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ROXBURGH
Consulting Engineers

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Report No: 5861/R1
Rev A - November 2016

PRESTON ROAD,
LONGRIDGE

FLOOD RISK ASSESSMENT

FEBRUARY 2015

Prepared By: **John E Lees B.Sc., C.Eng., M.I.C.E., M.C.I.W.E.M.**

Client: **JWPC Ltd**
18 Waterview
White Cross
Lancaster
LA1 4XS

REPORT DETAILS

Site Name:	Preston Road, Longridge
Report Title:	Flood Risk Assessment
Report Number:	5861/R1

Revision	Date	Status
-	February 2015	For Planning Submission
A	November 2016	For Planning Submission – Amended Layout

Client: JWPC Ltd
18 Waterview
White Cross
Lancaster
LA1 4XS

Client Contact: Stuart Booth

Prepared By: John E Lees B.Sc., C.Eng., M.I.C.E., M.C.I.W.E.M.

CONTENTS

APPENDICES

1.0 INTRODUCTION

1.1 Lees Roxburgh have been instructed by JWPC Limited to carry out a Flood Risk Assessment (FRA) for proposed residential development of land off Preston Road, Longridge.

1.2 This report has been prepared to accompany an outline planning application.

1.3 The site lies within an area designated on EA Flood mapping as Flood Risk Zone 1 and therefore comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year.

1.4 *The National Planning Policy Framework (NPPF)* and the accompanying *Planning Practice Guidance* set out the requirements for addressing flood risk with respect to potential development sites.

In accordance with the NPPF at over 1 hectare in area the site is required to be the subject of an FRA.

1.5 Developers are required to provide an assessment which addresses the following;

- The potential for the proposed development to be affected by flooding either from the development proposal or external sources.
- The potential for the proposed development to increase the flood risk elsewhere.
- That mitigation measures introduced to deal with any risks identified can be successfully managed.
- That the site can be developed and occupied safely.

The NPPF indicates that an assessment of flood risk should be proportionate to the risk and appropriate to the scale, nature and location of the development. This report reflects the requirements of the NPPF in this regard.

2.0 SITE DETAILS

2.1 Location

2.1.1 The site is centred on National Grid references SD59913, 35938 **(Appendix 1)** and comprises a total area of 18.84ha.

2.1.2 The site is situated to the southern outskirts of Longridge some 8km to the north east of Preston city centre.

2.2 Surrounding Land Use and Access

2.2.1 The site is bounded by residential development within Longridge to the north, including the current Miller Homes Development.

2.2.2 The site fronts onto the B6243 Preston Road to the east, from which access to the Miller Homes development is achieved, with open countryside beyond.

To the south and west is open countryside which continues around Longridge to the north.

2.2.3 Three large elevated reservoirs, Alston Reservoir No.1, No.2 and No.3 are located just beyond Preston Road to the north east of the site.

2.2.4 A dismantled railway runs north east to south west about 200m from the site at its closest.

2.2.5 Numerous farms are recorded in the area including Bolton Fold Farm, Daniels Farm and Alston Folds Farm immediately to the south of the site.

2.3 Site Description

2.3.1 The site substantially comprises 6 No. open fields, used as pasture for sheep and cows.

Internal and external field boundaries are generally formed by timber and post/wire fences, reinforced in places with hedges and occasional trees. There are garden fences, as well as post and wire fencing to the boundary of the residential properties to the north of the site.

2.3.2 A high voltage overhead power line cuts across the very northern area of the site and is supported by two pylons within the site area.

Charnley Farm, Fold and Cottage buildings share frontage to Preston Road but lie outside the site area.

2.3.3 There are four ponds recorded within the north west area of the site, although only two of them contained much water at the time of the site visit on 9th October 2014.

2.4 Topography

2.4.1 Ground levels across the site are uniform, falling generally in a south/south westerly direction.

2.4.2 Reference should be made to the topographical survey (**Appendix 2**) but levels can be summarised as follows;

- North east boundary with Preston Road … 83m AOD
- North west boundary… 85m AOD
- South west boundary… 77m AOD
- South east boundary adjacent to Preston Road… 78.5m AOD

2.4.3 Slopes in a north east to south westerly direction average 1 in 86**.**

2.5 Existing Drainage

2.5.1 Numerous minor watercourse systems are recorded in the area, including within the site.

The nearest main river system is Savick Brook located just beyond the dismantled railway to the north west.

The systems within the site generally flow in a south/south westerly direction through Tippings Farm and Dam House Farm before turning westerly towards Savick Brook.

Drainage to the opposite side of Preston Road generally falls in a southerly direction towards Turn Brook.

2.5.2 Within the site, three systems are recorded on OS mapping and have been confirmed on site.

2.5.3 Much of the site's western boundary is formed by a deep ditch which commences with two separate surface water outfalls from the Longridge housing development at the northern site boundary. This ditch system collects a new 225mm diameter outfall from the Miller Housing development which crosses the site before joining with a second ditch system which crosses the site from northeast to southwest. This latter ditch commences with a 300mm outfall pipe close to the site boundary with properties associated with Grimbledeston Farm.

2.5.4 Close to the south eastern site boundary, and running parallel with the Preston Road frontage, a short section of drain issues just south of Charnley Cottage before sinking in what appears to be a south easterly culvert direction. No obvious outfall for this culverted system was located within, or adjacent to the site, on the opposite side of Preston Road. It is presumed to connect with Turn Brook beyond Bolton Fold Farm.

2.5.5 A manhole was noted in Preston Road providing some evidence of a highway drainage system.

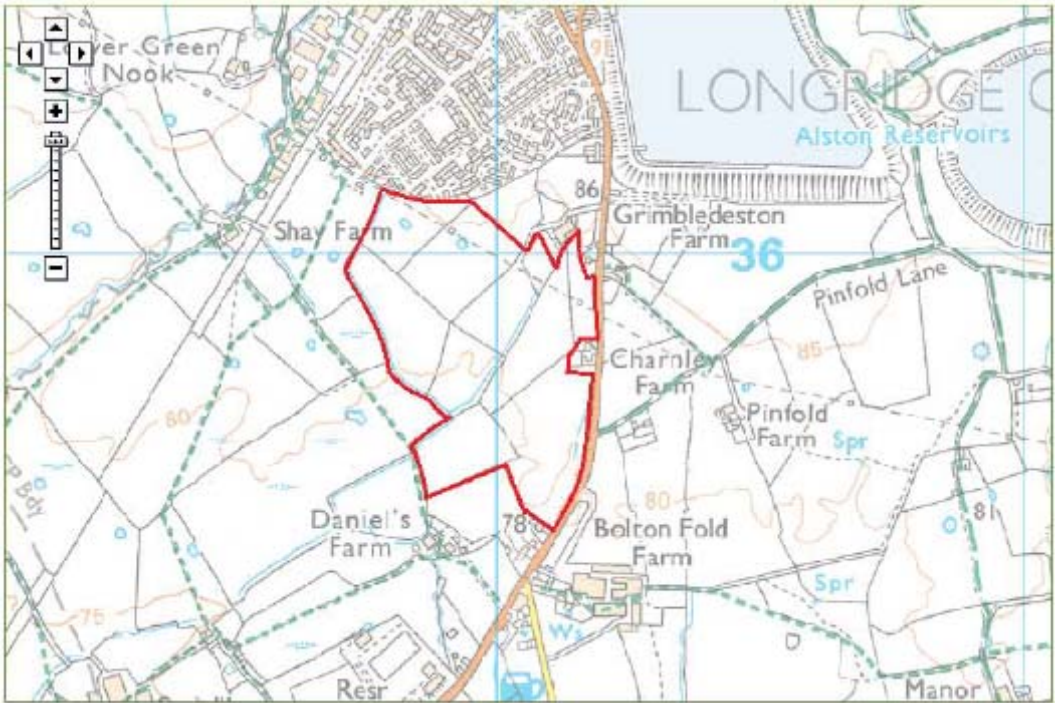
2.6 Development Proposals

2.6.1 The development proposals comprise up to 275 No. houses and are incorporated in **Appendix 5.**

3.0 FLOOD RISK

3.1 Environment Agency Flood Map

3.1.1 Reference to the Environment Agency Flood Map **(Figure. 1)** indicates that the existing site is situated within a Flood Zone 1 Area of flood risk. This is land defined within the NPPF as land assessed as having a less than 1 in 1000 annual probability of flooding. All uses of land are appropriate in this zone.



Risk of Flooding from Rivers and Sea

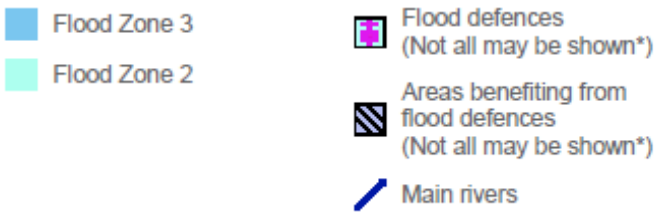


Figure 1: Environment Agency Flood Mapping

3.2 Sequential and Exception Tests

3.2.1 The proposed development is situated within a Flood Zone 1 Risk Area. On this basis, the Sequential and Exception Tests as set out in NPPF are not applicable.

