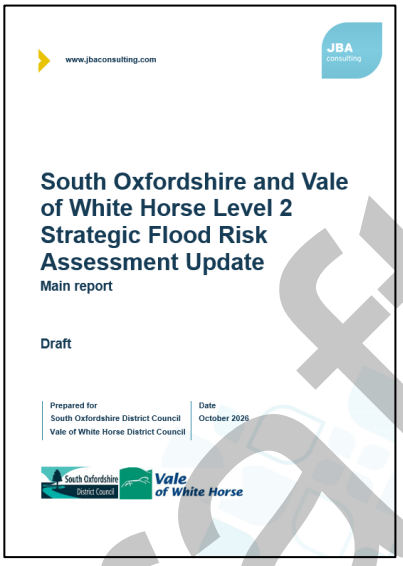
Cover note for the:

DRAFT South Oxfordshire and Vale of White Horse Level 2 Strategic Flood Risk Assessment Update (October 2026)



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We are currently updating our Strategic Flood Risk Assessment (SFRA) to:

i. apply a revised methodology for delineating the functional floodplain, as agreed in our June 2026 statement of common ground with the Environment Agency (examination library reference LPA67); and

ii. take account of updates made to the Environment Agency's national flood risk mapping in July 2026.

The Level 1 SFRA Addendum update is now complete, and this document has been added to the examination library (examination library reference LPA104).

The Level 2 SFRA Update will provide a more detailed assessment of flood risk and mitigation requirements for sites identified in the Joint Local Plan, where this has been identified as necessary in the Level 1 SFRA Addendum.

Work on the Level 2 SFRA Update is at an advanced stage. Our consultants have produced a full draft, which we have shared with the Environment Agency and Lead Local Flood Authority for review. We are submitting this Draft Level 2 SFRA Update to the examination to assist with discussions at the stage three hearing sessions.

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South Oxfordshire and Vale of White Horse Level 2 Strategic Flood Risk Assessment Update

Main report

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Prepared for
South Oxfordshire District Council
Vale of White Horse District Council

Date
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Prepared by	Freya Nation BSc (Hons) Analyst
Reviewed by	Laura Thompson-Jones BSc CGeog FRGS Senior Analyst
Authorised by	Mike Williamson BSc MSc CGeog FRGS EADA Principal Analyst

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Contract

JBA Project Manager	Freya Nation
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2026s1132

This report describes work commissioned by South Oxfordshire District Council and Vale of White Horse District Council by an instruction dated 11 August 2026. The Client's representative for the contract was Rebekah Goodwill of South Oxfordshire and Vale of White Horse District Councils. Freya Nation of JBA Consulting carried out this work.

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The methodology adopted and the sources of information used by JBA in providing its services are outlined in this Report. The work described in this Report was undertaken between August 2026 and November 2026 and is based on the conditions encountered and the information available during the said period. The scope of this Report and the services are accordingly factually limited by these circumstances.

The conclusions and recommendations contained in this Report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate. Information obtained by JBA has not been independently verified by JBA, unless otherwise stated in the Report.

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Acknowledgements

JBA would like to thank the representatives of South Oxfordshire District Council, Vale of White Horse District Council, Oxfordshire County Council, and the Environment Agency for information provided to inform this assessment.

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Abbreviations

1D	One Dimensional (modelling)
2D	Two Dimensional (modelling)
AEP	Annual Exceedance Probability
DTM	Digital Terrain Model
EA	Environment Agency
FMfP	Flood Map for Planning
FRA	Flood Risk Assessment
HFM	Historic Flood Map
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
NaFRA2	National Flood Risk Assessment 2
NFM	Natural Flood Management
NPPF	National Planning Policy Framework
OS	Ordnance Survey
PPG	Planning Practice Guidance
RFO	Recorded Flood Outline
RoFSW	Risk of Flooding from Surface Water
SCG	Statement of Common Ground
SFRA	Strategic Flood Risk Assessment

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1 Introduction

JBA Consulting were commissioned to produce a Level 2 Strategic Flood Risk Assessment (SFRA) for South Oxfordshire and Vale of White Horse District Councils (the Councils) to support their Joint Local Plan, as all identified potential development sites could not be allocated outside areas of medium or high flood risk, as identified through the Level 1 SFRA. The Level 2 SFRA was finalised in September 2025. Since finalisation of the Level 2 SFRA, the Environment Agency (EA) have published additional outputs of their National Flood Risk Assessment 2 (NaFRA2), updating the national surface water flood risk mapping for England (Section 1.1).

The councils have worked with the EA to establish a Statement of Common Ground (SoCG) as part of the Joint Local Plan examination process. A summary SoCG was agreed in June 2025. Within the summary SoCG, at paragraph 2.6, the EA raised a need to update the Level 2 SFRA to account for changes to the Flood Map for Planning (FMfP) within the study area. On the 17th of June 2026 an updated SoCG between the councils and the EA was published to include an appendix with the EA's comments on the Joint Local Plan site allocations. The updated SoCG highlights that the EA's New National Model (which has been used to delineate the functional floodplain where there is no detailed modelled data included in the Rivers and Sea 3.3% AEP defended event flood risk extent) is regularly reviewed and that the Councils should further update the delineation of Flood Zone 3b through the SFRA.

It was therefore agreed with the Councils that an update to the 2025 Level 2 SFRA would be produced to understand any changes to flood risk at each Joint Local Plan site, accounting for new and updated datasets. In addition, references to the NPPF will be updated to reflect the update published in September 2026. This report supersedes the 2025 Level 2 SFRA Main Report.

1.1 NaFRA2

The EA published the updated Flood Map for Planning (FMfP) on the 25 March 2025 with further updates to surface water mapping on 28 May 2026. The FMfP now shows updated extents for Flood Zone 2 (0.1% Annual Exceedance Probability (AEP)) and Flood Zone 3 (1% AEP) which incorporate new national modelling as well as local detailed model outputs where available. In addition to the updated flood zones, the following information is now also provided:

- Rivers and sea with defences
  - Mapping for the 3.3% AEP, 1% AEP, and 0.1% AEP events for present day and climate change (using the Central allowance for the 2080s epoch) taking account the presence of flood defences (extents only).
- Rivers and sea without defences

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- Mapping for the 3.3% AEP, 1% AEP, and 0.1% AEP events for present day and climate change (using the Central allowance for the 2080s epoch) which ignores the presence and condition of flood defences (extents only).

