The Sizewell C Project

SZC Co.'s Response to the Secretary of State's Request for Further Information dated 18 March 2022: Appendix 3 - The Drainage Strategy

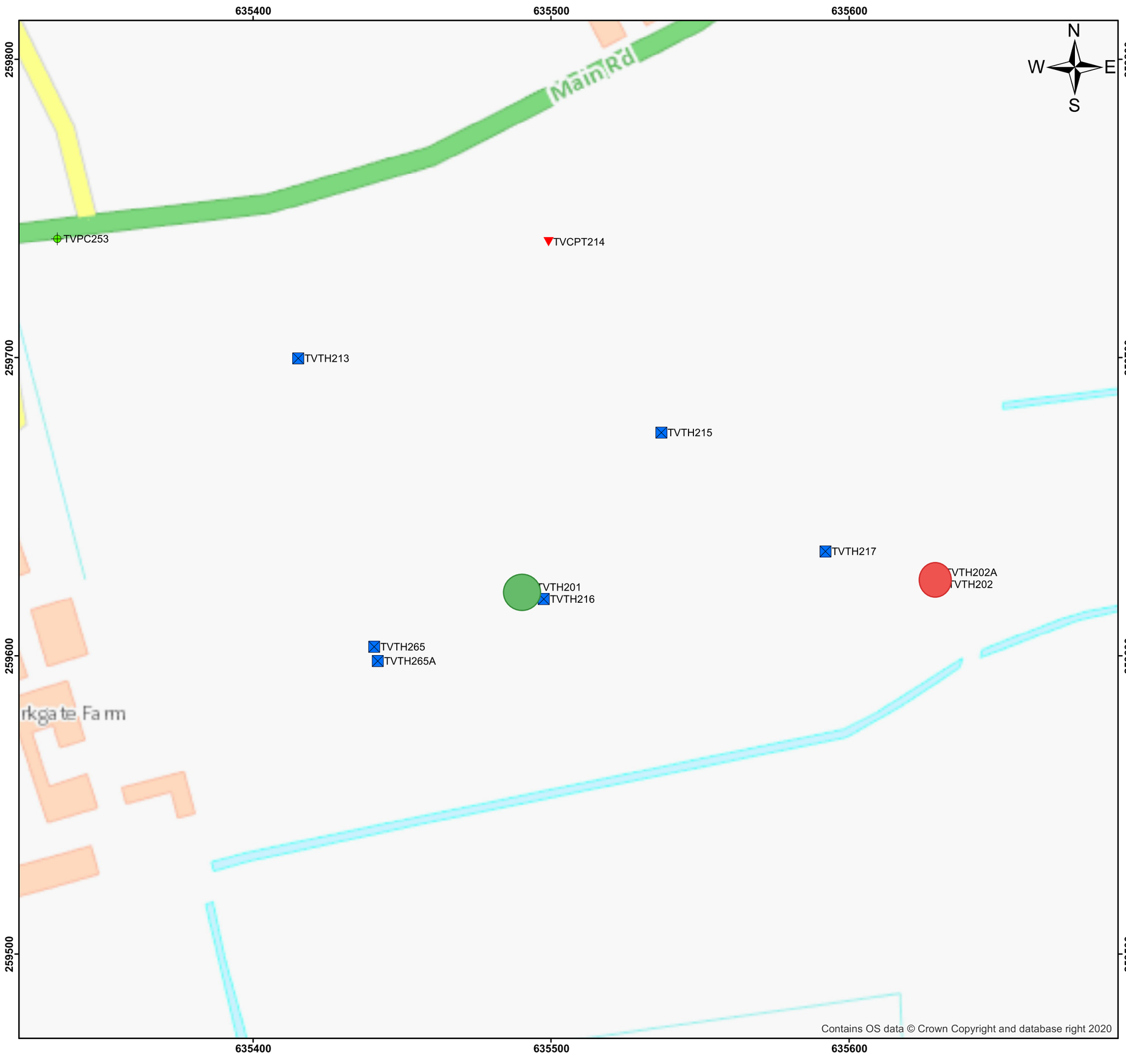
Part 8 of 12

Revision: 2.0

April 2022

SizewellC
Doing the power of good for Britain
EDF CGN

APPENDIX A: INFILTRATION TEST DATA AND RESULTS



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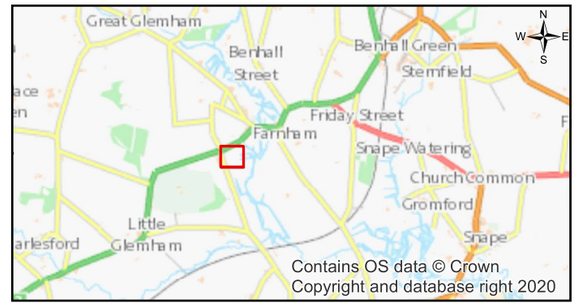

Scale: 1:100,000
0 1 2 4 6 8 Kilometres

Legend

Location Type

- Pavement Coreholes
- Cone Penetration Tests
- Trial Pits

Notes

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Some exploratory locations have been plotted using the setting out grid coordinates as agreed by NNB (as detailed on the exploratory hole records).

Rev.	Date	Description	Initials
1	04/11/2020	Draft Issue	LCB
2	07/12/2020	Final Issue	LCB

Scale: 1:1,250
0 10 20 40 60 80 100 Metres

Coordinate System
British National Grid

Client
NNB Generation Company (SZC) Limited
EDF-NNB, 90 Whitfield Street,
London, W1T 4EZ
Tel: 020 321 98311
Website:www.edfenergy.com

Investigation Supervisor
WSP

Principal Contractor
Fugro GeoServices Limited
Fugro House, Hithercroft Road, Wallingford,
Oxfordshire, OX10 9RB, United Kingdom
Registered in England No. 1284352
VAT No. GB 133 1704 09
www.fugro.com

Project Title

Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation - Two Village Bypass

Drawing Title

Exploratory Location Plan

Drawing Number

B.2.1

Drawn By	Checked By	Issued On	Project No.	Sheet Size	Rev.
LCB	CAY	07/12/2020	G200015U	A3	2

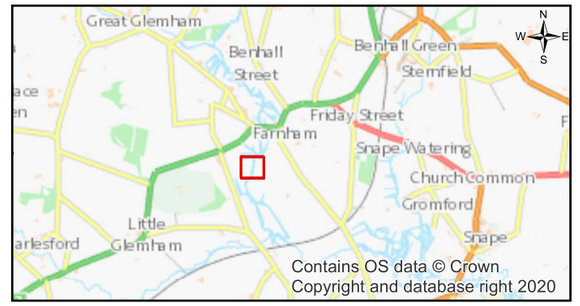
635700 635800 635900 636000

259600 259500 259400 259300

N W E S

TVCPT218
TVCPT219
TVTH220
TVBH221
TVCPT222
TVBH204
TVBH251
TVCPT248
TVCPT247
TVBH249
TVBH203
TVCPT223
TVTH250
TVCPT225
TVBH227
TVCPT224
TVTH224
TVBH205
TVTH228
TVTH226
TVCPT226

Location



Scale: 1:100,000
0 1 2 4 6 8 Kilometres

Legend

Location Type

- Cable Percussion Boreholes
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Project Title

Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation - Two Village Bypass

Drawing Title

Exploratory Location Plan

Drawing Number

B.2.2

Drawn By	Checked By	Issued On	Project No.	Sheet Size	Rev.
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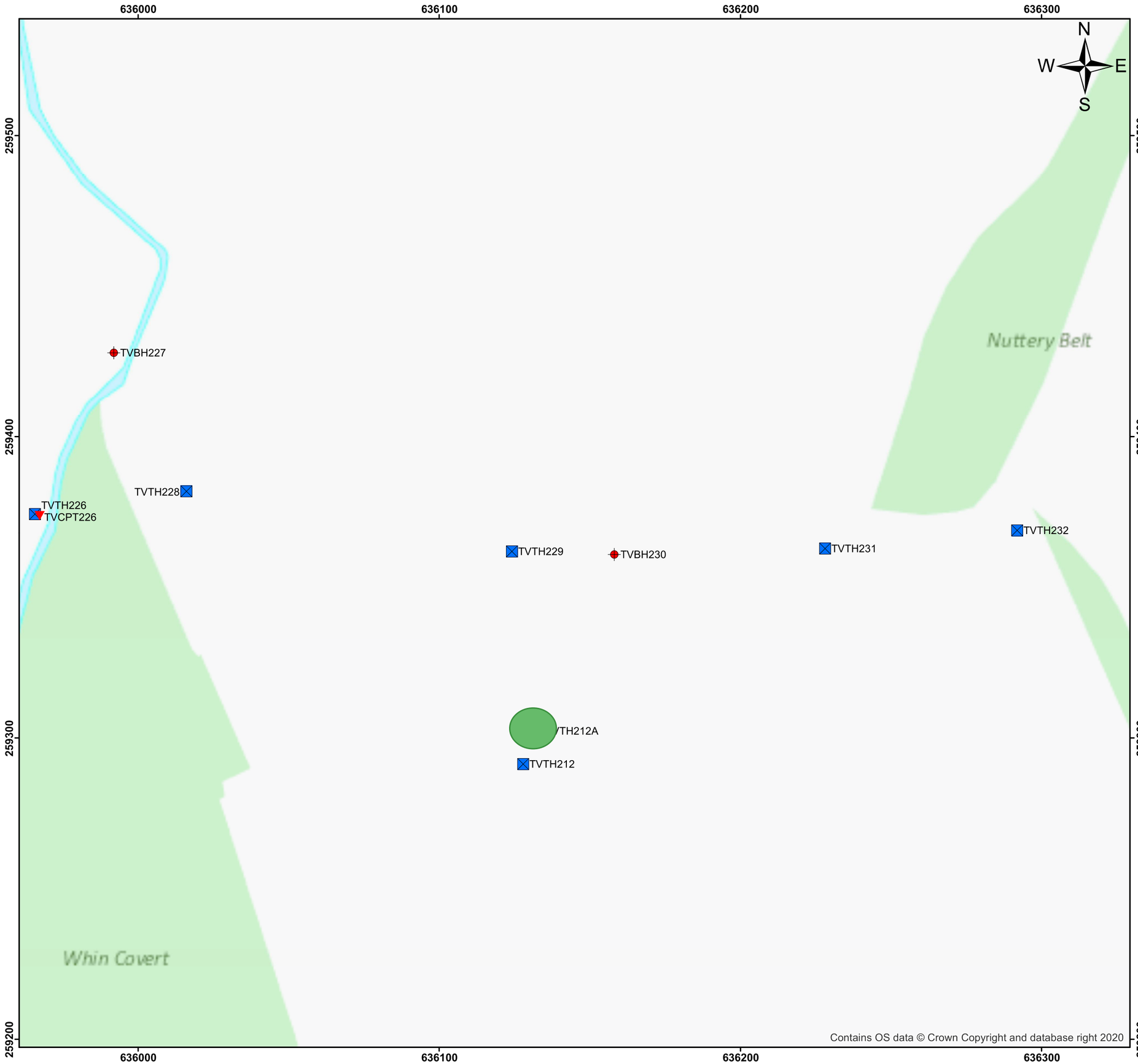

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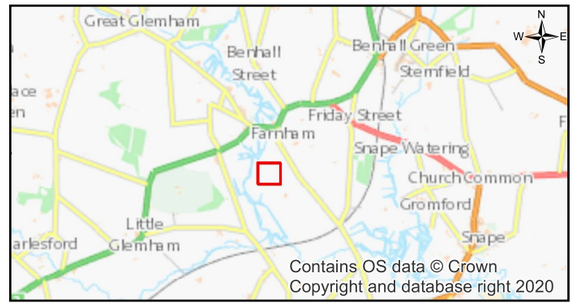

Scale: 1:100,000
0 1 2 4 6 8 Kilometres

Legend

Location Type

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- Cone Penetration Tests
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Project Title

Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation - Two Village Bypass

Drawing Title

Exploratory Location Plan

Drawing Number

B.2.3

Drawn By	Checked By	Issued On	Project No.	Sheet Size	Rev.
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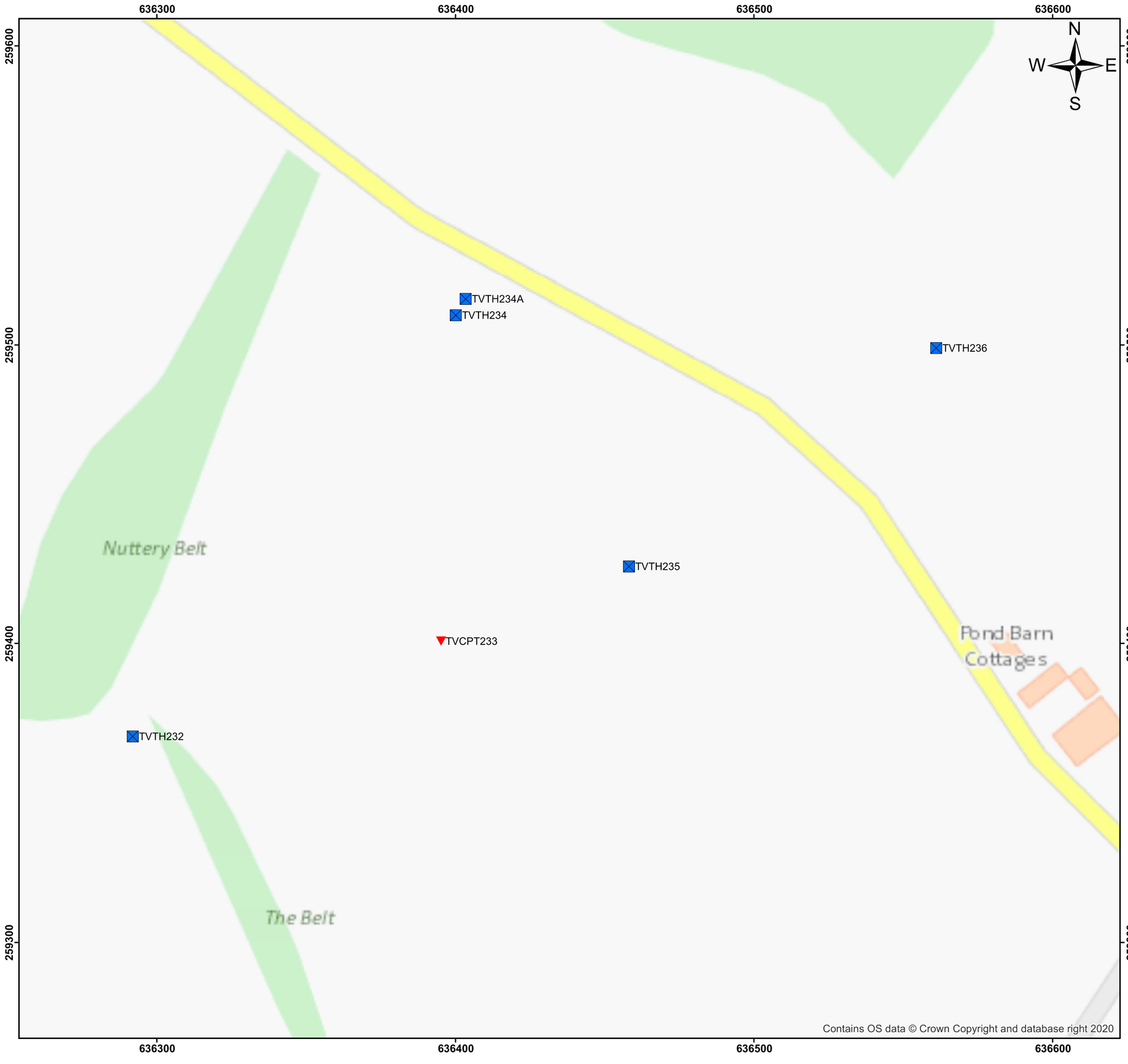

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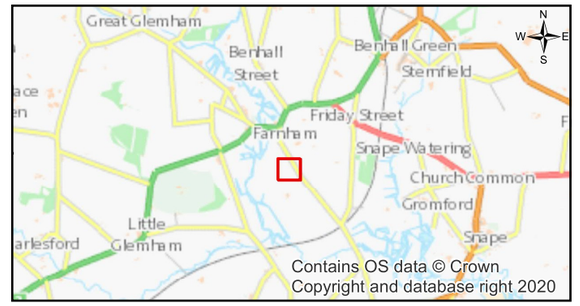

Scale: 1:100,000

0 1 2 4 6 8 Kilometres

Legend

Location Type

- Cone Penetration Tests
- Trial Pits

Notes

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Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation - Two Village Bypass

Drawing Title

Exploratory Location Plan

Drawing Number

B.2.4

Drawn By	Checked By	Issued On	Project No.	Sheet Size	Rev.
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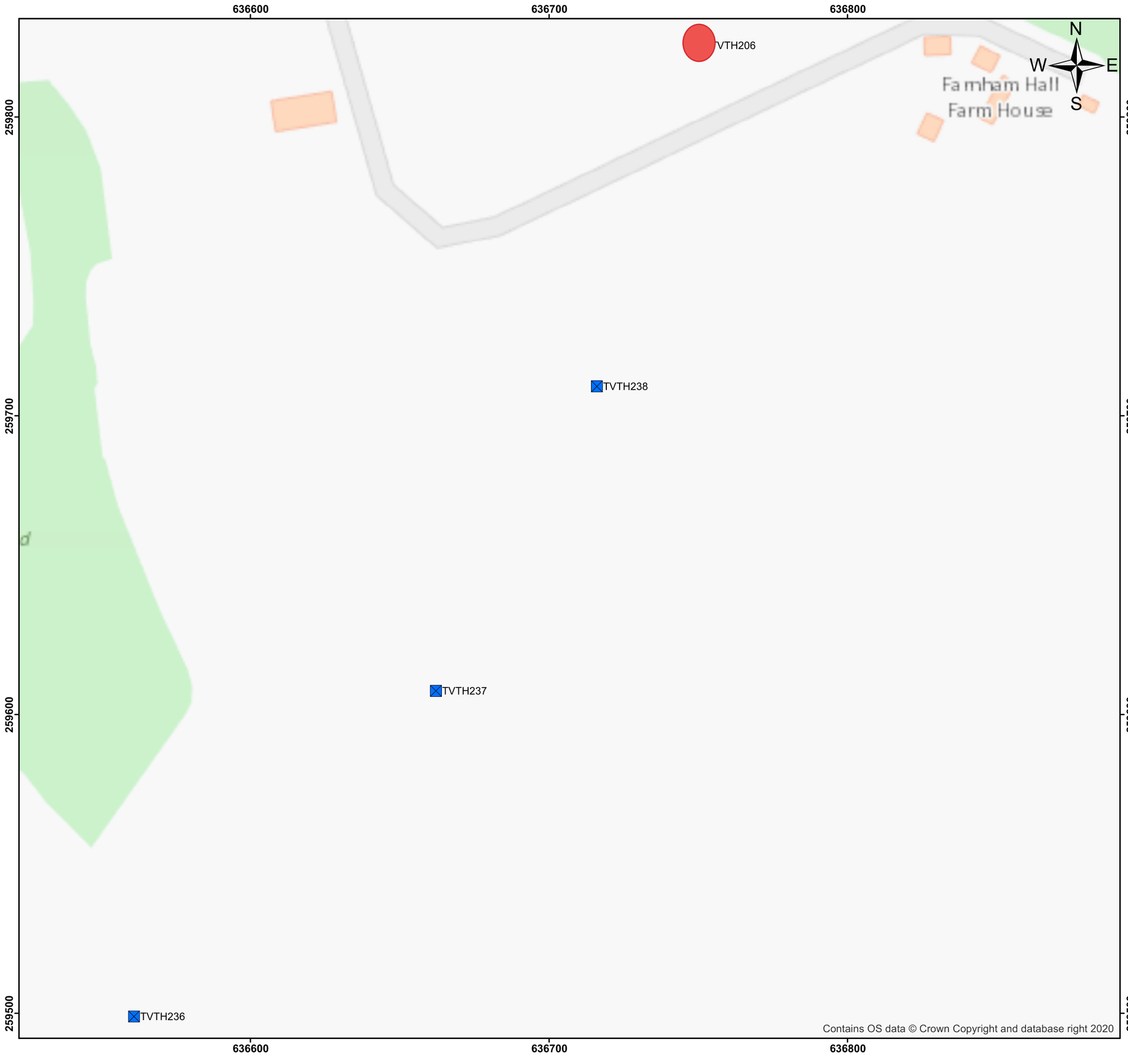

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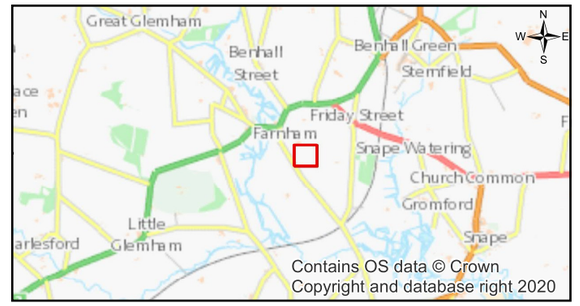

Scale: 1:100,000
0 1 2 4 6 8 Kilometres

Legend

Location Type

Trial Pits

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Project Title

Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation - Two Village Bypass

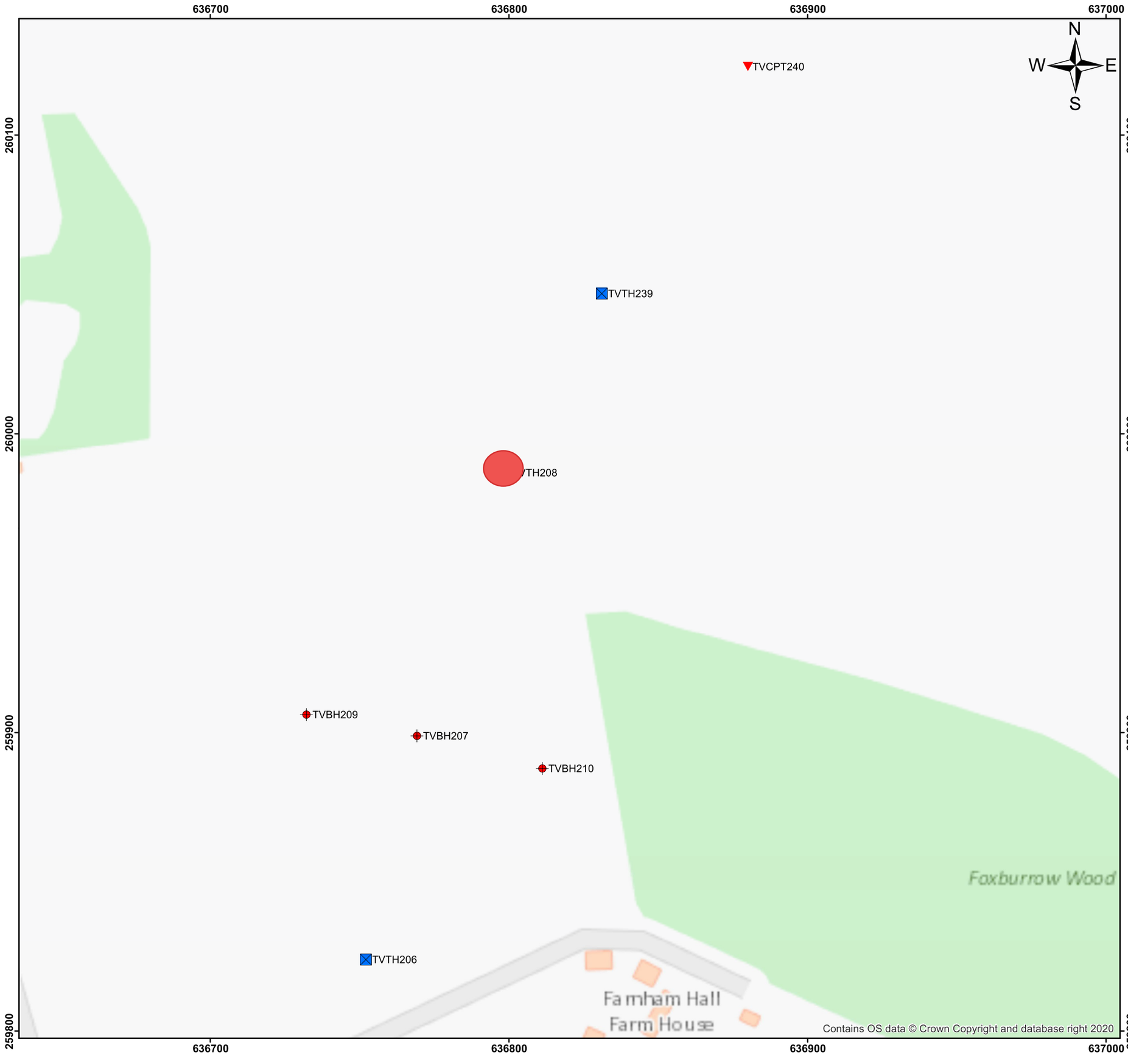
Drawing Title

Exploratory Location Plan

Drawing Number

B.2.5

Drawn By	Checked By	Issued On	Project No.	Sheet Size	Rev.
LCB	CAY	07/12/2020	G200015U	A3	2



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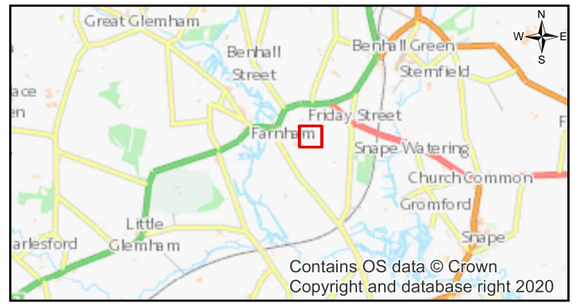

Scale: 1:100,000
0 1 2 4 6 8 Kilometres

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Project Title

Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation - Two Village Bypass

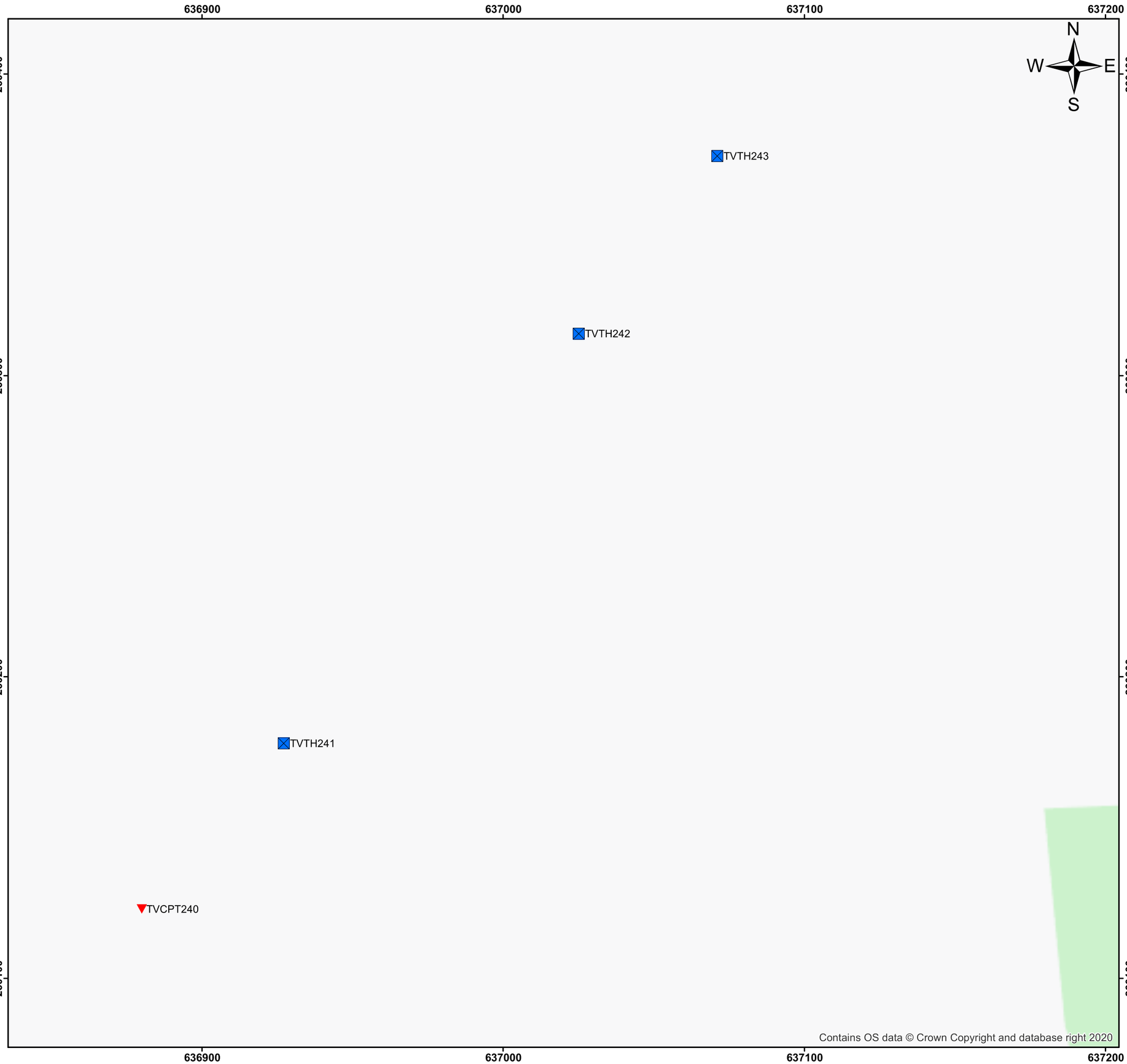
Drawing Title

Exploratory Location Plan

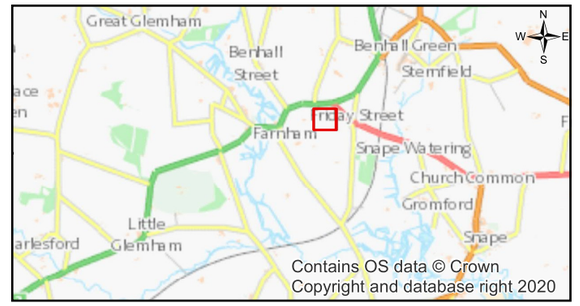
Drawing Number

B.2.6

Drawn By	Checked By	Issued On	Project No.	Sheet Size	Rev.
LCB	CAY	07/12/2020	G200015U	A3	2



Location



Scale: 1:100,000

0 1 2 4 6 8 Kilometres

Legend

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Project Title

Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation - Two Village Bypass

Drawing Title

Exploratory Location Plan

Drawing Number

B.2.7

Drawn By	Checked By	Issued On	Project No.	Sheet Size	Rev.
LCB	CAY	07/12/2020	G200015U	A3	2

637000 637100 637200 637300

260500 260400 260300

N W E S

TVTH245

TVCPT246

TVTH244

TVTH243

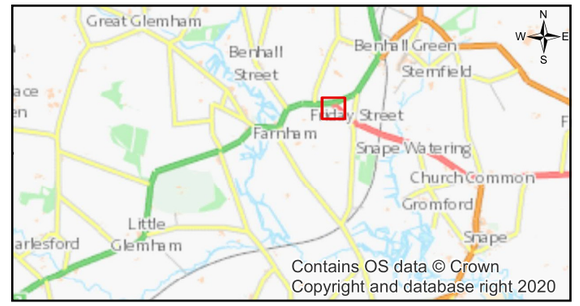
TVPC264

TVTH242

Contains OS data © Crown Copyright and database right 2020

637000 637100 637200 637300

Location



Scale: 1:100,000
0 1 2 4 6 8 Kilometres

Legend

Location Type

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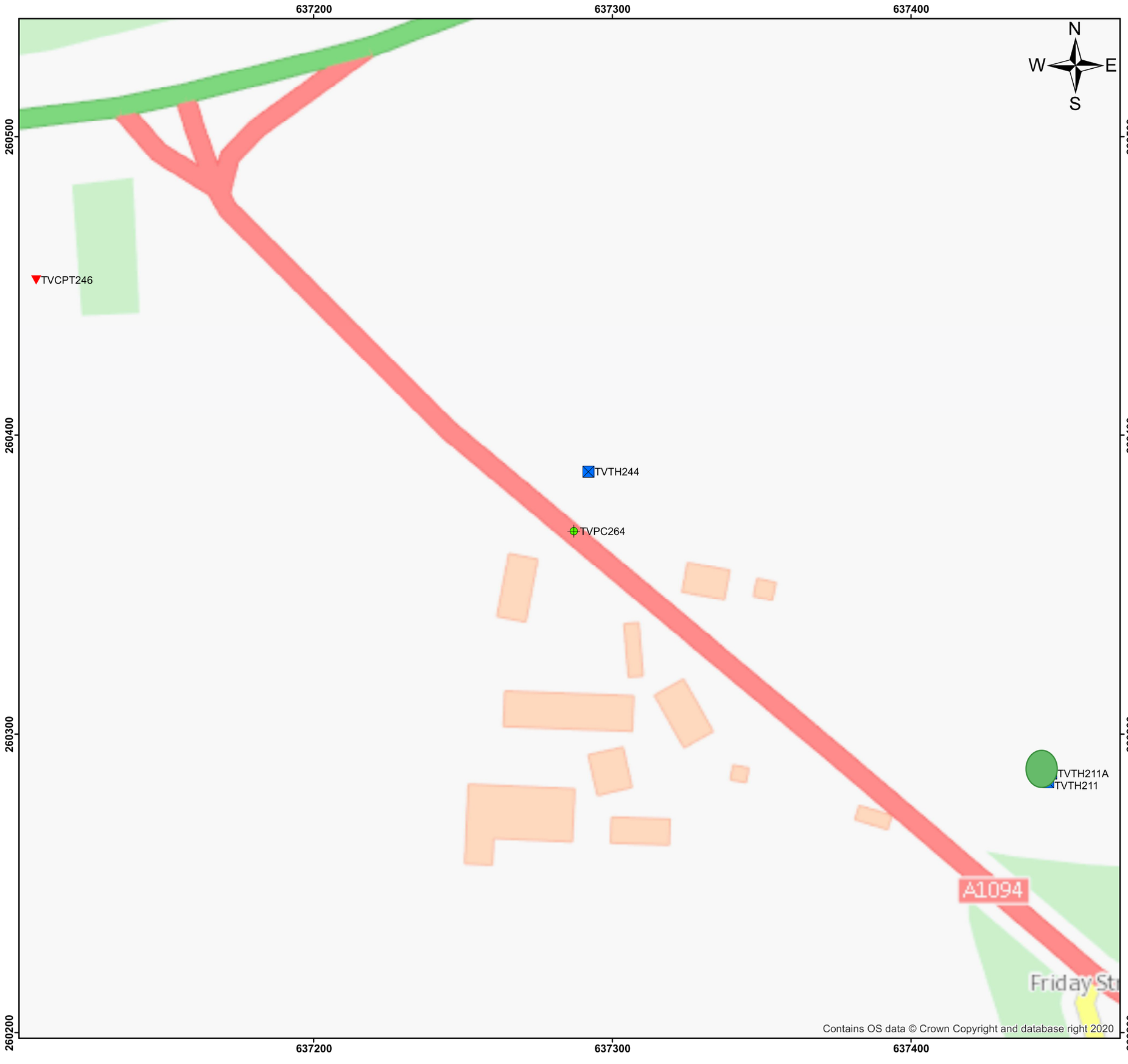
Drawing Title

Exploratory Location Plan

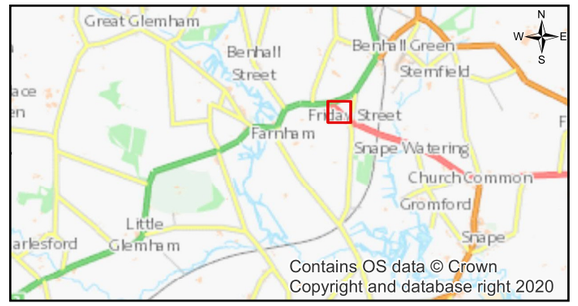
Drawing Number

B.2.8

Drawn By	Checked By	Issued On	Project No.	Sheet Size	Rev.
LCB	CAY	07/12/2020	G200015U	A3	2



Location



Scale: 1:100,000

0 1 2 4 6 8 Kilometres

Legend

Location Type

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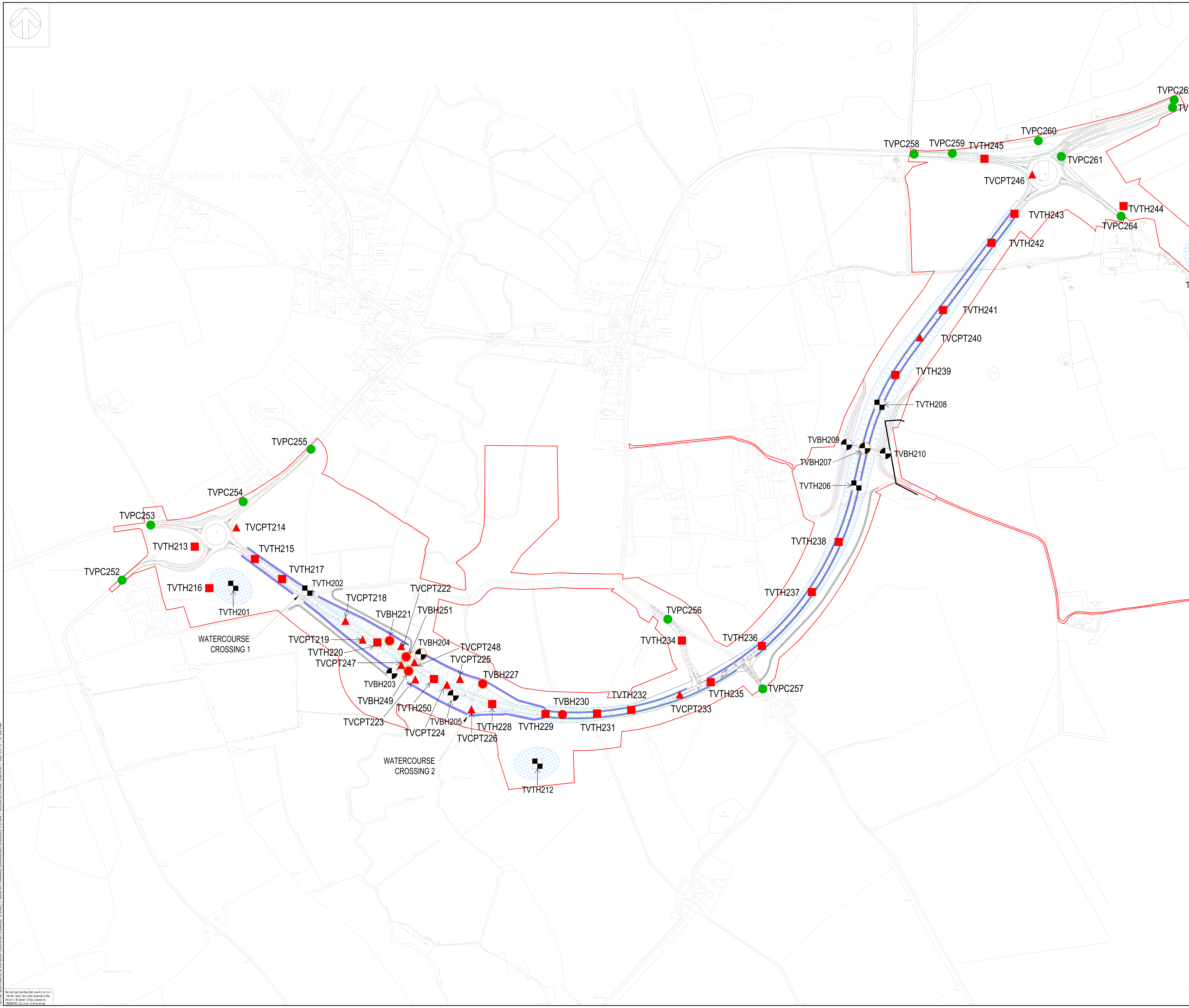
Drawing Title

Exploratory Location Plan

Drawing Number

B.2.9

Drawn By	Checked By	Issued On	Project No.	Sheet Size	Rev.
LCB	CAY	07/12/2020	G200015U	A3	2



DO NOT SCALE

BOREHOLE NOTE:

1. ALL EXPLORATORY HOLE LOCATIONS ARE PROVISIONAL ONLY AND SHOULD BE ASSESSED FOR SERVICES AND UXO PRIOR TO COMMENCEMENT.
2. ALL BOREHOLE POSITIONS ARE INDICATIVE . NO INTRUSIVE WORKS SHOULD BE COMMENCED UNTIL ALL LOCATIONS HAVE BEEN CLEARED FOR ALL SERVICES, BURIED OR ABOVE GROUND, AND FOLLOWING THE EXCAVATION OF A 1.2m DEEP HAND EXCAVATED INSPECTION PIT. WHERE BOREHOLES NEED TO BE RELOCATED THEY SHOULD BE AT LEAST 10m FROM ANY WATERCOURSE. THE NEW LOCATION SHALL BE CONFIRMED BY THE ENGINEER BEFORE COMMENCEMENT.

PLAN VIEW KEY:
- RED LINE BOUNDARY
- FLOOD COMPENSATION AREA
- EXTENT OF EARTHWORKS (CUT)
- EXTENT OF EARTHWORKS (FILL)
- PROPOSED DETENTION POND/BASIN – SUBJECT TO DETAILED DESIGN WORKS AND SITE INVESTIGATION
- SWALE
- PUBLIC RIGHTS OF WAY
- PROPOSED PUBLIC RIGHT OF WAY DIVERSION
- VISIBILITY SPLAY
- PROPOSED CONSTRUCTION COMPOUND
- TRANCHE 1 GROUND INVESTIGATION BOREHOLE
- TRANCHE 1 GROUND INVESTIGATION TRIAL HOLE
- TRANCHE 2 GROUND INVESTIGATION BOREHOLE
- TRANCHE 2 GROUND INVESTIGATION TRIAL HOLE
- TRANCHE 2 GROUND INVESTIGATION CPT
- TRANCHE 2 PAVEMENT CORES
- BOREHOLE WITH MONITORING STATION

TRANCHE 1 COORDINATES

DRA01	Position X	Position Y
TVTH201	635493	259621
TVTH202	635631	259624
TVBH203	635813	259444
TVBH204	635872	259482
TVBH205	635937	259399
TVTH206	636752	259824
TVBH207	636769	259899
TVTH208	636799	259987
TVBH209	636732	259906
TVBH210	636811	259888
TVTH211	637446	260284
TVTH212	636108	259261

TRANCHE 2 COORDINATES

TVTH213	635415	259700
TVCPT214	635499	259739
TVTH215	635537	259675
TVTH216	635445	259616
TVTH217	635592	259635
TVCPT218	635720	259550
TVCPT219	635754	259512
TVTH220	635784	259506
TVBH221	635809	259510
TVCPT222	635832	259499
TVCPT223	635861	259432
TVCPT224	635925	259421
TVCPT225	635951	259433
TVCPT226	635974	259371
TVBH227	635997	259423
TVTH228	636016	259382
TVTH229	636124	259362
TVBH230	636158	259361
TVTH231	636228	259363
TVTH232	636297	259370
TVCPT233	636395	259401
TVTH234	636400	259510
TVTH235	636458	259426
TVTH236	636561	259499
TVTH237	636662	259608
TVTH238	636716	259710
TVTH239	636831	260047
TVCPT240	636880	260123
TVTH241	636927	260178
TVTH242	637025	260314
TVTH243	637071	260373
TVTH244	637292	260388
TVTH245	637011	260484
TVCPT246	637107	260452
TVCPT247	635832	259461
TVCPT248	635859	259466
TVBH249	635847	259448
TVTH250	635899	259432
TVBH251	635842	259477
TVPC252	635268	259632
TVPC253	635326	259744
TVPC254	635513	259791
TVPC255	635650	259897
TVPC256	636371	259553
TVPC257	636563	259412
TVPC258	636869	260493
TVPC259	636946	260495
TVPC260	637120	260520
TVPC261	637166	260488
TVPC262	637394	260603
TVPC263	637391	260588
TVPC264	637287	260368

REV	DATE	BY	DESCRIPTION	CHK	APP
P06	06/07/2020	PR	LOCATION OF TVTH244 AND TVCPT246 AMENDED AS PER CLIENT REQUEST AND PAVEMENT CORE LABELS ADDED	RG	LB
P05	02/06/2020	PR	TRANCHE 2 GROUND INVESTIGATION TRIAL HOLES, BOREHOLES AND CPT LOCATIONS ADDED	RG	LB
P04	04/02/2020	SL	INFILTRATION BASINS ADDED	RG	LB
P03	28/01/2020	JEY	HALF OF THE BOREHOLES CHANGED TO TRIAL HOLES	RG	LB
P02	20/09/2019	JEY	LAYOUT REVISED AND BOREHOLES AMENDED TO SUIT	RG	LB
P01	18/04/2019	JEY	FIRST ISSUE	LB	LB

DRAWING STATUS: S3 - FOR REVIEW

wsp

62-64 Hills Road, Cambridge, CB2 1LA, UK
T+ 44 (0) 1223 558 050, F+ 44 (0) 1223 558 051
wsp.com

CLIENT: EDF ENERGY

ARCHITECT:

PROJECT: SIZEWELL C TRANSPORT PLANNING

TITLE: BOREHOLE LOCATIONS

SCALE @ A0: 1:2500	CHECKED: LB	APPROVED: LB
PROJECT No: 50400326	DESIGNED: / DRAWN: JEY	DATE: April 2019
DRAWING No: S□C□S□0204□□□000□DRW□SI		REV: P06

FUGRO	Contract Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Location ID **TVTH201**
	Client	NNB Generation Company (SZC) Limited			
	Fugro Reference	G200015U			
	Coordinates (m)	E635492.97 N259620.86	Ground Elevation (m Datum)	8.32	Sheet 1 of 1
	Hole Type	Trial Pit			Status: Final

Equipment

Depth From (m)	Depth To (m)	Hole Type	Date From	Date To	Equipment	Core Barrel	Core Bit	Drilling Crew	Logged By	Remarks
0.00	2.40	TP	12/08/2020	12/08/2020	Machine excavated : 140-LC-7			DS	EMM	

Progress

Date (dd/mm/yyyy)	Time (hh:mm)	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	Weather
12/08/2020	09:25	0.00			Hot with occasional breeze
12/08/2020	10:00	2.40		2.40	

Rotary Details

Depth From (m)	Depth To (m)	Flush Type	Flush Return (%)	Flush Colour	Run Time (hh:mm)

Core Details

Depth From (m)	Depth To (m)	Diameter (mm)

Hole and Casing

Depth To (m)	Hole Diameter (mm)	Depth To (m)	Casing Diameter (mm)

Chiselling / Slow Progress

Depth From (m)	Depth To (m)	Duration (hh:mm)	Tool / Remark

Water Strike

Strike At (m)	Rise To (m)	Time Elapsed (mins)	Casing Depth (m)	Depth Sealed (m)
2.40				

Water Added

Depth From (m)	Depth To (m)

Water Strike Remarks

Groundwater seepage at 2.40m.

General Remarks

1. Prior to excavation, a Cable Avoidance Tool (CAT) survey was undertaken; services were not located.
2. Soakaway testing was carried out on completion of excavation; results reported separately.
3. As-built coordinates and level were not requested; the setting out coordinates and level obtained during PAS survey prior to excavation were used.

Installation

Type	Tip Depth / Distance (m)	Response Zone Top (m)	Response Zone Base (m)	Installation Date

Pipe

ID	Top Depth (m)	Base Depth (m)	Diameter (mm)	Type

Backfill

Depth From (m)	Depth To (m)	Backfill Material	Date
0.00	2.20	Arisings	12/08/2020
2.20	2.40	Gravel	12/08/2020

Notes

- Abbreviations and results data defined in 'Exploratory Location Records Keysheets'

Checked By	CAY/ROR	Elevation Datum	Ordnance Datum (Newlyn)	Grid Coordinate System	OSGB
Template: FGSL/HBSI/FGSL BH Summary.hbt/Config Fugro Rev5/26/06/2019/TS+AW				Print Date	17/12/2020

FUGRO	Contract Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Location ID **TVTH201**
	Client	NNB Generation Company (SZC) Limited			
	Fugro Reference	G200015U			
	Coordinates (m)	E635492.97 N259620.86	Ground Elevation (m Datum)	8.32	Sheet 1 of 1
	Hole Type	Trial Pit / Trench			Status: Final

Sampling and In Situ Testing				Strata Details					Groundwater	
Depth (m)	Type	No.	Test Results	Depth (m)	Strata Descriptions	Depth (Thickness) (m)	Level (m Datum)	Legend	Water Strike	Backfill / Installation
					TOPSOIL. Dark brown slightly gravelly sand with frequent rootlets (<1mm x 10mm) and potatoes (<45mm x 75mm). Sand is fine to coarse. Gravel is subangular and subrounded fine to coarse of flint and sandstone.	(0.30)				
0.35 - 0.50	B	3			0.20m to 0.25m; with 1 No. subrounded cobble (35mm x 100mm x 250mm) of flint.	0.30	8.02			
0.40 - 0.50	D	2			Orangish brown slightly gravelly SAND. Sand is fine to coarse. Gravel is subangular and subrounded fine to coarse of flint and sandstone.					
0.40 - 0.50	ES	1				(0.40)				
0.40	PID		< 0.1 ppm							
0.75 - 1.00	B	7			Yellowish brown very gravelly silty SAND. Sand is fine to coarse. Gravel is subangular and subrounded fine to coarse of flint.	0.70	7.62			
0.90 - 1.00	D	6								
0.90 - 1.00	ES	4								
0.90 - 1.00	ES	5		1						
0.90	PID		< 0.1 ppm							
0.90	PID		< 0.1 ppm							
1.40 - 1.50	D	8								
1.50 - 2.00	B	11				(1.70)				
1.90 - 2.00	D	9		2						
2.30 - 2.40	D	10								
					End of Trial Pit / Trench at 2.40 m	2.40	5.92			
				3						
				4						

Notes	Pit Stability	Plan
- Abbreviations and results data defined on 'Notes on Exploratory Position Records'	Stable	2.50 m 0.60 m → 90°

FUGRO	Contract Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Location ID **TVTH202A**
	Client	NNB Generation Company (SZC) Limited			
	Fugro Reference	G200015U			
	Coordinates (m)	E635630.14 N259625.10	Ground Elevation (m Datum)	5.99	Sheet 1 of 1
	Hole Type	Trial Pit			Status: Final

Equipment

Depth From (m)	Depth To (m)	Hole Type	Date From	Date To	Equipment	Core Barrel	Core Bit	Drilling Crew	Logged By	Remarks
0.00	1.50	TP	08/08/2020	08/08/2020	Machine excavated : 140-LC-7			DS	EMM	

Progress

Date (dd/mm/yyyy)	Time (hh:mm)	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	Weather
08/08/2020	11:00	0.00			Hot and overcast
08/08/2020	11:15	1.50		Dry	

Rotary Details

Depth From (m)	Depth To (m)	Flush Type	Flush Return (%)	Flush Colour	Run Time (hh:mm)

Core Details

Depth From (m)	Depth To (m)	Diameter (mm)

Hole and Casing

Depth To (m)	Hole Diameter (mm)	Depth To (m)	Casing Diameter (mm)

Chiselling / Slow Progress

Depth From (m)	Depth To (m)	Duration (hh:mm)	Tool / Remark

Water Strike

Strike At (m)	Rise To (m)	Time Elapsed (mins)	Casing Depth (m)	Depth Sealed (m)

Water Added

Depth From (m)	Depth To (m)

Water Strike Remarks

Groundwater not encountered during excavation.

General Remarks

1. Relocated from TVTH202 to allow for soakaway testing; sampling not required.
2. Prior to excavation, a Cable Avoidance Tool (CAT) survey was undertaken; services were not located.
3. Soakaway testing was carried out on completion of excavation; results reported separately.

Installation

Type	Tip Depth / Distance (m)	Response Zone Top (m)	Response Zone Base (m)	Installation Date

Pipe

ID	Top Depth (m)	Base Depth (m)	Diameter (mm)	Type

Backfill

Depth From (m)	Depth To (m)	Backfill Material	Date
0.00	1.20	Arisings	08/08/2020
1.20	1.50	Gravel	08/08/2020

Notes

- Abbreviations and results data defined in 'Exploratory Location Records Keysheets'

Checked By	CAY/ROR	Elevation Datum	Ordnance Datum (Newlyn)	Grid Coordinate System	OSGB

Template: FGSL/HBSI/FGSL BH Summary.hbt/Config Fugro Rev5/26/06/2019/TS+AW — Print Date: 17/12/2020

FUGRO	Contract Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Location ID **TVTH202A**
	Client	NNB Generation Company (SZC) Limited			
	Fugro Reference	G200015U			
	Coordinates (m)	E635630.14 N259625.10	Ground Elevation (m Datum)	5.99	Sheet 1 of 1
	Hole Type	Trial Pit / Trench			Status: Final

Sampling and In Situ Testing				Strata Details					Groundwater	
Depth (m)	Type	No.	Test Results	Depth (m)	Strata Descriptions	Depth (Thickness) (m)	Level (m Datum)	Legend	Water Strike	Backfill / Installation
					TOPSOIL. Dark brown slightly gravelly sand with frequent rootlets (<1mm x 20mm). Sand is fine to coarse. Gravel is subangular and subrounded fine to coarse of sandstone.	(0.20)				
					0.10m to 0.20m; reddish brown.	0.20	5.79			
					Orangish brown slightly gravelly SAND. Sand is fine to coarse. Gravel is subangular and subrounded fine to coarse of chalk and flint.	(0.90)				
				1		1.10	4.89			
					Yellowish brown slightly gravelly SAND. Sand is medium and coarse. Gravel is subangular to rounded fine to coarse of chalk, flint and sandstone.	(0.40)				
					End of Trial Pit / Trench at 1.50 m	1.50	4.49			
				2						
				3						
				4						

Notes	Pit Stability	Plan
- Abbreviations and results data defined on 'Notes on Exploratory Position Records'	Stable	2.00 m 0.60 m → 90°

Contract Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Location ID **TVTH206**
Client	NNB Generation Company (SZC) Limited			
Fugro Reference	G200015U			
Coordinates (m)	E636752.02 N259824.10	Ground Elevation (m Datum)	23.40	Sheet 1 of 1
Hole Type	Trial Pit			Status: Final

Equipment

Depth From (m)	Depth To (m)	Hole Type	Date From	Date To	Equipment	Core Barrel	Core Bit	Drilling Crew	Logged By	Remarks
0.00	2.00	TP	16/07/2020	16/07/2020	Machine excavated : 140-LC-7			SA	EMM/SW	

Progress

Date (dd/mm/yyyy)	Time (hh:mm)	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	Weather
16/07/2020	13:15	0.00			Showers, cloud and sunny spells
16/07/2020	13:45	2.00		Dry	

Rotary Details

Depth From (m)	Depth To (m)	Flush Type	Flush Return (%)	Flush Colour	Run Time (hh:mm)

Core Details

Depth From (m)	Depth To (m)	Diameter (mm)

Hole and Casing

Depth To (m)	Hole Diameter (mm)	Depth To (m)	Casing Diameter (mm)

Chiselling / Slow Progress

Depth From (m)	Depth To (m)	Duration (hh:mm)	Tool / Remark

Water Strike

Strike At (m)	Rise To (m)	Time Elapsed (mins)	Casing Depth (m)	Depth Sealed (m)

Water Added

Depth From (m)	Depth To (m)

Water Strike Remarks

Groundwater not encountered during excavation.

General Remarks

1. Prior to excavation, a Cable Avoidance Tool (CAT) survey was undertaken; services were not located.
2. Soakaway testing was carried out on completion of excavation; results reported separately.
3. As-built coordinates and level were not requested; the setting out coordinates and level obtained during PAS survey prior to excavation were used.

Installation

Type	Tip Depth / Distance (m)	Response Zone Top (m)	Response Zone Base (m)	Installation Date

Pipe

ID	Top Depth (m)	Base Depth (m)	Diameter (mm)	Type

Backfill

Depth From (m)	Depth To (m)	Backfill Material	Date
0.00	2.00	Arisings	16/07/2020

Notes

- Abbreviations and results data defined in 'Exploratory Location Records Keysheets'

Checked By	ROR	Elevation Datum	Ordnance Datum (Newlyn)	Grid Coordinate System	OSGB

Template: FGSL/HBSI/FGSL BH Summary.hbt/Config Fugro Rev5/26/06/2019/TS+AW — Print Date: 17/12/2020

FUGRO	Contract Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Location ID **TVTH206**
	Client	NNB Generation Company (SZC) Limited			
	Fugro Reference	G200015U			
	Coordinates (m)	E636752.02 N259824.10	Ground Elevation (m Datum)	23.40	Sheet 1 of 1
	Hole Type	Trial Pit / Trench			Status: Final

Sampling and In Situ Testing				Strata Details					Groundwater	
Depth (m)	Type	No.	Test Results	Depth (m)	Strata Descriptions	Depth (Thickness) (m)	Level (m Datum)	Legend	Water Strike	Backfill / Installation
					TOPSOIL. Brown slightly gravelly sand with abundant rootlets (<1mm x 12mm). Sand is fine to coarse. Gravel is subangular and subrounded fine to coarse of flint.	(0.30)				
0.35 - 0.50	B	3				0.30	23.10			
0.40 - 0.50	D	2			Orangish brown slightly gravelly very clayey SAND with frequent nodules/pockets of (dried) sandy to very sandy silty clay, and with some rootlets (<1mm x 10mm). Sand is fine to coarse. Gravel is subangular and subrounded fine to coarse of flint.					
0.40 - 0.50	ES	1				(0.50)				
0.40	PID		< 0.1 ppm							
						0.80	22.60			
0.85 - 1.00	B	7			Stiff orangish brown slightly sandy gravelly CLAY with very thin beds of medium and coarse sand. Sand is fine to coarse. Gravel is subangular to rounded fine to coarse of mainly flint.					
0.90 - 1.00	D	6								
0.90 - 1.00	ES	4								
0.90 - 1.00	ES	5		1						
0.90	PID		< 0.1 ppm							
0.90	PID		< 0.1 ppm							
1.40 - 1.50	D	8				(1.20)				
1.50 - 2.00	B	10			1.70m to 2.00m; very stiff					
1.90 - 2.00	D	9								
				2	End of Trial Pit / Trench at 2.00 m	2.00	21.40			
				3						
				4						

Notes	Pit Stability	Plan
- Abbreviations and results data defined on 'Notes on Exploratory Position Records'	Stable	3.00 m 0.60 m → 185°

Template: FGSL/HBSI/FGSL Trial Pit.hbt/Config Fugro Rev5/05/12/2019/TS-AW

Print Date: 17/12/2020

FUGRO	Contract Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Location ID **TVTH208**
	Client	NNB Generation Company (SZC) Limited			
	Fugro Reference	G200015U			
	Coordinates (m)	E636798.99 N259987.06	Ground Elevation (m Datum)	23.72	Sheet 1 of 1
	Hole Type	Trial Pit			Status: Final

Equipment

Depth From (m)	Depth To (m)	Hole Type	Date From	Date To	Equipment	Core Barrel	Core Bit	Drilling Crew	Logged By	Remarks
0.00	2.00	TP	16/07/2020	21/07/2020	Machine excavated : 140-LC-7			SA	EMM/SW	

Progress

Date (dd/mm/yyyy)	Time (hh:mm)	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	Weather
16/07/2020	16:10	0.00			Sunny with showers
16/07/2020	17:55	2.00		Dry	

Rotary Details

Depth From (m)	Depth To (m)	Flush Type	Flush Return (%)	Flush Colour	Run Time (hh:mm)

Core Details

Depth From (m)	Depth To (m)	Diameter (mm)

Hole and Casing

Depth To (m)	Hole Diameter (mm)	Depth To (m)	Casing Diameter (mm)

Chiselling / Slow Progress

Depth From (m)	Depth To (m)	Duration (hh:mm)	Tool / Remark

Water Strike

Strike At (m)	Rise To (m)	Time Elapsed (mins)	Casing Depth (m)	Depth Sealed (m)

Water Added

Depth From (m)	Depth To (m)

Water Strike Remarks

Groundwater not encountered during excavation.

