Appendix C

CORRESPONDENCE

Our reference: 14672 EIR

02 January 2019

Dear Mr Woodward,

Thank you for your request of 18 December 2018 in which you asked for the following information:

I am trying to ascertain as to the ownership of the drainage ditch that runs alongside the western side of the A44/Woodstock Road between Yarnton and Begbroke, Oxfordshire. An approximate postcode would be OX5 1PU. I have attached an indicative map.

Please find our response below in bold:

Oxfordshire County Council does not maintain records of third party land ownership.

At the location shown on the plan supplied, the publicly maintained highway extends from boundary to boundary. The boundary feature can often be formed by a fence, wall or hedge, tree line, or the roadside edge of a ditch or stream. As a general rule, hedges, and trees growing in the hedgerow, and the ditches in front of them, are the responsibility of the adjoining landowner.

In this case the A44 road shown in the plan is a publicly maintained highway and the publicly maintained highway extent goes to the roadside edge of the ditch on the western side.

For enquiries regarding the extent of the public highway please contact our Highway Records Team via email at highway.records@oxfordshire.gov.uk.

Internal review
If you are dissatisfied with the service or response to your request you can ask for an internal review as follows:

- Contact the Complaints & Freedom of Information team in Law & Governance: foi@oxfordshire.gov.uk
- Use the online complaints form on our website: www.oxfordshire.gov.uk/complaints
- Write to the Complaints & Freedom of Information team at the FREEPOST address:

  Corporate Complaints Team
  Oxfordshire County Council
  FREEPOST (RTLL-ECKS-GLUA)
  Oxford OX1 1YA

If you remain dissatisfied with the handling of your request or complaint, you have a right to appeal to the Information Commissioner at:

The Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire, SK9 5AF.
Telephone: 0303 123 1113 Website: https://ico.org.uk

Please let me know if you have further enquiries. I would be grateful if you could use the reference number given at the top of this email.

Yours sincerely

[redacted]

Tom Scholes
Group Manager, Asset Data & Systems

Oxfordshire County Council
Email: highway.records@oxfordshire.gov.uk
www.oxfordshire.gov,uk

Asset location search

Thames Water Property Searches

Groundwise Searches Ltd
Suite 8 Chichester House
45Chichester Road
SOUTHEND ON SEA
SS1 2JU

Search address supplied Land Near Yarnton
Oxfordshire
OX5 1QD

Your reference 22630DM

Our reference ALS/ALS Standard/2018_3883092

Search date 3 October 2018

Keeping you up-to-date

Notification of Price Changes

From 1 September 2018 Thames Water Property Searches will be increasing the price of its Asset Location Search in line with RPI at 3.23%.

For further details on the price increase please visit our website: www.thameswater-propertysearches.co.uk
Please note that any orders received with a higher payment prior to the 1 September 2018 will be non-refundable.

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0845 070 9148

searchcode

Asset location search

Property Searches

Search address supplied: Land Near Yarnton, Oxfordshire, OX5 1QD

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This searchprovides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0845 070 9148, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk
Web: www.thameswater-propertysearches.co.uk

Waste Water Services

Please provide a copy extract from the public sewer map.

The following quartiles have been printed as they fall within Thames' sewerage area:

SP4712SW
SP4613NE
SP4612SE
SP4712NW
SP4612NE
SP4713NW
SP4713SW

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

The following quartiles have not been printed as they contain no assets:

SP4612NW
SP4613SE

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an 'as constructed' record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

The following quartiles have been printed as they fall within Thames' water area:

SP4712SW
SP4613NE
SP4712NW
SP4713NW
SP4713SW

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and pressure test to be carried out for a fee.

The following quartiles have not been printed as they contain no assets:

SP4612NW
SP4612SE
SP4613SE
SP4612NE

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Asset Location Search Sewer Map - ALS/ALS Standard/2018_3883092

SP4712SW

The width of the displayed area is 500m and the centre of the map is located at OS coordinates 447250,212250

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

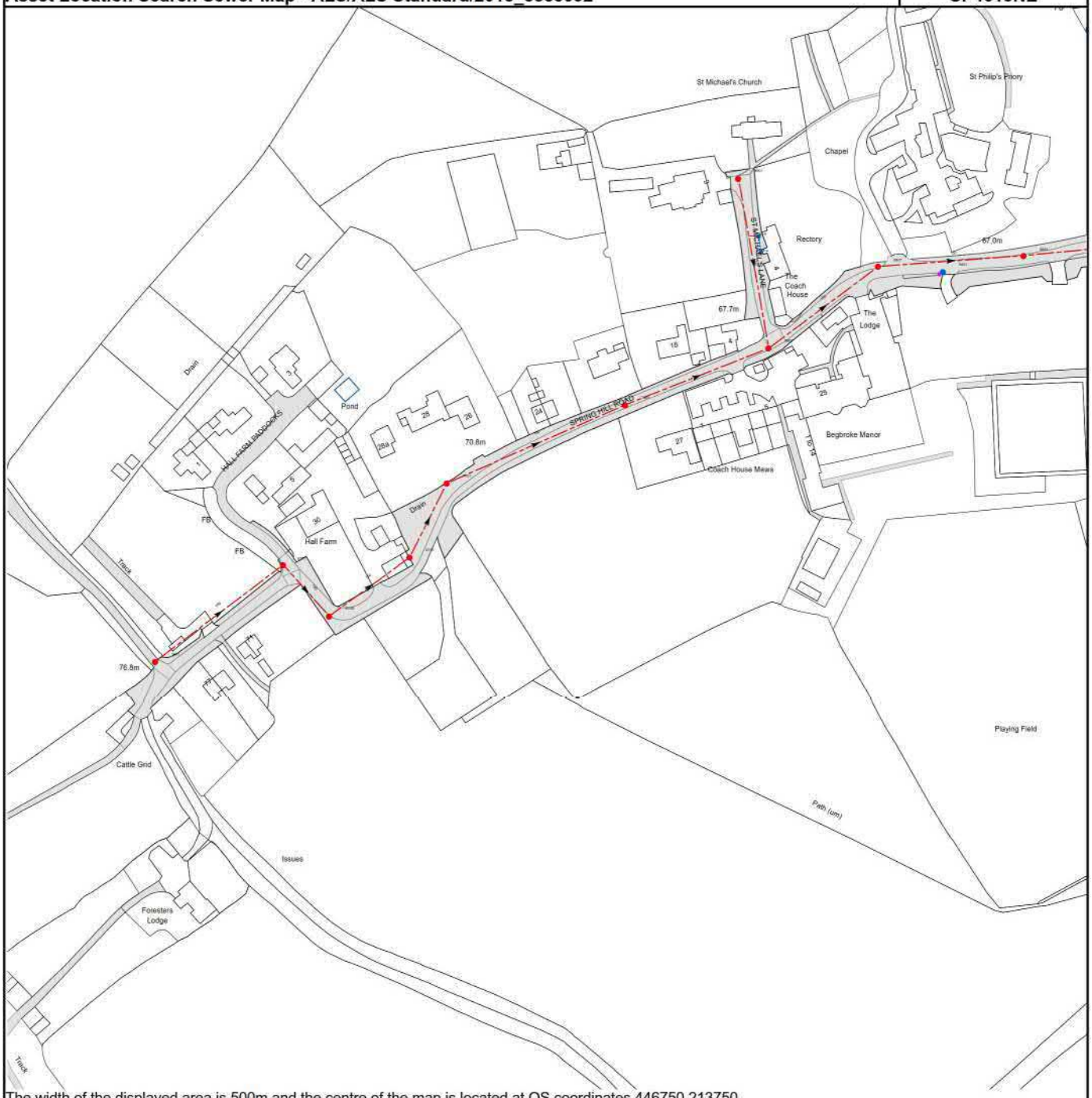
NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
4204	n/a	63.88
4205	n/a	64.2
4210	n/a	n/a
4213	65.48	63.78
4202	64.96	62.84
4209	64.73	62.47
4203	65.2	63.55
301A	n/a	n/a
301B	n/a	n/a
3002	64.54	63.03
3001	63.48	62.07
4002	63.02	61.56
4001	61.95	60.4
4101	64.19	62.64

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Asset Location Search Sewer Map - ALS/ALS Standard/2018_3883092

SP4613NE



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 446750,213750

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
5601	76.58	75.22
6701	75.54	73.85
6702	75.18	73.18
6791	n/a	n/a
7701	71.83	70.32
7801	69.3	67.65
8901	68.63	67.33
881B	n/a	n/a
881A	n/a	n/a
8801	67.22	65.91
9801	67.23	66.06
9851	67.1	66.37
9802	67.02	65.74

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Asset Location Search Sewer Map - ALS/ALS Standard/2018_3883092	SP4612SE