- Surface Water Spatial Planning
  - Mapping for the flood extents and banded flood depths for the present day and climate change (using the Upper End allowance for the 2070s epoch) 3.3%, 1% and 0.1% AEP events

1.2 Level 2 SFRA

Using the outputs from the Level 1 SFRA Addendum (2026), the Councils have performed the sequential test on all available sites using the administrative area of both districts as the search area. The outcomes of the sequential test found that there were no reasonably available alternative sites, within the search area, at lower risk of flooding. Hence the necessity for a more detailed assessment of flood risk through this Level 2 SFRA.

The Level 1 SFRA Addendum (2026) entailed the flood risk screening of 64 potential development site allocations for inclusion in the Joint Local Plan. 21 of these sites were shown to be at medium or high flood risk yet considered important to the Joint Local Plan strategy. These sites were previously assessed through the 2025 Level 2 SFRA, therefore these reports have been updated in this Level 2 SFRA update.

This Level 2 SFRA has been prepared with full consideration of the latest government and EA guidance on flood risk and planning policy, namely:

- National Planning Policy Framework (NPPF) 2026,
- Flood Risk and Coastal Change Planning Practice Guidance (FRCC-PPG) 2025,
- How to Prepare a Strategic Flood Risk Assessment guidance 2026,
- Strategic Flood Risk Assessment Good Practice Guide 2021,
- Flood Risk Assessments: Climate Change Allowances 2022.

The Councils have consulted the EA, the Lead Local Flood Authority (LLFA) and other key stakeholders throughout the Level 2 SFRA process with full transparency provided between all parties.

At the time of writing, this Level 2 SFRA has assessed and considered flood risk in the Joint Local Plan area at a specific point in time. This Level 2 SFRA has been developed using the most up-to-date data and information available at the time of publication. The Level 2 SFRA has been future proofed as far as possible though the reader should always confirm with the source organisation (the Councils) that the latest information is being used when decisions concerning development and flood risk are being considered.

This SFRA uses the EA's Flood Map for Planning (FMfP) Flood Zones and Flood Zones plus Climate Change to assess fluvial risk, accessed in August 2026, and the Flood Map for Planning Surface Water Spatial Planning datasets to assess surface water flood risk, also accessed in August 2026.

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The FRCC-PPG (September 2025), alongside the NPPF (September 2026), is referred to throughout this SFRA, being the current primary development and flood risk policy and guidance available at the time of the finalisation of this SFRA.

The EA's SFRA guidance states a review of a SFRA should be carried out when there are changes to:

- The predicted impacts of climate change on flood risk,
- Detailed flood modelling - such as from the EA or LLFA,
- The spatial development strategy or relevant local development documents,
- Local flood management schemes,
- Flood risk management plans,
- Local flood risk management strategies, and
- National planning policy or guidance.

The SFRA should also be reviewed after a significant flood event. It is in any authority's interest to keep the SFRA as up to date as possible.

Ideally, the SFRA should be kept as a 'live' entity and continually updated when new information becomes available. The EA requests for reports and maps to be published online and be easily updateable, when required.

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2 Level 2 SFRA requirements

The aim of a Level 2 assessment is to build on the findings of the Level 1 SFRA, focussing on identified sites or communities at high and medium flood risk that are considered important to Local Plan development. This allows the SFRA process to be time efficient using detailed modelling techniques only where they are required in the Level 2 assessment. These locations usually include significant development and / or regeneration areas that are at medium or high risk of flooding from main rivers, ordinary watercourses, or surface water whilst also accounting for the impacts of climate change. Flood risk data such as modelled flood extents, depths, and hazards are used to assess the suitability of these areas for development. Appropriate mitigation techniques and achievable site layouts can then be informed.

This detailed information should support further application of the sequential test, the sequential approach to development management, inform on whether sites can pass the exception test, where applicable, and allow for flood risk indicators to be produced for use in the Sustainability Appraisal of the Joint Local Plan.

EA SFRA guidance states a Level 2 SFRA should:

- *Be detailed enough for the LPA to identify which potential site allocations have the least risk of flooding,*
- *Contain the information needed to apply the exception test, if relevant,*
- *Enable the LPA to decide if development can be made safe without increasing flood risk elsewhere.*

It should enable the LPA to:

- *Apply the sequential approach by identifying the severity and variation in risk within medium and high flood risk areas,*
- *Establish whether proposed allocations or windfall sites, on which your local plan will rely, are capable of being made safe throughout their lifetime without increasing flood risk elsewhere,*
- *Apply the exception test, where relevant.*

A site-specific FRA will be required at the planning application stage which will assess risk to each site in greater detail than this Level 2 SFRA. The Level 2 SFRA is a strategic assessment that is not intended to replace the requirement of a site-specific FRA.

2.1 Objectives

In accordance with the latest national policy and guidance, the requirements of the Councils, and with consideration of the limitations stated in Chapter 6, the key objectives of this Level 2 SFRA update are to:

- Assess present day flood risk from all sources (fluvial, surface water, groundwater, canals, and reservoirs),

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- Document potential residual risk from potential defence breaches and culvert blockages (no modelling),
- Assess detailed modelled outputs including flood depths, velocities, and hazards, where information is available,
- Assess existing flood warnings and advise on required emergency planning procedures and safety of site access and escape routes in times of flood,
- Account for the potential cumulative impacts of development based on the cumulative impacts assessment carried out for the Level 1 SFRA,
- Provide site-specific advice on mitigation options i.e. developable / non-developable areas; blue / green infrastructure and open spaces; maintenance of fluvial and / or surface water flow routes; land raising and compensatory storage; and advice on minimum finished floor levels; SuDS,
- Assess any catchment-wide or strategic solutions, e.g. upstream opportunity areas for flood management (storage solutions) to mitigate against the risk of flooding downstream and elsewhere using Natural Flood Management (NFM) and Working with Natural Processes (WwNP) datasets,
- Demonstrate whether the second part of the Exception Test (part b) can be passed for the potential development site allocations, where applicable,
- Provide recommendations for additional and future works required following on from or to supplement the Level 2 SFRA i.e. further fluvial or surface water modelling including for climate change, modelling of site layout / design options including provisions for safe access and escape routes, development optioneering (land raising, compensatory storage, flow routes / rates), drainage strategies, site-specific FRA requirements.

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3 Available data and information

The data and information described in this chapter has been used in the Level 2 SFRA to assess the risk to each site.

3.1 EA flood models

Table 3-1 lists the EA hydraulic river models covering the Level 2 sites within the study area. Additional modelling beyond the available outputs noted in Table 3-1 has not been carried out for this assessment, due to the Councils' Joint Local Plan budget and programme not allowing for this.

