCRIPTION	BY	APP	DATE
P04	MINOR UPDATES TO REAR FENCES AND PARKING NUMBERS 173-178	CL	FA	27/05/26
P03	MINOR SITE LAYOUT UPDATES	CL	FA	12/05/26
P02	SITE LAYOUT UPDATED	CL	FA	27/04/26
P01	FIRST ISSUE	CL	FA	10/11/25

CLFA DESIGN

71-75 Shelton Street, Covent Garden
London, WC2H 9JQ

CLIENT:

Wain HOMES

PROJECT:
COURT FARM
TROWBRIDGE

DRAWING:
IMPERMEABLE AREAS PLAN
SHEET 2

PROJECT NUMBER:	DRAWING NUMBER:	
CLFA152	CLFA142-CLFA-00-XX-DR-C-0681.2	
STATUS: S2	SCALE @ A1 1:500	REV: P04

MANHOLE CATCHMENT		
MANHOLE ID	IMPERMEABLE AREA (m^2)	INCLUDING URBAN CREEP 10% (m^2)
ACCESS ROAD		
SWALE	578	578
TOTAL		**578**
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S4	996	1022
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S6	2547	2629
P43	154	169
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P38	399	439
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S7	1821	1859
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S9	1758	1803
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P135.1	87	96
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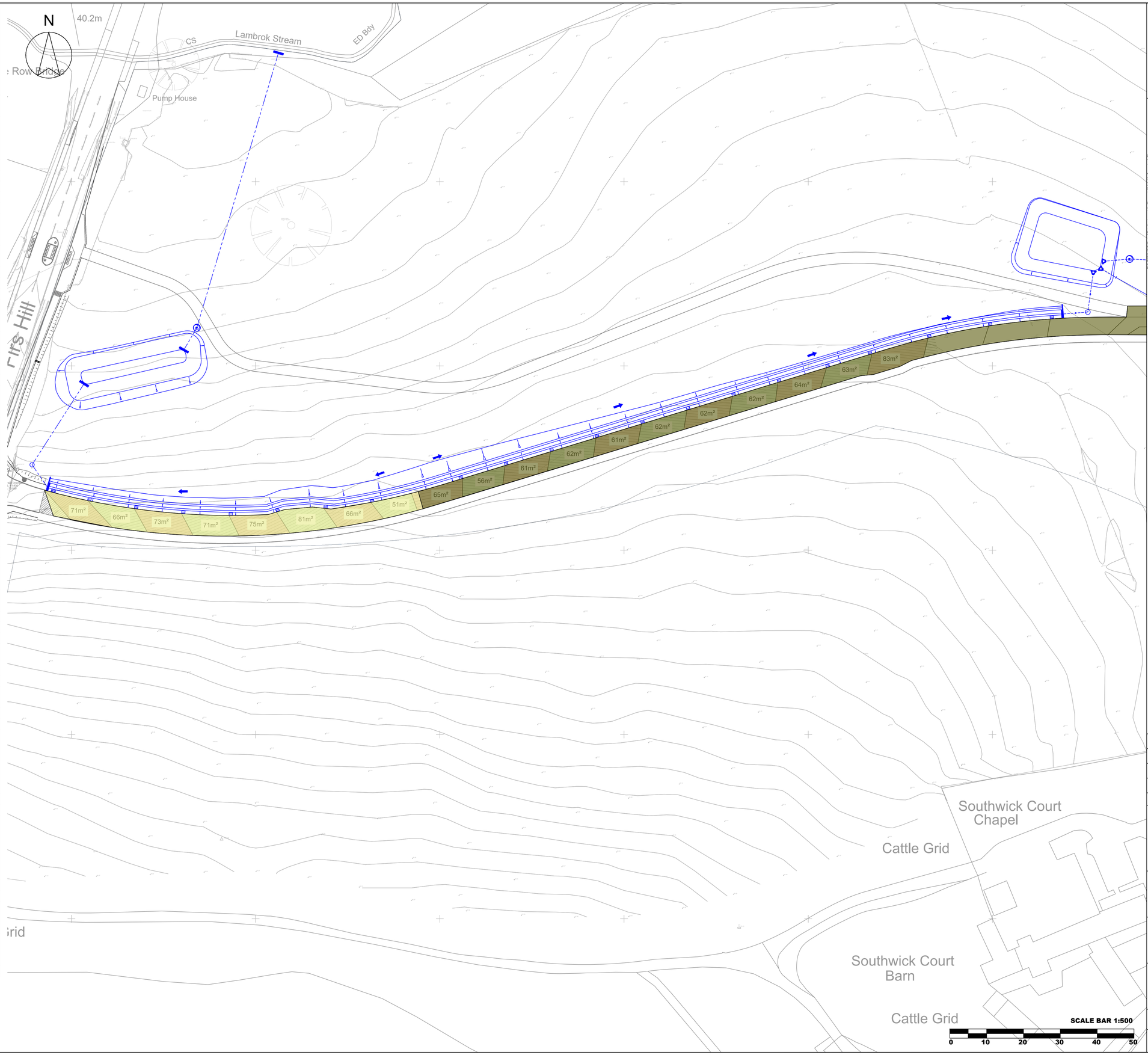
P18	96	106
P5	654	663
P4.1	0	0
P4.2	0	0
S26	227	237
S27	0	0
S28	1031	1055
S29	0	0
S30	920	942
S31	798	861
TOTAL		**35299**



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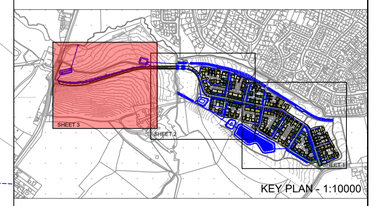

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P04	MINOR UPDATES TO REAR FENCES	CL	FA	27/05/26
P03	MINOR SITE LAYOUT UPDATES	CL	FA	12/05/26
P02	SITE LAYOUT UPDATED	CL	FA	27/04/26
P01	FIRST ISSUE	CL	FA	10/11/25

CLFA DESIGN

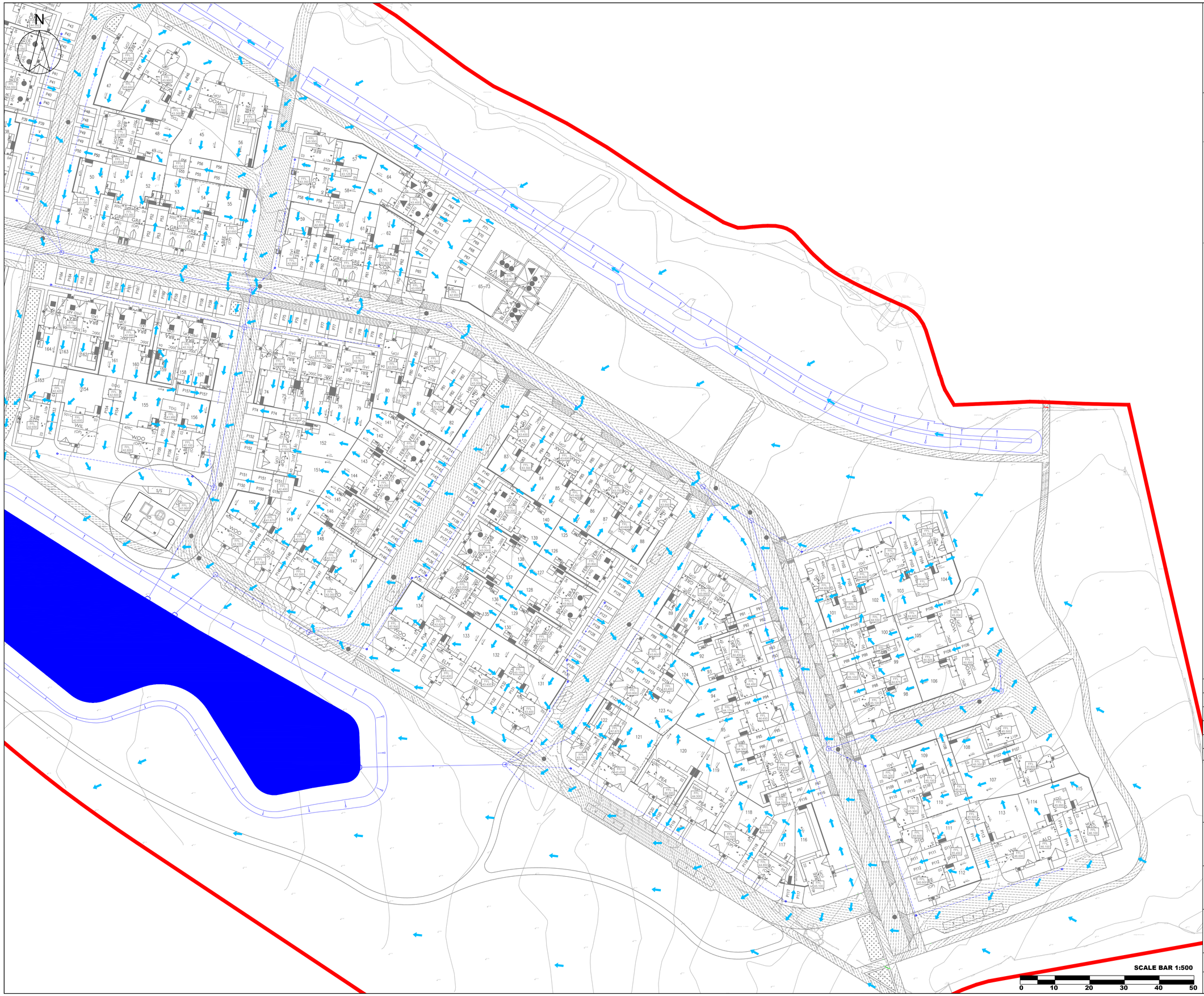
71-75 Shelton Street, Covent Garden
London, WC2H 9JQ

CLIENT:
Wain HOMES

PROJECT:
COURT FARM
TROWBRIDGE

DRAWING:
IMPERMEABLE AREAS PLAN
SHEET 3

PROJECT NUMBER:	DRAWING NUMBER:	
CLFA152	CLFA142-CLFA-00-XX-DR-C-0681.3	
STATUS: S2	SCALE @ A1 1:500	REV: P04



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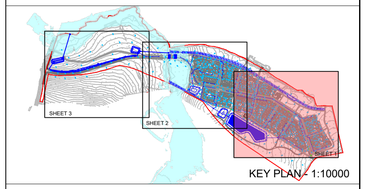


KEY PLAN - 1:10000

REV	DESCRIPTION	BY	APP	DATE
P05	ROAD CONTOURS SHOWN	MR	FA	27/05/26
P04	MINOR SITE LAYOUT UPDATES	MR	FA	12/05/26
P03	SITE LAYOUT UPDATED	MR	FA	27/04/26
P02	SCALE BAR ADDED	CL	FA	09/12/25
P01	FIRST ISSUE	MR	FA	10/11/25

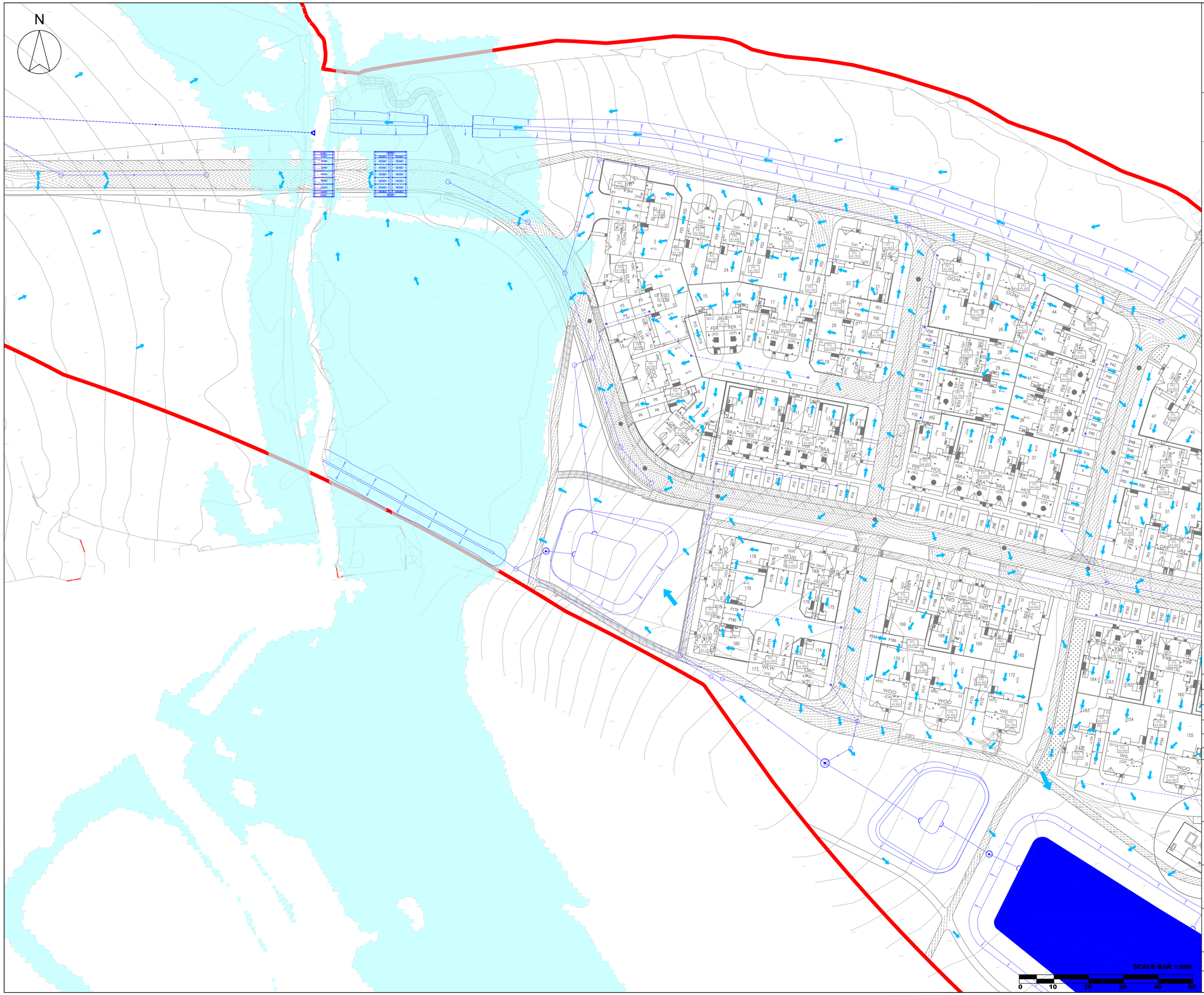
CLFA DESIGN
71-75 Shelton Street, Covent Garden
London, WC2H 9JQ

CLIENT:
Wain HOMES

PROJECT:
SOUTHWICK COURT FARM
TROWBRIDGE

DRAWING:
DRAINAGE EXCEEDANCE PLAN
SHEET 1

PROJECT NUMBER:	DRAWING NUMBER:	
CLFA142	CLFA142-CLFA-00-XX-DR-C-0505.1	
STATUS: S2	SCALE @ A1 1:500	REV: P05



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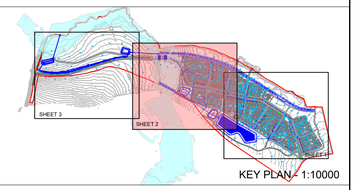

KEY PLAN - 1:10000

REV	DESCRIPTION	BY	APP	DATE
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CLIENT:

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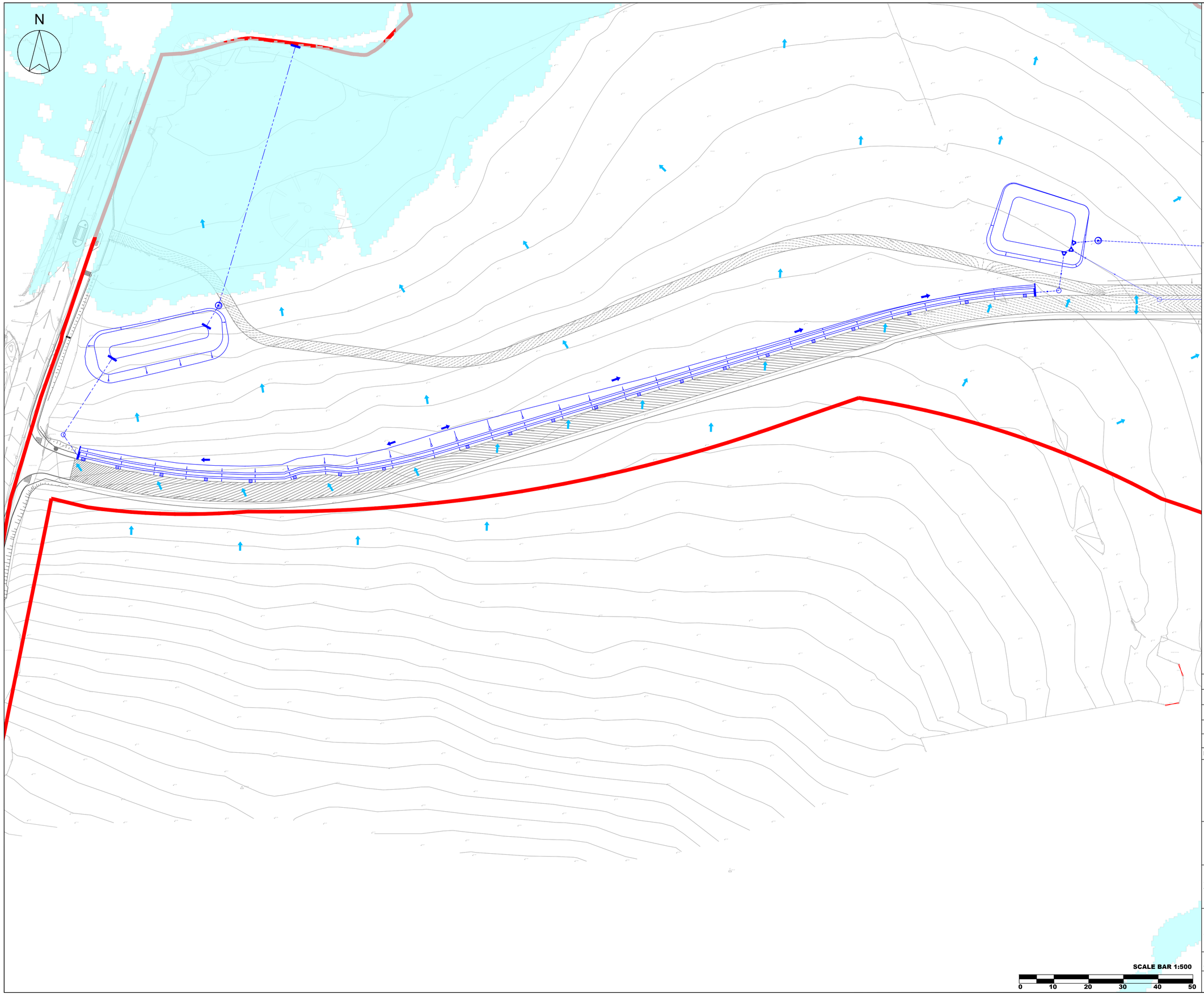
SOUTHWICK COURT FARM
TROWBRIDGE