The width of the displayed area is 500m and the centre of the map is located at OS coordinates 446750,212250

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
n/a	n/a	n/a

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Asset Location Search Sewer Map - ALS/ALS Standard/2018_3883092

SP4712NW

The width of the displayed area is 500m and the centre of the map is located at OS coordinates 447250,212750

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

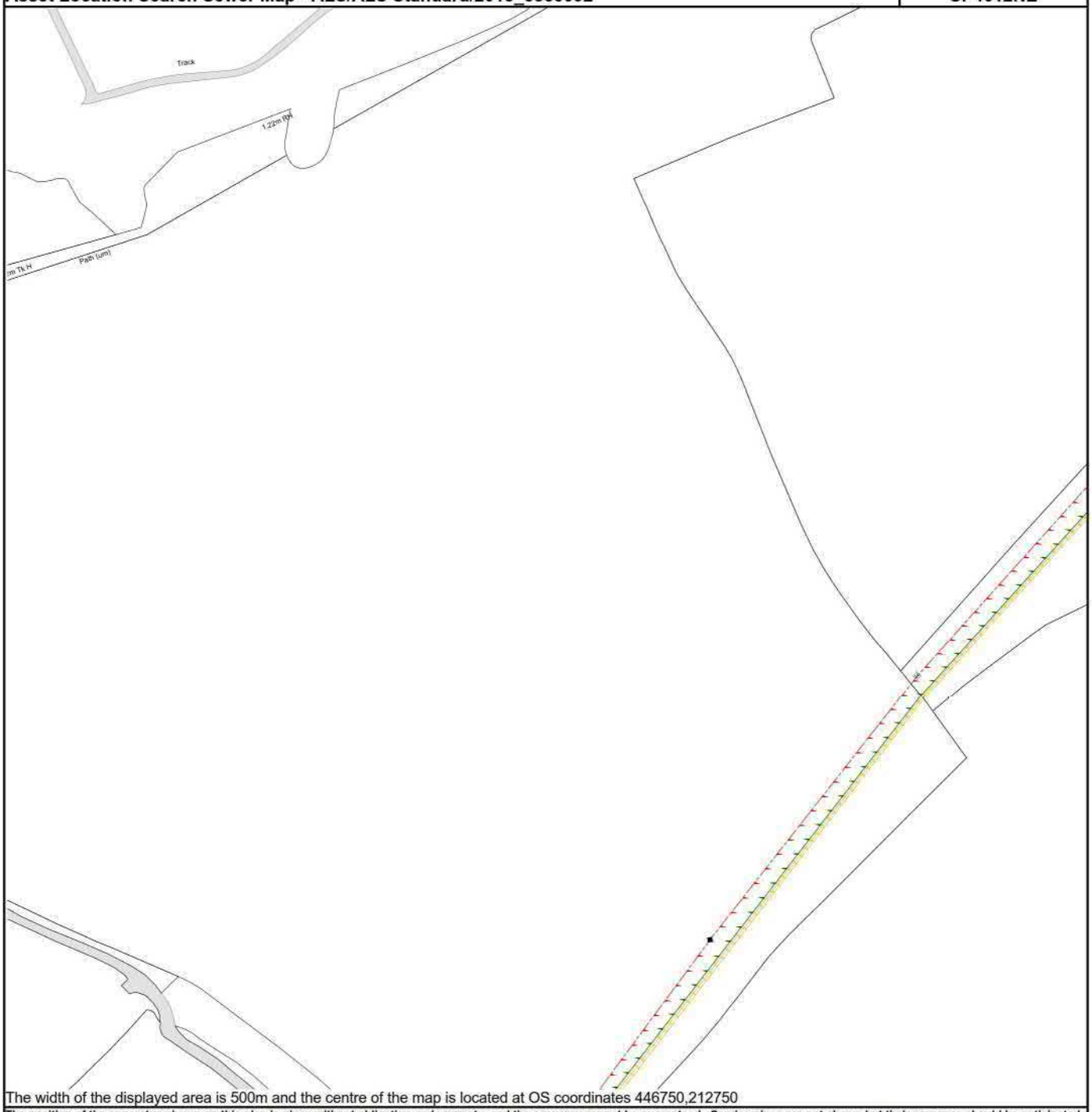
NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
4902	69.52	67.73
4952	69.5	68.13
4601	68.23	66.45
461D	n/a	n/a
461C	n/a	n/a
471I	n/a	n/a
471K	n/a	n/a
471L	n/a	n/a
471M	n/a	n/a
471N	n/a	n/a
471J	n/a	n/a
4951	69.51	67.62
4901	69.48	67.36
4791	n/a	n/a
4852	69.26	67.44
4801	69.36	67.16
4851	68.19	66.5
4802	68.25	66.48
471H	n/a	n/a

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Asset Location Search Sewer Map - ALS/ALS Standard/2018_3883092

SP4612NE



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 446750,212750

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
n/a	n/a	n/a

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Asset Location Search Sewer Map - ALS/ALS Standard/2018_3883092

SP4713NW

The width of the displayed area is 500m and the centre of the map is located at OS coordinates 447250,213750

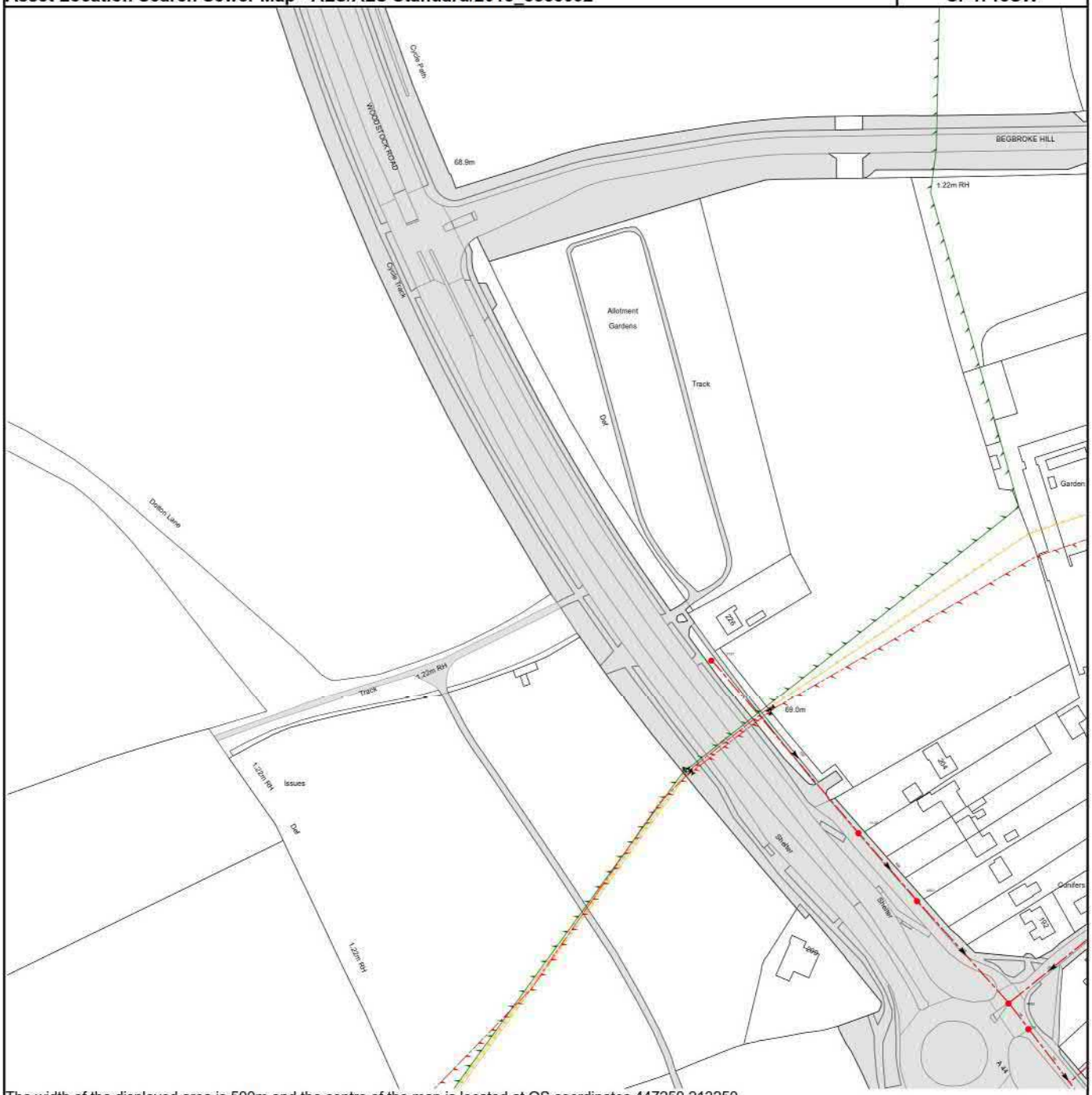
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
481A	n/a	n/a
4807	65.32	62.71
4802	65.41	62.2
4808	n/a	n/a
4804	n/a	n/a
4801	66.07	62.89
2891	n/a	n/a
3802	66.1	62.86
3801	66.21	63.64
491E	n/a	n/a
4991	n/a	n/a
491A	n/a	n/a
491C	n/a	n/a
491H	n/a	n/a
491B	n/a	n/a
491F	n/a	n/a
4951	67.1	66.16
4910	67.86	66.54
2901	67.53	65.93
2802	67.08	64.83
2801	66.8	64.93
3904	n/a	n/a
3905	n/a	n/a
3902	67.56	65.41
3993	n/a	n/a
3901	68.27	65.7
391A	n/a	n/a
3903	68.08	65.83
4902	68.21	65.9
491D	n/a	n/a
0891	n/a	n/a
0701	67.73	65.87
0702	67.64	65.84
0901	67.54	65.25
0802	67.39	65.08
191C	n/a	n/a
1801	67.35	64.68
191B	n/a	n/a
191A	n/a	n/a
1901	68.37	65.51
181D	n/a	n/a
181B	n/a	n/a
181C	n/a	n/a
181A	n/a	n/a
1991	n/a	n/a
1891	n/a	n/a
2991	n/a	n/a
081B	n/a	n/a
081A	n/a	n/a