3.3 Sources of Flood Risk

3.3.1 Water Bodies and Watercourse Systems

3.3.1.1 Grimsargh Reservoirs are situated well below site level and do not present a source of risk to the development.

The Alston Reservoirs are operated and managed by United Utilities and as such will be subject to regular inspection and maintenance to ensure no overtopping or risk of breach.

On this basis it is concluded that the risk of flooding from water bodies can be discounted.

3.3.1.2 The nearest main watercourse system is Savick Brook to the west and which flows away from the site and is not viewed as presenting a source of flood risk. This is confirmed by reference to EA mapping.

As noted, there are minor watercourse systems within the site, the risk of flooding from which will need to be considered.

3.3.2 **Existing Sewers and Drainage**

3.3.2.1 Copies of United Utilities public sewer records have been obtained and identify the presence of adopted drainage infrastructure in the area of the site. These records have been incorporated in **Appendix 3.**

3.3.2.2 Reference to the public sewer records indicates the following;

- Generally, foul, combined and surface water systems within the development to the north.

  The records here are incomplete.

  Foul (375mm diameter) and surface water systems (675mm diameter) exit the development to the north from Thirlmere Drive, cutting into the north west corner of the site.

  The surface water system outfalls into the boundary watercourse with the foul system continuing as combined to just beyond the dismantled railway before turning south westerly.

- A 300mm diameter abandoned sewer is also recorded extending down from the residential development and cutting across the western extremity of the site.

- No systems are recorded in Preston Road.

3.3.2.3 Information for the drainage from the Miller development has been obtained **(Appendix 3B).**

This identifies;

- Foul drainage draining to a new pumping station at the southern limit of the development, immediately adjacent to the northern site boundary with a rising main running along the boundary and understood to be connecting into (but not shown as such) the public system described above as it leaves Thirlmere Drive.

- Surface water gravity sewer cutting north east to south west across this development site and outfalling into the watercourse at the southern boundary with flows restricted to 15 litres/sec.

3.3.2.4 Reference to United Utilities has not identified any flooding issues associated with the public systems although their presence within the site needs to be taken into account within the development proposals.

3.3.3 **Land Drainage and Groundwater**

3.3.3.1 The site appeared generally well drained with the presence of four ponds noted.

3.3.3.2 On this basis, land drainage and groundwater issues will need to be considered by this FRA but none are anticipated which cannot be dealt with as part of the normal design and construction process.

3.3.4 **Comment**

3.3.4.1 On the basis of the assessment of the potential sources of flood risk described above, it is concluded that the risks associated with the following need to the addressed by this FRA;

- Minor watercourse systems within the site and along the site boundary

- Development drainage proposals

- Land drainage

4.0 SURFACE WATER RUNOFF

4.1 Requirements for Surface Water Drainage of the Site

4.1.1 The NPPF recommends that surface water generated by the development site should, as far as is practicable, be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development.

4.1.2 Proposals should ensure that volumes and peak flow rates of surface water leaving the developed site are no greater than those prior to development, reducing surface water run off where possible and taking climate change into consideration.

4.2 Site Area

4.2.1 Within the overall site area the developable area comprises 11.06 ha.

4.3 Existing Site Run Off

4.3.1 The existing site is greenfield.

4.3.2 Existing greenfield run off rates have been calculated based on the HR Wallingford greenfield runoff estimation method for the developable area, (**Appendix 4**) and these are as follows;

- Q_{bar} … 93.7 litres/sec
- Q_{1}… 81.5 litres/sec
- Q_{30}… 159.3 litres/sec
- Q_{100}… 195.0 litres/sec

4.4 Surface Water Run Off from the Developed Site

4.4.1 The development plan is incorporated in **Appendix 5.**

4.4.2 Uncontrolled flows from the development will significantly exceed greenfield run off rates. For the purposes of this FRA, it is considered that development run off rates limited to the greenfield run off rates identified in 4.3.2 would be appropriate.

4.5 Comment

4.5.1 A Phase 1 Geoenvironmental Site Assessment has been undertaken by REC and has identified that the site is underlain by clay. On this basis, ground conditions will not favour a ground percolation based drainage solution.

Should site investigation works identify the potential for some ground infiltration capability, this will be assessed at a more detailed design stage. Meanwhile, a positive surface water outfall from the development is required.

4.5.2 Levels within the proposed development area fall towards the watercourse system to the south which accommodates flows from the main systems running along the site boundary and within the site.

4.5.3 It is therefore proposed to connect the surface water drainage system into these systems, thus capturing and controlling surface water discharge from the development.

5.0 FLOOD MITIGATION MEASURES

5.1 Existing Ditch Systems

5.1.1 There are two existing ditch systems one running along the west boundary and one running through the centre of the site, both outfalling into a single system to the south west.

There is also a third system just within the Preston Road boundary which outfalls to the south east.

5.1.2 The western boundary system receives surface water from the development to the north.

The source of flows into the central system appear limited with flows from the current Miller development being directed through the site area to the watercourse system to the south.

5.1.3 Development levels will be set to ensure flows are safely directed through the development to the downstream watercourse system, and therefore not a source of flood risk (also note 5.2.2). Where required, channel improvement works and maintenance will be undertaken.

5.1.4 Measures will similarly be undertaken to the system which runs close to the Preston Road frontage.

5.2 Drainage Development Proposals

5.2.1 It is proposed to connect the Miller Homes outfall (flows limited to 15 litres/sec) into the development system.

5.2.2 Flows from the development will be connected into the existing ditch system to the south of the site with flows limited to the greenfield runoff rates identified in 4.3.2. This will be achieved by the incorporation of complex control arrangements to ensure that flows are contained, so as not to exceed the greenfield runoff rates for the equivalent storm event, plus 15 litres/sec from Miller Homes for all events.

The on site piped systems will be designed to accommodate flows up to the 1 in 30 year event and will be proposed for adoption by United Utilities. These systems will connect into two attenuation basins within the southern area of the site.

Overall flows up to the 1 in 100 year event plus climate change allowance will be accommodated onsite within the attenuation basins, and by appropriate setting of development levels prior to discharge off site, all subject to design development.

5.2.3 It is anticipated some raising of site levels may be required to achieve a gravity drainage solution.

More generally, development levels will also be set in accordance with good design practice and will therefore further mitigate against any risk of associated flooding of properties.

The drainage strategy is incorporated in **Appendix 5.**

5.3 Land Drainage

5.3.1 Where required, land drainage will be provided to ensure residual flows are safely conveyed through the development utilising the existing ditch system wherever practicable.

5.3.2 Development of itself will reduce uncontrolled land drainage run off from the site area.

6.0 CONCLUSIONS

6.1 The FRA has identified that the site lies in an area of Zone 1 Flood Risk.

6.2 Setting of development levels will ensure that flows within the existing ditch systems both to the boundary and within the site will be safely conveyed through the development.

6.3 It is proposed to pick up the Miller Homes system (restricted flow 15 litres/sec) and connect surface water drainage into the existing surface water system with flows limited to greenfield run off rates, plus 15 litres/sec, thus mimicking existing run off in accordance with the NPPF.

6.4 The proposed pipe drainage systems will be designed to accommodate a 1 in 30 year event. The systems will be put forward for adoption by United Utilities who will therefore become responsible for the long term maintenance of the new drainage systems.

The pipe systems will connect into two attenuation basins located in the southern area of the site from which flows will be restricted to the proposed rates. Overall the drainage system including the basins and appropriate setting of development levels will accommodate flows generated by up to the 1 in 100 year event plus allowance for climate change.

Private drainage (i.e. not adoptable) serving houses within the development will be designed to current building standards.

6.5 Where required, land drainage will be introduced to pick up residual land drainage flows.

6.6 It is therefore concluded that this FRA has demonstrated in accordance with the NPPF that the development is not at risk of flooding from external sources, will not increase flood risk associated with the development and its environment and is therefore appropriate.