DRAWING:
DRAINAGE EXCEEDANCE PLAN
SHEET 2

PROJECT NUMBER:	DRAWING NUMBER:	
CLFA142	CLFA142-CLFA-00-XX-DR-C-0505.2	
STATUS: S2	SCALE @ A1 1:500	REV: P05



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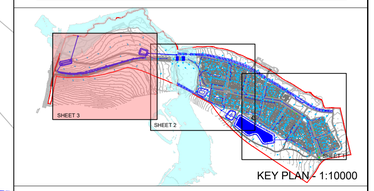

KEY PLAN - 1:10000

REV	DESCRIPTION	BY	APP	DATE
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PROJECT:
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TROWBRIDGE

DRAWING:
DRAINAGE EXCEEDANCE PLAN
SHEET 3

PROJECT NUMBER:	DRAWING NUMBER:	
CLFA142	CLFA142-CLFA-00-XX-DR-C-0505.3	
STATUS: S2	SCALE @ A1 1:500	REV: P05

APPENDIX B.1 – 1 IN 1, 1 IN 100 AND 1 IN 100CC CALCULATIONS ACCESS ROAD

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 1

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	21.000	Add Flow / Climate Change (%)	0
Ratio R	0.360	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Surface Network 1

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.054	4-8	0.072	8-12	0.002

Total Area Contributing (ha) = 0.128

Total Pipe Volume (m³) = 65.773

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	150.863	1.536	98.2	0.058	5.00	0.0	0.600	-1	-1	Pipe/Conduit	
1.001	33.429	1.592	21.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	25.815	0.050	516.3	0.070	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.003	77.189	5.514	14.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	6.42	42.736	0.058	0.0	0.0	0.0	1.77	745.2	7.9
1.001	50.00	6.67	40.440	0.058	0.0	0.0	0.0	2.21	39.0	7.9
1.002	50.00	7.66	38.650	0.128	0.0	0.0	0.0	0.44	7.7«	17.3
1.003	50.00	8.13	38.600	0.128	0.0	0.0	0.0	2.71	47.8	17.3

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Surcharged Outfall Details for Surface Network 1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.003	S7	39.150	33.086	38.050	5000	0

Datum (m) 0.000 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)
940	40.170	1880	40.170

Simulation Criteria for Surface Network 1

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	21.000	Storm Duration (mins)	30
Ratio R	0.360		

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Online Controls for Surface Network 1

Hydro-Brake® Optimum Manhole: S4, DS/PN: 1.003, Volume (m³): 2.4

Unit Reference	MD-SHE-0031-5000-1100-5000
Design Head (m)	1.100
Design Flow (l/s)	0.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	32
Invert Level (m)	38.600
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	**Head (m)**	**Flow (l/s)**
Design Point (Calculated)	1.100	0.5
Flush-Flo™	0.141	0.3
Kick-Flo®	0.282	0.3
Mean Flow over Head Range	-	0.4

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

Depth (m)	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**
0.100	0.3	1.200	0.5	3.000	0.8	7.000	1.1
0.200	0.3	1.400	0.6	3.500	0.8	7.500	1.2
0.300	0.3	1.600	0.6	4.000	0.9	8.000	1.2
0.400	0.3	1.800	0.6	4.500	0.9	8.500	1.3
0.500	0.4	2.000	0.7	5.000	1.0	9.000	1.3
0.600	0.4	2.200	0.7	5.500	1.0	9.500	1.3
0.800	0.4	2.400	0.7	6.000	1.1		
1.000	0.5	2.600	0.7	6.500	1.1		

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Storage Structures for Surface Network 1

Tank or Pond Manhole: Basin 1, DS/PN: 1.002

Invert Level (m) 38.650

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	104.9	1.350	423.8

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1 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 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.360
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 21.000 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 100
Climate Change (%) 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	Fake 1	15 Winter	1	+0%					42.764
1.001	SW1	15 Winter	1	+0%					40.487
1.002	Basin 1	2160 Winter	1	+0%	1/240 Winter				38.926
1.003	S4	2160 Summer	1	+0%	1/60 Winter				38.995

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	Fake 1	-0.272	0.000	0.01			8.1	FLOOD RISK	
1.001	SW1	-0.103	0.000	0.22			8.2	OK	
1.002	Basin 1	0.126	0.000	0.11			0.8	SURCHARGED	
1.003	S4	0.245	0.000	0.01			0.3	SURCHARGED	

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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 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.360
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 21.000 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 100
Climate Change (%) 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	Fake 1	15 Winter	100	+0%					42.788
1.001	SW1	15 Winter	100	+0%					40.534
1.002	Basin 1	2160 Winter	100	+0%	1/240 Winter				39.212
1.003	S4	2160 Winter	100	+0%	1/60 Winter				39.362

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	Fake 1	-0.248	0.000	0.04			25.8	FLOOD RISK	
1.001	SW1	-0.056	0.000	0.70			26.1	OK	
1.002	Basin 1	0.412	0.000	0.06			0.4	SURCHARGED	
1.003	S4	0.612	0.000	0.01			0.4	SURCHARGED	

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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 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.360
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 21.000 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 100
Climate Change (%) 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	Fake 1	15 Winter	100	+45%				
1.001	SW1	15 Winter	100	+45%				
1.002	Basin 1	2160 Winter	100	+45%	100/15 Summer			
1.003	S4	1440 Winter	100	+45%	100/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	Fake 1	42.801	-0.235	0.000	0.05			37.4	FLOOD RISK
1.001	SW1	40.575	-0.015	0.000	1.00			37.5	OK
1.002	Basin 1	39.403	0.603	0.000	0.06			0.4	SURCHARGED
1.003	S4	39.524	0.774	0.000	0.01			0.4	SURCHARGED

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

PN	US/MH Name	Level Exceeded
1.000	Fake 1	
1.001	SW1	
1.002	Basin 1	
1.003	S4	

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APPENDIX B.2 – 1 IN 1, 1 IN 100 AND 1 IN 100CC CALCULATIONS ROAD AND BRIDGE

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 2

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	21.000	Add Flow / Climate Change (%)	0
Ratio R	0.360	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Surface Network 2

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.036	4-8	0.127	8-12	0.010

Total Area Contributing (ha) = 0.173

Total Pipe Volume (m³) = 30.286

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	62.815	0.155	405.3	0.043	5.00	0.0	0.600	-1	-1	Pipe/Conduit	
1.001	13.877	1.250	11.1	0.043	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	41.829	0.403	103.8	0.028	5.00	0.0	0.600	o	150	Pipe/Conduit	
2.001	29.684	0.145	204.7	0.059	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	6.21	41.750	0.043	0.0	0.0	0.0	0.87	364.2	5.8
1.001	50.00	6.28	41.595	0.086	0.0	0.0	0.0	3.04	53.7	11.6
2.000	50.00	5.71	40.823	0.028	0.0	0.0	0.0	0.99	17.4	3.8
2.001	50.00	6.25	40.345	0.087	0.0	0.0	0.0	0.91	36.2	11.8

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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
1.002	8.298	0.050	166.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.003	90.118	0.406	222.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.002	50.00	6.46	40.200	0.173	0.0	0.0	0.0	0.78	13.7«	23.4
1.003	50.00	8.70	40.150	0.173	0.0	0.0	0.0	0.67	11.8«	23.4

Surcharged Outfall Details for Surface Network 2

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.003	Outfall B	42.423	39.744	0.000	0	0

Datum (m) 0.000 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1440	1.050	4320	1.050	7200	1.050	10080	1.050
2880	1.050	5760	1.050	8640	1.050		

Simulation Criteria for Surface Network 2

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	21.000
Return Period (years)	100	Ratio R	0.360
Region	England and Wales	Profile Type	Summer

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Synthetic Rainfall Details

Cv (Summer) 0.750 Storm Duration (mins) 30
Cv (Winter) 0.840

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Online Controls for Surface Network 2

Hydro-Brake® Optimum Manhole: SB3-FC, DS/PN: 1.003, Volume (m³): 1.9

Unit Reference	MD-SHE-0034-5000-0800-5000
Design Head (m)	0.800
Design Flow (l/s)	0.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	34
Invert Level (m)	40.150
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	0.5
Flush-Flo™	0.151	0.4
Kick-Flo®	0.303	0.3
Mean Flow over Head Range	-	0.4

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.4	1.200	0.6	3.000	0.9	7.000	1.3
0.200	0.4	1.400	0.6	3.500	1.0	7.500	1.4
0.300	0.3	1.600	0.7	4.000	1.0	8.000	1.4
0.400	0.4	1.800	0.7	4.500	1.1	8.500	1.4
0.500	0.4	2.000	0.7	5.000	1.1	9.000	1.5
0.600	0.4	2.200	0.8	5.500	1.2	9.500	1.5
0.800	0.5	2.400	0.8	6.000	1.2		
1.000	0.6	2.600	0.8	6.500	1.3		

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Storage Structures for Surface Network 2

Tank or Pond Manhole: Basin 2, DS/PN: 1.002

Invert Level (m) 40.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	231.4	1.100	480.2

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1 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 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.360
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 21.000 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 100
Climate Change (%) 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	Fake 1	15 Winter	1	+0%				
1.001	Fake 2	15 Winter	1	+0%				
2.000	S30	15 Winter	1	+0%				
2.001	S31-Catchpit	15 Winter	1	+0%	100/15 Summer			
1.002	Basin 2	960 Winter	1	+0%	100/30 Summer			
1.003	SB3-FC	960 Winter	1	+0%	1/180 Winter			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	Fake 1	41.785	-0.265	0.000	0.02			5.6	FLOOD RISK
1.001	Fake 2	41.642	-0.103	0.000	0.21			10.4	FLOOD RISK
2.000	S30	40.872	-0.101	0.000	0.23			4.0	OK
2.001	S31-Catchpit	40.433	-0.137	0.000	0.32			10.9	OK
1.002	Basin 2	40.324	-0.026	0.000	0.06			0.7	OK

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.003	SB3-FC	40.326	0.026	0.000	0.03			0.4	SURCHARGED

PN	US/MH Name	Level Exceeded
1.000	Fake 1	
1.001	Fake 2	
2.000	S30	
2.001	S31-Catchpit	
1.002	Basin 2	
1.003	SB3-FC	

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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 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.360
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 21.000 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 100
Climate Change (%) 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	Fake 1	15 Winter	100	+0%				
1.001	Fake 2	15 Winter	100	+0%				
2.000	S30	15 Winter	100	+0%				
2.001	S31-Catchpit	15 Winter	100	+0%	100/15 Summer			
1.002	Basin 2	1440 Winter	100	+0%	100/30 Summer			
1.003	SB3-FC	1440 Winter	100	+0%	1/180 Winter			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	Fake 1	41.818	-0.232	0.000	0.05			18.0	FLOOD RISK
1.001	Fake 2	41.693	-0.052	0.000	0.74			36.5	FLOOD RISK
2.000	S30	40.921	-0.052	0.000	0.73			12.3	OK
2.001	S31-Catchpit	40.612	0.042	0.000	1.13			38.3	SURCHARGED
1.002	Basin 2	40.582	0.232	0.000	0.06			0.7	SURCHARGED

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.003	SB3-FC	40.582	0.282	0.000	0.03			0.4	SURCHARGED

PN	US/MH Name	Level Exceeded
1.000	Fake 1	
1.001	Fake 2	
2.000	S30	
2.001	S31-Catchpit	
1.002	Basin 2	
1.003	SB3-FC	

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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 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.360
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 21.000 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 100
Climate Change (%) 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	Fake 1	15 Winter	100	+45%				
1.001	Fake 2	15 Winter	100	+45%				
2.000	S30	15 Winter	100	+45%	100/15 Summer			
2.001	S31-Catchpit	15 Winter	100	+45%	100/15 Summer			
1.002	Basin 2	2160 Winter	100	+45%	100/15 Summer			
1.003	SB3-FC	2160 Winter	100	+45%	100/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	Fake 1	41.836	-0.214	0.000	0.08			26.1	FLOOD RISK
1.001	Fake 2	41.717	-0.028	0.000	1.00			49.1	FLOOD RISK
2.000	S30	41.166	0.193	0.000	0.99			16.7	SURCHARGED
2.001	S31-Catchpit	40.784	0.214	0.000	1.56			52.7	SURCHARGED
1.002	Basin 2	40.759	0.409	0.000	0.08			1.0	SURCHARGED

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.003	SB3-FC	40.759	0.459	0.000	0.04			0.4	SURCHARGED

PN	US/MH Name	Level Exceeded
1.000	Fake 1	
1.001	Fake 2	
2.000	S30	
2.001	S31-Catchpit	
1.002	Basin 2	
1.003	SB3-FC	

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APPENDIX B.3 – 1 IN 1, 1 IN 100 AND 1 IN 100CC CALCULATIONS MAIN SITE

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 2

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	21.000	Add Flow / Climate Change (%)	0
Ratio R	0.360	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Surface Network 2

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.011	4-8	0.753	8-12	0.276	12-16	1.574	16-20	0.902	20-24	0.024

Total Area Contributing (ha) = 3.541

Total Pipe Volume (m³) = 191.511

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	44.076	0.467	94.4	0.080	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	45.352	0.769	59.0	0.032	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	11.731	1.003	11.7	0.028	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	8.434	0.056	150.6	0.050	5.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.55	44.811	0.080	0.0	0.0	0.0	1.35	53.5	10.8
1.001	50.00	5.99	44.344	0.112	0.0	0.0	0.0	1.71	67.8	15.2
1.002	50.00	6.04	43.575	0.140	0.0	0.0	0.0	3.85	153.0	19.0
2.000	50.00	5.17	43.937	0.050	0.0	0.0	0.0	0.82	14.4	6.8

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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
2.001	52.362	1.308	40.0	0.061	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	69.290	0.555	124.8	0.051	0.00	0.0	0.600	o	375	Pipe/Conduit	
3.000	91.322	1.000	91.3	0.144	5.00	0.0	0.600	o	300	Pipe/Conduit	
3.001	20.589	1.683	12.2	0.115	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.004	16.866	0.112	150.6	0.102	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.005	86.543	0.605	143.0	0.089	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.006	57.636	0.350	164.7	0.263	0.00	0.0	0.600	o	525	Pipe/Conduit	
4.000	20.807	0.150	138.7	0.017	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	32.693	1.400	23.4	0.011	0.00	0.0	0.600	o	150	Pipe/Conduit	
4.002	17.801	0.446	39.9	0.044	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.000	20.505	0.261	78.6	0.021	5.00	0.0	0.600	o	150	Pipe/Conduit	
5.001	36.250	1.289	28.1	0.049	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.002	7.549	0.444	17.0	0.027	0.00	0.0	0.600	o	225	Pipe/Conduit	
4.003	55.657	0.381	146.1	0.186	0.00	0.0	0.600	o	375	Pipe/Conduit	
6.000	43.757	1.850	23.7	0.050	5.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
2.001	50.00	5.59	43.881	0.111	0.0	0.0	0.0	2.07	82.5	15.0
1.003	50.00	6.75	42.422	0.302	0.0	0.0	0.0	1.62	179.0	40.9
3.000	50.00	5.92	44.625	0.144	0.0	0.0	0.0	1.65	116.3	19.5
3.001	50.00	6.00	43.625	0.259	0.0	0.0	0.0	4.52	319.4	35.1
1.004	50.00	6.92	41.792	0.663	0.0	0.0	0.0	1.65	263.1	89.8
1.005	50.00	7.69	41.605	0.752	0.0	0.0	0.0	1.87	405.0	101.8
1.006	50.00	8.24	41.000	1.015	0.0	0.0	0.0	1.74	377.3	137.4
4.000	50.00	5.41	43.400	0.017	0.0	0.0	0.0	0.85	15.0	2.3
4.001	50.00	5.67	43.250	0.028	0.0	0.0	0.0	2.09	37.0	3.8
4.002	50.00	5.81	41.775	0.072	0.0	0.0	0.0	2.08	82.6	9.7
5.000	50.00	5.30	43.400	0.021	0.0	0.0	0.0	1.14	20.1	2.8
5.001	50.00	5.54	43.064	0.070	0.0	0.0	0.0	2.48	98.5	9.5
5.002	50.00	5.58	41.775	0.097	0.0	0.0	0.0	3.19	126.8	13.1
4.003	50.00	6.43	41.179	0.355	0.0	0.0	0.0	1.50	165.3	48.1
6.000	50.00	5.35	43.050	0.050	0.0	0.0	0.0	2.08	36.7	6.8

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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
6.001	7.528	0.175	43.0	0.013	0.00	0.0	0.600	o	225	Pipe/Conduit	
7.000	31.658	1.382	22.9	0.019	5.00	0.0	0.600	o	100	Pipe/Conduit	
7.001	9.268	0.125	74.1	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.007	10.829	0.034	316.0	0.102	0.00	0.0	0.600	o	675	Pipe/Conduit	
1.008	46.946	0.149	316.0	0.094	0.00	0.0	0.600	o	675	Pipe/Conduit	
1.009	41.206	0.117	352.2	0.180	0.00	0.0	0.600	o	675	Pipe/Conduit	
8.000	63.099	1.450	43.5	0.070	5.00	0.0	0.600	o	225	Pipe/Conduit	
8.001	20.601	0.140	147.2	0.049	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.000	19.813	0.150	132.1	0.023	5.00	0.0	0.600	o	150	Pipe/Conduit	
9.001	6.148	0.223	27.6	0.010	0.00	0.0	0.600	o	150	Pipe/Conduit	
9.002	19.950	0.808	24.7	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
9.003	10.321	0.109	94.7	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
8.002	105.579	1.285	82.2	0.229	0.00	0.0	0.600	o	375	Pipe/Conduit	
10.000	15.920	0.200	79.6	0.011	5.00	0.0	0.600	o	150	Pipe/Conduit	
10.001	39.671	0.301	131.8	0.066	0.00	0.0	0.600	o	225	Pipe/Conduit	
10.002	20.803	1.049	19.8	0.037	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
6.001	50.00	5.41	41.125	0.063	0.0	0.0	0.0	2.00	79.5	8.5
7.000	50.00	5.33	42.582	0.019	0.0	0.0	0.0	1.62	12.7	2.6
7.001	50.00	5.50	41.200	0.019	0.0	0.0	0.0	0.89	7.0	2.6
1.007	50.00	8.37	40.500	1.554	0.0	0.0	0.0	1.47	525.7	210.4
1.008	50.00	8.90	40.466	1.648	0.0	0.0	0.0	1.47	525.7	223.2
1.009	50.00	9.39	40.317	1.828	0.0	0.0	0.0	1.39	497.7	247.5
8.000	50.00	5.53	43.225	0.070	0.0	0.0	0.0	1.99	79.1	9.5
8.001	50.00	5.79	41.700	0.119	0.0	0.0	0.0	1.29	91.5	16.1
9.000	50.00	5.38	43.000	0.023	0.0	0.0	0.0	0.87	15.4	3.1
9.001	50.00	5.43	42.850	0.033	0.0	0.0	0.0	1.93	34.0	4.5
9.002	50.00	5.60	42.627	0.033	0.0	0.0	0.0	2.03	36.0	4.5
9.003	50.00	5.76	41.819	0.033	0.0	0.0	0.0	1.03	18.3	4.5
8.002	50.00	6.67	41.485	0.381	0.0	0.0	0.0	2.00	220.9	51.6
10.000	50.00	5.24	42.700	0.011	0.0	0.0	0.0	1.13	19.9	1.5
10.001	50.00	5.82	42.425	0.077	0.0	0.0	0.0	1.14	45.2	10.4
10.002	50.00	5.93	42.124	0.114	0.0	0.0	0.0	2.95	117.4	15.4