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Asset Location Search Sewer Map - ALS/ALS Standard/2018_3883092	SP4713SW



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 447250,213250

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
401B	n/a	n/a
401A	n/a	n/a
4002	68.18	64.64
4001	68.08	65.95
3102	68.29	66.37
3101	68.95	67.61

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map with the sanction of the Controller of H.M Stationary Office License Number 10019345

ALS/ALS Standard/2018_3883092

0 45 90 180 270 360 Meters

Scale:	1:7161
Width:	2000m
Printed By:	SAsirvat
Print Date:	03/10/2018
Map Centre:	446903,212864
Grid Reference:	SP4612NE

Comments:

ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

Trunk Surface Water

Trunk Foul

Storm Relief

Trunk Combined

Vent Pipe

Bio-solids (Sludge)

Proposed Thames Surface Water Sewer

Proposed Thames Water Foul Sewer

Gallery

Foul Rising Main

Surface Water Rising Main

Combined Rising Main

Sludge Rising Main

Proposed Thames Water Rising Main

Vacuum

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

Air Valve

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

Control Valve

Drop Pipe

Ancillary

Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

Outfall

Undefined End

Inlet

Other Symbols

Symbols used on maps which do not fall under other general categories

Public/Private Pumping Station

Change of characteristic indicator (C.O.C.I.)

Invert Level

Summit

Areas

Lines denoting areas of underground surveys, etc.

Agreement

Operational Site

Chamber

Tunnel

Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

Foul Sewer

Surface Water Sewer

Combined Sewer

Gulley

Culverted Watercourse

Proposed

Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.

2) All measurements on the plans are metric.

3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.

4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.

5) 'na' or '0' on a manhole level indicates that data is unavailable.

6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.

Asset Location Search Water Map - ALS/ALS Standard/2018_3883092 | SP4712SW

The width of the displayed area is 500m and the centre of the map is located at OS coordinates 447250,212250

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Asset Location Search Water Map - ALS/ALS Standard/2018_3883092

SP4613NE

The width of the displayed area is 500m and the centre of the map is located at OS coordinates 446750,213750

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Asset Location Search Water Map - ALS/ALS Standard/2018_3883092

SP4712NW

The width of the displayed area is 500m and the centre of the map is located at OS coordinates 447250,212750

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Asset Location Search Water Map - ALS/ALS Standard/2018_3883092

SP4713NW

The width of the displayed area is 500m and the centre of the map is located at OS coordinates 447250,213750

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Asset Location Search Water Map - ALS/ALS Standard/2018_3883092 | SP4713SW

The width of the displayed area is 500m and the centre of the map is located at OS coordinates 447250,213250

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map with the sanction of the Controller of H.M Stationary Office License Number 10019345

ALS/ALS Standard/2018_3883092

0 45 90 180 270 360 Meters

Scale:	1:7161
Width:	2000m
Printed By:	SAsirvat
Print Date:	03/10/2018
Map Centre:	446903,212864
Grid Reference:	SP4612NE

Comments:

ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

4"

Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.

16"

Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.

3" SUPPLY

Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.

3" FIRE

Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.

3" METERED

Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.

Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.

Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Valves

- General Purpose Valve
- Air Valve
- Pressure Control Valve
- Customer Valve

Hydrants

- Single Hydrant

Meters

- Meter

End Items

Symbol indicating what happens at the end of a water main.

- Blank Flange
- Capped End
- Emptying Pit
- Undefined End
- Manifold
- Customer Supply
- Fire Supply

Operational Sites

- Booster Station
- Other
- Other (Proposed)
- Pumping Station
- Service Reservoir
- Shaft Inspection
- Treatment Works
- Unknown
- Water Tower

Other Symbols

- Data Logger

Other Water Pipes (Not Operated or Maintained by Thames Water)

Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

Private Main: Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL`s terms and conditions shall apply.
6. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800

If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to her at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	BACS Payment	Telephone Banking	Cheque
Call **0845 070 9148** quoting your invoice number starting CBA or ADS / OSS	Account number **90478703** Sort code **60-00-01** A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.** or email **ps.billing@thameswater.co.uk**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number	Made payable to '**Thames Water Utilities Ltd**' Write your Thames Water account number on the back. Send to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW** or by DX to **151280 Slough 13**

Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.

Appendix D

HIGH LEVEL SURFACE WATER HYDRAULIC MODELLING

A high-level surface water hydraulic model has been developed using Innovyze InfoWorks ICM 9.0. The hydraulic model utilises ground elevation data and rainfall profiles to enhance understanding of the existing potential flood risk within and downstream of the site. The model further represents the proposed development to represent proposed surface water flow paths and post-development flood risk.

This modelling has been undertaken at a high-level and is conceptual in nature to demonstrate the principles of the development. Further design development will be required, ahead of submission of a 'Reserved Matters' planning application to enhance the model representation and integrate the design features.

The following sections outline the approach and results of this high-level surface water modelling. This comprises of the following sections:

- Hydraulic model representation
- Rainfall Profiles & runoff coefficients
- Assumptions & limitations
- Results – Baseline Modelling
- Results – Proposed Development Modelling
- Conclusions & Recommendations

HYDRAULIC MODEL REPRESENTATION

Ground Model Data Sources

A combined ground model has been developed based on a number of sources of data. Within this site boundary, the ground model is based on topographic survey (25913R1_3D.dwg, received 28th July 2020). Survey triangles were received within the aforementioned CAD dwg file and were converted into a 500mm ASCII ground model via AutoCAD Civil 3D and Global Mapper software.

Outside of the site boundary, the topographic survey was combined with Environment Agency 1m DTM LiDAR downloaded from the data.gov.uk website[1]and where this was unavailable, OS 50m DTM LiDAR; used to cover the entirety of the upstream surface water catchment. The ground model data sources are illustrated in Figure D-1.