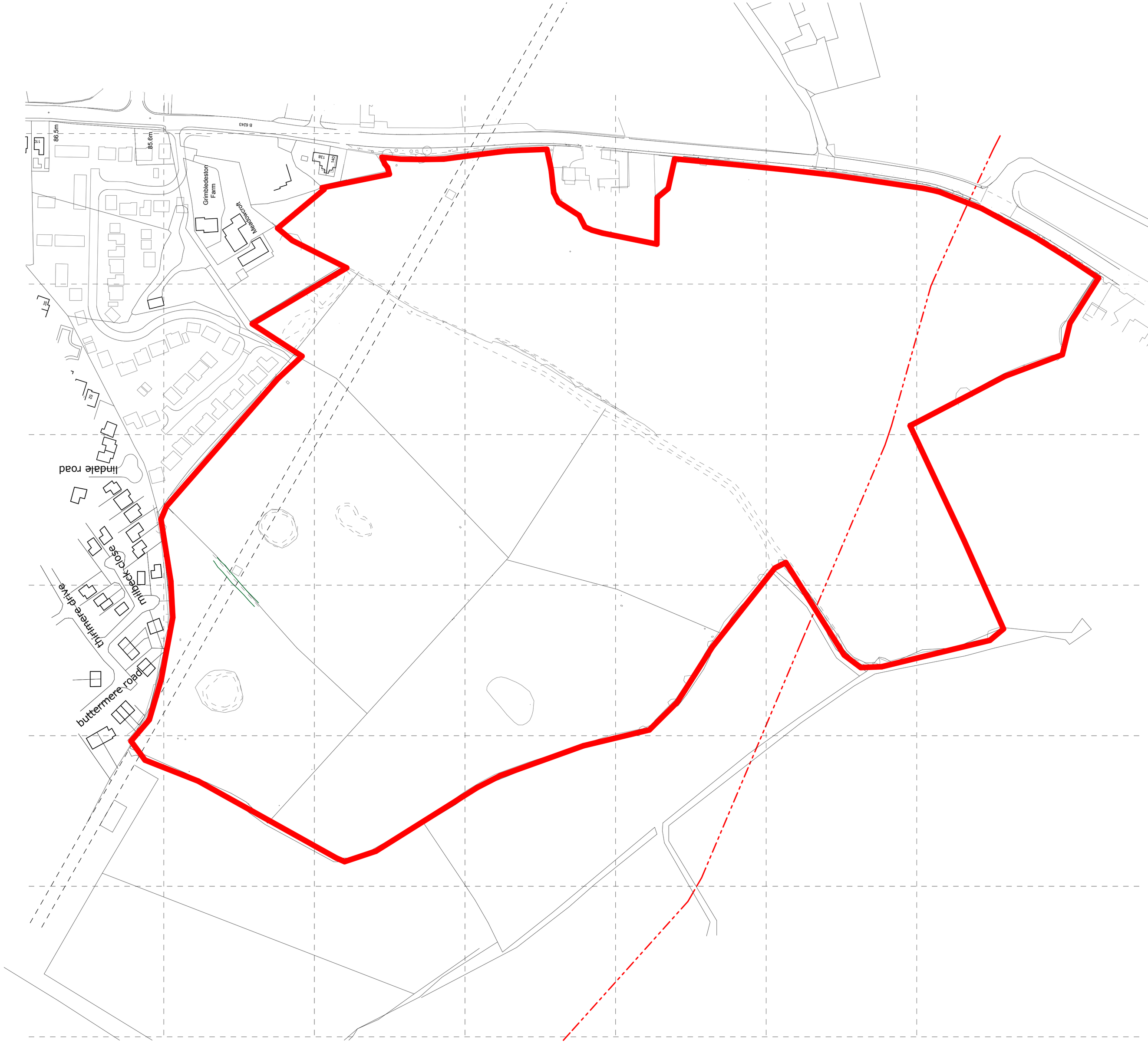
APPENDIX 1

SITE LOCATION

APPENDIX 1A

Location Plan

revisions:



OS PLAN

North

0 10 20 30 40 50 60 70 80 90 100m

scale 1:1250

campbell driver partnership

architects designers surveyors

client: grimbaldeston farm trustees/s+n forshaw

project: residential development

preston road longridge

sheet: OS plan

dwg no:	10.192	11	

scale: 1:1250 @ A1

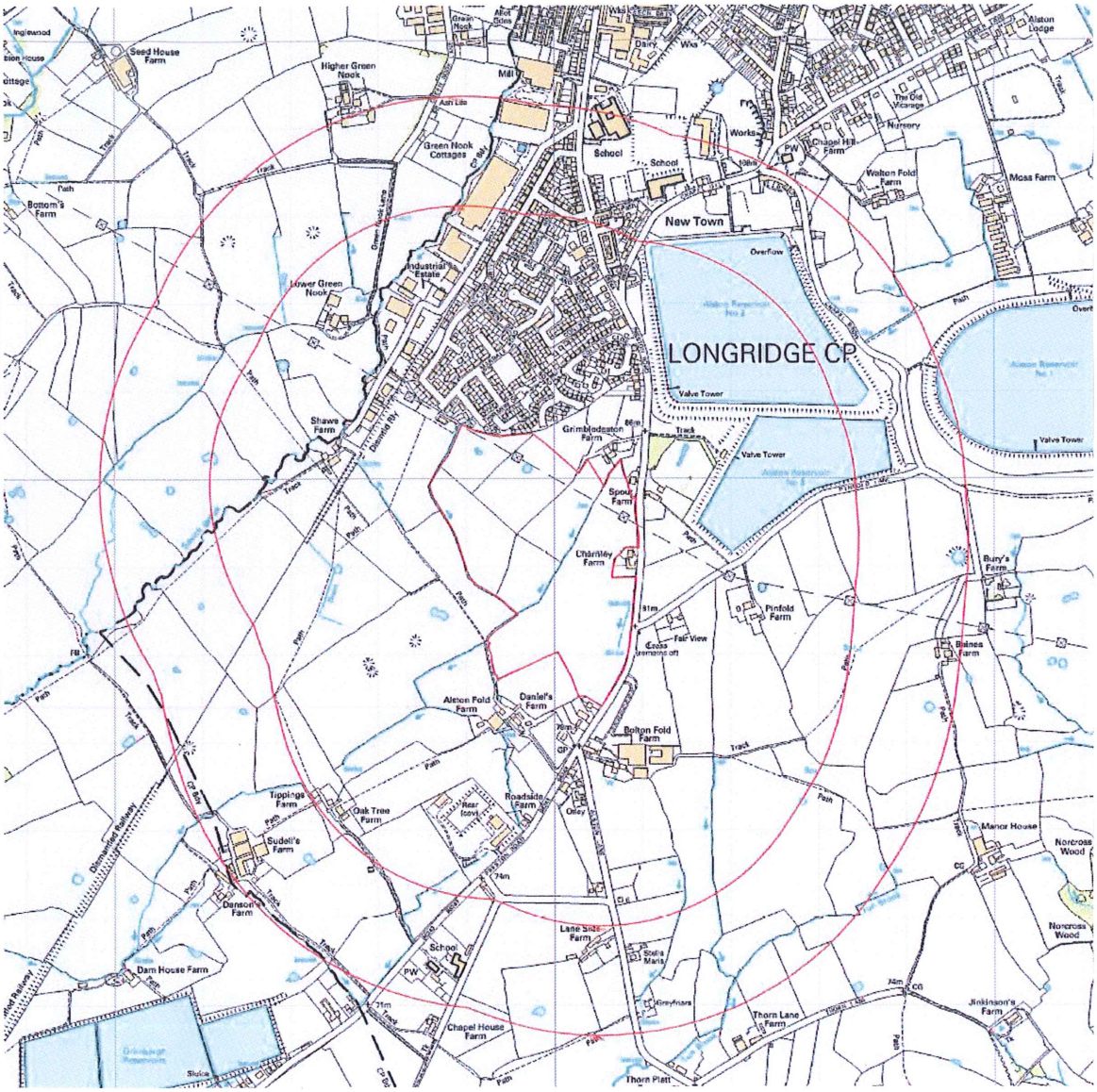
date: 25.02.2015

drawn: cn

capricorn park
blakewater road
blackburn bb1 5qr
t: 01254 297700
f: 01254 297701
email: design@cdparchitects.co.uk

APPENDIX 1B

Watercourse Systems



WATERCOURSE SYSTEMS **1:10,000**	**PRESTON ROAD,** **LONGRIDGE**	

APPENDIX 2

TOPOGRAPHICAL SURVEY
Tri CAD Solutions Ltd Ref. TRI-1192-01

APPENDIX 3

EXISTING DRAINAGE

APPENDIX 3A

United Utilities Public Sewer Records

Property Searches
Ground Floor Grasmere House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP

DX 715568 Warrington
Telephone 0870 751 0101

Fax Number 0870 7510102

Your Ref: 5861
Our Ref: 14/ 1053706
Date: 26/09/2014

Dear Sirs

I acknowledge with thanks your request dated 24/09/14 for information on the location of our services.

Please find enclosed plans showing the approximate position of our apparatus known to be in the vicinity of this site.
I attach General Condition Information sheets, which details contact numbers for additional services (i.e. new supplies, connections, diversions) which we are unable to deal with at this office. In addition you should ensure they are made available to anyone carrying out any works which may affect our apparatus.

I trust the above meets with you requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please telephone us on 0870 7510101.

Yours Faithfully,

S McManus.