General Remarks

1. Prior to excavation, a Cable Avoidance Tool (CAT) survey was undertaken; services were not located.
2. Soakaway testing was carried out on completion of excavation; results reported separately.
3. As-built coordinates and level were not requested; the setting out coordinates and level obtained during PAS survey prior to excavation were used.

Installation

Type	Tip Depth / Distance (m)	Response Zone Top (m)	Response Zone Base (m)	Installation Date

Pipe

ID	Top Depth (m)	Base Depth (m)	Diameter (mm)	Type

Backfill

Depth From (m)	Depth To (m)	Backfill Material	Date
0.00	2.00	Arisings	21/07/2020

Notes

- Abbreviations and results data defined in 'Exploratory Location Records Keysheets'

Checked By	ROR	Elevation Datum	Ordnance Datum (Newlyn)	Grid Coordinate System	OSGB
Template: FGSL/HBSI/FGSL BH Summary.hbt/Config Fugro Rev5/26/06/2019/TS+AW				Print Date	17/12/2020

FUGRO	Contract Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Location ID **TVTH208**
	Client	NNB Generation Company (SZC) Limited			
	Fugro Reference	G200015U			
	Coordinates (m)	E636798.99 N259987.06	Ground Elevation (m Datum)	23.72	Sheet 1 of 1
	Hole Type	Trial Pit / Trench			Status: Final

Sampling and In Situ Testing				Strata Details					Groundwater	
Depth (m)	Type	No.	Test Results	Depth (m)	Strata Descriptions	Depth (Thickness) (m)	Level (m Datum)	Legend	Water Strike	Backfill / Installation
					TOPSOIL. Dark brown slightly gravelly sand with abundant rootlets (<1mm x 18mm). Sand is fine to coarse. Gravel is subangular and subrounded fine to coarse of flint.	(0.20)				
0.25 - 0.50	B	3				0.20	23.52			
0.40 - 0.50	D	2			Orangish brown friable slightly gravelly very sandy CLAY with occasional and some rootlets (<1mm x 11mm). Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of flint and sandstone.					
0.40 - 0.50	ES	1								
0.40	PID		< 0.1 ppm			(0.60)				
						0.80	22.92			
0.85 - 1.00	B	7			Orangish brown slightly gravelly SAND. Sand is medium and coarse. Gravel is angular to rounded fine to coarse of flint and sandstone.					
0.90 - 1.00	D	6								
0.90 - 1.00	ES	4		1						
0.90 - 1.00	ES	5				(0.40)				
0.90	PID		< 0.1 ppm							
0.90	PID		< 0.1 ppm							
						1.20	22.52			
					Stiff and very stiff brownish grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to rounded fine and medium of flint and sandstone.					
1.40 - 1.50	D	8								
1.50 - 2.00	B	10			1.45m to 1.50m; with 1 No. angular boulder (100mm x 200mm x 210mm).					
						(0.80)				
1.90 - 2.00	D	9								
				2	End of Trial Pit / Trench at 2.00 m	2.00	21.72			
				3						
				4						

Notes	Pit Stability	Plan
- Abbreviations and results data defined on 'Notes on Exploratory Position Records'	Stable	3.00 m 0.60 m → 270°

Template: FGSL/HBSI/FGSL Trial Pit.hbt/Config Fugro Rev5/05/12/2019/TS-AW

Print Date: 17/12/2020

FUGRO	Contract Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Location ID **TVTH211A**
	Client	NNB Generation Company (SZC) Limited			
	Fugro Reference	G200015U			
	Coordinates (m)	E637446.96 N260286.88	Ground Elevation (m Datum)	13.29	Sheet 1 of 1
	Hole Type	Trial Pit			Status: Final

Equipment

Depth From (m)	Depth To (m)	Hole Type	Date From	Date To	Equipment	Core Barrel	Core Bit	Drilling Crew	Logged By	Remarks
0.00	3.00	TP	07/09/2020	07/09/2020	Machine excavated : 140-LC-7			DS	JB	

Progress

Date (dd/mm/yyyy)	Time (hh:mm)	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	Weather
07/09/2020	09:53	0.00			Overcast
07/09/2020	10:37	3.00		Dry	

Rotary Details

Depth From (m)	Depth To (m)	Flush Type	Flush Return (%)	Flush Colour	Run Time (hh:mm)

Core Details

Depth From (m)	Depth To (m)	Diameter (mm)

Hole and Casing

Depth To (m)	Hole Diameter (mm)	Depth To (m)	Casing Diameter (mm)

Chiselling / Slow Progress

Depth From (m)	Depth To (m)	Duration (hh:mm)	Tool / Remark

Water Strike

Strike At (m)	Rise To (m)	Time Elapsed (mins)	Casing Depth (m)	Depth Sealed (m)

Water Added

Depth From (m)	Depth To (m)

Water Strike Remarks

Groundwater not encountered during excavation.

General Remarks

1. Relocated from TVTH211, due to insufficient soakaway test data from TVTH211. Sampling not required.
2. Prior to excavation, a Cable Avoidance Tool (CAT) survey was undertaken; services were not located.
3. Soakaway testing was carried out on completion of excavation; results reported separately.

Installation

Type	Tip Depth / Distance (m)	Response Zone Top (m)	Response Zone Base (m)	Installation Date

Pipe

ID	Top Depth (m)	Base Depth (m)	Diameter (mm)	Type

Backfill

Depth From (m)	Depth To (m)	Backfill Material	Date
0.00	2.50	Arisings	07/09/2020
2.50	3.00	Gravel	07/09/2020

Notes

- Abbreviations and results data defined in 'Exploratory Location Records Keysheets'

Checked By	ROR	Elevation Datum	Ordnance Datum (Newlyn)	Grid Coordinate System	OSGB

Template: FGSL/HBSI/FGSL BH Summary.hbt/Config Fugro Rev5/26/06/2019/TS+AW — Print Date: 17/12/2020

FUGRO	Contract Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Location ID **TVTH211A**
	Client	NNB Generation Company (SZC) Limited			
	Fugro Reference	G200015U			
	Coordinates (m)	E637446.96 N260286.88	Ground Elevation (m Datum)	13.29	Sheet 1 of 1
	Hole Type	Trial Pit / Trench			Status: Final

Sampling and In Situ Testing				Strata Details					Groundwater	
Depth (m)	Type	No.	Test Results	Depth (m)	Strata Descriptions	Depth (Thickness) (m)	Level (m Datum)	Legend	Water Strike	Backfill / Installation
					TOPSOIL. Dark brown gravelly slightly clayey sand with abundant rootlets (<1mm), occasional plant remains (<4mm x 4mm x 15mm) and occasional pockets (<60mm x 200mm x 250mm) of firm brown slightly gravelly sandy clay. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of chalk, flint and sandstone.	(0.30)				
						0.30	12.99			
					Dark brown and orangish brown gravelly clayey SAND with occasional rootlets (<1mm) and rare fragments (<5mm x 5mm x 38mm) of partially decayed plant remains. Sand is fine to coarse. Gravel is subangular to rounded fine to coarse of chalk and flint, with occasional sandstone.	(0.70)				
				1		1.00	12.29			
					Dark grey mottled black slightly gravelly clayey SAND with abundant fragments (<4mm x 4mm x 45mm, occasionally <60mm x 60mm x 760mm) of partially decayed plant remains. Sand is fine and medium. Gravel is angular and subangular fine and medium of flint. Strong organic odour.					
					At 1.50m; with 1 No. fragment (350mm x 420mm x 630mm) of partially decayed plant remain.	(1.20)				
				2		2.20	11.09			
					Orangish brown gravelly silty SAND. Sand is fine to coarse, mainly fine and medium. Gravel is subangular and subrounded fine and medium of chalk, flint and sandstone.	(0.80)				
				3	End of Trial Pit / Trench at 3.00 m	3.00	10.29			
				4						

Notes	Pit Stability	Plan
- Abbreviations and results data defined on 'Notes on Exploratory Position Records'	Stable	3.00 m 0.60 m → 98°

FUGRO	Contract Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Location ID **TVTH212A**
	Client	NNB Generation Company (SZC) Limited			
	Fugro Reference	G200015U			
	Coordinates (m)	E636133.31 N259302.49	Ground Elevation (m Datum)	17.98	Sheet 1 of 1
	Hole Type	Trial Pit			Status: Final

Equipment

Depth From (m)	Depth To (m)	Hole Type	Date From	Date To	Equipment	Core Barrel	Core Bit	Drilling Crew	Logged By	Remarks
0.00	1.70	TP	08/09/2020	08/09/2020	Machine excavated : 140-LC-7			DS	JB	

Progress

Date (dd/mm/yyyy)	Time (hh:mm)	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	Weather
08/09/2020	09:32	0.00			Overcast
08/09/2020	13:08	1.70		Dry	

Rotary Details

Depth From (m)	Depth To (m)	Flush Type	Flush Return (%)	Flush Colour	Run Time (hh:mm)

Core Details

Depth From (m)	Depth To (m)	Diameter (mm)

Hole and Casing

Depth To (m)	Hole Diameter (mm)	Depth To (m)	Casing Diameter (mm)

Chiselling / Slow Progress

Depth From (m)	Depth To (m)	Duration (hh:mm)	Tool / Remark

Water Strike

Strike At (m)	Rise To (m)	Time Elapsed (mins)	Casing Depth (m)	Depth Sealed (m)

Water Added

Depth From (m)	Depth To (m)

Water Strike Remarks

Groundwater not encountered during excavation.

General Remarks

1. Relocated from TVTH212, due to insufficient soakaway test data from TVTH212; sampling not required.
2. Prior to excavation, a Cable Avoidance Tool (CAT) survey was undertaken; services were not located.
3. Trial pit terminated at a depth of 1.70m due to collapse of Faces B and D.
4. Soakaway testing was carried out on completion of excavation; results reported separately.

Installation

Type	Tip Depth / Distance (m)	Response Zone Top (m)	Response Zone Base (m)	Installation Date

Pipe

ID	Top Depth (m)	Base Depth (m)	Diameter (mm)	Type

Backfill

Depth From (m)	Depth To (m)	Backfill Material	Date
0.00	1.10	Arisings	08/09/2020
1.10	1.70	Gravel	08/09/2020

Notes

- Abbreviations and results data defined in 'Exploratory Location Records Keysheets'

Checked By	ROR	Elevation Datum	Ordnance Datum (Newlyn)	Grid Coordinate System	OSGB
Template: FGSL/HBSI/FGSL BH Summary.hbt/Config Fugro Rev5/26/06/2019/TS+AW				Print Date	17/12/2020

FUGRO	Contract Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Location ID **TVTH212A**
	Client	NNB Generation Company (SZC) Limited			
	Fugro Reference	G200015U			
	Coordinates (m)	E636133.31 N259302.49	Ground Elevation (m Datum)	17.98	Sheet 1 of 1
	Hole Type	Trial Pit / Trench			Status: Final

Sampling and In Situ Testing				Strata Details					Groundwater	
Depth (m)	Type	No.	Test Results	Depth (m)	Strata Descriptions	Depth (Thickness) (m)	Level (m Datum)	Legend	Water Strike	Backfill / Installation
					TOPSOIL. Brown gravelly slightly silty sand with abundant rootlets (<1mm). Sand is fine to coarse. Gravel is subangular and subrounded fine to coarse of sandstone with occasional flint.	(0.30)				
					Reddish brown gravelly slightly silty SAND. Sand is fine to coarse, mainly fine and medium. Gravel is angular to subrounded fine to coarse of sandstone with occasional flint and rare chalk.	0.30 (0.50)	17.68			
				1	Reddish brown slightly gravelly slightly silty SAND. Sand is fine to coarse, mainly fine and medium. Gravel is angular to subrounded fine to coarse of sandstone with occasional flint and rare chalk.	0.80 (0.90)	17.18			
					End of Trial Pit / Trench at 1.70 m	1.70	16.28			
				2						
				3						
				4						

Notes	Pit Stability	Plan
- Abbreviations and results data defined on 'Notes on Exploratory Position Records'	Unstable	2.80 m 0.60 m → 135°

F.3 Infiltration/Soakaway Tests

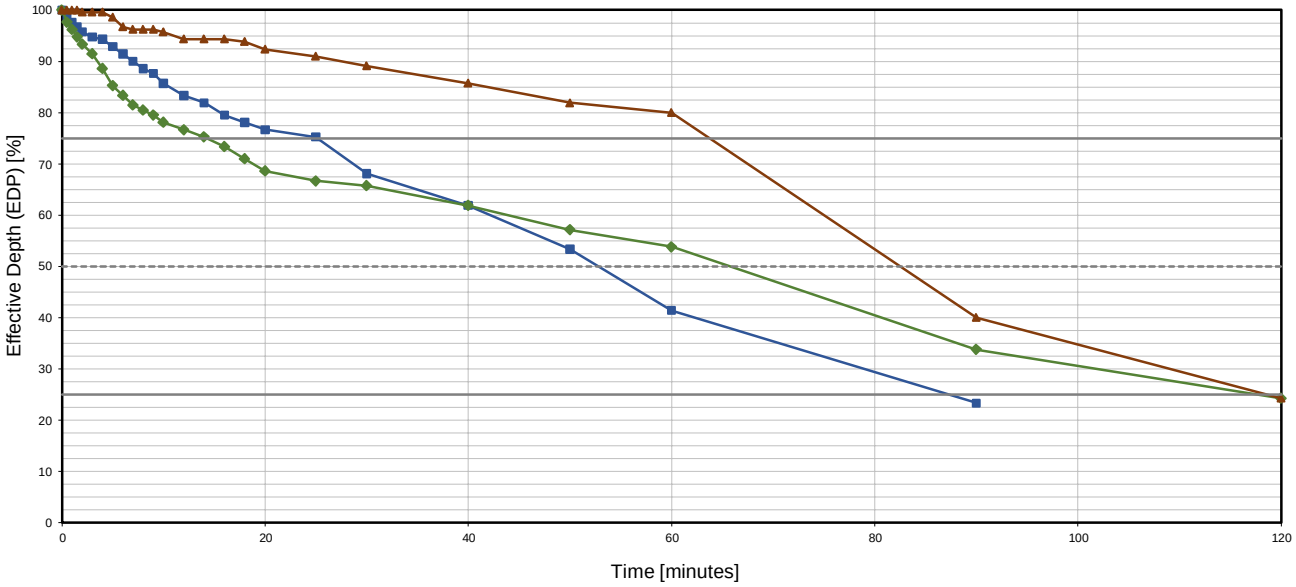
Title	Reference
Soakaway Test Results	Referenced by Location ID

NNB GENERATION COMPANY (SZC) LIMITED
SIZEWELL ROAD SCHEMES - INFILTRATION TESTING AND GEOTECHNICAL INVESTIGATION

SOAKAWAY TEST RECORD

Method BRE 365 2016

Date	12/08/2020	Operator	EMM	Pit Depth	2.40 m	Hole No.	TVTH201



Test 1			Test 2			Test 3		
Start Time =	10:36		Start Time =	12:12		Start Time =	14:20	
Test Top =	0.30	m BGL	Test Top =	0.30	m BGL	Test Top =	0.30	m BGL
Test Base =	2.40	m BGL	Test Base =	2.40	m BGL	Test Base =	2.40	m BGL
75% EDP =	0.83	m BGL	75% EDP =	0.83	m BGL	75% EDP =	0.83	m BGL
50% EDP =	1.35	m BGL	50% EDP =	1.35	m BGL	50% EDP =	1.35	m BGL
25% EDP =	1.88	m BGL	25% EDP =	1.88	m BGL	25% EDP =	1.88	m BGL

Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]
00:00:00		0.30	100	00:00:00		0.30	100	00:00:00		0.30	100
00:00:30		0.33	99	00:00:30		0.35	98	00:00:30		0.30	100
00:01:00		0.35	98	00:01:00		0.38	96	00:01:00		0.30	100
00:01:30		0.37	97	00:01:30		0.41	95	00:01:30		0.30	100
00:02:00		0.39	96	00:02:00		0.44	93	00:02:00		0.31	100
00:03:00		0.41	95	00:03:00		0.48	91	00:03:00		0.31	100
00:04:00		0.42	94	00:04:00		0.54	89	00:04:00		0.31	100
00:05:00		0.45	93	00:05:00		0.61	85	00:05:00		0.33	99
00:06:00		0.48	91	00:06:00		0.65	83	00:06:00		0.37	97
00:07:00		0.51	90	00:07:00		0.69	81	00:07:00		0.38	96
00:08:00		0.54	89	00:08:00		0.71	80	00:08:00		0.38	96
00:09:00		0.56	88	00:09:00		0.73	80	00:09:00		0.38	96
00:10:00		0.60	86	00:10:00		0.76	78	00:10:00		0.39	96
00:12:00		0.65	83	00:12:00		0.79	77	00:12:00		0.42	94
00:14:00		0.68	82	00:14:00		0.82	75	00:14:00		0.42	94
00:16:00		0.73	80	00:16:00		0.86	73	00:16:00		0.42	94
00:18:00		0.76	78	00:18:00		0.91	71	00:18:00		0.43	94
00:20:00		0.79	77	00:20:00		0.96	69	00:20:00		0.46	92
00:25:00		0.82	75	00:25:00		1.00	67	00:25:00		0.49	91
00:30:00		0.97	68	00:30:00		1.02	66	00:30:00		0.53	89
00:40:00		1.10	62	00:40:00		1.10	62	00:40:00		0.60	86
00:50:00		1.28	53	00:50:00		1.20	57	00:50:00		0.68	82
01:00:00		1.53	41	01:00:00		1.27	54	01:00:00		0.72	80
01:30:00		1.91	23	01:30:00		1.69	34	01:30:00		1.56	40
				02:00:00		1.89	24	02:00:00		1.89	24

Datum (-ve denotes AGL) = 0.00 m BGL
Ground Level taken as Datum.

Input by AH 19/08/2020 Checked by CAY 08/12/2020 Approved by NHA 14/12/2020

Contract No. G200015U

SOAKAWAY TEST RECORD							Method BRE 365 2016
Date	12/08/2020	Operator	EMM	Pit Depth	2.40 m	Hole No.	TVTH201

Test Details

Datum (-ve denotes AGL) =	0.00 m BGL	Well Screen	
		Well screen not used	
Pit Length =	2.50 m	Filter Material	
Pit Width =	0.60 m	Assumed Solid Fraction =	61.11 %
Pit Depth =	2.40 m BGL	Assumed Porosity =	38.89 %

Weather: Hot.

Geology: SAND.

Remarks

Gravel filled up to 0.78m BGL to support the pit.
Water seepage at 2.40m BGL noted during pitting.
Water added to the pit to 0.30m BGL (Test 1, Test 2 and Test 3).

Calculation

Test 1 ■			Test 2 ◆			Test 3 ▲		
Start Time =	10:36		Start Time =	12:12		Start Time =	14:20	
Test Top =	0.30	m BGL	Test Top =	0.30	m BGL	Test Top =	0.30	m BGL
Test Base =	2.40	m BGL	Test Base =	2.40	m BGL	Test Base =	2.40	m BGL
EDP =	2.10	m	EDP =	2.10	m	EDP =	2.10	m
75% EDP =	0.83	m BGL	75% EDP =	0.83	m BGL	75% EDP =	0.83	m BGL
50% EDP =	1.35	m BGL	50% EDP =	1.35	m BGL	50% EDP =	1.35	m BGL
25% EDP =	1.88	m BGL	25% EDP =	1.88	m BGL	25% EDP =	1.88	m BGL
V =	3.15	m^3	V =	3.15	m^3	V =	3.15	m^3
Vg =	1.49	m^3	Vg =	1.49	m^3	Vg =	1.49	m^3
Vp =	1.67	m^3	Vp =	1.67	m^3	Vp =	1.67	m^3
Vp75-25 =	0.61	m^3	Vp75-25 =	0.61	m^3	Vp75-25 =	0.61	m^3
ap =	8.01	m^2	ap =	8.01	m^2	ap =	8.01	m^2
Tp75 =	1500	s	Tp75 =	840	s	Tp75 =	3828	s
Tp25 =	5232	s	Tp25 =	7080	s	Tp25 =	7110	s
Infiltration Rate, f =	2.05E-05	m/s	Infiltration Rate, f =	1.23E-05	m/s	Infiltration Rate, f =	2.33E-05	m/s

Notes

Pit sides are assumed to be vertical; dimensions at mid-depth of pit used in general.

m AGL/BGL = metres above / below ground level;
m BDL = metres below datum level.

Effective depth of soakaway (EDP) is calculated from the initial water level to the base of hole.

V is the effective storage volume of water in the hole (ESV) when gravel fill not used; Vg is the effective volume taken up by the gravel solid;
Vp is the ESV, less the volume of the gravel fraction.
Vp75-25 is the ESV between 75% and 25% effective depth, less the volume of the gravel fraction; Vp75-50 is used when 25% EDP was not reached.

ap is the internal surface area of the pit including base area during the test.

Tp75 is time at 75% EDP; Tp50 is the time at 50% EDP; Tp25 is time at 25% EDP.
Tp75-25 is the assessed time for water level to fall from 75% to 25% EDP; Tp75-50 is used when 25% EDP was not reached.

$$Soil\ Infiltration\ rate, f = \frac{Vp_{75-25}}{ap \times Tp_{75-25}} \quad \text{or} \quad Soil\ Infiltration\ rate, f = \frac{Vp_{75-50}}{ap \times Tp_{75-50}}$$

Input by AH 19/08/2020 Checked by CAY 08/12/2020 Approved by NHA 14/12/2020

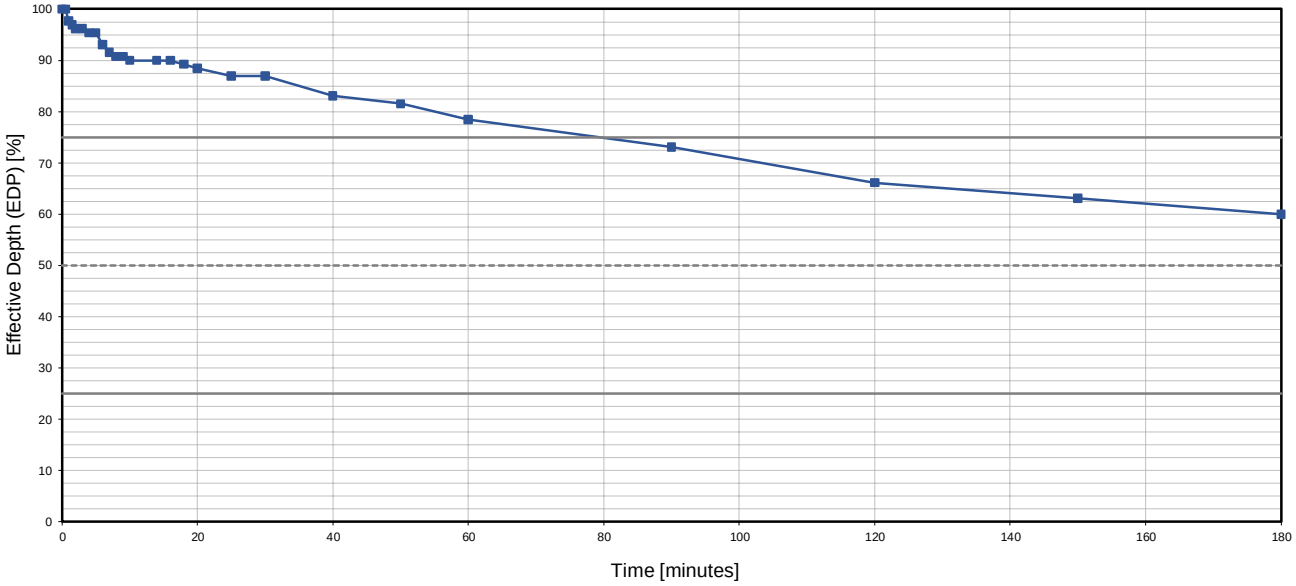
Contract No. G200015U

NNB GENERATION COMPANY (SZC) LIMITED
SIZEWELL ROAD SCHEMES - INFILTRATION TESTING AND GEOTECHNICAL INVESTIGATION

SOAKAWAY TEST RECORD

Method BRE 365 2016

Date	08/08/2020	Operator	EMM	Pit Depth	1.50 m	Hole No.	TVTH202A



Test 1			Test 2			Test 3		
Start Time =	12:25		Start Time =			Start Time =		
Test Top =	0.20	m BGL	Test Top =		m BGL	Test Top =		m BGL
Test Base =	1.50	m BGL	Test Base =		m BGL	Test Base =		m BGL
75% EDP =	0.53	m BGL	75% EDP =		m BGL	75% EDP =		m BGL
50% EDP =	0.85	m BGL	50% EDP =		m BGL	50% EDP =		m BGL
25% EDP =	1.18	m BGL	25% EDP =		m BGL	25% EDP =		m BGL

Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]
00:00:00	0.79	0.20	100	00:00:00				00:00:00			
00:00:30	0.79	0.20	100	00:00:30				00:00:30			
00:01:00	0.82	0.23	98	00:01:00				00:01:00			
00:01:30	0.83	0.24	97	00:01:30				00:01:30			
00:02:00	0.84	0.25	96	00:02:00				00:02:00			
00:03:00	0.84	0.25	96	00:03:00				00:03:00			
00:04:00	0.85	0.26	95	00:04:00				00:04:00			
00:05:00	0.85	0.26	95	00:05:00				00:05:00			
00:06:00	0.88	0.29	93	00:06:00				00:06:00			
00:07:00	0.90	0.31	92	00:07:00				00:07:00			
00:08:00	0.91	0.32	91	00:08:00				00:08:00			
00:09:00	0.91	0.32	91	00:09:00				00:09:00			
00:10:00	0.92	0.33	90	00:10:00				00:10:00			
00:14:00	0.92	0.33	90	00:12:00				00:12:00			
00:16:00	0.92	0.33	90	00:14:00				00:14:00			
00:18:00	0.93	0.34	89	00:16:00				00:16:00			
00:20:00	0.94	0.35	88	00:18:00				00:18:00			
00:25:00	0.96	0.37	87	00:20:00				00:20:00			
00:30:00	0.96	0.37	87	00:25:00				00:25:00			
00:40:00	1.01	0.42	83	00:30:00				00:30:00			
00:50:00	1.03	0.44	82	00:40:00				00:40:00			
01:00:00	1.07	0.48	78	00:50:00				00:50:00			
01:30:00	1.14	0.55	73	01:00:00				01:00:00			
02:00:00	1.23	0.64	66								
02:30:00	1.27	0.68	63								
03:00:00	1.31	0.72	60								

Datum (-ve denotes AGL) = -0.59 m BGL

Water depth measurements were taken from the Datum Level chosen on field, then converted to referencing Ground Level for calculations.

Input by AH 10/07/2020 Checked by CAY 08/12/2020 Approved by NHA 14/12/2020

Contract No. G200015U

SOAKAWAY TEST RECORD

Method BRE 365 2016

Date	08/08/2020	Operator	EMM	Pit Depth	1.50 m	Hole No.	TVTH202A

Test Details

Datum (-ve denotes AGL) =	-0.59 m BGL	Well Screen	
		Well screen not used	
Pit Length =	2.00 m	Filter Material	
Pit Width =	0.60 m	Assumed Solid Fraction =	61.11 %
Pit Depth =	1.50 m BGL	Assumed Porosity =	38.89 %

Weather: Hot, light wind.

Geology: SAND.

Remarks

Test termination agreed with client representative; Test 2 and Test 3 not required.
Water level did not reach 50% or 25% EDP; infiltration rate cannot be given.

Gravel filled up to 0.70m BGL to support the pit.
Pit was dry before adding water. Water added to the pit to 0.20m BGL (Test 1).
Water depth measurements were taken from top of measuring pipe that stuck up 0.59m AGL.

Calculation

	Test 1 ■		Test 2 ◆			Test 3 ▲		
Start Time =	12:25		Start Time =			Start Time =		
Test Top =	0.20	m BGL	Test Top =		m BGL	Test Top =		m BGL
Test Base =	1.50	m BGL	Test Base =		m BGL	Test Base =		m BGL
EDP =	1.30	m	EDP =		m	EDP =		m
75% EDP =	0.53	m BGL	75% EDP =		m BGL	75% EDP =		m BGL
50% EDP =	0.85	m BGL	50% EDP =		m BGL	50% EDP =		m BGL
25% EDP =	1.18	m BGL	25% EDP =		m BGL	25% EDP =		m BGL
V =	1.56	m^3	V =		m^3	V =		m^3
Vg =	0.59	m^3	Vg =	0.00	m^3	Vg =	0.00	m^3
Vp =	0.97	m^3	Vp =	0.00	m^3	Vp =	0.00	m^3
Vp75-25 =	0.49	m^3	Vp75-25 =		m^3	Vp75-25 =		m^3
ap =	4.58	m^2	ap =		m^2	ap =		m^2
Tp75 =	4800	s	Tp75 =		s	Tp75 =		s
Tp25 =		s	Tp25 =		s	Tp25 =		s
Infiltration Rate, f =		m/s	Infiltration Rate, f =		m/s	Infiltration Rate, f =		m/s

Notes

Pit sides are assumed to be vertical; dimensions at mid-depth of pit used in general.

m AGL/BGL = metres above / below ground level;
m BDL = metres below datum level.

Effective depth of soakaway (EDP) is calculated from the initial water level to the base of hole.

V is the effective storage volume of water in the hole (ESV) when gravel fill not used; Vg is the effective volume taken up by the gravel solid;
Vp is the ESV, less the volume of the gravel fraction.
Vp75-25 is the ESV between 75% and 25% effective depth, less the volume of the gravel fraction; Vp75-50 is used when 25% EDP was not reached.

ap is the internal surface area of the pit including base area during the test.

Tp75 is time at 75% EDP; Tp50 is the time at 50% EDP; Tp25 is time at 25% EDP.
Tp75-25 is the assessed time for water level to fall from 75% to 25% EDP; Tp75-50 is used when 25% EDP was not reached.

$$Soil\ Infiltration\ rate, f = \frac{Vp_{75-25}}{ap \times Tp_{75-25}}$$ or $$Soil\ Infiltration\ rate, f = \frac{Vp_{75-50}}{ap \times Tp_{75-50}}$$

Input by AH 10/07/2020 Checked by CAY 08/12/2020 Approved by NHA 14/12/2020

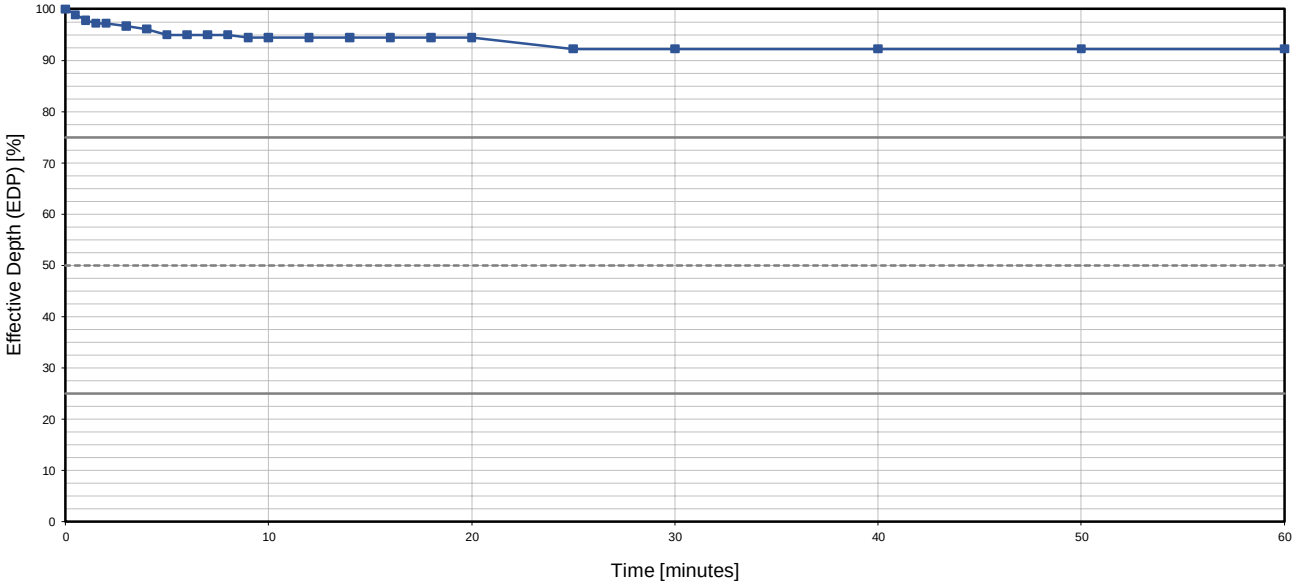
Contract No. G200015U

NNB GENERATION COMPANY (SZC) LIMITED
SIZEWELL ROAD SCHEMES - INFILTRATION TESTING AND GEOTECHNICAL INVESTIGATION

SOAKAWAY TEST RECORD

Method BRE 365 2016

Date	16/07/2020	Operator	EMM	Pit Depth	2.00 m	Hole No.	TVTH206



Test 1			Test 2			Test 3		
Start Time =	14:43		Start Time =			Start Time =		
Test Top =	0.20	m BGL	Test Top =		m BGL	Test Top =		m BGL
Test Base =	2.00	m BGL	Test Base =		m BGL	Test Base =		m BGL
75% EDP =	0.65	m BGL	75% EDP =		m BGL	75% EDP =		m BGL
50% EDP =	1.10	m BGL	50% EDP =		m BGL	50% EDP =		m BGL
25% EDP =	1.55	m BGL	25% EDP =		m BGL	25% EDP =		m BGL

Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]
00:00:00		0.20	100	00:00:00				00:00:00			
00:00:30		0.22	99	00:00:30				00:00:30			
00:01:00		0.24	98	00:01:00				00:01:00			
00:01:30		0.25	97	00:01:30				00:01:30			
00:02:00		0.25	97	00:02:00				00:02:00			
00:03:00		0.26	97	00:03:00				00:03:00			
00:04:00		0.27	96	00:04:00				00:04:00			
00:05:00		0.29	95	00:05:00				00:05:00			
00:06:00		0.29	95	00:06:00				00:06:00			
00:07:00		0.29	95	00:07:00				00:07:00			
00:08:00		0.29	95	00:08:00				00:08:00			
00:09:00		0.30	94	00:09:00				00:09:00			
00:10:00		0.30	94	00:10:00				00:10:00			
00:12:00		0.30	94	00:12:00				00:12:00			
00:14:00		0.30	94	00:14:00				00:14:00			
00:16:00		0.30	94	00:16:00				00:16:00			
00:18:00		0.30	94	00:18:00				00:18:00			
00:20:00		0.30	94	00:20:00				00:20:00			
00:25:00		0.34	92	00:25:00				00:25:00			
00:30:00		0.34	92	00:30:00				00:30:00			
00:40:00		0.34	92	00:40:00				00:40:00			
00:50:00		0.34	92	00:50:00				00:50:00			
01:00:00		0.34	92	01:00:00				01:00:00			

Datum (-ve denotes AGL) = 0.00 m BGL
Ground Level taken as Datum.

Input by AH 20/07/2020 Checked by CAY 08/12/2020 Approved by NHA 14/12/2020

Contract No. G200015U

SOAKAWAY TEST RECORD							Method BRE 365 2016
Date	16/07/2020	Operator	EMM	Pit Depth	2.00 m	Hole No.	TVTH206

Test Details

Datum (-ve denotes AGL) =	0.00	m BGL	Well Screen Well screen not used
Pit Length =	3.00	m	Filter Material
Pit Width =	0.60	m	Filter not used
Pit Depth =	2.00	m BGL	

Weather: Warm, light wind.

Geology: SAND over CLAY.

Remarks

Slow discharge observed; Test 1 terminated at 1 hour; Test 2 and Test 3 not required.
Water level did not reach 75%, 50% and 25% EDP; infiltration rates cannot be given.

Pit was dry before adding water.
Water added to the pit to 0.20m BGL (Test 1).

Calculation

Test 1 ■			Test 2 ◆		Test 3 ▲	
Start Time =	14:43		Start Time =		Start Time =	
Test Top =	0.20	m BGL	Test Top =	m BGL	Test Top =	m BGL
Test Base =	2.00	m BGL	Test Base =	m BGL	Test Base =	m BGL
EDP =	1.80	m	EDP =	m	EDP =	m
75% EDP =	0.65	m BGL	75% EDP =	m BGL	75% EDP =	m BGL
50% EDP =	1.10	m BGL	50% EDP =	m BGL	50% EDP =	m BGL
25% EDP =	1.55	m BGL	25% EDP =	m BGL	25% EDP =	m BGL
V =	3.24	m^3	V =	m^3	V =	m^3
Vg =		m^3	Vg =	m^3	Vg =	m^3
Vp =		m^3	Vp =	m^3	Vp =	m^3
Vp75-25 =	1.62	m^3	Vp75-25 =	m^3	Vp75-25 =	m^3
ap =	8.28	m^2	ap =	m^2	ap =	m^2
Tp75 =		s	Tp75 =	s	Tp75 =	s
Tp25 =		s	Tp25 =	s	Tp25 =	s
Infiltration Rate, f =		m/s	Infiltration Rate, f =	m/s	Infiltration Rate, f =	m/s

Notes

Pit sides are assumed to be vertical; dimensions at mid-depth of pit used in general.

m AGL/BGL = metres above / below ground level;
m BDL = metres below datum level.

Effective depth of soakaway (EDP) is calculated from the initial water level to the base of hole.

V is the effective storage volume of water in the hole (ESV) when gravel fill not used; Vg is the effective volume taken up by the gravel solid;
Vp is the ESV, less the volume of the gravel fraction.
Vp75-25 is the ESV between 75% and 25% effective depth, less the volume of the gravel fraction; Vp75-50 is used when 25% EDP was not reached.

ap is the internal surface area of the pit including base area during the test.

Tp75 is time at 75% EDP; Tp50 is the time at 50% EDP; Tp25 is time at 25% EDP.
Tp75-25 is the assessed time for water level to fall from 75% to 25% EDP; Tp75-50 is used when 25% EDP was not reached.

$$Soil\ Infiltration\ rate, f = \frac{Vp_{75-25}}{ap \times Tp_{75-25}}$$ or $$Soil\ Infiltration\ rate, f = \frac{Vp_{75-50}}{ap \times Tp_{75-50}}$$

Input by AH 20/07/2020 Checked by CAY 08/12/2020 Approved by NHA 14/12/2020

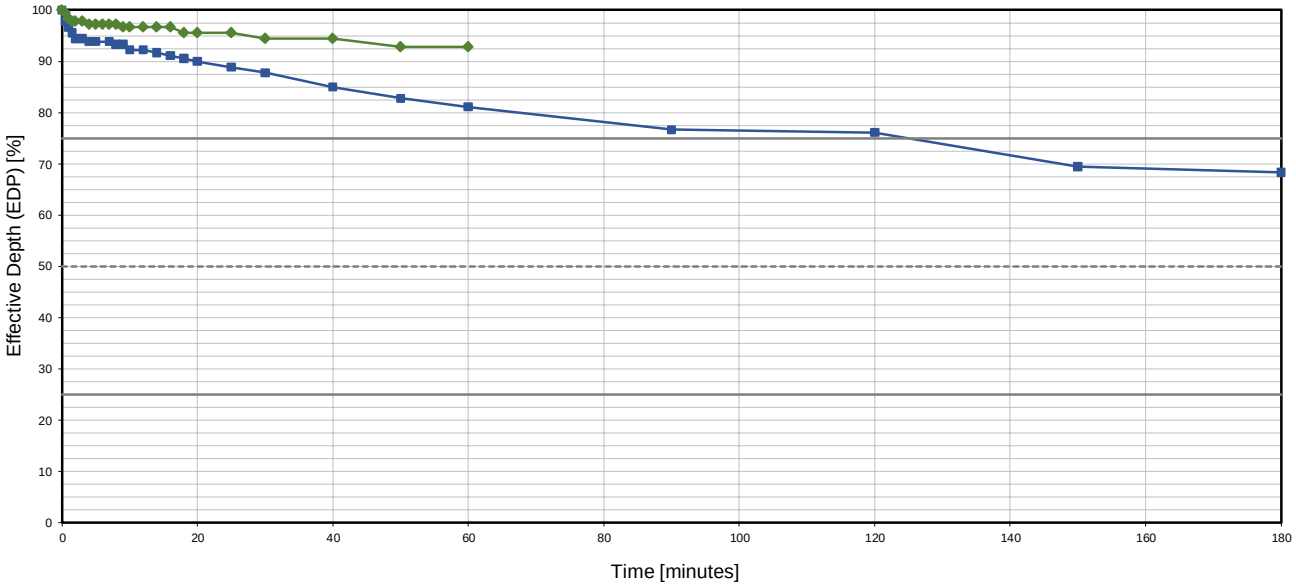
Contract No. G200015U

NNB GENERATION COMPANY (SZC) LIMITED
SIZEWELL ROAD SCHEMES - INFILTRATION TESTING AND GEOTECHNICAL INVESTIGATION

SOAKAWAY TEST RECORD

Method BRE 365 2016

Date	17/07/2020	Operator	EMM	Pit Depth	2.00 m	Hole No.	TVTH208



Test 1			Test 2			Test 3		
Start Time =	08:17		Start Time =	10:12		Start Time =		
Test Top =	0.20	m BGL	Test Top =	0.20	m BGL	Test Top =		m BGL
Test Base =	2.00	m BGL	Test Base =	2.00	m BGL	Test Base =		m BGL
75% EDP =	0.65	m BGL	75% EDP =	0.65	m BGL	75% EDP =		m BGL
50% EDP =	1.10	m BGL	50% EDP =	1.10	m BGL	50% EDP =		m BGL
25% EDP =	1.55	m BGL	25% EDP =	1.55	m BGL	25% EDP =		m BGL

Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]
00:00:00		0.20	100	00:00:00		0.20	100	00:00:00			
00:00:30		0.24	98	00:00:30		0.21	99	00:00:30			
00:01:00		0.26	97	00:01:00		0.23	98	00:01:00			
00:01:30		0.28	96	00:01:30		0.24	98	00:01:30			
00:02:00		0.30	94	00:02:00		0.24	98	00:02:00			
00:03:00		0.30	94	00:03:00		0.24	98	00:03:00			
00:04:00		0.31	94	00:04:00		0.25	97	00:04:00			
00:05:00		0.31	94	00:05:00		0.25	97	00:05:00			
00:07:00		0.31	94	00:06:00		0.25	97	00:06:00			
00:08:00		0.32	93	00:07:00		0.25	97	00:07:00			
00:09:00		0.32	93	00:08:00		0.25	97	00:08:00			
00:10:00		0.34	92	00:09:00		0.26	97	00:09:00			
00:12:00		0.34	92	00:10:00		0.26	97	00:10:00			
00:14:00		0.35	92	00:12:00		0.26	97	00:12:00			
00:16:00		0.36	91	00:14:00		0.26	97	00:14:00			
00:18:00		0.37	91	00:16:00		0.26	97	00:16:00			
00:20:00		0.38	90	00:18:00		0.28	96	00:18:00			
00:25:00		0.40	89	00:20:00		0.28	96	00:20:00			
00:30:00		0.42	88	00:25:00		0.28	96	00:25:00			
00:40:00		0.47	85	00:30:00		0.30	94	00:30:00			
00:50:00		0.51	83	00:40:00		0.30	94	00:40:00			
01:00:00		0.54	81	00:50:00		0.33	93	00:50:00			
01:30:00		0.62	77	01:00:00		0.33	93	01:00:00			
02:00:00		0.63	76								
02:30:00		0.75	69								
03:00:00		0.77	68								

Datum (-ve denotes AGL) = 0.00 m BGL
Ground Level taken as Datum.

Input by AH 10/08/2020 Checked by CAY 08/12/2020 Approved by NHA 14/12/2020

Contract No. G200015U

SOAKAWAY TEST RECORD							Method BRE 365 2016
Date	17/07/2020	Operator	EMM	Pit Depth	2.00 m	Hole No.	TVTH208

Test Details

Datum (-ve denotes AGL) =	0.00	m BGL	Well Screen Well screen not used
Pit Length =	3.00	m	Filter Material
Pit Width =	0.60	m	Filter not used
Pit Depth =	2.00	m BGL	

Weather: Warm, light wind.

Geology: CLAY and SAND.

Remarks

Test 1 undertaken on 17/07/2020; Test 2 undertaken on 20/07/2020.
Slow discharge observed; Test 1 terminated at 3 hour; Test 2 terminated at 1 hour; Test 3 not required.
Water level did not reach 50% or 25% EDP for Test 1; water level did not reach 75%, 50% or 25% EDP for Test 2; infiltration rates cannot be given.

Pit was dry before adding water.
Water added to the pit to 0.20m BGL (Test 1 and Test 2).

Calculation

Test 1 ■			Test 2 ◆			Test 3 ▲	
Start Time =	08:17		Start Time =	10:12		Start Time =	
Test Top =	0.20	m BGL	Test Top =	0.20	m BGL	Test Top =	m BGL
Test Base =	2.00	m BGL	Test Base =	2.00	m BGL	Test Base =	m BGL
EDP =	1.80	m	EDP =	1.80	m	EDP =	m
75% EDP =	0.65	m BGL	75% EDP =	0.65	m BGL	75% EDP =	m BGL
50% EDP =	1.10	m BGL	50% EDP =	1.10	m BGL	50% EDP =	m BGL
25% EDP =	1.55	m BGL	25% EDP =	1.55	m BGL	25% EDP =	m BGL
V =	3.24	m^3	V =	3.24	m^3	V =	m^3
Vg =		m^3	Vg =		m^3	Vg =	m^3
Vp =		m^3	Vp =		m^3	Vp =	m^3
Vp75-25 =	1.62	m^3	Vp75-25 =	1.62	m^3	Vp75-25 =	m^3
ap =	8.28	m^2	ap =	8.28	m^2	ap =	m^2
Tp75 =	7500	s	Tp75 =		s	Tp75 =	s
Tp25 =		s	Tp25 =		s	Tp25 =	s
Infiltration Rate, f =		m/s	Infiltration Rate, f =		m/s	Infiltration Rate, f =	m/s

Notes

Pit sides are assumed to be vertical; dimensions at mid-depth of pit used in general.

m AGL/BGL = metres above / below ground level;
m BDL = metres below datum level.

Effective depth of soakaway (EDP) is calculated from the initial water level to the base of hole.

V is the effective storage volume of water in the hole (ESV) when gravel fill not used; Vg is the effective volume taken up by the gravel solid;
Vp is the ESV, less the volume of the gravel fraction.
Vp75-25 is the ESV between 75% and 25% effective depth, less the volume of the gravel fraction; Vp75-50 is used when 25% EDP was not reached.

ap is the internal surface area of the pit including base area during the test.

Tp75 is time at 75% EDP; Tp50 is the time at 50% EDP; Tp25 is time at 25% EDP.
Tp75-25 is the assessed time for water level to fall from 75% to 25% EDP; Tp75-50 is used when 25% EDP was not reached.

$$Soil\ Infiltration\ rate, f = \frac{Vp_{75-25}}{ap \times Tp_{75-25}}$$ or $$Soil\ Infiltration\ rate, f = \frac{Vp_{75-50}}{ap \times Tp_{75-50}}$$

Input by AH 10/08/2020 Checked by CAY 08/12/2020 Approved by NHA 14/12/2020

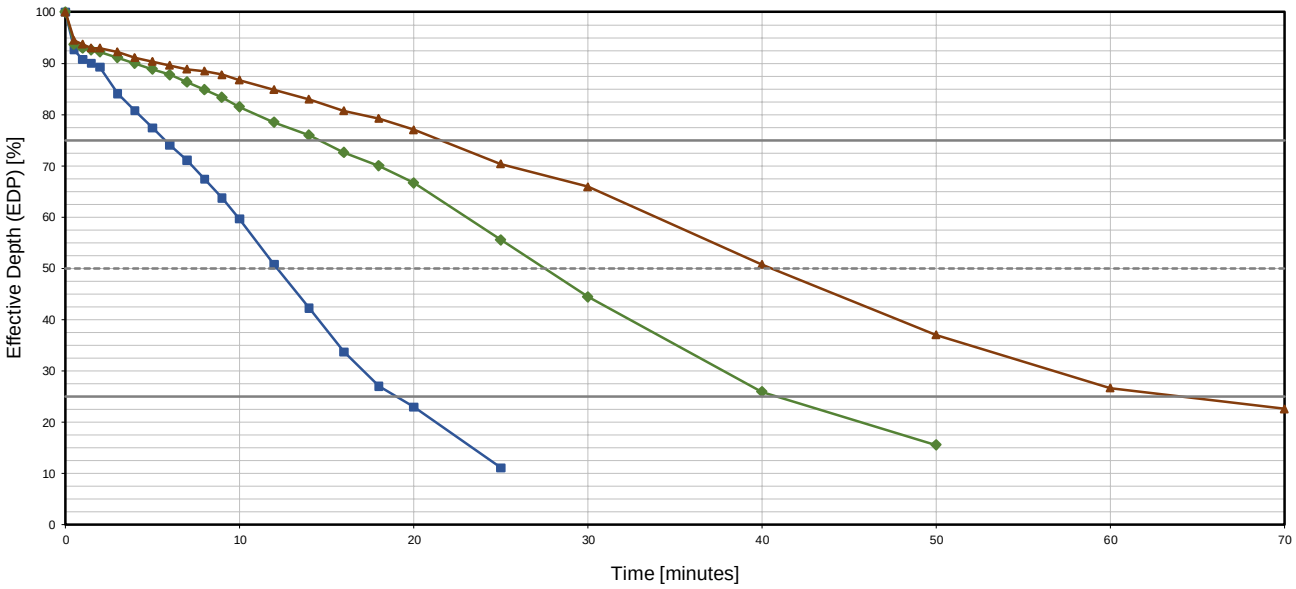
Contract No. G200015U

NNB GENERATION COMPANY (SZC) LIMITED
SIZEWELL ROAD SCHEMES - INFILTRATION TESTING AND GEOTECHNICAL INVESTIGATION

SOAKAWAY TEST RECORD

Method BRE 365 2016

Date	07/09/2020	Operator	JB	Pit Depth	3.00 m	Hole No.	TVTH211A



Test 1			Test 2			Test 3		
Start Time =	11:21		Start Time =	11:50		Start Time =	13:02	
Test Top =	0.30	m BGL	Test Top =	0.30	m BGL	Test Top =	0.30	m BGL
Test Base =	3.00	m BGL	Test Base =	3.00	m BGL	Test Base =	3.00	m BGL
75% EDP =	0.98	m BGL	75% EDP =	0.98	m BGL	75% EDP =	0.98	m BGL
50% EDP =	1.65	m BGL	50% EDP =	1.65	m BGL	50% EDP =	1.65	m BGL
25% EDP =	2.33	m BGL	25% EDP =	2.33	m BGL	25% EDP =	2.33	m BGL

Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]
00:00:00		0.30	100	00:00:00		0.30	100	00:00:00		0.30	100
00:00:30		0.50	93	00:00:30		0.47	94	00:00:30		0.45	94
00:01:00		0.55	91	00:01:00		0.49	93	00:01:00		0.47	94
00:01:30		0.57	90	00:01:30		0.50	93	00:01:30		0.49	93
00:02:00		0.59	89	00:02:00		0.51	92	00:02:00		0.49	93
00:03:00		0.73	84	00:03:00		0.54	91	00:03:00		0.51	92
00:04:00		0.82	81	00:04:00		0.57	90	00:04:00		0.54	91
00:05:00		0.91	77	00:05:00		0.60	89	00:05:00		0.56	90
00:06:00		1.00	74	00:06:00		0.63	88	00:06:00		0.58	90
00:07:00		1.08	71	00:07:00		0.67	86	00:07:00		0.60	89
00:08:00		1.18	67	00:08:00		0.71	85	00:08:00		0.61	89
00:09:00		1.28	64	00:09:00		0.75	83	00:09:00		0.63	88
00:10:00		1.39	60	00:10:00		0.80	81	00:10:00		0.66	87
00:12:00		1.63	51	00:12:00		0.88	79	00:12:00		0.71	85
00:14:00		1.86	42	00:14:00		0.95	76	00:14:00		0.76	83
00:16:00		2.09	34	00:16:00		1.04	73	00:16:00		0.82	81
00:18:00		2.27	27	00:18:00		1.11	70	00:18:00		0.86	79
00:20:00		2.38	23	00:20:00		1.20	67	00:20:00		0.92	77
00:25:00		2.70	11	00:25:00		1.50	56	00:25:00		1.10	70
				00:30:00		1.80	44	00:30:00		1.22	66
				00:40:00		2.30	26	00:40:00		1.63	51
				00:50:00		2.58	16	00:50:00		2.00	37
								01:00:00		2.28	27
								01:10:00		2.39	23

Datum (-ve denotes AGL) = 0.00 m BGL
Ground Level taken as Datum.

Input by AH 10/09/2020 Checked by CAY 08/12/2020 Approved by NHA 14/12/2020

Contract No. G200015U

SOAKAWAY TEST RECORD							Method BRE 365 2016
Date	07/09/2020	Operator	JB	Pit Depth	3.00 m	Hole No.	TVTH211A

Test Details

Datum (-ve denotes AGL) =	0.00 m BGL	Well Screen	
		Well screen not used	
Pit Length =	3.00 m	Filter Material	
Pit Width =	0.60 m	Assumed Solid Fraction =	61.11 %
Pit Depth =	3.00 m BGL	Assumed Porosity =	38.89 %

Weather: Warm, light rain, calm, dry ground.

Geology: SAND.

Remarks

Test undertaken to replace previous data acquired on 06/08/2020 in TVTH211 due to insufficiency.

Gravel filled up to 0.80m BGL to support pit.
Pit was dry before adding water.
Water added to the pit to 0.30m BGL (Test 1, Test 2 and Test 3).

Calculation

Test 1 ■			Test 2 ◆			Test 3 ▲		
Start Time =	11:21		Start Time =	11:50		Start Time =	13:02	
Test Top =	0.30	m BGL	Test Top =	0.30	m BGL	Test Top =	0.30	m BGL
Test Base =	3.00	m BGL	Test Base =	3.00	m BGL	Test Base =	3.00	m BGL
EDP =	2.70	m	EDP =	2.70	m	EDP =	2.70	m
75% EDP =	0.98	m BGL	75% EDP =	0.98	m BGL	75% EDP =	0.98	m BGL
50% EDP =	1.65	m BGL	50% EDP =	1.65	m BGL	50% EDP =	1.65	m BGL
25% EDP =	2.33	m BGL	25% EDP =	2.33	m BGL	25% EDP =	2.33	m BGL
V =	4.86	m^3	V =	4.86	m^3	V =	4.86	m^3
Vg =	2.42	m^3	Vg =	2.42	m^3	Vg =	2.42	m^3
Vp =	2.44	m^3	Vp =	2.44	m^3	Vp =	2.44	m^3
Vp75-25 =	0.95	m^3	Vp75-25 =	0.95	m^3	Vp75-25 =	0.95	m^3
ap =	11.52	m^2	ap =	11.52	m^2	ap =	11.52	m^2
Tp75 =	348	s	Tp75 =	876	s	Tp75 =	1296	s
Tp25 =	1140	s	Tp25 =	2460	s	Tp25 =	3840	s
Infiltration Rate, f =	1.04E-04	m/s	Infiltration Rate, f =	5.18E-05	m/s	Infiltration Rate, f =	3.22E-05	m/s

Notes

Pit sides are assumed to be vertical; dimensions at mid-depth of pit used in general.

m AGL/BGL = metres above / below ground level;
m BDL = metres below datum level.

Effective depth of soakaway (EDP) is calculated from the initial water level to the base of hole.

V is the effective storage volume of water in the hole (ESV) when gravel fill not used; Vg is the effective volume taken up by the gravel solid;
Vp is the ESV, less the volume of the gravel fraction.
Vp75-25 is the ESV between 75% and 25% effective depth, less the volume of the gravel fraction; Vp75-50 is used when 25% EDP was not reached.

ap is the internal surface area of the pit including base area during the test.