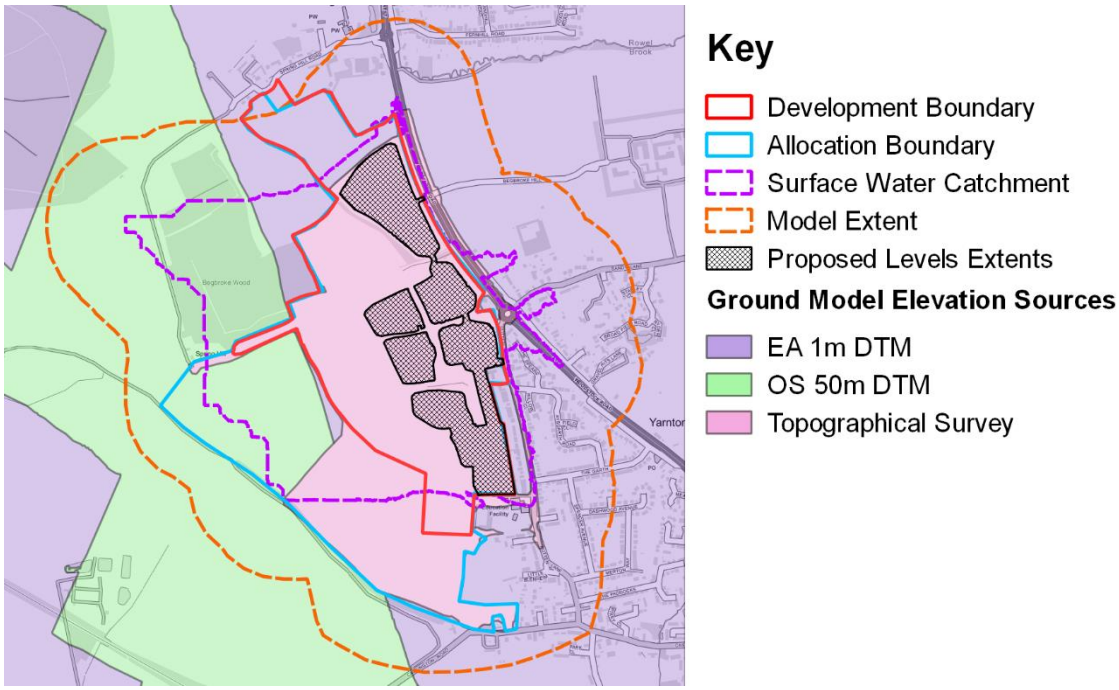
The combined ground model was used within a catchment analysis to determine the surface water catchment encompassing the site. From this, the 2D model domain extents were developed as a 250m offset from the catchment boundary and these were extended further to the south to cover Cassington Road.

An indicative proposed development earthworks model was developed within AutoCAD Civil 3D to understand the high-level cut/fill balance within the site. This was combined on top of the previously

[1] https://environment.data.gov.uk/DefraDataDownload/?Mode=survey

discussed data sources to represent the proposed development levels and this area is also represented within Figure D-1.

Figure D-1 - Ground Model Elevation Data Sources



<u>Baseline Model – Representation of ditches</u>

A number of existing surface water drainage ditches were identified within the provided topographic survey, which convey water from west to east. This information was confirmed during a site walkover on 5th December 2018, which provided additional understanding of the topography of the site. Ditches were observed to be small and shallow, approximately 500mm deep and a selection of photographs taken during the site visit are shown in Figure D-2.

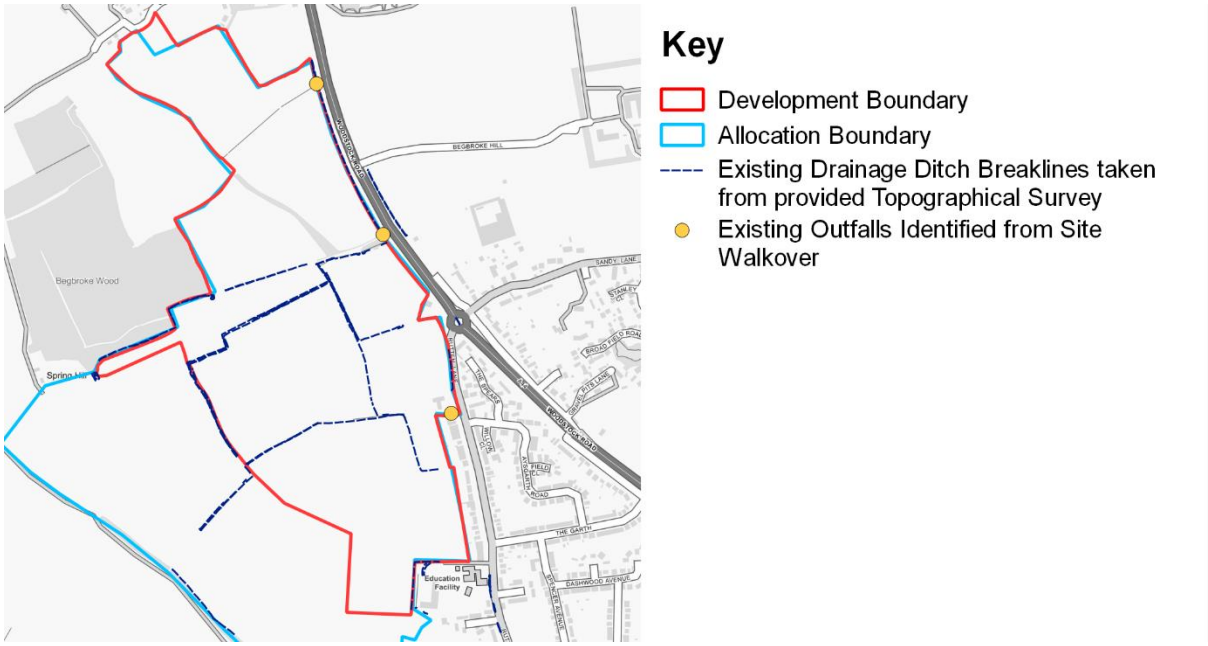
However due to the presence of dense vegetation, acquiring detailed survey information regarding levels of all the ditches was not possible. Survey of some ditches only recorded as top-of-bank or a bottom-of-bank as opposed to a complete ditch geometry on both sides. A conservative approach has been utilised to avoid making inaccurate assumptions pertaining to the state and dimensions of the ditches and as such the existing ditches are represented solely where these have been surveyed.

Given the triangulated surface received within the topographic survey, ditches are represented explicitly within the baseline ground model and to enhance the representation within the 2D domain, top and bottom of bank lines have been imported from the survey data provided and used in the hydraulic modelling as breaklines.

Figure D-2 - Site visit photographs

The observed existing ditches are shown on the Existing Drainage drawing (MC-WSP-Yarn-XXXX-SK-D-0504) in Appendix A and the Baseline Model break lines are shown in Figure D-3.

Figure D-3 - Existing Drainage Ditches



Site Outfall

Three outfall culverts were observed during site walkover along the eastern boundary of the site and are illustrated on the Existing Drainage drawing in Appendix A and also included within Figure D-3. These culverts have been incorporated into the hydraulic model as 225mm diameter culverts with invert levels inferred from the mesh element ground level.

Given that the downstream extent of these culverts to the east of the A44, are unknown. CCTV survey of these culverts is recommended to further understand the location and condition of these culverts and their associated downstream outfalls at the next stage of design. The modelling conducted should be updated during the next stage of design following receipt of this information.

Proposed Development Model – Conceptual representation of surface water drainage features

In order to offer additional protection to the proposed development from surface water flooding due to overland flow from the upstream catchment, a number of ‘cut-off’ ditches and basins are proposed along the western boundary of the development.

The proposed 'cut-off' ditches have been designed to be approximately 0.5m deep channels with a 0.5m base width and 1 in 3 side slopes providing a cross-sectional area of $1m^2$. These have been incorporated into the model using 'Mesh Level Zones' to create simplified rectangular channel of 2m wide and 0.5m deep thereby providing the same cross-sectional area and allowing for representation of a similar capacity.

The two proposed ‘cut-off’ basins have been designed to be approximately 1m deep basins with varying plan areas and approximate 1 in 4 side slopes. These have been incorporated into the model as a mesh level zone set circa 1m below ground level surrounded, at an approximate 4m distance, by a breakline on the western boundary of the basin and a 'Porous Wall' on the eastern boundary of the basin to ensure a 1m retained water depth, representative of the retaining top-of-bank.

The 'cut-off' ditches connect into a network of ‘Enhanced Ditches’ across the site used to convey runoff and discharges from the surface water drainage network. The ‘Enhanced Ditches’ are designed circa 1m deep, and 1m base width with 1 in 3 side slopes. The base area of these ‘Enhanced Ditches’ are included within the model as 'Mesh Level Zones', and the assumed top-of-banks are represented as break lines.