Table 3-1: EA river models

Model	Return periods available	Climate change availability
River Thames - Thames (Sandford to Pangbourne) 2018	2-year, 5-year, 10-year, 20-year, 30-year, 50-year, 75-year, 100-year, 200-year, 1000-year	100-year + 25%, 100-year + 35%, 100-year + 70%
Northfield & Littlemore Brooks 2011	5-year, 20-year, 100-year, 1000-year	100-year +20%
Didcot Valley Park 2019	100-year, 1000-year	None
Moor Ditch (Didcot to Thames Confluence) 2007	20-year, 100-year, 1000-year	100-year +20%
Stert (A34 to Thames Confluence) 2012	5-year, 20-year, 100-year, 1000-year	100-year +20%
Letcombe Brook 2009	5-year, 20-year, 100-year, 1000-year	100-year +20%

3.1.1 1D flood mapping

Upon review of the EA's flood models, it is apparent that modelled flood depth and hazard information are not available for the Didcot Valley Park 2019 model and the Moor Ditch (Didcot to Thames Confluence) 2007 model. For both models, depth and hazard information have been manually produced through a simple 1D mapping process involving the projection of existing modelled 1D flood depths within the river channel across a 2D LiDAR digital terrain model surface.

3.2 EA Open Data (August 2026)

Additional to the EA modelling information, the following datasets available from the EA's Open Data have been considered in the Level 2 SFRA:

- 2025 LIDAR digital terrain model (DTM) data
- FMfP Flood Zones 2 and 3
- FMfP Flood Zones plus Climate Change (Central allowance for 2080s epoch)

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- Flood Storage Areas
- FMfP Surface Water Spatial Planning flood extents for the present day and climate change (Upper End allowance for 2070s epoch) 3.3%, 1% and 0.1% Annual Exceedance Probability (AEP) events
- FMfP Surface Water Spatial Planning flood depths for the present day and climate change (Upper End allowance for 2070s epoch) 3.3%, 1% and 0.1% Annual Exceedance Probability (AEP) events
- Third generation Risk of Flooding from Surface Water (RoFSW) hazards for 3.3%, 1% and 0.1% AEP events
- Statutory Main River Map
- AIMS Spatial Flood Defences
- Historic Flood Map
- Recorded Flood Outlines
- Flood Warning Areas
- Flood Alert Areas
- Reservoir Flood Map
- Working with Natural Processes:
  - Riparian Woodland Potential
  - Wider Catchment Woodland Potential
  - Floodplain Woodland Potential
  - Floodplain Reconnection Potential
  - Runoff Attenuation Features 3.3% AEP
  - Runoff Attenuation Features 1% AEP

3.3 Other datasets

Other datasets and information used include:

- JBA 5m Groundwater Flood Map (already available under licence from JBA Risk Management from the Level 1 SFRA)
- LLFA historic flood incident register
- Sewer flooding - Thames Water flood incident register
- Canal & River Trust - historic overtopping and breach events
- Functional floodplain dataset - updated functional floodplain delineated through the Level 1 SFRA Addendum (2026)
- OS Open Data base-mapping.

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4 Methodology

This chapter presents the methodology used in each stage of the Level 2 SFRA. The site-specific reports (Appendix A) contain further information.

4.1 Assessing fluvial flood risk

4.1.1 Functional floodplain

The functional floodplain was updated through the Level 1 SFRA addendum (2026) and is assessed at each site, where applicable.

4.1.2 Climate change

EA SFRA guidance states that the SFRA should assess the effects of climate change on all sources of flooding, including the functional floodplain, to help inform the sequential approach to development. For rivers, the central allowance for the 2080s is recommended for assessment in SFRAs, as stated in the EA's Climate Change Allowance Guidance.

Where detailed climate change modelling outputs were not available, the Flood Map for Planning - Flood Zones plus Climate Change dataset has been used. This dataset shows how the combined extent of Flood Zones 2 and 3 could increase with climate change over the next century, ignoring the benefits of any existing flood defences, using the 'Central' allowance for the 2080s epoch (2070-2125) for risk of flooding from rivers.

Joint Local Plan policy (Section 5) details the requirements for development to be directed to the areas with the lowest risk of flooding from any source, taking into account the impacts of climate change.

The potential impacts of climate change on the functional floodplain have also been assessed to produce a 'future functional floodplain' flood extent, as updated through the Level 1 SFRA addendum (2026).

4.2 Assessing surface water flood risk

4.2.1 Extents

Surface water flood extents have been assessed using the EA's most recent version of the Flood Map for Planning Surface Water Spatial Planning Extents dataset at the time of writing, downloaded August 2026.

4.2.2 Depths and hazards

The Flood Map for Planning - Surface Water Spatial Planning Present Day Depths dataset has been used to assess surface water flood depths, also downloaded in August 2026.

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning data does not include hazard information suitable for planning purposes.

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Therefore, this Level 2 SFRA considers the third generation Risk of Flooding from Surface Water (RoFSW) hazard mapping in addition to the Flood Map for Planning - Surface Water Spatial Planning extents and depths, as the best available information. Updated surface water hazard information should be confirmed at the site-specific FRA stage.

4.2.3 Climate change

EA climate change guidance states that for SFRAs, the upper end allowance on peak rainfall for the 2070s should be modelled for the 3.3% and 1% AEP events. For South Oxfordshire and Vale of White Horse, this entails the allowances as shown in Table 4-1. The upper end peak rainfall allowance should be applied in drainage design unless site-specific justification demonstrates an alternative approach is appropriate.

The EA released the Flood Map for Planning - Surface Water Spatial Planning Climate Change Extent and Depths datasets in May 2026, which includes the modelled 2070s upper end peak rainfall intensity allowances. The climate change allowances are based on the latest UK Climate Projections (UKCP18) from the Met Office, using the Representative Concentration Pathway (RCP) 8.5.

This dataset has been used to assess the impact of climate change on surface water flooding to each site. The allowance for the 0.1% AEP event is not stated by the EA.

Joint Local Plan policy (Section 5) details the requirements for development to be directed to the areas with the lowest risk of flooding from any source, taking into account the impacts of climate change.

Table 4-1: Peak rainfall allowances for the management catchments within South Oxfordshire and Vale of White Horse

Management catchment	Allowance category	Total potential change (%) anticipated for '2070s' (2061 to 2125) 3.3% AEP	Total potential change (%) anticipated for '2070s' (2061 to 2125) 1% AEP
Cherwell and Ray	Upper end	35%	40%
Cotswolds	Upper end	35%	40%
Gloucestershire and the Vale	Upper end	35%	40%
Kennet and Tributaries	Upper end	35%	40%
Thames and South Chilterns	Upper end	35%	40%

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4.3 Residual risk

Paragraph 004 of the FRCC-PPG states the requirement in plan making to account for residual flood risks from flood risk management infrastructure. For this Level 2 SFRA, this involves the consideration of potential defence breach locations and blockage or failure of drainage assets, such as culverts.