Tp75 is time at 75% EDP; Tp50 is the time at 50% EDP; Tp25 is time at 25% EDP.
Tp75-25 is the assessed time for water level to fall from 75% to 25% EDP; Tp75-50 is used when 25% EDP was not reached.

$$Soil\ Infiltration\ rate, f = \frac{Vp_{75-25}}{ap \times Tp_{75-25}}$$ or $$Soil\ Infiltration\ rate, f = \frac{Vp_{75-50}}{ap \times Tp_{75-50}}$$

Input by AH 10/09/2020 Checked by CAY 08/12/2020 Approved by NHA 14/12/2020

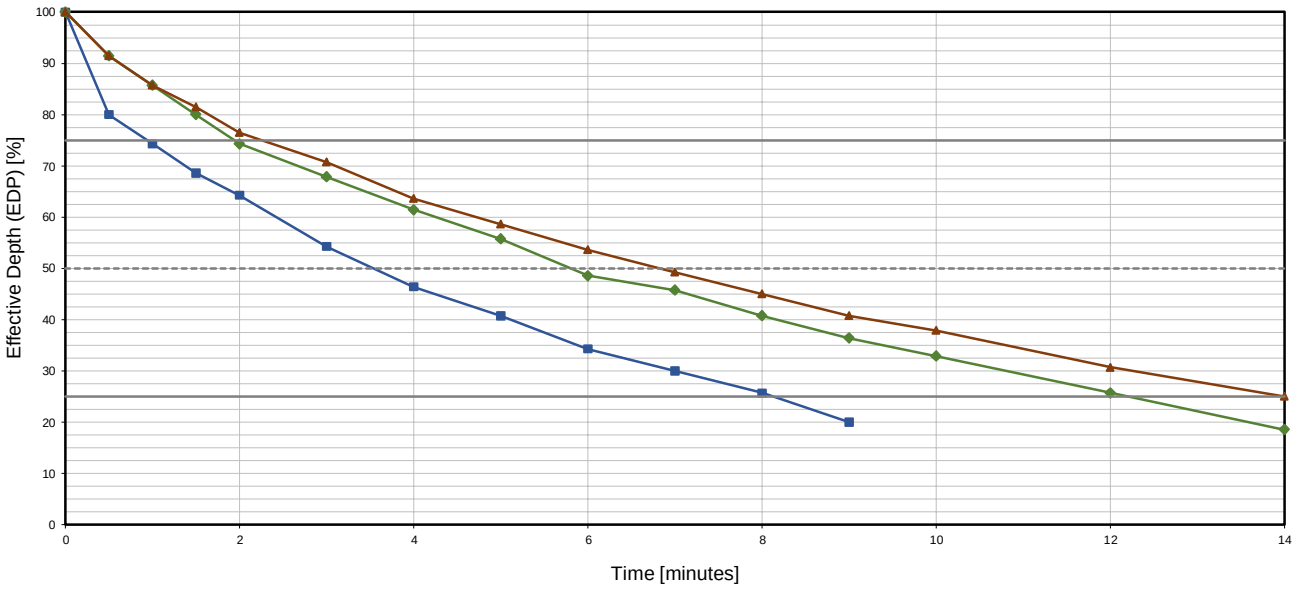
Contract No. G200015U

NNB GENERATION COMPANY (SZC) LIMITED
SIZEWELL ROAD SCHEMES - INFILTRATION TESTING AND GEOTECHNICAL INVESTIGATION

SOAKAWAY TEST RECORD

Method BRE 365 2016

Date	08/09/2020	Operator	JB	Pit Depth	1.70 m	Hole No.	TVTH212A



Test 1			Test 2			Test 3		
Start Time =	11:39		Start Time =	11:52		Start Time =	12:08	
Test Top =	0.30	m BGL	Test Top =	0.30	m BGL	Test Top =	0.30	m BGL
Test Base =	1.70	m BGL	Test Base =	1.70	m BGL	Test Base =	1.70	m BGL
75% EDP =	0.65	m BGL	75% EDP =	0.65	m BGL	75% EDP =	0.65	m BGL
50% EDP =	1.00	m BGL	50% EDP =	1.00	m BGL	50% EDP =	1.00	m BGL
25% EDP =	1.35	m BGL	25% EDP =	1.35	m BGL	25% EDP =	1.35	m BGL

Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]
00:00:00		0.30	100	00:00:00		0.30	100	00:00:00		0.30	100
00:00:30		0.58	80	00:00:30		0.42	91	00:00:30		0.42	91
00:01:00		0.66	74	00:01:00		0.50	86	00:01:00		0.50	86
00:01:30		0.74	69	00:01:30		0.58	80	00:01:30		0.56	81
00:02:00		0.80	64	00:02:00		0.66	74	00:02:00		0.63	76
00:03:00		0.94	54	00:03:00		0.75	68	00:03:00		0.71	71
00:04:00		1.05	46	00:04:00		0.84	61	00:04:00		0.81	64
00:05:00		1.13	41	00:05:00		0.92	56	00:05:00		0.88	59
00:06:00		1.22	34	00:06:00		1.02	49	00:06:00		0.95	54
00:07:00		1.28	30	00:07:00		1.06	46	00:07:00		1.01	49
00:08:00		1.34	26	00:08:00		1.13	41	00:08:00		1.07	45
00:09:00		1.42	20	00:09:00		1.19	36	00:09:00		1.13	41
				00:10:00		1.24	33	00:10:00		1.17	38
				00:12:00		1.34	26	00:12:00		1.27	31
				00:14:00		1.44	19	00:14:00		1.35	25

Datum (-ve denotes AGL) = 0.00 m BGL
Ground Level taken as Datum.

Input by AH 10/09/2020 Checked by CAY 08/12/2020 Approved by NHA 14/12/2020

Contract No. G200015U

SOAKAWAY TEST RECORD							Method BRE 365 2016
Date	08/09/2020	Operator	JB	Pit Depth	1.70 m	Hole No.	TVTH212A

Test Details

Datum (-ve denotes AGL) =	0.00 m BGL	Well Screen	
		Well screen not used	
Pit Length =	2.80 m	Filter Material	
Pit Width =	0.60 m	Assumed Solid Fraction =	61.11 %
Pit Depth =	1.70 m BGL	Assumed Porosity =	38.89 %

Weather: Warm, dry, calm, dry ground.

Geology: SAND.

Remarks

Test undertaken to replace previous data acquired on 24/07/2020 in TVTH212 due to insufficiency.

Gravel filled up to 0.20m BGL to support unstable pit.
Pit was dry before adding water.
Water added to the pit to 0.30m BGL (Test 1, Test 2 and Test 3).

Calculation

Test 1 ■			Test 2 ◆			Test 3 ▲		
Start Time =	11:39		Start Time =	11:52		Start Time =	12:08	
Test Top =	0.30	m BGL	Test Top =	0.30	m BGL	Test Top =	0.30	m BGL
Test Base =	1.70	m BGL	Test Base =	1.70	m BGL	Test Base =	1.70	m BGL
EDP =	1.40	m	EDP =	1.40	m	EDP =	1.40	m
75% EDP =	0.65	m BGL	75% EDP =	0.65	m BGL	75% EDP =	0.65	m BGL
50% EDP =	1.00	m BGL	50% EDP =	1.00	m BGL	50% EDP =	1.00	m BGL
25% EDP =	1.35	m BGL	25% EDP =	1.35	m BGL	25% EDP =	1.35	m BGL
V =	2.35	m^3	V =	2.35	m^3	V =	2.35	m^3
Vg =	1.44	m^3	Vg =	1.44	m^3	Vg =	1.44	m^3
Vp =	0.91	m^3	Vp =	0.91	m^3	Vp =	0.91	m^3
Vp75-25 =	0.46	m^3	Vp75-25 =	0.46	m^3	Vp75-25 =	0.46	m^3
ap =	6.44	m^2	ap =	6.44	m^2	ap =	6.44	m^2
Tp75 =	57	s	Tp75 =	117	s	Tp75 =	135	s
Tp25 =	489	s	Tp25 =	732	s	Tp25 =	840	s
Infiltration Rate, f =	1.64E-04	m/s	Infiltration Rate, f =	1.15E-04	m/s	Infiltration Rate, f =	1.01E-04	m/s

Notes

Pit sides are assumed to be vertical; dimensions at mid-depth of pit used in general.

m AGL/BGL = metres above / below ground level;
m BDL = metres below datum level.

Effective depth of soakaway (EDP) is calculated from the initial water level to the base of hole.

V is the effective storage volume of water in the hole (ESV) when gravel fill not used; Vg is the effective volume taken up by the gravel solid;
Vp is the ESV, less the volume of the gravel fraction.
Vp75-25 is the ESV between 75% and 25% effective depth, less the volume of the gravel fraction; Vp75-50 is used when 25% EDP was not reached.

ap is the internal surface area of the pit including base area during the test.

Tp75 is time at 75% EDP; Tp50 is the time at 50% EDP; Tp25 is time at 25% EDP.
Tp75-25 is the assessed time for water level to fall from 75% to 25% EDP; Tp75-50 is used when 25% EDP was not reached.

$$Soil\ Infiltration\ rate, f = \frac{Vp_{75-25}}{ap \times Tp_{75-25}}$$ or $$Soil\ Infiltration\ rate, f = \frac{Vp_{75-50}}{ap \times Tp_{75-50}}$$

Input by AH 10/09/2020 Checked by CAY 08/12/2020 Approved by NHA 14/12/2020

Contract No. G200015U

Contract Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation		Location ID
Client	NNB Generation Company (SZC) Limited		**TVBH 266s**
Fugro Reference	G200015U		
Coordinates (m)		Ground Elevation (m Datum)	Sheet 1 of 1
Hole Type	Cable Percussion		Status: Preliminary

Equipment

Depth From (m)	Depth To (m)	Hole Type	Date From	Date To	Equipment	Core Barrel	Core Bit	Drilling Crew	Logged By	Remarks
0.00	1.20	IP	05/05/2021	05/05/2021	Hand excavated			CC+DG+PO	PO	
1.20	6.00	CP	05/05/2021	06/05/2021	Dando 2000			CC+DG+PO	PO	

Progress

Date (dd/mm/yyyy)	Time (hh:mm)	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	Weather
05/05/2021	16:00	0.00			Dry
05/05/2021	18:00	1.20	0.00	Dry	Overcast/Heavy showers/
06/05/2021	07:30	1.20	0.00	Dry	Sunny/Warm intervals
06/05/2021	18:00	6.00	6.00	NR	

Rotary Details

Depth From (m)	Depth To (m)	Flush Type	Flush Return (%)	Flush Colour	Run Time (hh:mm)

Core Details

Depth From (m)	Depth To (m)	Diameter (mm)

Hole and Casing

Depth To (m)	Hole Diameter (mm)	Depth To (m)	Casing Diameter (mm)
6.00	200	6.00	200

Chiselling / Slow Progress

Depth From (m)	Depth To (m)	Duration (hh:mm)	Tool / Remark

Water Strike

Strike At (m)	Rise To (m)	Time Elapsed (mins)	Casing Depth (m)	Depth Sealed (m)

Water Added

Depth From (m)	Depth To (m)

Water Strike Remarks

Groundwater not encountered during excavation.

General Remarks

1. Prior to boring, a Cable Avoidance Tool (CAT) survey was undertaken, an inspection pit was hand-dug to 1.20m and rescanned using the CAT to check for services; services were not located.

Installation

Type	Tip Depth / Distance (m)	Response Zone Top (m)	Response Zone Base (m)	Installation Date
SP	6.00	0.50	6.00	06/05/2021

Pipe

ID	Top Depth (m)	Base Depth (m)	Diameter (mm)	Type
1	0.00	4.00	50	Plain
1	4.00	6.00	50	Slotted

Backfill

Depth From (m)	Depth To (m)	Backfill Material	Date
0.00	0.50	Concrete	06/05/2021
0.50	4.00	Bentonite	06/05/2021
4.00	6.00	Gravel	06/05/2021

Notes

- Abbreviations and results data defined in 'Exploratory Location Records Keysheets'

Checked By	SAF	Elevation Datum	Ordnance Datum (Newlyn)	Grid Coordinate System	OSGB

Template: FGSL/HBSI/FGSL BH Summary.hbt/Config Fugro Rev5/26/06/2019/TS+AW — Print Date: 25/08/2021

Contract Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation	Location ID	**TVBH 266s**
Client	NNB Generation Company (SZC) Limited		
Fugro Reference	G200015U		
Coordinates (m)	Ground Elevation (m Datum)	Sheet 1 of 2	
Hole Type	Cable Percussion	Status	Preliminary

Sampling and In Situ Testing				Strata Details					Groundwater	
Depth (m)	Type	No.	Test Results	Depth (m)	Strata Descriptions	Depth (Thickness) (m)	Level (m Datum)	Legend	Water Strike	Backfill / Installation
0.00 - 0.10	B	1			Soft and firm dark brown slightly gravelly sandy CLAY with occasional roots and rootlets (<3mm x 90mm). Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of flint.	(0.30)				
0.20 - 0.40	B	2				0.30				
0.40 - 0.80	B	3			Brown gravelly silty clayey SAND. Sand is fine and medium. Gravel is angular to well rounded fine to coarse of flint and quartz.					
1.00 - 1.20	B	4		1						
1.50 - 1.60	D	5				(2.90)				
				2						
2.50 - 2.60	D	6								
				3						
3.20 - 3.60	B	7			Brown very gravelly SAND. Sand is fine to coarse. Gravel is angular to rounded fine to coarse of flint, quartz and occasional chalk.	3.20				
3.60 - 4.00	B	8								
4.00 - 5.00	B	9		4		(1.80)				
5.00 - 6.00	B	10			Continued next page	5.00				

Notes

- Abbreviations and results data defined on 'Notes on Exploratory Position Records'

Contract Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation	Location ID	**TVBH 266s**
Client	NNB Generation Company (SZC) Limited		
Fugro Reference	G200015U		
Coordinates (m)	Ground Elevation (m Datum)	Sheet 2 of 2	
Hole Type	Cable Percussion	Status	Preliminary

Sampling and In Situ Testing				Strata Details					Groundwater	
Depth (m)	Type	No.	Test Results	Depth (m)	Strata Descriptions	Depth (Thickness) (m)	Level (m Datum)	Legend	Water Strike	Backfill / Installation
					Brown slightly gravelly SAND with rare pockets (<30mm x 50mm x 65mm) of soft brown mottled light grey clay. Sand is fine and medium. Gravel is subangular and subrounded fine to medium of flint.	(1.00)				
				6	End of Borehole at 6.00 m	6.00				
				7						
				8						
				9						

Notes

- Abbreviations and results data defined on 'Notes on Exploratory Position Records'

Contract Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation		Location ID
Client	NNB Generation Company (SZC) Limited		**TVTH 265sA**
Fugro Reference	G200015U		
Coordinates (m)		Ground Elevation (m Datum)	Sheet 1 of 1
Hole Type	Trial Pit		Status: Preliminary

Equipment

Depth From (m)	Depth To (m)	Hole Type	Date From	Date To	Equipment	Core Barrel	Core Bit	Drilling Crew	Logged By	Remarks
0.00	2.90	TP	12/05/2021	12/05/2021	Machine excavated : 14 Tonne				IU	

Progress

Date (dd/mm/yyyy)	Time (hh:mm)	Hole Depth (m)	Casing Depth (m)	Water Depth (m)	Weather
12/05/2021	09:35	0.00			Sunny
12/05/2021	12:00	2.90		2.00	

Rotary Details

Depth From (m)	Depth To (m)	Flush Type	Flush Return (%)	Flush Colour	Run Time (hh:mm)

Core Details

Depth From (m)	Depth To (m)	Diameter (mm)

Hole and Casing

Depth To (m)	Hole Diameter (mm)	Depth To (m)	Casing Diameter (mm)

Chiselling / Slow Progress

Depth From (m)	Depth To (m)	Duration (hh:mm)	Tool / Remark

Water Strike

Strike At (m)	Rise To (m)	Time Elapsed (mins)	Casing Depth (m)	Depth Sealed (m)
2.00	1.98	20		

Water Added

Depth From (m)	Depth To (m)

Water Strike Remarks

General Remarks

1. Trial pit relocated from TVTH 265s.
2. Prior to excavation, a Cable Avoidance Tool (CAT) survey was undertaken; services were not located.
3. Soakaway testing was carried out on completion of excavation; results reported separately.

Installation

Type	Tip Depth / Distance (m)	Response Zone Top (m)	Response Zone Base (m)	Installation Date

Pipe

ID	Top Depth (m)	Base Depth (m)	Diameter (mm)	Type

Backfill

Depth From (m)	Depth To (m)	Backfill Material	Date
0.00	2.90	Arisings	12/05/2021

Notes

- Abbreviations and results data defined in 'Exploratory Location Records Keysheets'

Checked By	SAF	Elevation Datum	Ordnance Datum (Newlyn)	Grid Coordinate System	OSGB

Template: FGSL/HBSI/FGSL BH Summary.hbt/Config Fugro Rev5/26/06/2019/TS+AW — Print Date: 25/08/2021

Contract Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation	Location ID	**TVTH 265sA**
Client	NNB Generation Company (SZC) Limited		
Fugro Reference	G200015U		
Coordinates (m)	Ground Elevation (m Datum)	Sheet 1 of 1	
Hole Type	Trial Pit / Trench	Status	Preliminary

Sampling and In Situ Testing				Strata Details					Groundwater	
Depth (m)	Type	No.	Test Results	Depth (m)	Strata Descriptions	Depth (Thickness) (m)	Level (m Datum)	Legend	Water Strike	Backfill / Installation
0.10 - 0.11	D	1			Dark brown slightly gravelly clayey SAND with frequent roots and rootlets (<18mm x 20mm). Sand is fine and medium. Gravel is angular to rounded fine to coarse of flint.	(0.40)				
0.10 - 0.12	ES	2								
0.10	PID		< 0.1 ppm							
0.20 - 0.50	B	3								
0.30 - 0.31	ES	4				0.40				
0.50 - 0.51	D	5			Dark brown mottled light brown slightly gravelly SAND with low cobble content and occasional lenses of orangish brown and light brown fine to coarse sand. Sand is fine and medium. Gravel is subangular and angular fine to coarse of flint. Cobbles are subangular of flint.	(0.50)				
0.50 - 0.51	ES	6								
0.50 - 0.51	ES	7								
0.50	PID		< 0.1 ppm							
0.50	PID		< 0.1 ppm			0.90				
1.00 - 1.10	D	8		1	Orangish brown slightly gravelly SAND with low cobble content. Sand is fine to coarse. Gravel is subangular and subrounded fine to coarse of flint and 2 No. red bricks. Cobbles are subangular of flint.					
1.00 - 1.20	ES	10								
1.00	PID		< 0.1 ppm							
1.10 - 1.20	ES	9								
1.10	PID		< 0.1 ppm			(1.10)				
1.50 - 2.00	B	11								
2.00 - 2.01	D	12		2	Brown mottled orangish brown slightly gravelly SAND with low cobble content. Sand is fine to coarse. Gravel is subangular and subrounded fine to coarse of flint. Cobbles are subangular of flint.	2.00				
2.10 - 2.20	ES	13								
2.10	PID		< 0.1 ppm							
2.50 - 2.51	ES	14				(0.90)				
2.50 - 2.90	B	15								
2.50	PID		< 0.1 ppm			2.90				
					End of Trial Pit / Trench at 2.90 m					
				3						
				4						

Notes	Pit Stability	Plan
- Abbreviations and results data defined on 'Notes on Exploratory Position Records'	Stable	2.25 m 0.68 m → 98°

FUGRO	Contract Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation		Location ID
	Client	NNB Generation Company (SZC) Limited		**TVBH 266s**
	Fugro Reference	G200015U		
	Coordinates (m)		Ground Elevation (m Datum)	Sheet 1 of 1
	Hole Type	Cable Percussion		Status: Preliminary

Standard Penetration Test Results

Test Depth (m)	Test Type	Self Weight Penetration (mm)	Test Result	Total Penetration (mm)	Hammer Serial Number	Energy Ratio (%)	Casing Depth (m)	Water Depth (m)

In Situ Vane Test Results

Test Depth (m)	Test Type	Undisturbed Undrained Shear Strength (kPa)	Residual Undrained Shear Strength (kPa)

In Situ Hand Penetrometer Results

Test Depth (m)	Undisturbed Undrained Shear Strength (kPa)

Volatile Headspace Testing by Photoionisation Detector

Test Depth (m)	PID Result (ppm)

Notes

- Abbreviations and results data defined on 'Notes on Exploratory Position Records'

FUGRO	Contract Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation		Location ID
	Client	NNB Generation Company (SZC) Limited		**TVTH 265sA**
	Fugro Reference	G200015U		
	Coordinates (m)		Ground Elevation (m Datum)	Sheet 1 of 1
	Hole Type	Trial Pit		Status: Preliminary

Standard Penetration Test Results

Test Depth (m)	Test Type	Self Weight Penetration (mm)	Test Result	Total Penetration (mm)	Hammer Serial Number	Energy Ratio (%)	Casing Depth (m)	Water Depth (m)

In Situ Vane Test Results

Test Depth (m)	Test Type	Undisturbed Undrained Shear Strength (kPa)	Residual Undrained Shear Strength (kPa)

In Situ Hand Penetrometer Results

Test Depth (m)	Undisturbed Undrained Shear Strength (kPa)

Volatile Headspace Testing by Photoionisation Detector

Test Depth (m)	PID Result (ppm)
0.10	< 0.1 ppm
0.50	< 0.1 ppm
0.50	< 0.1 ppm
1.00	< 0.1 ppm
1.10	< 0.1 ppm
2.10	< 0.1 ppm
2.50	< 0.1 ppm

Notes

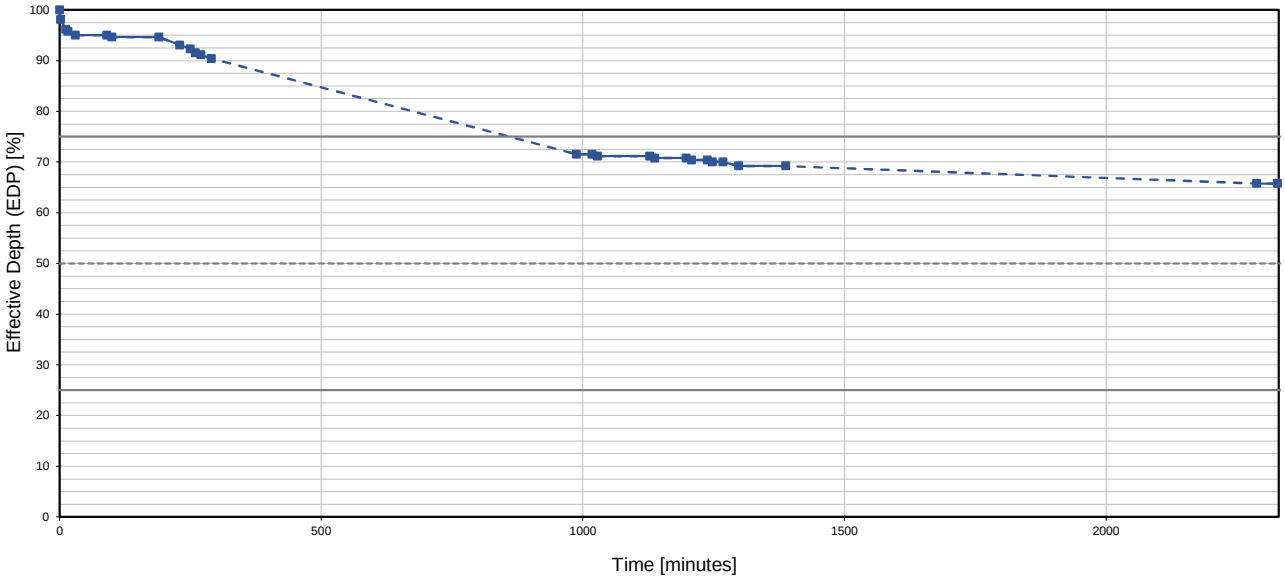
- Abbreviations and results data defined on 'Notes on Exploratory Position Records'

NNB GENERATION COMPANY (SZC) LIMITED
SIZEWELL ROAD SCHEMES – INFILTRATION TESTING AND GEOTECHNICAL INVESTIGATION

SOAKAWAY TEST RECORD

Method BRE 365 2016

Date	12/05/2021	Operator	IU/AD	Pit Depth	2.90 m	Hole No.	TVTH 265sA



Test 1			Test 2			Test 3		
Start Time =	13:05		Start Time =			Start Time =		
Test Top =	0.30	m BGL	Test Top =		m BGL	Test Top =		m BGL
Test Base =	2.90	m BGL	Test Base =		m BGL	Test Base =		m BGL
75% EDP =	0.95	m BGL	75% EDP =		m BGL	75% EDP =		m BGL
50% EDP =	1.60	m BGL	50% EDP =		m BGL	50% EDP =		m BGL
25% EDP =	2.25	m BGL	25% EDP =		m BGL	25% EDP =		m BGL

Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]	Elapsed Time [hr:min:sec]	Water [m BDL]	Water [m BGL]	EDP [%]
00:00:00	0.48	0.30	100	00:00:00				00:00:00			
00:02:00	0.53	0.35	98	00:00:30				00:00:30			
00:12:00	0.58	0.40	96	00:01:00				00:01:00			
00:16:00	0.59	0.41	96	00:01:30				00:01:30			
00:30:00	0.61	0.43	95	00:02:00				00:02:00			
01:30:00	0.61	0.43	95	00:03:00				00:03:00			
01:40:00	0.62	0.44	95	00:04:00				00:04:00			
03:10:00	0.62	0.44	95	00:05:00				00:05:00			
03:50:00	0.66	0.48	93	00:06:00				00:06:00			
04:10:00	0.68	0.50	92	00:07:00				00:07:00			
04:20:00	0.70	0.52	92	00:08:00				00:08:00			
04:30:00	0.71	0.53	91	00:09:00				00:09:00			
04:50:00	0.73	0.55	90	00:10:00				00:10:00			
16:28:00	1.22	1.04	72	00:12:00				00:12:00			
16:58:00	1.22	1.04	72	00:14:00				00:14:00			
17:08:00	1.23	1.05	71	00:16:00				00:16:00			
18:48:00	1.23	1.05	71	00:18:00				00:18:00			
18:58:00	1.24	1.06	71	00:20:00				00:20:00			
19:58:00	1.24	1.06	71	00:25:00				00:25:00			
20:08:00	1.25	1.07	70	00:30:00				00:30:00			
20:38:00	1.25	1.07	70	00:40:00				00:40:00			
20:48:00	1.26	1.08	70	00:50:00				00:50:00			
21:08:00	1.26	1.08	70	01:00:00				01:00:00			
21:38:00	1.28	1.10	69								
23:08:00	1.28	1.10	69								
38:08:00	1.37	1.19	66								
38:48:00	1.37	1.19	66								

Datum (-ve denotes AGL) = -0.18 m BGL.

Water depth measurements were taken from the Datum Level chosen on field, then converted to referencing Ground Level for calculations.

Input by AH 19/05/2021

Checked by CAY 17/08/2021

Contract No. G200015U

SOAKAWAY TEST RECORD							Method BRE 365 2016
Date	12/05/2021	Operator	IU/AD	Pit Depth	2.90 m	Hole No.	TVTH 265sA

Test Details

Datum (-ve denotes AGL) =	-0.18 m BGL	Well Screen	
		Well screen not used	
Pit Length =	2.25 m	Filter Material	
Pit Width =	0.68 m	Assumed Solid Fraction =	64.39 %
Pit Depth =	2.90 m BGL	Assumed Porosity =	35.61 %

Weather: Cold, dry, wet ground.

Geology: SAND

Remarks

Test 1 carried out over three days (12/05/2021 to 14/05/2021) (38 hr 48 min); test termination agreed with client representative; Test 2 and Test 3 not required.
Readings taken during site work hours only. Selective data are presented; see field records for full set of data.
Volume of gravel fraction assumed to be 64.39% of the total volume of gravel filled space.
Water level did not reach 50% or 25% EDP; infiltration rates cannot be given.

Test carried out in gravel filled trial pit; gravel filled up to 0.30m BGL. Water strike was noted during pitting at 2.00m BGL and rose to 1.98m BGL after 20 min. Water added to the pit to 0.30m BGL using about 5 min for Test 1. Water depth measurements taken from top of measuring pipe that stuck up 0.18m AGL.

Calculation

Test 1 ■			Test 2 ◆		Test 3 ▲	
Start Time =	13:05		Start Time =		Start Time =	
Test Top =	0.30	m BGL	Test Top =	m BGL	Test Top =	m BGL
Test Base =	2.90	m BGL	Test Base =	m BGL	Test Base =	m BGL
EDP =	2.60	m	EDP =	m	EDP =	m
75% EDP =	0.95	m BGL	75% EDP =	m BGL	75% EDP =	m BGL
50% EDP =	1.60	m BGL	50% EDP =	m BGL	50% EDP =	m BGL
25% EDP =	2.25	m BGL	25% EDP =	m BGL	25% EDP =	m BGL
V =	3.98	m^3	V =	m^3	V =	m^3
Vg =	2.56	m^3	Vg =	m^3	Vg =	m^3
Vp =	1.42	m^3	Vp =	m^3	Vp =	m^3
Vp75-25 =	0.71	m^3	Vp75-25 =	m^3	Vp75-25 =	m^3
ap =	9.15	m^2	ap =	m^2	ap =	m^2
Tp75 =		s	Tp75 =	s	Tp75 =	s
Tp25 =		s	Tp25 =	s	Tp25 =	s
Infiltration Rate, f =		m/s	Infiltration Rate, f =	m/s	Infiltration Rate, f =	m/s

Notes

Pit sides are assumed to be vertical; dimensions at mid-depth of pit used in general.

m AGL/BGL = metres above / below ground level;
m BDL = metres below datum level.

Effective depth of soakaway (EDP) is calculated from the initial water level to the base of hole.

V is the effective storage volume of water in the hole (ESV) when gravel fill not used; Vg is the effective volume taken up by the gravel solid;
Vp is the ESV, less the volume of the gravel fraction.
Vp75-25 is the ESV between 75% and 25% effective depth, less the volume of the gravel fraction; Vp75-50 is used when 25% EDP was not reached.

ap is the internal surface area of the pit including base area during the test.

Tp75 is time at 75% EDP; Tp50 is the time at 50% EDP; Tp25 is time at 25% EDP.
Tp75-25 is the assessed time for water level to fall from 75% to 25% EDP; Tp75-50 is used when 25% EDP was not reached.

$$Soil\ Infiltration\ rate, f = \frac{Vp_{75-25}}{ap \times Tp_{75-25}}$$ or $$Soil\ Infiltration\ rate, f = \frac{Vp_{75-50}}{ap \times Tp_{75-50}}$$

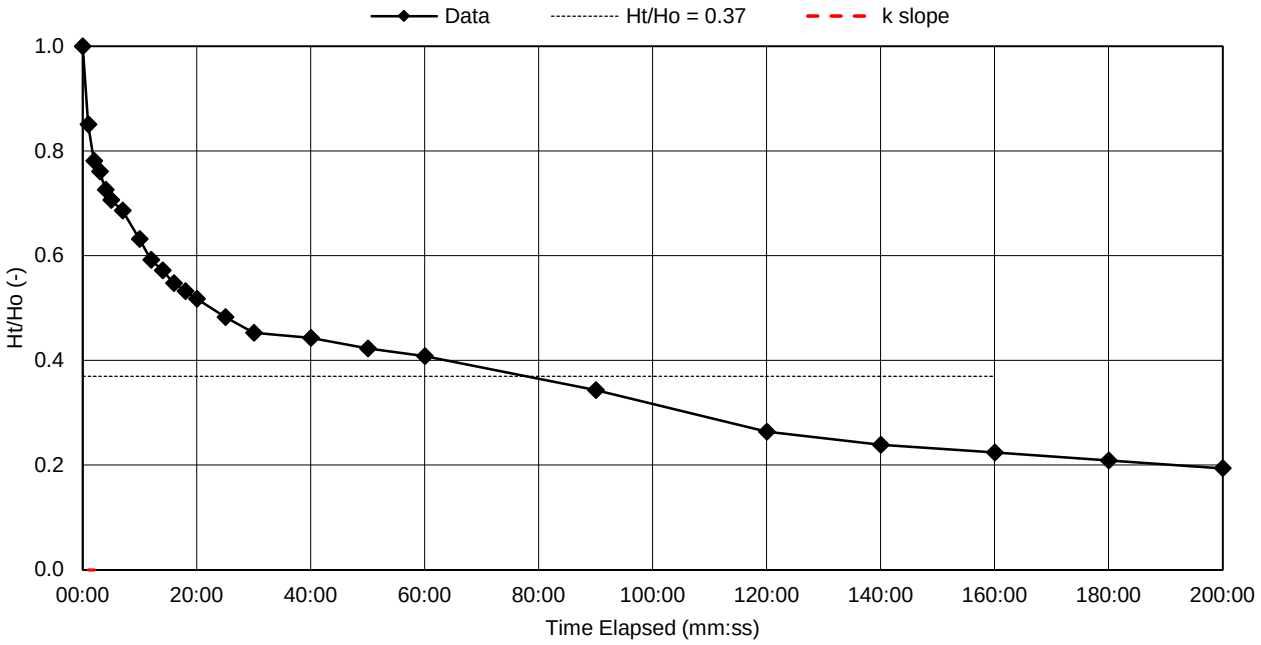
Input by AH 19/05/2021 Checked by CAY 17/08/2021

Contract No. G200015U

FUGRO	Contract Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation	Location ID **TVBH 266s**
	Client	NNB Generation Company (SZC) Limited	
	Fugro Reference	G200015U	
	Coordinates (m)	Elevation (m Datum)	Sheet 1 of 1
	Hole Type	CP	Status: Preliminary

Variable Head Permeability Test Record

Test Date	06/05/2021	Test No.	1	Test Depth (m)	4.00 to 6.00



Coefficient of Permeability (k) (m/s)

Time Elapsed (mm:ss)	Water Level (m BGL)	Ht (m)	Ht/Ho (-)
00:00	3.99	2.01	1.000
01:00	4.29	1.71	0.851
02:00	4.43	1.57	0.781
03:00	4.47	1.53	0.761
04:00	4.54	1.46	0.726
05:00	4.58	1.42	0.706
07:00	4.62	1.38	0.687
10:00	4.73	1.27	0.632
12:00	4.81	1.19	0.592
14:00	4.85	1.15	0.572
16:00	4.90	1.10	0.547
18:00	4.93	1.07	0.532
20:00	4.96	1.04	0.517
25:00	5.03	0.97	0.483
30:00	5.09	0.91	0.453
40:00	5.11	0.89	0.443
50:00	5.15	0.85	0.423
60:00	5.18	0.82	0.408
90:00	5.31	0.69	0.343
120:00	5.47	0.53	0.264
140:00	5.52	0.48	0.239
160:00	5.55	0.45	0.224
180:00	5.58	0.42	0.209
200:00	5.61	0.39	0.194

Analytical Method		Not Analysed
Test Type		Falling Head in Standpipe
Depth of Test Section	Top of Test Section (m BGL)	4.00
	Base of Test Section (m BGL)	6.00
Measurement Point (MP, m AGL)		Top of Standpipe
		0.33
Assumed Standing Water Level (m BGL)		6.00
Water Level (m BGL)	Start of Test	3.99
	End of Test	5.61
Internal Diameter of Casing (mm)		50
Hole Diameter (mm)		200
Response Zone Length (m)		2.00
Cross Sectional Area of Test Section (m²)		0.0314

Geology
Gravelly SAND.

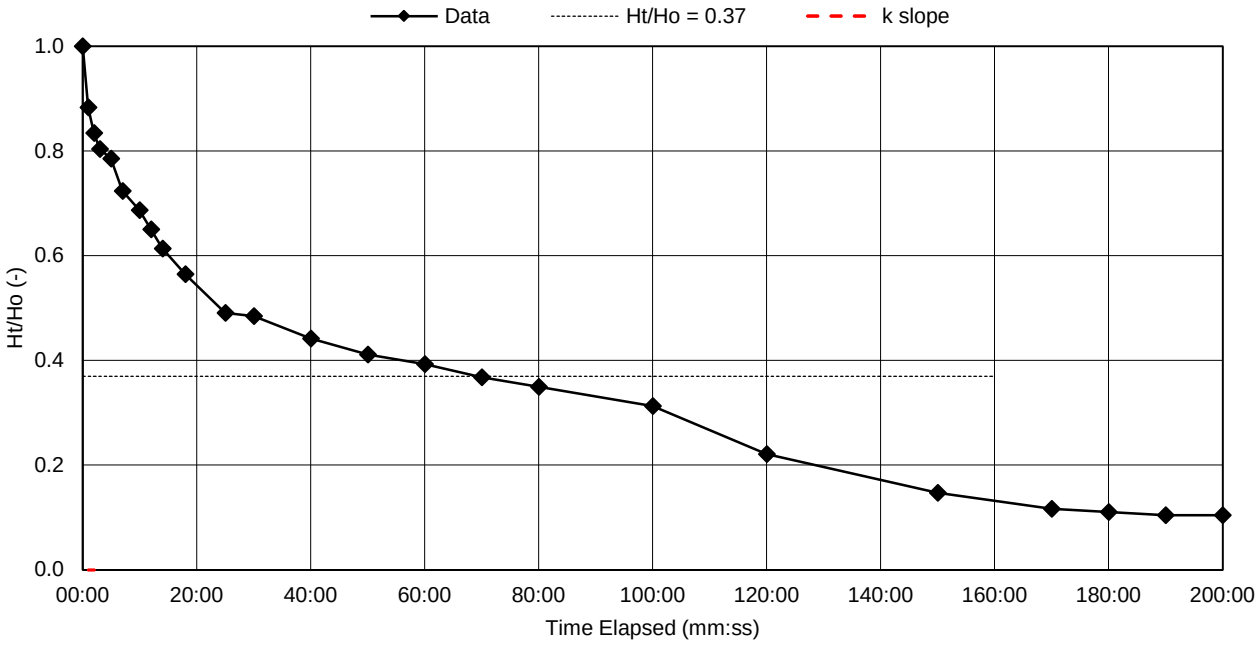
Remarks
200 litres of water added for the test.
Test carried out above groundwater level. Standing water level taken as 6.00m BGL for calculation purposes. Data provided for information only (coefficient of permeability cannot be given).

Notes

FUGRO	Contract Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation	Location ID **TVBH 266s**
	Client	NNB Generation Company (SZC) Limited	
	Fugro Reference	G200015U	
	Coordinates (m)	Elevation (m Datum)	Sheet 1 of 1
	Hole Type	CP	Status: Preliminary

Variable Head Permeability Test Record

Test Date	07/05/2021	Test No.	2	Test Depth (m)	4.00 to 6.00



Coefficient of Permeability (k) (m/s)

Time Elapsed (mm:ss)	Water Level (m BGL)	Ht (m)	Ht/Ho (-)
00:00	4.18	1.63	1.000
01:00	4.37	1.44	0.883
02:00	4.45	1.36	0.834
03:00	4.50	1.31	0.804
05:00	4.53	1.28	0.785
07:00	4.63	1.18	0.724
10:00	4.69	1.12	0.687
12:00	4.75	1.06	0.650
14:00	4.81	1.00	0.613
18:00	4.89	0.92	0.564
25:00	5.01	0.80	0.491
30:00	5.02	0.79	0.485
40:00	5.09	0.72	0.442
50:00	5.14	0.67	0.411
60:00	5.17	0.64	0.393
70:00	5.21	0.60	0.368
80:00	5.24	0.57	0.350
100:00	5.30	0.51	0.313
120:00	5.45	0.36	0.221
150:00	5.57	0.24	0.147
170:00	5.62	0.19	0.117
180:00	5.63	0.18	0.110
190:00	5.64	0.17	0.104
200:00	5.64	0.17	0.104

Analytical Method		Not Analysed
Test Type		Falling Head in Standpipe
Depth of Test Section	Top of Test Section (m BGL)	4.00
	Base of Test Section (m BGL)	6.00
Measurement Point (MP, m AGL)		Top of Standpipe
		0.33
Measured Standing Water Level (m BGL)		5.81
Water Level (m BGL)	Start of Test	4.18
	End of Test	5.64
Internal Diameter of Casing (mm)		50
Hole Diameter (mm)		200
Response Zone Length (m)		2.00
Cross Sectional Area of Test Section (m²)		0.0314

Geology
Gravelly SAND.

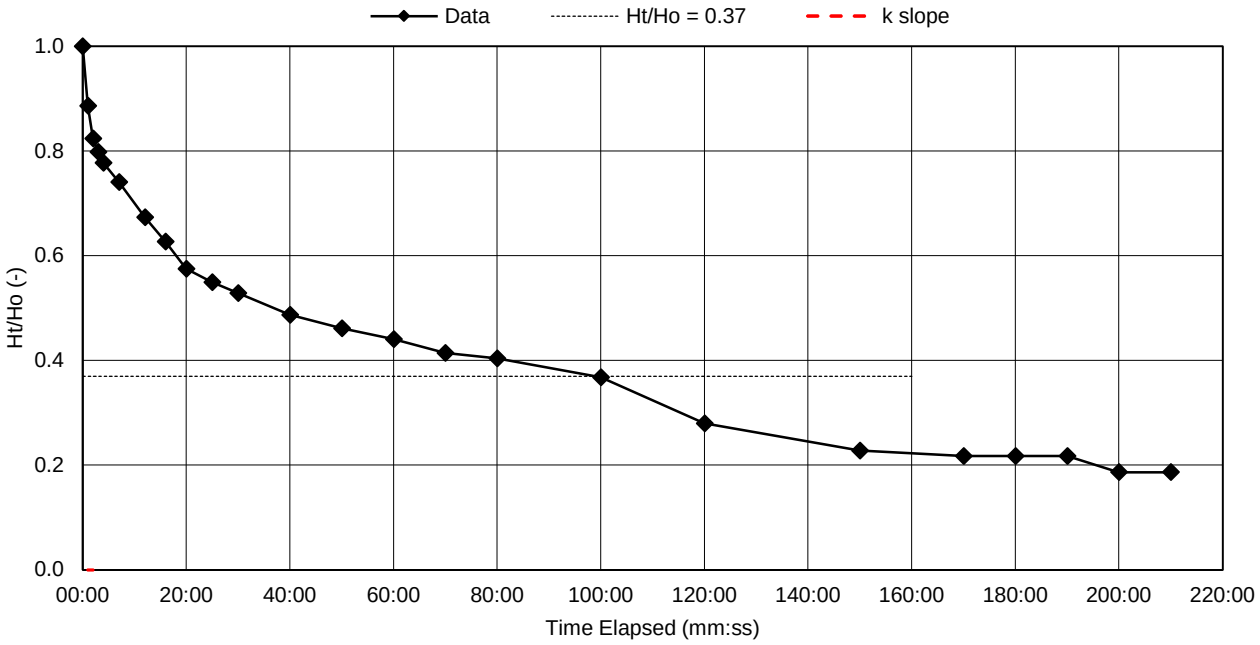
Remarks
200 litres of water added for the test.
Test carried out above groundwater level. Standing water level taken as 5.81m BGL for calculation purposes. Data provided for information only (coefficient of permeability cannot be given).

Notes

FUGRO	Contract Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation	Location ID **TVBH 266s**
	Client	NNB Generation Company (SZC) Limited	
	Fugro Reference	G200015U	
	Coordinates (m)	Elevation (m Datum)	Sheet 1 of 1
	Hole Type	CP	Status: Preliminary

Variable Head Permeability Test Record

Test Date	07/05/2021	Test No.	3	Test Depth (m)	4.00 to 6.00



Coefficient of Permeability (k) (m/s)

Time Elapsed (mm:ss)	Water Level (m BGL)	Ht (m)	Ht/Ho (-)
00:00	4.07	1.93	1.000
01:00	4.29	1.71	0.886
02:00	4.41	1.59	0.824
03:00	4.46	1.54	0.798
04:00	4.50	1.50	0.777
07:00	4.57	1.43	0.741
12:00	4.70	1.30	0.674
16:00	4.79	1.21	0.627
20:00	4.89	1.11	0.575
25:00	4.94	1.06	0.549
30:00	4.98	1.02	0.528
40:00	5.06	0.94	0.487
50:00	5.11	0.89	0.461
60:00	5.15	0.85	0.440
70:00	5.20	0.80	0.415
80:00	5.22	0.78	0.404
100:00	5.29	0.71	0.368
120:00	5.46	0.54	0.280
150:00	5.56	0.44	0.228
170:00	5.58	0.42	0.218
180:00	5.58	0.42	0.218
190:00	5.58	0.42	0.218
200:00	5.64	0.36	0.187
210:00	5.64	0.36	0.187

Analytical Method		Not Analysed
Test Type		Falling Head in Standpipe
Depth of Test Section	Top of Test Section (m BGL)	4.00
	Base of Test Section (m BGL)	6.00
Measurement Point (MP, m AGL)		Top of Standpipe
		0.33
Assumed Standing Water Level (m BGL)		6.00
Water Level (m BGL)	Start of Test	4.07
	End of Test	5.64
Internal Diameter of Casing (mm)		50
Hole Diameter (mm)		200
Response Zone Length (m)		2.00
Cross Sectional Area of Test Section (m²)		0.0314

Geology
Gravelly SAND.

Remarks
200 litres of water added for the test.
Test carried out above groundwater level. Standing water level taken as 6.00m BGL for calculation purposes. Data provided for information only (coefficient of permeability cannot be given).

Notes

LABORATORY TEST CERTIFICATE
Determination of Water Content

BS EN ISO 17892-1:2014

1483

Project Reference	G200015U			Location ID	TVBH 266s
Project Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Depth Top [m]	3.20
Specimen Description	Brown slightly clayey gravelly SAND			Sample Type	B
Specimen Reference		Specimen Depth [m]		Sample Reference	7

Test Data	
Date of Test	**05/07/2021**
Oven Temperature [°C]	**105.0**
Water Content [%]	**13.1**

Issue Date	16/07/2021	Certificate Reference		Authorised by	lindsayc
Client	NNB Generation Company (SZC) Limited			Authorised Date	15/07/2021
Remarks:					

Fugro GeoServices Ltd. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

LABORATORY TEST CERTIFICATE
Determination of Water Content

BS EN ISO 17892-1:2014

1483

Project Reference	G200015U			Location ID	TVBH 266s
Project Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Depth Top [m]	4.00
Specimen Description	Brown gravelly clayey SAND			Sample Type	B
Specimen Reference		Specimen Depth [m]		Sample Reference	9

Test Data	
Date of Test	**05/07/2021**
Oven Temperature [°C]	**105.0**
Water Content [%]	**16.6**

Issue Date	16/07/2021	Certificate Reference		Authorised by	lindsayc
Client	NNB Generation Company (SZC) Limited			Authorised Date	16/07/2021
Remarks:					

Fugro GeoServices Ltd. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

LABORATORY TEST CERTIFICATE
Determination of Water Content

BS EN ISO 17892-1:2014

1483

Project Reference	G200015U			Location ID	TVBH 266s
Project Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Depth Top [m]	5.00
Specimen Description	Brown slightly gravelly clayey SAND			Sample Type	B
Specimen Reference		Specimen Depth [m]		Sample Reference	10

Test Data	
Date of Test	**05/07/2021**
Oven Temperature [°C]	**105.0**
Water Content [%]	**14.6**

Issue Date	16/07/2021	Certificate Reference		Authorised by	lindsayc
Client	NNB Generation Company (SZC) Limited			Authorised Date	15/07/2021
Remarks:					

Fugro GeoServices Ltd. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

LABORATORY TEST CERTIFICATE
Determination of Water Content

BS EN ISO 17892-1:2014

1483

Project Reference	G200015U			Location ID	TVTH 265sA
Project Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Depth Top [m]	0.20
Specimen Description	Brown slightly gravelly silty SAND			Sample Type	B
Specimen Reference		Specimen Depth [m]		Sample Reference	3

Test Data	
Date of Test	**02/07/2021**
Oven Temperature [°C]	**105.0**
Water Content [%]	**8.5**

Issue Date	16/07/2021	Certificate Reference		Authorised by	lindsayc
Client	NNB Generation Company (SZC) Limited			Authorised Date	15/07/2021
Remarks:					

Fugro GeoServices Ltd. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

LABORATORY TEST CERTIFICATE
Determination of Water Content

BS EN ISO 17892-1:2014

1483

Project Reference	G200015U			Location ID	TVTH 265sA
Project Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Depth Top [m]	1.50
Specimen Description	Brown clayey gravelly SAND with low cobble content			Sample Type	B
Specimen Reference		Specimen Depth [m]		Sample Reference	11

Test Data	
Date of Test	**05/07/2021**
Oven Temperature [°C]	**105.0**
Water Content [%]	**11.4**

Issue Date	16/07/2021	Certificate Reference		Authorised by	lindsayc
Client	NNB Generation Company (SZC) Limited			Authorised Date	16/07/2021
Remarks:					

Fugro GeoServices Ltd. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

LABORATORY TEST CERTIFICATE
Determination of Water Content

BS EN ISO 17892-1:2014

1483

Project Reference	G200015U			Location ID	TVTH 265sA
Project Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Depth Top [m]	2.50
Specimen Description	Brown clayey gravelly SAND with low cobble content			Sample Type	B
Specimen Reference		Specimen Depth [m]		Sample Reference	15

Test Data	
Date of Test	**05/07/2021**
Oven Temperature [°C]	**105.0**
Water Content [%]	**10.9**

Issue Date	16/07/2021	Certificate Reference		Authorised by	lindsayc
Client	NNB Generation Company (SZC) Limited			Authorised Date	16/07/2021
Remarks:					

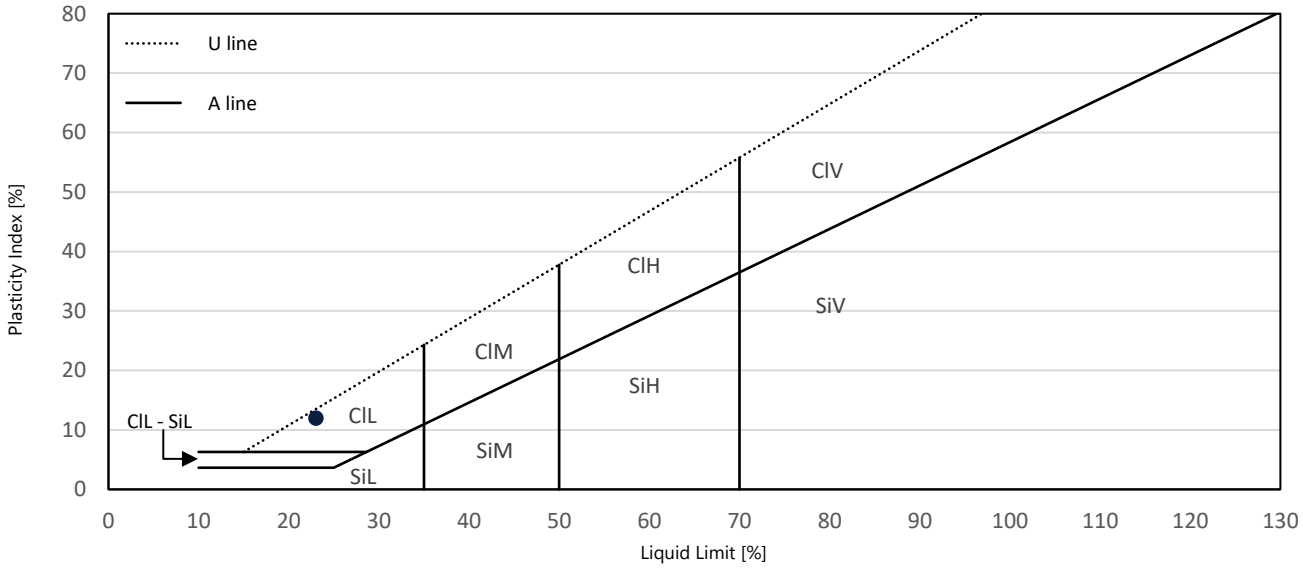
Fugro GeoServices Ltd. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

LABORATORY TEST CERTIFICATE
Determination of Liquid and Plastic Limits

BS EN ISO 17892-12:2018 / BS EN ISO 17892-1:2014

1483

Project Reference	G200015U			Location ID	TVBH 266s
Project Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Depth Top [m]	0.20
Specimen Description	Brown slightly gravelly slightly sandy CLAY			Sample Type	B
Specimen Reference		Specimen Depth [m]		Sample Reference	2



Test Parameters	
Method	Fall cone, 4 point. Increasing water content.
Fall Cone Used	80g/30° Cone
Preparation	Tested after >425um removed by hand
Mandatory Reporting Items	
As Received Water Content [%]	12.4
Liquid Limit [%]	23
Plastic Limit [%]	11
Plasticity Index [%]	12
% Passing 425 µm BS Sieve [%]	91
Optional Reporting Items	
Liquidity Index	0.223
Consistency Index	0.777
Activity Index	
Water Content of Material <425 µm [%]	13.7

Terms used on Plasticity Chart based on BS EN ISO 14688-2 : 2018

ClL = Low Plasticity Clay ClM = Medium Plasticity Clay ClH = High Plasticity Clay ClV = Very High Plasticity Clay

SiL = Low Plasticity Silt SiM = Medium Plasticity Silt SiH = High Plasticity Silt SiV = Very High Plasticity Silt

Issue Date	16/07/2021	Certificate Reference		Authorised by	lindsayc
Client	NNB Generation Company (SZC) Limited			Authorised Date	15/07/2021
Remarks:	Four point liquid limit test.				