Sue McManus
Operations Manager
Property Searches

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUW apparatus) of United Utilities Water PLC ("UUW").

1. This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.

2. This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.

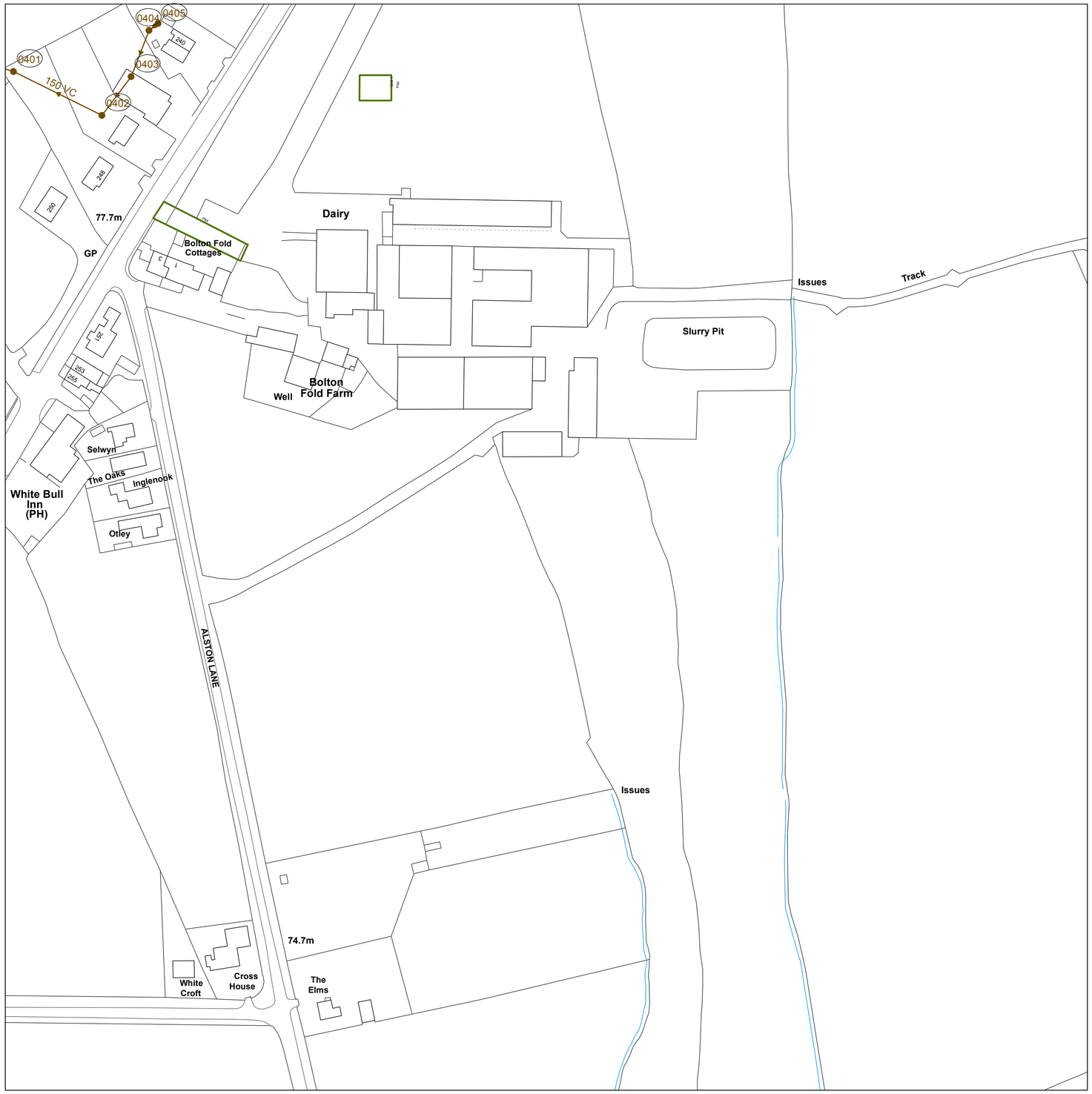
3. In particular, the position and depth of any UUW apparatus shown on the Map are approximate only. UUW strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUW apparatus. The exact location, positions and depths should be obtained by excavation trial holes.

4. The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.

5. The position and depth of UUW apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.

6. This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUW apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.

7. No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUW apparatus by reason of the actual position and/or depths of UUW apparatus being different from those shown on the Map and any information supplied with it.



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0404	78.45	FO	77.69	150		CI	VC	22.87	
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Refno	Cover	Func	Invert	Size.x	Size.y	Shape	Matl	Length	Grad

OS Sheet No: SD6035SW

Scale: 1: 1250 Date: 24/09/2014

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WASTE WATER SYMBOLOGY

Foul Surface Combined Overflow

Manhole
Manhole, Side Entry
MainSewer, Public
MainSewer, Private
MainSewer, S104
Rising Main, Public
Rising Main, Private
Rising Main, S104
Highway Drain, Private

Foul Surface Combined

WW Site Termination
Air Valve
Cascade
Non Return Valve
Extent of Survey
Flow Meter
Gulley
Hatch Box
Head of System
Hydrobrake / Vortex
Inlet
Inspection Chamber
Bifurcation
Catchpit
Contaminated Surface Water
WW Pumping Station
Sludge Pumping Station
Sewer Overflow
T Junction/Saddle
LampHole
OilInterceptor
PenStock
Pump
RoddingEye
Soakaway
Summit
Valve
Valve Chamber
Washout Chamber
DropShaft
WW Treatment Works
Septic Tank
Vent Column
Network Storage Tank
Orifice Plate
Vortex Chamber
Penstock Chamber
Blind Manhole

Foul Surface Combined Overflow

Screen Chamber
Discharge Point
Outfall

Control Kiosk
Unspecified

Sludge Main, Public
Sludge Main, Private
Sludge Main, S104

ABANDONED PIPE

MainSewer
Rising Main
Highway Drain
Sludge Main

LEGEND

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement	DI	Ductile Iron
BR	Brick	PVC	Polyvinyl Chloride
PE	Polyethylene	CI	Cast Iron
RP	Reinforced Plastic Matrix	SI	Spun Iron
CO	Concrete	ST	Steel
CSB	Concrete Segment Bolted	VC	Vitrified Clay
CSU	Concrete Segment Unbolted	PP	Polypropylene
CC	Concrete Box Culverted	PF	Pitch Fibre
PSC	Plastic/Steel Composite	MAC	Masonry, Coursed
GRC	Glass Reinforced Concrete	MAR	Masonry, Random
GRP	Glass Reinforced Plastic	U	Unspecified

OS Sheet No: SD6035SW

Scale: 1: 1250 Date: 24/09/2014

5 Nodes

Sheet 1 of 1

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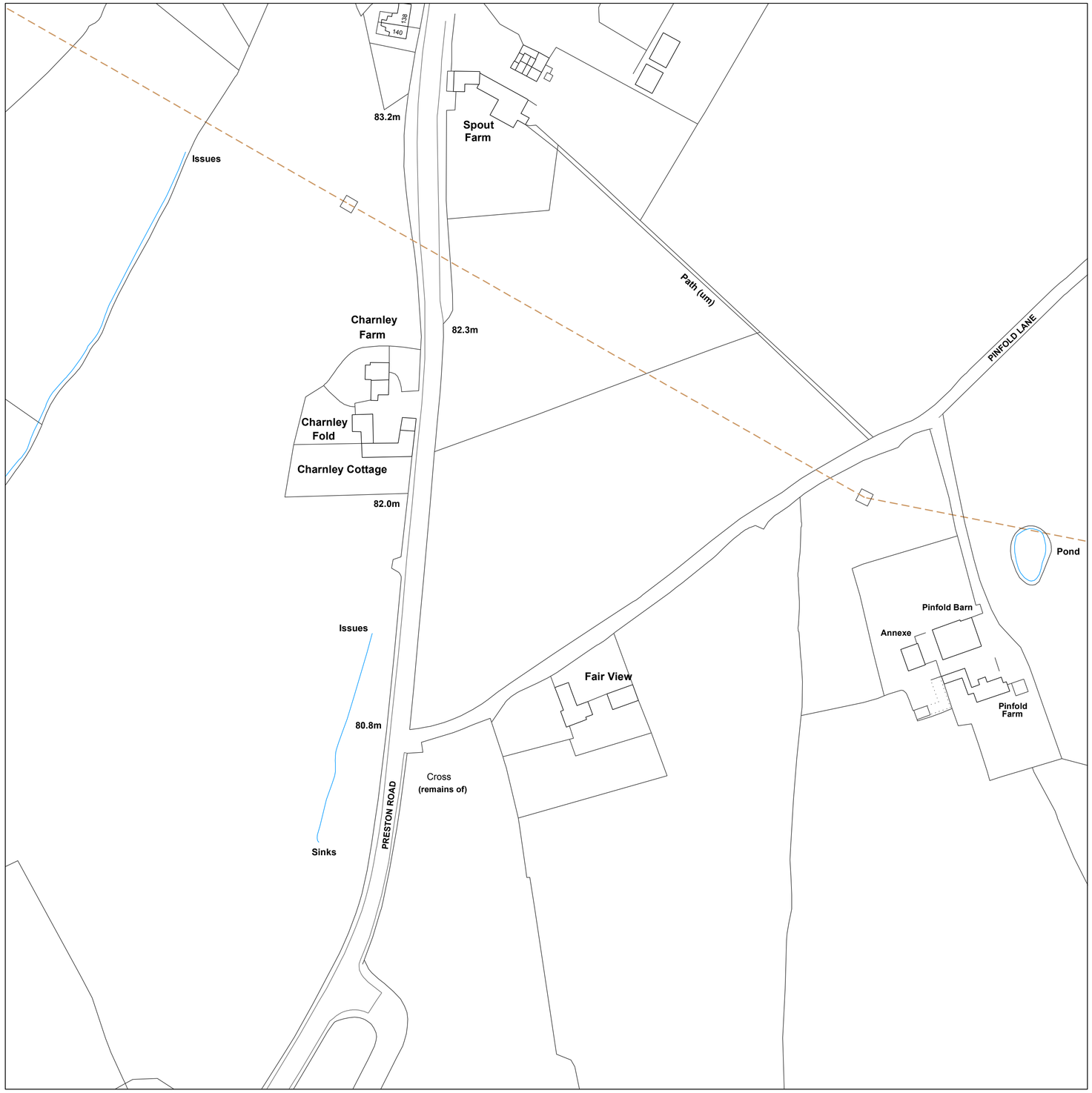
SEWER RECORDS