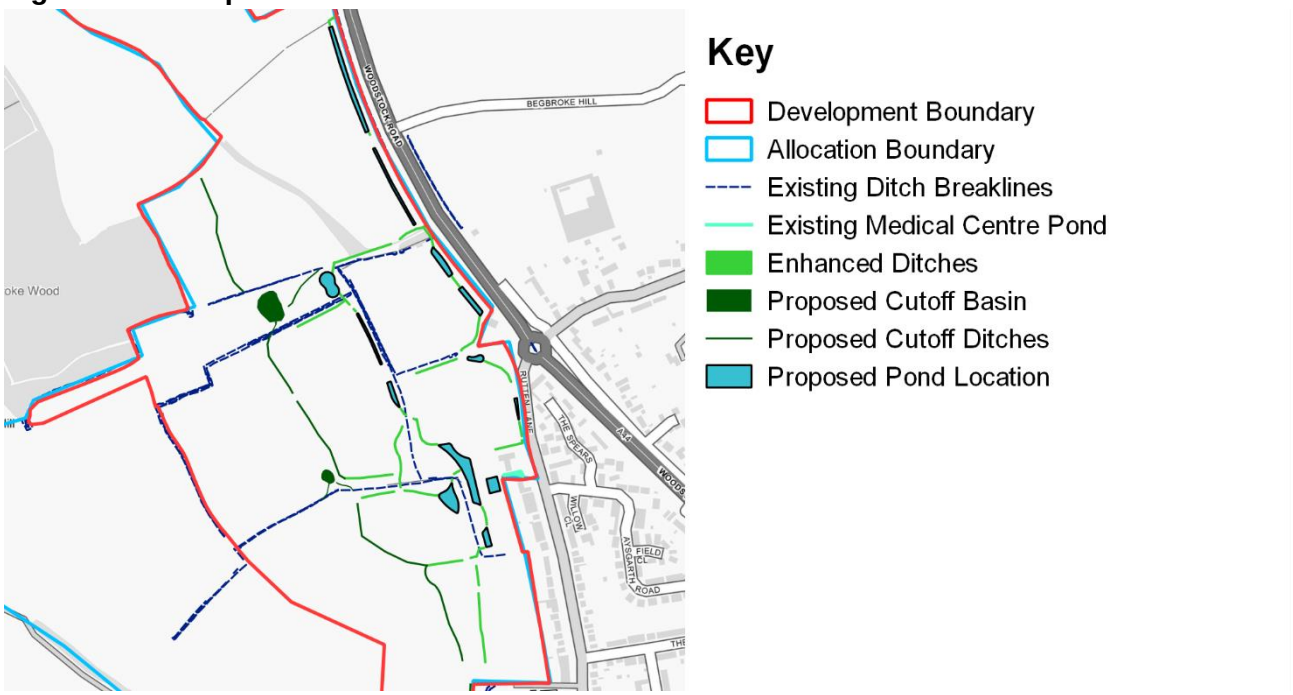
A number of culverts are included within the model to provide connectivity between these ditch features. These culverts are typically 300mm in diameter however some vary in size up to 900mm in diameter to provide additional conveyance.

As part of the site surface water sustainable drainage strategy, a number of basins are provided across the masterplan to attenuate and manage surface water runoff from the proposed development parcels. These basins have been illustratively represented within hydraulic model using a similar approach to the 'cut-off' basins, using 'Mesh Level Zones' and 'Porous Wall' objects.

Whilst the basins earthworks have been represented using the aforementioned features, the wider surface water drainage network and flow controls have not been included.

Figure D-4 illustrates the network of proposed 'cut-off' ditches and basins along with the ‘Enhanced Ditches’ and surface water attenuation basins.

Figure D-4 - Proposed Ditch Network



Proposed Development Model – Residential Parcels Ground Adjustments

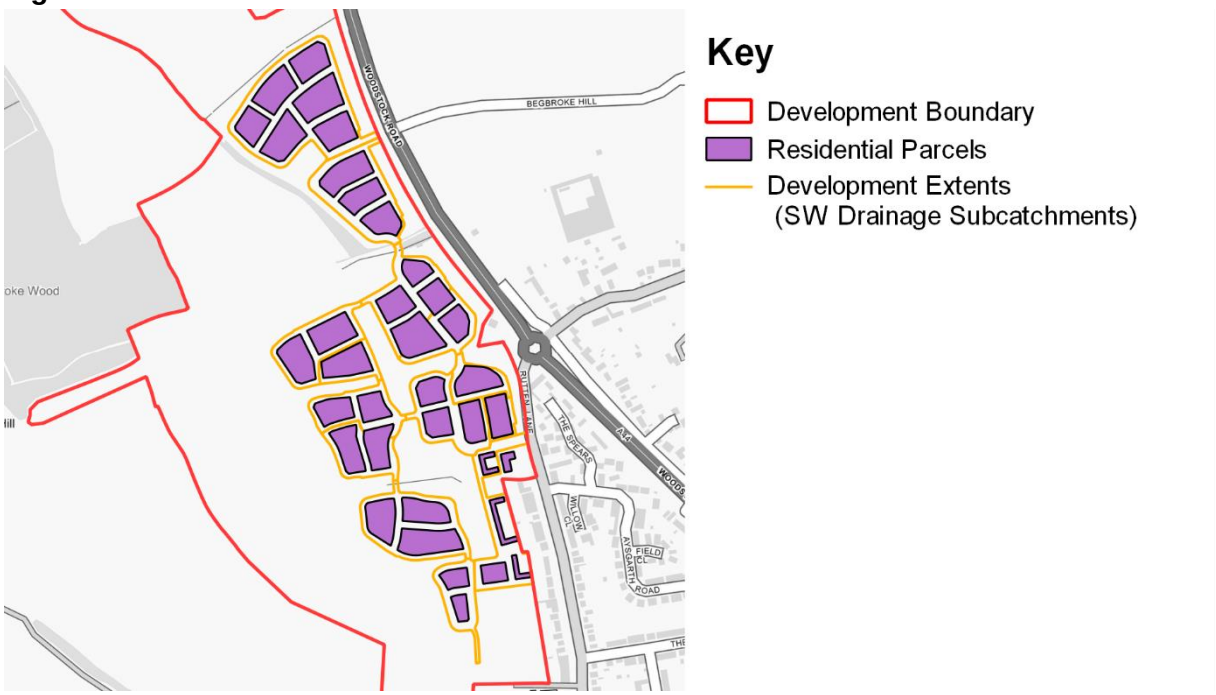
As outlined previously, high-level proposed earthworks have been developed to represent the highway network and gain an understanding of the cut / fill requirements across the development. This has been imported into the model and is used as the basis for the Proposed Development Model ground levels.

However, further design development of levels is envisaged at the next stage of design. As such it may be reasonable to assume post-development finished floor levels will be at least 200mm above current highway levels and to this end, residential parcels have been imported into the Proposed Development Model as 'Mesh Level Zones' and ground levels within these raised by 200mm. These are illustrated in Figure D-5.

Rainfall Profiles & Runoff Coefficients

Given the site topography, there are a number of localised, low lying areas and associated catchments which are evidenced by the contours on the Existing Drainage drawing (MC-WSP-YARN-XXXX-SK-D-0504) and Topographical Survey in Appendix A.

Figure D-5 – Residential Parcels



FEH catchment descriptors were purchased for a catchment overlaying the majority of the site red line boundary. The FEH catchment of approximately 61ha is shown in Figure D-6 against the site red line boundary of approximately 37ha and the surface water catchment of circa 96ha. The FEH catchment descriptors are shown in Table D-1.