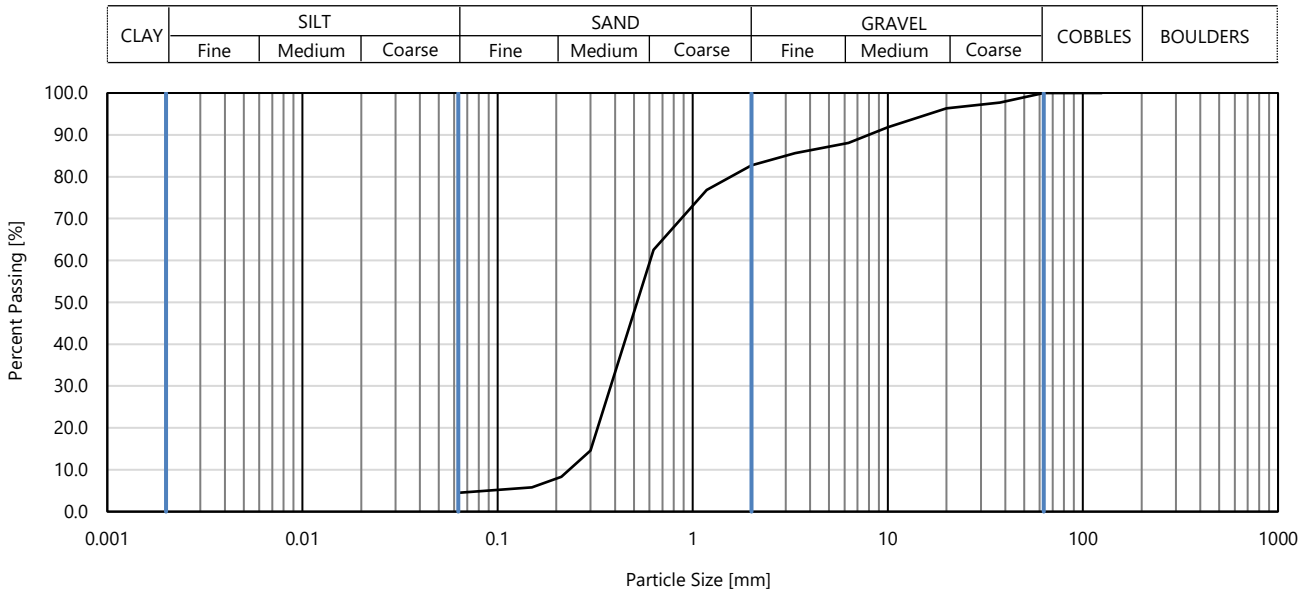
Fugro GeoServices Ltd. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

LABORATORY TEST CERTIFICATE
Determination of Particle Size Distribution

BS EN ISO 17892-4:2016 Clause 5.2

1483

Project Reference	G200015U			Location ID	TVBH 266s
Project Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Depth Top [m]	3.20
Specimen Description	Brown slightly clayey gravelly SAND			Sample Type	B
Specimen Reference		Specimen Depth [m]		Sample Reference	7



Sieving		Sedimentation	
Particle Size [mm]	**Passing [%]**	**Particle Size [mm]**	**Passing [%]**
125	100		
90.0	100		
75.0	100		
63.0	100		
37.5	98		
20.0	96		
10.0	92		
6.30	88		
3.35	86		
2.00	83		
1.18	77		
0.630	63		
0.300	15		
0.212	8		
0.150	6		
0.0630	5		

Dry Mass of Sample [g]	17151
Particle Density [Mg/m³]	

Sample Proportions	Dry Mass [%]
Very coarse	0.0
Gravel	17.3
Sand	78.3
Fines <0.063mm	4.5

Grading Analysis	
D100 [mm]	63
D60 [mm]	0.606
D30 [mm]	0.381
D10 [mm]	0.233
Coefficient of Uniformity	2.6
Coefficient of Curvature	1

Issue Date	16/07/2021	Certificate Reference		Authorised by	lindsayc
Client	NNB Generation Company (SZC) Limited			Authorised Date	15/07/2021
Remarks:					

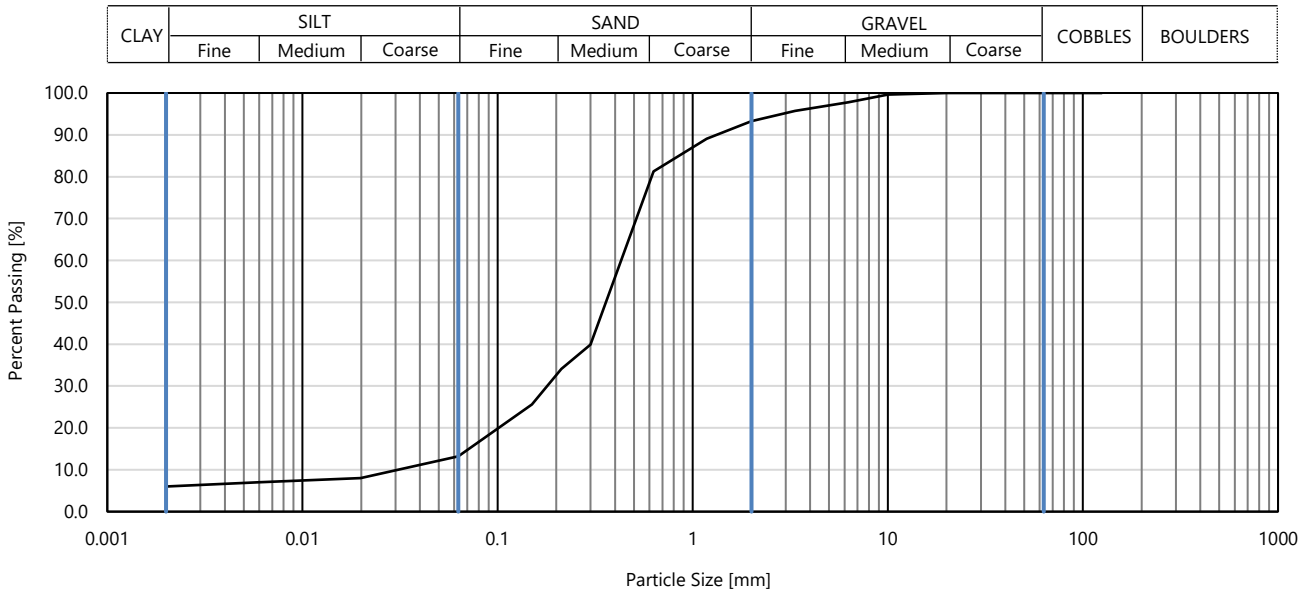
Fugro GeoServices Ltd. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

LABORATORY TEST CERTIFICATE
Determination of Particle Size Distribution

BS EN ISO 17892-4:2016 Clauses 5.2 and 5.4

1483

Project Reference	G200015U			Location ID	TVBH 266s
Project Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Depth Top [m]	4.00
Specimen Description	Brown gravelly clayey SAND			Sample Type	B
Specimen Reference		Specimen Depth [m]		Sample Reference	9



Sieving		Sedimentation	
Particle Size [mm]	**Passing [%]**	**Particle Size [mm]**	**Passing [%]**
125	100	0.0199	8
90.0	100	0.00600	7
75.0	100	0.00199	6
63.0	100		
37.5	100		
20.0	100		
10.0	100		
6.30	98		
3.35	96		
2.00	93		
1.18	89		
0.630	81		
0.300	40		
0.212	34		
0.150	26		
0.0630	13		

Dry Mass of Sample [g]	1331
Particle Density [Mg/m³]	2.70 assumed

Sample Proportions	**Dry Mass [%]**
Very coarse	0.0
Gravel	6.7
Sand	80.1
Silt	6.9
Clay	6.3

Grading Analysis	
D100 [mm]	20
D60 [mm]	0.43
D30 [mm]	0.179
D10 [mm]	0.029
Coefficient of Uniformity	15
Coefficient of Curvature	2.6

Issue Date	16/07/2021	Certificate Reference		Authorised by	lindsayc
Client	NNB Generation Company (SZC) Limited			Authorised Date	16/07/2021
Remarks:					

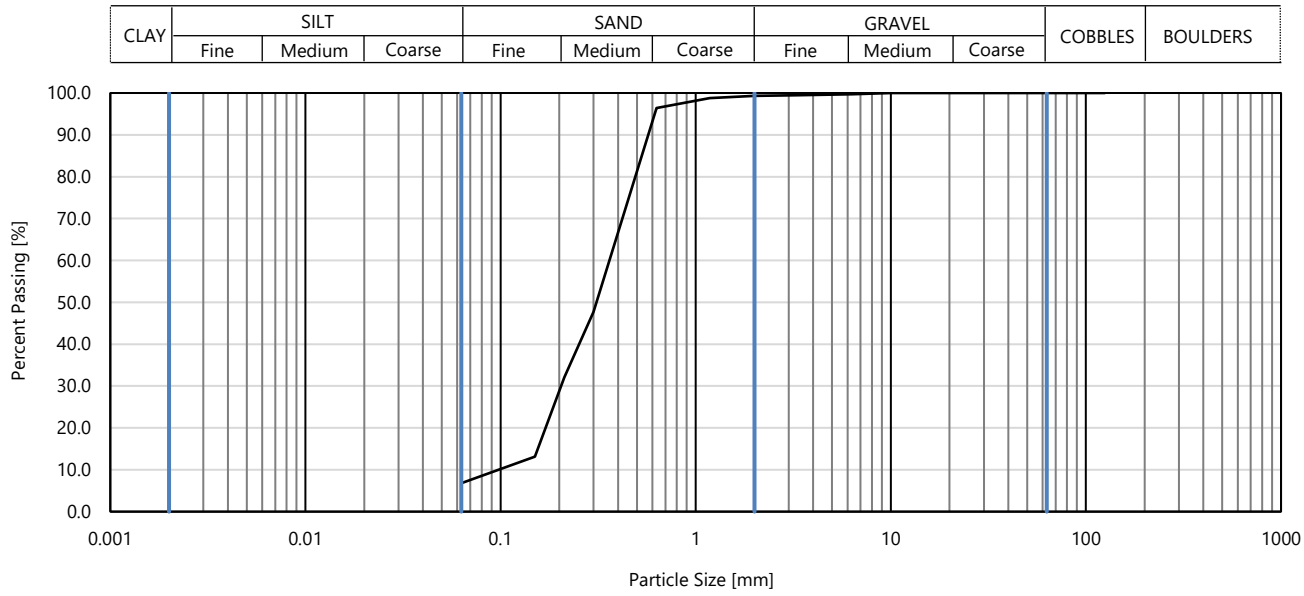
Fugro GeoServices Ltd. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

LABORATORY TEST CERTIFICATE
Determination of Particle Size Distribution

BS EN ISO 17892-4:2016 Clause 5.2

1483

Project Reference	G200015U			Location ID	TVBH 266s
Project Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Depth Top [m]	5.00
Specimen Description	Brown slightly gravelly clayey SAND			Sample Type	B
Specimen Reference		Specimen Depth [m]		Sample Reference	10



Sieving		Sedimentation	
Particle Size [mm]	**Passing [%]**	**Particle Size [mm]**	**Passing [%]**
125	100		
90.0	100		
75.0	100		
63.0	100		
37.5	100		
20.0	100		
10.0	100		
6.30	100		
3.35	100		
2.00	99		
1.18	99		
0.630	96		
0.300	48		
0.212	32		
0.150	13		
0.0630	7		

Dry Mass of Sample [g]	1504
Particle Density [Mg/m³]	

Sample Proportions	Dry Mass [%]
Very coarse	0.0
Gravel	0.7
Sand	92.5
Fines <0.063mm	6.8

Grading Analysis	
D100 [mm]	10
D60 [mm]	0.362
D30 [mm]	0.204
D10 [mm]	0.0982
Coefficient of Uniformity	3.7
Coefficient of Curvature	1.2

Issue Date	16/07/2021	Certificate Reference		Authorised by	lindsayc
Client	NNB Generation Company (SZC) Limited			Authorised Date	15/07/2021
Remarks:					

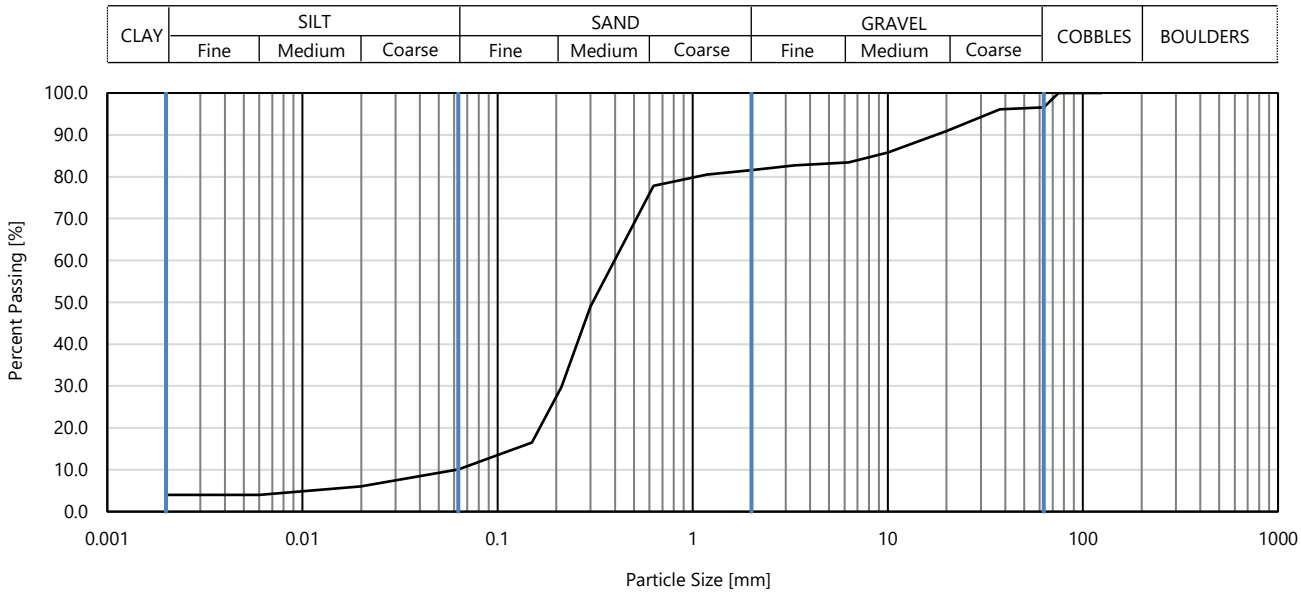
Fugro GeoServices Ltd. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

LABORATORY TEST CERTIFICATE
Determination of Particle Size Distribution

BS EN ISO 17892-4:2016 Clauses 5.2 and 5.4

1483

Project Reference	G200015U			Location ID	TVTH 265sA
Project Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Depth Top [m]	1.50
Specimen Description	Brown clayey gravelly SAND with low cobble content			Sample Type	B
Specimen Reference		Specimen Depth [m]		Sample Reference	11



Sieving		Sedimentation	
Particle Size [mm]	**Passing [%]**	**Particle Size [mm]**	**Passing [%]**
125	100	0.0199	6
90.0	100	0.00600	4
75.0	100	0.00199	4
63.0	97		
37.5	96		
20.0	91		
10.0	86		
6.30	83		
3.35	83		
2.00	82		
1.18	81		
0.630	78		
0.300	49		
0.212	30		
0.150	17		
0.0630	10		

Dry Mass of Sample [g]	16251
Particle Density [Mg/m³]	2.70 assumed

Sample Proportions	**Dry Mass [%]**
Very coarse	3.4
Gravel	15.0
Sand	71.4
Silt	6.3
Clay	3.9

Grading Analysis	
D100 [mm]	75
D60 [mm]	0.398
D30 [mm]	0.213
D10 [mm]	0.0609
Coefficient of Uniformity	6.5
Coefficient of Curvature	1.9

Issue Date	16/07/2021	Certificate Reference		Authorised by	lindsayc
Client	NNB Generation Company (SZC) Limited			Authorised Date	16/07/2021
Remarks:	Insufficient material to comply with the recommended minimum mass.				

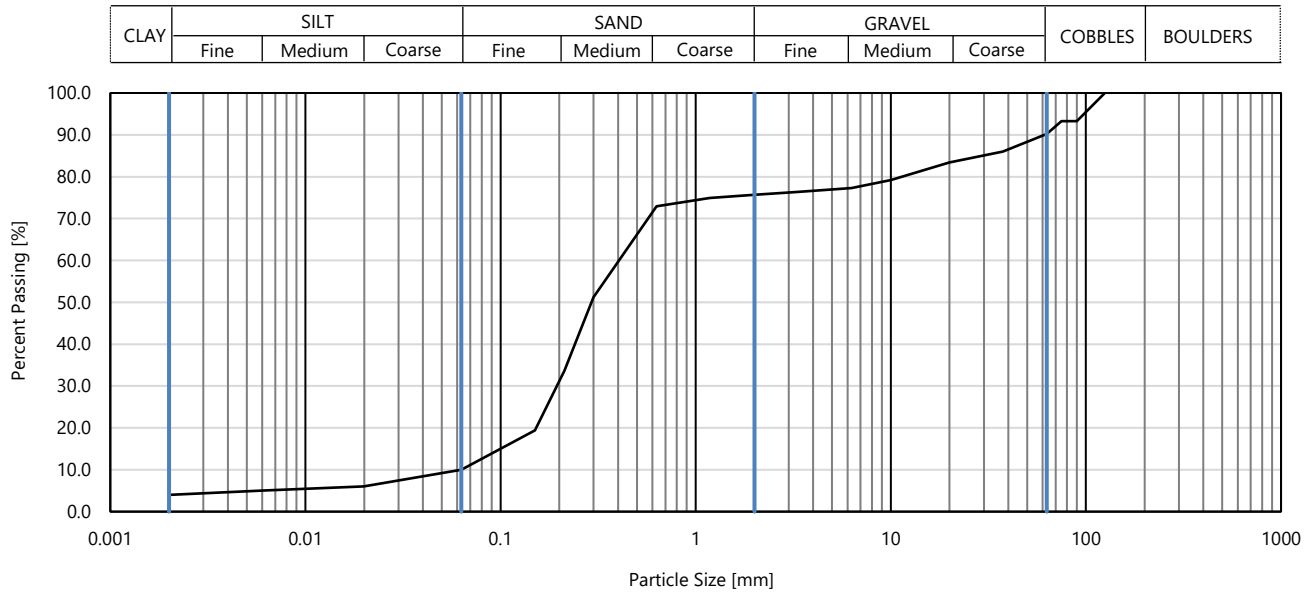
Fugro GeoServices Ltd. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

LABORATORY TEST CERTIFICATE
Determination of Particle Size Distribution

BS EN ISO 17892-4:2016 Clauses 5.2 and 5.4

1483

Project Reference	G200015U			Location ID	TVTH 265sA
Project Name	Sizewell Road Schemes - Infiltration Testing and Geotechnical Investigation			Depth Top [m]	2.50
Specimen Description	Brown clayey gravelly SAND with low cobble content			Sample Type	B
Specimen Reference		Specimen Depth [m]		Sample Reference	15



Sieving		Sedimentation	
Particle Size [mm]	**Passing [%]**	**Particle Size [mm]**	**Passing [%]**
125	100	0.0199	6
90.0	93	0.00600	5
75.0	93	0.00199	4
63.0	90		
37.5	86		
20.0	83		
10.0	79		
6.30	77		
3.35	76		
2.00	76		
1.18	75		
0.630	73		
0.300	51		
0.212	34		
0.150	19		
0.0630	10		

Dry Mass of Sample [g]	15859
Particle Density [Mg/m³]	2.70 assumed

Sample Proportions	**Dry Mass [%]**
Very coarse	9.8
Gravel	14.5
Sand	65.6
Silt	6.3
Clay	3.8

Grading Analysis	
D100 [mm]	125
D60 [mm]	0.405
D30 [mm]	0.194
D10 [mm]	0.0623
Coefficient of Uniformity	6.5
Coefficient of Curvature	1.5

Issue Date	16/07/2021	Certificate Reference		Authorised by	lindsayc
Client	NNB Generation Company (SZC) Limited			Authorised Date	16/07/2021
Remarks:	Insufficient material to comply with the recommended minimum mass.				

Fugro GeoServices Ltd. Unit 43, Number One Industrial Estate, Medomsley Road, Consett, DH8 6TW

APPENDIX B: POLLUTION MITIGATION MEASAURES ASSESSMENT

TECHNICAL NOTE 16

DATE:	26 October 2021	**CONFIDENTIALITY:**	Internal
SUBJECT:	Drainage Network Water Quality Assessment		
PROJECT:	Two Village Bypass	**AUTHOR :**	[redacted]
CHECKED:	[redacted]	**APPROVED:**	[redacted]

TWO VILLAGE BYPASS – POLLUTION ASSESSMENT REPORT

1 INTRODUCTION

1.1. WSP has been commissioned by Sizewell Co. (SZC) to validate and develop the design of the Two Village Bypass (TVBP) that was submitted to the Planning Inspectorate as part of a Development Consent Order (DCO) application to build and operate a new nuclear power station to the north of Sizewell B. The TVBP shall be designed to Suffolk County Council's (SCC) adoptable standards.

1.2. The TVBP forms one of the Associated Developments (AD) which are required to mitigate traffic impacts arising from the Main Development Site construction activities. The Two Village Bypass consists of a new 2.4 km long single carriageway road bypassing the villages of Stratford St Andrew and Farnham. The new bypass will connect to the existing A12 via at grade roundabouts at both the western and eastern ends of the scheme. The roundabout at the western end ties in with the existing A12 Main Road and the roundabout at the eastern end ties in with the A12 Main Road and Friday Street.

1.3. TVBP and its associated side roads will require provision of highway drainage infrastructure to effectively remove highway runoff for disposal. Highway runoff will collect contaminants from the road surface which can cause pollution to the receiving water body whether it be watercourse or aquafer. The extent of pollution and whether it is low so as to be acceptable depends on the discharge rate and volume. It also depends on the drainage infrastructure (treatment train) provided which can remove some contaminants, the receiving water body and discharge dilution rate.

1.4. In addition to general lower level pollution in the highway runoff produced by rainfall, there is a risk that pollution may occur as a result of road traffic accident or other incident resulting in spillage onto the highway.

1.5. Prior to the DCO submission, pollution risk was discussed in workshops attended by SCC and the Environment Agency (EA). They both confirmed that an assessment of pollution risk is required. Since the TVBP is a highway and is designed in accordance with the requirements of Design Manual for Roads and Bridges (DMRB), it was agreed that the Highways England Water Risk Assessment Tool (HEWRAT) would be used as a basis for assessment. The HEWRAT assessment methodology is set out in DMRB LA113.

1.6. This Technical Note (TN) 16 Pollution Assessment Report sets outs the results of the HEWRAT assessment. The calculations and results are contained in Appendix A.

TECHNICAL NOTE 16

DATE:	26 October 2021	**CONFIDENTIALITY:**	Internal
SUBJECT:	Drainage Network Water Quality Assessment		
PROJECT:	Two Village Bypass	**AUTHOR :**	[redacted]
CHECKED:	[redacted]	**APPROVED:**	[redacted]

2 PURPOSE

2.1 This TN provides details of an assessment of pollution risk to water bodies as a result of construction and use of the TVBP and its associated side roads due to

- Contaminates which are contained in highway runoff generated by rainfall
- Accidental spillage of contaminates on the highway

2.2 The assessment methodology is described in the results report shown in Appendix A, The methodology includes for an assessment of the effectiveness of the treatment train infrastructure provided which has the effect of reducing the pollution load on the receiving water body. In this case the treatment infrastructure consists of the shallow vegetated channels or swales, filter drains and infiltration basins.

3 SCOPE OF WORK

3.1 The assessment includes all of the TVBP and its associated side roads. The assessment was undertaken during the Preliminary Design stage but before its completion and results became available in January 2021. As such the results are based on the drainage design strategy being developed at December 2020.

3.2 For the TVBP the design was based on the assumption that all highway runoff discharges into infiltration basins and no discharge into watercourse.

3.3 Along the line of the TVBP, other than on the River Alde embankment, highway runoff would be discharged from the road and over the edge into a shallow vegetated channel where the road is at level grade or in cutting or into a swale vegetated channel where the road is on embankment. Runoff collected in the channel or swale filters through the vegetation and is collected in an underlying filter drain. Runoff passes through the filter drain where a proportion of flow infiltrates to ground and the remainder flows into one of four infiltration basins where final infiltration to ground takes place. The channels, swales and infiltration basins provide treatment by settling out solids and absorbtion of pollutants by vegetation.

3.3 The highway runoff along the River Alde embankment would be collected by an impermeable channel and discharged to Infiltration Basin 1 located to the west of the river embankment. This is to prevent infiltration into the embankment structure.

3.4 Highway runoff from the A12 roundabouts would be collected by highway gullies and collector drains. The collector drains would discharge into Infiltration Basin 1 at the west roundabout and Infiltration Basins 3 and 4 at the north east roundabout respectively.

3.5 HEWRAT has separate assessment methodologies for discharge to watercourse and infiltration to ground. The TVBP assessment uses the infiltration to ground methodology.

4 CONCLUSIONS

4.1 Following completion of the HEWRAT assessment using the drainage layout and treatment train infrastructure provided it can be confirmed that the arrangements result in a pass for the pollutants. This would indicate that applying DMRB standards, the polluting impact of highway runoff is sufficiently low such that no additional treatment measures are required. However as discussed with SCC, further treatment trains such as infiltration basin sediment forebays and defined vegetation such as reed beds will be incorporated at detailed design stage to optimise maintenance requirements and further enhance runoff treatment and biodiversity.

4.2 The HEWRAT assessment results confirming a pass with no additional treatment required have been reported to SCC through the Design Review meetings and the report will be shared for formal comment. SCC have indicated that irrespective, they may wish to see additional treatment trains added for additional mitigation of pollution risk. If such additional treatment is required, this will be included as part of Detailed Design.

5 NEXT STEPS

5.1 As noted, the HEWRAT assessment was undertaken for the design as proposed in December 2020. The final Preliminary Design has developed with a number of changes.

5.2 It was originally assumed that due to relative ground levels two Infiltration Basins would be required at the north east roundabout and these are shown as Infiltration basins 3 and 4. Following provision of detailed topography it has been determined that only one is required. The calculations contained in Appendix A show two separate basins IB03 and IB04. Merging of these basins does not change the results concluding that the there is a low risk of impact on water quality.

5.3 Following provision of detailed topography, it has been determined that a 140 m length of the west A12 Roundabout northern arm can't drain by gravity back to Infiltration Basin 1. Initially it was proposed that this length of road would discharge to a soakaway manhole. However following infiltration testing at the soakaway location infiltration is confirmed to be unviable. Alternative options have been proposed of which discharge by gravity into a local watercourse is favoured. Selection of option will be required prior to the commencement of detailed design. Since traffic which currently uses this section of the A12 will in future use the TVBP, the traffic and resulting pollution loading of highway runoff will be significantly reduced.

DATE:	26 October 2021	**CONFIDENTIALITY:**	Internal
SUBJECT:	Drainage Network Water Quality Assessment		
PROJECT:	Two Village Bypass	**AUTHOR :**	[redacted]
CHECKED:	[redacted]	**APPROVED:**	[redacted]

5.4 Hill Farm Lane was proposed to be drained via swales and filter drains which remove some of the highway runoff by infiltration. These would outfall to a soakaway manhole which would infiltrate remaining runoff. However following infiltration testing at the soakaway location infiltration is confirmed to be unviable. An alternative of a deep borehole soakaway is proposed. This would extend through the impermeable surface strata and allow infiltration into the underlying granular material. The viability of this option has been confirmed by infiltration testing. SCC have confirmed that the deep soakaway is acceptable in principle.

5.5 These A12 roundabout west and Hill Farm Lane changes have not been subject to HEWRAT assessment. Subject to confirmation from SCC it may be necessary to undertake a HEWRAT assessment to confirm that they will also pass as low risk such that discharge to ground and watercourse respectively is acceptable. If required, the assessment should be undertaken in advance of or at the commencement of Detailed Design

APPENDIX A

DRAINAGE NETWORK WATER QUALITY ASSESSMENT

1. INTRODUCTION

WSP have been commissioned to complete the preliminary drainage design for the Two Village Bypass, Suffolk. A water quality assessment has been carried out to confirm that the proposed drainage design provides suitable treatment of highway runoff before it is discharged to ground. This technical note summarises the results of the assessment.

2. DATA SOURCES

The following data was used for the assessments:

1. Impermeable and permeable highway catchment areas drainage to each infiltration basin
2. Annual Average Traffic Flow (AADT) and Percentage HGVs for the Two Village Bypass and associated roads. Provided from the most recent traffic model for the scheme.
3. Rainfall depth informed by the maps in the HEWRAT user guide
4. Ground Investigation data for the site

TECHNICAL NOTE 16

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PROJECT:	Two Village Bypass	**AUTHOR :**	[redacted]
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3. ASSESSMENT METHODOLOGY

The simple assessment methodology set out in DMRB LA113 was used to assess impact of the proposed drainage design on water quality of the underlying groundwater body.

An assessment of impacts from routine runoff to groundwater quality (Appendix C of LA113) was completed for the four proposed infiltration basins.

An assessment of spillage risk for the four infiltration basins was completed (Appendix D of LA113).

4. ASSESSMENT RESULTS

a. Groundwater Quality (Method C)

The assessment results are presented in *Table 1* below. In conclusion the impact to the underlying groundwater via each of the infiltration basins is determined to be low risk. The proposed drainage includes sufficient treatment of highway runoff prior to discharging to groundwater.

b. Spillage Risk (Method D)

The spillage risk for each basin is less than 0.5% which is acceptable and satisfies the standards set out in LA113. The input parameters used and results are presented in Table 2

	Parameter	IB03			IB04		
		Value	Risk Score	Score	Value	Risk Score	Score
Source	Traffic flow	21000	1	10	21000	1	10
	Rainfall depth	550mm	1	10	550mm	1	10
	Drainage area ratio	6.5	1	10	4.4	1	10
Pathway	Infiltration method	Region	2	30	Region	2	30
	Unsaturated zone	>15 bgl	1	20	>15 bgl	1	20
	Flow type	Intergranular	1	20	Intergranular	1	20

TECHNICAL NOTE 16

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	Parameter	IB03			IB04		
		Value	Risk Score	Score	Value	Risk Score	Score
	Unsaturated zone clay content	37.1%	1	5	8.8%	2	10
	Organic carbon	5.4%	2	10	1.9%	2	10
	Unsaturated zone soil pH	7.4	2	10	7.8	2	10
	TOTAL			**125 Low risk**			**130 Low risk**

Table 2

TECHNICAL NOTE 16

DATE:	26 October 2021	**CONFIDENTIALITY:**	Internal
SUBJECT:	Drainage Network Water Quality Assessment		
PROJECT:	Two Village Bypass	**AUTHOR :**	[redacted]
CHECKED:	[redacted]	**APPROVED:**	[redacted]

Table 1 - Input parameters and results for the assessment of impact to groundwater quality for Two Village Bypass.

	Parameter	IB01			IB02		
		Value	Risk Score	Score	Value	Risk Score	Score
Source	Traffic flow	21000	1	10	21000	1	10
	Rainfall depth	550mm	1	10	550mm	1	10
	Drainage area ratio	4.7	1	10	3.1	1	10
Pathway	Infiltration method	Region	2	30	Region	2	30
	Unsaturated zone	<15 bgl	1	20	24.8mbgl	1	20
	Flow type	Intergranular	1	20	Intergranular	1	20
	Unsaturated zone clay content	6.9%	2	10	2.3%	2	10
	Organic carbon	5.1%	2	10	0.2%	3	15
	Unsaturated zone soil pH	7.6	2	10	8	1	5
	TOTAL			**130 Low risk**			**130 Low risk**

TECHNICAL NOTE 16

DATE:	21 October 2021	**CONFIDENTIALITY:**	Confidential
SUBJECT:	Sizewell C - Associated Development Major Highway Schemes – Two Village Bypass		
PROJECT:	70071213	**AUTHOR:**	[redacted]
CHECKED:	[redacted]	**APPROVED:**	[redacted]

	Parameter	IB03			IB04		
		Value	Risk Score	Score	Value	Risk Score	Score
Source	Traffic flow	21000	1	10	21000	1	10
	Rainfall depth	550mm	1	10	550mm	1	10
	Drainage area ratio	6.5	1	10	4.4	1	10
Pathway	Infiltration method	Region	2	30	Region	2	30
	Unsaturated zone	>15 bgl	1	20	>15 bgl	1	20
	Flow type	Intergranular	1	20	Intergranular	1	20
	Unsaturated zone clay content	37.1%	1	5	8.8%	2	10
	Organic carbon	5.4%	2	10	1.9%	2	10
	Unsaturated zone soil pH	7.4	2	10	7.8	2	10
	TOTAL			**125 Low risk**			**130 Low risk**

TECHNICAL NOTE 16

DATE:	21 October 2021	**CONFIDENTIALITY:**	Confidential
SUBJECT:	Sizewell C - Associated Development Major Highway Schemes – Two Village Bypass		
PROJECT:	70071213	**AUTHOR:**	[redacted]
CHECKED:	[redacted]	**APPROVED:**	[redacted]

Table 2 - Input parameters and results of assessment of spillage risk at Two Village Bypass.

Road label	Length (km)	Road type	Junction type	AADT	%HGV	PSPL [1]	PPOL [2]	PINC[3]	RRF [4]	Mitigated PINC
IB01.01	0.168	Rural Trunk Road	Roundabout	21138	4%	0.0002%	0.6	0.0001%	0.48	0.0000%
IB01.02	0.1	Rural Trunk Road	Roundabout	4020	0%	0.0000%	0.6	0.0000%	0.48	0.0000%
IB01.03	0.1	Rural Trunk Road	Roundabout			0.0000%	0.6	0.0000%	0.48	0.0000%
IB01.04	0.1	Rural Trunk Road	Roundabout	398	10%	0.0000%	0.6	0.0000%	0.48	0.0000%
IB01.05	0.1	Rural Trunk Road	Roundabout	21138	4%	0.0001%	0.6	0.0001%	0.48	0.0000%
IB01.06	0.495	Rural Trunk Road	No Junction	21138	4%	0.0000%	0.6	0.0000%	0.48	0.0000%
IB01: TOTAL										0.**0001**%
IB02.01	0.361	Rural Trunk Road	No Junction	21138	4%	0.0000%	0.6	0.0000%	0.48	0.0000%
IB02.02	0.1	Rural Trunk Road	Side Road	21138	4%	0.0000%	0.6	0.0000%	0.48	0.0000%
IB02.03	0.1	Rural Trunk Road	Side Road			0.0000%	0.6	0.0000%	0.48	0.0000%
IB02.04	0.1	Rural Trunk Road	Side Road	21138	4%	0.0000%	0.6	0.0000%	0.48	0.0000%
IB02.05	0.1	Rural Trunk Road	Side Road			0.0000%	0.6	0.0000%	0.48	0.0000%
IB02.06	0.076	Rural Trunk Road	Side Road	21138	4%	0.0000%	0.6	0.0000%	0.48	0.0000%

[1] PSPL = annual probability of a spillage with the potential to cause a serious pollution incident
[2] PPOL = the probability, given a spillage, that a serious pollution incident will result. The location was considered to be rural with a response time to site of <1 hour.
[3] PINC = the probability of a spillage with an associated risk of a serious pollution incident occurring
[4] RRF = risk reduction factor. Implementation of swales and an infiltration basin provide a RRF of 0.48 according to the values provided in Table 8.6.4N3 of CG501. Infiltration basin has half the efficiency stated in CG501 as it is part of a linear treatment train.

TECHNICAL NOTE 16

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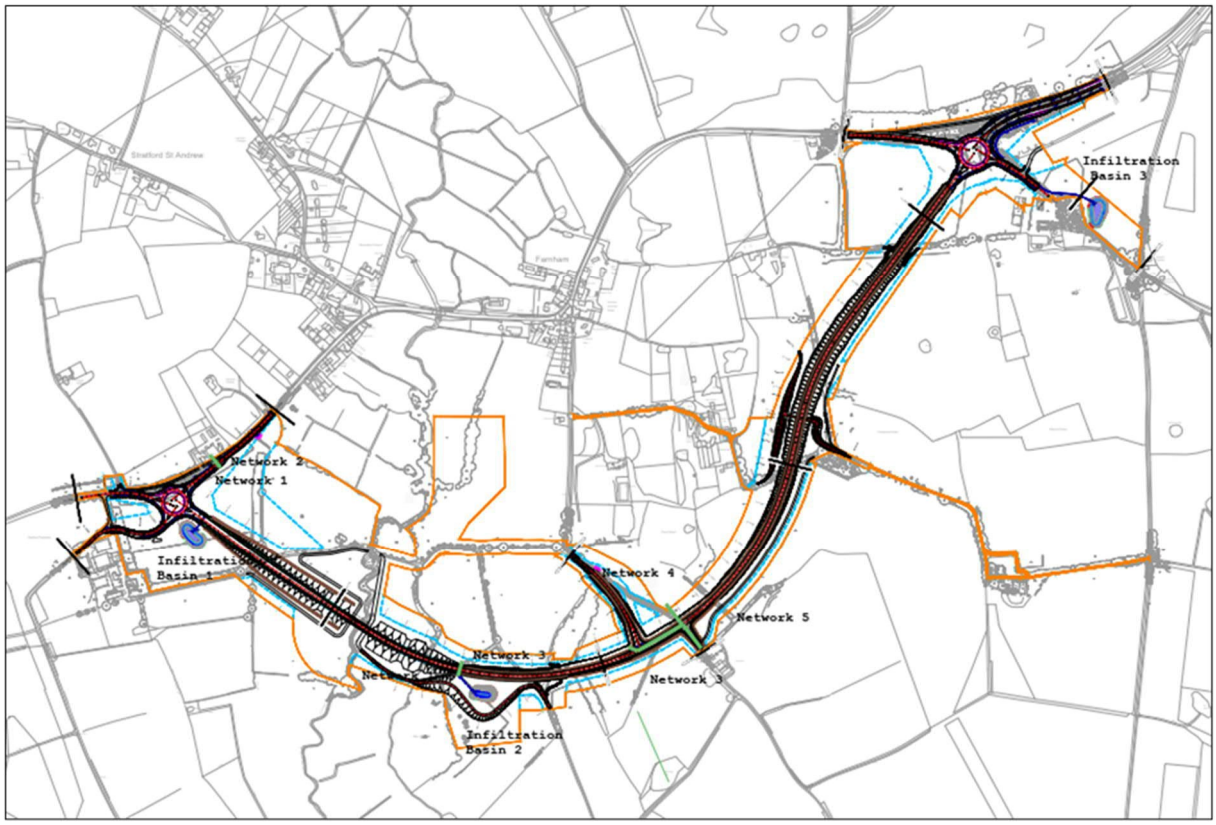
CHECKED:	[redacted]	**APPROVED:**	[redacted]

Road label	Length (km)	Road type	Junction type	AADT	%HGV	PSPL [1]	PPOL [2]	PINC[3]	RRF [4]	Mitigated PINC
IB02: TOTAL										0.**0000**%
IB03.01	0.025	Rural Trunk Road	Side Road	21138	4%	0.0000 %	0.6	0.0000 %	0.48	0.0000%
IB03.02	0.1	Rural Trunk Road	No Junction	21138	4%	0.0001 %	0.6	0.0001 %	0.48	0.0000%
IB03.03	0.037	Rural Trunk Road	Roundabout	21138	4%	0.0000 %	0.6	0.0000 %	0.48	0.0000%
IB03: TOTAL										**0.0000%**
IB04.01	0.197	Rural Trunk Road	Roundabout	21138	4%	0.0002 %	0.6	0.0001 %	0.48	0.0001%
IB04.02	0.1	Rural Trunk Road	Roundabout	511	10%	0.0000 %	0.6	0.0000 %	0.48	0.0000%
IB04.03	0.064	Rural Trunk Road	Roundabout	21138	4%	0.0001 %	0.6	0.0000 %	0.48	0.0000%
IB04.04	0.1	Rural Trunk Road	Roundabout	16855	4%	0.0001 %	0.6	0.0000 %	0.48	0.0000%
IB04.05	0.175	Rural Trunk Road	No Junction	16855	4%	0.0000 %	0.6	0.0000 %	0.48	0.0000%
IB04.06	0.1	Rural Trunk Road	Roundabout	8842	2%	0.0000 %	0.6	0.0000 %	0.48	0.0000%
IB04: TOTAL										**0.0001%**

APPENDIX C: HYDRAULIC MODELLING RESULTS FOR NETWORKS 1 -5

LOCATION PLAN


Infiltration Basin 3
Network 2
Network 1
Network 4
Network 5
Network 3
Network 6
Infiltration Basin 2

NETWORK 1 CATCHMENT

A12 ROUNDABOUT WEST AND RIVER ALDE CROSSING DRAINING TO INFILTRATION BASIN 1

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for A12 Western Roundabout Section-Road Sub-Catchment 1

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	2013
Site Location	GB 640286 267538 TM 40286 67538
Data Type	Point
Maximum Rainfall (mm/hr)	500
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for A12 Western Roundabout Section-Road Sub-Catchment 1

Time (mins)	Area (ha)	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	0.362	4-8	0.578	8-12	0.287	12-16	0.124	16-20	0.091	20-24	0.044	24-28	0.007

Total Area Contributing (ha) = 1.493

Total Pipe Volume (m^3) = 54.849

Network Design Table for A12 Western Roundabout Section-Road Sub-Catchment 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
N1-1.000	57.724	0.592	97.5	0.062	15.00	0.0	0.600	o	150	Pipe/Conduit	
N1-1.001	51.519	0.882	58.4	0.033	0.00	0.0	0.600	o	150	Pipe/Conduit	
N1-1.002	23.604	0.366	64.5	0.044	0.00	0.0	0.600	o	150	Pipe/Conduit	
N1-1.003	47.287	0.681	69.4	0.033	0.00	0.0	0.600	o	150	Pipe/Conduit	
N1-2.000	33.647	0.656	51.3	0.039	15.00	0.0	0.600	o	150	Pipe/Conduit	
N1-2.001	40.165	0.532	75.5	0.026	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)
N1-1.000	33.02	15.95	10.628	0.062	0.0	0.0	0.0	1.02	18.0	5.6
N1-1.001	32.23	16.60	10.036	0.095	0.0	0.0	0.0	1.32	23.3	8.3
N1-1.002	31.86	16.91	9.154	0.139	0.0	0.0	0.0	1.25	22.2	12.0
N1-1.003	31.12	17.56	8.788	0.172	0.0	0.0	0.0	1.21	21.4	14.5
N1-2.000	33.71	15.40	9.295	0.039	0.0	0.0	0.0	1.41	24.9	3.5
N1-2.001	32.98	15.98	8.639	0.065	0.0	0.0	0.0	1.16	20.5	5.8

Network Design Table for A12 Western Roundabout Section-Road Sub-Catchment 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
N1-1.004	8.204	0.064	128.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
N1-1.005	55.024	0.228	241.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
N1-1.006	27.550	0.100	275.5	0.021	0.00	0.0	0.600	o	225	Pipe/Conduit	
N1-1.007	27.766	0.116	239.4	0.043	0.00	0.0	0.600	o	225	Pipe/Conduit	
N1-1.008	28.996	0.133	218.0	0.073	0.00	0.0	0.600	o	225	Pipe/Conduit	
N1-3.000	38.890	0.387	100.5	0.031	15.00	0.0	0.600	o	150	Pipe/Conduit	
N1-3.001	31.841	0.333	95.6	0.014	0.00	0.0	0.600	o	150	Pipe/Conduit	
N1-4.000	49.265	0.579	85.1	0.000	15.00	0.0	0.600	o	150	Pipe/Conduit	
N1-4.001	39.302	0.586	67.1	0.021	0.00	0.0	0.600	o	150	Pipe/Conduit	
N1-4.002	19.979	0.207	96.5	0.006	0.00	0.0	0.600	o	150	Pipe/Conduit	
N1-4.003	18.821	0.298	63.2	0.011	0.00	0.0	0.600	o	150	Pipe/Conduit	
N1-3.002	9.339	0.111	84.1	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
N1-3.003	10.168	0.103	98.7	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
N1-5.000	48.684	0.533	91.3	0.028	15.00	0.0	0.600	o	150	Pipe/Conduit	
N1-5.001	21.424	0.406	52.8	0.016	0.00	0.0	0.600	o	150	Pipe/Conduit	
N1-3.004	38.051	0.246	154.7	0.031	0.00	0.0	0.600	o	150	Pipe/Conduit	
N1-3.005	26.580	0.455	58.4	0.022	0.00	0.0	0.600	o	150	Pipe/Conduit	
N1-6.000	90.231	1.819	49.6	0.110	15.00	0.0	0.600	o	150	Pipe/Conduit	
N1-6.001	84.591	0.592	142.9	0.101	0.00	0.0	0.600	o	225	Pipe/Conduit	
N1-6.002	28.475	0.252	113.0	0.028	0.00	0.0	0.600	o	225	Pipe/Conduit	
N1-6.003	62.019	0.425	145.9	0.038	0.00	0.0	0.600	o	225	Pipe/Conduit	
N1-6.004	90.000	0.647	139.1	0.046	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)
N1-1.004	30.99	17.68	8.032	0.237	0.0	0.0	0.0	1.15	45.9	19.9
N1-1.005	29.84	18.78	7.968	0.237	0.0	0.0	0.0	0.84	33.3	19.9
N1-1.006	29.26	19.36	7.740	0.258	0.0	0.0	0.0	0.78	31.1	20.4
N1-1.007	28.74	19.91	7.640	0.300	0.0	0.0	0.0	0.84	33.4	23.4
N1-1.008	28.24	20.46	7.524	0.373	0.0	0.0	0.0	0.88	35.0	28.5
N1-3.000	33.40	15.65	9.821	0.031	0.0	0.0	0.0	1.00	17.7	2.8
N1-3.001	32.75	16.16	9.434	0.045	0.0	0.0	0.0	1.03	18.2	4.0
N1-4.000	33.26	15.75	10.771	0.000	0.0	0.0	0.0	1.09	19.3	0.0
N1-4.001	32.60	16.29	10.192	0.021	0.0	0.0	0.0	1.23	21.7	1.9
N1-4.002	32.21	16.61	9.606	0.027	0.0	0.0	0.0	1.02	18.1	2.3
N1-4.003	31.92	16.86	9.399	0.037	0.0	0.0	0.0	1.27	22.4	3.2
N1-3.002	31.76	17.00	9.101	0.082	0.0	0.0	0.0	1.10	19.4	7.1
N1-3.003	31.57	17.17	8.990	0.082	0.0	0.0	0.0	1.01	17.9	7.1
N1-5.000	33.24	15.77	9.826	0.028	0.0	0.0	0.0	1.05	18.6	2.5
N1-5.001	32.92	16.03	9.293	0.044	0.0	0.0	0.0	1.39	24.5	3.9
N1-3.004	30.69	17.96	8.887	0.157	0.0	0.0	0.0	0.81	14.2	13.0
N1-3.005	30.34	18.29	8.641	0.179	0.0	0.0	0.0	1.32	23.3	14.7
N1-6.000	32.89	16.05	13.405	0.110	0.0	0.0	0.0	1.43	25.3	9.8
N1-6.001	31.37	17.34	11.511	0.210	0.0	0.0	0.0	1.09	43.4	17.9
N1-6.002	30.94	17.73	10.919	0.238	0.0	0.0	0.0	1.23	48.9	19.9
N1-6.003	29.93	18.68	10.667	0.276	0.0	0.0	0.0	1.08	42.9	22.4
N1-6.004	28.62	20.04	10.242	0.323	0.0	0.0	0.0	1.11	44.0	25.0

Network Design Table for A12 Western Roundabout Section-Road Sub-Catchment 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
N1-6.005	89.570	0.451	198.6	0.080	0.00	0.0	0.600	o	225	Pipe/Conduit	
N1-6.006	92.304	0.650	142.0	0.109	0.00	0.0	0.600	o	225	Pipe/Conduit	
N1-6.007	90.460	0.383	236.2	0.077	0.00	0.0	0.600	o	300	Pipe/Conduit	
N1-3.006	15.358	0.720	21.3	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
N1-7.000	90.001	0.966	93.2	0.110	15.00	0.0	0.600	o	150	Pipe/Conduit	
N1-7.001	90.003	0.616	146.1	0.046	0.00	0.0	0.600	o	150	Pipe/Conduit	
N1-7.002	90.021	0.660	136.4	0.038	0.00	0.0	0.600	o	150	Pipe/Conduit	
N1-7.003	92.063	0.804	114.5	0.068	0.00	0.0	0.600	o	225	Pipe/Conduit	
N1-1.009	18.633	0.094	198.2	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
N1-1.010	8.445	0.064	131.9	0.090	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)
N1-6.005	27.22	21.66	9.595	0.402	0.0	0.0	0.0	0.92	36.7	29.6
N1-6.006	26.11	23.06	9.144	0.511	0.0	0.0	0.0	1.10	43.5	36.2
N1-6.007	25.06	24.54	8.419	0.588	0.0	0.0	0.0	1.02	72.0	39.9
N1-3.006	25.01	24.62	8.036	0.768	0.0	0.0	0.0	3.42	241.7	52.0
N1-7.000	32.42	16.44	10.512	0.110	0.0	0.0	0.0	1.04	18.4	9.7
N1-7.001	30.38	18.25	9.546	0.156	0.0	0.0	0.0	0.83	14.7	12.9
N1-7.002	28.66	20.00	8.930	0.194	0.0	0.0	0.0	0.86	15.2	15.1
N1-7.003	27.55	21.25	8.195	0.262	0.0	0.0	0.0	1.22	48.5	19.5
N1-1.009	24.84	24.86	7.241	1.403	0.0	0.0	0.0	1.28	141.7	94.4
N1-1.010	24.78	24.95	7.147	1.493	0.0	0.0	0.0	1.58	174.0	100.2

Manhole Schedules for A12 Western Roundabout Section-Road Sub-Catchment 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
N1-1-0	11.978	1.350	Open Manhole	1200	N1-1.000	10.628	150				
N1-1-1	11.386	1.350	Open Manhole	1200	N1-1.001	10.036	150	N1-1.000	10.036	150	
N1-1-2	10.496	1.342	Open Manhole	1200	N1-1.002	9.154	150	N1-1.001	9.154	150	
N1-1-3	10.138	1.350	Open Manhole	1200	N1-1.003	8.788	150	N1-1.002	8.788	150	
N1-2-0	10.645	1.350	Open Manhole	1200	N1-2.000	9.295	150				
N1-2-1	9.989	1.350	Open Manhole	1200	N1-2.001	8.639	150	N1-2.000	8.639	150	
N1-1-4	9.457	1.425	Open Manhole	1200	N1-1.004	8.032	225	N1-1.003	8.107	150	
								N1-2.001	8.107	150	
N1-1-5	9.743	1.775	Open Manhole	1200	N1-1.005	7.968	225	N1-1.004	7.968	225	
N1-1-6	10.115	2.375	Open Manhole	1200	N1-1.006	7.740	225	N1-1.005	7.740	225	
N1-1-7	10.165	2.525	Open Manhole	1200	N1-1.007	7.640	225	N1-1.006	7.640	225	
N1-1-8	10.049	2.525	Open Manhole	1200	N1-1.008	7.524	225	N1-1.007	7.524	225	
N1-3-0	11.171	1.350	Open Manhole	1200	N1-3.000	9.821	150				
N1-3-1	10.959	1.525	Open Manhole	1200	N1-3.001	9.434	150	N1-3.000	9.434	150	
N1-4-0	12.121	1.350	Open Manhole	1200	N1-4.000	10.771	150				
N1-4-1	11.542	1.350	Open Manhole	1200	N1-4.001	10.192	150	N1-4.000	10.192	150	
N1-4-2	10.956	1.350	Open Manhole	1200	N1-4.002	9.606	150	N1-4.001	9.606	150	
N1-4-3	10.849	1.450	Open Manhole	1200	N1-4.003	9.399	150	N1-4.002	9.399	150	
N1-3-2	10.576	1.475	Open Manhole	1200	N1-3.002	9.101	150	N1-3.001	9.101	150	
								N1-4.003	9.101	150	
N1-3-3	10.569	1.579	Open Manhole	1200	N1-3.003	8.990	150	N1-3.002	8.990	150	
N1-5-0	11.176	1.350	Open Manhole	1200	N1-5.000	9.826	150				
N1-5-1	10.843	1.550	Open Manhole	1200	N1-5.001	9.293	150	N1-5.000	9.293	150	
N1-3-4	10.462	1.575	Open Manhole	1200	N1-3.004	8.887	150	N1-3.003	8.887	150	
								N1-5.001	8.887	150	
N1-3-5	9.991	1.350	Open Manhole	1200	N1-3.005	8.641	150	N1-3.004	8.641	150	
N1-6-0	14.755	1.350	Open Manhole	1200	N1-6.000	13.405	150				
N1-6-1	12.936	1.425	Open Manhole	1200	N1-6.001	11.511	225	N1-6.000	11.586	150	
N1-6-2	12.344	1.425	Open Manhole	1200	N1-6.002	10.919	225	N1-6.001	10.919	225	
N1-6-3	12.292	1.625	Open Manhole	1200	N1-6.003	10.667	225	N1-6.002	10.667	225	
N1-6-4	11.867	1.625	Open Manhole	1200	N1-6.004	10.242	225	N1-6.003	10.242	225	
N1-6-5	11.220	1.625	Open Manhole	1200	N1-6.005	9.595	225	N1-6.004	9.595	225	
N1-6-6	10.569	1.425	Open Manhole	1200	N1-6.006	9.144	225	N1-6.005	9.144	225	
N1-6-7	9.919	1.500	Open Manhole	1200	N1-6.007	8.419	300	N1-6.006	8.494	225	
N1-3-6	9.836	1.800	Open Manhole	1200	N1-3.006	8.036	300	N1-3.005	8.186	150	
								N1-6.007	8.036	300	
N1-7-0	11.862	1.350	Open Manhole	1200	N1-7.000	10.512	150				
N1-7-1	11.241	1.695	Open Manhole	1200	N1-7.001	9.546	150	N1-7.000	9.546	150	
N1-7-2	10.880	1.950	Open Manhole	1200	N1-7.002	8.930	150	N1-7.001	8.930	150	
N1-7-3	10.020	1.825	Open Manhole	1200	N1-7.003	8.195	225	N1-7.002	8.270	150	
N1-1-9	9.916	2.675	Open Manhole	1350	N1-1.009	7.241	375	N1-1.008	7.391	225	
								N1-3.006	7.316	300	
								N1-7.003	7.391	225	
N1-1-10	8.922	1.775	Open Manhole	1350	N1-1.010	7.147	375	N1-1.009	7.147	375	
N1-HW-1	9.053	1.970	Open Manhole	0		OUTFALL		N1-1.010	7.083	375	

Manhole Schedules for A12 Western Roundabout Section-Road Sub-Catchment 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
N1-1-0	635336.158	259738.819	635336.158	259738.819	Required	
N1-1-1	635393.437	259733.783	635393.437	259733.783	Required	
N1-1-2	635433.545	259703.796	635433.545	259703.796	Required	
N1-1-3	635432.046	259681.189	635432.046	259681.189	Required	
N1-2-0	635318.659	259670.197	635318.659	259670.197	Required	
N1-2-1	635351.860	259670.050	635351.860	259670.050	Required	
N1-1-4	635390.989	259661.541	635390.989	259661.541	Required	
N1-1-5	635391.010	259653.337	635391.010	259653.337	Required	
N1-1-6	635439.659	259675.370	635439.659	259675.370	Required	
N1-1-7	635461.411	259692.185	635461.411	259692.185	Required	
N1-1-8	635488.354	259697.061	635488.354	259697.061	Required	
N1-3-0	635534.983	259799.977	635534.983	259799.977	Required	
N1-3-1	635504.212	259776.195	635504.212	259776.195	Required	
N1-4-0	635355.120	259748.543	635355.120	259748.543	Required	
N1-4-1	635403.642	259740.838	635403.642	259740.838	Required	
N1-4-2	635440.288	259749.846	635440.288	259749.846	Required	
N1-4-3	635459.183	259755.247	635459.183	259755.247	Required	
N1-3-2	635477.559	259758.930	635477.559	259758.930	Required	
N1-3-3	635481.150	259750.309	635481.150	259750.309	Required	

Manhole Schedules for A12 Western Roundabout Section-Road Sub-Catchment 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
N1-5-0	635539.484	259793.087	635539.484	259793.087	Required	
N1-5-1	635502.391	259761.556	635502.391	259761.556	Required	
N1-3-4	635489.622	259744.686	635489.622	259744.686	Required	
N1-3-5	635500.568	259711.012	635500.568	259711.012	Required	
N1-6-0	636058.907	259378.021	636058.907	259378.021	Required	
N1-6-1	635972.705	259404.374	635972.705	259404.374	Required	
N1-6-2	635896.562	259441.047	635896.562	259441.047	Required	
N1-6-3	635872.085	259455.597	635872.085	259455.597	Required	
N1-6-4	635819.921	259489.143	635819.921	259489.143	Required	
N1-6-5	635745.085	259539.138	635745.085	259539.138	Required	
N1-6-6	635670.911	259589.347	635670.911	259589.347	Required	
N1-6-7	635596.097	259643.411	635596.097	259643.411	Required	
N1-3-6	635522.662	259696.235	635522.662	259696.235	Required	
N1-7-0	635813.240	259480.125	635813.240	259480.125	Required	
N1-7-1	635737.446	259528.657	635737.446	259528.657	Required	
N1-7-2	635662.012	259577.750	635662.012	259577.750	Required	
N1-7-3	635588.593	259629.834	635588.593	259629.834	Required	
N1-1-9	635513.884	259683.633	635513.884	259683.633	Required	
N1-1-10	635502.875	259668.600	635502.875	259668.600	Required	

Manhole Schedules for A12 Western Roundabout Section-Road Sub-Catchment 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
N1-HW-1	635495.957	259663.758			No Entry	

Area Summary for A12 Western Roundabout Section-Road Sub-Catchment 1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	Classification	Carriageway	100	0.062	0.062	0.062
1.001	Classification	Carriageway	100	0.033	0.033	0.033
1.002	Classification	Carriageway	100	0.029	0.029	0.029
	Classification	Carriageway	100	0.015	0.015	0.044
1.003	Classification	Carriageway	100	0.033	0.033	0.033
2.000	Classification	Carriageway	100	0.039	0.039	0.039
2.001	Classification	Carriageway	100	0.026	0.026	0.026
1.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
1.006	Classification	Carriageway	100	0.021	0.021	0.021
1.007	Classification	Carriageway	100	0.028	0.028	0.028
	Classification	Carriageway	100	0.015	0.015	0.043
1.008	Classification	Carriageway	100	0.054	0.054	0.054
	Classification	Carriageway	100	0.018	0.018	0.073
3.000	Classification	Carriageway	100	0.031	0.031	0.031
3.001	Classification	Carriageway	100	0.014	0.014	0.014
4.000	-	-	100	0.000	0.000	0.000
4.001	Classification	Carriageway	100	0.011	0.011	0.011
	Classification	Carriageway	100	0.010	0.010	0.021
4.002	Classification	Carriageway	100	0.006	0.006	0.006
4.003	Classification	Carriageway	100	0.011	0.011	0.011
3.002	-	-	100	0.000	0.000	0.000
3.003	-	-	100	0.000	0.000	0.000
5.000	Classification	Carriageway	100	0.019	0.019	0.019
	Classification	Carriageway	100	0.009	0.009	0.028
5.001	Classification	Carriageway	100	0.016	0.016	0.016
3.004	Classification	Carriageway	100	0.031	0.031	0.031
3.005	Classification	Carriageway	100	0.022	0.022	0.022
6.000	Classification	Carriageway	100	0.110	0.110	0.110
6.001	Classification	Carriageway	100	0.101	0.101	0.101
6.002	Classification	Carriageway	100	0.028	0.028	0.028
6.003	Classification	Carriageway	100	0.038	0.038	0.038
6.004	Classification	Carriageway	100	0.046	0.046	0.046
6.005	Classification	Carriageway	100	0.080	0.080	0.080
6.006	Classification	Carriageway	100	0.109	0.109	0.109
6.007	Classification	Carriageway	100	0.077	0.077	0.077
3.006	-	-	100	0.000	0.000	0.000
7.000	Classification	Carriageway	100	0.110	0.110	0.110
7.001	Classification	Carriageway	100	0.046	0.046	0.046
7.002	Classification	Carriageway	100	0.038	0.038	0.038
7.003	Classification	Carriageway	100	0.068	0.068	0.068
1.009	-	-	100	0.000	0.000	0.000
1.010	-	-	100	0.090	0.090	0.090
				Total	Total	Total
				1.493	1.493	1.493

Free Flowing Outfall Details for A12 Western Roundabout Section-Road Sub-Catchment 1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
N1-1.010	N1-HW-1	9.053	7.083	0.000	0	0

Simulation Criteria for A12 Western Roundabout Section-Road Sub-Catchment 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.500	Storm Duration (mins)	30
Ratio R	0.404		

Online Controls for A12 Western Roundabout Section-Road Sub-Catchment 1

Weir Manhole: N1-1-10, DS/PN: N1-1.010, Volume (m³): 4.4

Discharge Coef 0.544 Width (m) 0.300 Invert Level (m) 8.622

Storage Structures for A12 Western Roundabout Section-Road Sub-Catchment 1

Infiltration Basin Manhole: N1-1-10, DS/PN: N1-1.010

Invert Level (m) 7.072 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.06012 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.06012

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	400.0	1.850	1096.7

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Western Roundabout Section-Road Sub-Catchment 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
FEH Rainfall Version 2013 Cv (Summer) 0.750
Site Location GB 640286 267538 TM 40286 67538 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
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N1-1.000	N1-1-0	30 Winter	2	+0%	100/15 Summer	100/30 Winter			10.683	-0.095
N1-1.001	N1-1-1	15 Winter	2	+0%	30/15 Summer	100/30 Winter			10.099	-0.087
N1-1.002	N1-1-2	15 Winter	2	+0%	30/15 Summer	100/15 Summer			9.241	-0.063
N1-1.003	N1-1-3	15 Winter	2	+0%	5/15 Winter	100/15 Summer			8.894	-0.044
N1-2.000	N1-2-0	30 Winter	2	+0%	100/15 Summer				9.331	-0.114
N1-2.001	N1-2-1	15 Winter	2	+0%	30/15 Winter				8.695	-0.094
N1-1.004	N1-1-4	15 Winter	2	+0%	30/15 Summer	100/15 Winter			8.163	-0.094
N1-1.005	N1-1-5	15 Winter	2	+0%	30/15 Summer				8.109	-0.084
N1-1.006	N1-1-6	15 Winter	2	+0%	5/15 Winter				7.897	-0.068
N1-1.007	N1-1-7	15 Winter	2	+0%	5/15 Summer				7.803	-0.062
N1-1.008	N1-1-8	15 Winter	2	+0%	5/15 Summer				7.703	-0.046
N1-3.000	N1-3-0	30 Winter	2	+0%	100/15 Summer				9.859	-0.112
N1-3.001	N1-3-1	15 Winter	2	+0%	30/15 Summer				9.482	-0.102
N1-4.000	N1-4-0	240 Winter	2	+0%					10.771	-0.150
N1-4.001	N1-4-1	15 Winter	2	+0%	100/15 Summer				10.228	-0.114
N1-4.002	N1-4-2	15 Winter	2	+0%	30/15 Winter				9.652	-0.104
N1-4.003	N1-4-3	15 Winter	2	+0%	30/15 Summer				9.447	-0.102
N1-3.002	N1-3-2	15 Winter	2	+0%	5/15 Winter	100/30 Winter			9.176	-0.075
N1-3.003	N1-3-3	15 Winter	2	+0%	5/15 Summer				9.097	-0.043
N1-5.000	N1-5-0	30 Winter	2	+0%	100/15 Summer				9.861	-0.115
N1-5.001	N1-5-1	15 Winter	2	+0%	30/15 Summer				9.334	-0.109
N1-3.004	N1-3-4	15 Winter	2	+0%	2/15 Summer				9.069	0.032
N1-3.005	N1-3-5	15 Winter	2	+0%	30/15 Summer				8.739	-0.052
N1-6.000	N1-6-0	30 Winter	2	+0%	100/15 Summer	100/15 Summer			13.467	-0.088
N1-6.001	N1-6-1	15 Winter	2	+0%	30/15 Summer	100/15 Summer			11.620	-0.116
N1-6.002	N1-6-2	15 Winter	2	+0%	30/15 Summer	100/15 Summer			11.029	-0.115
N1-6.003	N1-6-3	15 Winter	2	+0%	30/15 Summer	100/15 Summer			10.797	-0.095
N1-6.004	N1-6-4	15 Winter	2	+0%	5/15 Winter	100/15 Summer			10.381	-0.086
N1-6.005	N1-6-5	15 Winter	2	+0%	5/15 Summer	100/15 Summer			9.774	-0.046
N1-6.006	N1-6-6	15 Winter	2	+0%	5/15 Summer	100/15 Summer			9.322	-0.047
N1-6.007	N1-6-7	15 Winter	2	+0%	100/15 Summer				8.596	-0.123
N1-3.006	N1-3-6	15 Winter	2	+0%	100/120 Summer				8.146	-0.190