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OS Sheet No: SD6035NW

Scale: 1: 1250 Date: 24/09/2014

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WASTE WATER SYMBOLOGY

Foul Surface Combined Overflow

- Manhole
- Manhole, Side Entry
- MainSewer, Public
- MainSewer, Private
- MainSewer, S104
- Rising Main, Public
- Rising Main, Private
- Rising Main, S104
- Highway Drain, Private

Foul Surface Combined

- WW Site Termination
- Air Valve
- Cascade
- Non Return Valve
- Extent of Survey
- Flow Meter
- Gulley
- Hatch Box
- Head of System
- Hydrobrake / Vortex
- Inlet
- Inspection Chamber
- Bifurcation
- Catchpit
- Contaminated Surface Water
- WW Pumping Station
- Sludge Pumping Station
- Sewer Overflow
- T Junction/Saddle
- LampHole
- OilInterceptor
- PenStock
- Pump
- RoddingEye
- Soakaway
- Summit
- Valve
- Valve Chamber
- Washout Chamber
- DropShaft
- WW Treatment Works
- Septic Tank
- Vent Column
- Network Storage Tank
- Orifice Plate
- Vortex Chamber
- Penstock Chamber
- Blind Manhole

Foul Surface Combined Overflow

- Screen Chamber
- Discharge Point
- Outfall

- Sludge Main, Public
- Sludge Main, Private
- Sludge Main, S104

ABANDONED PIPE

- MainSewer
- Rising Main
- Highway Drain
- Sludge Main

- Control Kiosk
- Unspecified

LEGEND

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement	DI	Ductile Iron
BR	Brick	PVC	Polyvinyl Chloride
PE	Polyethylene	CI	Cast Iron
RP	Reinforced Plastic Matrix	SI	Spun Iron
CO	Concrete	ST	Steel
CSB	Concrete Segment Bolted	VC	Vitrified Clay
CSU	Concrete Segment Unbolted	PP	Polypropylene
CC	Concrete Box Culverted	PF	Pitch Fibre
PSC	Plastic/Steel Composite	MAC	Masonry, Coursed
GRC	Glass Reinforced Concrete	MAR	Masonry, Random
GRP	Glass Reinforced Plastic	U	Unspecified

OS Sheet No: SD6035NW
Scale: 1: 1250 Date: 24/09/2014
0 Nodes
Sheet 1 of 1

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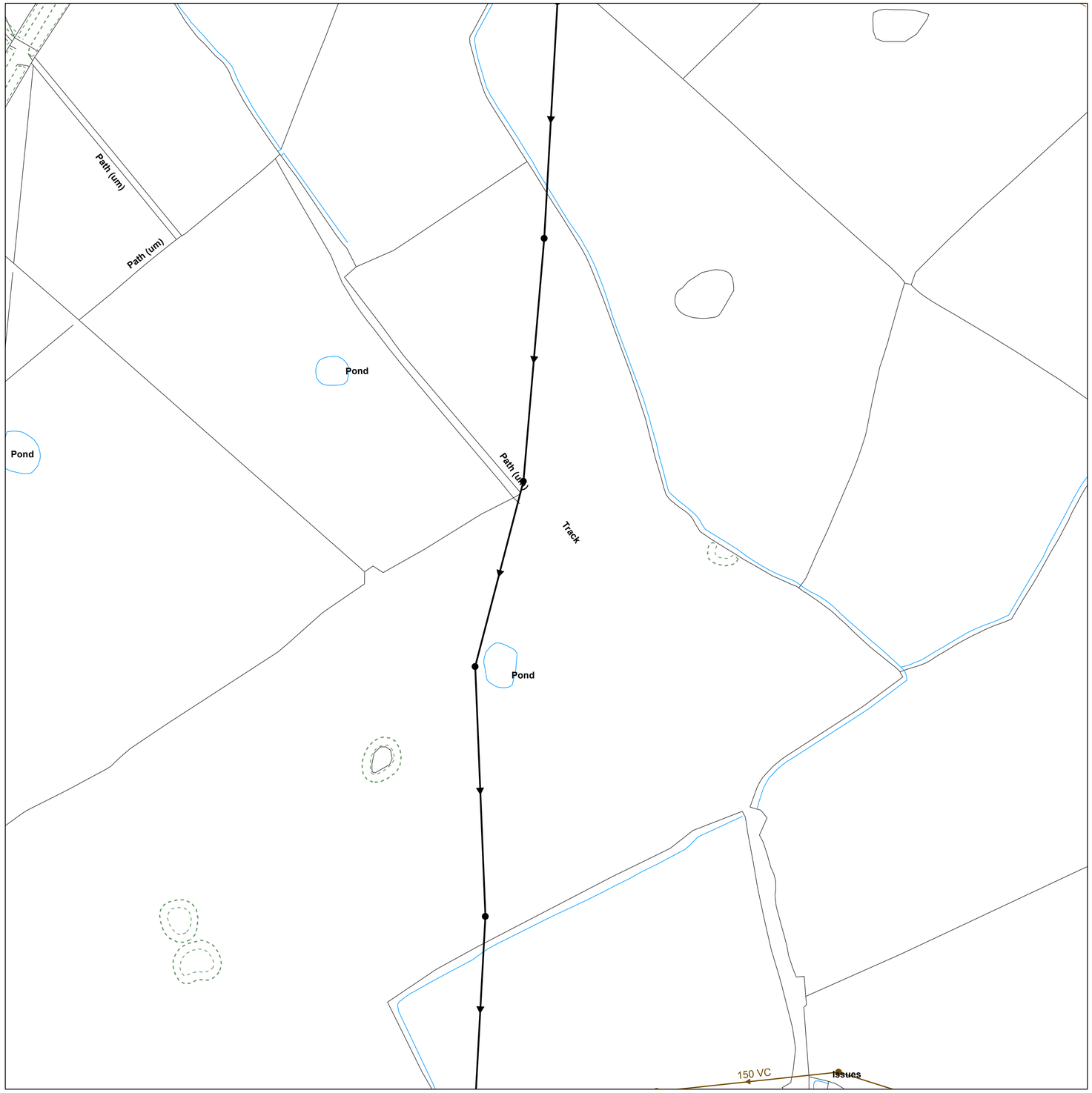
SEWER RECORDS



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7501		FO																	
7601		FO																	
7701		FO																	
7801		FO																	

OS Sheet No: SD5935NE

Scale: 1: 1250 Date: 24/09/2014

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WASTE WATER SYMBOLOGY

Foul | Surface | Combined | Overflow

- Manhole
- Manhole, Side Entry
- MainSewer, Public
- MainSewer, Private
- MainSewer, S104
- Rising Main, Public
- Rising Main, Private
- Rising Main, S104
- Highway Drain, Private

Foul | Surface | Combined

- WW Site Termination
- Air Valve
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- Inlet
- Inspection Chamber
- Bifurcation
- Catchpit
- Contaminated Surface Water
- WW Pumping Station
- Sludge Pumping Station
- Sewer Overflow
- TJunction/Saddle
- LampHole
- OilInterceptor
- PenStock
- Pump
- RoddingEye
- Soakaway
- Summit
- Valve
- Valve Chamber
- Washout Chamber
- DropShaft
- WW Treatment Works
- Septic Tank
- Vent Column
- Network Storage Tank
- Orifice Plate
- Vortex Chamber
- Penstock Chamber
- Blind Manhole