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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
10.003	10.277	0.078	131.8	0.007	0.00	0.0	0.600	o	300	Pipe/Conduit	
11.000	24.966	0.300	83.2	0.023	5.00	0.0	0.600	o	150	Pipe/Conduit	
11.001	4.167	0.200	20.8	0.010	0.00	0.0	0.600	o	150	Pipe/Conduit	
11.002	24.258	0.769	31.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
11.003	17.433	0.209	83.4	0.041	0.00	0.0	0.600	o	225	Pipe/Conduit	
10.004	31.500	0.502	62.7	0.055	0.00	0.0	0.600	o	300	Pipe/Conduit	
10.005	19.831	0.145	136.8	0.044	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.010	123.790	0.100	1237.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
12.000	35.007	1.600	21.9	0.000	5.00	0.0	0.600	o	100	Pipe/Conduit	
12.001	15.523	0.182	85.3	0.030	0.00	0.0	0.600	o	150	Pipe/Conduit	
12.002	40.668	0.354	114.9	0.106	0.00	0.0	0.600	o	300	Pipe/Conduit	
12.003	13.828	0.092	150.3	0.023	0.00	0.0	0.600	o	300	Pipe/Conduit	
12.004	40.671	0.271	150.1	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
13.000	28.993	0.290	100.0	0.050	5.00	0.0	0.600	o	150	Pipe/Conduit	
13.001	16.849	0.207	81.4	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
13.002	12.944	1.470	8.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
10.003	50.00	6.06	41.000	0.121	0.0	0.0	0.0	1.37	96.7	16.4
11.000	50.00	5.38	42.550	0.023	0.0	0.0	0.0	1.10	19.5	3.1
11.001	50.00	5.41	42.250	0.033	0.0	0.0	0.0	2.22	39.2	4.5
11.002	50.00	5.63	42.050	0.033	0.0	0.0	0.0	1.80	31.8	4.5
11.003	50.00	5.84	41.207	0.074	0.0	0.0	0.0	1.43	57.0	10.0
10.004	50.00	6.32	40.922	0.250	0.0	0.0	0.0	1.99	140.5	33.9
10.005	50.00	6.54	40.345	0.294	0.0	0.0	0.0	1.55	170.9	39.8
1.010	38.10	16.83	40.200	2.503	0.0	0.0	0.0	0.28	4.9«	258.3
12.000	50.00	5.35	42.900	0.000	0.0	0.0	0.0	1.66	13.0	0.0
12.001	50.00	5.59	41.250	0.030	0.0	0.0	0.0	1.09	19.2	4.1
12.002	50.00	6.05	40.919	0.136	0.0	0.0	0.0	1.47	103.6	18.4
12.003	50.00	6.23	40.565	0.159	0.0	0.0	0.0	1.28	90.5	21.5
12.004	50.00	6.76	40.472	0.159	0.0	0.0	0.0	1.28	90.6	21.5
13.000	50.00	5.48	42.319	0.050	0.0	0.0	0.0	1.00	17.8	6.8
13.001	50.00	5.73	42.029	0.050	0.0	0.0	0.0	1.12	19.7	6.8
13.002	50.00	5.80	41.822	0.050	0.0	0.0	0.0	3.42	60.4	6.8

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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
14.000	40.506	2.469	16.4	0.023	5.00	0.0	0.600	o	150	Pipe/Conduit	
12.005	8.018	0.049	163.6	0.106	0.00	0.0	0.600	o	300	Pipe/Conduit	
12.006	8.495	0.052	163.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.011	41.173	0.188	219.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.012	68.091	0.312	218.2	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
15.000	78.068	1.230	63.5	0.094	5.00	0.0	0.600	o	300	Pipe/Conduit	
16.000	14.665	0.248	59.1	0.020	5.00	0.0	0.600	o	150	Pipe/Conduit	
16.001	49.334	1.452	34.0	0.086	0.00	0.0	0.600	o	225	Pipe/Conduit	
16.002	4.348	0.083	52.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
17.000	21.859	0.250	87.4	0.000	5.00	0.0	0.600	o	100	Pipe/Conduit	
17.001	5.358	0.289	18.5	0.018	0.00	0.0	0.600	o	100	Pipe/Conduit	
17.002	20.961	0.921	22.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
17.003	12.345	0.223	55.4	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
15.001	69.550	0.500	139.1	0.119	0.00	0.0	0.600	o	375	Pipe/Conduit	
15.002	21.209	0.141	150.4	0.052	0.00	0.0	0.600	o	375	Pipe/Conduit	
15.003	34.081	0.224	152.1	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
14.000	50.00	5.27	43.100	0.023	0.0	0.0	0.0	2.50	44.2	3.1
12.005	50.00	6.87	40.201	0.338	0.0	0.0	0.0	1.23	86.7	45.8
12.006	50.00	6.99	40.152	0.338	0.0	0.0	0.0	1.23	86.9	45.8
1.011	37.28	17.47	40.100	2.841	0.0	0.0	0.0	1.06	74.8«	286.8
1.012	36.00	18.55	39.912	2.841	0.0	0.0	0.0	1.06	74.9«	286.8
15.000	50.00	5.66	42.447	0.094	0.0	0.0	0.0	1.98	139.7	12.7
16.000	50.00	5.19	43.150	0.020	0.0	0.0	0.0	1.31	23.2	2.7
16.001	50.00	5.55	42.827	0.106	0.0	0.0	0.0	2.25	89.5	14.4
16.002	50.00	5.59	41.375	0.106	0.0	0.0	0.0	1.81	72.1	14.4
17.000	50.00	5.44	43.100	0.000	0.0	0.0	0.0	0.82	6.5	0.0
17.001	50.00	5.49	42.850	0.018	0.0	0.0	0.0	1.80	14.2	2.4
17.002	50.00	5.71	42.561	0.018	0.0	0.0	0.0	1.63	12.8	2.4
17.003	50.00	5.91	41.640	0.018	0.0	0.0	0.0	1.04	8.1	2.4
15.001	50.00	6.66	41.142	0.337	0.0	0.0	0.0	1.53	169.5	45.6
15.002	50.00	6.90	40.642	0.389	0.0	0.0	0.0	1.48	162.9	52.7
15.003	50.00	7.29	40.426	0.389	0.0	0.0	0.0	1.47	162.0	52.7

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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
18.000	25.785	0.336	76.7	0.045	5.00	0.0	0.600	o	150	Pipe/Conduit	
18.001	18.074	0.120	150.6	0.020	0.00	0.0	0.600	o	150	Pipe/Conduit	
15.004	25.692	0.171	150.2	0.040	0.00	0.0	0.600	o	450	Pipe/Conduit	
19.000	34.246	0.994	34.5	0.011	5.00	0.0	0.600	o	150	Pipe/Conduit	
19.001	17.512	0.374	46.8	0.066	0.00	0.0	0.600	o	225	Pipe/Conduit	
19.002	12.913	0.436	29.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
19.003	10.506	0.120	87.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
20.000	13.659	0.107	127.7	0.024	5.00	0.0	0.600	o	225	Pipe/Conduit	
20.001	26.891	0.449	59.9	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
15.005	5.631	0.038	148.2	0.105	0.00	0.0	0.600	o	450	Pipe/Conduit	
15.006	51.398	0.343	150.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
15.007	26.958	0.050	539.2	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.013	58.372	0.100	583.7	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
18.000	50.00	5.37	40.959	0.045	0.0	0.0	0.0	1.15	20.3	6.1
18.001	50.00	5.74	40.622	0.065	0.0	0.0	0.0	0.82	14.4	8.8
15.004	50.00	7.55	40.201	0.494	0.0	0.0	0.0	1.66	263.4	66.9
19.000	50.00	5.33	42.254	0.011	0.0	0.0	0.0	1.72	30.4	1.5
19.001	50.00	5.48	41.185	0.077	0.0	0.0	0.0	1.92	76.2	10.4
19.002	50.00	5.57	40.811	0.077	0.0	0.0	0.0	2.41	95.9	10.4
19.003	50.00	5.70	40.375	0.077	0.0	0.0	0.0	1.40	55.5	10.4
20.000	50.00	5.20	40.811	0.024	0.0	0.0	0.0	1.16	46.0	3.2
20.001	50.00	5.46	40.704	0.024	0.0	0.0	0.0	1.69	67.3	3.2
15.005	50.00	7.60	40.030	0.700	0.0	0.0	0.0	1.67	265.3	94.8
15.006	50.00	8.12	39.993	0.700	0.0	0.0	0.0	1.66	263.6	94.8
15.007	50.00	8.79	39.650	0.700	0.0	0.0	0.0	0.67	47.4«	94.8
1.013	33.50	20.92	39.600	3.541	0.0	0.0	0.0	0.41	7.2«	321.3

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Surcharged Outfall Details for Surface Network 2

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.013	Outfall	39.769	39.500	0.000	1350	0

Datum (m) 0.000 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1440	1.400	4320	1.400	7200	1.400	10080	1.400
2880	1.400	5760	1.400	8640	1.400		

Simulation Criteria for Surface Network 2

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	21.000	Storm Duration (mins)	30
Ratio R	0.360		

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Online Controls for Surface Network 2

Hydro-Brake® Optimum Manhole: Pond 1, DS/PN: 1.010, Volume (m³): 29.6

Unit Reference	MD-SHE-0063-2000-1300-2000
Design Head (m)	1.300
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	63
Invert Level (m)	40.200
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.300	2.0
Flush-Flo™	0.280	1.7
Kick-Flo®	0.564	1.4
Mean Flow over Head Range	-	1.6

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)
0.100	1.4	1.200	1.9	3.000	2.9	7.000	4.4
0.200	1.7	1.400	2.1	3.500	3.2	7.500	4.5
0.300	1.7	1.600	2.2	4.000	3.4	8.000	4.6
0.400	1.6	1.800	2.3	4.500	3.5	8.500	4.8
0.500	1.5	2.000	2.4	5.000	3.7	9.000	4.9
0.600	1.4	2.200	2.5	5.500	3.9	9.500	5.0
0.800	1.6	2.400	2.6	6.000	4.1		
1.000	1.8	2.600	2.7	6.500	4.2		

Hydro-Brake® Optimum Manhole: Basin 4, DS/PN: 1.011, Volume (m³): 15.3

Unit Reference	MD-SHE-0054-2000-2500-2000
Design Head (m)	2.500
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	54
Invert Level (m)	40.100
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

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Hydro-Brake® Optimum Manhole: Basin 4, DS/PN: 1.011, Volume (m³): 15.3

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.500	2.0
Flush-Flo™	0.239	1.2
Kick-Flo®	0.484	1.0
Mean Flow over Head Range	-	1.4

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.0	1.200	1.4	3.000	2.2	7.000	3.2
0.200	1.2	1.400	1.5	3.500	2.3	7.500	3.3
0.300	1.2	1.600	1.6	4.000	2.5	8.000	3.4
0.400	1.1	1.800	1.7	4.500	2.6	8.500	3.5
0.500	1.0	2.000	1.8	5.000	2.8	9.000	3.6
0.600	1.1	2.200	1.9	5.500	2.9	9.500	3.7
0.800	1.2	2.400	2.0	6.000	3.0		
1.000	1.3	2.600	2.0	6.500	3.1		

Hydro-Brake® Optimum Manhole: Basin 3, DS/PN: 15.007, Volume (m³): 14.7

Unit Reference	MD-SHE-0096-5000-1650-5000
Design Head (m)	1.650
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	96
Invert Level (m)	39.650
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.650	5.0
Flush-Flo™	0.419	4.6
Kick-Flo®	0.856	3.7
Mean Flow over Head Range	-	4.2

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.1	0.300	4.5	0.500	4.6	0.800	4.0
0.200	4.2	0.400	4.6	0.600	4.5	1.000	4.0

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Hydro-Brake® Optimum Manhole: Basin 3, DS/PN: 15.007, Volume (m³): 14.7

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
1.200	4.3	2.400	6.0	5.000	8.4	8.000	10.5
1.400	4.6	2.600	6.2	5.500	8.8	8.500	10.8
1.600	4.9	3.000	6.6	6.000	9.2	9.000	11.1
1.800	5.2	3.500	7.1	6.500	9.5	9.500	11.4
2.000	5.5	4.000	7.6	7.000	9.9		
2.200	5.7	4.500	8.0	7.500	10.2		

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Storage Structures for Surface Network 2

Tank or Pond Manhole: Pond 1, DS/PN: 1.010

Invert Level (m) 40.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	3478.3	1.600	5061.0

Tank or Pond Manhole: Basin 4, DS/PN: 1.011

Invert Level (m) 40.150

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	46.9	2.750	557.8

Tank or Pond Manhole: Basin 3, DS/PN: 15.007

Invert Level (m) 39.650

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	163.3	1.950	605.9

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1 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 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 3
Number of Online Controls 3 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.360
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 21.000 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 100
Climate Change (%) 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	P114	15 Winter	1	+0%				
1.001	P112	15 Winter	1	+0%				
1.002	P109	15 Winter	1	+0%				
2.000	S1	15 Winter	1	+0%	100/15 Summer			
2.001	S2	15 Winter	1	+0%				
1.003	S3	15 Winter	1	+0%				
3.000	Swale P116	15 Winter	1	+0%				
3.001	Swale P90	15 Winter	1	+0%				
1.004	S4	15 Winter	1	+0%	100/15 Summer			
1.005	S5	15 Winter	1	+0%	100/15 Winter			
1.006	S6	15 Winter	1	+0%	100/15 Summer			
4.000	P43	15 Winter	1	+0%				
4.001	P40	15 Winter	1	+0%				
4.002	P38	15 Winter	1	+0%				
5.000	Swale P47	15 Winter	1	+0%				
5.001	Swale P48	15 Winter	1	+0%				
5.002	Swale P50	15 Winter	1	+0%				
4.003	S7	15 Winter	1	+0%	100/15 Summer			
6.000	Swale P56	15 Winter	1	+0%				

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	P114	44.883	-0.153	0.000	0.22			11.1	OK
1.001	P112	44.417	-0.152	0.000	0.23			14.9	OK
1.002	P109	43.631	-0.169	0.000	0.14			18.1	OK
2.000	S1	44.018	-0.069	0.000	0.55			7.0	OK
2.001	S2	43.946	-0.160	0.000	0.18			14.4	OK
1.003	S3	42.543	-0.254	0.000	0.22			37.5	OK
3.000	Swale P116	44.711	-0.214	0.000	0.17			19.5	OK
3.001	Swale P90	43.693	-0.232	0.000	0.12			33.0	OK
1.004	S4	42.000	-0.242	0.000	0.43			81.3	OK
1.005	S5	41.781	-0.349	0.000	0.24			89.9	OK
1.006	S6	41.213	-0.312	0.000	0.34			116.1	OK
4.000	P43	43.442	-0.108	0.000	0.17			2.4	OK
4.001	P40	43.282	-0.118	0.000	0.10			3.7	OK
4.002	P38	41.827	-0.173	0.000	0.12			8.9	OK
5.000	Swale P47	43.440	-0.110	0.000	0.15			2.9	OK
5.001	Swale P48	43.111	-0.178	0.000	0.09			8.8	OK
5.002	Swale P50	41.829	-0.171	0.000	0.13			12.0	OK
4.003	S7	41.315	-0.239	0.000	0.28			43.3	OK
6.000	Swale P56	43.095	-0.105	0.000	0.19			7.0	OK

PN	US/MH Name	Level Exceeded
1.000	P114	
1.001	P112	
1.002	P109	
2.000	S1	
2.001	S2	
1.003	S3	
3.000	Swale P116	
3.001	Swale P90	
1.004	S4	
1.005	S5	
1.006	S6	
4.000	P43	
4.001	P40	
4.002	P38	
5.000	Swale P47	
5.001	Swale P48	
5.002	Swale P50	
4.003	S7	
6.000	Swale P56	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
6.001	Swale P55	15 Winter	1	+0%	100/15 Summer		
7.000	P57	15 Winter	1	+0%			
7.001	P59	15 Winter	1	+0%	100/15 Summer		
1.007	S8	15 Winter	1	+0%	100/15 Summer		
1.008	S31	15 Winter	1	+0%	100/15 Summer		
1.009	S9	15 Winter	1	+0%	100/15 Summer		
8.000	Swale P89	15 Winter	1	+0%			
8.001	Swale P122	15 Winter	1	+0%			
9.000	P127	15 Winter	1	+0%			
9.001	P129	15 Winter	1	+0%			
9.002	P131.1	15 Winter	1	+0%			
9.003	P131.2	15 Winter	1	+0%			
8.002	S13	15 Winter	1	+0%			
10.000	Swale P82	15 Winter	1	+0%			
10.001	Swale P141	15 Winter	1	+0%			
10.002	Swale P146	15 Winter	1	+0%			
10.003	Swale P147	15 Winter	1	+0%			
11.000	P139	15 Winter	1	+0%			
11.001	P135.1	15 Winter	1	+0%			
11.002	P135.2	15 Winter	1	+0%			
11.003	P134	15 Winter	1	+0%			
10.004	S10	15 Winter	1	+0%			
10.005	S11	10080 Winter	1	+0%	100/1440 Winter		
1.010	Pond 1	10080 Winter	1	+0%	1/360 Winter		
12.000	P14	15 Summer	1	+0%			
12.001	P8	15 Winter	1	+0%	100/15 Winter		
12.002	S14	15 Winter	1	+0%	100/15 Summer		
12.003	S15	15 Winter	1	+0%	100/15 Summer		
12.004	S16	240 Winter	1	+0%	100/15 Summer		
13.000	P179	15 Winter	1	+0%	100/15 Summer		
13.001	P175	15 Winter	1	+0%	100/15 Summer		
13.002	P174	15 Winter	1	+0%			
14.000	Swale P169	15 Winter	1	+0%			
12.005	S17	240 Winter	1	+0%	1/60 Winter		
12.006	S18	240 Winter	1	+0%	1/30 Winter		
1.011	Basin 4	240 Winter	1	+0%	1/15 Winter		
1.012	S19	5760 Summer	1	+0%			
15.000	S30	15 Winter	1	+0%			
16.000	Swale P14.1	15 Winter	1	+0%			
16.001	Swale 14.2	15 Winter	1	+0%			
16.002	Swale P21	15 Winter	1	+0%	100/15 Summer		
17.000	P32	15 Summer	1	+0%			
17.001	P28.1	15 Winter	1	+0%			
17.002	P28.2	15 Winter	1	+0%			
17.003	P27	15 Winter	1	+0%	100/15 Summer		
15.001	S20	15 Winter	1	+0%			
15.002	S21	15 Winter	1	+0%	100/15 Summer		
15.003	S22	15 Winter	1	+0%	100/15 Summer		