Figure D-6 - FEH Catchment Boundary

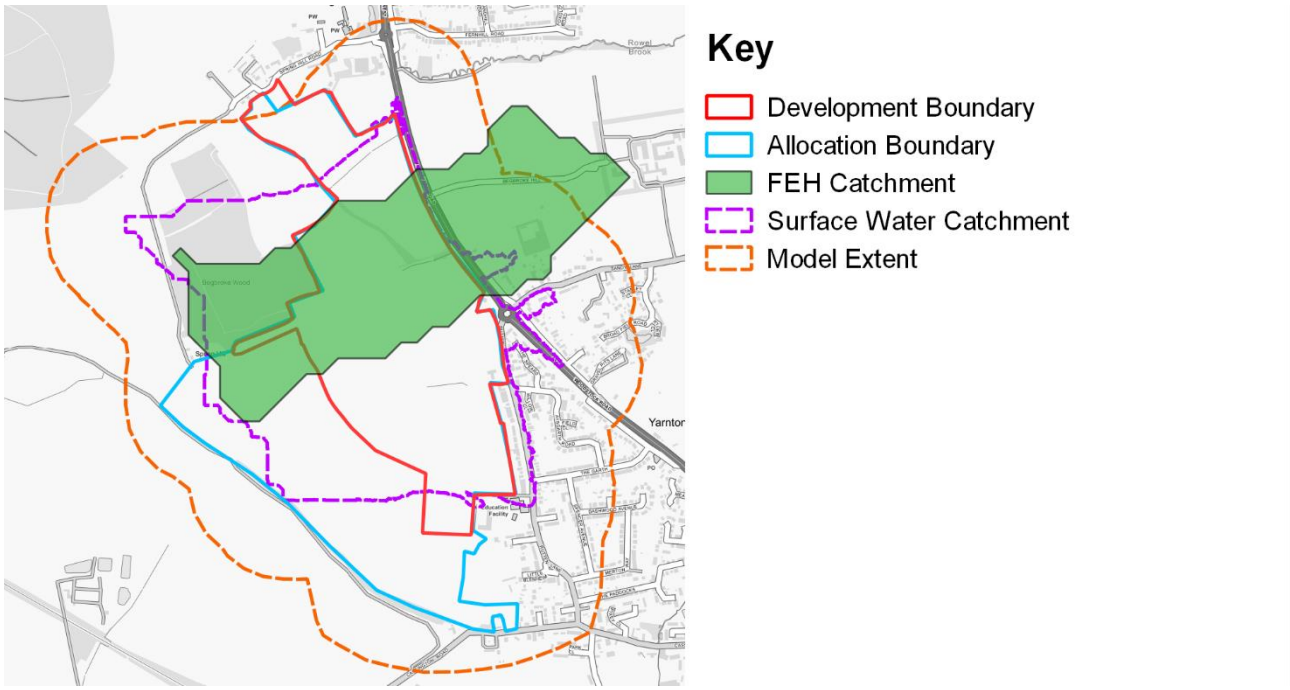


Table D-1 - FEH Catchment Descriptors

CATCHMENT		GB 447800 213450		SP 47800 13450	
CENTROID		GB 447084 213180		SP 47084 13180	
AREA	e	**RMED-1H**	9.6	**C**	-0.02295
ALTBAR	77	**RMED-1D**	30	**D1**	0.31945
ASPBAR	68	**RMED-2D**	39.1	**D2**	0.34229
ASPVAR	0.87	**SAAR**	621	**D3**	0.23637
BFIHOST	0.646	**SAAR4170**	648	**E**	0.29021
DPLBAR	0.89	**SPRHOST**	28.51	**F**	2.43373
DPSBAR	23.8	**URBCONC1990**	0	**C(1 km)**	-0.023
FARL	1	**URBEXT1990**	0.0061	**D1(1 km)**	0.317
FPEXT	0.1025	**URBLOC1990**	0.653	**D2(1 km)**	0.346
FPDBAR	0.328	**URBCONC2000**	0.769	**D3(1 km)**	0.231
FPLOC	0.358	**URBEXT2000**	0.0369	**E(1 km)**	0.291
LDP	1.67	**URBLOC2000**	0.467	**F(1 km)**	2.44
PROPWET	0.32				

Catchment descriptors were input into ReFH2 to generate design rainfall profiles. Catchment descriptors were unchanged with the exception of the catchment area updated to 0.96km^2 in line within the measured surface water catchment area.

The critical storm duration for the catchment was calculated by ReFH2 as a 3 hour 30 minute duration storm event. Given the short storm duration, the interval was reduced to a 6 minute time step to produce smoother rainfall profiles as compared to the ReFH2 default 30 minute time step. Rainfall profiles were produced for the following return periods and are shown in Figure D-7.

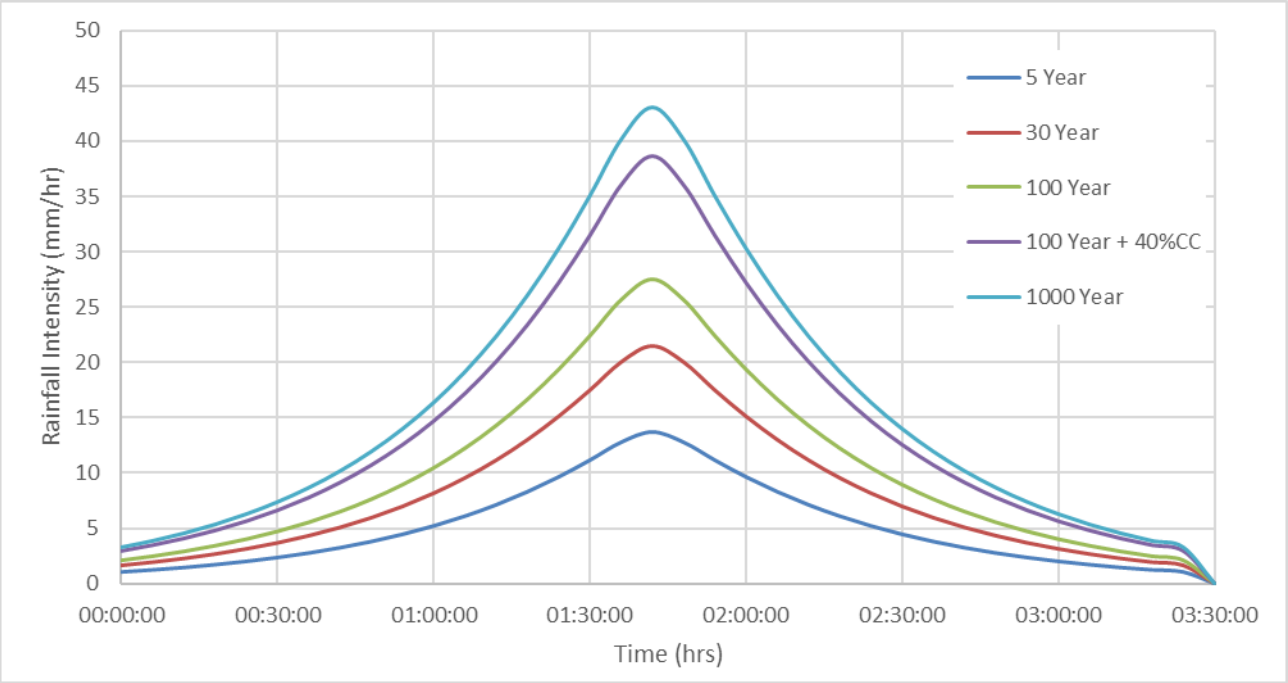
- 1 in 5 year;
- 1 in 30 year;
- 1 in 100 year;
- 1 in 100 year + 40% climate change;
- 1 in 1,000 year;

The BGS maps and observed conditions indicate the ground is of a clay nature and may be considered to be impermeable. However, given the outline nature of the planning application, detailed site investigation has yet to be undertaken and therefore the FEH catchment descriptors provide the best available indication of runoff from the catchment.

The FEH catchment descriptor specify a Standard Percentage Runoff based on Hydrology of Soil Types data (SPRHOST) of 28.5%. An Infiltration Zone has been included within the model covering the same area as the 2D domain and the rainfall percentage has been set to the SPRHOST value.

Within the Proposed Development Model, a number of additional Infiltration Zones have been included covering the Development Extents (as outlined in Figure D-5) and within these, the rainfall percentage has been set to 60% in line with the surface water drainage strategy contributing area.

Figure D-7 - ReFH2 Rainfall Profiles



Given the small catchment of less than 1km^2 and the high level nature of the modelling conducted, a statistical calculation / approach to the hydrology has not been undertaken. Further refinement of the hydrology may be conducted during the later stages of design.

KEY ASSUMPTIONS

As previously stated, the hydraulic modelling undertaken is high level. As such, a number of key assumptions have been applied which comprise, but are not exclusive to:

- The underlying combined ground model combines OS 50m DTM, Environment Agency 1m DTM and Topographic Survey, the merged ground model is considered suitable for this high-level modelling.
- Ditches are represented in the underlying combined ground model, surveyed top and bottom of bank lines are included within the hydraulic model to ensure representation in the mesh
- Three outfalls of 225mm diameter are included with invert levels based on mesh element levels (ground levels).
- The residential parcels have been assumed to be 200mm above the indicative proposed ground levels.
- The surface water drainage features represented simplistically within the model utilising 'Mesh Level Zones' to locally depress the modelled ground levels and using 'Porous Walls' to represent embankments where necessary.
    - 'Enhanced Ditches' are represented as a depression consistent with the base area and top-of-banks included as break lines.
    - 'Cut-off' ditches are modelled using rectangular channels of an equivalent cross-sectional area to the assumed ditch cross section.
- Rainfall profiles have been generated from ReFH2 with no modification of catchment descriptors (with the exception of catchment area). ReFH2 calculates a critical storm duration

of 3.5hrs, no further hydrological analysis has been conducted such as a statistical approach / method.