Foul | Surface | Combined | Overflow

- Screen Chamber
- Discharge Point
- Outfall

- Control Kiosk
- Unspecified

- Sludge Main, Public
- Sludge Main, Private
- Sludge Main, S104

ABANDONED PIPE

- MainSewer
- Rising Main
- Highway Drain
- Sludge Main

LEGEND

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement	DI	Ductile Iron
BR	Brick	PVC	Polyvinyl Chloride
PE	Polyethylene	CI	Cast Iron
RP	Reinforced Plastic Matrix	SI	Spun Iron
CO	Concrete	ST	Steel
CSB	Concrete Segment Bolted	VC	Vitrified Clay
CSU	Concrete Segment Unbolted	PP	Polypropylene
CC	Concrete Box Culverted	PF	Pitch Fibre
PSC	Plastic/Steel Composite	MAC	Masonry, Coursed
GRC	Glass Reinforced Concrete	MAR	Masonry, Random
GRP	Glass Reinforced Plastic	U	Unspecified

The position of underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available.
The actual positions may be different from those shown on
the plan and private pipes, sewers or drains may not be recorded.
United Utilities will not accept any liability for any damage caused by the actual positions being different from those shown.

OS Sheet No: SD5935NE
Scale: 1: 1250 Date: 24/09/2014
5 Nodes
Sheet 1 of 1

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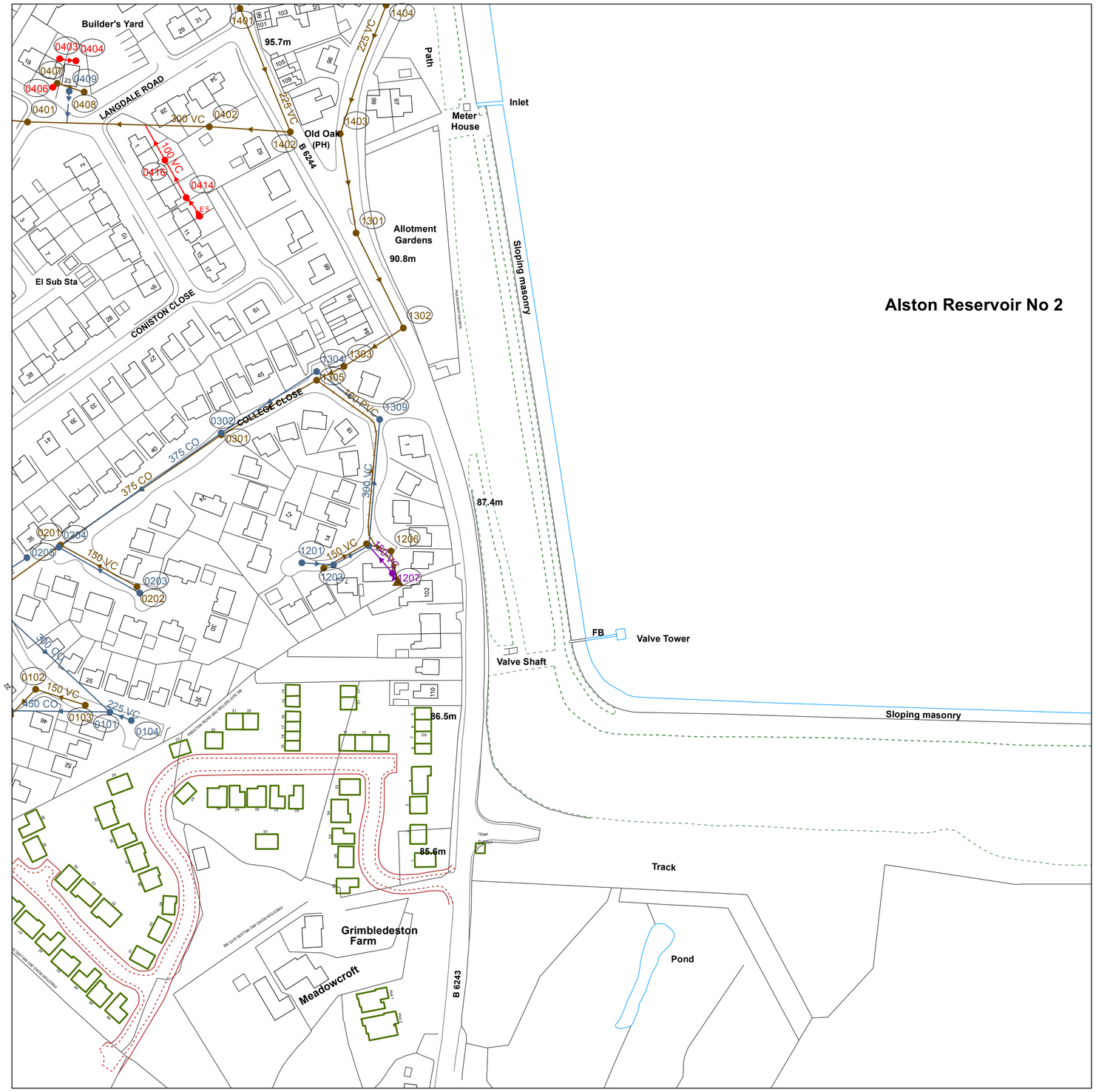
SEWER RECORDS



Alston Reservoir No 2

Refno	Cover	Func	Invert	Size.x	Size.y	Shape	Matl	Length	Grad
0101	86.48	SW							
0102		FO							
0103	86.21	FO	85.53	150		CI	VC	24.16	
0104	85.95	SW	85.17	225		CI	VC	10.71	40
0201	86.37	FO							
0202		FO	0	150		CI	VC	40.28	
0203	87.01	SW	86.39	225		CI	VC	43.12	37
0204	87.85	SW							
0205		SW	0	450		CI	CO	26.87	
0301	86.22	FO	83.97	375		CI	CO	90.21	1002
0302	88.4	SW	84.53	375		CI	CO	92.02	188
0401	93.85	FO	90.66	375		CI	VC	46.81	360
0402	94.29	FO	90.95	300		CI	VC	84.26	351
0403		CO							
0404		CO							
0406		CO							
0407		FO		0		CI	VC	13.16	
0408		FO							
0409		SW							
0414		CO							
0416		CO		100		CI	VC	18.61	
1201	86.95	SW	85.61	225		CI	VC	14.71	105
1202		FO	0	150		CI	VC	22.74	
1203	86.94	SW							
1204	87.19	SW							
1205		FO							
1206	87.36	FO							
1207		CV							
1301	91.17	FO	88.62	375		CI	CO	49.15	45
1302	89.78	FO	87.53	375		CI	CO	32.69	78
1303	89.6	FO	87.09	375		CI	CO	14.25	89
1304	89.48	SW	84.93	300		CI	VC	52.6	159
1305	89.24	FO							
1309	88.14	SW							
1401	96.49	FO							
1402	93.19	FO							
1403	92.94	FO							
0405		CO							
0411		SW							
0413		CO		100		CI	VC	5.84	
1405		FO	91.67	375		CI	CO	31.98	27
0410		FO							
0415		FO							
1208		FO	0			CI	PVC	5.12	

WASTE WATER SYMBOLOGY

Foul Surface Combined Overflow

Manhole
Manhole, Side Entry
MainSewer, Public
MainSewer, Private
MainSewer, S104
Rising Main, Public
Rising Main, Private
Rising Main, S104
Highway Drain, Private

Foul Surface Combined

WW Site Termination
Air Valve
Cascade
Non Return Valve
Extent of Survey
Flow Meter
Gulley
Hatch Box
Head of System
Hydrobrake / Vortex
Inlet
Inspection Chamber
Bifurcation
Catchpit
Contaminated Surface Water
WW Pumping Station
Sludge Pumping Station
Sewer Overflow
TJunction/Saddle
LampHole
OilInterceptor
PenStock
Pump
RoddingEye
Soakaway
Summit
Valve
Valve Chamber
Washout Chamber
DropShaft
WW Treatment Works
Septic Tank
Vent Column
Network Storage Tank
Orifice Plate
Vortex Chamber
Penstock Chamber
Blind Manhole
Foul Surface Combined Overflow
Screen Chamber
Discharge Point
Outfall
Control Kiosk
Unspecified