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
6.001	Swale P55		41.182	-0.168	0.000	0.15			8.6
7.000	P57		42.614	-0.068	0.000	0.21			2.7
7.001	P59		41.245	-0.055	0.000	0.41			2.6
1.007	S8		40.861	-0.314	0.000	0.56			175.3
1.008	S31		40.775	-0.366	0.000	0.41			183.7
1.009	S9		40.646	-0.346	0.000	0.48			198.9
8.000	Swale P89		43.279	-0.171	0.000	0.13			9.8
8.001	Swale P122		41.791	-0.209	0.000	0.20			15.7
9.000	P127		43.048	-0.102	0.000	0.22			3.2
9.001	P129		42.890	-0.110	0.000	0.15			4.4
9.002	P131.1		42.663	-0.114	0.000	0.13			4.4
9.003	P131.2		41.872	-0.097	0.000	0.27			4.4
8.002	S13		41.605	-0.255	0.000	0.22			47.0
10.000	Swale P82		42.729	-0.121	0.000	0.08			1.5
10.001	Swale P141		42.497	-0.153	0.000	0.22			9.4
10.002	Swale P146		42.178	-0.171	0.000	0.13			13.7
10.003	Swale P147		41.093	-0.207	0.000	0.21			14.5
11.000	P139		42.592	-0.108	0.000	0.17			3.2
11.001	P135.1		42.290	-0.110	0.000	0.16			4.4
11.002	P135.2		42.088	-0.112	0.000	0.15			4.4
11.003	P134		41.272	-0.160	0.000	0.18			9.3
10.004	S10		41.021	-0.201	0.000	0.24			30.3
10.005	S11		40.492	-0.228	0.000	0.00			0.7
1.010	Pond 1		40.492	0.142	0.000	0.21			1.1
12.000	P14		42.900	-0.100	0.000	0.00			0.0
12.001	P8		41.296	-0.104	0.000	0.20			3.6
12.002	S14		41.002	-0.217	0.000	0.17			16.2
12.003	S15		40.667	-0.198	0.000	0.25			19.0
12.004	S16		40.572	-0.200	0.000	0.06			5.0
13.000	P179		42.387	-0.082	0.000	0.41			6.9
13.001	P175		42.093	-0.086	0.000	0.38			7.0
13.002	P174		41.857	-0.115	0.000	0.13			7.0
14.000	Swale P169		43.127	-0.123	0.000	0.08			3.2
12.005	S17		40.570	0.069	0.000	0.16			9.6
12.006	S18		40.569	0.117	0.000	0.15			9.4
1.011	Basin 4		40.567	0.167	0.000	0.02			1.2
1.012	S19		39.935	-0.277	0.000	0.02			1.2
15.000	S30		42.510	-0.237	0.000	0.10			13.0
16.000	Swale P14.1		43.186	-0.114	0.000	0.13			2.8
16.001	Swale 14.2		42.886	-0.166	0.000	0.15			13.1
16.002	Swale P21		41.463	-0.137	0.000	0.32			13.1
17.000	P32		43.100	-0.100	0.000	0.00			0.0
17.001	P28.1		42.878	-0.072	0.000	0.17			2.2
17.002	P28.2		42.589	-0.072	0.000	0.17			2.1
17.003	P27		41.676	-0.064	0.000	0.28			2.2
15.001	S20		41.273	-0.244	0.000	0.26			41.0
15.002	S21		40.794	-0.223	0.000	0.34			47.1

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
15.003	S22		40.572	-0.229	0.000	0.32			46.6

PN	US/MH Name	Status	Level Exceeded
6.001	Swale P55	OK	
7.000	P57	OK	
7.001	P59	OK	
1.007	S8	OK	
1.008	S31	OK	
1.009	S9	OK	
8.000	Swale P89	OK	
8.001	Swale P122	OK	
9.000	P127	OK	
9.001	P129	OK	
9.002	P131.1	OK	
9.003	P131.2	OK	
8.002	S13	OK	
10.000	Swale P82	OK	
10.001	Swale P141	OK	
10.002	Swale P146	OK	
10.003	Swale P147	OK	
11.000	P139	OK	
11.001	P135.1	OK	
11.002	P135.2	OK	
11.003	P134	OK	
10.004	S10	OK	
10.005	S11	OK	
1.010	Pond 1	SURCHARGED	
12.000	P14	OK	
12.001	P8	OK	
12.002	S14	OK	
12.003	S15	OK	
12.004	S16	OK	
13.000	P179	OK	
13.001	P175	OK	
13.002	P174	OK	
14.000	Swale P169	OK	
12.005	S17	SURCHARGED	
12.006	S18	SURCHARGED	
1.011	Basin 4	SURCHARGED	
1.012	S19	OK	
15.000	S30	OK	
16.000	Swale P14.1	OK	
16.001	Swale 14.2	OK	
16.002	Swale P21	OK	

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

PN	US/MH Name	Status	Level Exceeded
17.000	P32	OK	
17.001	P28.1	OK	
17.002	P28.2	OK	
17.003	P27	OK	
15.001	S20	OK	
15.002	S21	OK	
15.003	S22	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
18.000	S23	15 Winter	1	+0%	100/15 Summer		
18.001	S24	15 Winter	1	+0%	100/15 Summer		
15.004	S25	15 Winter	1	+0%	100/15 Summer	100/720 Winter	
19.000	P18	15 Winter	1	+0%			
19.001	P5	15 Winter	1	+0%			
19.002	P4.1	15 Winter	1	+0%			
19.003	P4.2	15 Winter	1	+0%	100/15 Summer	100/720 Winter	
20.000	S26	15 Winter	1	+0%			
20.001	S27	15 Winter	1	+0%			
15.005	S28	15 Winter	1	+0%	100/15 Summer	100/720 Winter	
15.006	S29	15 Winter	1	+0%	100/30 Winter		
15.007	Basin 3	240 Winter	1	+0%	1/60 Summer		
1.013	Swale Inlet	480 Winter	1	+0%			

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
18.000	S23		41.018	-0.091	0.000	0.32			6.3
18.001	S24		40.710	-0.062	0.000	0.64			8.7
15.004	S25		40.359	-0.292	0.000	0.26			58.4
19.000	P18		42.276	-0.128	0.000	0.05			1.5
19.001	P5		41.241	-0.169	0.000	0.14			9.4
19.002	P4.1		40.861	-0.174	0.000	0.11			9.4
19.003	P4.2		40.444	-0.156	0.000	0.20			9.5
20.000	S26		40.855	-0.181	0.000	0.08			3.4
20.001	S27		40.738	-0.191	0.000	0.05			3.4
15.005	S28		40.262	-0.218	0.000	0.52			80.7
15.006	S29		40.173	-0.269	0.000	0.34			80.6
15.007	Basin 3		40.054	0.104	0.000	0.11			4.6
1.013	Swale Inlet		39.702	-0.048	0.000	0.80			5.6

PN	US/MH Name	Status	Level Exceeded
18.000	S23	OK	
18.001	S24	OK	
15.004	S25	OK	
19.000	P18	OK	
19.001	P5	OK	
19.002	P4.1	OK	
19.003	P4.2	OK	
20.000	S26	OK	
20.001	S27	OK	
15.005	S28	OK	

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

PN	US/MH Name	Status	Level Exceeded
15.006	S29	OK	
15.007	Basin 3	SURCHARGED	
1.013	Swale Inlet	OK	

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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 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 3
Number of Online Controls 3 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.360
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 21.000 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 100
Climate Change (%) 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	P114	15 Winter	100	+0%				
1.001	P112	15 Winter	100	+0%				
1.002	P109	15 Winter	100	+0%				
2.000	S1	15 Winter	100	+0%	100/15 Summer			
2.001	S2	15 Winter	100	+0%				
1.003	S3	15 Winter	100	+0%				
3.000	Swale P116	15 Winter	100	+0%				
3.001	Swale P90	15 Winter	100	+0%				
1.004	S4	15 Winter	100	+0%	100/15 Summer			
1.005	S5	15 Winter	100	+0%	100/15 Winter			
1.006	S6	15 Winter	100	+0%	100/15 Summer			
4.000	P43	15 Winter	100	+0%				
4.001	P40	15 Winter	100	+0%				
4.002	P38	15 Winter	100	+0%				
5.000	Swale P47	15 Winter	100	+0%				
5.001	Swale P48	15 Winter	100	+0%				
5.002	Swale P50	15 Winter	100	+0%				
4.003	S7	15 Winter	100	+0%	100/15 Summer			
6.000	Swale P56	15 Winter	100	+0%				

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	P114	44.952	-0.084	0.000	0.69			35.3	OK
1.001	P112	44.496	-0.073	0.000	0.76			49.5	OK
1.002	P109	43.686	-0.114	0.000	0.47			61.6	OK
2.000	S1	44.204	0.117	0.000	1.76			22.2	SURCHARGED
2.001	S2	44.014	-0.092	0.000	0.63			49.9	OK
1.003	S3	42.720	-0.077	0.000	0.78			131.0	OK
3.000	Swale P116	44.790	-0.135	0.000	0.55			62.3	OK
3.001	Swale P90	43.760	-0.165	0.000	0.40			112.4	OK
1.004	S4	42.372	0.130	0.000	1.50			283.6	SURCHARGED
1.005	S5	42.176	0.046	0.000	0.78			293.0	SURCHARGED
1.006	S6	41.852	0.327	0.000	1.03			351.3	SURCHARGED
4.000	P43	43.479	-0.071	0.000	0.53			7.5	OK
4.001	P40	43.313	-0.087	0.000	0.35			12.6	OK
4.002	P38	41.882	-0.118	0.000	0.46			33.7	OK
5.000	Swale P47	43.476	-0.074	0.000	0.49			9.3	OK
5.001	Swale P48	43.157	-0.132	0.000	0.35			32.9	OK
5.002	Swale P50	41.887	-0.113	0.000	0.49			45.8	OK
4.003	S7	41.773	0.219	0.000	1.00			153.5	SURCHARGED
6.000	Swale P56	43.137	-0.063	0.000	0.62			22.2	OK

PN	US/MH Name	Level Exceeded
1.000	P114	
1.001	P112	
1.002	P109	
2.000	S1	
2.001	S2	
1.003	S3	
3.000	Swale P116	
3.001	Swale P90	
1.004	S4	
1.005	S5	
1.006	S6	
4.000	P43	
4.001	P40	
4.002	P38	
5.000	Swale P47	
5.001	Swale P48	
5.002	Swale P50	
4.003	S7	
6.000	Swale P56	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
6.001	Swale P55	15 Winter	100	+0%	100/15 Summer		
7.000	P57	15 Winter	100	+0%			
7.001	P59	15 Winter	100	+0%	100/15 Summer		
1.007	S8	15 Winter	100	+0%	100/15 Summer		
1.008	S31	15 Winter	100	+0%	100/15 Summer		
1.009	S9	15 Winter	100	+0%	100/15 Summer		
8.000	Swale P89	15 Winter	100	+0%			
8.001	Swale P122	15 Winter	100	+0%			
9.000	P127	15 Winter	100	+0%			
9.001	P129	15 Winter	100	+0%			
9.002	P131.1	15 Winter	100	+0%			
9.003	P131.2	15 Winter	100	+0%			
8.002	S13	15 Winter	100	+0%			
10.000	Swale P82	15 Winter	100	+0%			
10.001	Swale P141	15 Winter	100	+0%			
10.002	Swale P146	15 Winter	100	+0%			
10.003	Swale P147	15 Winter	100	+0%			
11.000	P139	15 Winter	100	+0%			
11.001	P135.1	15 Winter	100	+0%			
11.002	P135.2	15 Winter	100	+0%			
11.003	P134	15 Winter	100	+0%			
10.004	S10	15 Winter	100	+0%			
10.005	S11	10080 Winter	100	+0%	100/1440 Winter		
1.010	Pond 1	10080 Winter	100	+0%	1/360 Winter		
12.000	P14	15 Summer	100	+0%			
12.001	P8	15 Winter	100	+0%	100/15 Winter		
12.002	S14	30 Winter	100	+0%	100/15 Summer		
12.003	S15	360 Winter	100	+0%	100/15 Summer		
12.004	S16	360 Winter	100	+0%	100/15 Summer		
13.000	P179	15 Winter	100	+0%	100/15 Summer		
13.001	P175	15 Winter	100	+0%	100/15 Summer		
13.002	P174	15 Winter	100	+0%			
14.000	Swale P169	15 Winter	100	+0%			
12.005	S17	360 Winter	100	+0%	1/60 Winter		
12.006	S18	360 Winter	100	+0%	1/30 Winter		
1.011	Basin 4	360 Winter	100	+0%	1/15 Winter		
1.012	S19	360 Winter	100	+0%			
15.000	S30	15 Winter	100	+0%			
16.000	Swale P14.1	15 Winter	100	+0%			
16.001	Swale 14.2	15 Winter	100	+0%			
16.002	Swale P21	15 Winter	100	+0%	100/15 Summer		
17.000	P32	15 Summer	100	+0%			
17.001	P28.1	15 Winter	100	+0%			
17.002	P28.2	15 Winter	100	+0%			
17.003	P27	15 Winter	100	+0%	100/15 Summer		
15.001	S20	15 Winter	100	+0%			
15.002	S21	15 Winter	100	+0%	100/15 Summer		
15.003	S22	15 Winter	100	+0%	100/15 Summer		

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
6.001	Swale P55		41.527	0.177	0.000	0.46			27.0
7.000	P57		42.644	-0.038	0.000	0.68			8.5
7.001	P59		41.634	0.334	0.000	1.20			7.8
1.007	S8		41.475	0.300	0.000	1.65			521.1
1.008	S31		41.305	0.164	0.000	1.21			543.4
1.009	S9		41.081	0.089	0.000	1.41			587.7
8.000	Swale P89		43.326	-0.124	0.000	0.40			30.9
8.001	Swale P122		41.883	-0.117	0.000	0.67			53.2
9.000	P127		43.095	-0.055	0.000	0.70			10.2
9.001	P129		42.928	-0.072	0.000	0.52			14.8
9.002	P131.1		42.698	-0.079	0.000	0.43			14.7
9.003	P131.2		41.933	-0.036	0.000	0.91			14.8
8.002	S13		41.750	-0.110	0.000	0.82			173.4
10.000	Swale P82		42.753	-0.097	0.000	0.27			5.0
10.001	Swale P141		42.586	-0.064	0.000	0.83			35.7
10.002	Swale P146		42.238	-0.111	0.000	0.50			53.0
10.003	Swale P147		41.208	-0.092	0.000	0.80			55.8
11.000	P139		42.631	-0.069	0.000	0.55			10.2
11.001	P135.1		42.329	-0.071	0.000	0.53			14.9
11.002	P135.2		42.126	-0.074	0.000	0.49			14.7
11.003	P134		41.344	-0.088	0.000	0.67			34.3
10.004	S10		41.148	-0.074	0.000	0.90			114.9
10.005	S11		40.883	0.163	0.000	0.01			1.4
1.010	Pond 1		40.883	0.533	0.000	0.20			1.1
12.000	P14		42.900	-0.100	0.000	0.00			0.0
12.001	P8		41.425	0.025	0.000	0.81			14.5
12.002	S14		41.359	0.140	0.000	0.51			48.7
12.003	S15		41.268	0.403	0.000	0.13			9.5
12.004	S16		41.267	0.495	0.000	0.11			9.2
13.000	P179		42.642	0.173	0.000	1.21			20.6
13.001	P175		42.215	0.036	0.000	1.10			20.2
13.002	P174		41.885	-0.087	0.000	0.37			20.1
14.000	Swale P169		43.150	-0.100	0.000	0.24			10.3
12.005	S17		41.265	0.764	0.000	0.34			20.7
12.006	S18		41.263	0.811	0.000	0.33			20.5
1.011	Basin 4		41.261	0.861	0.000	0.02			1.4
1.012	S19		39.940	-0.272	0.000	0.02			1.4
15.000	S30		42.563	-0.184	0.000	0.31			41.4
16.000	Swale P14.1		43.218	-0.082	0.000	0.42			9.0
16.001	Swale 14.2		42.951	-0.101	0.000	0.58			50.1
16.002	Swale P21		41.634	0.034	0.000	1.22			49.8
17.000	P32		43.100	-0.100	0.000	0.00			0.0
17.001	P28.1		42.912	-0.038	0.000	0.70			8.7
17.002	P28.2		42.623	-0.038	0.000	0.71			8.7
17.003	P27		41.798	0.058	0.000	1.12			8.6
15.001	S20		41.512	-0.005	0.000	0.90			144.2
15.002	S21		41.163	0.146	0.000	1.07			147.5

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
15.003	S22		40.999	0.198	0.000	1.02			148.0

PN	US/MH Name	Status	Level Exceeded
6.001	Swale P55	SURCHARGED	
7.000	P57	OK	
7.001	P59	SURCHARGED	
1.007	S8	SURCHARGED	
1.008	S31	SURCHARGED	
1.009	S9	SURCHARGED	
8.000	Swale P89	OK	
8.001	Swale P122	OK	
9.000	P127	OK	
9.001	P129	OK	
9.002	P131.1	OK	
9.003	P131.2	OK	
8.002	S13	OK	
10.000	Swale P82	OK	
10.001	Swale P141	OK	
10.002	Swale P146	OK	
10.003	Swale P147	OK	
11.000	P139	OK	
11.001	P135.1	OK	
11.002	P135.2	OK	
11.003	P134	OK	
10.004	S10	OK	
10.005	S11	SURCHARGED	
1.010	Pond 1	SURCHARGED	
12.000	P14	OK	
12.001	P8	SURCHARGED	
12.002	S14	SURCHARGED	
12.003	S15	SURCHARGED	
12.004	S16	SURCHARGED	
13.000	P179	SURCHARGED	
13.001	P175	SURCHARGED	
13.002	P174	OK	
14.000	Swale P169	OK	
12.005	S17	SURCHARGED	
12.006	S18	SURCHARGED	
1.011	Basin 4	SURCHARGED	
1.012	S19	OK	
15.000	S30	OK	
16.000	Swale P14.1	OK	
16.001	Swale 14.2	OK	
16.002	Swale P21	SURCHARGED	

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

PN	US/MH Name	Status	Level Exceeded
17.000	P32	OK	
17.001	P28.1	OK	
17.002	P28.2	OK	
17.003	P27	SURCHARGED	
15.001	S20	OK	
15.002	S21	SURCHARGED	
15.003	S22	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
18.000	S23	15 Winter	100	+0%	100/15 Summer		
18.001	S24	15 Winter	100	+0%	100/15 Summer		
15.004	S25	720 Winter	100	+0%	100/15 Summer	100/720 Winter	
19.000	P18	15 Winter	100	+0%			
19.001	P5	15 Winter	100	+0%			
19.002	P4.1	15 Winter	100	+0%			
19.003	P4.2	720 Winter	100	+0%	100/15 Summer	100/720 Winter	
20.000	S26	15 Winter	100	+0%			
20.001	S27	720 Winter	100	+0%			
15.005	S28	720 Winter	100	+0%	100/15 Summer	100/720 Winter	
15.006	S29	720 Winter	100	+0%	100/30 Winter		
15.007	Basin 3	480 Winter	100	+0%	1/60 Summer		
1.013	Swale Inlet	30 Summer	100	+0%			