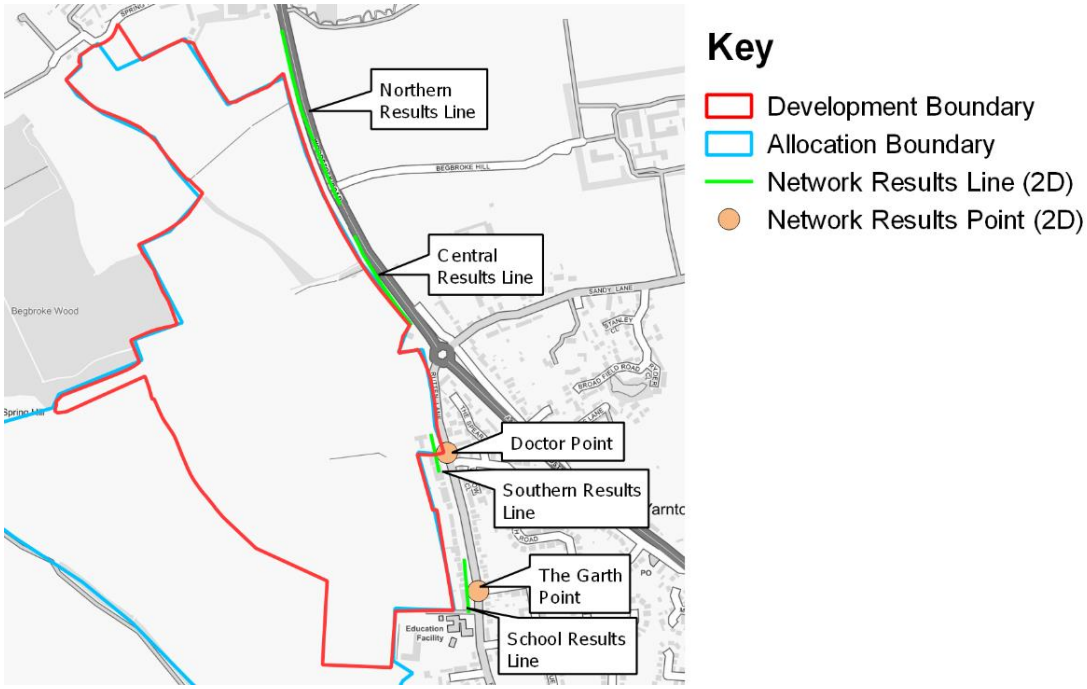
- The wider catchment rainfall percentage (impermeability) is set at 28.5% in line with the SPRHOST
    - Within the Proposed Development Model, the rainfall percentage within the Development Extents is set at 60% in line with the surface water drainage strategy contributing area.

RESULTS

Given the high-level nature of the modelling and the assumptions made regarding the size of the three culvert/sewer outfalls from the model, these are understood to be at capacity in all modelled events. As such, surface water runoff from the site discharges via overland flows typically directed towards the known outfalls / low spots in the north and centre of the site and in the vicinity of the medical centre and educational facility in the south.

A number of 'Network Results Lines' are included within the model to analyse the peak flows and volumes from the site during the modelled events. These are consistent between the Baseline Model and Proposed Development Model to allow for analysis of the impact of the impact of the 'cut-off' ditches on where surface water flow is directed downstream. The locations of these 'Network Results Lines' are illustrated in Figure D-8.

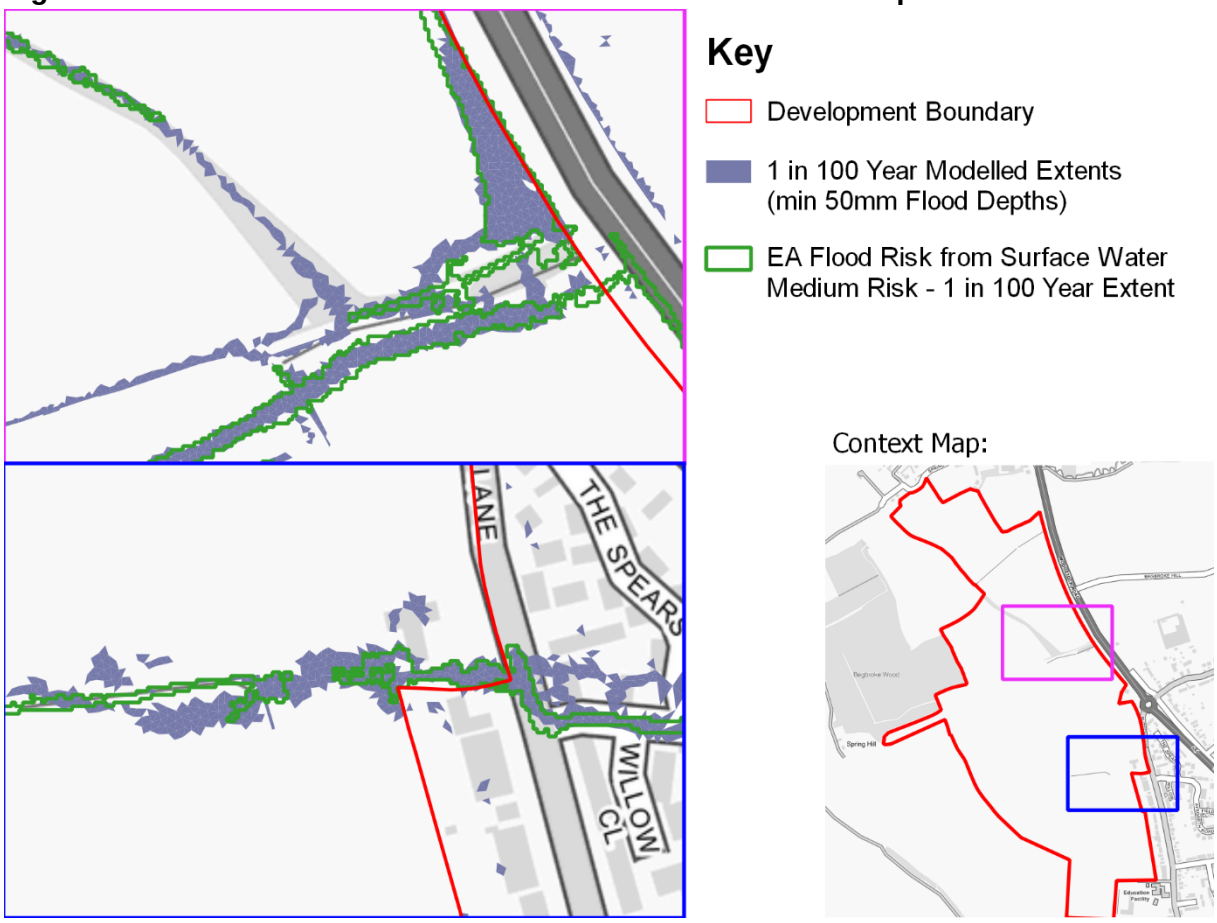
Figure D-8 - 'Network Results Points' and 'Network Results Lines'



BASELINE MODEL RESULTS

Given the catchment is ungauged, the publicly available Flood Risk from Surface Water mapping provides the best available data against which to verify the Baseline Model. Surface water flood extents for the modelled 1 in 100 year event are broadly in accordance with the Flood Risk from Surface Water mapping medium risk 1 in 100 year extent, shown in Figure D-9.

Figure D-9 - Baseline Model Results - 1 in 100 Year Extents Comparison



Where discrepancies in flood extents do occur these may be considered as a result of the detailed topographic survey undertaken across the site and subsequent enhanced representation of existing ground levels.

Given the above, it may be reasonable to consider the Baseline Model largely representative of the flows from the catchment and the associated potential flood risk within the development site and downstream.

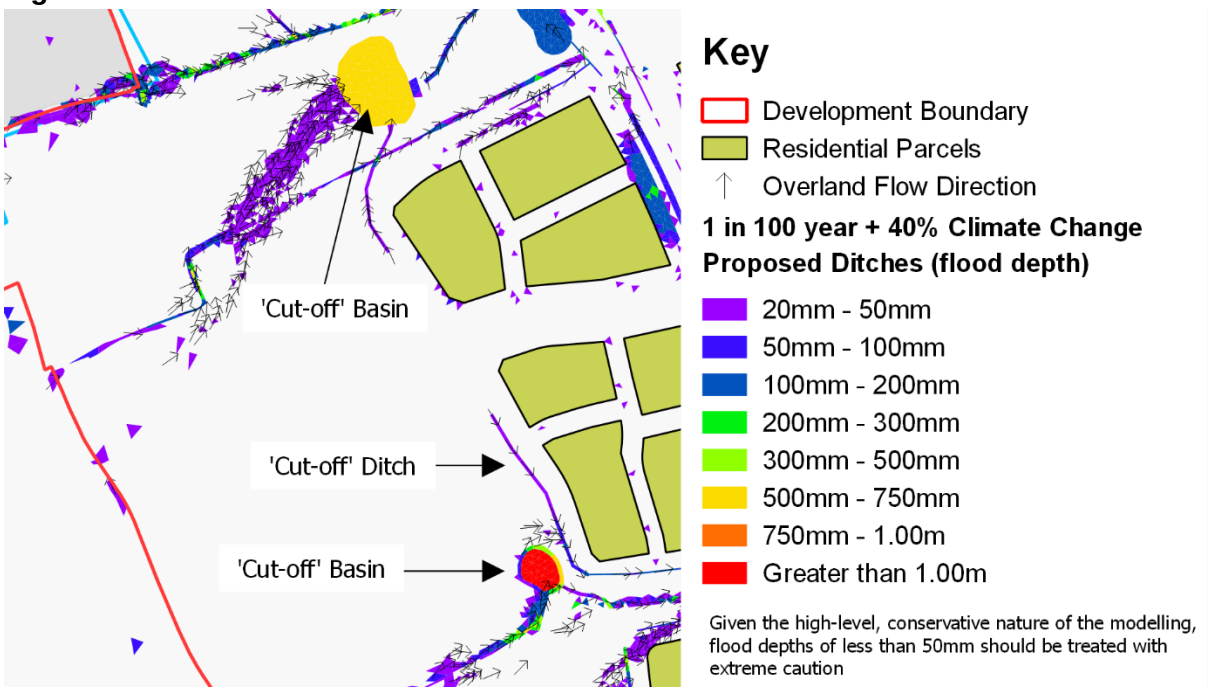
Subsequent refinement of the Baseline Model is recommended in the next stage of design to enhance the representation of existing features including additional survey of ditches and the known culverts / outfalls from the site.