Potential residual risk from structure blockages and raised defence breaches have not been modelled, due to the accelerated timetable of the Joint Local Plan. Where a site is identified to be at potential residual risk, recommendations for further work are provided. It is recommended that any update to this Level 2 SFRA and/or any site-specific FRA should include for defence breach or structure blockage modelling to allow for an up-to-date assessment of residual risk.

For sites potentially at residual risk, the FRCC-PPG includes the following information:

- Areas of residual risk should be included in the sequential approach to risk avoidance when sequential testing or through development management,
- Where avoidance is not shown to be feasible through appropriate sequential testing, flood resistance and resilience measures should be in place, including for finished floor levels to be place above the design flood level plus a minimum of 600mm,
- Adequate flood warning and emergency plans should be available to site users. Residual risks will need to be safely managed to ensure people are not exposed to hazardous flooding. This includes the ability of residents and site users to safely access and escape a building during the design flood and to evacuate before an extreme flood event which is defined as the 0.1% AEP event with an allowance for climate change this event is not available in the EA models),
- The likelihood of defences keeping pace with climate change should be considered e.g. is funding available and what are the funding options (e.g. Community Infrastructure Levy, planning obligations / S106 agreements, or Partnership Funding). This should inform the nature of residual risk to be considered and whether new development can remain safe for its lifetime,
- LPAs should use information on identified residual risk to state in strategic policies their preferred mitigation strategy for ensuring development will be safe throughout its lifetime in relation to urban form, risk management and where flood mitigation measures are likely to have wider sustainable design implications,
- A site-specific FRA will be required for all sites modelled to be at residual risk. The FRAs would need to show that appropriate emergency plans, evacuation procedures, flood response infrastructure, and property flood resilience measures are in place to manage the residual risk associated with an extreme flood event.

4.4 Assessing flood risk from reservoirs

The EA's SFRA guidance requests for the assessment of risk from reservoir dam failure using the EA's Reservoir Flood Map (RFM). This Level 2 SFRA assess potential reservoir flood risk in both a 'dry day' and 'wet day' scenario. The 'dry day' scenario shows the flood

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extents if a reservoir were to fail and release the water held when local rivers are at normal levels, whereas the 'wet day' assumes the local rivers have already overflowed their banks.

The RFM shows the credible worst-case scenarios from dam failure. If a site is shown to be at risk, the SFRA should advise if the design or maintenance of the reservoir would need improving. It is advised that the reservoir owner(s) are consulted to ascertain the flood risk in more detail and whether the proposed development could affect the reservoir's risk designation, it's design category or how it is operated.

Para 046 of the FRCC-PPG states the following in relation to the risk of flooding from a reservoir:

"The local planning authority will need to evaluate the potential damage to buildings or loss of life in the event of dam failure, compared to other risks, when considering development downstream of a reservoir. Local planning authorities are also advised to consult with the owners/operators of raised reservoirs, to establish constraints upon safe development.

Local planning authorities should also consider any implications for reservoir safety and reservoir owners and operators caused by new development located downstream of a reservoir, such as the cost of measures to improve the design of the dam to reduce flood risk, the operation of the reservoir, and general maintenance costs, by consulting with reservoir owners and operators on plan and development proposals. Local authorities, as category 1 responders, can access more information about reservoir risk and reservoir owners using the Resilience Direct system. Developers should be expected to cover any additional costs incurred, as required by the National Planning Policy Framework's 'agent of change' policy (paragraph 187[1]). This could be through Community Infrastructure Levy or section 106 obligations for example.

Applications will need to include any evidence local planning authorities need to understand the impact of individual developments on reservoirs. In doing so, they need to refer to relevant guidance in the Institution of Civil Engineers publication Floods and Reservoir Safety (4th edition) and the Environment Agency's Guide to risk assessment for reservoir safety management. It may be necessary to seek expert advice, such as from an All Reservoirs Panel Engineer, from the government accredited list under How to appoint a panel engineer.

Consideration should also be given to the potential impacts of development on the operation of reservoirs. This is particularly important where impacts could affect the management of flood risk or the supply of water."

Only sites AS2 (Land adjacent to Culham Campus) and JT1f (Abingdon Science Park) are shown to be at risk from reservoir flooding according to the RFM. The LPA may wish to follow the above guidance for these sites. However, this is for wider consideration within the local planning authority and emergency planning teams outside of the Level 2 SFRA.

1 See Paragraph P4: Impact of development on existing activities in NPPF 2026.

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4.5 Assessing flood risk from groundwater emergence

Susceptibility of areas to groundwater emergence is appraised using JBA's national 5m Groundwater Flood Map. In creating this map, modelling was carried out to show how and where groundwater levels would rise following prolonged periods of rainfall, considering factors such as topography, groundwater recharge volumes and spatial variations in aquifer storage and transmission properties. The model outputs were validated against recorded groundwater levels for past flood events and checked against areas historically affected by groundwater flooding. The high-resolution maps make it easier for users to pinpoint and report risks from groundwater emergence.

4.6 Assessing flood risk from sewers

Information suitable for inclusion in the Level 2 assessment was not available.

4.7 Assessing historic flood risk

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. Details on historic flooding have been documented within the site-specific reports where applicable. The LPA have also provided information on historic flood incidents within the vicinity of the sites.

4.8 Access and escape and emergency planning

The EA's Flood Warning Areas and Flood Alert Areas have been reviewed and mapped against each potential site allocation. Potential access and escape routes have been documented for each site, identified where they are modelled to stay dry or experience non-hazardous to life flooding. Liaison with emergency planners and the local resilience forum may be required at the site-specific FRA stage. Safe access and escape routes are subject to highways approval at application stage.

4.9 Cumulative impacts

A joined-up approach should be adopted between developers at the FRA stage for any clusters of sites to ensure possible flood risk mitigation at one site does not increase risk to a neighbouring or downstream site as a result of loss of floodplain storage, the deflection or constriction of flood flow routes, or through inadequate management of surface water. Paragraph 049 of the FRCC-PPG states that site-specific flood risk assessments should assess cumulative impacts and demonstrate how mitigation measures have addressed them. The site-specific reports recommend for any clusters of sites at significant risk to be combined into a wider drainage strategy and masterplanning process.