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
18.000	S23		41.348	0.239	0.000	0.85			16.4
18.001	S24		41.104	0.332	0.000	1.67			22.6
15.004	S25		40.907	0.256	2.830	0.08			18.7
19.000	P18		42.295	-0.109	0.000	0.17			4.9
19.001	P5		41.303	-0.107	0.000	0.54			36.7
19.002	P4.1		40.916	-0.120	0.000	0.44			36.7
19.003	P4.2		40.915	0.315	0.358	0.06			3.0
20.000	S26		40.891	-0.145	0.000	0.27			10.8
20.001	S27		40.887	-0.042	0.000	0.01			0.9
15.005	S28		41.009	0.529	3.943	0.17			26.4
15.006	S29		40.904	0.461	0.000	0.11			26.1
15.007	Basin 3		40.767	0.817	0.000	0.11			4.6
1.013	Swale Inlet		39.703	-0.047	0.000	0.82			5.8

PN	US/MH Name	Status	Level Exceeded
18.000	S23	SURCHARGED	
18.001	S24	SURCHARGED	
15.004	S25	FLOOD	
19.000	P18	OK	
19.001	P5	OK	
19.002	P4.1	OK	
19.003	P4.2	FLOOD	
20.000	S26	OK	
20.001	S27	OK	
15.005	S28	FLOOD	

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

PN	US/MH Name	Status	Level Exceeded
15.006	S29	SURCHARGED	
15.007	Basin 3	SURCHARGED	
1.013	Swale Inlet	OK	

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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 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 3
Number of Online Controls 3 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.360
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 21.000 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 100
Climate Change (%) 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	P114	15 Winter	100	+45%	100/15 Summer			
1.001	P112	15 Winter	100	+45%	100/15 Summer			
1.002	P109	15 Winter	100	+45%	100/15 Summer			
2.000	S1	15 Winter	100	+45%	100/15 Summer			
2.001	S2	15 Winter	100	+45%	100/15 Summer			
1.003	S3	15 Winter	100	+45%	100/15 Summer			
3.000	Swale P116	15 Winter	100	+45%				
3.001	Swale P90	15 Winter	100	+45%	100/15 Winter			
1.004	S4	15 Winter	100	+45%	100/15 Summer			
1.005	S5	15 Winter	100	+45%	100/15 Summer			
1.006	S6	15 Winter	100	+45%	100/15 Summer			
4.000	P43	15 Winter	100	+45%				
4.001	P40	15 Winter	100	+45%				
4.002	P38	15 Winter	100	+45%	100/15 Summer			
5.000	Swale P47	15 Winter	100	+45%				
5.001	Swale P48	15 Winter	100	+45%				
5.002	Swale P50	15 Winter	100	+45%	100/15 Summer			
4.003	S7	15 Winter	100	+45%	100/15 Summer			
6.000	Swale P56	15 Winter	100	+45%	100/15 Summer			

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	P114	45.153	0.117	0.000	0.96			49.0	SURCHARGED
1.001	P112	44.840	0.271	0.000	1.00			64.8	SURCHARGED
1.002	P109	44.276	0.476	0.000	0.60			78.0	SURCHARGED
2.000	S1	44.757	0.670	0.000	2.24			28.3	SURCHARGED
2.001	S2	44.538	0.432	0.000	0.82			64.8	SURCHARGED
1.003	S3	44.013	1.216	0.000	0.94			159.0	SURCHARGED
3.000	Swale P116	44.837	-0.088	0.000	0.80			90.4	OK
3.001	Swale P90	44.026	0.101	0.000	0.57			159.8	FLOOD RISK
1.004	S4	43.675	1.433	0.000	1.70			320.5	FLOOD RISK
1.005	S5	43.385	1.255	0.000	0.94			353.4	SURCHARGED
1.006	S6	42.869	1.344	0.000	1.38			470.6	FLOOD RISK
4.000	P43	43.501	-0.049	0.000	0.77			10.9	OK
4.001	P40	43.328	-0.072	0.000	0.51			18.3	OK
4.002	P38	42.886	0.886	0.000	0.55			40.8	SURCHARGED
5.000	Swale P47	43.496	-0.054	0.000	0.72			13.5	OK
5.001	Swale P48	43.179	-0.110	0.000	0.51			47.7	OK
5.002	Swale P50	42.922	0.922	0.000	0.59			55.8	SURCHARGED
4.003	S7	42.758	1.204	0.000	1.29			198.4	FLOOD RISK
6.000	Swale P56	43.299	0.099	0.000	0.86			30.6	FLOOD RISK

PN	US/MH Name	Level Exceeded
1.000	P114	
1.001	P112	
1.002	P109	
2.000	S1	
2.001	S2	
1.003	S3	
3.000	Swale P116	
3.001	Swale P90	
1.004	S4	
1.005	S5	
1.006	S6	
4.000	P43	
4.001	P40	
4.002	P38	
5.000	Swale P47	
5.001	Swale P48	
5.002	Swale P50	
4.003	S7	
6.000	Swale P56	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
6.001	Swale P55	15 Winter	100	+45%	100/15 Summer		
7.000	P57	15 Winter	100	+45%	100/15 Summer		
7.001	P59	15 Winter	100	+45%	100/15 Summer		
1.007	S8	15 Winter	100	+45%	100/15 Summer	100/7200 Winter	
1.008	S31	15 Winter	100	+45%	100/15 Summer		
1.009	S9	15 Winter	100	+45%	100/15 Summer		
8.000	Swale P89	15 Winter	100	+45%			
8.001	Swale P122	15 Winter	100	+45%	100/15 Summer		
9.000	P127	15 Winter	100	+45%	100/15 Winter		
9.001	P129	15 Winter	100	+45%			
9.002	P131.1	15 Winter	100	+45%			
9.003	P131.2	15 Winter	100	+45%	100/15 Summer		
8.002	S13	15 Winter	100	+45%	100/15 Summer		
10.000	Swale P82	15 Winter	100	+45%			
10.001	Swale P141	15 Winter	100	+45%	100/15 Summer		
10.002	Swale P146	15 Winter	100	+45%			
10.003	Swale P147	15 Winter	100	+45%	100/15 Summer		
11.000	P139	15 Winter	100	+45%			
11.001	P135.1	15 Winter	100	+45%			
11.002	P135.2	15 Winter	100	+45%			
11.003	P134	15 Winter	100	+45%	100/15 Summer		
10.004	S10	15 Winter	100	+45%	100/15 Summer		
10.005	S11	10080 Winter	100	+45%	100/15 Summer		
1.010	Pond 1	10080 Winter	100	+45%	100/15 Summer		
12.000	P14	15 Summer	100	+45%			
12.001	P8	15 Winter	100	+45%	100/15 Summer		
12.002	S14	15 Winter	100	+45%	100/15 Summer		
12.003	S15	15 Winter	100	+45%	100/15 Summer		
12.004	S16	15 Winter	100	+45%	100/15 Summer		
13.000	P179	15 Winter	100	+45%	100/15 Summer		
13.001	P175	15 Winter	100	+45%	100/15 Summer		
13.002	P174	15 Winter	100	+45%			
14.000	Swale P169	15 Winter	100	+45%			
12.005	S17	15 Winter	100	+45%	100/15 Summer		
12.006	S18	480 Winter	100	+45%	100/15 Summer		
1.011	Basin 4	480 Winter	100	+45%	100/15 Summer		
1.012	S19	480 Winter	100	+45%			
15.000	S30	15 Winter	100	+45%			
16.000	Swale P14.1	15 Winter	100	+45%			
16.001	Swale 14.2	15 Winter	100	+45%	100/15 Winter		
16.002	Swale P21	15 Winter	100	+45%	100/15 Summer		
17.000	P32	15 Winter	100	+45%			
17.001	P28.1	15 Winter	100	+45%	100/15 Summer		
17.002	P28.2	15 Winter	100	+45%	100/15 Summer		
17.003	P27	15 Winter	100	+45%	100/15 Summer		
15.001	S20	15 Winter	100	+45%	100/15 Summer		
15.002	S21	15 Winter	100	+45%	100/15 Summer		
15.003	S22	15 Winter	100	+45%	100/15 Summer		

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
6.001	Swale P55		42.256	0.906	0.000	0.59			35.1
7.000	P57		43.117	0.435	0.000	0.85			10.5
7.001	P59		42.378	1.078	0.000	1.56			10.1
1.007	S8		42.157	0.982	0.000	2.37			749.8
1.008	S31		41.800	0.659	0.000	1.73			775.2
1.009	S9		41.342	0.350	0.000	2.02			842.3
8.000	Swale P89		43.352	-0.098	0.000	0.59			44.8
8.001	Swale P122		42.269	0.269	0.000	0.93			74.4
9.000	P127		43.155	0.005	0.000	1.01			14.7
9.001	P129		42.948	-0.052	0.000	0.75			21.3
9.002	P131.1		42.714	-0.063	0.000	0.63			21.2
9.003	P131.2		42.316	0.347	0.000	1.35			22.0
8.002	S13		42.155	0.295	0.000	1.08			230.0
10.000	Swale P82		42.799	-0.051	0.000	0.40			7.3
10.001	Swale P141		42.769	0.119	0.000	1.16			49.9
10.002	Swale P146		42.264	-0.085	0.000	0.68			72.9
10.003	Swale P147		41.634	0.334	0.000	1.10			77.2
11.000	P139		42.654	-0.046	0.000	0.80			14.7
11.001	P135.1		42.351	-0.049	0.000	0.77			21.5
11.002	P135.2		42.146	-0.054	0.000	0.71			21.3
11.003	P134		41.718	0.286	0.000	0.91			46.3
10.004	S10		41.538	0.316	0.000	1.22			156.3
10.005	S11		41.189	0.469	0.000	0.01			2.1
1.010	Pond 1		41.189	0.839	0.000	0.25			1.3
12.000	P14		42.900	-0.100	0.000	0.00			0.0
12.001	P8		42.332	0.932	0.000	0.93			16.6
12.002	S14		42.183	0.964	0.000	0.75			72.4
12.003	S15		41.984	1.119	0.000	1.10			82.3
12.004	S16		41.872	1.100	0.000	0.96			80.9
13.000	P179		42.966	0.497	0.000	1.49			25.3
13.001	P175		42.346	0.167	0.000	1.36			24.9
13.002	P174		41.900	-0.072	0.000	0.45			24.9
14.000	Swale P169		43.162	-0.088	0.000	0.35			14.9
12.005	S17		41.628	1.127	0.000	2.79			171.0
12.006	S18		41.617	1.164	0.000	0.40			24.7
1.011	Basin 4		41.615	1.215	0.000	0.02			1.6
1.012	S19		39.942	-0.270	0.000	0.02			1.6
15.000	S30		42.590	-0.157	0.000	0.45			60.0
16.000	Swale P14.1		43.236	-0.064	0.000	0.61			13.1
16.001	Swale 14.2		43.108	0.056	0.000	0.81			69.6
16.002	Swale P21		42.503	0.903	0.000	1.56			63.3
17.000	P32		43.124	-0.076	0.000	0.01			0.0
17.001	P28.1		43.137	0.187	0.000	0.91			11.4
17.002	P28.2		43.004	0.343	0.000	0.88			10.8
17.003	P27		42.608	0.868	0.000	1.28			9.9
15.001	S20		42.359	0.842	0.000	1.05			167.6
15.002	S21		41.829	0.812	0.000	1.36			187.8

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
15.003	S22		41.567	0.766	0.000	1.29			186.9

PN	US/MH Name	Status	Level Exceeded
6.001	Swale P55	FLOOD RISK	
7.000	P57	FLOOD RISK	
7.001	P59	FLOOD RISK	
1.007	S8	FLOOD RISK	
1.008	S31	SURCHARGED	
1.009	S9	SURCHARGED	
8.000	Swale P89	OK	
8.001	Swale P122	SURCHARGED	
9.000	P127	SURCHARGED	
9.001	P129	OK	
9.002	P131.1	OK	
9.003	P131.2	SURCHARGED	
8.002	S13	SURCHARGED	
10.000	Swale P82	OK	
10.001	Swale P141	FLOOD RISK	
10.002	Swale P146	OK	
10.003	Swale P147	SURCHARGED	
11.000	P139	OK	
11.001	P135.1	OK	
11.002	P135.2	OK	
11.003	P134	SURCHARGED	
10.004	S10	SURCHARGED	
10.005	S11	SURCHARGED	
1.010	Pond 1	SURCHARGED	
12.000	P14	OK	
12.001	P8	SURCHARGED	
12.002	S14	SURCHARGED	
12.003	S15	SURCHARGED	
12.004	S16	SURCHARGED	
13.000	P179	FLOOD RISK	
13.001	P175	SURCHARGED	
13.002	P174	OK	
14.000	Swale P169	OK	
12.005	S17	SURCHARGED	
12.006	S18	SURCHARGED	
1.011	Basin 4	SURCHARGED	
1.012	S19	OK	
15.000	S30	OK	
16.000	Swale P14.1	OK	
16.001	Swale 14.2	FLOOD RISK	
16.002	Swale P21	FLOOD RISK	

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

PN	US/MH Name	Status	Level Exceeded
17.000	P32	OK	
17.001	P28.1	SURCHARGED	
17.002	P28.2	FLOOD RISK	
17.003	P27	SURCHARGED	
15.001	S20	SURCHARGED	
15.002	S21	FLOOD RISK	
15.003	S22	FLOOD RISK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
18.000	S23	15 Winter	100	+45%	100/15 Summer			
18.001	S24	15 Winter	100	+45%	100/15 Summer			
15.004	S25	240 Winter	100	+45%	100/15 Summer			
19.000	P18	15 Winter	100	+45%				
19.001	P5	15 Winter	100	+45%				
19.002	P4.1	15 Winter	100	+45%	100/15 Summer			
19.003	P4.2	240 Winter	100	+45%	100/15 Summer			
20.000	S26	240 Winter	100	+45%	100/15 Winter			
20.001	S27	240 Winter	100	+45%	100/15 Summer			
15.005	S28	240 Winter	100	+45%	100/15 Summer			
15.006	S29	600 Winter	100	+45%	100/15 Summer			
15.007	Basin 3	600 Winter	100	+45%	100/15 Summer			
1.013	Swale Inlet	600 Winter	100	+45%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
18.000	S23	42.049	0.940	0.000	1.04			20.1	FLOOD RISK
18.001	S24	41.680	0.908	0.000	2.02			27.3	FLOOD RISK
15.004	S25	41.265	0.614	0.000	0.27			59.1	SURCHARGED
19.000	P18	42.304	-0.100	0.000	0.24			7.1	OK
19.001	P5	41.357	-0.053	0.000	0.78			52.8	OK
19.002	P4.1	41.204	0.169	0.000	0.59			48.5	SURCHARGED
19.003	P4.2	41.189	0.589	0.000	0.21			9.8	SURCHARGED
20.000	S26	41.188	0.152	0.000	0.08			3.1	SURCHARGED
20.001	S27	41.186	0.257	0.000	0.05			3.1	SURCHARGED
15.005	S28	41.184	0.704	0.000	0.54			83.5	FLOOD RISK
15.006	S29	41.165	0.723	0.000	0.18			42.1	FLOOD RISK
15.007	Basin 3	41.163	1.213	0.000	0.11			4.7	SURCHARGED
1.013	Swale Inlet	39.710	-0.040	0.000	0.89			6.3	OK

PN	US/MH Name	Level Exceeded
18.000	S23	
18.001	S24	
15.004	S25	
19.000	P18	
19.001	P5	
19.002	P4.1	
19.003	P4.2	
20.000	S26	
20.001	S27	
15.005	S28	

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

PN	US/MH Name	Level Exceeded
15.006	S29	
15.007	Basin 3	
1.013	Swale Inlet	

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APPENDIX C.1 – GREENFIELD RUNOFF CALCULATIONS ACCESS ROAD

Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

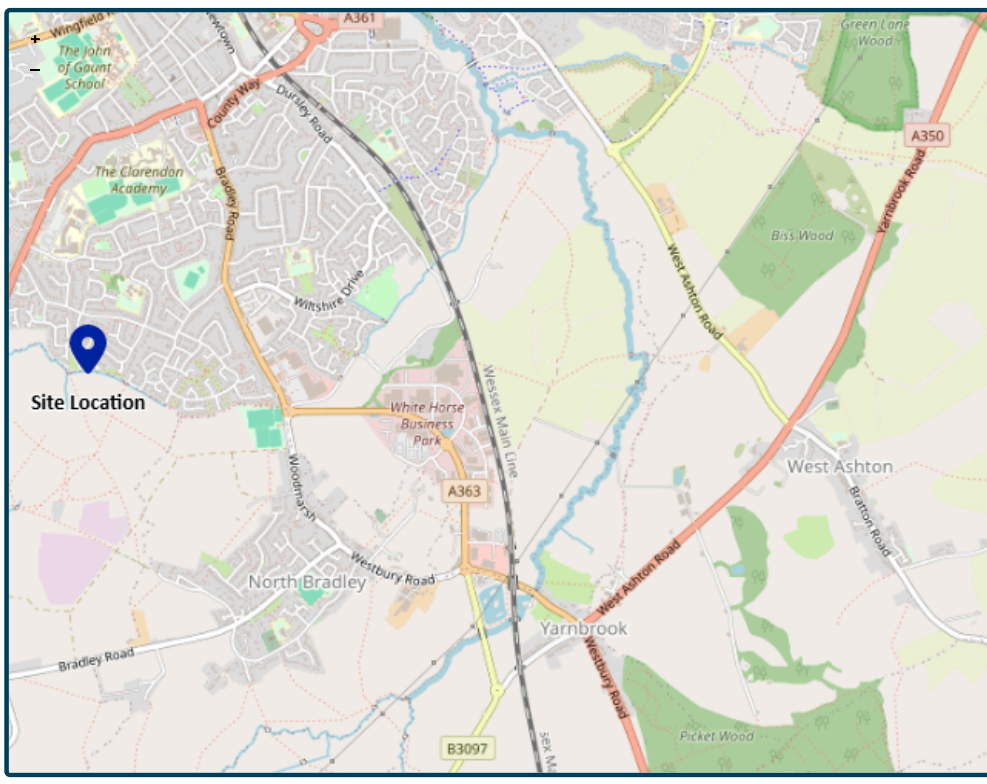
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	27/04/2026
Calculated by	
Reference	
Model version	2.2.3

Location

Site name	Court Farm
Site location	Trowbridge



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Site easting (British National Grid)	384673
Site northing (British National Grid)	155948

Site details

Total site area (ha)	0.0578 ha

Greenfield runoff

Method

Method	IH124

IH124

	My value	Map value
SAAR (mm)	738 mm	738
How should SPR be derived?	WRAP soil type	
WRAP soil type	4	4
SPR	0.47	
QBar (IH124) (l/s)	0.3 l/s	

Growth curve factors

	My value	Map value
Hydrological region	8	8
1 year growth factor	0.78	
2 year growth factor	0.93	
10 year growth factor	1.49	
30 year growth factor	1.95	
100 year growth factor	2.43	
200 year growth factor	2.78	