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Western Roundabout Section-Road Sub-Catchment 1

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N1-1.000	N1-1-0	0.000	0.29		5.0	OK	1
N1-1.001	N1-1-1	0.000	0.36		8.1	OK	1
N1-1.002	N1-1-2	0.000	0.63		13.2	OK	8
N1-1.003	N1-1-3	0.000	0.82		17.1	OK	8
N1-2.000	N1-2-0	0.000	0.13		3.1	OK	
N1-2.001	N1-2-1	0.000	0.30		5.9	OK	
N1-1.004	N1-1-4	0.000	0.64		22.9	OK	3
N1-1.005	N1-1-5	0.000	0.69		22.2	OK	
N1-1.006	N1-1-6	0.000	0.82		23.7	OK	
N1-1.007	N1-1-7	0.000	0.86		26.8	OK	
N1-1.008	N1-1-8	0.000	0.98		31.9	OK	
N1-3.000	N1-3-0	0.000	0.14		2.5	OK	
N1-3.001	N1-3-1	0.000	0.22		3.8	OK	
N1-4.000	N1-4-0	0.000	0.00		0.0	OK	
N1-4.001	N1-4-1	0.000	0.13		2.7	OK	
N1-4.002	N1-4-2	0.000	0.20		3.4	OK	
N1-4.003	N1-4-3	0.000	0.23		4.8	OK	
N1-3.002	N1-3-2	0.000	0.50		8.5	OK	1
N1-3.003	N1-3-3	0.000	0.51		8.1	OK	
N1-5.000	N1-5-0	0.000	0.12		2.2	OK	
N1-5.001	N1-5-1	0.000	0.16		3.8	OK	
N1-3.004	N1-3-4	0.000	1.07		14.7	SURCHARGED	
N1-3.005	N1-3-5	0.000	0.75		16.8	OK	
N1-6.000	N1-6-0	0.000	0.36		8.9	OK	6
N1-6.001	N1-6-1	0.000	0.44		18.7	OK	6
N1-6.002	N1-6-2	0.000	0.48		21.8	OK	9
N1-6.003	N1-6-3	0.000	0.61		25.3	OK	5
N1-6.004	N1-6-4	0.000	0.67		28.7	OK	9
N1-6.005	N1-6-5	0.000	0.94		33.7	OK	9
N1-6.006	N1-6-6	0.000	0.95		40.2	OK	7
N1-6.007	N1-6-7	0.000	0.63		43.7	OK	
N1-3.006	N1-3-6	0.000	0.29		59.4	OK	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Western Roundabout Section-Road Sub-Catchment 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N1-7.000	N1-7-0	30 Winter	2	+0%	30/15 Summer	100/15 Summer			10.586	-0.076
N1-7.001	N1-7-1	15 Winter	2	+0%	5/15 Summer	100/15 Summer			9.654	-0.042
N1-7.002	N1-7-2	15 Winter	2	+0%	5/15 Summer	100/15 Winter			9.057	-0.023
N1-7.003	N1-7-3	15 Winter	2	+0%	100/15 Summer				8.299	-0.121
N1-1.009	N1-1-9	360 Winter	2	+0%	5/15 Winter				7.594	-0.022
N1-1.010	N1-1-10	360 Winter	2	+0%	2/180 Winter				7.590	0.068

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N1-7.000	N1-7-0	0.000	0.49		8.9	OK	11
N1-7.001	N1-7-1	0.000	0.82		11.9	OK	11
N1-7.002	N1-7-2	0.000	0.98		14.6	OK	3
N1-7.003	N1-7-3	0.000	0.42		20.1	OK	
N1-1.009	N1-1-9	0.000	0.32		37.7	OK	
N1-1.010	N1-1-10	0.000	0.00		0.0	SURCHARGED	

5 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Western Roundabout Section-Road Sub-Catchment 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
FEH Rainfall Version 2013 Cv (Summer) 0.750
Site Location GB 640286 267538 TM 40286 67538 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
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N1-1.000	N1-1-0	30 Winter	5	+0%	100/15 Summer	100/30 Winter			10.693	-0.085
N1-1.001	N1-1-1	15 Winter	5	+0%	30/15 Summer	100/30 Winter			10.110	-0.076
N1-1.002	N1-1-2	15 Winter	5	+0%	30/15 Summer	100/15 Summer			9.262	-0.042
N1-1.003	N1-1-3	15 Winter	5	+0%	5/15 Winter	100/15 Summer			9.008	0.070
N1-2.000	N1-2-0	30 Winter	5	+0%	100/15 Summer				9.337	-0.108
N1-2.001	N1-2-1	15 Winter	5	+0%	30/15 Winter				8.706	-0.083
N1-1.004	N1-1-4	15 Winter	5	+0%	30/15 Summer	100/15 Winter			8.211	-0.046
N1-1.005	N1-1-5	15 Winter	5	+0%	30/15 Summer				8.175	-0.018
N1-1.006	N1-1-6	15 Winter	5	+0%	5/15 Winter				8.008	0.043
N1-1.007	N1-1-7	15 Winter	5	+0%	5/15 Summer				7.911	0.046
N1-1.008	N1-1-8	15 Winter	5	+0%	5/15 Summer				7.794	0.045
N1-3.000	N1-3-0	30 Winter	5	+0%	100/15 Summer				9.866	-0.105
N1-3.001	N1-3-1	15 Winter	5	+0%	30/15 Summer				9.490	-0.094
N1-4.000	N1-4-0	240 Winter	5	+0%					10.771	-0.150
N1-4.001	N1-4-1	15 Winter	5	+0%	100/15 Summer				10.234	-0.108
N1-4.002	N1-4-2	15 Winter	5	+0%	30/15 Winter				9.659	-0.097
N1-4.003	N1-4-3	15 Winter	5	+0%	30/15 Summer				9.456	-0.093
N1-3.002	N1-3-2	15 Winter	5	+0%	5/15 Winter	100/30 Winter			9.281	0.030
N1-3.003	N1-3-3	15 Winter	5	+0%	5/15 Summer				9.245	0.105
N1-5.000	N1-5-0	30 Winter	5	+0%	100/15 Summer				9.867	-0.109
N1-5.001	N1-5-1	15 Winter	5	+0%	30/15 Summer				9.341	-0.102
N1-3.004	N1-3-4	15 Winter	5	+0%	2/15 Summer				9.206	0.169
N1-3.005	N1-3-5	15 Winter	5	+0%	30/15 Summer				8.754	-0.037
N1-6.000	N1-6-0	30 Winter	5	+0%	100/15 Summer	100/15 Summer			13.478	-0.077
N1-6.001	N1-6-1	15 Winter	5	+0%	30/15 Summer	100/15 Summer			11.642	-0.094
N1-6.002	N1-6-2	15 Winter	5	+0%	30/15 Summer	100/15 Summer			11.052	-0.092
N1-6.003	N1-6-3	15 Winter	5	+0%	30/15 Summer	100/15 Summer			10.826	-0.066
N1-6.004	N1-6-4	15 Winter	5	+0%	5/15 Winter	100/15 Summer			10.473	0.006
N1-6.005	N1-6-5	30 Winter	5	+0%	5/15 Summer	100/15 Summer			10.037	0.217
N1-6.006	N1-6-6	30 Winter	5	+0%	5/15 Summer	100/15 Summer			9.479	0.110
N1-6.007	N1-6-7	30 Winter	5	+0%	100/15 Summer				8.616	-0.103
N1-3.006	N1-3-6	30 Winter	5	+0%	100/120 Summer				8.158	-0.178

5 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Western Roundabout Section-Road Sub-Catchment 1

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N1-1.000	N1-1-0	0.000	0.39		6.8	OK	1
N1-1.001	N1-1-1	0.000	0.48		10.9	OK	1
N1-1.002	N1-1-2	0.000	0.85		17.9	OK	8
N1-1.003	N1-1-3	0.000	1.05		21.8	SURCHARGED	8
N1-2.000	N1-2-0	0.000	0.18		4.3	OK	
N1-2.001	N1-2-1	0.000	0.40		7.9	OK	
N1-1.004	N1-1-4	0.000	0.83		29.5	OK	3
N1-1.005	N1-1-5	0.000	0.88		28.3	OK	
N1-1.006	N1-1-6	0.000	1.01		29.3	SURCHARGED	
N1-1.007	N1-1-7	0.000	1.02		31.8	SURCHARGED	
N1-1.008	N1-1-8	0.000	1.13		37.1	SURCHARGED	
N1-3.000	N1-3-0	0.000	0.20		3.4	OK	
N1-3.001	N1-3-1	0.000	0.29		5.1	OK	
N1-4.000	N1-4-0	0.000	0.00		0.0	OK	
N1-4.001	N1-4-1	0.000	0.17		3.7	OK	
N1-4.002	N1-4-2	0.000	0.27		4.6	OK	
N1-4.003	N1-4-3	0.000	0.31		6.5	OK	
N1-3.002	N1-3-2	0.000	0.59		10.1	SURCHARGED	1
N1-3.003	N1-3-3	0.000	0.64		10.2	SURCHARGED	
N1-5.000	N1-5-0	0.000	0.17		3.0	OK	
N1-5.001	N1-5-1	0.000	0.22		5.1	OK	
N1-3.004	N1-3-4	0.000	1.30		18.0	SURCHARGED	
N1-3.005	N1-3-5	0.000	0.92		20.5	OK	
N1-6.000	N1-6-0	0.000	0.48		12.0	OK	6
N1-6.001	N1-6-1	0.000	0.60		25.3	OK	6
N1-6.002	N1-6-2	0.000	0.65		29.4	OK	9
N1-6.003	N1-6-3	0.000	0.82		34.1	OK	5
N1-6.004	N1-6-4	0.000	0.85		36.5	SURCHARGED	9
N1-6.005	N1-6-5	0.000	1.10		39.6	SURCHARGED	9
N1-6.006	N1-6-6	0.000	1.08		46.1	SURCHARGED	7
N1-6.007	N1-6-7	0.000	0.75		51.9	OK	
N1-3.006	N1-3-6	0.000	0.35		71.4	OK	

5 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Western Roundabout Section-Road Sub-Catchment 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N1-7.000	N1-7-0	30 Winter	5	+0%	30/15 Summer	100/15 Summer			10.602	-0.060
N1-7.001	N1-7-1	30 Winter	5	+0%	5/15 Summer	100/15 Summer			9.912	0.216
N1-7.002	N1-7-2	30 Winter	5	+0%	5/15 Summer	100/15 Winter			9.265	0.185
N1-7.003	N1-7-3	15 Winter	5	+0%	100/15 Summer				8.312	-0.108
N1-1.009	N1-1-9	360 Winter	5	+0%	5/15 Winter				7.716	0.100
N1-1.010	N1-1-10	360 Winter	5	+0%	2/180 Winter				7.712	0.190

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N1-7.000	N1-7-0	0.000	0.66		12.0	OK	11
N1-7.001	N1-7-1	0.000	1.02		14.7	SURCHARGED	11
N1-7.002	N1-7-2	0.000	1.13		16.9	SURCHARGED	3
N1-7.003	N1-7-3	0.000	0.51		24.2	OK	
N1-1.009	N1-1-9	0.000	0.39		46.3	SURCHARGED	
N1-1.010	N1-1-10	0.000	0.00		0.0	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Western Roundabout Section-Road Sub-Catchment 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
FEH Rainfall Version 2013 Cv (Summer) 0.750
Site Location GB 640286 267538 TM 40286 67538 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
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N1-1.000	N1-1-0	30 Winter	30	+0%	100/15 Summer	100/30 Winter			10.716	-0.062
N1-1.001	N1-1-1	15 Winter	30	+0%	30/15 Summer	100/30 Winter			10.414	0.228
N1-1.002	N1-1-2	15 Winter	30	+0%	30/15 Summer	100/15 Summer			10.087	0.783
N1-1.003	N1-1-3	15 Winter	30	+0%	5/15 Winter	100/15 Summer			9.742	0.804
N1-2.000	N1-2-0	30 Winter	30	+0%	100/15 Summer				9.351	-0.094
N1-2.001	N1-2-1	30 Winter	30	+0%	30/15 Winter				8.860	0.071
N1-1.004	N1-1-4	30 Winter	30	+0%	30/15 Summer	100/15 Winter			8.719	0.462
N1-1.005	N1-1-5	30 Winter	30	+0%	30/15 Summer				8.659	0.466
N1-1.006	N1-1-6	30 Winter	30	+0%	5/15 Winter				8.409	0.444
N1-1.007	N1-1-7	15 Winter	30	+0%	5/15 Summer				8.279	0.414
N1-1.008	N1-1-8	15 Winter	30	+0%	5/15 Summer				8.092	0.343
N1-3.000	N1-3-0	30 Winter	30	+0%	100/15 Summer				9.880	-0.091
N1-3.001	N1-3-1	15 Winter	30	+0%	30/15 Summer				9.757	0.173
N1-4.000	N1-4-0	240 Winter	30	+0%					10.771	-0.150
N1-4.001	N1-4-1	15 Winter	30	+0%	100/15 Summer				10.255	-0.087
N1-4.002	N1-4-2	15 Winter	30	+0%	30/15 Winter				9.759	0.003
N1-4.003	N1-4-3	15 Winter	30	+0%	30/15 Summer				9.738	0.189
N1-3.002	N1-3-2	15 Winter	30	+0%	5/15 Winter	100/30 Winter			9.710	0.459
N1-3.003	N1-3-3	15 Winter	30	+0%	5/15 Summer				9.656	0.516
N1-5.000	N1-5-0	30 Winter	30	+0%	100/15 Summer				9.880	-0.096
N1-5.001	N1-5-1	15 Winter	30	+0%	30/15 Summer				9.631	0.188
N1-3.004	N1-3-4	15 Winter	30	+0%	2/15 Summer				9.599	0.562
N1-3.005	N1-3-5	15 Winter	30	+0%	30/15 Summer				8.941	0.150
N1-6.000	N1-6-0	30 Winter	30	+0%	100/15 Summer	100/15 Summer			13.508	-0.047
N1-6.001	N1-6-1	30 Winter	30	+0%	30/15 Summer	100/15 Summer			12.146	0.410
N1-6.002	N1-6-2	30 Winter	30	+0%	30/15 Summer	100/15 Summer			11.860	0.716
N1-6.003	N1-6-3	30 Winter	30	+0%	30/15 Summer	100/15 Summer			11.732	0.840
N1-6.004	N1-6-4	30 Winter	30	+0%	5/15 Winter	100/15 Summer			11.408	0.941
N1-6.005	N1-6-5	30 Winter	30	+0%	5/15 Summer	100/15 Summer			10.903	1.083
N1-6.006	N1-6-6	30 Winter	30	+0%	5/15 Summer	100/15 Summer			10.087	0.718
N1-6.007	N1-6-7	30 Winter	30	+0%	100/15 Summer				8.712	-0.007
N1-3.006	N1-3-6	30 Winter	30	+0%	100/120 Summer				8.180	-0.156

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Western Roundabout Section-Road Sub-Catchment 1

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N1-1.000	N1-1-0	0.000	0.65		11.4	OK	1
N1-1.001	N1-1-1	0.000	0.73		16.7	SURCHARGED	1
N1-1.002	N1-1-2	0.000	0.99		20.9	SURCHARGED	8
N1-1.003	N1-1-3	0.000	1.26		26.2	SURCHARGED	8
N1-2.000	N1-2-0	0.000	0.30		7.1	OK	
N1-2.001	N1-2-1	0.000	0.64		12.6	SURCHARGED	
N1-1.004	N1-1-4	0.000	1.00		35.5	SURCHARGED	3
N1-1.005	N1-1-5	0.000	1.11		35.7	SURCHARGED	
N1-1.006	N1-1-6	0.000	1.29		37.4	SURCHARGED	
N1-1.007	N1-1-7	0.000	1.30		40.3	SURCHARGED	
N1-1.008	N1-1-8	0.000	1.62		53.0	SURCHARGED	
N1-3.000	N1-3-0	0.000	0.33		5.6	OK	
N1-3.001	N1-3-1	0.000	0.43		7.6	SURCHARGED	
N1-4.000	N1-4-0	0.000	0.00		0.0	OK	
N1-4.001	N1-4-1	0.000	0.36		7.6	OK	
N1-4.002	N1-4-2	0.000	0.55		9.4	SURCHARGED	
N1-4.003	N1-4-3	0.000	0.54		11.4	SURCHARGED	
N1-3.002	N1-3-2	0.000	0.72		12.4	SURCHARGED	1
N1-3.003	N1-3-3	0.000	0.83		13.2	SURCHARGED	
N1-5.000	N1-5-0	0.000	0.28		5.1	OK	
N1-5.001	N1-5-1	0.000	0.34		7.9	SURCHARGED	
N1-3.004	N1-3-4	0.000	1.63		22.5	SURCHARGED	
N1-3.005	N1-3-5	0.000	1.16		25.8	SURCHARGED	
N1-6.000	N1-6-0	0.000	0.80		20.1	OK	6
N1-6.001	N1-6-1	0.000	0.91		38.5	SURCHARGED	6
N1-6.002	N1-6-2	0.000	0.81		36.8	SURCHARGED	9
N1-6.003	N1-6-3	0.000	0.92		38.1	SURCHARGED	5
N1-6.004	N1-6-4	0.000	0.96		41.1	SURCHARGED	9
N1-6.005	N1-6-5	0.000	1.33		47.9	SURCHARGED	9
N1-6.006	N1-6-6	0.000	1.43		60.8	SURCHARGED	7
N1-6.007	N1-6-7	0.000	1.00		69.6	OK	
N1-3.006	N1-3-6	0.000	0.47		94.8	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Western Roundabout Section-Road Sub-Catchment 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N1-7.000	N1-7-0	30 Winter	30	+0%	30/15 Summer	100/15 Summer			11.570	0.908
N1-7.001	N1-7-1	30 Winter	30	+0%	5/15 Summer	100/15 Summer			10.726	1.030
N1-7.002	N1-7-2	30 Winter	30	+0%	5/15 Summer	100/15 Winter			9.762	0.682
N1-7.003	N1-7-3	15 Winter	30	+0%	100/15 Summer				8.356	-0.064
N1-1.009	N1-1-9	480 Winter	30	+0%	5/15 Winter				8.045	0.429
N1-1.010	N1-1-10	480 Winter	30	+0%	2/180 Winter				8.039	0.517

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N1-7.000	N1-7-0	0.000	0.92		16.8	FLOOD RISK	11
N1-7.001	N1-7-1	0.000	1.30		18.8	SURCHARGED	11
N1-7.002	N1-7-2	0.000	1.41		21.1	SURCHARGED	3
N1-7.003	N1-7-3	0.000	0.79		37.5	OK	
N1-1.009	N1-1-9	0.000	0.49		57.5	SURCHARGED	
N1-1.010	N1-1-10	0.000	0.00		0.0	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Western Roundabout Section-Road Sub-Catchment 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
FEH Rainfall Version 2013 Cv (Summer) 0.750
Site Location GB 640286 267538 TM 40286 67538 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
Return Period(s) (years) 2, 5, 30, 100
Climate Change (%) 0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N1-1.000	N1-1-0	30 Winter	100	+40%	100/15 Summer	100/30 Winter			11.979	1.201
N1-1.001	N1-1-1	30 Winter	100	+40%	30/15 Summer	100/30 Winter			11.386	1.200
N1-1.002	N1-1-2	30 Winter	100	+40%	30/15 Summer	100/15 Summer			10.505	1.201
N1-1.003	N1-1-3	30 Winter	100	+40%	5/15 Winter	100/15 Summer			10.143	1.205
N1-2.000	N1-2-0	30 Winter	100	+40%	100/15 Summer				10.066	0.621
N1-2.001	N1-2-1	30 Winter	100	+40%	30/15 Winter				9.886	1.097
N1-1.004	N1-1-4	30 Winter	100	+40%	30/15 Summer	100/15 Winter			9.458	1.201
N1-1.005	N1-1-5	15 Winter	100	+40%	30/15 Summer				9.431	1.238
N1-1.006	N1-1-6	15 Winter	100	+40%	5/15 Winter				9.255	1.290
N1-1.007	N1-1-7	15 Winter	100	+40%	5/15 Summer				9.127	1.262
N1-1.008	N1-1-8	15 Winter	100	+40%	5/15 Summer				8.824	1.075
N1-3.000	N1-3-0	30 Winter	100	+40%	100/15 Summer				10.845	0.874
N1-3.001	N1-3-1	30 Winter	100	+40%	30/15 Summer				10.719	1.135
N1-4.000	N1-4-0	240 Winter	100	+40%					10.771	-0.150
N1-4.001	N1-4-1	30 Winter	100	+40%	100/15 Summer				10.655	0.313
N1-4.002	N1-4-2	30 Winter	100	+40%	30/15 Winter				10.628	0.872
N1-4.003	N1-4-3	30 Winter	100	+40%	30/15 Summer				10.606	1.057
N1-3.002	N1-3-2	30 Winter	100	+40%	5/15 Winter	100/30 Winter			10.577	1.326
N1-3.003	N1-3-3	30 Winter	100	+40%	5/15 Summer				10.519	1.379
N1-5.000	N1-5-0	30 Winter	100	+40%	100/15 Summer				10.673	0.697
N1-5.001	N1-5-1	30 Winter	100	+40%	30/15 Summer				10.547	1.104
N1-3.004	N1-3-4	30 Winter	100	+40%	2/15 Summer				10.458	1.421
N1-3.005	N1-3-5	15 Winter	100	+40%	30/15 Summer				9.417	0.626
N1-6.000	N1-6-0	30 Winter	100	+40%	100/15 Summer	100/15 Summer			14.760	1.205
N1-6.001	N1-6-1	30 Winter	100	+40%	30/15 Summer	100/15 Summer			12.941	1.205
N1-6.002	N1-6-2	60 Winter	100	+40%	30/15 Summer	100/15 Summer			12.362	1.218
N1-6.003	N1-6-3	15 Winter	100	+40%	30/15 Summer	100/15 Summer			12.292	1.400
N1-6.004	N1-6-4	30 Winter	100	+40%	5/15 Winter	100/15 Summer			11.872	1.405
N1-6.005	N1-6-5	30 Winter	100	+40%	5/15 Summer	100/15 Summer			11.236	1.416
N1-6.006	N1-6-6	30 Winter	100	+40%	5/15 Summer	100/15 Summer			10.577	1.208
N1-6.007	N1-6-7	15 Winter	100	+40%	100/15 Summer				9.100	0.381
N1-3.006	N1-3-6	960 Winter	100	+40%	100/120 Summer				8.740	0.404

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Western Roundabout Section-Road Sub-Catchment 1

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N1-1.000	N1-1-0	0.680	1.07		18.7	FLOOD	1
N1-1.001	N1-1-1	0.153	1.00		22.7	FLOOD	1
N1-1.002	N1-1-2	9.043	1.24		26.0	FLOOD	8
N1-1.003	N1-1-3	5.635	1.46		30.4	FLOOD	8
N1-2.000	N1-2-0	0.000	0.55		13.2	SURCHARGED	
N1-2.001	N1-2-1	0.000	0.89		17.6	FLOOD RISK	
N1-1.004	N1-1-4	1.095	1.27		45.3	FLOOD	3
N1-1.005	N1-1-5	0.000	1.38		44.1	SURCHARGED	
N1-1.006	N1-1-6	0.000	1.57		45.4	SURCHARGED	
N1-1.007	N1-1-7	0.000	1.66		51.6	SURCHARGED	
N1-1.008	N1-1-8	0.000	2.54		83.0	SURCHARGED	
N1-3.000	N1-3-0	0.000	0.57		9.7	SURCHARGED	
N1-3.001	N1-3-1	0.000	0.65		11.4	FLOOD RISK	
N1-4.000	N1-4-0	0.000	0.00		0.0	OK	
N1-4.001	N1-4-1	0.000	0.49		10.2	SURCHARGED	
N1-4.002	N1-4-2	0.000	0.55		9.3	SURCHARGED	
N1-4.003	N1-4-3	0.000	0.46		9.6	FLOOD RISK	
N1-3.002	N1-3-2	0.847	1.03		17.6	FLOOD	1
N1-3.003	N1-3-3	0.000	1.17		18.6	FLOOD RISK	
N1-5.000	N1-5-0	0.000	0.51		9.2	SURCHARGED	
N1-5.001	N1-5-1	0.000	0.49		11.4	FLOOD RISK	
N1-3.004	N1-3-4	0.000	2.14		29.5	FLOOD RISK	
N1-3.005	N1-3-5	0.000	1.54		34.2	SURCHARGED	
N1-6.000	N1-6-0	4.273	1.04		26.1	FLOOD	6
N1-6.001	N1-6-1	5.854	1.01		42.8	FLOOD	6
N1-6.002	N1-6-2	17.488	0.79		36.2	FLOOD	9
N1-6.003	N1-6-3	0.396	1.11		46.2	FLOOD	5
N1-6.004	N1-6-4	5.364	1.03		44.4	FLOOD	9
N1-6.005	N1-6-5	16.105	1.68		60.3	FLOOD	9
N1-6.006	N1-6-6	7.875	1.65		70.4	FLOOD	7
N1-6.007	N1-6-7	0.000	1.36		94.4	SURCHARGED	
N1-3.006	N1-3-6	0.000	0.18		37.3	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Western Roundabout Section-Road Sub-Catchment 1

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N1-7.000	N1-7-0	30 Winter	100	+40%	30/15 Summer	100/15 Summer			11.876	1.214
N1-7.001	N1-7-1	30 Winter	100	+40%	5/15 Summer	100/15 Summer			11.249	1.553
N1-7.002	N1-7-2	15 Winter	100	+40%	5/15 Summer	100/15 Winter			10.881	1.801
N1-7.003	N1-7-3	15 Winter	100	+40%	100/15 Summer				8.911	0.491
N1-1.009	N1-1-9	960 Winter	100	+40%	5/15 Winter				8.725	1.109
N1-1.010	N1-1-10	960 Winter	100	+40%	2/180 Winter				8.711	1.189

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N1-7.000	N1-7-0	14.187	1.02		18.6	FLOOD	11
N1-7.001	N1-7-1	7.235	1.52		21.9	FLOOD	11
N1-7.002	N1-7-2	0.431	1.72		25.8	FLOOD	3
N1-7.003	N1-7-3	0.000	1.08		51.0	SURCHARGED	
N1-1.009	N1-1-9	0.000	0.58		67.9	SURCHARGED	
N1-1.010	N1-1-10	0.000	0.11		12.0	FLOOD RISK	

NETWORK 2 CATCHMENT

A12 ROUNDABOUT NORTH DRAINING TO SOAKAWAY BUT TO BE CHANGED TO LOCAL WATERCOURSE

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for A12 Western Roundabout Section-Road Sub-Catchment 2

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	2013
Site Location	GB 640286 267538 TM 40286 67538
Data Type	Point
Maximum Rainfall (mm/hr)	500
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for A12 Western Roundabout Section-Road Sub-Catchment 2

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.010	4-8	0.016	8-12	0.016	12-16	0.016	16-20	0.002

Total Area Contributing (ha) = 0.061

Total Pipe Volume (m³) = 2.793

Network Design Table for A12 Western Roundabout Section-Road Sub-Catchment 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
N2-1.000	90.020	1.354	66.5	0.061	15.00	0.0	0.600	o	150	Pipe/Conduit	
N2-2.000	49.374	0.482	102.4	0.000	15.00	0.0	0.600	o	150	Pipe/Conduit	
N2-1.001	13.521	0.190	71.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
N2-1.002	5.123	0.020	256.1	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)
N2-1.000	32.69	16.21	9.775	0.061	0.0	0.0	0.0	1.24	21.8	5.4
N2-2.000	33.17	15.83	8.103	0.000	0.0	0.0	0.0	0.99	17.5	0.0
N2-1.001	32.46	16.40	7.621	0.061	0.0	0.0	0.0	1.19	21.1	5.4
N2-1.002	32.30	16.54	7.431	0.061	0.0	0.0	0.0	0.62	11.0	5.4

Manhole Schedules for A12 Western Roundabout Section-Road Sub-Catchment 2

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
N2-1-0	11.125	1.350	Open Manhole	1200	N2-1.000	9.775	150				
N2-2-0	9.153	1.050	Open Manhole	1200	N2-2.000	8.103	150				
N2-1-1	9.771	2.150	Open Manhole	1200	N2-1.001	7.621	150	N2-1.000	8.421	150	800
								N2-2.000	7.621	150	
N2-1-2	8.881	1.450	Open Manhole	1200	N2-1.002	7.431	150	N2-1.001	7.431	150	
N2-	9.136	1.725	Open Manhole	0		OUTFALL		N2-1.002	7.411	150	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
N2-1-0	635556.041	259816.472	635556.041	259816.472	Required	
N2-2-0	635658.211	259910.966	635658.211	259910.966	Required	
N2-1-1	635624.212	259875.169	635624.212	259875.169	Required	
N2-1-2	635633.721	259865.557	635633.721	259865.557	Required	
N2-	635630.375	259861.678			No Entry	

Area Summary for A12 Western Roundabout Section-Road Sub-Catchment 2

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	Classification	Carriageway	100	0.061	0.061	0.061
2.000	-	-	100	0.000	0.000	0.000
1.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.061	0.061	0.061

Free Flowing Outfall Details for A12 Western Roundabout Section-Road Sub-Catchment 2

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
N2-1.002	N2-	9.136	7.411	0.000	0	0

Simulation Criteria for A12 Western Roundabout Section-Road Sub-Catchment 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.500	Storm Duration (mins)	30
Ratio R	0.404		

Online Controls for A12 Western Roundabout Section-Road Sub-Catchment 2

Weir Manhole: N2-1-2, DS/PN: N2-1.002, Volume (m³): 1.9

Discharge Coef 0.544 Width (m) 0.300 Invert Level (m) 8.881

Storage Structures for A12 Western Roundabout Section-Road Sub-Catchment 2

Lined Soakaway Manhole: N2-1-2, DS/PN: N2-1.002

Infiltration Coefficient Base (m/hr)	0.06012	Ring Diameter (m)	2.40
Infiltration Coefficient Side (m/hr)	0.06012	Pit Multiplier	1.5
Safety Factor	2.0	Number Required	2
Porosity	0.30	Cap Volume Depth (m)	2.100
Invert Level (m)	6.431	Cap Infiltration Depth (m)	2.100

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Western Roundabout Section-Road Sub-Catchment 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FEH	Data Type Point
FEH Rainfall Version		2013	Cv (Summer) 0.750
Site Location	GB 640286 267538 TM 40286 67538		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
Return Period(s) (years)	2, 5, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N2-1.000	N2-1-0	30 Winter	2	+0%					9.824	-0.101
N2-2.000	N2-2-0	240 Winter	2	+0%	100/120 Winter				8.103	-0.150
N2-1.001	N2-1-1	30 Winter	2	+0%	100/30 Winter				7.672	-0.099
N2-1.002	N2-1-2	360 Winter	2	+0%	30/180 Winter	100/180 Winter			7.024	-0.557

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N2-1.000	N2-1-0	0.000	0.23		5.0	OK	
N2-2.000	N2-2-0	0.000	0.00		0.0	OK	
N2-1.001	N2-1-1	0.000	0.26		5.0	OK	
N2-1.002	N2-1-2	0.000	0.00		0.0	OK	13

5 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Western Roundabout Section-Road Sub-Catchment 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FEH	Data Type Point
FEH Rainfall Version		2013	Cv (Summer) 0.750
Site Location	GB 640286 267538 TM 40286 67538		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
Return Period(s) (years)	2, 5, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N2-1.000	N2-1-0	30 Winter	5	+0%					9.832	-0.093
N2-2.000	N2-2-0	240 Winter	5	+0%	100/120 Winter				8.103	-0.150
N2-1.001	N2-1-1	30 Winter	5	+0%	100/30 Winter				7.682	-0.089
N2-1.002	N2-1-2	360 Winter	5	+0%	30/180 Winter	100/180 Winter			7.205	-0.376

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N2-1.000	N2-1-0	0.000	0.31		6.7	OK	
N2-2.000	N2-2-0	0.000	0.00		0.0	OK	
N2-1.001	N2-1-1	0.000	0.35		6.7	OK	
N2-1.002	N2-1-2	0.000	0.00		0.0	OK	13

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Western Roundabout Section-Road Sub-Catchment 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FEH Data Type	Point
FEH Rainfall Version		2013 Cv (Summer)	0.750
Site Location	GB 640286 267538 TM 40286 67538	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
Return Period(s) (years)	2, 5, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N2-1.000	N2-1-0	30 Winter	30	+0%					9.852	-0.073
N2-2.000	N2-2-0	240 Winter	30	+0%	100/120 Winter				8.103	-0.150
N2-1.001	N2-1-1	360 Winter	30	+0%	100/30 Winter				7.721	-0.050
N2-1.002	N2-1-2	360 Winter	30	+0%	30/180 Winter	100/180 Winter			7.719	0.138

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N2-1.000	N2-1-0	0.000	0.52		11.3	OK	
N2-2.000	N2-2-0	0.000	0.00		0.0	OK	
N2-1.001	N2-1-1	0.000	0.16		3.2	OK	
N2-1.002	N2-1-2	0.000	0.00		0.0	SURCHARGED	13

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Western Roundabout Section-Road Sub-Catchment 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FEH	Data Type Point
FEH Rainfall Version		2013	Cv (Summer) 0.750
Site Location	GB 640286 267538 TM 40286 67538		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
Return Period(s) (years)	2, 5, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N2-1.000	N2-1-0	30 Winter	100	+40%					9.891	-0.034
N2-2.000	N2-2-0	480 Winter	100	+40%	100/120 Winter				8.895	0.642
N2-1.001	N2-1-1	480 Winter	100	+40%	100/30 Winter				8.896	1.125
N2-1.002	N2-1-2	720 Winter	100	+40%	30/180 Winter	100/180 Winter			8.889	1.308

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N2-1.000	N2-1-0	0.000	0.95		20.5	OK	
N2-2.000	N2-2-0	0.000	0.01		0.2	FLOOD RISK	
N2-1.001	N2-1-1	0.000	0.23		4.5	SURCHARGED	
N2-1.002	N2-1-2	8.246	0.00		0.0	FLOOD	13

NETWORK 3 CATCHMENT

BYPASS EAST OF RIVER ALDE CROSSING DRAINING TO INFILTRATION BASIN 2

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Swale Section-Road Sub-Catchment 3

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	2013
Site Location	GB 640286 267538 TM 40286 67538
Data Type	Point
Maximum Rainfall (mm/hr)	500
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Swale Section-Road Sub-Catchment 3

Time (mins)	Area (ha)	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	0.318	4-8	0.636	8-12	0.298	12-16	0.095	16-20	0.049	20-24	0.049	24-28	0.019

Total Area Contributing (ha) = 1.464

Total Pipe Volume (m^3) = 1259.316

Network Design Table for Swale Section-Road Sub-Catchment 3

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
N3-1.000	61.542	0.525	117.2	0.031	15.00	0.0		0.045	3 \=/	500	1:3 Swale	
N3-1.001	15.274	0.080	190.9	0.027	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N3-1.002	39.932	0.150	266.2	0.042	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N3-1.003	16.533	0.088	187.9	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
N3-1.004	42.859	0.107	400.6	0.045	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N3-1.005	11.686	0.050	233.7	0.021	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N3-1.006	90.463	0.744	121.6	0.051	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N3-1.007	83.393	1.867	44.7	0.047	0.00	0.0		0.045	3 \=/	500	1:3 Swale	

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)
N3-1.000	32.72	16.19	25.200	0.031	0.0	0.0	0.0	0.86	863.9	2.8
N3-1.001	32.27	16.56	24.675	0.058	0.0	0.0	0.0	0.68	676.9	5.1
N3-1.002	30.94	17.72	24.595	0.101	0.0	0.0	0.0	0.57	573.2	8.4
N3-1.003	30.68	17.97	23.445	0.101	0.0	0.0	0.0	1.14	80.8	8.4
N3-1.004	29.13	19.49	24.357	0.146	0.0	0.0	0.0	0.47	467.3	11.5
N3-1.005	28.83	19.81	24.250	0.166	0.0	0.0	0.0	0.61	611.8	13.0
N3-1.006	27.27	21.59	24.200	0.217	0.0	0.0	0.0	0.85	848.2	16.0
N3-1.007	26.48	22.58	23.456	0.265	0.0	0.0	0.0	1.40	1399.5	19.0

Network Design Table for Swale Section-Road Sub-Catchment 3

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
N3-1.008	66.458	0.998	66.6	0.038	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N3-1.009	13.659	0.116	117.8	0.006	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N3-1.010	90.036	2.159	41.7	0.048	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N3-1.011	90.043	2.295	39.2	0.061	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N3-1.012	40.549	1.035	39.2	0.023	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N3-2.000	87.131	0.167	521.7	0.151	15.00	0.0		0.045	3 \=/	500	1:3 Swale	
N3-2.001	87.078	0.673	129.4	0.177	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N3-2.002	43.762	0.640	68.4	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
N3-2.003	88.539	1.660	53.3	0.162	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N3-2.004	89.671	2.308	38.9	0.154	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N3-2.005	90.177	2.352	38.3	0.150	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N3-2.006	90.013	2.146	41.9	0.150	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N3-2.007	12.706	0.168	75.6	0.000	0.00	0.0	0.600		o	375	Pipe/Conduit	
N3-1.013	9.210	0.323	28.5	0.000	0.00	0.0	0.600		o	375	Pipe/Conduit	
N3-1.014	37.799	0.828	45.7	0.000	0.00	0.0	0.600		o	375	Pipe/Conduit	
N3-1.015	6.842	0.111	61.6	0.078	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)
N3-1.008	25.75	23.55	21.589	0.303	0.0	0.0	0.0	1.15	1146.2	21.1
N3-1.009	25.56	23.81	20.591	0.309	0.0	0.0	0.0	0.86	861.9	21.4
N3-1.010	24.85	24.85	20.475	0.357	0.0	0.0	0.0	1.45	1448.3	24.0
N3-1.011	24.20	25.85	18.316	0.418	0.0	0.0	0.0	1.49	1493.2	27.4
N3-1.012	23.92	26.31	16.021	0.441	0.0	0.0	0.0	1.49	1494.3	28.6
N3-2.000	30.07	18.55	24.500	0.151	0.0	0.0	0.0	0.41	409.5	12.3
N3-2.001	28.37	20.31	24.333	0.328	0.0	0.0	0.0	0.82	822.3	25.2
N3-2.002	28.03	20.69	22.660	0.328	0.0	0.0	0.0	1.90	134.6	25.2
N3-2.003	27.06	21.85	23.020	0.491	0.0	0.0	0.0	1.28	1280.7	36.0
N3-2.004	26.28	22.84	21.360	0.645	0.0	0.0	0.0	1.50	1500.5	45.9
N3-2.005	25.55	23.84	19.052	0.794	0.0	0.0	0.0	1.51	1510.5	55.0
N3-2.006	24.83	24.88	16.700	0.944	0.0	0.0	0.0	1.44	1444.2	63.5
N3-2.007	24.76	24.98	13.554	0.944	0.0	0.0	0.0	2.09	230.3	63.5
N3-1.013	23.89	26.35	13.386	1.386	0.0	0.0	0.0	3.40	376.0	89.6
N3-1.014	23.75	26.59	13.063	1.386	0.0	0.0	0.0	2.69	296.9	89.6
N3-1.015	23.72	26.64	12.235	1.464	0.0	0.0	0.0	2.31	255.3	94.0

Manhole Schedules for Swale Section-Road Sub-Catchment 3

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
N3-1-0	25.700	0.500	Junction		N3-1.000	25.200	500				
N3-1-1	25.175	0.500	Junction		N3-1.001	24.675	500	N3-1.000	24.675	500	
N3-1-2	25.095	0.500	Junction		N3-1.002	24.595	500	N3-1.001	24.595	500	
N3-1-3	25.300	1.855	Open Manhole	600	N3-1.003	23.445	300	N3-1.002	24.445	500	1200
N3-1-4	24.857	1.500	Junction		N3-1.004	24.357	500	N3-1.003	23.357	300	
N3-1-5	24.916	0.666	Junction		N3-1.005	24.250	500	N3-1.004	24.250	500	
N3-1-6	24.738	0.538	Junction		N3-1.006	24.200	500	N3-1.005	24.200	500	
N3-1-7	23.956	0.500	Junction		N3-1.007	23.456	500	N3-1.006	23.456	500	
N3-1-8	22.089	0.500	Junction		N3-1.008	21.589	500	N3-1.007	21.589	500	
N3-1-9	21.091	0.500	Junction		N3-1.009	20.591	500	N3-1.008	20.591	500	
N3-1-10	21.114	0.639	Junction		N3-1.010	20.475	500	N3-1.009	20.475	500	
N3-1-11	18.816	0.500	Junction		N3-1.011	18.316	500	N3-1.010	18.316	500	
N3-1-12	16.521	0.500	Junction		N3-1.012	16.021	500	N3-1.011	16.021	500	
N3-2-0	25.000	0.500	Junction		N3-2.000	24.500	500				
N3-2-1	24.833	0.500	Junction		N3-2.001	24.333	500	N3-2.000	24.333	500	
N3-2-2	24.160	1.500	Open Manhole	600	N3-2.002	22.660	300	N3-2.001	23.660	500	1200
N3-2-3	23.520	1.500	Junction		N3-2.003	23.020	500	N3-2.002	22.020	300	
N3-2-4	21.860	0.500	Junction		N3-2.004	21.360	500	N3-2.003	21.360	500	
N3-2-5	19.552	0.500	Junction		N3-2.005	19.052	500	N3-2.004	19.052	500	
N3-2-6	17.200	0.500	Junction		N3-2.006	16.700	500	N3-2.005	16.700	500	
N3-2-7	15.054	1.500	Open Manhole	600	N3-2.007	13.554	375	N3-2.006	14.554	500	1125
N3-1-13	15.486	2.100	Open Manhole	600	N3-1.013	13.386	375	N3-1.012	14.986	500	1725
								N3-2.007	13.386	375	
N3-1-14	14.338	1.275	Open Manhole	1350	N3-1.014	13.063	375	N3-1.013	13.063	375	
N3-1-15	13.810	1.575	Open Manhole	1350	N3-1.015	12.235	375	N3-1.014	12.235	375	
N3-HW-1	13.999	1.875	Open Manhole	0		OUTFALL		N3-1.015	12.124	375	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
N3-1-0	636592.134	259515.196			No Entry	
N3-1-1	636547.935	259472.411			No Entry	
N3-1-2	636545.867	259458.305			No Entry	
N3-1-3	636566.280	259423.988			No Entry	
N3-1-4	636552.956	259414.200			No Entry	
N3-1-5	636523.804	259445.423			No Entry	

Manhole Schedules for Swale Section-Road Sub-Catchment 3

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
N3-1-6	636512.973	259446.403			No Entry	
N3-1-7	636434.212	259401.972			No Entry	
N3-1-8	636355.994	259373.227			No Entry	
N3-1-9	636291.139	259358.874			No Entry	
N3-1-10	636277.534	259360.102			No Entry	
N3-1-11	636187.980	259352.318			No Entry	
N3-1-12	636098.328	259358.602			No Entry	
N3-2-0	636591.524	259536.308			No Entry	
N3-2-1	636524.975	259480.255			No Entry	
N3-2-2	636451.412	259433.788			No Entry	
N3-2-3	636411.998	259414.770			No Entry	
N3-2-4	636329.130	259383.868			No Entry	
N3-2-5	636240.990	259367.677			No Entry	
N3-2-6	636150.900	259365.979			No Entry	
N3-2-7	636061.789	259378.309			No Entry	
N3-1-13	636058.496	259366.037			No Entry	
N3-1-14	636056.480	259357.050	636056.480	259357.050	Required	
N3-1-15	636082.125	259329.281	636082.125	259329.281	Required	
N3-HW-1	636088.013	259325.795			No Entry	

Area Summary for Swale Section-Road Sub-Catchment 3

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	Classification	Swales	100	0.021	0.021	0.021
	Classification	Earthworks	50	0.006	0.003	0.024
	Classification	Verge	50	0.015	0.007	0.031
1.001	Classification	Carriageway	100	0.017	0.017	0.017
	Classification	Verge	50	0.006	0.003	0.020
	Classification	Swales	100	0.006	0.006	0.026
	Classification	Earthworks	50	0.003	0.001	0.027
1.002	Classification	Swales	100	0.015	0.015	0.015
	Classification	Earthworks	50	0.003	0.001	0.016
	Classification	Verge	50	0.010	0.005	0.021
	Classification	Carriageway	100	0.021	0.021	0.042
	Classification	Earthworks	50	0.001	0.000	0.042
1.003	-	-	100	0.000	0.000	0.000
1.004	Classification	Carriageway	100	0.023	0.023	0.023
	Classification	Verge	50	0.011	0.005	0.028
	Classification	Earthworks	50	0.001	0.000	0.029
	Classification	Swales	100	0.015	0.015	0.044
	Classification	Earthworks	50	0.002	0.001	0.045
1.005	Classification	Carriageway	100	0.013	0.013	0.013
	Classification	Verge	50	0.005	0.002	0.015
	Classification	Earthworks	50	0.003	0.001	0.017
	Classification	Swales	100	0.004	0.004	0.021
1.006	Classification	Verge	50	0.022	0.011	0.011
	Classification	Earthworks	50	0.016	0.008	0.019
	Classification	Swales	100	0.032	0.032	0.051
1.007	Classification	Verge	50	0.021	0.010	0.010
	Classification	Earthworks	50	0.016	0.008	0.018
	Classification	Swales	100	0.029	0.029	0.047
1.008	Classification	Verge	50	0.016	0.008	0.008
	Classification	Earthworks	50	0.013	0.006	0.015
	Classification	Swales	100	0.023	0.023	0.038
1.009	Classification	Verge	50	0.002	0.001	0.001
	Classification	Earthworks	50	0.000	0.000	0.001
	Classification	Swales	100	0.005	0.005	0.006
	Classification	Verge	50	0.000	0.000	0.006
	Classification	Earthworks	50	0.000	0.000	0.006
1.010	Classification	Swales	100	0.031	0.031	0.031
	Classification	Verge	50	0.023	0.011	0.043
	Classification	Earthworks	50	0.010	0.005	0.048
	Classification	Earthworks	50	0.000	0.000	0.048
	Classification	Earthworks	50	0.000	0.000	0.048
1.011	Classification	Verge	50	0.023	0.011	0.011
	Classification	Swales	100	0.032	0.032	0.043
	Classification	Earthworks	50	0.037	0.018	0.061
1.012	Classification	Swales	100	0.015	0.015	0.015
	Classification	Verge	50	0.011	0.005	0.020
	Classification	Earthworks	50	0.006	0.003	0.023
2.000	Classification	Carriageway	100	0.095	0.095	0.095
	Classification	Swales	100	0.031	0.031	0.125
	Classification	Verge	50	0.048	0.024	0.149
	Classification	Earthworks	50	0.004	0.002	0.151
2.001	Classification	Earthworks	50	0.005	0.002	0.002
	Classification	Verge	50	0.064	0.032	0.035
	Classification	Swales	100	0.030	0.030	0.065
	Classification	Carriageway	100	0.112	0.112	0.177
2.002	-	-	100	0.000	0.000	0.000
2.003	Classification	Earthworks	50	0.001	0.001	0.001
	Classification	Verge	50	0.075	0.037	0.038
	Classification	Swales	100	0.031	0.031	0.069
	Classification	Carriageway	100	0.093	0.093	0.162
2.004	Classification	Earthworks	50	0.016	0.008	0.008
	Classification	Verge	50	0.062	0.031	0.039

Area Summary for Swale Section-Road Sub-Catchment 3

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
	Classification	Swales	100	0.031	0.031	0.070
	Classification	Carriageway	100	0.084	0.084	0.154
2.005	Classification	Carriageway	100	0.085	0.085	0.085
	Classification	Swales	100	0.032	0.032	0.116
	Classification	Verge	50	0.022	0.011	0.128
	Classification	Earthworks	50	0.044	0.022	0.150
2.006	Classification	Carriageway	100	0.087	0.087	0.087
	Classification	Swales	100	0.032	0.032	0.119
	Classification	Verge	50	0.022	0.011	0.130
	Classification	Earthworks	50	0.039	0.019	0.150
2.007	-	-	100	0.000	0.000	0.000
1.013	-	-	100	0.000	0.000	0.000
1.014	-	-	100	0.000	0.000	0.000
1.015	-	-	100	0.078	0.078	0.078
				Total	Total	Total
				1.805	1.464	1.464

Free Flowing Outfall Details for Swale Section-Road Sub-Catchment 3

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
N3-1.015	N3-HW-1	13.999	12.124	0.000	0	0

Simulation Criteria for Swale Section-Road Sub-Catchment 3

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 19 Number of Storage Structures 19 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)	19.500	Storm Duration (mins)	30
Ratio R	0.404		

Online Controls for Swale Section-Road Sub-Catchment 3

V-Notch Weir Manhole: N3-1-1, DS/PN: N3-1.001, Volume (m³): 61.5

Angle of V in Degrees 90.000 Discharge Coefficient 0.590 Invert Level (m) 24.975

V-Notch Weir Manhole: N3-1-2, DS/PN: N3-1.002, Volume (m³): 15.3

Angle of V in Degrees 90.000 Discharge Coefficient 0.590 Invert Level (m) 24.895

Complex Manhole: N3-1-3, DS/PN: N3-1.003, Volume (m³): 40.2

Orifice

Diameter (m) 0.300 Discharge Coefficient 0.600 Invert Level (m) 23.445

Weir

Discharge Coef 0.544 Width (m) 0.300 Invert Level (m) 25.300

V-Notch Weir Manhole: N3-1-5, DS/PN: N3-1.005, Volume (m³): 42.9

Angle of V in Degrees 90.000 Discharge Coefficient 0.590 Invert Level (m) 24.550

V-Notch Weir Manhole: N3-1-6, DS/PN: N3-1.006, Volume (m³): 19.4

Angle of V in Degrees 90.000 Discharge Coefficient 0.590 Invert Level (m) 24.500

V-Notch Weir Manhole: N3-1-7, DS/PN: N3-1.007, Volume (m³): 102.9

Angle of V in Degrees 90.000 Discharge Coefficient 0.590 Invert Level (m) 23.756

V-Notch Weir Manhole: N3-1-8, DS/PN: N3-1.008, Volume (m³): 83.4

Angle of V in Degrees 90.000 Discharge Coefficient 0.590 Invert Level (m) 21.889

V-Notch Weir Manhole: N3-1-9, DS/PN: N3-1.009, Volume (m³): 66.5

Angle of V in Degrees 90.000 Discharge Coefficient 0.590 Invert Level (m) 20.891

V-Notch Weir Manhole: N3-1-10, DS/PN: N3-1.010, Volume (m³): 13.7

Angle of V in Degrees 90.000 Discharge Coefficient 0.590 Invert Level (m) 20.775

V-Notch Weir Manhole: N3-1-11, DS/PN: N3-1.011, Volume (m³): 139.1

Angle of V in Degrees 90.000 Discharge Coefficient 0.590 Invert Level (m) 18.616

V-Notch Weir Manhole: N3-1-12, DS/PN: N3-1.012, Volume (m³): 90.0

Angle of V in Degrees 90.000 Discharge Coefficient 0.590 Invert Level (m) 16.321

V-Notch Weir Manhole: N3-2-1, DS/PN: N3-2.001, Volume (m³): 87.1

Angle of V in Degrees 90.000 Discharge Coefficient 0.590 Invert Level (m) 24.733

Complex Manhole: N3-2-2, DS/PN: N3-2.002, Volume (m³): 87.2

Orifice

Diameter (m) 0.300 Discharge Coefficient 0.600 Invert Level (m) 22.660

Weir

Discharge Coef 0.544 Width (m) 0.300 Invert Level (m) 24.160

V-Notch Weir Manhole: N3-2-4, DS/PN: N3-2.004, Volume (m³): 88.5

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 21.660

V-Notch Weir Manhole: N3-2-5, DS/PN: N3-2.005, Volume (m³): 89.7

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 19.352

V-Notch Weir Manhole: N3-2-6, DS/PN: N3-2.006, Volume (m³): 90.2

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 17.000

Complex Manhole: N3-2-7, DS/PN: N3-2.007, Volume (m³): 90.1

Orifice

Diameter (m) 0.375 Discharge Coefficient 0.600 Invert Level (m) 13.554

Weir

Discharge Coef 0.544 Width (m) 0.300 Invert Level (m) 15.054

Complex Manhole: N3-1-13, DS/PN: N3-1.013, Volume (m³): 42.2

Orifice

Diameter (m) 0.300 Discharge Coefficient 0.600 Invert Level (m) 13.386

Weir

Discharge Coef 0.544 Width (m) 0.300 Invert Level (m) 15.486

Weir Manhole: N3-1-15, DS/PN: N3-1.015, Volume (m³): 6.3

Discharge Coef 0.544 Width (m) 0.300 Invert Level (m) 13.510

Storage Structures for Swale Section-Road Sub-Catchment 3

Complex Manhole: N3-1-1, DS/PN: N3-1.001

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	117.2
Invert Level (m)	23.675	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	61.5		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	61.5
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	117.2
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	24.675	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N3-1-2, DS/PN: N3-1.002

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	190.9
Invert Level (m)	23.595	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	15.3		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	15.3
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	190.9
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	24.595	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N3-1-3, DS/PN: N3-1.003

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Trench Length (m)	39.9
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Diameter (m)	0.150
Safety Factor	2.0	Pipe Depth above Invert (m)	0.000
Porosity	0.30	Number of Pipes	1
Invert Level (m)	23.445	Slope (1:X)	266.2
Trench Width (m)	0.5	Cap Volume Depth (m)	1.000

Filter Drain

Cap Infiltration Depth (m) 1.000

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	39.9
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	266.2
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	24.445	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N3-1-5, DS/PN: N3-1.005

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.225
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	400.6
Invert Level (m)	23.250	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	42.9		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	42.9
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	400.6
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	24.250	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N3-1-6, DS/PN: N3-1.006

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.225
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	233.7
Invert Level (m)	23.200	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	11.7		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	11.7
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	233.7
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	24.200	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N3-1-7, DS/PN: N3-1.007

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	121.6
Invert Level (m)	22.456	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	90.5		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	90.5
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	121.6
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	23.456	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N3-1-8, DS/PN: N3-1.008

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	44.7
Invert Level (m)	20.589	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	83.4		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	83.4
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	44.7
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	21.589	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N3-1-9, DS/PN: N3-1.009

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	66.6
Invert Level (m)	19.591	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	66.5		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	66.5
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	66.6
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	20.591	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N3-1-10, DS/PN: N3-1.010

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	117.8
Invert Level (m)	19.475	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	13.7		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	13.7
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	117.8
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	20.475	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N3-1-11, DS/PN: N3-1.011

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	41.7
Invert Level (m)	17.316	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	90.0		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	90.0
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	41.7
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	18.316	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N3-1-12, DS/PN: N3-1.012

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	39.2
Invert Level (m)	15.021	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	90.0		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	90.0
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	39.2
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	16.021	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N3-2-1, DS/PN: N3-2.001

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	521.7
Invert Level (m)	23.333	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	87.1		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	87.1
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	521.7
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	24.333	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N3-2-2, DS/PN: N3-2.002

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	129.4
Invert Level (m)	22.660	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	87.1		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr) 0.52200 Infiltration Coefficient Side (m/hr) 0.52200

Swale

Safety Factor	2.0	Side Slope (1:X)	3.0
Porosity	1.00	Slope (1:X)	129.4
Invert Level (m)	23.660	Cap Volume Depth (m)	0.500
Base Width (m)	0.5	Cap Infiltration Depth (m)	0.500
Length (m)	87.1	Include Swale Volume	Yes

Complex Manhole: N3-2-4, DS/PN: N3-2.004

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	53.3
Invert Level (m)	20.360	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	88.5		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	88.5
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	53.3
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	21.360	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N3-2-5, DS/PN: N3-2.005

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	38.9
Invert Level (m)	18.052	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	89.7		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	89.7
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	38.9
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	19.052	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N3-2-6, DS/PN: N3-2.006

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	38.3
Invert Level (m)	15.700	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	90.2		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	90.2
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	38.3
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	16.700	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N3-2-7, DS/PN: N3-2.007

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	41.9
Invert Level (m)	13.554	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	90.0		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	90.0
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	41.9
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	14.554	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N3-1-13, DS/PN: N3-1.013

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	39.2
Invert Level (m)	12.486	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	40.5		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr) 0.52200 Infiltration Coefficient Side (m/hr) 0.52200

Swale

Safety Factor	2.0	Side Slope (1:X)	3.0
Porosity	1.00	Slope (1:X)	39.2
Invert Level (m)	13.486	Cap Volume Depth (m)	0.500
Base Width (m)	0.5	Cap Infiltration Depth (m)	0.500
Length (m)	40.5	Include Swale Volume	Yes

Infiltration Basin Manhole: N3-1-15, DS/PN: N3-1.015

Invert Level (m)	12.235	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.52200	Porosity	1.00
Infiltration Coefficient Side (m/hr)	0.52200		

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	65.0	1.575	369.7

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Swale Section-Road Sub-Catchment 3