Cumulative impacts of development and land use change were assessed in the Level 1 SFRA addendum (2026). The site reports in Appendix A recommend for any clusters of sites at significant risk to be combined into a wider drainage strategy and masterplanning process.

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4.10 Working with Natural Processes

The EA's national Working with Natural Processes mapping dataset has been assessed as to whether there is any potential for NFM measures that could benefit potential site allocations. This includes for tree planting, enhancing floodplain connectivity and attenuation of runoff through gully blocking and other runoff attenuation features.

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5 Joint Local Plan Policy

The Joint Local Plan (pre-submission version, October 2024) policy relating to development and flood risk, which applies to all sites assessed as part of this Level 2 SFRA update, is outlined below.

Policy CE6 - Flood risk

1) The risk and impact of flooding must be minimised by:

   a) directing development to areas with the lowest risk of flooding from any source, taking into account current and future impacts of climate change;

   b) ensuring development does not increase the risk of flooding elsewhere;

   c) ensuring development is safe for its lifetime; and

   d) taking opportunities provided by development and improvements in green and other infrastructure to reduce the causes and impacts of flooding, making as much use as possible of natural flood management techniques that also deliver wider environmental benefits.

2) Development in areas at risk of flooding must pass the Sequential Test and where necessary the Exception Test, where they are required by national planning policy and guidance. Regard should be had to the Joint Local Plan Strategic Flood Risk Assessment (or any future update) in applying the tests.

3) A site-specific Flood Risk Assessment (FRA) must be provided for all development in Flood Zones 2 and 3. In Flood Zone 1 a FRA must accompany all proposals involving:

   a) sites of 1 hectare or more;

   b) land identified in the Strategic Flood Risk Assessment as being at increased flood risk in future; or

   c) land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

   FRAs must consider all sources of flood risk and the impacts of climate change. FRAs must also consider the cumulative impact of development on flood risk as set out in the Joint Local Plan Strategic Flood Risk Assessment (or any future update). It should be demonstrated that flood risk downstream will not be made worse by development. Measures that contribute to a reduction in flood risk downstream are encouraged.

4) Where flood risk is a consideration and relevant tests have been passed development must:

   a) firstly, seek to minimise flood risk through design, with site layouts that locate the most vulnerable elements of development

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in areas of lowest flood risk (or on upper storeys) as far as possible and by raising finished floor and/or ground levels where appropriate.

b) then, where appropriate, investigate opportunities to control the risk of flooding in discussion with the council, Environment Agency and Oxfordshire County Council (as Lead Local Flood Authority). Consideration should be given to natural flood management techniques.

c) then use flood resistance and resilience measures to address any residual risk. Passive measures should be prioritised over active measures.

d) then consider any further flood management measures required. Safe access and escape routes must be provided. Consideration must also be given to whether adequate flood warning will be available to people using the development.

5) Planning permission will not be granted for development in the functional flood plain (Flood Zone 3b) except where it is for water-compatible uses or essential infrastructure (as defined in national planning policy and guidance) or where it is on brownfield land and includes a high standard of flood resistance and resilience measures designed to decrease risk compared with the existing situation. All of the following criteria must also be met:

a) development will not lead to a net increase in the built footprint and where possible will reduce the built footprint;

b) development will not result in a reduction in flood storage and where possible will increase flood storage;

c) development will not increase the risk of flooding elsewhere; and

d) any future occupants of the development will not be put at risk and safe access and escape routes will be provided.

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Policy CE8 - Water quality, wastewater infrastructure and drainage

Protecting and enhancing water quality

1) Development must protect and enhance water quality, including through:

   a) the use of green infrastructure, including sustainable drainage systems (SuDS);

   b) utilising natural means of water quality improvements where possible, with mechanical water quality improvement devices only being used in situations where insufficient water quality improvement can be achieved through natural means;

   c) maximising water efficiency; and

   d) identifying and implementing opportunities to remedy historical water contamination issues, where appropriate.

2) Where a development includes the creation or extension of roads, the potential water quality issues associated with road runoff must be considered and appropriate mitigation provided to address impacts.

3) Where development may have an adverse impact on water quality, evidence must be provided that identifies potential impacts (including for human health, the natural environment and amenity) and suitable mitigation. Engagement should be undertaken with the Environment Agency to agree the scope and content of the evidence required. Mitigation must be in place before any environmental effects occur. Where appropriate, water quality monitoring should be undertaken and submitted to the council to ensure that mitigation is effective.

Meeting legal requirements

4) Development, individually or cumulatively, must not prevent the future attainment of "good" status under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.

5) Where there are impact pathways on habitats of national or international importance, development must not prevent a protected waterbody achieving the objectives set out in the Common Standards Monitoring Guidance (or any future standards/guidance that may supersede this).

Wastewater infrastructure

6) There must be adequate wastewater treatment capacity to serve development.

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7) Applications for major development must be supported by a Sewage Capacity Assessment.

8) Where wastewater infrastructure capacity constraints are identified, development must not commence until the delivery of sufficient new and/or upgraded wastewater infrastructure has been agreed and programmed (between the developer and Thames Water or other utility provider). Development must not be occupied until the necessary wastewater treatment infrastructure upgrades have been completed. A phased approach may be required to ensure alignment between development and infrastructure delivery. The council will apply Grampian conditions, where appropriate, to ensure that adequate sewerage capacity is in place before new homes are occupied in order to protect water quality.

Drainage

9) All development will be required to provide a Drainage Strategy.

10) Development will be expected to incorporate sustainable drainage systems (SuDS) that:

a) are well designed;

b) are appropriate to their location (for example, infiltration SuDS are unlikely to be appropriate in areas of contamination, even following remediation);

c) are multifunctional, providing a range of benefits for people and nature, including protecting and enhancing water quality (including groundwater quality), managing flood risk and supporting biodiversity;

d) attenuate run-off rates to greenfield run-off rates. Higher rates would need to be justified and the risks quantified. Development on brownfield land should reduce run-off rates to as close to greenfield rates as possible; and

e) reduce the amount of water discharging to the wider wastewater infrastructure network at source, with opportunities taken to disconnect flows where possible. (For example, by using features such as water butts, swales and rain gardens, rather than direct network connections from gullies and rainwater pipes.)

11) Major development must comply with the latest local standards and guidance for surface water drainage produced by the Lead Local Flood Authority (Oxfordshire County Council).*

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12) No new surface water connections are to be connected to a foul sewer. For brownfield sites, where existing connections are proven, the drainage strategy should seek to either remove these if feasible or attenuate existing flows to as close to the QBar greenfield rate as feasible or to a rate acceptable to Thames Water whichever is the lower.