Results

Method	IH124	
Flow rate 1 year (l/s)	0.2	l/s
Flow rate 2 year (l/s)	0.3	l/s
Flow rate 10 years (l/s)	0.4	l/s
Flow rate 30 years (l/s)	0.6	l/s
Flow rate 100 years (l/s)	0.7	l/s
Flow rate 200 years (l/s)	0.8	l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.3) developed by HR Wallingford and available at uksuds.com (https://www.uksuds.com/). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (https://www.uksuds.com/terms-conditions). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

APPENDIX C.2 – GREENFIELD RUNOFF CALCULATIONS ROAD AND BRIDGE

Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

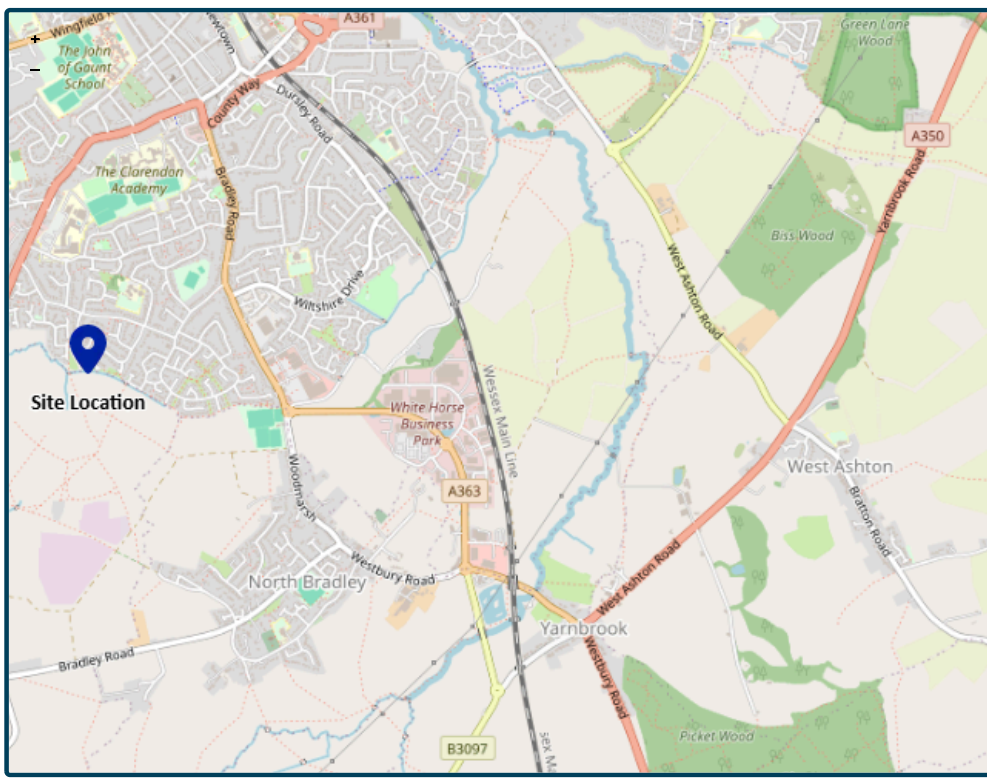
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	27/04/2026
Calculated by	
Reference	
Model version	2.2.3

Location

Site name	Court Farm
Site location	Trowbridge



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Site easting (British National Grid)	384673
Site northing (British National Grid)	155948

Site details

Total site area (ha)	0.1735 ha

Greenfield runoff

Method

Method	IH124

IH124

	My value	Map value
SAAR (mm)	738 mm	738
How should SPR be derived?	WRAP soil type	
WRAP soil type	4	4
SPR	0.47	
QBar (IH124) (l/s)	0.9 l/s	

Growth curve factors

	My value	Map value
Hydrological region	8	8
1 year growth factor	0.78	
2 year growth factor	0.93	
10 year growth factor	1.49	
30 year growth factor	1.95	
100 year growth factor	2.43	
200 year growth factor	2.78	

Results

Method	IH124	
Flow rate 1 year (l/s)	0.7	l/s
Flow rate 2 year (l/s)	0.8	l/s
Flow rate 10 years (l/s)	1.3	l/s
Flow rate 30 years (l/s)	1.7	l/s
Flow rate 100 years (l/s)	2.2	l/s
Flow rate 200 years (l/s)	2.5	l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.3) developed by HR Wallingford and available at uksuds.com (https://www.uksuds.com/). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (https://www.uksuds.com/terms-conditions). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

APPENDIX C.3 – GREENFIELD RUNOFF CALCULATIONS MAIN SITE

Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	27/04/2026
Calculated by	
Reference	
Model version	2.2.3

Location

Site name	Court Farm
Site location	Trowbridge

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Site easting (British National Grid)	384673
Site northing (British National Grid)	155948

Site details

Total site area (ha)	3.5299	ha

Greenfield runoff

Method

Method	IH124

IH124

	My value		Map value
SAAR (mm)	738	mm	738
How should SPR be derived?	WRAP soil type		
WRAP soil type	4		4
SPR	0.47		
QBar (IH124) (l/s)	18.1	l/s	

Growth curve factors

	My value	Map value
Hydrological region	8	8
1 year growth factor	0.78	
2 year growth factor	0.93	
10 year growth factor	1.49	
30 year growth factor	1.95	
100 year growth factor	2.43	
200 year growth factor	2.78	

Results

Method	IH124	
Flow rate 1 year (l/s)	14.1	l/s
Flow rate 2 year (l/s)	16.9	l/s
Flow rate 10 years (l/s)	27.0	l/s
Flow rate 30 years (l/s)	35.4	l/s
Flow rate 100 years (l/s)	44.1	l/s
Flow rate 200 years (l/s)	50.4	l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.3) developed by HR Wallingford and available at uksuds.com (https://www.uksuds.com/). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (https://www.uksuds.com/terms-conditions). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

APPENDIX D.1 – GREENFIELD VOLUME CALCULATIONS ACCESS ROAD

Greenfield Runoff Volume

FSR Data

Return Period (years)	100
Storm Duration (mins)	360
Region	England and Wales
M5-60 (mm)	20.900
Ratio R	0.350
Areal Reduction Factor	1.00
Area (ha)	0.058
SAAR (mm)	733
CWI	109.258
Urban	0.000
SPR	10.000

Results

Percentage Runoff (%)	10.74
Greenfield Runoff Volume (m^3)	4.259

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APPENDIX D.2 – GREENFIELD VOLUME CALCULATIONS ROAD AND BRIDGE

Greenfield Runoff Volume

FSR Data

Return Period (years)	100
Storm Duration (mins)	360
Region	England and Wales
M5-60 (mm)	20.900
Ratio R	0.350
Areal Reduction Factor	1.00
Area (ha)	0.174
SAAR (mm)	733
CWI	109.258
Urban	0.000
SPR	10.000

Results

Percentage Runoff (%)	10.74
Greenfield Runoff Volume (m^3)	12.778

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APPENDIX D.3 – GREENFIELD VOLUME CALCULATIONS MAIN SITE

Greenfield Runoff Volume

FSR Data

Return Period (years)	100
Storm Duration (mins)	360
Region	England and Wales
M5-60 (mm)	20.900
Ratio R	0.350
Areal Reduction Factor	1.00
Area (ha)	3.530
SAAR (mm)	733
CWI	109.258
Urban	0.000
SPR	10.000

Results

Percentage Runoff (%)	10.74
Greenfield Runoff Volume (m^3)	259.229

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APPENDIX E.1 – 1 IN 100 YEAR, 6 HOUR EVENT CALCULATIONS ACCESS ROAD

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 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.360
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 21.000 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 360
Return Period(s) (years) 100
Climate Change (%) 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	Fake 1	360 Summer	100	+0%				
1.001	SW1	360 Summer	100	+0%				
1.002	Basin 1	360 Winter	100	+0%	100/360 Summer			
1.003	S4	360 Winter	100	+0%	100/360 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	Fake 1	42.753	-0.283	0.000	0.01			5.2	FLOOD RISK
1.001	SW1	40.477	-0.113	0.000	0.14			5.2	OK
1.002	Basin 1	39.097	0.297	0.000	0.07			0.5	SURCHARGED
1.003	S4	39.106	0.356	0.000	0.01			0.4	SURCHARGED

PN	US/MH Name	Level Exceeded
1.000	Fake 1	

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

PN	US/MH Name	Level Exceeded
1.001	SW1	
1.002	Basin 1	
1.003	S4	

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APPENDIX E.2 – 1 IN 100 YEAR, 6 HOUR EVENT CALCULATIONS ROAD AND BRIDGE

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 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.360
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 21.000 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 360
Return Period(s) (years) 100
Climate Change (%) 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	Fake 1	360 Summer	100	+0%				
1.001	Fake 2	360 Summer	100	+0%				
2.000	S30	360 Summer	100	+0%				
2.001	S31-Catchpit	360 Winter	100	+0%				
1.002	Basin 2	360 Winter	100	+0%	100/360 Summer			
1.003	SB3-FC	360 Winter	100	+0%	100/360 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	Fake 1	41.778	-0.272	0.000	0.01			4.0	FLOOD RISK
1.001	Fake 2	41.635	-0.110	0.000	0.16			7.9	FLOOD RISK
2.000	S30	40.862	-0.111	0.000	0.15			2.6	OK
2.001	S31-Catchpit	40.538	-0.032	0.000	0.17			5.8	OK
1.002	Basin 2	40.537	0.187	0.000	0.04			0.5	SURCHARGED
1.003	SB3-FC	40.537	0.237	0.000	0.03			0.4	SURCHARGED

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

PN	US/MH Name	Level Exceeded
1.000	Fake 1	
1.001	Fake 2	
2.000	S30	
2.001	S31-Catchpit	
1.002	Basin 2	
1.003	SB3-FC	

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APPENDIX E.3– 1 IN 100 YEAR, 6 HOUR EVENT CALCULATIONS MAIN SITE

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 3
Number of Online Controls 3 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.360
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 21.000 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 360
Return Period(s) (years) 100
Climate Change (%) 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	P114	360 Summer	100	+0%					44.867
1.001	P112	360 Summer	100	+0%					44.403
1.002	P109	360 Summer	100	+0%					43.622
2.000	S1	360 Summer	100	+0%					43.998
2.001	S2	360 Summer	100	+0%					43.934
1.003	S3	360 Summer	100	+0%					42.522
3.000	Swale P116	360 Summer	100	+0%					44.692
3.001	Swale P90	360 Summer	100	+0%					43.682
1.004	S4	360 Summer	100	+0%					41.964
1.005	S5	360 Summer	100	+0%					41.753
1.006	S6	360 Summer	100	+0%					41.183
4.000	P43	360 Summer	100	+0%					43.433
4.001	P40	360 Summer	100	+0%					43.276
4.002	P38	360 Summer	100	+0%					41.819
5.000	Swale P47	360 Summer	100	+0%					43.431
5.001	Swale P48	360 Summer	100	+0%					43.102
5.002	Swale P50	360 Summer	100	+0%					41.821
4.003	S7	360 Summer	100	+0%					41.294
6.000	Swale P56	360 Summer	100	+0%					43.085
6.001	Swale P55	360 Summer	100	+0%					41.171
7.000	P57	360 Summer	100	+0%					42.606
7.001	P59	360 Summer	100	+0%					41.234

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	P114	-0.169	0.000	0.14			7.1	OK	
1.001	P112	-0.166	0.000	0.15			10.0	OK	
1.002	P109	-0.178	0.000	0.10			12.5	OK	
2.000	S1	-0.089	0.000	0.35			4.5	OK	
2.001	S2	-0.172	0.000	0.13			9.9	OK	
1.003	S3	-0.275	0.000	0.16			26.9	OK	
3.000	Swale P116	-0.233	0.000	0.11			12.8	OK	
3.001	Swale P90	-0.243	0.000	0.08			23.1	OK	
1.004	S4	-0.278	0.000	0.31			59.1	OK	
1.005	S5	-0.377	0.000	0.18			67.1	OK	
1.006	S6	-0.342	0.000	0.27			90.5	OK	
4.000	P43	-0.117	0.000	0.11			1.5	OK	
4.001	P40	-0.124	0.000	0.07			2.5	OK	
4.002	P38	-0.181	0.000	0.09			6.4	OK	
5.000	Swale P47	-0.119	0.000	0.10			1.9	OK	
5.001	Swale P48	-0.187	0.000	0.07			6.2	OK	
5.002	Swale P50	-0.179	0.000	0.09			8.7	OK	
4.003	S7	-0.260	0.000	0.21			31.7	OK	
6.000	Swale P56	-0.115	0.000	0.12			4.5	OK	
6.001	Swale P55	-0.179	0.000	0.10			5.6	OK	
7.000	P57	-0.076	0.000	0.14			1.7	OK	
7.001	P59	-0.066	0.000	0.26			1.7	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.007	S8	360 Summer	100	+0%				
1.008	S31	360 Summer	100	+0%				
1.009	S9	360 Summer	100	+0%				
8.000	Swale P89	360 Summer	100	+0%				
8.001	Swale P122	360 Summer	100	+0%				
9.000	P127	360 Summer	100	+0%				
9.001	P129	360 Summer	100	+0%				
9.002	P131.1	360 Summer	100	+0%				
9.003	P131.2	360 Summer	100	+0%				
8.002	S13	360 Summer	100	+0%				
10.000	Swale P82	360 Summer	100	+0%				
10.001	Swale P141	360 Summer	100	+0%				
10.002	Swale P146	360 Summer	100	+0%				
10.003	Swale P147	360 Summer	100	+0%				
11.000	P139	360 Summer	100	+0%				
11.001	P135.1	360 Summer	100	+0%				
11.002	P135.2	360 Summer	100	+0%				
11.003	P134	360 Summer	100	+0%				
10.004	S10	360 Summer	100	+0%				
10.005	S11	360 Winter	100	+0%				
1.010	Pond 1	360 Winter	100	+0%	100/360 Summer			
12.000	P14	360 Summer	100	+0%				
12.001	P8	360 Summer	100	+0%				
12.002	S14	360 Winter	100	+0%	100/360 Winter			
12.003	S15	360 Winter	100	+0%	100/360 Summer			
12.004	S16	360 Winter	100	+0%	100/360 Summer			
13.000	P179	360 Summer	100	+0%				
13.001	P175	360 Summer	100	+0%				
13.002	P174	360 Summer	100	+0%				
14.000	Swale P169	360 Summer	100	+0%				
12.005	S17	360 Winter	100	+0%	100/360 Summer			
12.006	S18	360 Winter	100	+0%	100/360 Summer			
1.011	Basin 4	360 Winter	100	+0%	100/360 Summer			
1.012	S19	360 Winter	100	+0%				
15.000	S30	360 Summer	100	+0%				
16.000	Swale P14.1	360 Summer	100	+0%				
16.001	Swale 14.2	360 Summer	100	+0%				
16.002	Swale P21	360 Summer	100	+0%				
17.000	P32	360 Summer	100	+0%				
17.001	P28.1	360 Summer	100	+0%				
17.002	P28.2	360 Summer	100	+0%				
17.003	P27	360 Summer	100	+0%				
15.001	S20	360 Summer	100	+0%				
15.002	S21	360 Winter	100	+0%				
15.003	S22	360 Winter	100	+0%				
18.000	S23	360 Summer	100	+0%				
18.001	S24	360 Winter	100	+0%				
15.004	S25	360 Winter	100	+0%	100/360 Summer			
19.000	P18	360 Summer	100	+0%				

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.007	S8	40.812	-0.363	0.000	0.44			138.6	OK
1.008	S31	40.740	-0.401	0.000	0.33			146.9	OK
1.009	S9	40.609	-0.383	0.000	0.39			162.6	OK
8.000	Swale P89	43.268	-0.182	0.000	0.08			6.2	OK
8.001	Swale P122	41.772	-0.228	0.000	0.13			10.6	OK
9.000	P127	43.037	-0.113	0.000	0.14			2.1	OK
9.001	P129	42.882	-0.118	0.000	0.10			2.9	OK
9.002	P131.1	42.657	-0.120	0.000	0.09			2.9	OK
9.003	P131.2	41.862	-0.107	0.000	0.18			2.9	OK
8.002	S13	41.585	-0.275	0.000	0.16			34.0	OK
10.000	Swale P82	42.722	-0.128	0.000	0.05			1.0	OK
10.001	Swale P141	42.485	-0.165	0.000	0.16			6.9	OK
10.002	Swale P146	42.170	-0.179	0.000	0.10			10.2	OK
10.003	Swale P147	41.078	-0.222	0.000	0.15			10.8	OK
11.000	P139	42.583	-0.117	0.000	0.11			2.1	OK
11.001	P135.1	42.282	-0.118	0.000	0.11			2.9	OK
11.002	P135.2	42.081	-0.119	0.000	0.10			2.9	OK
11.003	P134	41.261	-0.171	0.000	0.13			6.6	OK
10.004	S10	41.006	-0.216	0.000	0.17			22.3	OK
10.005	S11	40.602	-0.118	0.000	0.14			19.5	OK
1.010	Pond 1	40.602	0.252	0.000	0.01			0.1	SURCHARGED
12.000	P14	42.900	-0.100	0.000	0.00			0.0	OK
12.001	P8	41.289	-0.111	0.000	0.15			2.7	OK
12.002	S14	41.270	0.051	0.000	0.09			9.0	SURCHARGED
12.003	S15	41.268	0.403	0.000	0.13			9.5	SURCHARGED
12.004	S16	41.267	0.495	0.000	0.11			9.2	SURCHARGED
13.000	P179	42.371	-0.098	0.000	0.26			4.5	OK
13.001	P175	42.079	-0.100	0.000	0.24			4.5	OK
13.002	P174	41.850	-0.122	0.000	0.08			4.5	OK
14.000	Swale P169	43.121	-0.129	0.000	0.05			2.1	OK
12.005	S17	41.265	0.764	0.000	0.34			20.7	SURCHARGED
12.006	S18	41.263	0.811	0.000	0.33			20.5	SURCHARGED
1.011	Basin 4	41.261	0.861	0.000	0.02			1.4	SURCHARGED
1.012	S19	39.940	-0.272	0.000	0.02			1.4	OK
15.000	S30	42.495	-0.252	0.000	0.06			8.4	OK
16.000	Swale P14.1	43.179	-0.121	0.000	0.08			1.8	OK
16.001	Swale 14.2	42.877	-0.175	0.000	0.11			9.5	OK
16.002	Swale P21	41.448	-0.152	0.000	0.23			9.5	OK
17.000	P32	43.100	-0.100	0.000	0.00			0.0	OK
17.001	P28.1	42.874	-0.076	0.000	0.13			1.6	OK
17.002	P28.2	42.585	-0.076	0.000	0.13			1.6	OK
17.003	P27	41.671	-0.069	0.000	0.21			1.6	OK
15.001	S20	41.251	-0.266	0.000	0.19			30.1	OK
15.002	S21	40.813	-0.204	0.000	0.19			25.8	OK
15.003	S22	40.801	0.000	0.000	0.18			25.6	OK
18.000	S23	41.005	-0.104	0.000	0.21			4.0	OK
18.001	S24	40.768	-0.004	0.000	0.32			4.3	OK
15.004	S25	40.766	0.115	0.000	0.14			30.5	SURCHARGED