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 19 Number of Storage Structures 19 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FEH Data Type	Point
FEH Rainfall Version		2013 Cv (Summer)	0.750
Site Location	GB 640286 267538 TM 40286 67538	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
Return Period(s) (years)	2, 5, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N3-1.000	N3-1-0	30 Winter	2	+0%					25.226	-0.474
N3-1.001	N3-1-1	30 Winter	2	+0%					24.014	-1.161
N3-1.002	N3-1-2	30 Winter	2	+0%					24.101	-0.994
N3-1.003	N3-1-3	30 Winter	2	+0%	30/15 Summer				23.616	-0.129
N3-1.004	N3-1-4	30 Winter	2	+0%					23.669	-1.188
N3-1.005	N3-1-5	15 Winter	2	+0%					23.346	-1.570
N3-1.006	N3-1-6	30 Winter	2	+0%					23.910	-0.828
N3-1.007	N3-1-7	30 Winter	2	+0%					22.760	-1.196
N3-1.008	N3-1-8	30 Winter	2	+0%					21.042	-1.047
N3-1.009	N3-1-9	30 Winter	2	+0%					19.709	-1.382
N3-1.010	N3-1-10	30 Winter	2	+0%					20.043	-1.071
N3-1.011	N3-1-11	30 Winter	2	+0%					17.949	-0.867
N3-1.012	N3-1-12	30 Winter	2	+0%					15.376	-1.145
N3-2.000	N3-2-0	30 Winter	2	+0%					24.595	-0.405
N3-2.001	N3-2-1	30 Winter	2	+0%					24.101	-0.732
N3-2.002	N3-2-2	120 Summer	2	+0%	2/15 Summer				23.000	0.040
N3-2.003	N3-2-3	30 Winter	2	+0%					23.063	-0.457
N3-2.004	N3-2-4	120 Winter	2	+0%	100/15 Summer	100/15 Summer			21.538	-0.322
N3-2.005	N3-2-5	120 Winter	2	+0%	100/15 Summer	100/15 Summer			19.156	-0.396
N3-2.006	N3-2-6	120 Winter	2	+0%	100/15 Summer	100/15 Summer			16.811	-0.389
N3-2.007	N3-2-7	240 Winter	2	+0%	100/15 Summer				13.554	-0.375
N3-1.013	N3-1-13	240 Winter	2	+0%					12.486	-1.275
N3-1.014	N3-1-14	240 Winter	2	+0%					13.063	-0.375
N3-1.015	N3-1-15	30 Winter	2	+0%	100/15 Summer				12.280	-0.330

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N3-1.000	N3-1-0	0.000	0.00		2.5	OK	
N3-1.001	N3-1-1	0.000	0.00		0.0	OK	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Swale Section-Road Sub-Catchment 3

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N3-1.002	N3-1-2	0.000	0.00		0.0	OK	
N3-1.003	N3-1-3	0.000	0.00		0.0	OK	
N3-1.004	N3-1-4	0.000	0.00		0.0	OK	
N3-1.005	N3-1-5	0.000	0.00		0.0	OK	
N3-1.006	N3-1-6	0.000	0.00		0.0	OK	
N3-1.007	N3-1-7	0.000	0.00		0.0	OK	
N3-1.008	N3-1-8	0.000	0.00		0.0	OK	
N3-1.009	N3-1-9	0.000	0.00		0.0	OK	
N3-1.010	N3-1-10	0.000	0.00		0.0	OK	
N3-1.011	N3-1-11	0.000	0.00		0.0	OK	
N3-1.012	N3-1-12	0.000	0.00		0.0	OK	
N3-2.000	N3-2-0	0.000	0.03		12.2	OK	
N3-2.001	N3-2-1	0.000	0.00		0.0	OK	
N3-2.002	N3-2-2	0.000	0.00		0.0	SURCHARGED	
N3-2.003	N3-2-3	0.000	0.01		8.3	OK	
N3-2.004	N3-2-4	0.000	0.00		0.0	OK	7
N3-2.005	N3-2-5	0.000	0.00		0.0	OK	9
N3-2.006	N3-2-6	0.000	0.00		0.0	OK	10
N3-2.007	N3-2-7	0.000	0.00		0.0	OK	
N3-1.013	N3-1-13	0.000	0.00		0.0	OK	
N3-1.014	N3-1-14	0.000	0.00		0.0	OK	
N3-1.015	N3-1-15	0.000	0.00		0.0	OK	

5 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Swale Section-Road Sub-Catchment 3

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 19 Number of Storage Structures 19 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FEH Data Type	Point
FEH Rainfall Version		2013 Cv (Summer)	0.750
Site Location	GB 640286 267538 TM 40286 67538	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
Return Period(s) (years)	2, 5, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N3-1.000	N3-1-0	30 Winter	5	+0%					25.231	-0.469
N3-1.001	N3-1-1	30 Winter	5	+0%					24.089	-1.086
N3-1.002	N3-1-2	30 Winter	5	+0%					24.317	-0.778
N3-1.003	N3-1-3	30 Winter	5	+0%	30/15 Summer				23.697	-0.048
N3-1.004	N3-1-4	30 Winter	5	+0%					23.755	-1.102
N3-1.005	N3-1-5	15 Winter	5	+0%					23.368	-1.548
N3-1.006	N3-1-6	30 Winter	5	+0%					24.207	-0.531
N3-1.007	N3-1-7	30 Winter	5	+0%					22.825	-1.131
N3-1.008	N3-1-8	30 Winter	5	+0%					21.146	-0.943
N3-1.009	N3-1-9	30 Winter	5	+0%					19.736	-1.355
N3-1.010	N3-1-10	30 Winter	5	+0%					20.309	-0.805
N3-1.011	N3-1-11	30 Winter	5	+0%					18.094	-0.722
N3-1.012	N3-1-12	30 Winter	5	+0%					15.459	-1.062
N3-2.000	N3-2-0	30 Winter	5	+0%					24.611	-0.389
N3-2.001	N3-2-1	30 Winter	5	+0%					24.369	-0.464
N3-2.002	N3-2-2	30 Winter	5	+0%	2/15 Summer				23.014	0.054
N3-2.003	N3-2-3	30 Winter	5	+0%					23.081	-0.439
N3-2.004	N3-2-4	60 Winter	5	+0%	100/15 Summer	100/15 Summer			21.667	-0.193
N3-2.005	N3-2-5	60 Winter	5	+0%	100/15 Summer	100/15 Summer			19.292	-0.260
N3-2.006	N3-2-6	60 Winter	5	+0%	100/15 Summer	100/15 Summer			16.944	-0.256
N3-2.007	N3-2-7	240 Winter	5	+0%	100/15 Summer				13.554	-0.375
N3-1.013	N3-1-13	240 Winter	5	+0%					12.486	-1.275
N3-1.014	N3-1-14	240 Winter	5	+0%					13.063	-0.375
N3-1.015	N3-1-15	30 Winter	5	+0%	100/15 Summer				12.297	-0.313

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N3-1.000	N3-1-0	0.000	0.00		3.4	OK	
N3-1.001	N3-1-1	0.000	0.00		0.0	OK	

5 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Swale Section-Road Sub-Catchment 3

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N3-1.002	N3-1-2	0.000	0.00		0.0	OK	
N3-1.003	N3-1-3	0.000	0.00		0.0	OK	
N3-1.004	N3-1-4	0.000	0.00		0.0	OK	
N3-1.005	N3-1-5	0.000	0.00		0.0	OK	
N3-1.006	N3-1-6	0.000	0.00		0.0	OK	
N3-1.007	N3-1-7	0.000	0.00		0.0	OK	
N3-1.008	N3-1-8	0.000	0.00		0.0	OK	
N3-1.009	N3-1-9	0.000	0.00		0.0	OK	
N3-1.010	N3-1-10	0.000	0.00		0.0	OK	
N3-1.011	N3-1-11	0.000	0.00		0.0	OK	
N3-1.012	N3-1-12	0.000	0.00		0.0	OK	
N3-2.000	N3-2-0	0.000	0.04		16.6	OK	
N3-2.001	N3-2-1	0.000	0.00		0.0	OK	
N3-2.002	N3-2-2	0.000	0.00		0.0	SURCHARGED	
N3-2.003	N3-2-3	0.000	0.01		16.3	OK	
N3-2.004	N3-2-4	0.000	0.00		0.0	FLOOD RISK*	7
N3-2.005	N3-2-5	0.000	0.00		0.0	FLOOD RISK*	9
N3-2.006	N3-2-6	0.000	0.00		0.0	FLOOD RISK*	10
N3-2.007	N3-2-7	0.000	0.00		0.0	OK	
N3-1.013	N3-1-13	0.000	0.00		0.0	OK	
N3-1.014	N3-1-14	0.000	0.00		0.0	OK	
N3-1.015	N3-1-15	0.000	0.00		0.0	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Swale Section-Road Sub-Catchment 3

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 19 Number of Storage Structures 19 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH	Data Type	Point
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 640286 267538 TM 40286 67538	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
Return Period(s) (years)	2, 5, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N3-1.000	N3-1-0	30 Winter	30	+0%					25.242	-0.458
N3-1.001	N3-1-1	30 Winter	30	+0%					24.256	-0.919
N3-1.002	N3-1-2	30 Winter	30	+0%					24.669	-0.426
N3-1.003	N3-1-3	30 Winter	30	+0%	30/15 Summer				23.989	0.244
N3-1.004	N3-1-4	30 Winter	30	+0%					24.067	-0.790
N3-1.005	N3-1-5	15 Winter	30	+0%					23.444	-1.472
N3-1.006	N3-1-6	60 Winter	30	+0%					24.372	-0.366
N3-1.007	N3-1-7	30 Winter	30	+0%					22.981	-0.975
N3-1.008	N3-1-8	30 Winter	30	+0%					21.387	-0.702
N3-1.009	N3-1-9	30 Winter	30	+0%					19.799	-1.292
N3-1.010	N3-1-10	30 Winter	30	+0%					20.611	-0.503
N3-1.011	N3-1-11	30 Winter	30	+0%					18.410	-0.406
N3-1.012	N3-1-12	30 Winter	30	+0%					15.652	-0.869
N3-2.000	N3-2-0	30 Winter	30	+0%					24.645	-0.355
N3-2.001	N3-2-1	60 Winter	30	+0%					24.531	-0.302
N3-2.002	N3-2-2	30 Summer	30	+0%	2/15 Summer				23.046	0.086
N3-2.003	N3-2-3	15 Winter	30	+0%					23.129	-0.391
N3-2.004	N3-2-4	30 Winter	30	+0%	100/15 Summer	100/15 Summer			21.810	-0.050
N3-2.005	N3-2-5	60 Winter	30	+0%	100/15 Summer	100/15 Summer			19.499	-0.053
N3-2.006	N3-2-6	60 Winter	30	+0%	100/15 Summer	100/15 Summer			17.146	-0.054
N3-2.007	N3-2-7	60 Winter	30	+0%	100/15 Summer				13.730	-0.199
N3-1.013	N3-1-13	60 Winter	30	+0%					13.548	-0.213
N3-1.014	N3-1-14	60 Winter	30	+0%					13.133	-0.305
N3-1.015	N3-1-15	60 Winter	30	+0%	100/15 Summer				12.432	-0.178

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N3-1.000	N3-1-0	0.000	0.01		5.7	OK	
N3-1.001	N3-1-1	0.000	0.00		0.0	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Swale Section-Road Sub-Catchment 3

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N3-1.002	N3-1-2	0.000	0.00		0.0	OK	
N3-1.003	N3-1-3	0.000	0.00		0.0	SURCHARGED	
N3-1.004	N3-1-4	0.000	0.00		0.0	OK	
N3-1.005	N3-1-5	0.000	0.00		0.0	OK	
N3-1.006	N3-1-6	0.000	0.00		0.0	OK	
N3-1.007	N3-1-7	0.000	0.00		0.0	OK	
N3-1.008	N3-1-8	0.000	0.00		0.0	OK	
N3-1.009	N3-1-9	0.000	0.00		0.0	OK	
N3-1.010	N3-1-10	0.000	0.00		0.0	OK	
N3-1.011	N3-1-11	0.000	0.00		0.0	OK	
N3-1.012	N3-1-12	0.000	0.00		0.0	OK	
N3-2.000	N3-2-0	0.000	0.07		27.2	OK	
N3-2.001	N3-2-1	0.000	0.00		0.0	OK	
N3-2.002	N3-2-2	0.000	0.00		0.0	SURCHARGED	
N3-2.003	N3-2-3	0.000	0.03		43.5	OK	
N3-2.004	N3-2-4	0.000	0.02		27.9	FLOOD RISK*	7
N3-2.005	N3-2-5	0.000	0.02		26.9	FLOOD RISK*	9
N3-2.006	N3-2-6	0.000	0.02		27.0	FLOOD RISK*	10
N3-2.007	N3-2-7	0.000	0.16		26.5	OK	
N3-1.013	N3-1-13	0.000	0.10		21.8	OK	
N3-1.014	N3-1-14	0.000	0.08		21.7	OK	
N3-1.015	N3-1-15	0.000	0.00		0.0	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Swale Section-Road Sub-Catchment 3

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 19 Number of Storage Structures 19 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FEH Data Type	Point
FEH Rainfall Version		2013 Cv (Summer)	0.750
Site Location	GB 640286 267538 TM 40286 67538	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
Return Period(s) (years)	2, 5, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N3-1.000	N3-1-0	30 Winter	100	+40%					25.257	-0.443
N3-1.001	N3-1-1	60 Winter	100	+40%					24.703	-0.472
N3-1.002	N3-1-2	60 Winter	100	+40%					24.832	-0.263
N3-1.003	N3-1-3	30 Winter	100	+40%	30/15 Summer				24.341	0.596
N3-1.004	N3-1-4	30 Winter	100	+40%					24.435	-0.422
N3-1.005	N3-1-5	30 Winter	100	+40%					23.922	-0.994
N3-1.006	N3-1-6	60 Winter	100	+40%					24.545	-0.193
N3-1.007	N3-1-7	30 Winter	100	+40%					23.230	-0.726
N3-1.008	N3-1-8	30 Winter	100	+40%					21.733	-0.356
N3-1.009	N3-1-9	30 Winter	100	+40%					19.895	-1.196
N3-1.010	N3-1-10	60 Winter	100	+40%					20.782	-0.332
N3-1.011	N3-1-11	30 Winter	100	+40%					18.646	-0.170
N3-1.012	N3-1-12	30 Winter	100	+40%					15.959	-0.562
N3-2.000	N3-2-0	30 Winter	100	+40%					24.718	-0.282
N3-2.001	N3-2-1	60 Winter	100	+40%					24.689	-0.144
N3-2.002	N3-2-2	15 Winter	100	+40%	2/15 Summer				23.090	0.130
N3-2.003	N3-2-3	15 Winter	100	+40%					23.175	-0.345
N3-2.004	N3-2-4	30 Winter	100	+40%	100/15 Summer	100/15 Summer			21.874	0.014
N3-2.005	N3-2-5	60 Winter	100	+40%	100/15 Summer	100/15 Summer			19.566	0.014
N3-2.006	N3-2-6	60 Winter	100	+40%	100/15 Summer	100/15 Summer			17.217	0.017
N3-2.007	N3-2-7	60 Winter	100	+40%	100/15 Summer				14.014	0.085
N3-1.013	N3-1-13	60 Winter	100	+40%					13.709	-0.052
N3-1.014	N3-1-14	60 Winter	100	+40%					13.188	-0.250
N3-1.015	N3-1-15	60 Winter	100	+40%	100/15 Summer				13.025	0.415

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N3-1.000	N3-1-0	0.000	0.01		10.4	OK	
N3-1.001	N3-1-1	0.000	0.00		0.0	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Swale Section-Road Sub-Catchment 3

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N3-1.002	N3-1-2	0.000	0.00		0.0	FLOOD RISK*	
N3-1.003	N3-1-3	0.000	0.00		0.0	SURCHARGED	
N3-1.004	N3-1-4	0.000	0.02		9.2	OK	
N3-1.005	N3-1-5	0.000	0.00		0.0	OK	
N3-1.006	N3-1-6	0.000	0.00		0.6	FLOOD RISK*	
N3-1.007	N3-1-7	0.000	0.00		0.0	OK	
N3-1.008	N3-1-8	0.000	0.00		0.0	OK	
N3-1.009	N3-1-9	0.000	0.00		0.0	OK	
N3-1.010	N3-1-10	0.000	0.00		0.0	OK	
N3-1.011	N3-1-11	0.000	0.00		0.2	FLOOD RISK*	
N3-1.012	N3-1-12	0.000	0.00		0.0	OK	
N3-2.000	N3-2-0	0.000	0.12		48.8	FLOOD RISK*	
N3-2.001	N3-2-1	0.000	0.00		0.0	FLOOD RISK*	
N3-2.002	N3-2-2	0.000	0.00		0.0	SURCHARGED	
N3-2.003	N3-2-3	0.000	0.07		89.8	OK	
N3-2.004	N3-2-4	13.518	0.05		70.4	FLOOD	7
N3-2.005	N3-2-5	14.347	0.05		71.4	FLOOD	9
N3-2.006	N3-2-6	16.595	0.05		73.4	FLOOD	10
N3-2.007	N3-2-7	0.000	0.45		72.0	SURCHARGED	
N3-1.013	N3-1-13	0.000	0.30		65.7	OK	
N3-1.014	N3-1-14	0.000	0.24		65.7	OK	
N3-1.015	N3-1-15	0.000	0.00		0.0	SURCHARGED	

NETWORK 4 CATCHMENT

HILL FARM LANE DRAINING TO SOAKAWAY BUT TO BE CHANGED TO DEEP BOREHOLE

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Swale Section-Road Sub-Catchment 4

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	2013
Site Location	GB 640286 267538 TM 40286 67538
Data Type	Point
Maximum Rainfall (mm/hr)	500
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Swale Section-Road Sub-Catchment 4

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.247	4-8	0.141	8-12	0.026	12-16	0.026	16-20	0.007

Total Area Contributing (ha) = 0.448

Total Pipe Volume (m^3) = 372.820

Network Design Table for Swale Section-Road Sub-Catchment 4

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
N4-1.000	12.811	0.599	21.4	0.052	15.00	0.0	0.045	3	\=/	500	1:3 Swale	
N4-1.001	46.754	0.644	72.6	0.034	0.00	0.0	0.045	3	\=/	500	1:3 Swale	
N4-1.002	36.045	0.885	40.7	0.023	0.00	0.0	0.045	3	\=/	500	1:3 Swale	
N4-1.003	60.739	2.572	23.6	0.000	0.00	0.0	0.045	3	\=/	500	1:3 Swale	
N4-1.004	31.957	2.223	14.4	0.044	0.00	0.0	0.045	3	\=/	500	1:3 Swale	
N4-2.000	11.408	0.100	114.1	0.047	15.00	0.0	0.045	3	\=/	500	1:3 Swale	
N4-2.001	47.524	0.900	52.8	0.089	0.00	0.0	0.045	3	\=/	500	1:3 Swale	

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)
N4-1.000	34.09	15.11	23.500	0.052	0.0	0.0	0.0	2.02	2022.5	4.8
N4-1.001	33.18	15.82	22.901	0.085	0.0	0.0	0.0	1.10	1097.7	7.7
N4-1.002	32.68	16.23	22.257	0.109	0.0	0.0	0.0	1.47	1465.6	9.6
N4-1.003	32.05	16.75	21.372	0.109	0.0	0.0	0.0	1.92	1924.7	9.6
N4-1.004	31.80	16.97	18.800	0.153	0.0	0.0	0.0	2.47	2466.8	13.1
N4-2.000	33.95	15.22	23.000	0.047	0.0	0.0	0.0	0.88	875.7	4.3
N4-2.001	33.16	15.83	22.900	0.136	0.0	0.0	0.0	1.29	1287.1	12.2

Network Design Table for Swale Section-Road Sub-Catchment 4

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
N4-2.002	33.848	0.926	36.6	0.049	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N4-2.003	90.062	4.299	20.9	0.111	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N4-2.004	9.905	0.198	50.0	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
N4-1.005	6.705	0.063	106.4	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
N4-1.006	7.050	0.065	108.5	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
N4-2.002	32.71	16.20	22.000	0.185	0.0	0.0	0.0	1.55	1547.0	16.3
N4-2.003	31.84	16.93	21.074	0.295	0.0	0.0	0.0	2.04	2043.4	25.5
N4-2.004	31.75	17.01	15.775	0.295	0.0	0.0	0.0	2.23	157.5	25.5
N4-1.005	31.67	17.08	15.577	0.448	0.0	0.0	0.0	1.52	107.7	38.4
N4-1.006	31.58	17.16	15.514	0.448	0.0	0.0	0.0	1.51	106.7	38.4

Manhole Schedules for Swale Section-Road Sub-Catchment 4

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
N4-1-0	24.000	0.500	Junction		N4-1.000	23.500	500				
N4-1-1	23.401	0.500	Junction		N4-1.001	22.901	500	N4-1.000	22.901	500	
N4-1-2	22.757	0.500	Junction		N4-1.002	22.257	500	N4-1.001	22.257	500	
N4-1-3	21.872	0.500	Junction		N4-1.003	21.372	500	N4-1.002	21.372	500	
N4-1-4	19.300	0.500	Junction		N4-1.004	18.800	500	N4-1.003	18.800	500	
N4-2-0	23.500	0.500	Junction		N4-2.000	23.000	500				
N4-2-1	23.400	0.500	Junction		N4-2.001	22.900	500	N4-2.000	22.900	500	
N4-2-2	22.500	0.500	Junction		N4-2.002	22.000	500	N4-2.001	22.000	500	
N4-2-3	21.574	0.500	Junction		N4-2.003	21.074	500	N4-2.002	21.074	500	
N4-2-4	17.275	1.500	Open Manhole	600	N4-2.004	15.775	300	N4-2.003	16.775	500	1200
N4-2-5	17.577	2.000	Open Manhole	600	N4-1.005	15.577	300	N4-1.004	16.577	500	1200
								N4-2.004	15.577	300	
N4-1-6	18.109	2.595	Open Manhole	1200	N4-1.006	15.514	300	N4-1.005	15.514	300	
N4-HW-1	17.899	2.450	Open Manhole	0		OUTFALL		N4-1.006	15.449	300	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
N4-1-0	636448.724	259432.847			No Entry	
N4-1-1	636436.855	259435.857			No Entry	
N4-1-2	636414.938	259477.153			No Entry	
N4-1-3	636396.377	259507.924			No Entry	
N4-1-4	636360.119	259556.546			No Entry	
N4-2-0	636414.838	259417.116			No Entry	
N4-2-1	636418.140	259427.552			No Entry	
N4-2-2	636404.331	259472.961			No Entry	
N4-2-3	636388.385	259502.816			No Entry	
N4-2-4	636331.219	259572.022			No Entry	
N4-2-5	636337.805	259579.421			No Entry	

Manhole Schedules for Swale Section-Road Sub-Catchment 4

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
N4-1-6	636342.620	259584.087	636342.620	259584.087	Required	
N4-HW-1	636344.992	259590.726			No Entry	

Area Summary for Swale Section-Road Sub-Catchment 4

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	Classification	Carriageway	100	0.043	0.043	0.043
	Classification	Swales	100	0.005	0.005	0.049
	Classification	Verge	50	0.005	0.003	0.052
1.001	Classification	Swales	100	0.016	0.016	0.016
	Classification	Verge	50	0.022	0.011	0.028
	Classification	Earthworks	50	0.012	0.006	0.034
1.002	Classification	Swales	100	0.013	0.013	0.013
	Classification	Verge	50	0.009	0.004	0.017
	Classification	Earthworks	50	0.012	0.006	0.023
1.003	-	-	100	0.000	0.000	0.000
1.004	Classification	Swales	100	0.032	0.032	0.032
	Classification	Earthworks	50	0.023	0.012	0.044
2.000	Classification	Carriageway	100	0.040	0.040	0.040
	Classification	Swales	100	0.005	0.005	0.045
	Classification	Verge	50	0.004	0.002	0.047
	Classification	Earthworks	50	0.000	0.000	0.047
2.001	Classification	Carriageway	100	0.057	0.057	0.057
	Classification	Swales	100	0.017	0.017	0.073
	Classification	Verge	50	0.021	0.011	0.084
	Classification	Earthworks	50	0.010	0.005	0.089
2.002	Classification	Swales	100	0.012	0.012	0.012
	Classification	Carriageway	100	0.027	0.027	0.038
	Classification	Verge	50	0.008	0.004	0.043
	Classification	Earthworks	50	0.012	0.006	0.049
2.003	Classification	Carriageway	100	0.055	0.055	0.055
	Classification	Swales	100	0.032	0.032	0.087
	Classification	Earthworks	50	0.048	0.024	0.111
2.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.543	0.448	0.448

Free Flowing Outfall Details for Swale Section-Road Sub-Catchment 4

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
N4-1.006	N4-HW-1	17.899	15.449	0.000	0	0

Simulation Criteria for Swale Section-Road Sub-Catchment 4

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 Offline Controls 0	Number of Time/Area Diagrams 0
Number of Online Controls 10	Number of Storage Structures 10	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)	19.500	Storm Duration (mins)	30
Ratio R	0.404		

Online Controls for Swale Section-Road Sub-Catchment 4

V-Notch Weir Manhole: N4-1-1, DS/PN: N4-1.001, Volume (m³): 12.8

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 23.201

V-Notch Weir Manhole: N4-1-2, DS/PN: N4-1.002, Volume (m³): 46.8

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 22.557

V-Notch Weir Manhole: N4-1-3, DS/PN: N4-1.003, Volume (m³): 36.0

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 21.672

V-Notch Weir Manhole: N4-1-4, DS/PN: N4-1.004, Volume (m³): 60.7

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 19.100

V-Notch Weir Manhole: N4-2-1, DS/PN: N4-2.001, Volume (m³): 11.4

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 23.200

V-Notch Weir Manhole: N4-2-2, DS/PN: N4-2.002, Volume (m³): 47.5

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 22.300

V-Notch Weir Manhole: N4-2-3, DS/PN: N4-2.003, Volume (m³): 33.8

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 21.374

Complex Manhole: N4-2-4, DS/PN: N4-2.004, Volume (m³): 90.2

Orifice

Diameter (m) 0.300 Discharge Coefficient 0.600 Invert Level (m) 15.775

Weir

Discharge Coef 0.544 Width (m) 0.300 Invert Level (m) 17.275

Complex Manhole: N4-2-5, DS/PN: N4-1.005, Volume (m³): 32.9

Orifice

Diameter (m) 0.300 Discharge Coefficient 0.600 Invert Level (m) 15.577

Weir

Discharge Coef 0.544 Width (m) 0.300 Invert Level (m) 17.577

Weir Manhole: N4-1-6, DS/PN: N4-1.006, Volume (m³): 3.3

Discharge Coef 0.544 Width (m) 0.300 Invert Level (m) 17.809

Storage Structures for Swale Section-Road Sub-Catchment 4

Complex Manhole: N4-1-1, DS/PN: N4-1.001

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	21.4
Invert Level (m)	21.901	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	12.8		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	12.8
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	21.4
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	22.901	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N4-1-2, DS/PN: N4-1.002

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	72.6
Invert Level (m)	21.257	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	46.8		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	46.8
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	72.6
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	22.257	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N4-1-3, DS/PN: N4-1.003

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Trench Length (m)	36.0
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Diameter (m)	0.150
Safety Factor	2.0	Pipe Depth above Invert (m)	0.000
Porosity	0.30	Number of Pipes	1
Invert Level (m)	20.372	Slope (1:X)	40.7
Trench Width (m)	0.5	Cap Volume Depth (m)	1.000

Filter Drain

Cap Infiltration Depth (m) 1.000

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	36.0
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	40.7
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	21.372	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N4-1-4, DS/PN: N4-1.004

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	23.6
Invert Level (m)	17.800	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	60.7		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	60.7
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	23.6
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	18.800	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N4-2-1, DS/PN: N4-2.001

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	114.1
Invert Level (m)	21.900	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	11.4		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	11.4
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	114.1
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	22.900	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N4-2-2, DS/PN: N4-2.002

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	52.8
Invert Level (m)	21.000	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	47.5		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	47.5
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	52.8
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	22.000	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N4-2-3, DS/PN: N4-2.003

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	36.6
Invert Level (m)	20.074	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	33.8		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	47.5
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	52.8
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	21.074	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N4-2-4, DS/PN: N4-2.004

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	20.9
Invert Level (m)	15.775	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	90.1		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	90.1
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	20.9
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	16.775	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N4-2-5, DS/PN: N4-1.005

Filter Drain

Infiltration Coefficient Base (m/hr)	0.52200	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.52200	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	14.4
Invert Level (m)	15.577	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	32.0		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.52200	Length (m)	32.0
Infiltration Coefficient Side (m/hr)	0.52200	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	14.4
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	16.577	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Lined Soakaway Manhole: N4-1-6, DS/PN: N4-1.006

Infiltration Coefficient Base (m/hr)	0.52200	Ring Diameter (m)	1.50
Infiltration Coefficient Side (m/hr)	0.52200	Pit Multiplier	1.5
Safety Factor	2.0	Number Required	1
Porosity	0.30	Cap Volume Depth (m)	2.295
Invert Level (m)	15.514	Cap Infiltration Depth (m)	2.295

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Swale Section-Road Sub-Catchment 4

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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 10 Number of Storage Structures 10 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FEH Data Type	Point
FEH Rainfall Version		2013 Cv (Summer)	0.750
Site Location	GB 640286 267538 TM 40286 67538	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
Return Period(s) (years)	2, 5, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
N4-1.000	N4-1-0	30 Winter	2	+0%					23.521	-0.479	0.000
N4-1.001	N4-1-1	120 Winter	2	+0%					23.148	-0.253	0.000
N4-1.002	N4-1-2	30 Winter	2	+0%					21.544	-1.213	0.000
N4-1.003	N4-1-3	240 Winter	2	+0%					20.372	-1.500	0.000
N4-1.004	N4-1-4	30 Winter	2	+0%					18.550	-0.750	0.000
N4-2.000	N4-2-0	120 Winter	2	+0%					23.127	-0.373	0.000
N4-2.001	N4-2-1	120 Winter	2	+0%					23.127	-0.273	0.000
N4-2.002	N4-2-2	30 Winter	2	+0%					21.547	-0.953	0.000
N4-2.003	N4-2-3	30 Winter	2	+0%					21.112	-0.462	0.000
N4-2.004	N4-2-4	240 Winter	2	+0%	100/15 Summer				15.775	-0.300	0.000
N4-1.005	N4-2-5	240 Winter	2	+0%	100/15 Summer				15.577	-0.300	0.000
N4-1.006	N4-1-6	240 Winter	2	+0%	100/15 Summer				15.514	-0.300	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N4-1.000	N4-1-0	0.00		4.2	OK	
N4-1.001	N4-1-1	0.00		0.0	FLOOD RISK*	
N4-1.002	N4-1-2	0.00		0.0	OK	
N4-1.003	N4-1-3	0.00		0.0	OK	
N4-1.004	N4-1-4	0.00		0.0	OK	
N4-2.000	N4-2-0	0.00		2.1	OK	
N4-2.001	N4-2-1	0.00		0.0	FLOOD RISK*	
N4-2.002	N4-2-2	0.00		0.0	OK	
N4-2.003	N4-2-3	0.00		0.0	OK	
N4-2.004	N4-2-4	0.00		0.0	OK	
N4-1.005	N4-2-5	0.00		0.0	OK	
N4-1.006	N4-1-6	0.00		0.0	OK	

5 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Swale Section-Road Sub-Catchment 4

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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 10 Number of Storage Structures 10 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FEH Data Type	Point
FEH Rainfall Version		2013 Cv (Summer)	0.750
Site Location	GB 640286 267538 TM 40286 67538	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
Return Period(s) (years)	2, 5, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
N4-1.000	N4-1-0	30 Winter	5	+0%					23.526	-0.474	0.000
N4-1.001	N4-1-1	60 Winter	5	+0%					23.236	-0.165	0.000
N4-1.002	N4-1-2	30 Winter	5	+0%					21.612	-1.145	0.000
N4-1.003	N4-1-3	240 Winter	5	+0%					20.372	-1.500	0.000
N4-1.004	N4-1-4	30 Winter	5	+0%					18.721	-0.579	0.000
N4-2.000	N4-2-0	120 Winter	5	+0%					23.204	-0.296	0.000
N4-2.001	N4-2-1	120 Winter	5	+0%					23.204	-0.196	0.000
N4-2.002	N4-2-2	30 Winter	5	+0%					21.668	-0.832	0.000
N4-2.003	N4-2-3	30 Winter	5	+0%					21.267	-0.307	0.000
N4-2.004	N4-2-4	240 Winter	5	+0%	100/15 Summer				15.775	-0.300	0.000
N4-1.005	N4-2-5	240 Winter	5	+0%	100/15 Summer				15.577	-0.300	0.000
N4-1.006	N4-1-6	240 Winter	5	+0%	100/15 Summer				15.514	-0.300	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N4-1.000	N4-1-0	0.00		5.7	OK	
N4-1.001	N4-1-1	0.00		0.8	FLOOD RISK*	
N4-1.002	N4-1-2	0.00		0.0	OK	
N4-1.003	N4-1-3	0.00		0.0	OK	
N4-1.004	N4-1-4	0.00		0.0	OK	
N4-2.000	N4-2-0	0.00		2.8	FLOOD RISK*	
N4-2.001	N4-2-1	0.00		0.0	FLOOD RISK*	
N4-2.002	N4-2-2	0.00		0.0	OK	
N4-2.003	N4-2-3	0.00		0.0	OK	
N4-2.004	N4-2-4	0.00		0.0	OK	
N4-1.005	N4-2-5	0.00		0.0	OK	
N4-1.006	N4-1-6	0.00		0.0	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Swale Section-Road Sub-Catchment 4

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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 10 Number of Storage Structures 10 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FEH Data Type	Point
FEH Rainfall Version		2013 Cv (Summer)	0.750
Site Location	GB 640286 267538 TM 40286 67538	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
Return Period(s) (years)	2, 5, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
N4-1.000	N4-1-0	30 Winter	30	+0%					23.534	-0.466	0.000
N4-1.001	N4-1-1	30 Winter	30	+0%					23.294	-0.107	0.000
N4-1.002	N4-1-2	60 Winter	30	+0%					22.137	-0.620	0.000
N4-1.003	N4-1-3	240 Winter	30	+0%					20.372	-1.500	0.000
N4-1.004	N4-1-4	30 Winter	30	+0%					19.016	-0.284	0.000
N4-2.000	N4-2-0	60 Winter	30	+0%					23.297	-0.203	0.000
N4-2.001	N4-2-1	60 Winter	30	+0%					23.296	-0.104	0.000
N4-2.002	N4-2-2	60 Winter	30	+0%					22.190	-0.310	0.000
N4-2.003	N4-2-3	30 Winter	30	+0%					21.427	-0.147	0.000
N4-2.004	N4-2-4	30 Winter	30	+0%	100/15 Summer				15.825	-0.250	0.000
N4-1.005	N4-2-5	60 Winter	30	+0%	100/15 Summer				15.664	-0.213	0.000
N4-1.006	N4-1-6	60 Winter	30	+0%	100/15 Summer				15.641	-0.173	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N4-1.000	N4-1-0	0.00		9.5	OK	
N4-1.001	N4-1-1	0.01		8.9	FLOOD RISK*	
N4-1.002	N4-1-2	0.00		0.0	OK	
N4-1.003	N4-1-3	0.00		0.0	OK	
N4-1.004	N4-1-4	0.00		0.0	FLOOD RISK*	
N4-2.000	N4-2-0	0.01		6.8	FLOOD RISK*	
N4-2.001	N4-2-1	0.01		9.7	FLOOD RISK*	
N4-2.002	N4-2-2	0.00		0.0	OK	
N4-2.003	N4-2-3	0.00		2.1	FLOOD RISK*	
N4-2.004	N4-2-4	0.02		2.1	OK	
N4-1.005	N4-2-5	0.03		1.6	OK	
N4-1.006	N4-1-6	0.00		0.0	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Swale Section-Road Sub-Catchment 4

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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 10 Number of Storage Structures 10 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FEH	Data Type Point
FEH Rainfall Version		2013	Cv (Summer) 0.750
Site Location	GB 640286 267538 TM 40286 67538		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
Return Period(s) (years)	2, 5, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
N4-1.000	N4-1-0	30 Winter	100	+40%					23.548	-0.452	0.000
N4-1.001	N4-1-1	30 Winter	100	+40%					23.341	-0.060	0.000
N4-1.002	N4-1-2	60 Winter	100	+40%					22.574	-0.183	0.000
N4-1.003	N4-1-3	60 Winter	100	+40%					20.403	-1.469	0.000
N4-1.004	N4-1-4	30 Winter	100	+40%					19.179	-0.121	0.000
N4-2.000	N4-2-0	30 Winter	100	+40%					23.369	-0.131	0.000
N4-2.001	N4-2-1	30 Winter	100	+40%					23.368	-0.032	0.000
N4-2.002	N4-2-2	60 Winter	100	+40%					22.434	-0.066	0.000
N4-2.003	N4-2-3	60 Winter	100	+40%					21.525	-0.049	0.000
N4-2.004	N4-2-4	60 Winter	100	+40%	100/15 Summer				17.186	1.111	0.000
N4-1.005	N4-2-5	60 Winter	100	+40%	100/15 Summer				17.096	1.219	0.000
N4-1.006	N4-1-6	60 Winter	100	+40%	100/15 Summer				17.056	1.242	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N4-1.000	N4-1-0	0.01		17.2	OK	
N4-1.001	N4-1-1	0.02		24.5	FLOOD RISK*	
N4-1.002	N4-1-2	0.00		0.1	FLOOD RISK*	
N4-1.003	N4-1-3	0.00		0.0	OK	
N4-1.004	N4-1-4	0.00		5.9	FLOOD RISK*	
N4-2.000	N4-2-0	0.02		16.0	FLOOD RISK*	
N4-2.001	N4-2-1	0.03		38.2	FLOOD RISK*	
N4-2.002	N4-2-2	0.01		22.1	FLOOD RISK*	
N4-2.003	N4-2-3	0.01		29.4	FLOOD RISK*	
N4-2.004	N4-2-4	0.14		15.9	FLOOD RISK	
N4-1.005	N4-2-5	0.16		10.1	SURCHARGED	
N4-1.006	N4-1-6	0.00		0.0	SURCHARGED	

NETWORK 5 CATCHMENT

BYPASS NORTHEAST OF HILL FARM LANE AND A12 ROUNDABOUT NORTHEAST DRAINING TO INFILTRATION BASIN 3

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for A12 Eastern Roundabout Section-Road Sub-Catchment 5

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	2013
Site Location	GB 640286 267538 TM 40286 67538
Data Type	Point
Maximum Rainfall (mm/hr)	500
Maximum Time of Concentration (mins)	50
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for A12 Eastern Roundabout Section-Road Sub-Catchment 5

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	0.103	8-12	0.389	16-20	0.591	24-28	0.600	32-36	0.053	40-44	0.051
4-8	0.534	12-16	0.360	20-24	0.578	28-32	0.383	36-40	0.053	44-48	0.006

Total Area Contributing (ha) = 3.703

Total Pipe Volume (m^3) = 1967.709

Network Design Table for A12 Eastern Roundabout Section-Road Sub-Catchment 5

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
N5-1.000	90.022	0.669	134.6	0.150	15.00	0.0	0.045	3	\=/	500	1:3 Swale	
N5-1.001	90.010	1.383	65.1	0.154	0.00	0.0	0.045	3	\=/	500	1:3 Swale	
N5-1.002	87.817	1.644	53.4	0.157	0.00	0.0	0.045	3	\=/	500	1:3 Swale	
N5-1.003	99.338	1.300	76.4	0.164	0.00	0.0	0.045	3	\=/	500	1:3 Swale	
N5-1.004	103.076	0.300	343.6	0.121	0.00	0.0	0.045	3	\=/	500	1:3 Swale	
N5-1.005	88.117	0.446	197.6	0.100	0.00	0.0	0.045	3	\=/	500	1:3 Swale	

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)
N5-1.000	31.92	16.86	24.496	0.150	0.0	0.0	0.0	0.81	806.3	13.0
N5-1.001	30.48	18.15	23.827	0.304	0.0	0.0	0.0	1.16	1159.4	25.1
N5-1.002	29.32	19.30	22.444	0.460	0.0	0.0	0.0	1.28	1279.7	36.5
N5-1.003	27.90	20.85	20.800	0.625	0.0	0.0	0.0	1.07	1070.0	47.2
N5-1.004	25.26	24.25	19.500	0.746	0.0	0.0	0.0	0.50	504.6	51.0
N5-1.005	23.82	26.46	19.200	0.846	0.0	0.0	0.0	0.67	665.4	54.6

Network Design Table for A12 Eastern Roundabout Section-Road Sub-Catchment 5

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
N5-1.006	90.099	0.942	95.6	0.108	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N5-1.007	90.000	0.625	144.0	0.134	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N5-1.008	90.000	0.560	160.7	0.119	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N5-1.009	85.639	0.127	674.3	0.102	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N5-1.010	75.490	0.314	240.4	0.050	0.00	0.0		0.045	o	300	Pipe/Conduit	
N5-1.011	35.043	0.386	90.8	0.019	0.00	0.0	0.600		o	300	Pipe/Conduit	
N5-2.000	87.052	1.040	83.7	0.064	15.00	0.0	0.600		o	150	Pipe/Conduit	
N5-2.001	90.028	1.757	51.2	0.065	0.00	0.0	0.600		o	150	Pipe/Conduit	
N5-2.002	26.981	0.539	50.1	0.014	0.00	0.0	0.600		o	150	Pipe/Conduit	
N5-2.003	63.100	1.339	47.1	0.044	0.00	0.0	0.600		o	150	Pipe/Conduit	
N5-1.012	17.082	0.102	167.5	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
N5-3.000	86.650	0.581	149.1	0.050	15.00	0.0		0.045	3 \=/	500	1:3 Swale	
N5-3.001	90.029	1.246	72.3	0.057	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N5-3.002	90.098	1.646	54.7	0.068	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N5-3.003	90.087	1.957	46.0	0.085	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N5-3.004	79.597	0.642	124.0	0.127	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N5-3.005	90.195	0.752	119.9	0.185	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N5-3.006	90.067	0.396	227.4	0.189	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N5-3.007	90.053	0.533	169.0	0.154	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N5-3.008	90.000	0.565	159.3	0.132	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N5-3.009	126.997	0.282	450.3	0.151	0.00	0.0		0.045	3 \=/	500	1:3 Swale	
N5-3.010	75.721	0.361	209.8	0.061	0.00	0.0		0.045	o	300	Pipe/Conduit	
N5-3.011	33.276	0.441	75.5	0.018	0.00	0.0	0.600		o	300	Pipe/Conduit	
N5-1.013	30.103	0.159	189.3	0.027	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)
N5-1.006	22.91	28.03	18.754	0.954	0.0	0.0	0.0	0.96	956.3	59.2
N5-1.007	21.90	29.95	17.812	1.088	0.0	0.0	0.0	0.78	779.4	64.5
N5-1.008	20.93	31.99	17.187	1.207	0.0	0.0	0.0	0.74	737.8	68.4
N5-1.009	19.31	35.95	16.627	1.310	0.0	0.0	0.0	0.36	360.2	68.5
N5-1.010	17.65	40.88	15.600	1.360	0.0	0.0	0.0	0.25	18.0«	68.5
N5-1.011	17.54	41.24	15.286	1.379	0.0	0.0	0.0	1.65	116.7	68.5
N5-2.000	32.56	16.32	20.650	0.064	0.0	0.0	0.0	1.10	19.4	5.7
N5-2.001	31.32	17.38	19.610	0.130	0.0	0.0	0.0	1.41	24.9	11.0
N5-2.002	30.97	17.70	17.853	0.144	0.0	0.0	0.0	1.43	25.2	12.1
N5-2.003	30.21	18.42	17.314	0.188	0.0	0.0	0.0	1.47	26.0	15.4
N5-1.012	17.47	41.47	14.900	1.567	0.0	0.0	0.0	1.21	85.7	74.1
N5-3.000	31.89	16.89	25.200	0.050	0.0	0.0	0.0	0.77	765.9	4.4
N5-3.001	30.38	18.25	24.619	0.108	0.0	0.0	0.0	1.10	1100.3	8.9
N5-3.002	29.19	19.44	23.373	0.176	0.0	0.0	0.0	1.26	1264.2	13.9
N5-3.003	28.18	20.53	21.727	0.261	0.0	0.0	0.0	1.38	1378.5	19.9
N5-3.004	26.85	22.11	19.770	0.388	0.0	0.0	0.0	0.84	840.0	28.2
N5-3.005	25.53	23.87	19.128	0.573	0.0	0.0	0.0	0.85	854.0	39.6
N5-3.006	23.93	26.29	18.376	0.762	0.0	0.0	0.0	0.62	620.2	49.4
N5-3.007	22.72	28.37	17.980	0.917	0.0	0.0	0.0	0.72	719.6	56.4
N5-3.008	21.68	30.40	17.447	1.049	0.0	0.0	0.0	0.74	741.1	61.6
N5-3.009	19.59	35.20	16.882	1.200	0.0	0.0	0.0	0.44	440.7	63.7
N5-3.010	17.98	39.82	15.600	1.261	0.0	0.0	0.0	0.27	19.3«	63.7
N5-3.011	17.88	40.13	15.239	1.279	0.0	0.0	0.0	1.81	128.1	63.7
N5-1.013	17.36	41.86	14.723	2.872	0.0	0.0	0.0	1.31	145.1	135.1

Network Design Table for A12 Eastern Roundabout Section-Road Sub-Catchment 5

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
N5-1.014	29.374	0.155	189.5	0.077	0.00	0.0	0.600		o	375	Pipe/Conduit	
N5-1.015	22.514	0.284	79.3	0.083	0.00	0.0	0.600		o	375	Pipe/Conduit	
N5-4.000	42.125	1.928	21.8	0.031	15.00	0.0	0.600		o	150	Pipe/Conduit	
N5-5.000	36.638	0.602	60.9	0.017	15.00	0.0	0.600		o	150	Pipe/Conduit	
N5-5.001	18.452	0.158	116.8	0.013	0.00	0.0	0.600		o	150	Pipe/Conduit	
N5-5.002	18.984	0.140	135.6	0.005	0.00	0.0	0.600		o	150	Pipe/Conduit	
N5-5.003	18.004	0.208	86.6	0.009	0.00	0.0	0.600		o	150	Pipe/Conduit	
N5-5.004	31.841	0.392	81.2	0.023	0.00	0.0	0.600		o	150	Pipe/Conduit	
N5-5.005	63.649	1.046	60.8	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
N5-5.006	80.500	1.442	55.8	0.029	0.00	0.0	0.600		o	150	Pipe/Conduit	
N5-6.000	50.630	0.229	221.1	0.038	15.00	0.0	0.600		o	225	Pipe/Conduit	
N5-6.001	50.630	0.259	195.5	0.037	0.00	0.0	0.600		o	225	Pipe/Conduit	
N5-5.007	21.664	0.111	195.2	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
N5-7.000	51.714	0.298	173.5	0.064	15.00	0.0	0.600		o	225	Pipe/Conduit	
N5-7.001	51.714	0.501	103.2	0.060	0.00	0.0	0.600		o	225	Pipe/Conduit	
N5-5.008	54.582	0.283	192.9	0.085	0.00	0.0	0.600		o	225	Pipe/Conduit	
N5-8.000	20.070	0.343	58.5	0.024	15.00	0.0	0.600		o	150	Pipe/Conduit	
N5-8.001	41.501	1.544	26.9	0.085	0.00	0.0	0.600		o	150	Pipe/Conduit	
N5-8.002	41.501	1.338	31.0	0.084	0.00	0.0	0.600		o	150	Pipe/Conduit	
N5-5.009	10.792	0.096	112.4	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
N5-1.014	17.25	42.23	14.564	2.950	0.0	0.0	0.0	1.31	145.0	137.8
N5-1.015	17.20	42.41	14.409	3.032	0.0	0.0	0.0	2.04	224.9	141.3
N5-4.000	33.81	15.32	16.750	0.031	0.0	0.0	0.0	2.16	38.2	2.8
N5-5.000	33.62	15.47	17.950	0.017	0.0	0.0	0.0	1.29	22.8	1.6
N5-5.001	33.20	15.80	17.348	0.031	0.0	0.0	0.0	0.93	16.4	2.8
N5-5.002	32.74	16.17	17.190	0.036	0.0	0.0	0.0	0.86	15.2	3.2
N5-5.003	32.41	16.45	17.050	0.044	0.0	0.0	0.0	1.08	19.1	3.9
N5-5.004	31.85	16.92	16.842	0.068	0.0	0.0	0.0	1.12	19.7	5.8
N5-5.005	30.92	17.75	16.450	0.068	0.0	0.0	0.0	1.29	22.8	5.8
N5-5.006	29.88	18.74	15.404	0.096	0.0	0.0	0.0	1.35	23.8	7.8
N5-6.000	33.00	15.96	14.375	0.038	0.0	0.0	0.0	0.88	34.8	3.4
N5-6.001	31.91	16.87	14.146	0.075	0.0	0.0	0.0	0.93	37.0	6.5
N5-5.007	29.49	19.13	13.887	0.171	0.0	0.0	0.0	0.93	37.1	13.7
N5-7.000	33.11	15.87	14.575	0.064	0.0	0.0	0.0	0.99	39.3	5.7
N5-7.001	32.30	16.54	14.277	0.124	0.0	0.0	0.0	1.29	51.2	10.8
N5-5.008	28.57	20.10	13.776	0.380	0.0	0.0	0.0	0.94	37.3	29.4
N5-8.000	33.90	15.25	16.793	0.024	0.0	0.0	0.0	1.32	23.3	2.2
N5-8.001	33.44	15.61	16.450	0.108	0.0	0.0	0.0	1.95	34.5	9.8
N5-8.002	32.97	15.99	14.906	0.193	0.0	0.0	0.0	1.81	32.1	17.2
N5-5.009	28.44	20.24	13.493	0.572	0.0	0.0	0.0	1.23	49.0	44.1

Network Design Table for A12 Eastern Roundabout Section-Road Sub-Catchment 5

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
N5-5.010	63.422	0.306	207.3	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
N5-5.011	63.574	0.321	198.1	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
N5-5.012	5.251	0.023	228.3	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
N5-4.001	11.744	0.072	163.1	0.008	0.00	0.0	0.600		o	300	Pipe/Conduit	
N5-1.016	49.486	0.235	210.6	0.032	0.00	0.0	0.600		o	450	Pipe/Conduit	
N5-1.017	44.972	0.201	223.7	0.027	0.00	0.0	0.600		o	450	Pipe/Conduit	
N5-1.018	8.795	0.073	120.5	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
N5-1.019	52.139	0.323	161.4	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
N5-1.020	67.596	1.208	56.0	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
N5-1.021	8.083	0.421	19.2	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	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)
N5-5.010	27.58	21.21	13.322	0.572	0.0	0.0	0.0	1.09	76.9	44.1
N5-5.011	26.80	22.17	13.016	0.572	0.0	0.0	0.0	1.11	78.7	44.1
N5-5.012	26.74	22.25	12.695	0.572	0.0	0.0	0.0	1.04	73.3	44.1
N5-4.001	26.61	22.41	12.672	0.611	0.0	0.0	0.0	1.23	86.8	44.1
N5-1.016	17.04	43.00	12.450	3.676	0.0	0.0	0.0	1.40	222.2	169.6
N5-1.017	16.88	43.56	12.215	3.703	0.0	0.0	0.0	1.36	215.5	169.6
N5-1.018	16.86	43.64	12.014	3.703	0.0	0.0	0.0	1.85	294.4	169.6
N5-1.019	16.72	44.18	11.941	3.703	0.0	0.0	0.0	1.60	254.1	169.6
N5-1.020	16.61	44.59	11.618	3.703	0.0	0.0	0.0	2.72	433.0	169.6
N5-1.021	16.60	44.62	10.410	3.703	0.0	0.0	0.0	4.66	740.6	169.6

Manhole Schedules for A12 Eastern Roundabout Section-Road Sub-Catchment 5

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
N5-1-0	24.996	0.500	Junction		N5-1.000	24.496	500				
N5-1-1	24.327	0.500	Junction		N5-1.001	23.827	500	N5-1.000	23.827	500	
N5-1-2	22.944	0.500	Junction		N5-1.002	22.444	500	N5-1.001	22.444	500	
N5-1-3	21.300	0.500	Junction		N5-1.003	20.800	500	N5-1.002	20.800	500	
N5-1-4	20.000	0.500	Junction		N5-1.004	19.500	500	N5-1.003	19.500	500	
N5-1-5	19.800	0.600	Junction		N5-1.005	19.200	500	N5-1.004	19.200	500	
N5-1-6	19.254	0.500	Junction		N5-1.006	18.754	500	N5-1.005	18.754	500	
N5-1-7	18.312	0.500	Junction		N5-1.007	17.812	500	N5-1.006	17.812	500	
N5-1-8	17.687	0.500	Junction		N5-1.008	17.187	500	N5-1.007	17.187	500	
N5-1-9	17.127	0.500	Junction		N5-1.009	16.627	500	N5-1.008	16.627	500	
N5-1-10	17.100	1.500	Open Manhole	600	N5-1.010	15.600	300	N5-1.009	16.500	500	1100
N5-1-11	17.636	2.350	Open Manhole	1200	N5-1.011	15.286	300	N5-1.010	15.286	300	
N5-2-0	22.000	1.350	Open Manhole	1200	N5-2.000	20.650	150				
N5-2-1	20.960	1.350	Open Manhole	1200	N5-2.001	19.610	150	N5-2.000	19.610	150	
N5-2-2	19.203	1.350	Open Manhole	1200	N5-2.002	17.853	150	N5-2.001	17.853	150	
N5-2-3	18.664	1.350	Open Manhole	1200	N5-2.003	17.314	150	N5-2.002	17.314	150	
N5-1-12	17.900	3.000	Open Manhole	1200	N5-1.012	14.900	300	N5-1.011	14.900	300	
								N5-2.003	15.975	150	925
N5-3-0	25.700	0.500	Junction		N5-3.000	25.200	500				
N5-3-1	25.119	0.500	Junction		N5-3.001	24.619	500	N5-3.000	24.619	500	
N5-3-2	23.873	0.500	Junction		N5-3.002	23.373	500	N5-3.001	23.373	500	
N5-3-3	22.227	0.500	Junction		N5-3.003	21.727	500	N5-3.002	21.727	500	
N5-3-4	20.270	0.500	Junction		N5-3.004	19.770	500	N5-3.003	19.770	500	
N5-3-5	19.628	0.500	Junction		N5-3.005	19.128	500	N5-3.004	19.128	500	
N5-3-6	18.876	0.500	Junction		N5-3.006	18.376	500	N5-3.005	18.376	500	
N5-3-7	18.480	0.500	Junction		N5-3.007	17.980	500	N5-3.006	17.980	500	
N5-3-8	17.947	0.500	Junction		N5-3.008	17.447	500	N5-3.007	17.447	500	
N5-3-9	17.382	0.500	Junction		N5-3.009	16.882	500	N5-3.008	16.882	500	
N5-3-10	17.100	1.500	Junction		N5-3.010	15.600	300	N5-3.009	16.600	500	1200
N5-3-11	17.639	2.400	Open Manhole	1200	N5-3.011	15.239	300	N5-3.010	15.239	300	
N5-1-13	17.953	3.230	Open Manhole	1350	N5-1.013	14.723	375	N5-1.012	14.798	300	
								N5-3.011	14.798	300	
N5-1-14	17.864	3.300	Open Manhole	1350	N5-1.014	14.564	375	N5-1.013	14.564	375	
N5-1-15	17.784	3.375	Open Manhole	1350	N5-1.015	14.409	375	N5-1.014	14.409	375	
N5-4-0	18.100	1.350	Open Manhole	1200	N5-4.000	16.750	150				
N5-5-0	19.300	1.350	Open Manhole	1200	N5-5.000	17.950	150				
N5-5-1	18.448	1.100	Open Manhole	1200	N5-5.001	17.348	150	N5-5.000	17.348	150	
N5-5-2	18.540	1.350	Open Manhole	1200	N5-5.002	17.190	150	N5-5.001	17.190	150	
N5-5-3	18.500	1.450	Open Manhole	1200	N5-5.003	17.050	150	N5-5.002	17.050	150	
N5-5-4	18.342	1.500	Open Manhole	1200	N5-5.004	16.842	150	N5-5.003	16.842	150	
N5-5-5	17.800	1.350	Open Manhole	1200	N5-5.005	16.450	150	N5-5.004	16.450	150	
N5-5-6	16.754	1.350	Open Manhole	1200	N5-5.006	15.404	150	N5-5.005	15.404	150	
N5-6-0	15.800	1.425	Open Manhole	1200	N5-6.000	14.375	225				
N5-6-1	15.721	1.575	Open Manhole	1200	N5-6.001	14.146	225	N5-6.000	14.146	225	
N5-5-7	15.462	1.575	Open Manhole	1200	N5-5.007	13.887	225	N5-5.006	13.962	150	
								N5-6.001	13.887	225	

Manhole Schedules for A12 Eastern Roundabout Section-Road Sub-Catchment 5

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
N5-7-0	16.000	1.425	Open Manhole	1200	N5-7.000	14.575	225				
N5-7-1	15.902	1.625	Open Manhole	1200	N5-7.001	14.277	225	N5-7.000	14.277	225	
N5-5-8	15.651	1.875	Open Manhole	1200	N5-5.008	13.776	225	N5-5.007	13.776	225	
								N5-7.001	13.776	225	
N5-8-0	18.143	1.350	Open Manhole	1200	N5-8.000	16.793	150				
N5-8-1	17.800	1.350	Open Manhole	1200	N5-8.001	16.450	150	N5-8.000	16.450	150	
N5-8-2	16.256	1.350	Open Manhole	1200	N5-8.002	14.906	150	N5-8.001	14.906	150	
N5-5-9	15.318	1.825	Open Manhole	1200	N5-5.009	13.493	225	N5-5.008	13.493	225	
								N5-8.002	13.568	150	
N5-5-10	16.247	2.925	Open Manhole	1200	N5-5.010	13.322	300	N5-5.009	13.397	225	
N5-5-11	16.591	3.575	Open Manhole	1200	N5-5.011	13.016	300	N5-5.010	13.016	300	
N5-5-12	17.118	4.423	Open Manhole	1200	N5-5.012	12.695	300	N5-5.011	12.695	300	
N5-4-1	17.437	4.765	Open Manhole	1200	N5-4.001	12.672	300	N5-4.000	14.822	150	2000
								N5-5.012	12.672	300	
N5-1-16	17.500	5.050	Open Manhole	1350	N5-1.016	12.450	450	N5-1.015	14.125	375	1600
								N5-4.001	12.600	300	
N5-1-17	16.100	3.885	Open Manhole	1350	N5-1.017	12.215	450	N5-1.016	12.215	450	
N5-1-18	14.739	2.725	Open Manhole	1350	N5-1.018	12.014	450	N5-1.017	12.014	450	
N5-1-19	14.841	2.900	Open Manhole	1350	N5-1.019	11.941	450	N5-1.018	11.941	450	
N5-1-20	14.168	2.550	Open Manhole	1350	N5-1.020	11.618	450	N5-1.019	11.618	450	
N5-1-21	11.760	1.350	Open Manhole	1350	N5-1.021	10.410	450	N5-1.020	10.410	450	
N5-HW-1	11.629	1.640	Open Manhole	0		OUTFALL		N5-1.021	9.989	450	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
N5-1-0	636592.370	259537.068			No Entry	
N5-1-1	636650.108	259606.021			No Entry	
N5-1-2	636696.701	259682.986			No Entry	
N5-1-3	636729.334	259764.390			No Entry	
N5-1-4	636753.956	259860.585			No Entry	
N5-1-5	636781.086	259959.946			No Entry	
N5-1-6	636817.803	260039.921			No Entry	
N5-1-7	636868.459	260114.369			No Entry	