13) In the case of extensions to buildings, changes of use and refurbishments, developments are encouraged to take the opportunity to upgrade the drainage of the existing building as well as the extension, by disconnecting roof drainage from the surface water sewer network and incorporating soakaways, water butts and greywater recycling schemes.

14) All development will be required to demonstrate suitable arrangements for future maintenance and management of drainage schemes. All below ground drainage serving more than one property should be designed to adoptable standards and offered to an OFWAT approved statutory water authority for adoption.

15) In areas where high groundwater could potentially affect the drainage system, specific measures should be incorporated in any new network provided to reduce the risk of groundwater affecting the drainage system.

**Current local standards can be found at Oxfordshire County Council (December 2021) Local Standards and Guidance for Surface Water Drainage on Major Development in Oxfordshire. V1.2: www.oxfordshirefloodtoolkit.com/wp-content/uploads/2022/01/LOCAL-STANDARDS-AND-GUIDANCE-FOR-SURFACE-WATER-DRAINAGE-ON-MAJOR-DEVELOPMENT-IN-OXFORDSHIRE-Jan-22-2.pdf*

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6 Limitations

This Level 2 SFRA update has been prepared under several limitations associated with the availability and quality of data. These limitations have been subject to consultation with council officers whereby alternative approaches have been agreed to enable the Level 2 SFRA to be prepared using available existing information. Consultation has also been undertaken with the EA, who have approved the use of alternative approaches. The timescales of the Joint Local Plan programme meant it was not possible to update EA flood models with the latest information. The limitations include the following:

- The latest available EA flood models provided for use in the Level 2 SFRA are not up to date with the latest hydrology, therefore they may not be fully representative of current hydrological conditions. Model survey and digital terrain model data may also not be based on the latest information. The Councils' Joint Local Plan budget and programme would not allow for any updates to the EA models. The EA models used in the assessment are listed in Table 3-1.
- As shown in Table 3-1, the latest climate change allowances for peak flows are also not represented in the models. Where detailed climate change modelling outputs were not available, the Flood Map for Planning - Flood Zones plus Climate Change dataset has been used. It is recommended any site-specific FRA should include for the most up to date climate change allowances to allow for an up-to-date assessment of future flood risk.
- This Level 2 SFRA update considers the third generation Risk of Flooding from Surface Water map to assess surface water hazard, as appropriate hazard data is not available as part of the Flood Map for Planning Surface Water Spatial Planning dataset, at the time of writing. It is recommended that updated surface water modelling is completed as part of the site-specific FRA to provide a robust assessment of present day and future surface water flood risk.
- Several sites being assessed are at risk of flooding from rivers though a local detailed EA model is not available for a more robust assessment of the risk. Therefore, flood risk can only be assessed using the Flood Map for Planning which is based on the New National Model. Depth, hazard and velocity information is unavailable for assessment in these areas, at the time of writing.
- Upon review of the EA's flood models, it is apparent that modelled flood depth and hazard information are not available for the Didcot Valley Park 2019 model and the Moor Ditch (Didcot to Thames Confluence) 2007 model. Modelled flood depth and hazard information is required to inform flood risk and potential developability of sites in a Level 2 SFRA. Depth and hazard information in these areas have therefore been produced using a simple 1D mapping process. This involves projecting existing modelled 1D flood depths within the river channel across a 2D LIDAR digital elevation model terrain surface. This method assumes uniformity across each cross-section and does not account for the detailed variations in topography and flow behaviour that occur laterally. Consequently,

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extrapolated flood extents may not be robustly predicted, leading to the formulation of isolated patches of flooding with no connectivity to the modelled watercourse. Small-scale topographical features, such as depressions and minor elevations, may not be adequately resolved in the model, resulting in misrepresentations of where water might pool or flow.

- Residual flood risks from flood risk management infrastructure should be assessed through the Level 2 SFRA. However, due to the accelerated timetable for the Joint Local Plan, updating the available EA models to represent any residual risk scenarios was not possible.

Any future SFRA update should look to include updates to the EA models with the latest information that is available at the time, including up to date hydrology inputs, channel and bank survey, LIDAR terrain data, and using the latest modelling software to update and run the models. The latest climate change allowances should be modelled and used to update the SFRA. Any future SFRA update should also use any detailed culvert information available from the LLFA to more robustly define the functional floodplain and any residual risk modelling of culvert blockage scenarios.

Joint Local Plan policies (Section 5) in relation to development and flood risk refer to directing development to the areas at the lowest risk of flooding from any source. Therefore, in the absence of an update to the SFRA ahead of any planning application for allocated sites, the site-specific FRA should address all these limitations to the satisfaction of the LPA, the EA, and the LLFA, where required.

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7 Level 2 SFRA site assessments

21 individual detailed Level 2 SFRA site screening reports have been produced detailing the site-specific assessments caried out through this Level 2 SFRA update.

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7.1 Summary of Level 2 SFRA outcomes

Table 7-1: Level 2 site assessment outcomes

Site reference	Site name	How has main risk been identified?	Summary of Level 2 assessment	Main barriers to development	Further work / next steps
AS1	Land at Berinsfield Garden Village	Fluvial (River Thame) - no model available, therefore limited assessment	The exception test is not required for this site as it is not located within Flood Zone 3a. Updated present day and climate change modelling of the River Thame and the unnamed watercourse should be used to update this Level 2 SFRA at the earliest opportunity to provide an up-to-date strategic assessment of flood risk to this site and the surrounding areas. It would be acceptable to update the modelling at the site-specific FRA stage. Were this site to be allocated based on current information, the LPA must make it clear that this site cannot be developed until the required information detailed in this SFRA on existing and future flood risk from the River Thame and the unnamed watercourse is fully ascertained.	Absence of detailed river modelling. Groundwater conditions.	Site-specific FRA to inform development, including updated modelling of the River Thame