RESULTS – PROPOSED DEVELOPMENT MODELLING

This high-level modelling has been conducted to illustrate the principles of the proposed surface water management strategy, including the proposed network of surface water 'cut-off' ditches and basins to mitigate the potential risk of surface water flooding to the proposed development.

The modelling undertaken to date indicates these 'cut-off' features may be considered to be functional in redirecting and collecting overland flows from the upstream catchment. These are illustrated in Figure D-10 during the 1 in 100 year event + 40% climate change, in line with the surface water drainage strategy design. As discussed previously, the 'cut-off' ditches and basins are subject to further refinement and enhancement of the hydraulic modelling during the next stage of design.

Figure D-10 - 'Cut-off' Ditch and Basin Performance



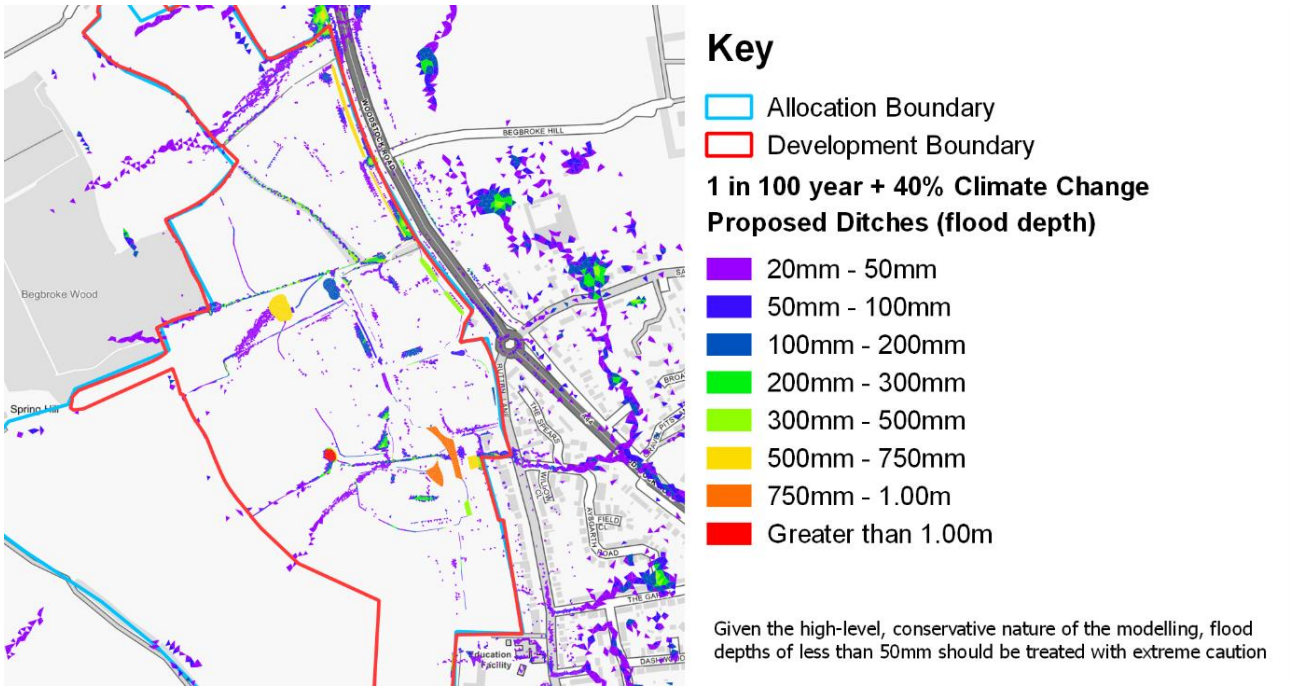
Further to this, the modelling undertaken to date indicates there is a potential reduction in peak surface water flows and depths off-site as a result of the collection and attenuation of surface water within the development. In relation to the 'Network Results Lines' and 'Network Results Points' shown in Figure D-8, Table D-2 outlines the peak flows discharging from the site via overland flows and depths within Rutten Lane immediately adjacent to the site. In all locations, peak flows and depths are significantly reduced.

Table D-2 - Peak Flows and Depths Comparison

Location	Baseline 1 in 100 year +40%cc peak flow	Proposed Development 1 in 100 year +40%cc peak flow
Northern Results Line	1.01m³/s	0.81m³/s
Central Results Line	0.22m³/s	0.01m³/s
Southern Results Line	0.73m³/s	0.17m³/s
School Results Line	0.13m³/s	0.13m³/s
	Baseline 1 in 100 year +40%cc peak depth	**Proposed Development 1 in 100 year +40%cc peak depth**
Doctor Point (within Rutten Lane adjacent to Yarnton Medical Practice)	124mm	80mm
The Garth Point (at junction of Rutten Lane & The Garth)	17mm	18mm

Across the Proposed Development Model, peak flood depths are shown in Figure D-11 where greater flood depths are observed in the proposed areas of attenuation.

Figure D-11 - Proposed Development Model - 1 in 100 Year +40%CC Peak Depths



<u>Proposed Development Model – Overland Flow Sensitivity Test</u>

As outlined previously, the Development Extents (illustrated in Figure D-5) are included in the Proposed Development Model with a 60% rainfall percentage, in accordance with the assumed 60% impermeability. A sensitivity test has been developed to exclude the development contributing area by setting the rainfall percentage within the Development Extents to 0% and alongside this, removing the proposed surface water drainage strategy attenuation basins.

Figure D-12 shows how overland flows from the upstream catchment pass through the development in the centre of the site, upstream of Yarnton Medical Practice and similar flow patterns are observed elsewhere across the site.

As illustrated within the figure, flows typically pass through the development in the green corridors proposed with negligible impact to the proposed development parcels. Figure D-12 illustrates how flood extents are constrained to outside of the residential parcels and as such, the development may be considered at minimal risk of flooding from the upstream catchment.

Figure D-12 - Proposed Development Model - 1 in 100 Year +40%CC (Overland Flow Routing Sensitivity Test)

CONCLUSIONS & RECOMMENDATIONS

High level modelling has been undertaken to understand the existing (baseline) surface water flood risk and the potential impact of the proposed development including the provision of surface water 'cut-off' ditches and basins to the west of the proposed residential development parcels.

The modelling undertaken may be considered to be high level, with the aim of demonstrating the principles of the proposed drainage strategy. The approach is considered an appropriate level of detail required to support the outline planning application and further design development is recommended at the next stage of the design.

The baseline modelling is largely consistent with the publicly available Flood Risk from Surface Water mapping and as such it may be reasonable to consider the Baseline Model is largely representative of the current potential flood risk conditions.

The Proposed Development Model indicates upstream overland flows are collected and controlled within the proposed 'cut-off' ditches and basins. Downstream of the site, peak flows and flood depths are reduced and it may be reasonable to assume this is a result of the proposed surface water management within the site. Additional sensitivity testing has been undertaken to show how the upstream catchment is managed and the development may be considered at little risk of surface water flooding from the upstream catchment.

The principles of the proposed surface water drainage strategy including the use of 'cut-off' ditches and basins ensure the site may be developed safely and the post-development surface water flood risk may be considered low.

Given the high-level surface water modelling undertaken to date, it is recommended that this is refined and enhanced during the next stage of design. For example, it would be considered beneficial to incorporate the following elements:

- Further survey information to include:
  - Survey of the outfalls from the site (e.g. CCTV)
  - Additional survey of ditches across the site
- Integration of drainage strategy into the proposed site earthworks and holistic modelling of the combined proposed levels design.
- Refinement of the model hydrology including use of a statistical approach to rainfall
- Modelling of the proposed drainage scheme following design development (i.e. incorporate any sewer collection systems and flow controls)

The Mailbox
Level 2
100 Wharfside Street, Birmingham
B1 1RT

wsp.com