Manhole Schedules for A12 Eastern Roundabout Section-Road Sub-Catchment 5

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
N5-1-8	636922.425	260186.395			No Entry	
N5-1-9	636976.546	260258.304			No Entry	
N5-1-10	637028.163	260326.639	637028.163	260326.639	Required	
N5-1-11	637074.095	260386.502	637074.095	260386.502	Required	
N5-2-0	636872.486	260487.675	636872.486	260487.675	Required	
N5-2-1	636959.475	260484.451	636959.475	260484.451	Required	
N5-2-2	637048.503	260471.841	637048.503	260471.841	Required	
N5-2-3	637074.929	260466.396	637074.929	260466.396	Required	
N5-1-12	637094.309	260415.125	637094.309	260415.125	Required	
N5-3-0	636596.062	259522.363			No Entry	
N5-3-1	636652.928	259587.647			No Entry	
N5-3-2	636701.092	259663.608			No Entry	
N5-3-3	636737.107	259746.111			No Entry	
N5-3-4	636760.823	259832.978			No Entry	
N5-3-5	636779.014	259910.464			No Entry	
N5-3-6	636809.475	259995.233			No Entry	
N5-3-7	636854.270	260073.239			No Entry	
N5-3-8	636907.926	260145.554			No Entry	
N5-3-9	636961.948	260217.537			No Entry	

Manhole Schedules for A12 Eastern Roundabout Section-Road Sub-Catchment 5

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
N5-3-10	637038.282	260319.033			No Entry	
N5-3-11	637082.878	260380.218	637082.878	260380.218	Required	
N5-1-13	637106.629	260403.291	637106.629	260403.291	Required	
N5-1-14	637132.980	260417.183	637132.980	260417.183	Required	
N5-1-15	637159.010	260429.803	637159.010	260429.803	Required	
N5-4-0	637166.214	260476.316	637166.214	260476.316	Required	
N5-5-0	637053.628	260481.541	637053.628	260481.541	Required	
N5-5-1	637089.781	260475.599	637089.781	260475.599	Required	
N5-5-2	637106.996	260480.702	637106.996	260480.702	Required	
N5-5-3	637123.316	260489.841	637123.316	260489.841	Required	
N5-5-4	637140.295	260495.532	637140.295	260495.532	Required	
N5-5-5	637165.479	260514.973	637165.479	260514.973	Required	
N5-5-6	637220.780	260546.032	637220.780	260546.032	Required	
N5-6-0	637391.480	260607.717	637391.480	260607.717	Required	
N5-6-1	637345.130	260587.361	637345.130	260587.361	Required	
N5-5-7	637297.684	260569.711	637297.684	260569.711	Required	
N5-7-0	637399.798	260587.765	637399.798	260587.765	Required	
N5-7-1	637352.501	260566.875	637352.501	260566.875	Required	
N5-5-8	637303.989	260548.985	637303.989	260548.985	Required	

Manhole Schedules for A12 Eastern Roundabout Section-Road Sub-Catchment 5

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
N5-8-0	637167.027	260480.115	637167.027	260480.115	Required	
N5-8-1	637177.851	260496.540	637177.851	260496.540	Required	
N5-8-2	637213.005	260518.471	637213.005	260518.471	Required	
N5-5-9	637251.765	260533.114	637251.765	260533.114	Required	
N5-5-10	637255.522	260522.997	637255.522	260522.997	Required	
N5-5-11	637196.651	260499.424	637196.651	260499.424	Required	
N5-5-12	637189.101	260447.126	637189.101	260447.126	Required	
N5-4-1	637186.436	260442.601	637186.436	260442.601	Required	
N5-1-16	637180.670	260432.369	637180.670	260432.369	Required	
N5-1-17	637223.643	260408.055	637223.643	260408.055	Required	
N5-1-18	637260.463	260382.238	637260.463	260382.238	Required	
N5-1-19	637265.903	260389.149	637265.903	260389.149	Required	
N5-1-20	637313.013	260370.545	637313.013	260370.545	Required	
N5-1-21	637377.609	260354.723	637377.609	260354.723	Required	
N5-HW-1	637383.888	260349.634			No Entry	

Area Summary for A12 Eastern Roundabout Section-Road Sub-Catchment 5

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	Classification	Swales	100	0.032	0.032	0.032
	Classification	Verge	50	0.037	0.019	0.051
	Classification	Earthworks	50	0.028	0.014	0.064
	Classification	Carriageway	100	0.086	0.086	0.150
1.001	Classification	Carriageway	100	0.085	0.085	0.085
	Classification	Swales	100	0.031	0.031	0.116
	Classification	Verge	50	0.027	0.014	0.130
	Classification	Earthworks	50	0.048	0.024	0.154
1.002	Classification	Carriageway	100	0.082	0.082	0.082
	Classification	Swales	100	0.031	0.031	0.113
	Classification	Verge	50	0.022	0.011	0.124
	Classification	Earthworks	50	0.065	0.032	0.157
1.003	Classification	Earthworks	50	0.094	0.047	0.047
	Classification	Verge	50	0.025	0.012	0.059
	Classification	Swales	100	0.035	0.035	0.094
	Classification	Carriageway	100	0.070	0.070	0.164
1.004	Classification	Carriageway	100	0.011	0.011	0.011
	Classification	Swales	100	0.036	0.036	0.047
	Classification	Verge	50	0.026	0.013	0.060
	Classification	Earthworks	50	0.123	0.062	0.121
1.005	Classification	Swales	100	0.031	0.031	0.031
	Classification	Verge	50	0.022	0.011	0.042
	Classification	Earthworks	50	0.116	0.058	0.100
1.006	Classification	Carriageway	100	0.009	0.009	0.009
	Classification	Swales	100	0.032	0.032	0.041
	Classification	Verge	50	0.023	0.011	0.052
	Classification	Earthworks	50	0.113	0.056	0.108
1.007	Classification	Earthworks	50	0.099	0.050	0.050
	Classification	Verge	50	0.022	0.011	0.061
	Classification	Swales	100	0.032	0.032	0.092
	Classification	Carriageway	100	0.042	0.042	0.134
1.008	Classification	Carriageway	100	0.042	0.042	0.042
	Classification	Swales	100	0.031	0.031	0.073
	Classification	Verge	50	0.023	0.011	0.085
	Classification	Earthworks	50	0.069	0.034	0.119
1.009	Classification	Carriageway	100	0.040	0.040	0.040
	Classification	Swales	100	0.030	0.030	0.070
	Classification	Verge	50	0.021	0.011	0.081
	Classification	Earthworks	50	0.044	0.022	0.102
1.010	Classification	Carriageway	100	0.019	0.019	0.019
	Classification	Verge	50	0.026	0.013	0.032
	Classification	Verge	50	0.018	0.009	0.041
	Classification	Earthworks	50	0.018	0.009	0.050
1.011	Classification	Carriageway	100	0.019	0.019	0.019
2.000	Classification	Carriageway	100	0.064	0.064	0.064
2.001	Classification	Carriageway	100	0.065	0.065	0.065
2.002	Classification	Carriageway	100	0.014	0.014	0.014
2.003	Classification	Carriageway	100	0.044	0.044	0.044
1.012	-	-	100	0.000	0.000	0.000
3.000	Classification	Swales	100	0.033	0.033	0.033
	Classification	Verge	50	0.022	0.011	0.044
	Classification	Earthworks	50	0.014	0.007	0.050
3.001	Classification	Swales	100	0.032	0.032	0.032
	Classification	Verge	50	0.023	0.011	0.043
	Classification	Earthworks	50	0.029	0.015	0.057
3.002	Classification	Swales	100	0.032	0.032	0.032
	Classification	Verge	50	0.023	0.011	0.043
	Classification	Earthworks	50	0.050	0.025	0.068
3.003	Classification	Carriageway	100	0.011	0.011	0.011
	Classification	Earthworks	50	0.063	0.032	0.042
	Classification	Verge	50	0.023	0.011	0.054
	Classification	Swales	100	0.032	0.032	0.085

Area Summary for A12 Eastern Roundabout Section-Road Sub-Catchment 5

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
3.004	Classification	Carriageway	100	0.052	0.052	0.052
	Classification	Swales	100	0.028	0.028	0.080
	Classification	Verge	50	0.020	0.010	0.090
	Classification	Earthworks	50	0.075	0.037	0.127
3.005	Classification	Carriageway	100	0.085	0.085	0.085
	Classification	Swales	100	0.032	0.032	0.116
	Classification	Verge	50	0.022	0.011	0.128
	Classification	Earthworks	50	0.115	0.057	0.185
3.006	Classification	Carriageway	100	0.085	0.085	0.085
	Classification	Swales	100	0.032	0.032	0.116
	Classification	Verge	50	0.022	0.011	0.128
	Classification	Earthworks	50	0.123	0.062	0.189
3.007	Classification	Carriageway	100	0.052	0.052	0.052
	Classification	Swales	100	0.032	0.032	0.084
	Classification	Verge	50	0.023	0.011	0.095
	Classification	Earthworks	50	0.119	0.059	0.154
3.008	Classification	Carriageway	100	0.042	0.042	0.042
	Classification	Swales	100	0.031	0.031	0.073
	Classification	Verge	50	0.022	0.011	0.085
	Classification	Earthworks	50	0.094	0.047	0.132
3.009	Classification	Carriageway	100	0.059	0.059	0.059
	Classification	Swales	100	0.044	0.044	0.104
	Classification	Verge	50	0.032	0.016	0.119
	Classification	Earthworks	50	0.064	0.032	0.151
3.010	Classification	Carriageway	100	0.034	0.034	0.034
	Classification	Verge	50	0.026	0.013	0.047
	Classification	Verge	50	0.018	0.009	0.056
	Classification	Earthworks	50	0.009	0.004	0.061
3.011	Classification	Carriageway	100	0.018	0.018	0.018
1.013	Classification	Carriageway	100	0.027	0.027	0.027
1.014	Classification	Carriageway	100	0.009	0.009	0.009
	Classification	Carriageway	100	0.068	0.068	0.077
1.015	Classification	Carriageway	100	0.016	0.016	0.016
	Classification	Carriageway	100	0.067	0.067	0.083
4.000	Classification	Carriageway	100	0.031	0.031	0.031
5.000	Classification	Carriageway	100	0.017	0.017	0.017
5.001	Classification	Carriageway	100	0.013	0.013	0.013
5.002	Classification	Carriageway	100	0.005	0.005	0.005
5.003	Classification	Carriageway	100	0.009	0.009	0.009
5.004	Classification	Carriageway	100	0.023	0.023	0.023
5.005	-	-	100	0.000	0.000	0.000
5.006	Classification	Carriageway	100	0.029	0.029	0.029
6.000	Classification	Carriageway	100	0.038	0.038	0.038
6.001	Classification	Carriageway	100	0.037	0.037	0.037
5.007	-	-	100	0.000	0.000	0.000
7.000	Classification	Carriageway	100	0.064	0.064	0.064
7.001	Classification	Carriageway	100	0.060	0.060	0.060
5.008	Classification	Carriageway	100	0.085	0.085	0.085
8.000	Classification	Carriageway	100	0.024	0.024	0.024
8.001	Classification	Carriageway	100	0.027	0.027	0.027
	Classification	Carriageway	100	0.058	0.058	0.085
8.002	Classification	Carriageway	100	0.084	0.084	0.084
5.009	-	-	100	0.000	0.000	0.000
5.010	-	-	100	0.000	0.000	0.000
5.011	-	-	100	0.000	0.000	0.000
5.012	-	-	100	0.000	0.000	0.000
4.001	Classification	Carriageway	100	0.008	0.008	0.008
1.016	Classification	Carriageway	100	0.032	0.032	0.032
1.017	Classification	Carriageway	100	0.027	0.027	0.027
1.018	-	-	100	0.000	0.000	0.000
1.019	-	-	100	0.000	0.000	0.000
1.020	-	-	100	0.000	0.000	0.000

Area Summary for A12 Eastern Roundabout Section-Road Sub-Catchment 5

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.021	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				4.772	3.703	3.703

Free Flowing Outfall Details for A12 Eastern Roundabout Section-Road Sub-Catchment 5

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
N5-1.021	N5-HW-1	11.629	9.989	0.000	0	0

Simulation Criteria for A12 Eastern Roundabout Section-Road Sub-Catchment 5

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 Offline Controls 0	Number of Time/Area Diagrams 0
Number of Online Controls 21	Number of Storage Structures 21	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)	19.500	Storm Duration (mins)	30
Ratio R	0.404		

Online Controls for A12 Eastern Roundabout Section-Road Sub-Catchment 5

V-Notch Weir Manhole: N5-1-1, DS/PN: N5-1.001, Volume (m³): 90.0

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 24.127

V-Notch Weir Manhole: N5-1-2, DS/PN: N5-1.002, Volume (m³): 90.0

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 22.744

V-Notch Weir Manhole: N5-1-3, DS/PN: N5-1.003, Volume (m³): 87.8

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 21.100

V-Notch Weir Manhole: N5-1-4, DS/PN: N5-1.004, Volume (m³): 99.3

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 19.800

V-Notch Weir Manhole: N5-1-5, DS/PN: N5-1.005, Volume (m³): 103.1

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 19.600

V-Notch Weir Manhole: N5-1-6, DS/PN: N5-1.006, Volume (m³): 121.6

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 19.054

V-Notch Weir Manhole: N5-1-7, DS/PN: N5-1.007, Volume (m³): 90.1

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 18.112

V-Notch Weir Manhole: N5-1-8, DS/PN: N5-1.008, Volume (m³): 90.0

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 17.487

V-Notch Weir Manhole: N5-1-9, DS/PN: N5-1.009, Volume (m³): 90.0

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 16.927

Complex Manhole: N5-1-10, DS/PN: N5-1.010, Volume (m³): 85.8

Orifice

Diameter (m) 0.300 Discharge Coefficient 0.600 Invert Level (m) 15.600

Weir

Discharge Coef 0.544 Width (m) 0.300 Invert Level (m) 17.100

V-Notch Weir Manhole: N5-3-1, DS/PN: N5-3.001, Volume (m³): 86.7

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 24.919

V-Notch Weir Manhole: N5-3-2, DS/PN: N5-3.002, Volume (m³): 90.0

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 23.673

V-Notch Weir Manhole: N5-3-3, DS/PN: N5-3.003, Volume (m³): 90.1

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 22.027

V-Notch Weir Manhole: N5-3-4, DS/PN: N5-3.004, Volume (m³): 90.1

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 20.070

V-Notch Weir Manhole: N5-3-5, DS/PN: N5-3.005, Volume (m³): 79.6

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 19.428

V-Notch Weir Manhole: N5-3-6, DS/PN: N5-3.006, Volume (m³): 90.2

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 18.676

V-Notch Weir Manhole: N5-3-7, DS/PN: N5-3.007, Volume (m³): 90.1

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 18.280

V-Notch Weir Manhole: N5-3-8, DS/PN: N5-3.008, Volume (m³): 90.1

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 17.747

V-Notch Weir Manhole: N5-3-9, DS/PN: N5-3.009, Volume (m³): 90.0

Angle of V in Degrees 135.000 Discharge Coefficient 0.590 Invert Level (m) 17.182

Complex Manhole: N5-3-10, DS/PN: N5-3.010, Volume (m³): 127.0

Orifice

Diameter (m) 0.300 Discharge Coefficient 0.600 Invert Level (m) 15.600

Weir

Discharge Coef 0.544 Width (m) 0.300 Invert Level (m) 17.100

Weir Manhole: N5-1-21, DS/PN: N5-1.021, Volume (m³): 12.5

Discharge Coef 0.544 Width (m) 0.300 Invert Level (m) 11.460

Storage Structures for A12 Eastern Roundabout Section-Road Sub-Catchment 5

Complex Manhole: N5-1-1, DS/PN: N5-1.001

Filter Drain

Infiltration Coefficient Base (m/hr)	0.11700	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.11700	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	134.6
Invert Level (m)	22.827	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	90.0		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.11700	Length (m)	90.0
Infiltration Coefficient Side (m/hr)	0.11700	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	134.6
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	23.827	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N5-1-2, DS/PN: N5-1.002

Filter Drain

Infiltration Coefficient Base (m/hr)	0.11700	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.11700	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	65.1
Invert Level (m)	21.444	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	90.0		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.11700	Length (m)	90.0
Infiltration Coefficient Side (m/hr)	0.11700	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	65.1
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	22.444	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N5-1-3, DS/PN: N5-1.003

Filter Drain

Infiltration Coefficient Base (m/hr)	0.11700	Trench Length (m)	87.8
Infiltration Coefficient Side (m/hr)	0.11700	Pipe Diameter (m)	0.300
Safety Factor	2.0	Pipe Depth above Invert (m)	0.000
Porosity	0.30	Number of Pipes	1
Invert Level (m)	19.800	Slope (1:X)	53.4
Trench Width (m)	0.5	Cap Volume Depth (m)	1.000

Filter Drain

Cap Infiltration Depth (m) 1.000

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.11700	Length (m)	87.8
Infiltration Coefficient Side (m/hr)	0.11700	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	53.4
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	20.800	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N5-1-4, DS/PN: N5-1.004

Filter Drain

Infiltration Coefficient Base (m/hr)	0.11700	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.11700	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	76.4
Invert Level (m)	18.500	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	99.3		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.11700	Length (m)	99.3
Infiltration Coefficient Side (m/hr)	0.11700	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	76.4
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	19.500	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N5-1-5, DS/PN: N5-1.005

Filter Drain

Infiltration Coefficient Base (m/hr)	0.11700	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.11700	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	343.6
Invert Level (m)	18.200	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	103.1		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.11700	Length (m)	103.1
Infiltration Coefficient Side (m/hr)	0.11700	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	343.6
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	19.200	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N5-1-6, DS/PN: N5-1.006

Filter Drain

Infiltration Coefficient Base (m/hr)	0.11700	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.11700	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	197.6
Invert Level (m)	17.754	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	88.1		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.11700	Length (m)	88.1
Infiltration Coefficient Side (m/hr)	0.11700	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	197.6
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	18.754	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N5-1-7, DS/PN: N5-1.007

Filter Drain

Infiltration Coefficient Base (m/hr)	0.11700	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.11700	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	95.6
Invert Level (m)	16.812	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	90.1		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.11700	Length (m)	90.1
Infiltration Coefficient Side (m/hr)	0.11700	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	95.6
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	17.812	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N5-1-8, DS/PN: N5-1.008

Filter Drain

Infiltration Coefficient Base (m/hr)	0.11700	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.11700	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	144.0
Invert Level (m)	16.187	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	90.0		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.11700	Length (m)	90.0
Infiltration Coefficient Side (m/hr)	0.11700	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	144.0
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	17.187	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N5-1-9, DS/PN: N5-1.009

Filter Drain

Infiltration Coefficient Base (m/hr)	0.11700	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.11700	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	160.7
Invert Level (m)	15.627	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	90.0		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.11700	Length (m)	90.0
Infiltration Coefficient Side (m/hr)	0.11700	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	160.7
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	16.627	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N5-1-10, DS/PN: N5-1.010

Filter Drain

Infiltration Coefficient Base (m/hr)	0.11700	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.11700	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	674.3
Invert Level (m)	15.600	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	85.6		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.11700	Length (m)	85.6
Infiltration Coefficient Side (m/hr)	0.11700	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	674.3
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	16.600	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N5-3-1, DS/PN: N5-3.001

Filter Drain

Infiltration Coefficient Base (m/hr)	0.11700	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.11700	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	149.1
Invert Level (m)	23.619	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	86.7		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.11700	Length (m)	86.7
Infiltration Coefficient Side (m/hr)	0.11700	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	149.1
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	24.619	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N5-3-2, DS/PN: N5-3.002

Filter Drain

Infiltration Coefficient Base (m/hr)	0.11700	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.11700	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	72.3
Invert Level (m)	22.373	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	90.0		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.11700	Length (m)	90.0
Infiltration Coefficient Side (m/hr)	0.11700	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	72.3
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	23.373	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N5-3-3, DS/PN: N5-3.003

Filter Drain

Infiltration Coefficient Base (m/hr)	0.11700	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.11700	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	54.7
Invert Level (m)	20.727	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	90.1		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr) 0.11700 Infiltration Coefficient Side (m/hr) 0.11700

Swale

Safety Factor	2.0	Side Slope (1:X)	3.0
Porosity	1.00	Slope (1:X)	54.7
Invert Level (m)	21.727	Cap Volume Depth (m)	0.500
Base Width (m)	0.5	Cap Infiltration Depth (m)	0.500
Length (m)	90.1	Include Swale Volume	Yes

Complex Manhole: N5-3-4, DS/PN: N5-3.004

Filter Drain

Infiltration Coefficient Base (m/hr)	0.11700	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.11700	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	46.0
Invert Level (m)	18.770	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	90.1		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.11700	Length (m)	90.1
Infiltration Coefficient Side (m/hr)	0.11700	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	46.0
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	19.770	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N5-3-5, DS/PN: N5-3.005

Filter Drain

Infiltration Coefficient Base (m/hr)	0.11700	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.11700	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	124.0
Invert Level (m)	18.128	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	79.6		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.11700	Length (m)	79.6
Infiltration Coefficient Side (m/hr)	0.11700	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	124.0
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	19.128	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N5-3-6, DS/PN: N5-3.006

Filter Drain

Infiltration Coefficient Base (m/hr)	0.11700	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.11700	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	119.9
Invert Level (m)	17.376	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	90.2		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.11700	Length (m)	90.2
Infiltration Coefficient Side (m/hr)	0.11700	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	119.9
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	18.376	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N5-3-7, DS/PN: N5-3.007

Filter Drain

Infiltration Coefficient Base (m/hr)	0.11700	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.11700	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	227.4
Invert Level (m)	16.980	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	90.1		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.11700	Length (m)	90.1
Infiltration Coefficient Side (m/hr)	0.11700	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	227.4
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	17.980	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N5-3-8, DS/PN: N5-3.008

Filter Drain

Infiltration Coefficient Base (m/hr)	0.11700	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.11700	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	169.0
Invert Level (m)	16.447	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	90.1		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr) 0.11700 Infiltration Coefficient Side (m/hr) 0.11700

Swale

Safety Factor	2.0	Side Slope (1:X)	3.0
Porosity	1.00	Slope (1:X)	169.0
Invert Level (m)	17.447	Cap Volume Depth (m)	0.500
Base Width (m)	0.5	Cap Infiltration Depth (m)	0.500
Length (m)	90.1	Include Swale Volume	Yes

Complex Manhole: N5-3-9, DS/PN: N5-3.009

Filter Drain

Infiltration Coefficient Base (m/hr)	0.11700	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.11700	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	159.3
Invert Level (m)	15.882	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	90.0		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.11700	Length (m)	90.0
Infiltration Coefficient Side (m/hr)	0.11700	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	159.3
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	16.882	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Complex Manhole: N5-3-10, DS/PN: N5-3.010

Filter Drain

Infiltration Coefficient Base (m/hr)	0.11700	Pipe Diameter (m)	0.300
Infiltration Coefficient Side (m/hr)	0.11700	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	450.3
Invert Level (m)	15.600	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	1.000
Trench Length (m)	127.0		

Swale

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.11700	Length (m)	127.0
Infiltration Coefficient Side (m/hr)	0.11700	Side Slope (1:X)	3.0
Safety Factor	2.0	Slope (1:X)	450.3
Porosity	1.00	Cap Volume Depth (m)	0.500
Invert Level (m)	16.600	Cap Infiltration Depth (m)	0.500
Base Width (m)	0.5	Include Swale Volume	Yes

Infiltration Basin Manhole: N5-1-21, DS/PN: N5-1.021

Invert Level (m)	10.335	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.11700	Porosity	1.00
Infiltration Coefficient Side (m/hr)	0.11700		

Infiltration Basin Manhole: N5-1-21, DS/PN: N5-1.021

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	525.0	1.425	1090.0

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Eastern Roundabout Section-Road Sub-Catchment 5

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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 21 Number of Storage Structures 21 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FEH	Data Type Point
FEH Rainfall Version		2013	Cv (Summer) 0.750
Site Location	GB 640286 267538 TM 40286 67538		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
Return Period(s) (years)	2, 5, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N5-1.000	N5-1-0	30 Winter	2	+0%					24.560	-0.436
N5-1.001	N5-1-1	240 Winter	2	+0%					24.111	-0.216
N5-1.002	N5-1-2	180 Winter	2	+0%	100/60 Winter	100/60 Winter			22.668	-0.276
N5-1.003	N5-1-3	240 Winter	2	+0%	100/30 Winter	100/30 Winter			21.097	-0.203
N5-1.004	N5-1-4	180 Winter	2	+0%	100/30 Winter	100/30 Winter			19.546	-0.454
N5-1.005	N5-1-5	180 Winter	2	+0%					18.613	-1.187
N5-1.006	N5-1-6	180 Winter	2	+0%					18.359	-0.895
N5-1.007	N5-1-7	180 Winter	2	+0%					17.803	-0.509
N5-1.008	N5-1-8	180 Winter	2	+0%					16.934	-0.753
N5-1.009	N5-1-9	180 Winter	2	+0%					16.259	-0.868
N5-1.010	N5-1-10	15 Winter	2	+0%					15.680	-0.220
N5-1.011	N5-1-11	15 Winter	2	+0%					15.336	-0.250
N5-2.000	N5-2-0	30 Winter	2	+0%	100/15 Summer	100/30 Winter			20.703	-0.097
N5-2.001	N5-2-1	15 Winter	2	+0%	30/15 Summer	100/15 Summer			19.685	-0.075
N5-2.002	N5-2-2	15 Winter	2	+0%	30/15 Summer	100/15 Summer			17.933	-0.070
N5-2.003	N5-2-3	15 Winter	2	+0%	30/15 Summer	100/15 Summer			17.409	-0.055
N5-1.012	N5-1-12	15 Winter	2	+0%					15.021	-0.179
N5-3.000	N5-3-0	30 Winter	2	+0%					25.237	-0.463
N5-3.001	N5-3-1	180 Winter	2	+0%					24.321	-0.798
N5-3.002	N5-3-2	180 Winter	2	+0%					23.140	-0.733
N5-3.003	N5-3-3	180 Winter	2	+0%					21.751	-0.476
N5-3.004	N5-3-4	240 Winter	2	+0%					20.030	-0.240
N5-3.005	N5-3-5	180 Winter	2	+0%					19.256	-0.372
N5-3.006	N5-3-6	180 Winter	2	+0%	100/60 Winter	100/60 Winter			18.486	-0.390
N5-3.007	N5-3-7	180 Winter	2	+0%					17.805	-0.675
N5-3.008	N5-3-8	180 Winter	2	+0%					17.210	-0.737
N5-3.009	N5-3-9	180 Winter	2	+0%					16.773	-0.609
N5-3.010	N5-3-10	15 Winter	2	+0%					15.692	-0.208
N5-3.011	N5-3-11	15 Winter	2	+0%					15.291	-0.248
N5-1.013	N5-1-13	15 Winter	2	+0%					14.858	-0.240
N5-1.014	N5-1-14	15 Winter	2	+0%	100/15 Summer				14.715	-0.224
N5-1.015	N5-1-15	15 Winter	2	+0%					14.541	-0.243

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Eastern Roundabout Section-Road Sub-Catchment 5

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N5-1.000	N5-1-0	0.000	0.02		12.2	OK	
N5-1.001	N5-1-1	0.000	0.00		0.0	FLOOD RISK*	
N5-1.002	N5-1-2	0.000	0.00		0.0	FLOOD RISK*	3
N5-1.003	N5-1-3	0.000	0.00		0.0	FLOOD RISK*	9
N5-1.004	N5-1-4	0.000	0.00		0.0	OK	10
N5-1.005	N5-1-5	0.000	0.00		0.0	OK	
N5-1.006	N5-1-6	0.000	0.00		0.0	OK	
N5-1.007	N5-1-7	0.000	0.00		0.0	OK	
N5-1.008	N5-1-8	0.000	0.00		0.0	OK	
N5-1.009	N5-1-9	0.000	0.00		0.0	OK	
N5-1.010	N5-1-10	0.000	0.28		5.0	OK	
N5-1.011	N5-1-11	0.000	0.06		6.9	OK	
N5-2.000	N5-2-0	0.000	0.27		5.2	OK	1
N5-2.001	N5-2-1	0.000	0.48		11.7	OK	6
N5-2.002	N5-2-2	0.000	0.55		13.3	OK	6
N5-2.003	N5-2-3	0.000	0.72		18.3	OK	6
N5-1.012	N5-1-12	0.000	0.34		25.2	OK	
N5-3.000	N5-3-0	0.000	0.01		4.1	OK	
N5-3.001	N5-3-1	0.000	0.00		0.0	OK	
N5-3.002	N5-3-2	0.000	0.00		0.0	OK	
N5-3.003	N5-3-3	0.000	0.00		0.0	OK	
N5-3.004	N5-3-4	0.000	0.00		0.0	FLOOD RISK*	
N5-3.005	N5-3-5	0.000	0.00		0.0	OK	
N5-3.006	N5-3-6	0.000	0.00		0.0	OK	2
N5-3.007	N5-3-7	0.000	0.00		0.0	OK	
N5-3.008	N5-3-8	0.000	0.00		0.0	OK	
N5-3.009	N5-3-9	0.000	0.00		0.0	OK	
N5-3.010	N5-3-10	0.000	0.33		6.4	OK*	
N5-3.011	N5-3-11	0.000	0.07		8.2	OK	
N5-1.013	N5-1-13	0.000	0.28		35.8	OK	
N5-1.014	N5-1-14	0.000	0.34		43.3	OK	
N5-1.015	N5-1-15	0.000	0.27		51.3	OK	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Eastern Roundabout Section-Road Sub-Catchment 5

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N5-4.000	N5-4-0	30 Winter	2	+0%					16.775	-0.125
N5-5.000	N5-5-0	30 Winter	2	+0%					17.974	-0.126
N5-5.001	N5-5-1	15 Winter	2	+0%	100/15 Summer				17.392	-0.106
N5-5.002	N5-5-2	15 Winter	2	+0%	100/15 Summer				17.240	-0.100
N5-5.003	N5-5-3	15 Winter	2	+0%	100/15 Summer				17.101	-0.099
N5-5.004	N5-5-4	15 Winter	2	+0%	100/15 Summer				16.907	-0.085
N5-5.005	N5-5-5	15 Winter	2	+0%	100/15 Summer				16.508	-0.092
N5-5.006	N5-5-6	15 Winter	2	+0%	30/15 Summer	100/15 Winter			15.474	-0.080
N5-6.000	N5-6-0	30 Winter	2	+0%	30/15 Summer				14.421	-0.179
N5-6.001	N5-6-1	15 Winter	2	+0%	30/15 Summer				14.214	-0.157
N5-5.007	N5-5-7	15 Winter	2	+0%	5/15 Summer	100/15 Summer			14.041	-0.071
N5-7.000	N5-7-0	30 Winter	2	+0%	30/15 Winter				14.630	-0.170
N5-7.001	N5-7-1	15 Winter	2	+0%	30/15 Summer				14.352	-0.150
N5-5.008	N5-5-8	15 Winter	2	+0%	2/15 Winter				14.007	0.006
N5-8.000	N5-8-0	30 Winter	2	+0%	30/15 Winter				16.823	-0.120
N5-8.001	N5-8-1	15 Winter	2	+0%	30/15 Summer	100/15 Summer			16.514	-0.086
N5-8.002	N5-8-2	15 Winter	2	+0%	5/15 Winter	30/15 Summer			15.004	-0.052
N5-5.009	N5-5-9	15 Winter	2	+0%	2/15 Summer				13.764	0.046
N5-5.010	N5-5-10	15 Winter	2	+0%	30/15 Summer				13.510	-0.112
N5-5.011	N5-5-11	15 Winter	2	+0%	30/15 Summer				13.198	-0.118
N5-5.012	N5-5-12	15 Winter	2	+0%	5/15 Winter				12.946	-0.049
N5-4.001	N5-4-1	15 Winter	2	+0%	30/15 Summer				12.871	-0.101
N5-1.016	N5-1-16	15 Winter	2	+0%	100/15 Summer				12.674	-0.226
N5-1.017	N5-1-17	15 Winter	2	+0%	100/15 Summer				12.446	-0.219
N5-1.018	N5-1-18	15 Winter	2	+0%	100/15 Summer				12.263	-0.201
N5-1.019	N5-1-19	15 Winter	2	+0%	100/15 Winter				12.147	-0.244
N5-1.020	N5-1-20	15 Winter	2	+0%					11.769	-0.299
N5-1.021	N5-1-21	240 Winter	2	+0%	100/30 Summer				10.578	-0.282

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N5-4.000	N5-4-0	0.000	0.07		2.5	OK	
N5-5.000	N5-5-0	0.000	0.06		1.4	OK	
N5-5.001	N5-5-1	0.000	0.18		2.8	OK	
N5-5.002	N5-5-2	0.000	0.24		3.5	OK	
N5-5.003	N5-5-3	0.000	0.25		4.5	OK	
N5-5.004	N5-5-4	0.000	0.38		7.3	OK	
N5-5.005	N5-5-5	0.000	0.32		7.1	OK	
N5-5.006	N5-5-6	0.000	0.42		10.0	OK	3
N5-6.000	N5-6-0	0.000	0.09		3.0	OK	
N5-6.001	N5-6-1	0.000	0.19		6.9	OK	
N5-5.007	N5-5-7	0.000	0.49		16.6	OK	8
N5-7.000	N5-7-0	0.000	0.14		5.1	OK	
N5-7.001	N5-7-1	0.000	0.23		11.5	OK	
N5-5.008	N5-5-8	0.000	0.93		33.4	SURCHARGED	
N5-8.000	N5-8-0	0.000	0.09		1.9	OK	
N5-8.001	N5-8-1	0.000	0.37		12.5	OK	4
N5-8.002	N5-8-2	0.000	0.75		23.4	OK	9
N5-5.009	N5-5-9	0.000	1.26		52.2	SURCHARGED	
N5-5.010	N5-5-10	0.000	0.70		51.3	OK	
N5-5.011	N5-5-11	0.000	0.67		50.6	OK	
N5-5.012	N5-5-12	0.000	1.00		49.2	OK	
N5-4.001	N5-4-1	0.000	0.77		51.9	OK	
N5-1.016	N5-1-16	0.000	0.49		99.2	OK	
N5-1.017	N5-1-17	0.000	0.52		100.1	OK	
N5-1.018	N5-1-18	0.000	0.59		100.1	OK	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Eastern Roundabout Section-Road Sub-Catchment 5

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N5-1.019	N5-1-19	0.000	0.43		99.5	OK	
N5-1.020	N5-1-20	0.000	0.25		99.5	OK	
N5-1.021	N5-1-21	0.000	0.00		0.0	OK	

5 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Eastern Roundabout Section-Road Sub-Catchment 5

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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 21 Number of Storage Structures 21 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FEH	Data Type Point
FEH Rainfall Version		2013	Cv (Summer) 0.750
Site Location	GB 640286 267538 TM 40286 67538		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
Return Period(s) (years)	2, 5, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N5-1.000	N5-1-0	30 Winter	5	+0%					24.572	-0.424
N5-1.001	N5-1-1	180 Winter	5	+0%					24.178	-0.149
N5-1.002	N5-1-2	180 Winter	5	+0%	100/60 Winter	100/60 Winter			22.772	-0.172
N5-1.003	N5-1-3	180 Winter	5	+0%	100/30 Winter	100/30 Winter			21.153	-0.147
N5-1.004	N5-1-4	180 Winter	5	+0%	100/30 Winter	100/30 Winter			19.723	-0.277
N5-1.005	N5-1-5	120 Winter	5	+0%					18.733	-1.067
N5-1.006	N5-1-6	180 Winter	5	+0%					18.538	-0.716
N5-1.007	N5-1-7	180 Winter	5	+0%					17.946	-0.366
N5-1.008	N5-1-8	180 Winter	5	+0%					17.121	-0.566
N5-1.009	N5-1-9	180 Winter	5	+0%					16.405	-0.722
N5-1.010	N5-1-10	15 Winter	5	+0%					15.694	-0.206
N5-1.011	N5-1-11	15 Winter	5	+0%					15.346	-0.240
N5-2.000	N5-2-0	30 Winter	5	+0%	100/15 Summer	100/30 Winter			20.713	-0.087
N5-2.001	N5-2-1	15 Winter	5	+0%	30/15 Summer	100/15 Summer			19.701	-0.059
N5-2.002	N5-2-2	15 Winter	5	+0%	30/15 Summer	100/15 Summer			17.951	-0.052
N5-2.003	N5-2-3	15 Winter	5	+0%	30/15 Summer	100/15 Summer			17.433	-0.031
N5-1.012	N5-1-12	15 Winter	5	+0%					15.043	-0.157
N5-3.000	N5-3-0	30 Winter	5	+0%					25.244	-0.456
N5-3.001	N5-3-1	180 Winter	5	+0%					24.501	-0.618
N5-3.002	N5-3-2	180 Winter	5	+0%					23.268	-0.605
N5-3.003	N5-3-3	180 Winter	5	+0%					21.883	-0.344
N5-3.004	N5-3-4	180 Winter	5	+0%					20.105	-0.165
N5-3.005	N5-3-5	180 Winter	5	+0%					19.364	-0.264
N5-3.006	N5-3-6	180 Winter	5	+0%	100/60 Winter	100/60 Winter			18.599	-0.277
N5-3.007	N5-3-7	180 Winter	5	+0%					18.019	-0.461
N5-3.008	N5-3-8	180 Winter	5	+0%					17.431	-0.516
N5-3.009	N5-3-9	180 Winter	5	+0%					16.959	-0.423
N5-3.010	N5-3-10	15 Winter	5	+0%					15.707	-0.193
N5-3.011	N5-3-11	15 Winter	5	+0%					15.301	-0.238
N5-1.013	N5-1-13	15 Winter	5	+0%					14.883	-0.215
N5-1.014	N5-1-14	15 Winter	5	+0%	100/15 Summer				14.743	-0.196
N5-1.015	N5-1-15	15 Winter	5	+0%					14.565	-0.219

5 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Eastern Roundabout Section-Road Sub-Catchment 5

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N5-1.000	N5-1-0	0.000	0.02		16.3	OK	
N5-1.001	N5-1-1	0.000	0.00		1.9	FLOOD RISK*	
N5-1.002	N5-1-2	0.000	0.00		0.4	FLOOD RISK*	3
N5-1.003	N5-1-3	0.000	0.00		2.2	FLOOD RISK*	9
N5-1.004	N5-1-4	0.000	0.00		0.0	FLOOD RISK*	10
N5-1.005	N5-1-5	0.000	0.00		0.0	OK	
N5-1.006	N5-1-6	0.000	0.00		0.0	OK	
N5-1.007	N5-1-7	0.000	0.00		0.0	OK	
N5-1.008	N5-1-8	0.000	0.00		0.0	OK	
N5-1.009	N5-1-9	0.000	0.00		0.0	OK	
N5-1.010	N5-1-10	0.000	0.37		6.7	OK	
N5-1.011	N5-1-11	0.000	0.09		9.3	OK	
N5-2.000	N5-2-0	0.000	0.37		7.0	OK	1
N5-2.001	N5-2-1	0.000	0.65		15.9	OK	6
N5-2.002	N5-2-2	0.000	0.75		18.0	OK	6
N5-2.003	N5-2-3	0.000	0.97		24.7	OK	6
N5-1.012	N5-1-12	0.000	0.46		34.0	OK	
N5-3.000	N5-3-0	0.000	0.01		5.5	OK	
N5-3.001	N5-3-1	0.000	0.00		0.0	OK	
N5-3.002	N5-3-2	0.000	0.00		0.0	OK	
N5-3.003	N5-3-3	0.000	0.00		0.0	OK	
N5-3.004	N5-3-4	0.000	0.00		0.7	FLOOD RISK*	
N5-3.005	N5-3-5	0.000	0.00		0.0	FLOOD RISK*	
N5-3.006	N5-3-6	0.000	0.00		0.0	FLOOD RISK*	2
N5-3.007	N5-3-7	0.000	0.00		0.0	OK	
N5-3.008	N5-3-8	0.000	0.00		0.0	OK	
N5-3.009	N5-3-9	0.000	0.00		0.0	OK	
N5-3.010	N5-3-10	0.000	0.45		8.7	OK*	
N5-3.011	N5-3-11	0.000	0.10		11.2	OK	
N5-1.013	N5-1-13	0.000	0.38		48.4	OK	
N5-1.014	N5-1-14	0.000	0.46		58.6	OK	
N5-1.015	N5-1-15	0.000	0.36		69.4	OK	

5 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Eastern Roundabout Section-Road Sub-Catchment 5

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N5-4.000	N5-4-0	30 Winter	5	+0%					16.780	-0.120
N5-5.000	N5-5-0	30 Winter	5	+0%					17.979	-0.121
N5-5.001	N5-5-1	15 Winter	5	+0%	100/15 Summer				17.399	-0.099
N5-5.002	N5-5-2	15 Winter	5	+0%	100/15 Summer				17.249	-0.091
N5-5.003	N5-5-3	15 Winter	5	+0%	100/15 Summer				17.111	-0.089
N5-5.004	N5-5-4	15 Winter	5	+0%	100/15 Summer				16.920	-0.072
N5-5.005	N5-5-5	15 Winter	5	+0%	100/15 Summer				16.519	-0.081
N5-5.006	N5-5-6	15 Winter	5	+0%	30/15 Summer	100/15 Winter			15.488	-0.066
N5-6.000	N5-6-0	30 Winter	5	+0%	30/15 Summer				14.427	-0.173
N5-6.001	N5-6-1	15 Winter	5	+0%	30/15 Summer				14.261	-0.110
N5-5.007	N5-5-7	15 Winter	5	+0%	5/15 Summer	100/15 Summer			14.237	0.125
N5-7.000	N5-7-0	30 Winter	5	+0%	30/15 Winter				14.640	-0.160
N5-7.001	N5-7-1	15 Winter	5	+0%	30/15 Summer				14.365	-0.137
N5-5.008	N5-5-8	15 Winter	5	+0%	2/15 Winter				14.197	0.196
N5-8.000	N5-8-0	30 Winter	5	+0%	30/15 Winter				16.827	-0.116
N5-8.001	N5-8-1	15 Winter	5	+0%	30/15 Summer	100/15 Summer			16.526	-0.074
N5-8.002	N5-8-2	15 Winter	5	+0%	5/15 Winter	30/15 Summer			15.072	0.016
N5-5.009	N5-5-9	15 Winter	5	+0%	2/15 Summer				13.847	0.129
N5-5.010	N5-5-10	15 Winter	5	+0%	30/15 Summer				13.540	-0.082
N5-5.011	N5-5-11	15 Winter	5	+0%	30/15 Summer				13.228	-0.088
N5-5.012	N5-5-12	15 Winter	5	+0%	5/15 Winter				13.009	0.014
N5-4.001	N5-4-1	15 Winter	5	+0%	30/15 Summer				12.908	-0.064
N5-1.016	N5-1-16	15 Winter	5	+0%	100/15 Summer				12.711	-0.189
N5-1.017	N5-1-17	15 Winter	5	+0%	100/15 Summer				12.483	-0.182
N5-1.018	N5-1-18	15 Winter	5	+0%	100/15 Summer				12.307	-0.157
N5-1.019	N5-1-19	15 Winter	5	+0%	100/15 Winter				12.179	-0.212
N5-1.020	N5-1-20	15 Winter	5	+0%					11.791	-0.277
N5-1.021	N5-1-21	240 Winter	5	+0%	100/30 Summer				10.655	-0.205

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N5-4.000	N5-4-0	0.000	0.09		3.4	OK	
N5-5.000	N5-5-0	0.000	0.09		1.9	OK	
N5-5.001	N5-5-1	0.000	0.25		3.8	OK	
N5-5.002	N5-5-2	0.000	0.33		4.7	OK	
N5-5.003	N5-5-3	0.000	0.34		6.1	OK	
N5-5.004	N5-5-4	0.000	0.52		9.8	OK	
N5-5.005	N5-5-5	0.000	0.43		9.6	OK	
N5-5.006	N5-5-6	0.000	0.58		13.5	OK	3
N5-6.000	N5-6-0	0.000	0.12		4.1	OK	
N5-6.001	N5-6-1	0.000	0.26		9.3	OK	
N5-5.007	N5-5-7	0.000	0.67		22.5	SURCHARGED	8
N5-7.000	N5-7-0	0.000	0.18		6.9	OK	
N5-7.001	N5-7-1	0.000	0.32		15.6	OK	
N5-5.008	N5-5-8	0.000	1.13		40.6	SURCHARGED	
N5-8.000	N5-8-0	0.000	0.12		2.6	OK	
N5-8.001	N5-8-1	0.000	0.51		16.9	OK	4
N5-8.002	N5-8-2	0.000	0.97		30.2	SURCHARGED	9
N5-5.009	N5-5-9	0.000	1.56		64.5	SURCHARGED	
N5-5.010	N5-5-10	0.000	0.87		63.5	OK	
N5-5.011	N5-5-11	0.000	0.83		62.3	OK	
N5-5.012	N5-5-12	0.000	1.25		61.4	SURCHARGED	
N5-4.001	N5-4-1	0.000	0.97		65.0	OK	
N5-1.016	N5-1-16	0.000	0.63		126.4	OK	
N5-1.017	N5-1-17	0.000	0.66		127.5	OK	
N5-1.018	N5-1-18	0.000	0.75		127.1	OK	

5 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Eastern Roundabout Section-Road Sub-Catchment 5

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N5-1.019	N5-1-19	0.000	0.55		126.9	OK	
N5-1.020	N5-1-20	0.000	0.31		126.6	OK	
N5-1.021	N5-1-21	0.000	0.00		0.0	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Eastern Roundabout Section-Road Sub-Catchment 5

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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 21 Number of Storage Structures 21 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH	Data Type	Point
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 640286 267538 TM 40286 67538	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
Return Period(s) (years)	2, 5, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N5-1.000	N5-1-0	30 Winter	30	+0%					24.598	-0.398
N5-1.001	N5-1-1	120 Winter	30	+0%					24.244	-0.083
N5-1.002	N5-1-2	120 Winter	30	+0%	100/60 Winter	100/60 Winter			22.871	-0.073
N5-1.003	N5-1-3	120 Winter	30	+0%	100/30 Winter	100/30 Winter			21.238	-0.062
N5-1.004	N5-1-4	180 Winter	30	+0%	100/30 Winter	100/30 Winter			19.935	-0.065
N5-1.005	N5-1-5	180 Winter	30	+0%					19.499	-0.301
N5-1.006	N5-1-6	120 Winter	30	+0%					18.879	-0.375
N5-1.007	N5-1-7	180 Winter	30	+0%					18.119	-0.193
N5-1.008	N5-1-8	120 Winter	30	+0%					17.394	-0.293
N5-1.009	N5-1-9	120 Winter	30	+0%					16.749	-0.378
N5-1.010	N5-1-10	15 Winter	30	+0%					15.736	-0.164
N5-1.011	N5-1-11	15 Winter	30	+0%					15.369	-0.217
N5-2.000	N5-2-0	30 Winter	30	+0%	100/15 Summer	100/30 Winter			20.735	-0.065
N5-2.001	N5-2-1	15 Winter	30	+0%	30/15 Summer	100/15 Summer			20.072	0.312
N5-2.002	N5-2-2	15 Winter	30	+0%	30/15 Summer	100/15 Summer			18.640	0.637
N5-2.003	N5-2-3	15 Winter	30	+0%	30/15 Summer	100/15 Summer			18.116	0.652
N5-1.012	N5-1-12	15 Winter	30	+0%					15.078	-0.122
N5-3.000	N5-3-0	30 Winter	30	+0%					25.258	-0.442
N5-3.001	N5-3-1	120 Winter	30	+0%					24.798	-0.321
N5-3.002	N5-3-2	120 Winter	30	+0%					23.523	-0.350
N5-3.003	N5-3-3	180 Winter	30	+0%					22.043	-0.184
N5-3.004	N5-3-4	60 Winter	30	+0%					20.166	-0.104
N5-3.005	N5-3-5	120 Winter	30	+0%					19.520	-0.108
N5-3.006	N5-3-6	180 Winter	30	+0%	100/60 Winter	100/60 Winter			18.767	-0.109
N5-3.007	N5-3-7	180 Winter	30	+0%					18.271	-0.209
N5-3.008	N5-3-8	120 Winter	30	+0%					17.663	-0.284
N5-3.009	N5-3-9	180 Winter	30	+0%					17.140	-0.242
N5-3.010	N5-3-10	15 Winter	30	+0%					15.755	-0.145
N5-3.011	N5-3-11	15 Winter	30	+0%					15.328	-0.211
N5-1.013	N5-1-13	15 Winter	30	+0%					14.932	-0.166
N5-1.014	N5-1-14	15 Winter	30	+0%	100/15 Summer				14.810	-0.129
N5-1.015	N5-1-15	15 Winter	30	+0%					14.626	-0.158

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Eastern Roundabout Section-Road Sub-Catchment 5

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N5-1.000	N5-1-0	0.000	0.03		27.0	OK	
N5-1.001	N5-1-1	0.000	0.01		15.5	FLOOD RISK*	
N5-1.002	N5-1-2	0.000	0.01		19.1	FLOOD RISK*	3
N5-1.003	N5-1-3	0.000	0.02		23.3	FLOOD RISK*	9
N5-1.004	N5-1-4	0.000	0.04		22.4	FLOOD RISK*	10
N5-1.005	N5-1-5	0.000	0.00		0.0	OK	
N5-1.006	N5-1-6	0.000	0.00		0.0	OK	
N5-1.007	N5-1-7	0.000	0.00		0.0	FLOOD RISK*	
N5-1.008	N5-1-8	0.000	0.00		0.0	FLOOD RISK*	
N5-1.009	N5-1-9	0.000	0.00		0.0	OK	
N5-1.010	N5-1-10	0.000	0.72		12.9	OK	
N5-1.011	N5-1-11	0.000	0.16		17.6	OK	
N5-2.000	N5-2-0	0.000	0.61		11.7	OK	1
N5-2.001	N5-2-1	0.000	0.95		23.2	SURCHARGED	6
N5-2.002	N5-2-2	0.000	1.04		25.0	SURCHARGED	6
N5-2.003	N5-2-3	0.000	1.22		31.0	SURCHARGED	6
N5-1.012	N5-1-12	0.000	0.66		47.9	OK	
N5-3.000	N5-3-0	0.000	0.01		9.3	OK	
N5-3.001	N5-3-1	0.000	0.00		0.0	OK	
N5-3.002	N5-3-2	0.000	0.00		0.0	OK	
N5-3.003	N5-3-3	0.000	0.00		0.1	FLOOD RISK*	
N5-3.004	N5-3-4	0.000	0.01		8.9	FLOOD RISK*	
N5-3.005	N5-3-5	0.000	0.01		8.5	FLOOD RISK*	
N5-3.006	N5-3-6	0.000	0.01		8.2	FLOOD RISK*	2
N5-3.007	N5-3-7	0.000	0.00		0.0	FLOOD RISK*	
N5-3.008	N5-3-8	0.000	0.00		0.0	FLOOD RISK*	
N5-3.009	N5-3-9	0.000	0.00		0.0	FLOOD RISK*	
N5-3.010	N5-3-10	0.000	0.89		17.2	OK*	
N5-3.011	N5-3-11	0.000	0.19		21.7	OK	
N5-1.013	N5-1-13	0.000	0.59		75.4	OK	
N5-1.014	N5-1-14	0.000	0.75		95.4	OK	
N5-1.015	N5-1-15	0.000	0.62		119.4	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Eastern Roundabout Section-Road Sub-Catchment 5

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N5-4.000	N5-4-0	30 Winter	30	+0%					16.789	-0.111
N5-5.000	N5-5-0	30 Winter	30	+0%					17.988	-0.112
N5-5.001	N5-5-1	15 Winter	30	+0%	100/15 Summer				17.421	-0.077
N5-5.002	N5-5-2	15 Winter	30	+0%	100/15 Summer				17.277	-0.063
N5-5.003	N5-5-3	15 Winter	30	+0%	100/15 Summer				17.140	-0.060
N5-5.004	N5-5-4	15 Winter	30	+0%	100/15 Summer				16.979	-0.013
N5-5.005	N5-5-5	15 Winter	30	+0%	100/15 Summer				16.556	-0.044
N5-5.006	N5-5-6	15 Winter	30	+0%	30/15 Summer	100/15 Winter			15.916	0.362
N5-6.000	N5-6-0	30 Winter	30	+0%	30/15 Summer				14.940	0.340
N5-6.001	N5-6-1	30 Winter	30	+0%	30/15 Summer				14.920	0.549
N5-5.007	N5-5-7	30 Winter	30	+0%	5/15 Summer	100/15 Summer			14.890	0.778
N5-7.000	N5-7-0	30 Winter	30	+0%	30/15 Winter				14.915	0.115
N5-7.001	N5-7-1	30 Winter	30	+0%	30/15 Summer				14.880	0.378
N5-5.008	N5-5-8	30 Winter	30	+0%	2/15 Winter				14.825	0.824
N5-8.000	N5-8-0	15 Winter	30	+0%	30/15 Winter				16.993	0.050
N5-8.001	N5-8-1	15 Winter	30	+0%	30/15 Summer	100/15 Summer			16.976	0.376
N5-8.002	N5-8-2	15 Winter	30	+0%	5/15 Winter	30/15 Summer			16.257	1.201
N5-5.009	N5-5-9	30 Winter	30	+0%	2/15 Summer				14.259	0.541
N5-5.010	N5-5-10	30 Winter	30	+0%	30/15 Summer				13.866	0.244
N5-5.011	N5-5-11	30 Winter	30	+0%	30/15 Summer				13.488	0.172
N5-5.012	N5-5-12	30 Winter	30	+0%	5/15 Winter				13.110	0.115
N5-4.001	N5-4-1	30 Winter	30	+0%	30/15 Summer				13.005	0.033
N5-1.016	N5-1-16	15 Winter	30	+0%	100/15 Summer				12.790	-0.110
N5-1.017	N5-1-17	30 Winter	30	+0%	100/15 Summer				12.613	-0.052
N5-1.018	N5-1-18	30 Winter	30	+0%	100/15 Summer				12.463	-0.001
N5-1.019	N5-1-19	15 Winter	30	+0%	100/15 Winter				12.227	-0.164
N5-1.020	N5-1-20	30 Winter	30	+0%					11.821	-0.247
N5-1.021	N5-1-21	240 Winter	30	+0%	100/30 Summer				10.855	-0.005

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N5-4.000	N5-4-0	0.000	0.15		5.7	OK	
N5-5.000	N5-5-0	0.000	0.14		3.2	OK	
N5-5.001	N5-5-1	0.000	0.46		7.1	OK	
N5-5.002	N5-5-2	0.000	0.62		8.9	OK	
N5-5.003	N5-5-3	0.000	0.66		11.7	OK	
N5-5.004	N5-5-4	0.000	1.00		18.9	OK	
N5-5.005	N5-5-5	0.000	0.83		18.5	OK	
N5-5.006	N5-5-6	0.000	0.88		20.6	SURCHARGED	3
N5-6.000	N5-6-0	0.000	0.24		8.1	SURCHARGED	
N5-6.001	N5-6-1	0.000	0.43		15.1	SURCHARGED	
N5-5.007	N5-5-7	0.000	0.82		27.7	SURCHARGED	8
N5-7.000	N5-7-0	0.000	0.33		12.3	SURCHARGED	
N5-7.001	N5-7-1	0.000	0.45		22.1	SURCHARGED	
N5-5.008	N5-5-8	0.000	1.43		51.3	SURCHARGED	
N5-8.000	N5-8-0	0.000	0.29		6.4	SURCHARGED	
N5-8.001	N5-8-1	0.000	0.81		27.0	SURCHARGED	4
N5-8.002	N5-8-2	0.479	1.28		39.8	FLOOD	9
N5-5.009	N5-5-9	0.000	2.08		86.0	SURCHARGED	
N5-5.010	N5-5-10	0.000	1.16		84.9	SURCHARGED	
N5-5.011	N5-5-11	0.000	1.09		81.5	SURCHARGED	
N5-5.012	N5-5-12	0.000	1.65		81.4	SURCHARGED	
N5-4.001	N5-4-1	0.000	1.29		86.6	SURCHARGED	
N5-1.016	N5-1-16	0.000	0.90		181.5	OK	
N5-1.017	N5-1-17	0.000	0.91		177.2	OK	
N5-1.018	N5-1-18	0.000	1.00		169.1	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Eastern Roundabout Section-Road Sub-Catchment 5

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N5-1.019	N5-1-19	0.000	0.73		169.1	OK	
N5-1.020	N5-1-20	0.000	0.42		169.1	OK	
N5-1.021	N5-1-21	0.000	0.00		0.0	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Eastern Roundabout Section-Road Sub-Catchment 5