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Site reference	Site name	How has main risk been identified?	Summary of Level 2 assessment	Main barriers to development	Further work / next steps
AS2	Land adjacent to Culham Campus	Fluvial (River Thames) - Thames (Sandford to Pangbourne) 2018	Based on current information, this site should be able to pass the exception test. However, all the recommendations suggested in this Level 2 SFRA should be considered at the site-specific FRA stage or before any site design planning. Updated climate change modelling of the River Thames should be used to update this Level 2 SFRA at the earliest opportunity to provide an up-to-date strategic assessment of flood risk to this site and the surrounding areas. It would be acceptable to use updated modelling to suitably assess risk through a site-specific FRA, as well as/instead of a Level 2 SFRA update. Were this site to be allocated based on current information, the LPA must make it clear that this site cannot be developed until the required information detailed in this SFRA on flood risk from the River Thames is fully ascertained.	Fluvial risk from the River Thames and absence of detailed modelling of climate change. Groundwater conditions.	Site-specific FRA to inform development, including updated modelling of River Thames
AS3	Land South of Grenoble Road, Edge of Oxford	Fluvial - Northfield & Littlemore Brooks 2011	Based on current information, this site should be able to pass the exception test. However, all the recommendations suggested in this Level 2 SFRA should be considered at the site-specific FRA stage or before any site design planning. Updated climate change modelling of Northfield Brook and Littlemore Brook should be used to update this Level 2 SFRA at the earliest opportunity to provide an up-to-date strategic assessment of flood risk to this site and the surrounding areas.	Fluvial risk from Northfield Brook and Littlemore Brook and absence of detailed modelling of climate change.	Site-specific FRA to inform development, including updated modelling of Northfield Brook and Littlemore Brook.

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Site reference	Site name	How has main risk been identified?	Summary of Level 2 assessment	Main barriers to development	Further work / next steps
			It would be acceptable to use updated modelling to suitably assess risk through a site-specific FRA, as well as/instead of a Level 2 SFRA update. Were this site to be allocated based on current information, the LPA must make it clear that this site cannot be developed until the required information detailed in this SFRA on flood risk from Northfield Brook and Littlemore Brook is fully ascertained.	Surface water flood risk. Groundwater conditions.	
AS4	Land at Northfield, Edge of Oxford	Fluvial - Northfield & Littlemore Brooks 2011	Based on current information, this site should be able to pass the exception test. However, all the recommendations suggested in this Level 2 SFRA should be considered at the site-specific FRA stage or before any site design planning. Updated climate change modelling of Northfield Brook should be used to update this Level 2 SFRA at the earliest opportunity to provide an up-to-date strategic assessment of flood risk to this site and the surrounding areas. It would be acceptable to use updated modelling to suitably assess risk through a site-specific FRA, as well as/instead of a Level 2 SFRA update. Were this site to be allocated based on current information, the LPA must make it clear that this site cannot be developed until the required information detailed in this SFRA on flood risk from Northfield Brook is fully ascertained.	Fluvial risk from Northfield Brook and absence of detailed modelling of climate change. Surface water flood risk. Groundwater conditions. Potential residual risk from Northfield Brook culvert.	Site-specific FRA to inform development, including updated modelling of Northfield Brook including residual risk from culvert.
AS5	Land at Bayswater	Fluvial (Bayswater Brook) - no model	Based on current information, this site should be able to pass the exception test. However, all the	Fluvial risk from	Site-specific FRA to inform

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Site reference	Site name	How has main risk been identified?	Summary of Level 2 assessment	Main barriers to development	Further work / next steps
	Brook, Edge of Oxford	available, therefore limited assessment	recommendations suggested in this Level 2 SFRA should be considered at the site-specific FRA stage or before any site design planning. Updated present day and climate change modelling of Bayswater Brook and Sydlings Brook should be used to update this Level 2 SFRA at the earliest opportunity to provide an up-to-date strategic assessment of flood risk to this site and the surrounding areas. It would be acceptable to use updated modelling to suitably assess risk through a site-specific FRA, as well as/instead of a Level 2 SFRA update. Were this site to be allocated based on current information, the LPA must make it clear that this site cannot be developed until the required information detailed in this SFRA on existing and future flood risk from Bayswater Brook and Sydlings Brook is fully ascertained.	Bayswater Brook and Sydlings Brook and absence of detailed modelling of climate change. Surface water flood risk. Groundwater conditions.	development, including updated modelling of Bayswater Brook and Sydlings Brook.
AS6	Rich's Sidings and Broadway, Didcot	Surface water	The exception test is not required for this site as it is not located within Flood Zone 3a. Based on current information, this site could be allocated if development avoids the short surface water flow path along the eastern boundary of the site. A surface water drainage strategy, proportionate to the risk, will be required to show that surface water flood risk can be managed onsite.	Surface water flood risk to surrounding roads.	Site-specific FRA to inform development.
AS7	Didcot Gateway, Didcot	Surface water	The exception test is not required for this site as it is not located within Flood Zone 3a. Based on current information, this site could be allocated	Surface water flood risk.	Site-specific FRA to inform development.

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Site reference	Site name	How has main risk been identified?	Summary of Level 2 assessment	Main barriers to development	Further work / next steps
			if development avoids the area at modelled surface water flood risk. Surface water risk should be attenuated onsite and included in site design and layout. A drainage strategy will be required for any new development.		
AS8	North West of Grove, Grove	Surface water	The exception test is not required for this site as it is not located within Flood Zone 3a. Based on current information, this site could be allocated if development avoids the areas of significant surface water ponding onsite. Surface water risk should be attenuated onsite and included in site design and layout. A detailed drainage strategy will be required for any new development, given the flow paths and ponding present on a large site.	Surface water flood risk. Groundwater conditions.	Site-specific FRA to inform development.
AS9	North West of Valley Park, Didcot	Fluvial - Didcot Valley Park 2019 / Moor Ditch (Didcot to Thames Confluence) 2007. No modelled depths or hazards provided within the EA model share therefore derived through 1D mapping approach	The exception test is not required for this site as it is not located within Flood Zone 3a. Present day depth and hazard information and updated climate change modelling from the Didcot Valley Park 2019 model should be used to update this Level 2 SFRA at the earliest opportunity to provide an up-to-date strategic assessment of flood risk to this site and the surrounding areas. It would be acceptable to use updated modelling to suitably assess risk through a site-specific FRA, as well as/instead of a Level 2 SFRA update. Were this site to be allocated based on current information, the LPA must make it clear that this site cannot be developed until the required information	Fluvial risk from unnamed drain and absence of detailed modelling of climate change.	Updated modelling of unnamed drain.