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
19.000	P18	42.272	-0.132	0.000	0.03			1.0	OK

PN	US/MH Name	Level Exceeded
1.007	S8	
1.008	S31	
1.009	S9	
8.000	Swale P89	
8.001	Swale P122	
9.000	P127	
9.001	P129	
9.002	P131.1	
9.003	P131.2	
8.002	S13	
10.000	Swale P82	
10.001	Swale P141	
10.002	Swale P146	
10.003	Swale P147	
11.000	P139	
11.001	P135.1	
11.002	P135.2	
11.003	P134	
10.004	S10	
10.005	S11	
1.010	Pond 1	
12.000	P14	
12.001	P8	
12.002	S14	
12.003	S15	
12.004	S16	
13.000	P179	
13.001	P175	
13.002	P174	
14.000	Swale P169	
12.005	S17	
12.006	S18	
1.011	Basin 4	
1.012	S19	
15.000	S30	
16.000	Swale P14.1	
16.001	Swale 14.2	
16.002	Swale P21	
17.000	P32	
17.001	P28.1	
17.002	P28.2	
17.003	P27	

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

PN	US/MH Name	Level Exceeded
15.001	S20	
15.002	S21	
15.003	S22	
18.000	S23	
18.001	S24	
15.004	S25	
19.000	P18	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
19.001	P5	360 Summer	100	+0%				
19.002	P4.1	360 Summer	100	+0%				
19.003	P4.2	360 Winter	100	+0%	100/360 Summer			
20.000	S26	360 Summer	100	+0%				
20.001	S27	360 Winter	100	+0%				
15.005	S28	360 Winter	100	+0%	100/360 Summer			
15.006	S29	360 Winter	100	+0%	100/360 Summer			
15.007	Basin 3	360 Winter	100	+0%	100/360 Summer			
1.013	Swale Inlet	360 Winter	100	+0%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
19.001	P5	41.233	-0.177	0.000	0.10			6.9	OK
19.002	P4.1	40.854	-0.182	0.000	0.08			6.9	OK
19.003	P4.2	40.765	0.165	0.000	0.11			5.1	SURCHARGED
20.000	S26	40.844	-0.192	0.000	0.05			2.1	OK
20.001	S27	40.764	-0.165	0.000	0.03			1.6	OK
15.005	S28	40.765	0.285	0.000	0.26			41.1	SURCHARGED
15.006	S29	40.764	0.321	0.000	0.17			41.1	SURCHARGED
15.007	Basin 3	40.761	0.811	0.000	0.11			4.6	SURCHARGED
1.013	Swale Inlet	39.703	-0.047	0.000	0.81			5.8	OK

PN	US/MH Name	Level Exceeded
19.001	P5	
19.002	P4.1	
19.003	P4.2	
20.000	S26	
20.001	S27	
15.005	S28	
15.006	S29	
15.007	Basin 3	
1.013	Swale Inlet	

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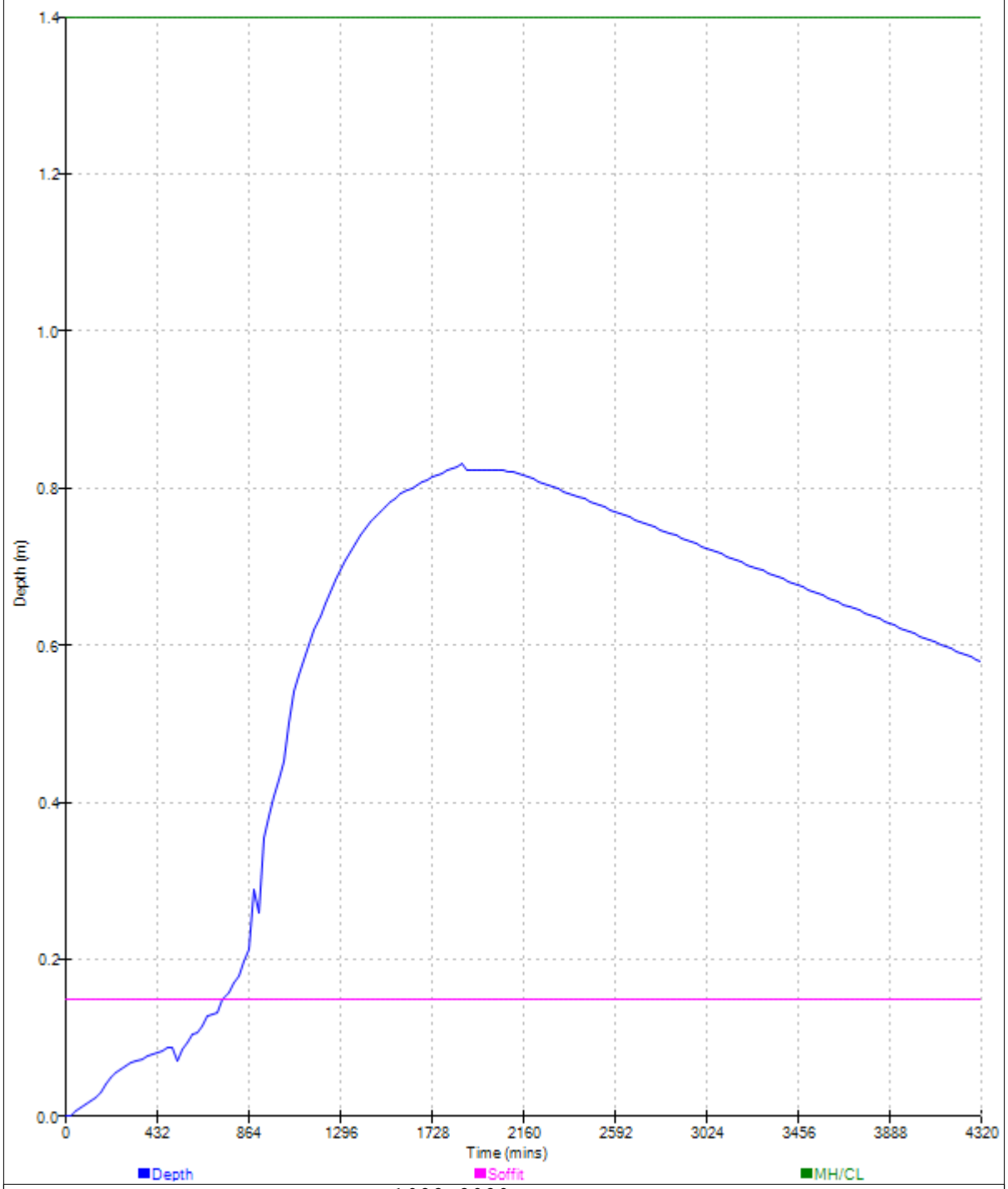
APPENDIX F.1 – 1 IN 30CC CALCULATIONS ACCESS ROAD

Graphs for Pipe 1.003 US/MH S4 (Surface Network 1)
2160 minute 30 year Winter I+45%
Status: SURCHARGED



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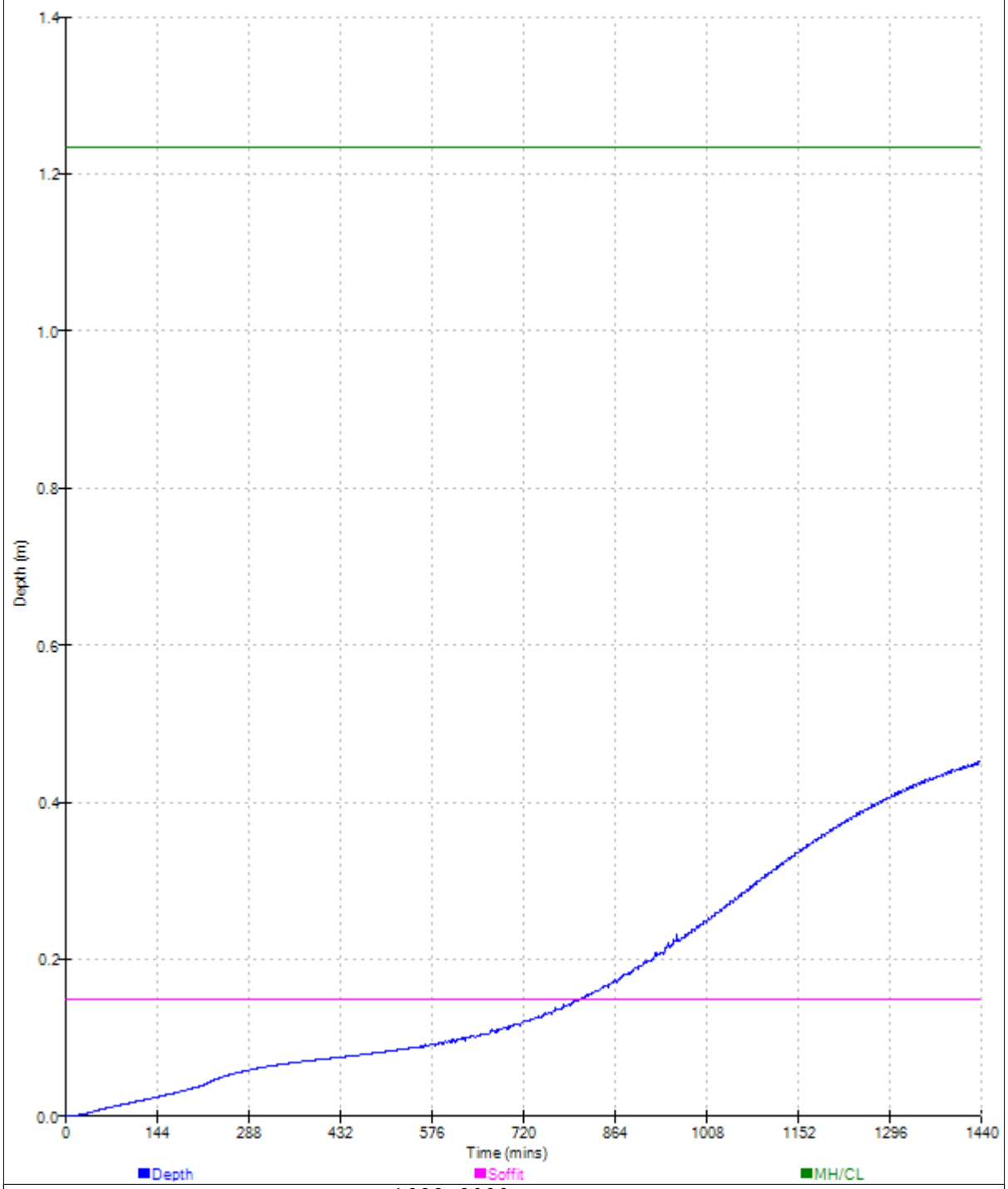
APPENDIX F.2 – 1 IN 30CC CALCULATIONS ROAD AND BRIDGE

Graphs for Pipe 1.003 US/MH SB3-FC (Surface Network 2)
2160 minute 30 year Winter I+45%
Status: SURCHARGED (1 of 3)



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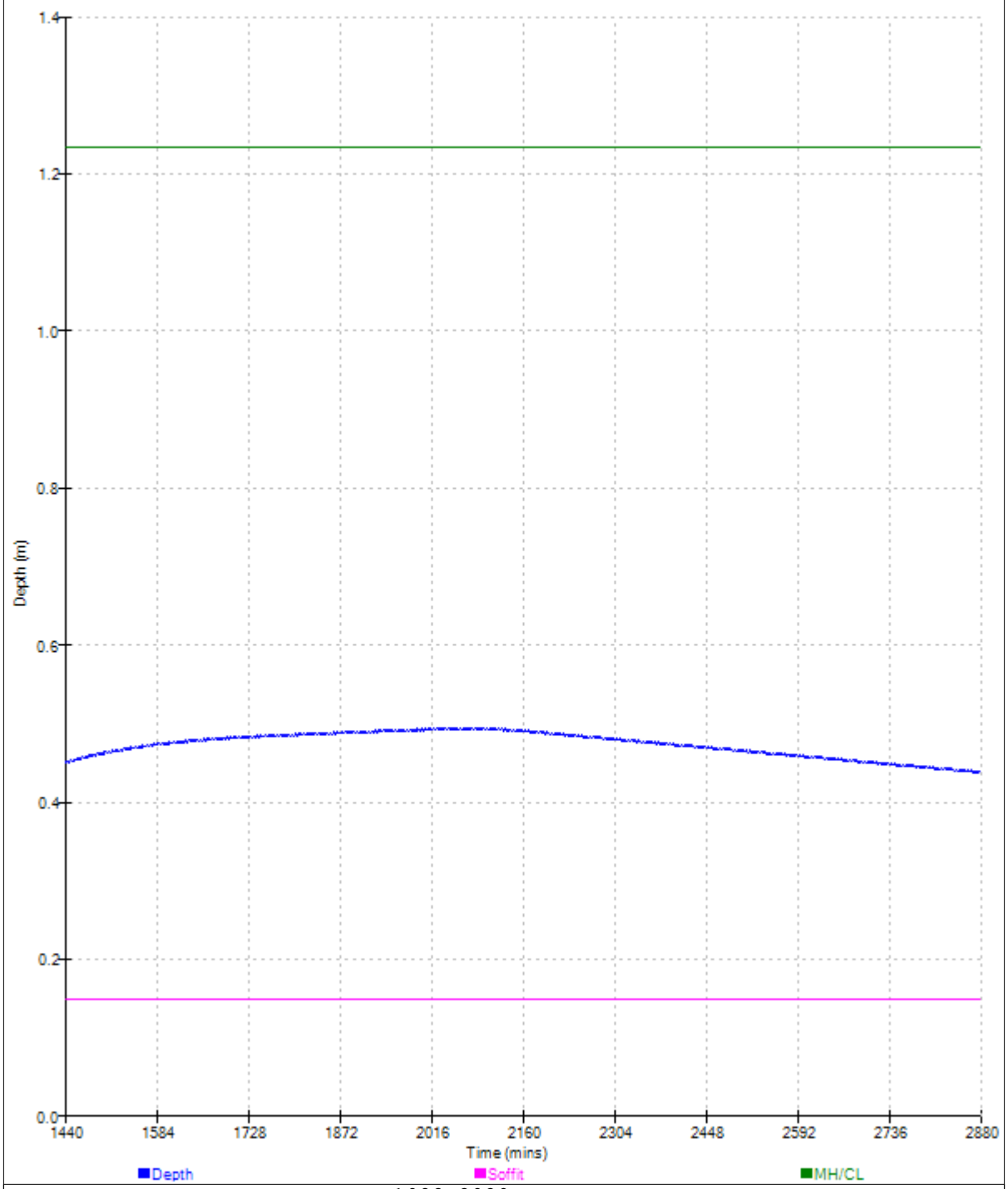
Graphs for Pipe 1.003 US/MH SB3-FC (Surface Network 2)
2160 minute 30 year Winter I+45%
Status: SURCHARGED (2 of 3)



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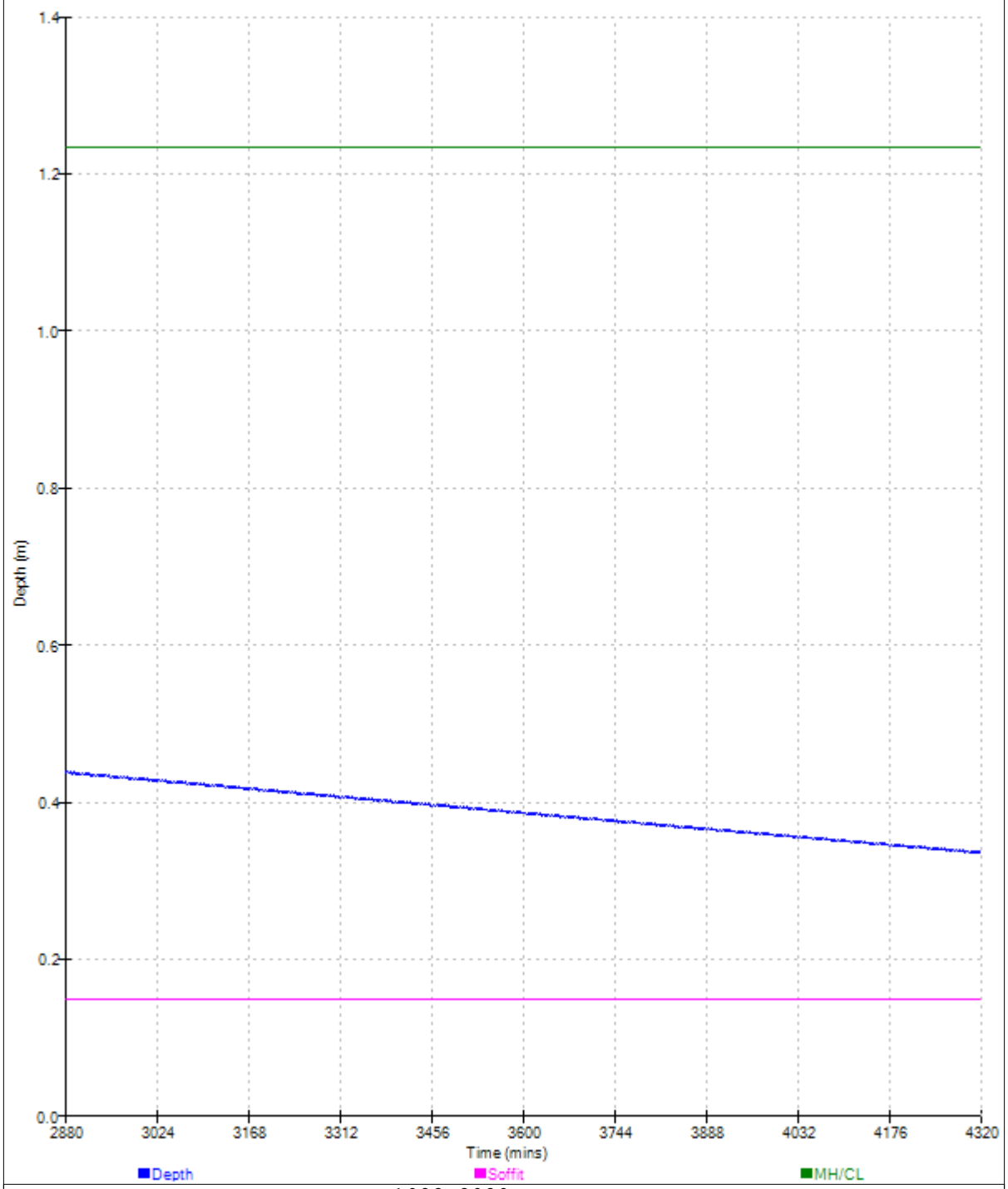
Graphs for Pipe 1.003 US/MH SB3-FC (Surface Network 2)
2160 minute 30 year Winter I+45%
Status: SURCHARGED (3 of 3)