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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 21 Number of Storage Structures 21 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH	Data Type	Point
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 640286 267538 TM 40286 67538	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
Return Period(s) (years)	2, 5, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N5-1.000	N5-1-0	30 Winter	100	+40%					24.634	-0.362
N5-1.001	N5-1-1	60 Winter	100	+40%					24.319	-0.008
N5-1.002	N5-1-2	60 Winter	100	+40%	100/60 Winter	100/60 Winter			22.947	0.003
N5-1.003	N5-1-3	120 Winter	100	+40%	100/30 Winter	100/30 Winter			21.314	0.014
N5-1.004	N5-1-4	120 Winter	100	+40%	100/30 Winter	100/30 Winter			20.014	0.014
N5-1.005	N5-1-5	180 Winter	100	+40%					19.782	-0.018
N5-1.006	N5-1-6	240 Winter	100	+40%					19.211	-0.043
N5-1.007	N5-1-7	240 Winter	100	+40%					18.265	-0.047
N5-1.008	N5-1-8	360 Winter	100	+40%					17.630	-0.057
N5-1.009	N5-1-9	360 Winter	100	+40%					17.059	-0.068
N5-1.010	N5-1-10	15 Winter	100	+40%					15.783	-0.117
N5-1.011	N5-1-11	15 Winter	100	+40%					15.402	-0.184
N5-2.000	N5-2-0	30 Winter	100	+40%	100/15 Summer	100/30 Winter			22.000	1.200
N5-2.001	N5-2-1	30 Winter	100	+40%	30/15 Summer	100/15 Summer			20.964	1.204
N5-2.002	N5-2-2	30 Winter	100	+40%	30/15 Summer	100/15 Summer			19.205	1.202
N5-2.003	N5-2-3	15 Winter	100	+40%	30/15 Summer	100/15 Summer			18.666	1.202
N5-1.012	N5-1-12	15 Winter	100	+40%					15.180	-0.020
N5-3.000	N5-3-0	30 Winter	100	+40%					25.279	-0.421
N5-3.001	N5-3-1	180 Winter	100	+40%					24.972	-0.147
N5-3.002	N5-3-2	180 Winter	100	+40%					23.729	-0.144
N5-3.003	N5-3-3	60 Winter	100	+40%					22.136	-0.091
N5-3.004	N5-3-4	30 Winter	100	+40%					20.240	-0.030
N5-3.005	N5-3-5	60 Winter	100	+40%					19.619	-0.009
N5-3.006	N5-3-6	120 Winter	100	+40%	100/60 Winter	100/60 Winter			18.877	0.001
N5-3.007	N5-3-7	120 Winter	100	+40%					18.470	-0.010
N5-3.008	N5-3-8	180 Winter	100	+40%					17.930	-0.017
N5-3.009	N5-3-9	240 Winter	100	+40%					17.361	-0.021
N5-3.010	N5-3-10	240 Winter	100	+40%					15.859	-0.041
N5-3.011	N5-3-11	240 Winter	100	+40%					15.370	-0.169
N5-1.013	N5-1-13	15 Winter	100	+40%					15.094	-0.004
N5-1.014	N5-1-14	15 Winter	100	+40%	100/15 Summer				14.975	0.036
N5-1.015	N5-1-15	15 Winter	100	+40%					14.706	-0.078

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Eastern Roundabout Section-Road Sub-Catchment 5

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N5-1.000	N5-1-0	0.000	0.06		49.0	OK	
N5-1.001	N5-1-1	0.000	0.05		53.2	FLOOD RISK*	
N5-1.002	N5-1-2	3.432	0.05		62.7	FLOOD	3
N5-1.003	N5-1-3	13.605	0.07		70.8	FLOOD	9
N5-1.004	N5-1-4	14.392	0.14		71.4	FLOOD	10
N5-1.005	N5-1-5	0.000	0.05		46.5	FLOOD RISK*	
N5-1.006	N5-1-6	0.000	0.03		32.9	FLOOD RISK*	
N5-1.007	N5-1-7	0.000	0.04		30.7	FLOOD RISK*	
N5-1.008	N5-1-8	0.000	0.04		25.9	FLOOD RISK*	
N5-1.009	N5-1-9	0.000	0.06		21.1	FLOOD RISK*	
N5-1.010	N5-1-10	0.000	1.36		24.4	OK	
N5-1.011	N5-1-11	0.000	0.31		32.9	OK	
N5-2.000	N5-2-0	0.179	1.00		19.1	FLOOD	1
N5-2.001	N5-2-1	4.273	1.03		25.2	FLOOD	6
N5-2.002	N5-2-2	2.281	1.32		31.9	FLOOD	6
N5-2.003	N5-2-3	1.699	1.38		35.1	FLOOD	6
N5-1.012	N5-1-12	0.000	0.93		68.3	OK	
N5-3.000	N5-3-0	0.000	0.02		16.6	OK	
N5-3.001	N5-3-1	0.000	0.00		2.1	FLOOD RISK*	
N5-3.002	N5-3-2	0.000	0.00		2.5	FLOOD RISK*	
N5-3.003	N5-3-3	0.000	0.01		12.9	FLOOD RISK*	
N5-3.004	N5-3-4	0.000	0.04		37.6	FLOOD RISK*	
N5-3.005	N5-3-5	0.000	0.06		52.3	FLOOD RISK*	
N5-3.006	N5-3-6	1.377	0.10		60.9	FLOOD	2
N5-3.007	N5-3-7	0.000	0.07		52.5	FLOOD RISK*	
N5-3.008	N5-3-8	0.000	0.06		48.1	FLOOD RISK*	
N5-3.009	N5-3-9	0.000	0.10		45.2	FLOOD RISK*	
N5-3.010	N5-3-10	0.000	2.37		45.8	OK*	
N5-3.011	N5-3-11	0.000	0.40		46.4	OK	
N5-1.013	N5-1-13	0.000	0.90		115.8	OK	
N5-1.014	N5-1-14	0.000	1.14		145.1	SURCHARGED	
N5-1.015	N5-1-15	0.000	0.96		184.7	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Eastern Roundabout Section-Road Sub-Catchment 5

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
N5-4.000	N5-4-0	30 Winter	100	+40%					16.804	-0.096
N5-5.000	N5-5-0	30 Winter	100	+40%					18.002	-0.098
N5-5.001	N5-5-1	15 Winter	100	+40%	100/15 Summer				17.774	0.276
N5-5.002	N5-5-2	15 Winter	100	+40%	100/15 Summer				17.732	0.392
N5-5.003	N5-5-3	15 Winter	100	+40%	100/15 Summer				17.681	0.481
N5-5.004	N5-5-4	15 Winter	100	+40%	100/15 Summer				17.615	0.623
N5-5.005	N5-5-5	15 Winter	100	+40%	100/15 Summer				17.321	0.721
N5-5.006	N5-5-6	30 Winter	100	+40%	30/15 Summer	100/15 Winter			16.754	1.200
N5-6.000	N5-6-0	30 Winter	100	+40%	30/15 Summer				15.632	1.032
N5-6.001	N5-6-1	30 Winter	100	+40%	30/15 Summer				15.595	1.224
N5-5.007	N5-5-7	30 Winter	100	+40%	5/15 Summer	100/15 Summer			15.488	1.376
N5-7.000	N5-7-0	30 Winter	100	+40%	30/15 Winter				15.914	1.114
N5-7.001	N5-7-1	30 Winter	100	+40%	30/15 Summer				15.839	1.337
N5-5.008	N5-5-8	30 Winter	100	+40%	2/15 Winter				15.543	1.542
N5-8.000	N5-8-0	30 Winter	100	+40%	30/15 Winter				17.845	0.902
N5-8.001	N5-8-1	15 Winter	100	+40%	30/15 Summer	100/15 Summer			17.802	1.202
N5-8.002	N5-8-2	30 Winter	100	+40%	5/15 Winter	30/15 Summer			16.273	1.217
N5-5.009	N5-5-9	30 Winter	100	+40%	2/15 Summer				14.940	1.222
N5-5.010	N5-5-10	30 Winter	100	+40%	30/15 Summer				14.538	0.916
N5-5.011	N5-5-11	30 Winter	100	+40%	30/15 Summer				14.135	0.819
N5-5.012	N5-5-12	30 Winter	100	+40%	5/15 Winter				13.720	0.725
N5-4.001	N5-4-1	30 Winter	100	+40%	30/15 Summer				13.607	0.635
N5-1.016	N5-1-16	30 Winter	100	+40%	100/15 Summer				13.463	0.563
N5-1.017	N5-1-17	30 Winter	100	+40%	100/15 Summer				13.072	0.407
N5-1.018	N5-1-18	30 Winter	100	+40%	100/15 Summer				12.696	0.232
N5-1.019	N5-1-19	30 Winter	100	+40%	100/15 Winter				12.473	0.082
N5-1.020	N5-1-20	30 Winter	100	+40%					11.885	-0.183
N5-1.021	N5-1-21	360 Winter	100	+40%	100/30 Summer				11.555	0.695

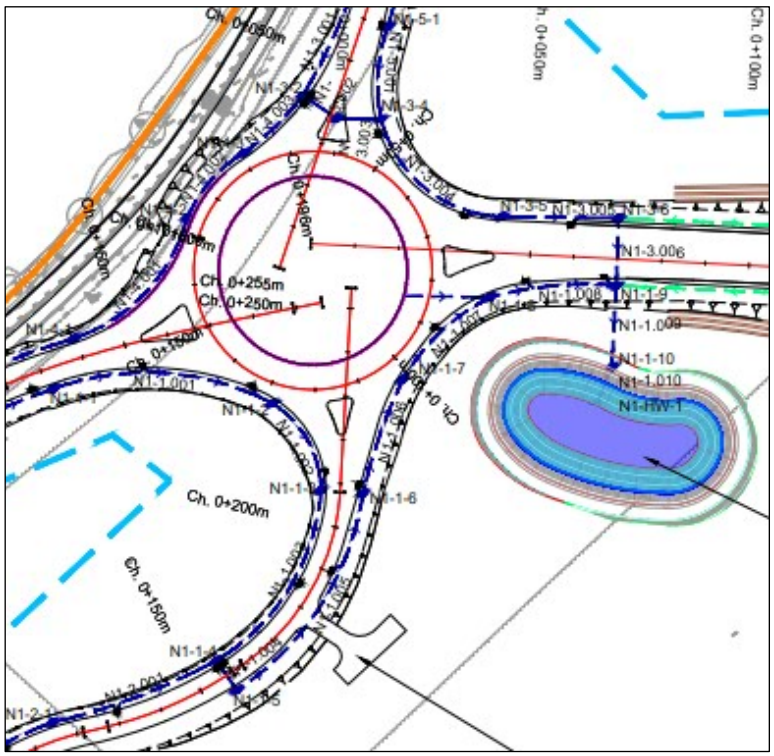
PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N5-4.000	N5-4-0	0.000	0.28		10.4	OK	
N5-5.000	N5-5-0	0.000	0.26		5.7	OK	
N5-5.001	N5-5-1	0.000	0.73		11.2	SURCHARGED	
N5-5.002	N5-5-2	0.000	0.82		11.7	SURCHARGED	
N5-5.003	N5-5-3	0.000	0.72		12.9	SURCHARGED	
N5-5.004	N5-5-4	0.000	1.20		22.7	SURCHARGED	
N5-5.005	N5-5-5	0.000	0.78		17.5	SURCHARGED	
N5-5.006	N5-5-6	0.349	0.94		22.1	FLOOD	3
N5-6.000	N5-6-0	0.000	0.38		12.8	FLOOD RISK	
N5-6.001	N5-6-1	0.000	0.66		23.3	FLOOD RISK	
N5-5.007	N5-5-7	25.483	1.74		58.7	FLOOD	8
N5-7.000	N5-7-0	0.000	0.60		22.7	FLOOD RISK	
N5-7.001	N5-7-1	0.000	0.77		37.9	FLOOD RISK	
N5-5.008	N5-5-8	0.000	1.81		65.0	FLOOD RISK	
N5-8.000	N5-8-0	0.000	0.56		12.2	FLOOD RISK	
N5-8.001	N5-8-1	2.387	1.00		33.3	FLOOD	4
N5-8.002	N5-8-2	16.913	1.26		39.2	FLOOD	9
N5-5.009	N5-5-9	0.000	2.34		96.5	SURCHARGED	
N5-5.010	N5-5-10	0.000	1.26		92.7	SURCHARGED	
N5-5.011	N5-5-11	0.000	1.24		92.7	SURCHARGED	
N5-5.012	N5-5-12	0.000	1.92		94.3	SURCHARGED	
N5-4.001	N5-4-1	0.000	1.54		103.3	SURCHARGED	
N5-1.016	N5-1-16	0.000	1.29		259.8	SURCHARGED	
N5-1.017	N5-1-17	0.000	1.37		266.5	SURCHARGED	
N5-1.018	N5-1-18	0.000	1.57		265.7	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for A12 Eastern Roundabout Section-Road Sub-Catchment 5

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
N5-1.019	N5-1-19	0.000	1.15		265.2	SURCHARGED	
N5-1.020	N5-1-20	0.000	0.66		264.6	OK	
N5-1.021	N5-1-21	0.000	0.04		14.3	FLOOD RISK	

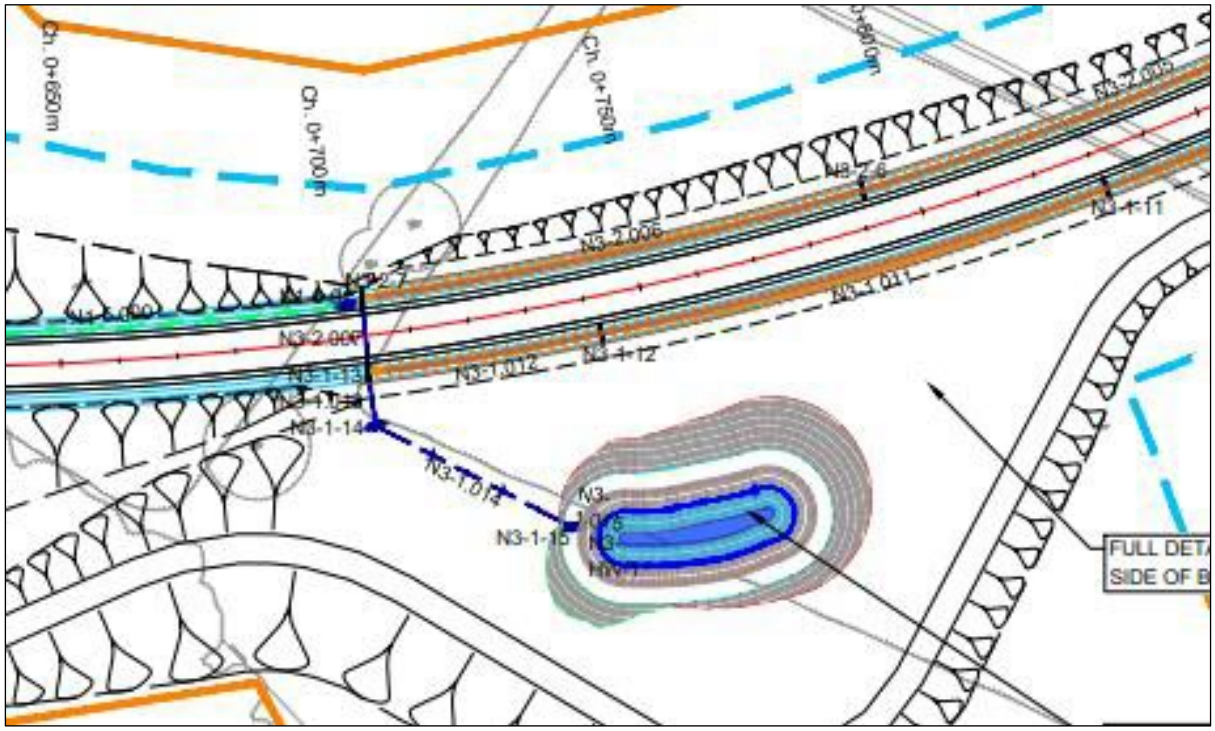
APPENDIX D: INFILTRATION BASIN LOCATION, LAYOUT PLANS AND HYDRAULIC PERFORMANCE

INFILTRATION BASIN 1



Infiltration Basin 1 – A12 West and River Alde Crossing			
Basin Invert Level	7.072	m	Metres Above Ordnance Datum
Basin Top Level	8.922		
Water Volume at 1 in 100 year Event	1114.7	m^3	
Storage Depth at a 1 in 100 year Event	1.639	m	Above pond Invert
Freeboard 1 in 100 year Event (m)	0.211		
1 in 2 year	7.590	m	Metres Above Ordnance Datum
1 in 5 year	7.712		
1 in 100 year	8.711		

INFILTRATION BASIN 2



Infiltration Basin 2 – Bypass East Hill Farm Lane and A12 Roundabout Northeast			
Basin Invert Level	12.235	m	Metres Above Ordnance Datum
Basin Top Level	13.810		
Water Volume at 1 in 100 year Event	99.224	m^3	
Storage Depth at a 1 in 100 year Event	0.790	m	Above pond Invert
Freeboard 1 in 100 year Event (m)	0.785		
1 in 2 year	12.280	m	Metres Above Ordnance Datum
1 in 5 year	12.297		
1 in 100 year	13.025		

INFILTRATION BASIN 3

Infiltration Basin 3 – Bypass East of River Alde Crossing			
Basin Invert Level	10.335	m	Metres Above Ordnance Datum
Basin Top Level	11.760		
Water Volume at 1 in 100 year Event	922.8	m^3	
Storage Depth at a 1 in 100 year Event	1.220	m	Above pond Invert
Freeboard 1 in 100 year Event (m)	0.205		
1 in 2 year	10.578	m	Metres Above Ordnance Datum
1 in 5 year	10.655		
1 in 100 year	11.555		

APPENDIX E: INFILTRATION BASINS I, 2 AND 3 SOURCE CONTROL MODELLING

NOTES:

1. DO NOT SCALE FROM THIS DRAWING.
2. ALL DIMENSIONS ARE SHOWN IN METRES UNLESS OTHERWISE STATED.
3. ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM UNLESS OTHERWISE STATED.
4. THE WORKS SHALL BE CARRIED OUR IN ACCORDANCE WITH DESIGN MANUAL FOR ROADS AND BRIDGES, MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS, CIRIA C753 THE SuDS MANUAL AND SUFFOLK COUNTY COUNCIL SPECIFIC STANDARD DETAILS AND SPECIFICATIONS AS APPROPRIATE.
5. POSITION OF PROPOSED HIGHWAY GULLIES IS APPROXIMATE AND TO BE FIXED AT THE DETAILED DESIGN STAGE.
6. ALL MANHOLES SHALL BE CATCHPIT MANHOLES UNLESS OTHERWISE STATED. REFER TO MANHOLE SCHEDULES FOR MANHOLE DETAILS.
7. POLLUTION CONTROL MEASURES TO BE ADDED AT THE DETAILED DESIGN STAGE FOLLOWING RECOMMENDATIONS OF HEWRAT ASSESSMENT.
8. DRAINAGE PIPE AND MANHOLE REFERENCE RELATE TO THOSE CONTAINED IN HYDRAULIC MODEL.
9. CUTTING CUT OFF DRAINS ARE NOT SHOWN AT PRELIMINARY DESIGN STAGE AND WILL BE ADDED AT DETAILED DESIGN STAGE, IF REQUIRED.

KEY:

- PROPOSED CARRIER DRAIN
- PROPOSED CONCRETE CHANNEL WITH UNDERDRAIN CARRIER PIPE
- PROPOSED SWALE WITH UNDERDRAIN
- FILTER PIPE OF 150mm TO 300mm Ø
- PROPOSED COMBINED KERB DRAINAGE UNIT
- PROPOSED BRIDGE DECK UNIT
- PROPOSED CATCHPIT
- PROPOSED HEADWALL
- PROPOSED SOAKAWAY MANHOLE
- PROPOSED GULLY WITH CONNECTION
- PROPOSED WEIR
- PROPOSED INFILTRATION BASIN
- PROPOSED PERMANENT BOUNDARY
- PROPOSED DCO BOUNDARY

SOAKAWAY 1
MANHOLE INVERT LEVEL - 6.479 m
MANHOLE COVER LEVEL - 8.897 m
INTERNAL DIAMETER - 2400 mm
DEPTH OF MANHOLE - 2450 mm
NO. OF SOAKAWAY MANHOLES - 2
INFILTRATION RATE - 0.11239 m/hr

THE PRECISE POSITION AND LEVELS FOR THE SOAKAWAY MANHOLES WILL BE SUBJECT TO ADJUSTMENT AT DETAILED DESIGN IN ORDER TO INCORPORATE, TREATMENT TRAIN INFRASTRUCTURE AND MEANS OF ACCESS FOR MAINTENANCE, EITHER BY MAINTENANCE LAY-BY OR OFF ROAD ACCESS TRACK.

Source Control Derived

New Base Area: 990
New Top of Basin Area: 2001

Maximum Depth 1 in 100 + 40% = 0.999m

INFILTRATION BASIN 1 PRELIMINARY DESIGN
BASIN INVERT LEVEL - 7.130 m
TOP OF BASIN LEVEL - 9.119 m
STORAGE VOLUME - 1527 m³
STORAGE DEPTH - 1.989 m
FREEBOARD - 300 mm
INFILTRATION RATE - 0.11239 m/hr
PREDICTED MAXIMUM WATER LEVEL IN 1 YEAR RETURN PERIOD - 7.391 m AOD
PREDICTED MAXIMUM WATER LEVEL IN 5 YEAR RETURN PERIOD - 7.576 m AOD
PREDICTED MAXIMUM WATER LEVEL IN 100 YEAR +40 % CC RETURN PERIOD - 8.326 m AOD

THE PRECISE POSITION, SHAPE AND LEVELS FOR THE BASIN WILL BE SUBJECT TO ADJUSTMENT AT DETAILED DESIGN IN ORDER TO INCORPORATE, TREATMENT TRAIN INFRASTRUCTURE, POTENTIAL ECOLOGICAL ENHANCEMENT AND OPTIMISE EARTHWORKS.

FULL DETAILS OF ACCESS TRACK ARRANGEMENTS TO THE BASIN TO BE DETERMINED AT DETAILED DESIGN.

Rev.	Date	Description	App'd	Auth'd
P01	05/02/20	First Revision	CR	---

Mountbatten House, Basing View, Basingstoke, RG21 4HJ, UK
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Client: SZC

Project Title: AD3 MAJOR ROAD SCHEMES
AD0320 TWO VILLAGE BYPASS

Drawing Title: PRELIMINARY DESIGN
DRAINAGE HIGHWAYS NETWORK LAYOUT

SHEET 01

Scale @ A1	Date	Drawn	Check	Approved	Authorised
1:500	05/02/20	J.Silekar	D.Lord	C.Ritchley	---

Suitability	Status	Stage
S2	Suitable for Information	3

Drawing Number: SZC-AD0320-WSP-TVBHDG-ZZ0000-DRW-HCD-305001
Revision: P01

WSP Project Number: 70071213

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 921 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	7.417	0.345	8.3	369.3	O K
30 min Summer	7.515	0.443	8.9	484.6	O K
60 min Summer	7.608	0.536	9.5	598.3	O K
120 min Summer	7.709	0.637	10.2	727.0	O K
180 min Summer	7.774	0.702	10.6	812.8	O K
240 min Summer	7.821	0.749	10.9	875.9	O K
360 min Summer	7.884	0.812	11.3	962.2	O K
480 min Summer	7.920	0.848	11.6	1012.8	O K
600 min Summer	7.938	0.866	11.7	1038.0	O K
720 min Summer	7.945	0.873	11.8	1047.7	O K
960 min Summer	7.944	0.872	11.8	1046.4	O K
1440 min Summer	7.914	0.842	11.5	1003.3	O K
2160 min Summer	7.847	0.775	11.1	910.2	O K
2880 min Summer	7.782	0.710	10.7	823.1	O K
4320 min Summer	7.667	0.595	9.9	673.2	O K
5760 min Summer	7.574	0.502	9.3	555.9	O K
15 min Winter	7.456	0.384	8.5	414.7	O K
30 min Winter	7.564	0.492	9.2	544.3	O K
60 min Winter	7.667	0.595	9.9	673.0	O K
120 min Winter	7.780	0.708	10.7	820.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	136.920	0.0	35
30 min Summer	90.020	0.0	47
60 min Summer	56.280	0.0	74
120 min Summer	35.119	0.0	130
180 min Summer	26.852	0.0	188
240 min Summer	22.239	0.0	246
360 min Summer	17.061	0.0	366
480 min Summer	14.088	0.0	484
600 min Summer	12.076	0.0	600
720 min Summer	10.605	0.0	676
960 min Summer	8.554	0.0	788
1440 min Summer	6.193	0.0	1042
2160 min Summer	4.385	0.0	1452
2880 min Summer	3.403	0.0	1856
4320 min Summer	2.354	0.0	2680
5760 min Summer	1.813	0.0	3456
15 min Winter	136.920	0.0	35
30 min Winter	90.020	0.0	47
60 min Winter	56.280	0.0	74
120 min Winter	35.119	0.0	128

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
180 min Winter	7.854	0.782	11.1	919.8	O K
240 min Winter	7.907	0.835	11.5	993.8	O K
360 min Winter	7.979	0.907	12.0	1097.1	O K
480 min Winter	8.023	0.951	12.3	1160.5	O K
600 min Winter	8.047	0.975	12.5	1195.8	O K
720 min Winter	8.058	0.999	12.5	1212.4	O K
960 min Winter	8.056	0.984	12.5	1208.5	O K
1440 min Winter	8.021	0.949	12.3	1156.7	O K
2160 min Winter	7.937	0.865	11.7	1036.5	O K
2880 min Winter	7.853	0.781	11.1	918.4	O K
4320 min Winter	7.699	0.627	10.1	713.2	O K
5760 min Winter	7.572	0.500	9.3	553.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
180 min Winter	26.852	0.0	186
240 min Winter	22.239	0.0	244
360 min Winter	17.061	0.0	358
480 min Winter	14.088	0.0	472
600 min Winter	12.076	0.0	584
720 min Winter	10.605	0.0	692
960 min Winter	8.554	0.0	892
1440 min Winter	6.193	0.0	1110
2160 min Winter	4.385	0.0	1568
2880 min Winter	3.403	0.0	2020
4320 min Winter	2.354	0.0	2860
5760 min Winter	1.813	0.0	3688

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 640286 267538 TM 40286 67538
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	5760
Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.493

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.362	8	12	0.287	16	20	0.091	24	28	0.007
4	8	0.578	12	16	0.124	20	24	0.044			

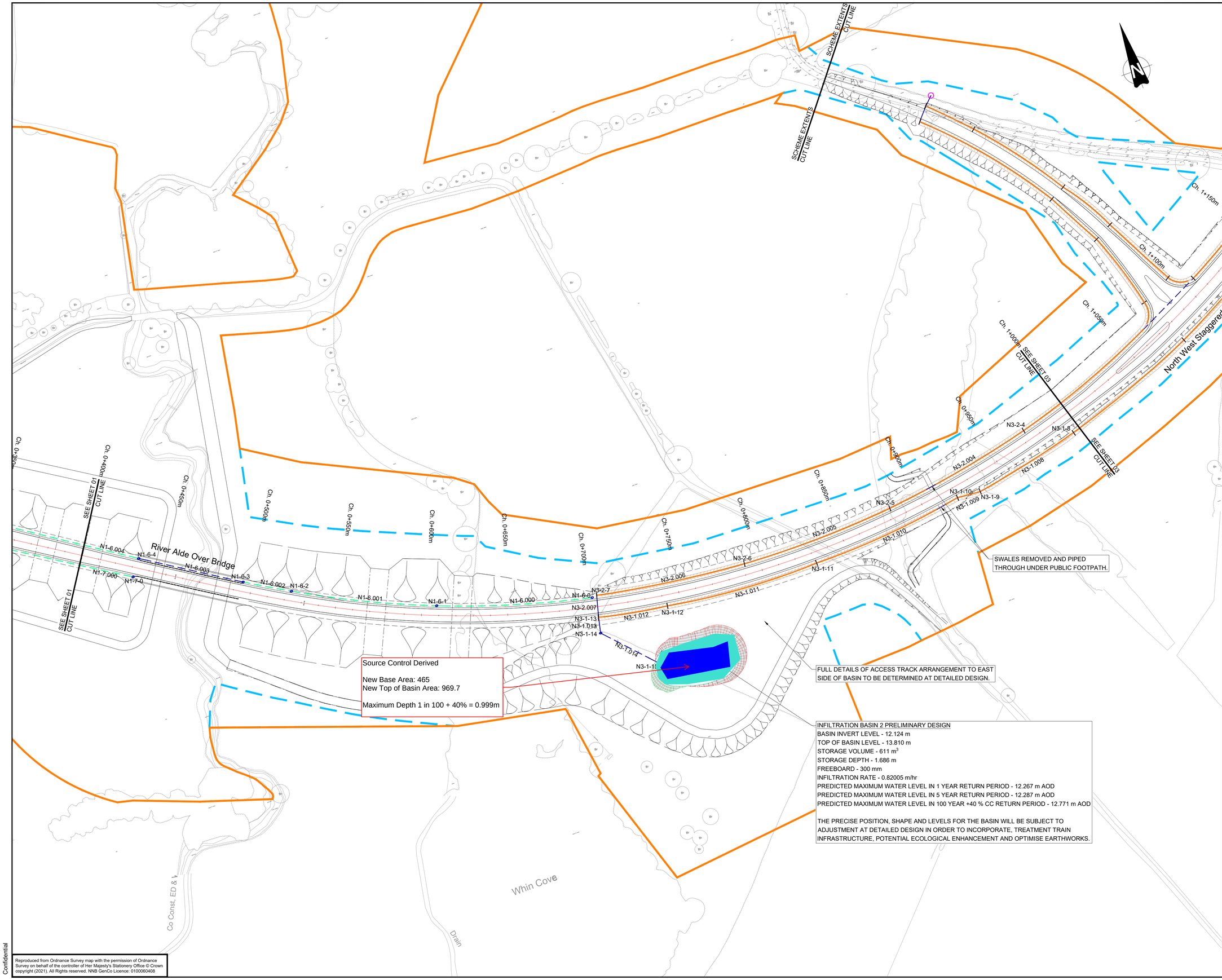
Model Details

Storage is Online Cover Level (m) 9.000

Infiltration Basin Structure

Invert Level (m) 7.072 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.04425 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.04425

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	990.0	1.850	2001.0



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KEY:

- PROPOSED CARRIER DRAIN
- PROPOSED CONCRETE CHANNEL WITH UNDERDRAIN CARRIER PIPE
- PROPOSED SWALE WITH UNDERDRAIN
- FILTER PIPE OF 150mm TO 300mm Ø
- PROPOSED COMBINED KERB DRAINAGE UNIT
- PROPOSED BRIDGE DECK UNIT
- PROPOSED CATCHPIT
- PROPOSED HEADWALL
- PROPOSED SOAKAWAY MANHOLE
- PROPOSED GULLY WITH CONNECTION
- PROPOSED WEIR
- PROPOSED INFILTRATION BASIN
- PROPOSED PERMANENT BOUNDARY
- PROPOSED DCO BOUNDARY

Rev.	Date	Description	App'd	Auth'd
P01	05/02/20	First Revision	CR	---

wsp

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Client: SZC EDF ENERGY CGN

Project Title: AD3 MAJOR ROAD SCHEMES
AD0320 TWO VILLAGE BYPASS

Drawing Title: PRELIMINARY DESIGN
DRAINAGE HIGHWAYS NETWORK LAYOUT

SHEET 02

Scale @ A1	Date	Drawn	Check	Approved	Authorised
1:500	05/02/20	J.Silekar	D.Lord	C.Ritchley	---

Suitability	Status	Stage
S2	Suitable for Information	3

Drawing Number	Revision
SZC-AD0320-WSP-TVBHDG-ZZ0000-DRW-HCD-305002	P01

WSP Project Number: 70071213

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 109 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	12.811	0.576	41.4	313.5	O K
30 min Summer	12.960	0.725	46.2	410.9	O K
60 min Summer	13.061	0.826	49.6	480.7	O K
120 min Summer	13.110	0.875	51.2	515.5	O K
180 min Summer	13.128	0.893	51.8	528.9	O K
240 min Summer	13.134	0.899	52.0	532.8	O K
360 min Summer	13.127	0.892	51.8	527.5	O K
480 min Summer	13.107	0.872	51.1	513.1	O K
600 min Summer	13.078	0.843	50.1	492.3	O K
720 min Summer	13.044	0.809	49.0	468.4	O K
960 min Summer	12.968	0.733	46.5	416.4	O K
1440 min Summer	12.819	0.584	41.6	318.5	O K
2160 min Summer	12.630	0.395	35.6	204.7	O K
2880 min Summer	12.488	0.253	31.2	126.1	O K
4320 min Summer	12.315	0.080	25.9	38.1	O K
5760 min Summer	12.279	0.044	21.8	20.5	O K
15 min Winter	12.876	0.641	43.5	354.9	O K
30 min Winter	13.039	0.804	48.8	465.2	O K
60 min Winter	13.156	0.921	52.7	548.9	O K
120 min Winter	13.215	0.980	54.7	593.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	136.920	0.0	31
30 min Summer	90.020	0.0	40
60 min Summer	56.280	0.0	64
120 min Summer	35.119	0.0	104
180 min Summer	26.852	0.0	136
240 min Summer	22.239	0.0	172
360 min Summer	17.061	0.0	240
480 min Summer	14.088	0.0	310
600 min Summer	12.076	0.0	378
720 min Summer	10.605	0.0	444
960 min Summer	8.554	0.0	574
1440 min Summer	6.193	0.0	826
2160 min Summer	4.385	0.0	1192
2880 min Summer	3.403	0.0	1552
4320 min Summer	2.354	0.0	2220
5760 min Summer	1.813	0.0	2928
15 min Winter	136.920	0.0	31
30 min Winter	90.020	0.0	40
60 min Winter	56.280	0.0	64
120 min Winter	35.119	0.0	112

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
180 min Winter	13.233	0.998	55.3	606.8	O K
240 min Winter	13.234	0.999	55.4	607.9	O K
360 min Winter	13.210	0.975	54.6	589.4	O K
480 min Winter	13.170	0.935	53.2	559.8	O K
600 min Winter	13.122	0.887	51.6	524.3	O K
720 min Winter	13.069	0.834	49.8	486.5	O K
960 min Winter	12.960	0.725	46.2	410.9	O K
1440 min Winter	12.758	0.523	39.7	280.7	O K
2160 min Winter	12.521	0.286	32.2	144.0	O K
2880 min Winter	12.358	0.123	27.2	59.2	O K
4320 min Winter	12.276	0.041	20.5	19.3	O K
5760 min Winter	12.267	0.032	15.7	14.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
180 min Winter	26.852	0.0	144
240 min Winter	22.239	0.0	184
360 min Winter	17.061	0.0	258
480 min Winter	14.088	0.0	332
600 min Winter	12.076	0.0	404
720 min Winter	10.605	0.0	472
960 min Winter	8.554	0.0	608
1440 min Winter	6.193	0.0	866
2160 min Winter	4.385	0.0	1232
2880 min Winter	3.403	0.0	1564
4320 min Winter	2.354	0.0	2204
5760 min Winter	1.813	0.0	2856

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 640286 267538 TM 40286 67538
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	5760
Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.464

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.318	8	12	0.298	16	20	0.049	24	28	0.019
4	8	0.636	12	16	0.095	20	24	0.049			

Model Details

Storage is Online Cover Level (m) 13.810

Infiltration Basin Structure

Invert Level (m) 12.235 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.36360 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.36360

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	465.0	1.575	969.7

Source Control Derived

New Base Area: 1287
New Top of Basin Area: 3001

Maximum Depth 1 in 100 + 40% = 0.999m

INFILTRATION BASIN 3 PRELIMINARY DESIGN
BASIN INVERT LEVEL - 9.914 m
TOP OF BASIN LEVEL - 11.700 m
STORAGE VOLUME - 1512 m^3
STORAGE DEPTH - 1.786 m
FREEBOARD - 300 mm
INFILTRATION RATE - 0.12611 m/hr
PREDICTED MAXIMUM WATER LEVEL IN 1 YEAR RETURN PERIOD - 10.511 m AOD
PREDICTED MAXIMUM WATER LEVEL IN 5 YEAR RETURN PERIOD - 10.631 m AOD
PREDICTED MAXIMUM WATER LEVEL IN 100 YEAR +40 % CC RETURN PERIOD - 11.269 m AOD

THE PRECISE POSITION, SHAPE AND LEVELS FOR THE BASIN WILL BE SUBJECT TO ADJUSTMENT AT DETAILED DESIGN IN ORDER TO INCORPORATE, TREATMENT TRAIN INFRASTRUCTURE, POTENTIAL ECOLOGICAL ENHANCEMENT AND OPTIMISE EARTHWORKS.

FULL DETAILS OF ACCESS TRACK ARRANGEMENT TO THE BASIN TO BE DETERMINED AT DETAILED DESIGN.

NOTES:

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8. DRAINAGE PIPE AND MANHOLE REFERENCE RELATE TO THOSE CONTAINED IN HYDRAULIC MODEL.
9. CUTTING CUT OFF DRAINS ARE NOT SHOWN AT PRELIMINARY DESIGN STAGE AND WILL BE ADDED AT DETAILED DESIGN STAGE, IF REQUIRED.

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- PROPOSED CONCRETE CHANNEL WITH UNDERDRAIN CARRIER PIPE
- PROPOSED SWALE WITH UNDERDRAIN
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- PROPOSED WEIR
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- PROPOSED PERMANENT BOUNDARY
- PROPOSED DCO BOUNDARY

Rev.	Date	Description	App'd	Auth'd
P01	05/02/20	First Revision	CR	---

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Client: SZC

Project Title: AD3 MAJOR ROAD SCHEMES
AD0320 TWO VILLAGE BYPASS

Drawing Title: PRELIMINARY DESIGN
DRAINAGE HIGHWAYS NETWORK LAYOUT

SHEET 05

Scale @ A1	Date	Drawn	Check	Approved	Authorised
1:500	05/02/20	J.Silekar	D.Lord	C.Ritchley	---

Suitability	Status	Stage
S2	Suitable for Information	3

Drawing Number: SZC-AD0320-WSP-TVBHDG-ZZ0000-DRW-HCD-305005
Revision: P01

WSP Project Number: 70071213

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 326 minutes.

	Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15	min Summer	10.777	0.442	44.2	851.7	O K
30	min Summer	10.900	0.565	49.1	1129.1	O K
60	min Summer	11.006	0.671	53.4	1382.3	O K
120	min Summer	11.102	0.767	57.4	1625.8	O K
180	min Summer	11.153	0.818	59.5	1759.5	O K
240	min Summer	11.182	0.847	60.8	1836.8	O K
360	min Summer	11.214	0.879	62.1	1923.3	O K
480	min Summer	11.229	0.894	62.7	1962.3	O K
600	min Summer	11.230	0.895	62.8	1966.1	O K
720	min Summer	11.223	0.888	62.5	1947.8	O K
960	min Summer	11.196	0.861	61.3	1872.8	O K
1440	min Summer	11.123	0.788	58.3	1680.2	O K
2160	min Summer	11.010	0.675	53.6	1392.5	O K
2880	min Summer	10.908	0.573	49.5	1147.6	O K
4320	min Summer	10.740	0.405	42.8	772.6	O K
5760	min Summer	10.617	0.282	37.9	518.2	O K
15	min Winter	10.826	0.491	46.2	961.0	O K
30	min Winter	10.960	0.625	51.6	1272.2	O K
60	min Winter	11.077	0.742	56.4	1561.9	O K
120	min Winter	11.187	0.852	61.0	1849.5	O K

	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15	min Summer	136.920	0.0	50
30	min Summer	90.020	0.0	59
60	min Summer	56.280	0.0	84
120	min Summer	35.119	0.0	136
180	min Summer	26.852	0.0	188
240	min Summer	22.239	0.0	242
360	min Summer	17.061	0.0	304
480	min Summer	14.088	0.0	368
600	min Summer	12.076	0.0	438
720	min Summer	10.605	0.0	508
960	min Summer	8.554	0.0	646
1440	min Summer	6.193	0.0	920
2160	min Summer	4.385	0.0	1320
2880	min Summer	3.403	0.0	1704
4320	min Summer	2.354	0.0	2444
5760	min Summer	1.813	0.0	3176
15	min Winter	136.920	0.0	50
30	min Winter	90.020	0.0	60
60	min Winter	56.280	0.0	84
120	min Winter	35.119	0.0	136

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
180 min Winter	11.247	0.912	63.5	2012.9	O K
240 min Winter	11.283	0.948	65.0	2112.9	O K
360 min Winter	11.317	0.982	66.4	2209.0	O K
480 min Winter	11.332	0.999	67.1	2252.8	O K
600 min Winter	11.331	0.996	67.1	2251.5	O K
720 min Winter	11.321	0.986	66.6	2220.8	O K
960 min Winter	11.280	0.945	64.9	2106.4	O K
1440 min Winter	11.178	0.843	60.6	1824.1	O K
2160 min Winter	11.023	0.688	54.2	1425.3	O K
2880 min Winter	10.888	0.553	48.7	1100.3	O K
4320 min Winter	10.672	0.337	40.1	630.8	O K
5760 min Winter	10.522	0.187	34.2	334.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
180 min Winter	26.852	0.0	190
240 min Winter	22.239	0.0	242
360 min Winter	17.061	0.0	322
480 min Winter	14.088	0.0	390
600 min Winter	12.076	0.0	468
720 min Winter	10.605	0.0	544
960 min Winter	8.554	0.0	696
1440 min Winter	6.193	0.0	988
2160 min Winter	4.385	0.0	1404
2880 min Winter	3.403	0.0	1796
4320 min Winter	2.354	0.0	2552
5760 min Winter	1.813	0.0	3248

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 640286 267538 TM 40286 67538
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	5760
Climate Change %	+40

Time Area Diagram

Total Area (ha) 3.701

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.103	12	16	0.360	24	28	0.600	36	40	0.053
4	8	0.534	16	20	0.591	28	32	0.383	40	44	0.051
8	12	0.389	20	24	0.578	32	36	0.053	44	48	0.006

Model Details

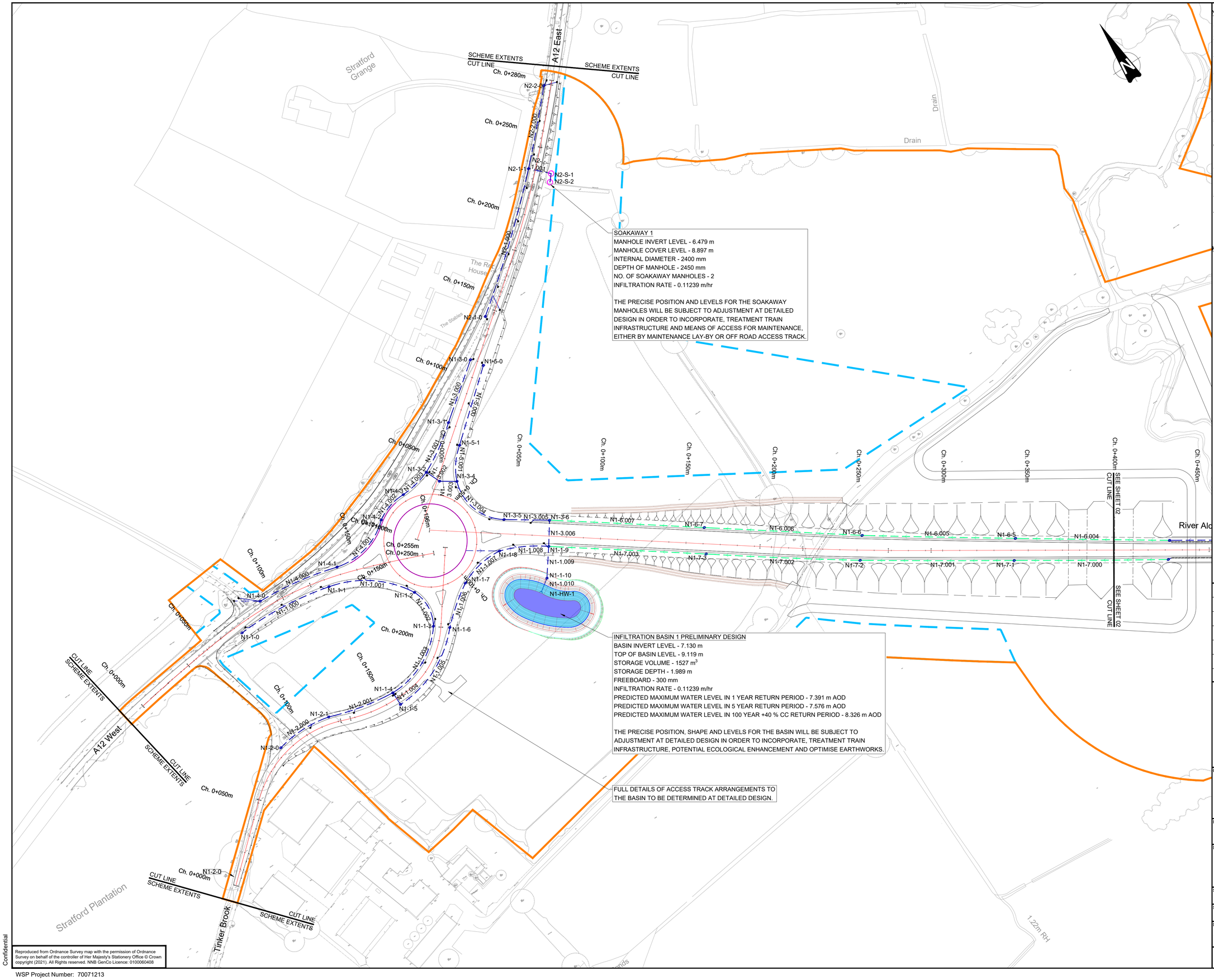
Storage is Online Cover Level (m) 11.760

Infiltration Basin Structure

Invert Level (m) 10.335 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.11592 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.11592

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1287.0	1.425	3001.0

APPENDIX F: DRAINAGE NETWORK LAYOUT WITH HYDRAULIC MODEL LABELS



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Rev.	Date	Description	App'd	Auth'd
P01	05/02/20	First Revision	CR	---

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Client: SZC EDF ENERGY CGN

Project Title: AD3 MAJOR ROAD SCHEMES
AD0320 TWO VILLAGE BYPASS

Drawing Title: PRELIMINARY DESIGN
DRAINAGE HIGHWAYS NETWORK LAYOUT

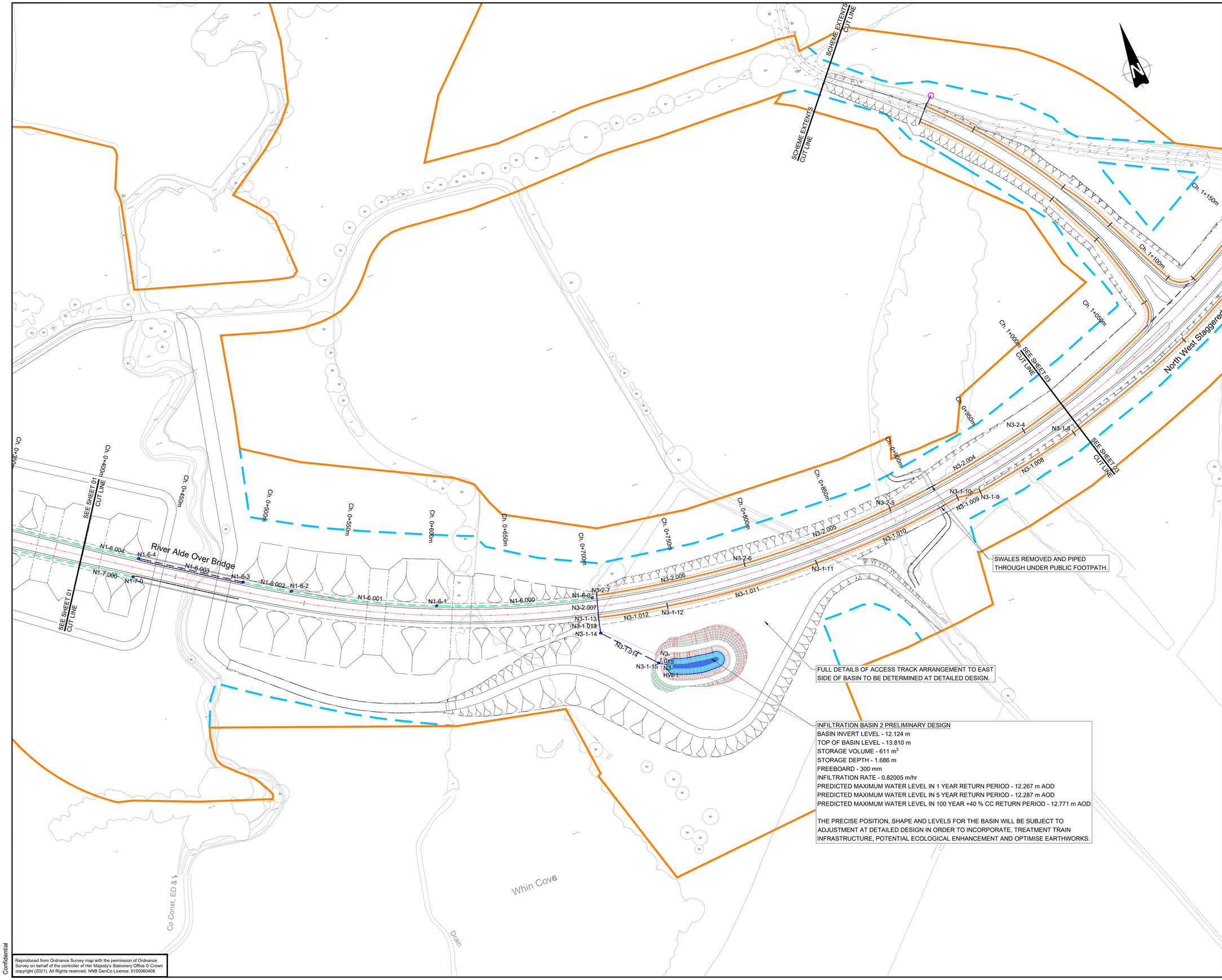
SHEET 01

Scale @ A1	Date	Drawn	Check	Approved	Authorised
1:500	05/02/20	J.Silekar	D.Lord	C.Ritchley	---

Suitability	Status	Stage
S2	Suitable for Information	3

Drawing Number: SZC-AD0320-WSP-TVBHDG-ZZ0000-DRW-HCD-305001
Revision: P01

WSP Project Number: 70071213



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Rev.	Date	Description	App'd	Auth'd
P01	05/02/20	First Revision	CR	---

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wsp.com

Client: SZC EDF ENERGY CGN

Project Title: AD3 MAJOR ROAD SCHEMES
AD0320 TWO VILLAGE BYPASS

Drawing Title: PRELIMINARY DESIGN
DRAINAGE HIGHWAYS NETWORK LAYOUT

SHEET 02

Scale @ A1	Date	Drawn	Check	Approved	Authorised
1:500	05/02/20	J.Silekar	D.Lord	C.Ritchley	---

Suitability	Status	Stage
S2	Suitable for Information	3

Drawing Number: SZC-AD0320-WSP-TVBHDG-ZZ0000-DRW-HCD-305002

Revision: P01

WSP Project Number: 70071213

SCHEME EXTENTS CUT LINE

SCHEME EXTENTS CUT LINE

SOAKAWAY 2
MANHOLE INVERT LEVEL - 15.514 m
MANHOLE COVER LEVEL - 18.109 m
INTERNAL DIAMETER - 1500 mm
DEPTH OF MANHOLE - 2595 mm
NO. OF SOAKAWAY MANHOLES - 1
INFILTRATION RATE - 0.82005 m/hr

THE PRECISE POSITION AND LEVELS FOR THE SOAKAWAY MANHOLES WILL BE SUBJECT TO ADJUSTMENT AT DETAILED DESIGN IN ORDER TO INCORPORATE, TREATMENT TRAIN INFRASTRUCTURE AND MEANS OF ACCESS FOR MAINTENANCE, EITHER BY MAINTENANCE LAY-BY OR OFF ROAD ACCESS TRACK

SEE SHEET 02 CUT LINE

SEE SHEET 04 CUT LINE

CUT LINE SCHEME EXTENTS

CUT LINE SCHEME EXTENTS

North West Staggered Junction

South East Staggered Junction

Ch. 0+850m

Ch. 0+950m

Ch. 1+000m

Ch. 1+050m

Ch. 1+100m

Ch. 1+150m

Ch. 1+200m

Ch. 1+250m

Ch. 1+300m

Ch. 1+350m

Ch. 1+400m

Ch. 1+450m

Ch. 1+500m

Ch. 1+550m

Ch. 1+600m

Ch. 1+650m

N4-2.004 N4-2-4 N4-2-5 N4-S-1 N4-1.005 N4-1.004 N4-1-4 N4-2.003 N4-1.003 N4-2-3 N4-1-3 N4-2.002 N4-1.002 N4-2-2 N4-1-2 N4-2.001 N4-1.001 N4-2.000 N4-2-1 N4-1-1 N4-1.000 N3-2-2 N3-2.003 N3-2-3 N3-1.007 N3-2.002 N3-1-7 N3-1.006 N3-2.001 N3-2-1 N3-2.000 N3-1-6 N3-1.005 N3-1-5 N3-1.004 N3-1-4 N3-1.003 N3-1-3 N3-1.002 N3-1-2 N3-1.001 N3-1-1 N3-1.000 N3-2-0 N5-1-0 N5-1.000 N5-1-1 N5-1.001 N5-1-2 N5-3.000 N5-3-1 N5-3.001 N5-3-2 N5-3.002 N5-3-3 N5-1.002 N5-1-3 N5-1.003 N5-3.003

The Old Vicarage
Tennis Court
Pond
Farnham Manor
Farnham Hall
Hall Cottages
Farnham Barn
Pond Barn
Track
23.9m
Pond

NOTES:

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Rev.	Date	Description	App'd	Auth'd
P01	05/02/20	First Revision	CR	---

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Client: SZC EDF ENERGY CGN

Project Title: AD3 MAJOR ROAD SCHEMES
AD0320 TWO VILLAGE BYPASS

Drawing Title: PRELIMINARY DESIGN
DRAINAGE HIGHWAYS NETWORK LAYOUT

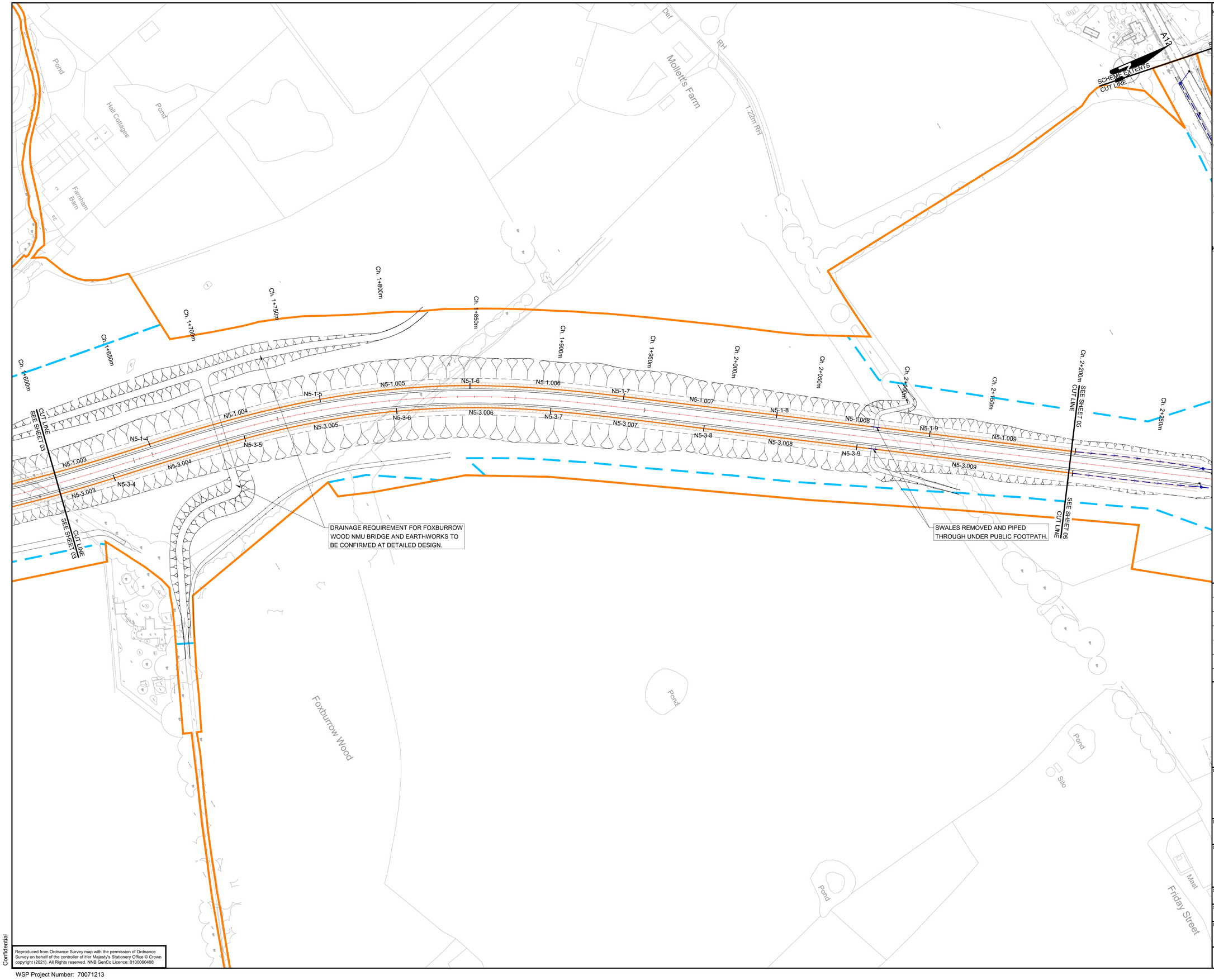
SHEET 03

Scale @ A1	Date	Drawn	Check	Approved	Authorised
1:500	05/02/20	J.Silekar	D.Lord	C.Ritchley	---

Suitability	Status	Stage
S2	Suitable for Information	3

Drawing Number: SZC-AD0320-WSP-TVBHDG-ZZ0000-DRW-HCD-305003
Revision: P01

WSP Project Number: 70071213



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Rev.	Date	Description	App'd	Auth'd
P01	05/02/20	First Revision	CR	---

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Project Title: AD3 MAJOR ROAD SCHEMES
AD0320 TWO VILLAGE BYPASS

Drawing Title: PRELIMINARY DESIGN
DRAINAGE HIGHWAYS NETWORK LAYOUT

SHEET 04

Scale @ A1	Date	Drawn	Check	Approved	Authorised
1:500	05/02/20	J.Silekar	D.Lord	C.Ritchley	---

Suitability	Status	Stage
S2	Suitable for Information	3

Drawing Number	Revision
SZC-AD0320-WSP-TVBHDG-ZZ0000-DRW-HCD-305004	P01

WSP Project Number: 70071213