Sludge Main, Public
Sludge Main, Private
Sludge Main, S104

ABANDONED PIPE
MainSewer
Rising Main
Highway Drain
Sludge Main

LEGEND

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

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BR	Brick	PVC	Polyvinyl Chloride
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CO	Concrete	ST	Steel
CSB	Concrete Segment Bolted	VC	Vitrified Clay
CSU	Concrete Segment Unbolted	PP	Polypropylene
CC	Concrete Box Culverted	PF	Pitch Fibre
PSC	Plastic/Steel Composite	MAC	Masonry, Coursed
GRC	Glass Reinforced Concrete	MAR	Masonry, Random
GRP	Glass Reinforced Plastic	U	Unspecified

OS Sheet No: sd6036sw
Scale: 1: 1250 Date: 26/09/2014
44 Nodes
Sheet 1 of 1

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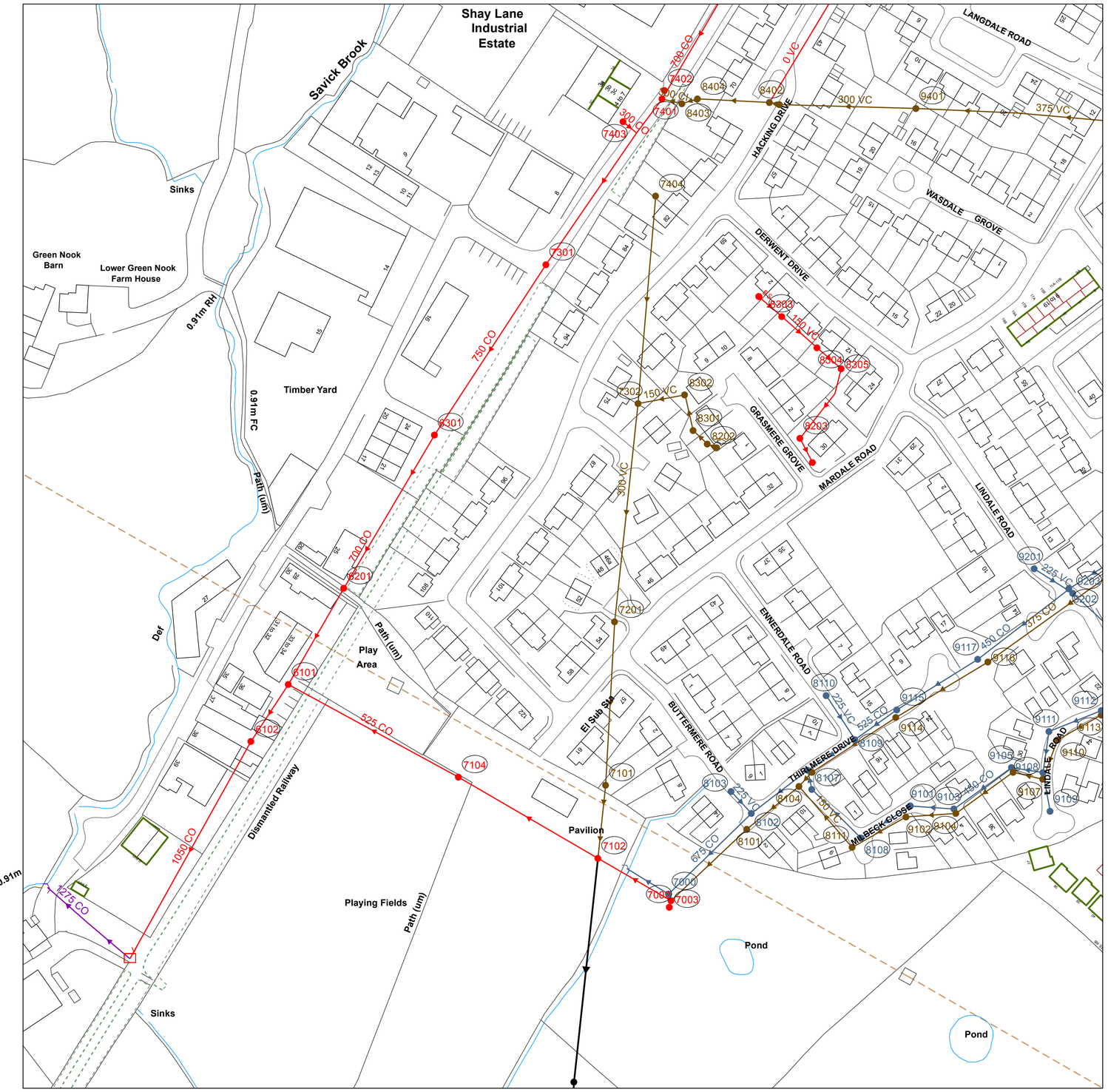
SEWER RECORDS

Printed By: Gareth Hindley

OS Sheet No: sd6036sw

Scale: 1: 1250 Date: 26/09/2014



Refno	Cover	Func	Invert	Size.x	Size.y	Shape	Matl	Length	Grad
6101	84.83	CO	81.75	1050		CI	CO	31.56	
6102		CO	0	1050		CI	CO	115.21	
6201		CO							
6301	86.38	CO	83.95	750		CI	CO	40.85	
7000	84.67	SW	83.53	675		CI	CO	22.66	1133
7002		CO							
7003	84.46	CO							
7101	84.89	FO	83.34	300		CI	VC	15.99	89
7102	84.4	CO							
7104	84.42	CO							
7201	85.82	FO	84.39	300		CI	VC	75.76	74
7301	87.81	CO	86.17	750		CI	CO	94.34	43
7302	87.58	FO							
7401	91.21	CO							
7402	91.25	CO							
7403	90.48	CO	87.77	300		CI	CO	8.13	
7404		FO	0	300		CI	VC	96.38	
8101	85.36	FO	83.17	375		CI	CO	48.26	179
8102	85.49	SW							
8103	85.24	SW	84.15	225		CI	VC	13.88	278
8104	85.57	FO	83.34	375		CI	CO	31.21	195
8105	85.68	SW	83.7	675		CI	CO	32.85	411
8106	85.63	FO	83.38	375		CI	CO	8.97	224
8107	85.41	SW	83.91	450		CI	CO	9.02	451
8108	85.55	SW	84.01	450		CI	CO	32.08	356
8109	85.88	SW							
8110	85.96	SW	84.33	225		CI	VC	24.34	135
8111		FO	0	150		CI	VC	37.46	
8202		FO		150		CI	VC	9.05	
8203		CO							
8204		CO							
8301		FO							
8302		FO		150		CI	VC	21.94	
8303		CO							
8304		CO							
8305		CO							
8401		FO							
8402	92.2	FO							
8403		FO	0	300		CI	CI	9.54	
8404	91.42	FO							
9101	85.85	SW	84.14	450		CI	CO	27.33	228
9102		FO	0	150		CI	VC	28.63	
9103	86.32	SW	84.23	450		CI	CO	20.19	288
9104		FO	0	150		CI	VC	23.2	
9105	86.78	SW	84.25	450		CI	CO	32.81	
9106		FO	0	150		CI	VC	32.61	
9107		FO	0	150		CI	VC	14.16	
9108	88.4	SW							
9109	86.21	SW	85.1	225		CI	VC	18.13	38
9110		FO	0	150		CI	VC	19.39	
9111	86.59	SW	84.47	450		CI	CO	19.25	275
9112	86.46	SW	84.56	450		CI	CO	26.04	289
9113		FO	0	150		CI	VC	23.37	
9114	86.08	FO	83.86	375		CI	CO	46.34	101
9115	86.12	SW	83.81	525		CI	CO	23.76	792
9116	87.25	FO	84.39	375		CI	CO	49.77	98
9117	87.18	SW	83.86	450		CI	CO	44.19	884
9201	87.31	SW	85.85	225		CI	VC	21.2	68
9202	87.09	SW	83.93	450		CI	CO	53.31	888
9203	87.01	SW							
9401	93.32	FO							
5004		OV	81.27	1275		CI	CO	25.01	
6202		CO	0	700		CI	CO	41.64	
7106		FO	83.16	300		CI	CO	18.07	100
9402		FO	90.53	300		CI	VC	47.16	393
7405		CO							
7001	82.67	FO							
5001		CO	0	1300	600	RE	CC	25.52	

Refno	Cover	Func	Invert	Size.x	Size.y	Shape	Matl	Length	Grad

WASTE WATER SYMBOLOGY

Foul / Surface / Combined / Overflow

- Manhole
- Manhole, Side Entry
- MainSewer, Public
- MainSewer, Private
- MainSewer, S104
- Rising Main, Public
- Rising Main, Private
- Rising Main, S104
- Highway Drain, Private

Foul / Surface / Combined

- WW Site Termination
- Air Valve
- Cascade
- Non Return Valve
- Extent of Survey
- Flow Meter
- Gulley
- Hatch Box
- Head of System
- Hydrobrake / Vortex
- Inlet
- Inspection Chamber
- Bifurcation
- Catchpit
- Contaminated Surface Water
- WW Pumping Station
- Sludge Pumping Station
- Sewer Overflow
- TJunction/Saddle
- LampHole
- OilInterceptor
- PenStock
- Pump
- RoddingEye
- Soakaway
- Summit
- Valve
- Valve Chamber
- Washout Chamber
- DropShaft
- WW Treatment Works
- Septic Tank
- Vent Column
- Network Storage Tank
- Orifice Plate
- Vortex Chamber
- Penstock Chamber
- Blind Manhole