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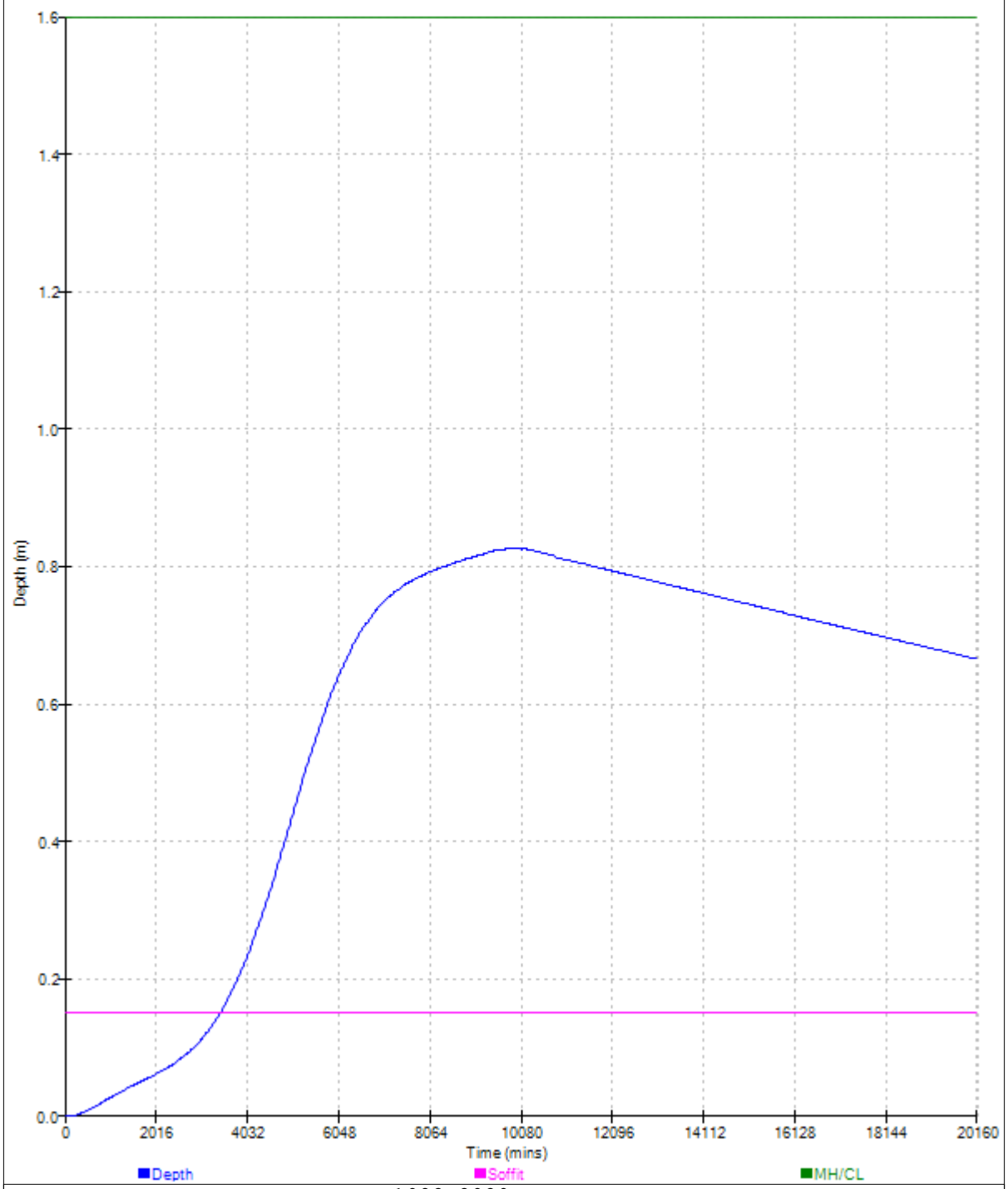
APPENDIX F.3 – 1 IN 30CC CALCULATIONS MAIN SITE

Graphs for Pipe 1.010 US/MH Pond 1 (Surface Network 2)
10080 minute 30 year Winter I+45%
Status: SURCHARGED



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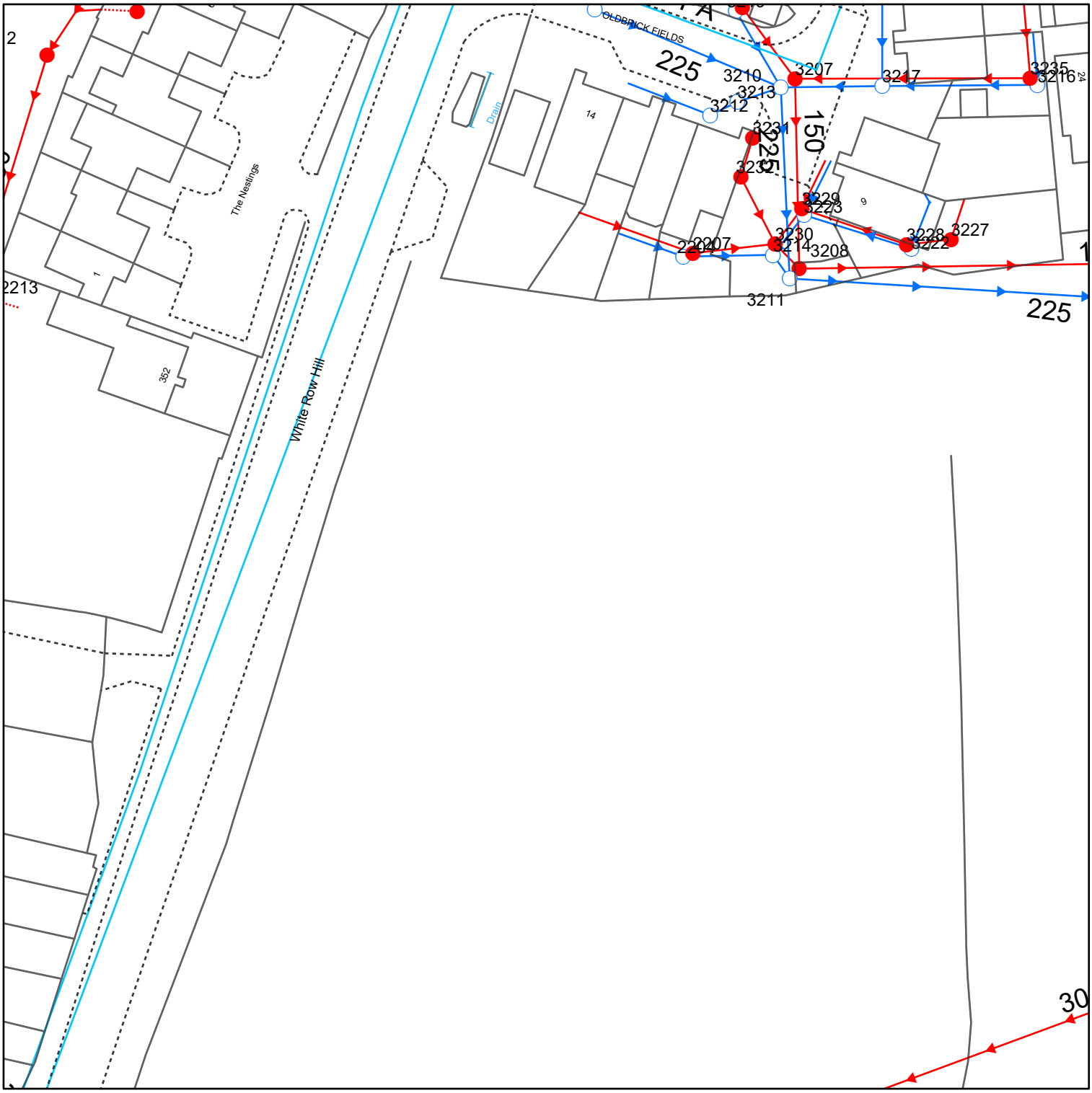
APPENDIX G – WESSEX WATER ASSET MAPS

Wessex Water Network Map



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WATER MAINS
- Distribution
- Washout
- Raw Water
- Abandoned
- Private

FITTINGS
- Hydrant
- Other

SEWERS — STRATEGIC / PUBLIC / PRIVATE / SECTION 104
- Foul
- Surface
- Combined
- Abandoned

Colours generally indicate the use of the sewer/drain (i.e Red - Foul, Dark Blue - Surface, Magenta - Combined/Dual Use, Light Green - Highway Drain, Mid Green - Overflow).
Some styles of line and symbol are shown on the key in sample/typical colours.

STRUCTURES
- Manhole - Foul
- Manhole - Surface
- Manhole - Combined
- Inlet
- Outfall
- Lamphole
- Bifurcation - Foul
- Bifurcation - Surface
- Bifurcation - Combined
- Combined Sewage Overflow
- Pumping Station - Surface
- Pumping Stn - Foul/Combined
- Gully
- Vent Column
- Rodding Eye
- Catchpit
- Flushing Chamber
- Soakaway
- Non Return Valve
- Air Valve
- Hatch Box
- X Washout

OTHER WESSEX PIPES
- Rising Mains
- Standby Rising Mains
- EDM Effluent Disposal
- Overflow
- S Syphon

NON-WESSEX / UNKNOWN
- Private Rising Mains
- CW Culverted Watercourse
- H Highway Drain
- ? Use Unknown
- SU Status Unknown

OTHER STRUCTURES
- Attenuation Tank
- Storage Tank
- Chamber
- Tunnel
- Interceptor

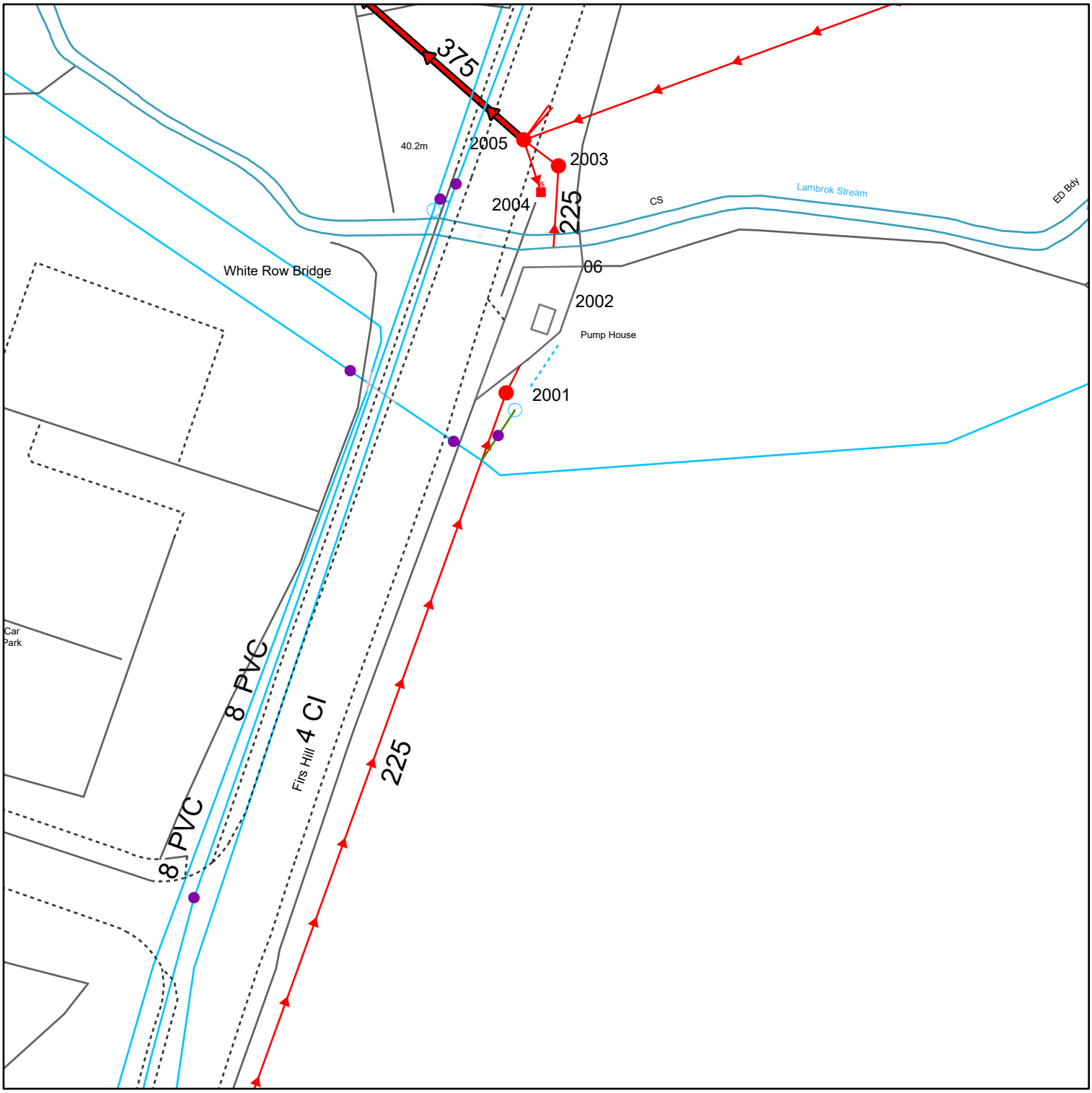
Wessex Water
YTL GROUP

Information in this map is provided for identification purposes only. No warranty as to accuracy is given or implied. The precise route of pipe work may not exactly match that shown. Wessex Water does not accept liability for inaccuracies. Sewers and lateral drains adopted by Wessex Water under the Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011 are to be plotted over time and may not yet be shown. In carrying out any works, you accept liability for the cost of any repairs to Wessex Water apparatus damaged as a result of your works. You are advised to commence excavations using hand tools only. Mechanical digging equipment should not be used until pipe work has been precisely located. If you are considering any form of building works and pipe work is shown within the boundary of your property or a property to be purchased (or very close by) a surveyor should plot its exact position prior to commencing works or purchase. If you are proposing to build over or near Wessex Water's apparatus you should contact the Developer Services Team, tel: 01225 526333 or e-mail: developer.enquiries@wessexwater.co.uk to discuss your proposals. Details of assets within Wessex Water's land ownership are unavailable through this service.

Date: 06/10/2025
Centre: 384283E, 156196N
Scale: 1:625
(when printed at A4 size)

N W E S

Wessex Water Network Map



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WATER MAINS
- Distribution
- Washout
- Raw Water
- Abandoned
- Private

FITTINGS
- Hydrant
- Other

SEWERS — STRATEGIC / PUBLIC / PRIVATE / SECTION 104
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- Rodding Eye
- Catchpit
- Flushing Chamber
- Soakaway
- Non Return Valve
- Air Valve
- Hatch Box
- X Washout

OTHER WESSEX PIPES
- Rising Mains
- Standby Rising Mains
- EDM Effluent Disposal
- Overflow
- S Syphon

NON-WESSEX / UNKNOWN
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- CW Culverted Watercourse
- H Highway Drain
- ? Use Unknown
- SU Status Unknown

OTHER STRUCTURES
- Attenuation Tank
- Storage Tank
- Chamber
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- Interceptor

Wessex Water
YTL GROUP

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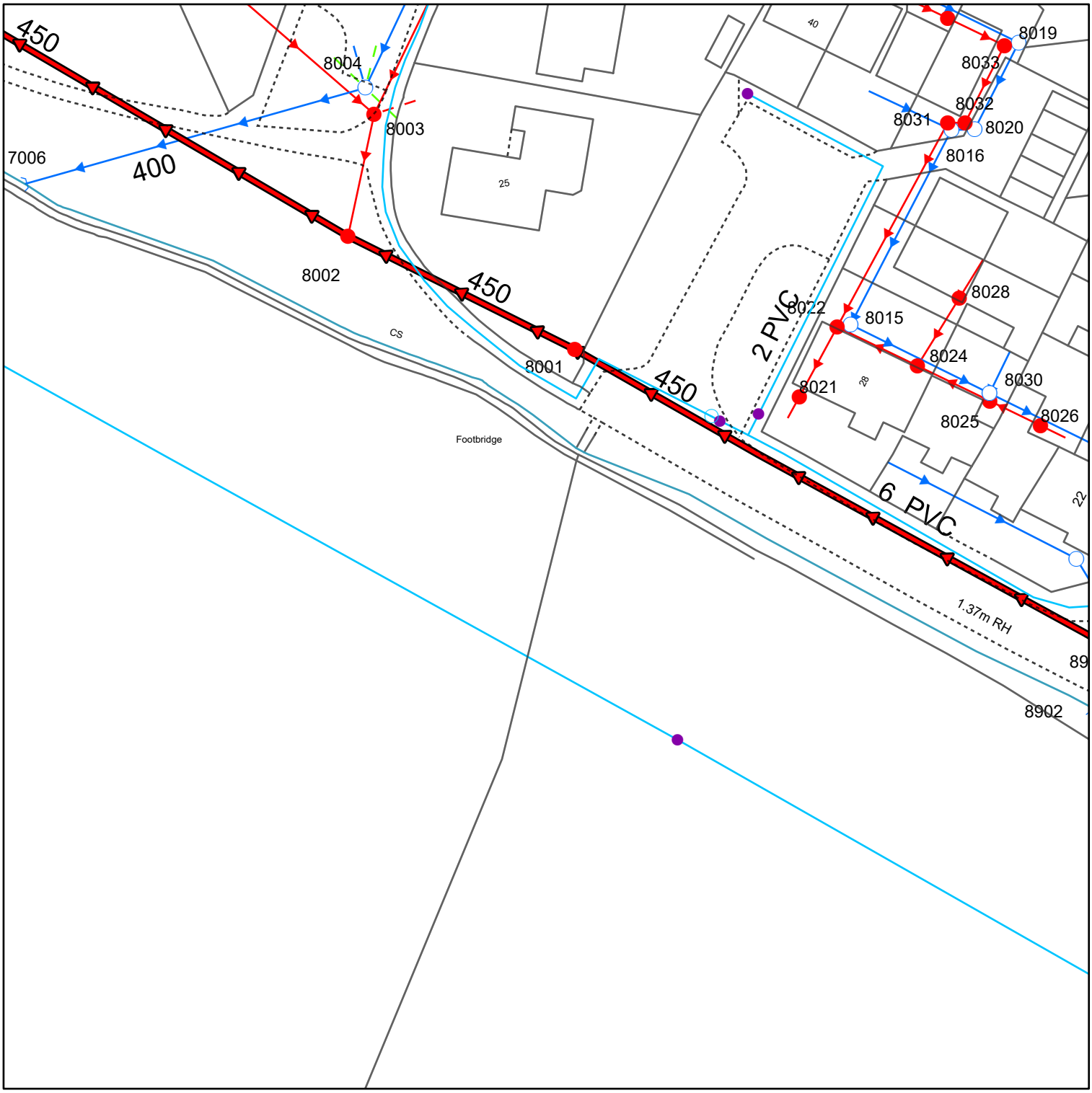
Date: 06/10/2025
Centre: 384220E, 156048N
Scale: 1:625
(when printed at A4 size)

N W E S

Wessex Water Network Map



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WATER MAINS
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FITTINGS
- Hydrant
- Other

SEWERS — STRATEGIC / PUBLIC / PRIVATE / SECTION 104
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Wessex Water
YTL GROUP

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Date: 06/10/2025
Centre: 384833E, 155989N
Scale: 1:625
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N W E S