Foul / Surface / Combined / Overflow

- Screen Chamber
- Discharge Point
- Outfall

- Control Kiosk
- Unspecified

Sludge Main, Public / Private / S104

ABANDONED PIPE

- MainSewer
- Rising Main
- Highway Drain
- Sludge Main

LEGEND

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

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GRP	Glass Reinforced Plastic	U	Unspecified

OS Sheet No: sd5936se
Scale: 1: 1250 Date: 26/09/2014
68 Nodes
Sheet 1 of 1

OS Sheet No: sd5936se

Scale: 1: 1250 Date: 26/09/2014

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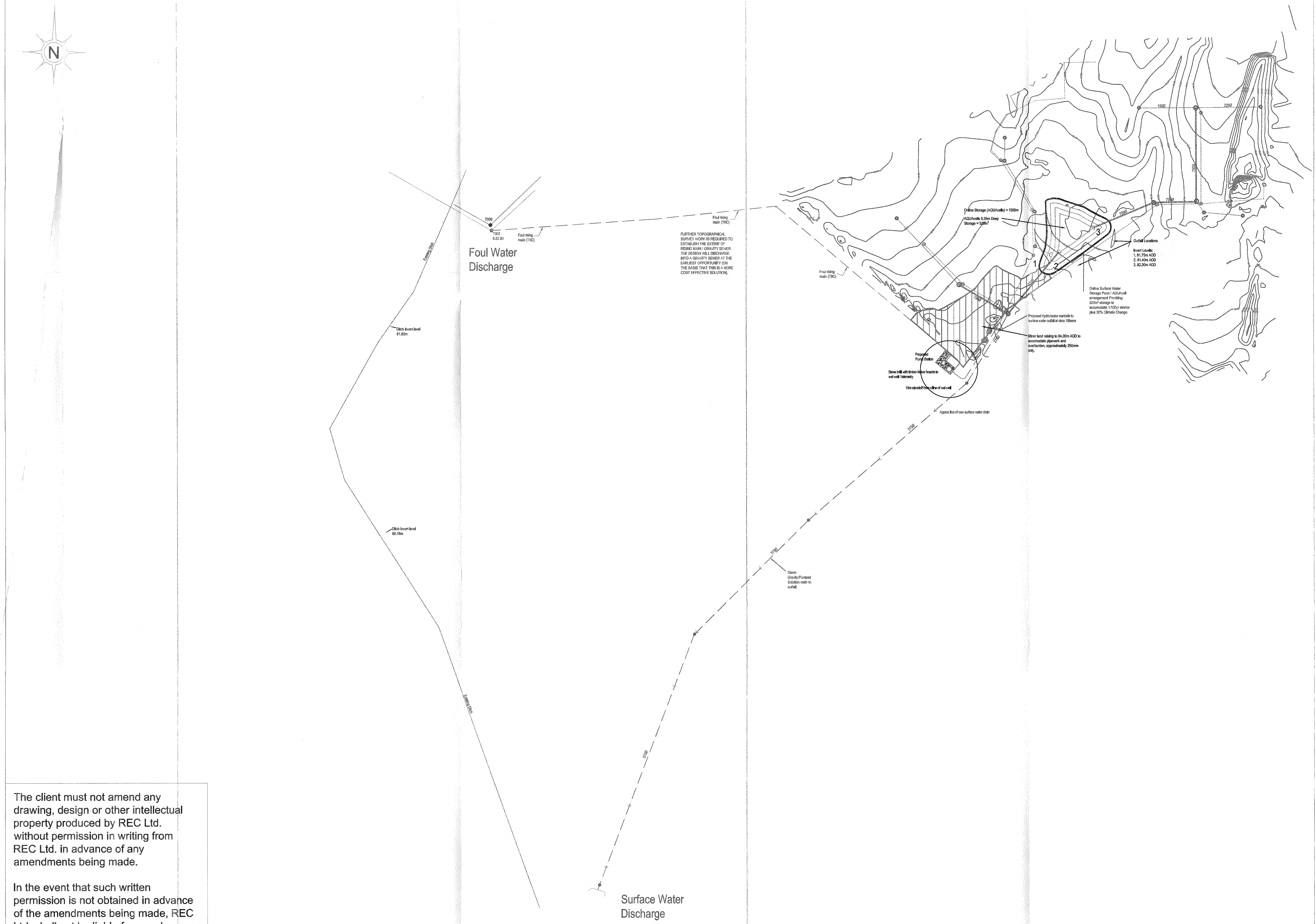
SEWER RECORDS

APPENDIX 3B

Miller Homes Proposals



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E-mail: sales@recltd.co.uk
Website: www.recltd.co.uk

Job Title	Client		DATE	Notes:	Drawing Title
Preston Road, Longridge	Miller Homes	Job No: 44661 Drawn by: R. Willoughby Approved by: L. Waterhouse Scale: 1:1000 @ A1	22-01-13		44661p1r1-001 Conceptual Drainage Feasibility Plan

APPENDIX 4

EXISTING SITE RUN OFF RATES
HR Wallingford Greenfield runoff estimation for sites

HR Wallingford
Working with water

Greenfield runoff estimation for sites

Site name: Preston Road

Site location: Longridge

This is an estimation of the greenfield runoff rate limits that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the CIRIA SUDS Manual (2007). It is not to be used for detailed design of drainage systems. It is recommended that every drainage scheme uses hydraulic modelling software to finalise volume requirements and design details before drawings are produced.

Site coordinates

Latitude: 53.82510° N

Longitude: 2.59763° W

Reference: gcw4hys3yvfs / 11.06

Date: 7 Nov 2016

Site characteristics

Total site area	11.06	ha
Significant public open space	0	ha
Area positively drained	11.06	ha

Methodology

Greenfield runoff method	IH124

Qbar estimation method	Calculate from SPR and SAAR
SPR estimation method	Calculate from SOIL type
SOIL type	4
HOST class	N/A
SPR	0.47

Hydrological characteristics

	Default	Edited	
SAAR	1132	1132	mm
M5-60 Rainfall Depth	20	20	mm
'r' Ratio M5-60/M5-2 day	0.3	0.3	
FEH/FSR conversion factor	0.84	0.84	
Hydrological region	10	10	
Growth curve factor: 1 year	0.87	0.87	
Growth curve factor: 10 year	1.38	1.38	
Growth curve factor: 30 year	1.7	1.7	
Growth curve factor: 100 year	2.08	2.08	

Greenfield runoff rates

	Default	Edited	
Qbar	93.70	93.70	l/s
1 in 1 year	81.52	81.52	l/s
1 in 30 years	159.29	159.29	l/s
1 in 100 years	194.90	194.90	l/s

Please note that a minimum flow of 5 l/s applies to any site

APPENDIX 5

DRAINAGE STRATEGY
Lees Roxburgh Limited Drg. No. 5861-01-03A

IF IN DOUBT – ASK

Notes

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE CONSTRUCTION (DESIGN and MANAGEMENT) REGULATIONS 2007.

Legend:

- Existing Combined Sewer
- Existing Surface Sewer from Miller Homes. Connect into Site System and increase flow rate from the West Attenuation Basin accordingly
- Existing Foul Rising Main
- Existing Sewer Easements
- Existing Ditch to be retained
- Proposed Foul Sewer
- Proposed Surface Sewer
- Proposed Foul Rising Main
- Proposed Sewer Easements

Existing Greenfield Run-off Rates:

Total site area = 18.84 ha

Total development area = 11.06 ha

Therefore, existing greenfield run-off rates:

- **Qbar = 93.7 L/sec**
- **Q1 = 81.5 L/sec**
- **Q30 = 159.3 L/sec**
- **Q100 = 195.0 L/sec**

Plus 15 L/sec from Miller Homes

SUBJECT TO DETAILED DESIGN

Rev	REVISION	By	Date
A	UPDATED TO AMENDED LAYOUT	DM	08.11.16

JWPC LTD
18 WATERVIEW
WHITECROSS, LANCASTER
LA1 4XS

PRESTON ROAD
LONGRIDGE

DRAINAGE STRATEGY

LEES ROXBURGH Consulting Engineers
THE GENESIS CENTRE, SCIENCE PARK SOUTH, BIRCHWOOD, WARRINGTON, CHESHIRE, WA3 7BH.
Tel: 01925 812898 Fax: 01925 838864

Job No.	Drawing No.	Revision
5861	01–03	A

Scale 1:1000 @A3 Date FEB 2015

Drawn By	Designed By	Checked By
MF	MF	JEL

DRAWING FILE LOCATION: -