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Site reference	Site name	How has main risk been identified?	Summary of Level 2 assessment	Main barriers to development	Further work / next steps
			detailed in this SFRA on future flood risk from the unnamed drain is fully ascertained.		
AS10	Land at Dalton Barracks Garden Village, Shippon	Fluvial (Sandford Brook) - no model available, therefore limited assessment	The exception test is not required for this site as it is not located within Flood Zone 3a, and it is expected that vulnerable development will avoid the area of functional floodplain. Updated present day and climate change modelling of Sandford Brook should be used to update this Level 2 SFRA at the earliest opportunity to provide an up-to-date strategic assessment of flood risk to this site and surrounding areas. It would be acceptable to update the modelling at the site-specific FRA stage. Were this site to be allocated based on current information, the LPA must make it clear that this site cannot be developed until the required information detailed in this SFRA on existing and future flood risk from Sandford Brook is fully ascertained.	Absence of detailed river modelling. Groundwater conditions.	Site-specific FRA to inform development, including updated modelling of Sandford Brook.
AS11	Culham Campus	Surface water	The exception test is not required for this site as it is proposed for less vulnerable uses. Site wholly in Flood Zone 1. Development design and layout should include for the surface water flow path through the east of the site. A detailed drainage strategy will be required for any new development, given the large area of the site. Options to de-culvert should be explored within the site masterplan development.	Surface water flood risk. Groundwater conditions.	Site-specific FRA to inform development.

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Site reference	Site name	How has main risk been identified?	Summary of Level 2 assessment	Main barriers to development	Further work / next steps
AS12	Harwell Campus	Surface water	The exception test is not required for this site as it is proposed for less vulnerable uses. It should be appropriate for this site to be allocated, given the low fluvial and surface water flood risk to the site. A full detailed drainage strategy would be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA.	Surface water flood risk.	Site-specific FRA to inform development.
AS15	Harcourt Hill Campus	Surface water	The exception test is not required for this site as it is not located within Flood Zone 3a. It should be appropriate for this site to be allocated, given the low fluvial and surface water flood risk to the site. A detailed drainage strategy will be required for any new development, given the large area of the site.	Surface water flood risk. Groundwater conditions.	Site-specific FRA to inform development.
AS16	Vauxhall Barracks, Didcot	Surface water	The exception test is not required for this site as it is not located within Flood Zone 3a. It should be appropriate for this site to be allocated, given the low fluvial and surface water flood risk to the site. A drainage strategy would therefore be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development.	Surface water flood risk.	Site-specific FRA to inform development.
JT1a	Southmead Industrial Estate, Didcot	Fluvial - Moor Ditch (Didcot to Thames Confluence) 2007. No modelled depths or hazards provided within the	The exception test is not required for this site as it is proposed for less vulnerable uses. Updated modelling of Moor Ditch should be used to update this Level 2 SFRA at the earliest opportunity to provide an up-to-date strategic assessment of flood risk to this site and the surrounding areas.	Fluvial risk from Moor Ditch and absence of detailed modelling of	Site-specific FRA to inform development, including updated modelling of

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Site reference	Site name	How has main risk been identified?	Summary of Level 2 assessment	Main barriers to development	Further work / next steps
		EA model share therefore derived through 1D mapping approach	It would be acceptable to use updated modelling to suitably assess risk through a site-specific FRA, as well as/instead of a Level 2 SFRA update. Were this site to be allocated based on current information, the LPA must make it clear that this site cannot be developed until the required information detailed in this SFRA on flood risk from Moor Ditch is fully ascertained.	climate change. Groundwater conditions.	Moor Ditch.
JT1b	Grove Technology Park	Surface water	The exception test is not required for this site as it is proposed for less vulnerable uses. It should be appropriate for this site to be allocated, given the low fluvial and surface water flood risk to the site. A detailed drainage strategy will be required for any new development, given the large area of the site.	Surface water flood risk. Groundwater conditions.	Site-specific FRA to inform development.
JT1d	Hithercroft Industrial Estate, Wallingford	Surface water	The exception test is not required for this site as it is proposed for less vulnerable uses. Updated present day and climate change modelling of Bradford's Brook its tributaries should be used to update this Level 2 SFRA at the earliest opportunity to provide an up-to-date strategic assessment of fluvial flood risk to the site. It should be appropriate for this site to be allocated, given the low fluvial and surface water flood risk to the site. However, were this site to be allocated based on current information, the LPA must make it clear that this site cannot be developed until the required information detailed in this SFRA on present day and future flood risk from fluvial sources is fully ascertained.	Surface water flood risk. Groundwater conditions. Safe access and escape routes.	Site-specific FRA to inform development, including detailed modelling of Bradford's Brook and its tributaries.

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Site reference	Site name	How has main risk been identified?	Summary of Level 2 assessment	Main barriers to development	Further work / next steps
			Updated surface water hazard information is required to understand whether Lupton Road is a viable access and escape route from the eastern site parcel.		
JT1e	Monument Business Park, Chalgrove	Surface water	The exception test is not required for this site as it is proposed for less vulnerable uses. This site could be allocated if development avoids the area at modelled surface water flood risk in the high and medium risk events. A detailed drainage strategy will be required for any new development, given the large proportion of the site at surface water risk.	Surface water flood risk. Groundwater conditions.	Site-specific FRA to inform development.
JT1f	Abingdon Science Park	Fluvial - Thames (Sandford to Pangbourne) 2018. No model available for Radley Park Ditch therefore limited assessment of risk from this watercourse	The exception test is not required for this site as it is proposed for less vulnerable uses. Updated climate change modelling of the River Thames and Radley Park Ditch should be used to update this Level 2 SFRA at the earliest opportunity to provide an up-to-date strategic assessment of flood risk to this site and the surrounding areas. It would be acceptable to use updated modelling to suitably assess risk through a site-specific FRA, as well as/instead of a Level 2 SFRA update. Were this site to be allocated based on current information, the LPA must make it clear that this site cannot be developed until the required information detailed in this SFRA on flood risk from the River Thames and Radley Park Ditch is fully ascertained.	Fluvial risk from the River Thames and absence of detailed modelling of climate change. Absence of detailed modelling for Radley Park Ditch. Potential residual risk from Radley Park Ditch culvert	Site-specific FRA to inform development, including detailed modelling of Radley Park Ditch.

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Site reference	Site name	How has main risk been identified?	Summary of Level 2 assessment	Main barriers to development	Further work / next steps
				blockage and defence breach.	
JT1i	Former Esso Research Centre	Surface water	The exception test is not required for this site as it is proposed for less vulnerable uses. It should be appropriate for this site to be allocated, given the low fluvial and surface water flood risk to the site. A drainage strategy would be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development.	Surface water flood risk.	Site-specific FRA to inform development.
JT1k	South of Park Road, Faringdon	Surface water	The exception test is not required for this site as it is proposed for less vulnerable uses. It should be appropriate for this site to be allocated, given the low fluvial and surface water flood risk to the site.	Surface water flood risk. Groundwater conditions.	Site-specific FRA to inform development.

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A Appendix A - Level 2 SFRA update site screening reports

Contains 21 individual Level 2 SFRA site screening reports.

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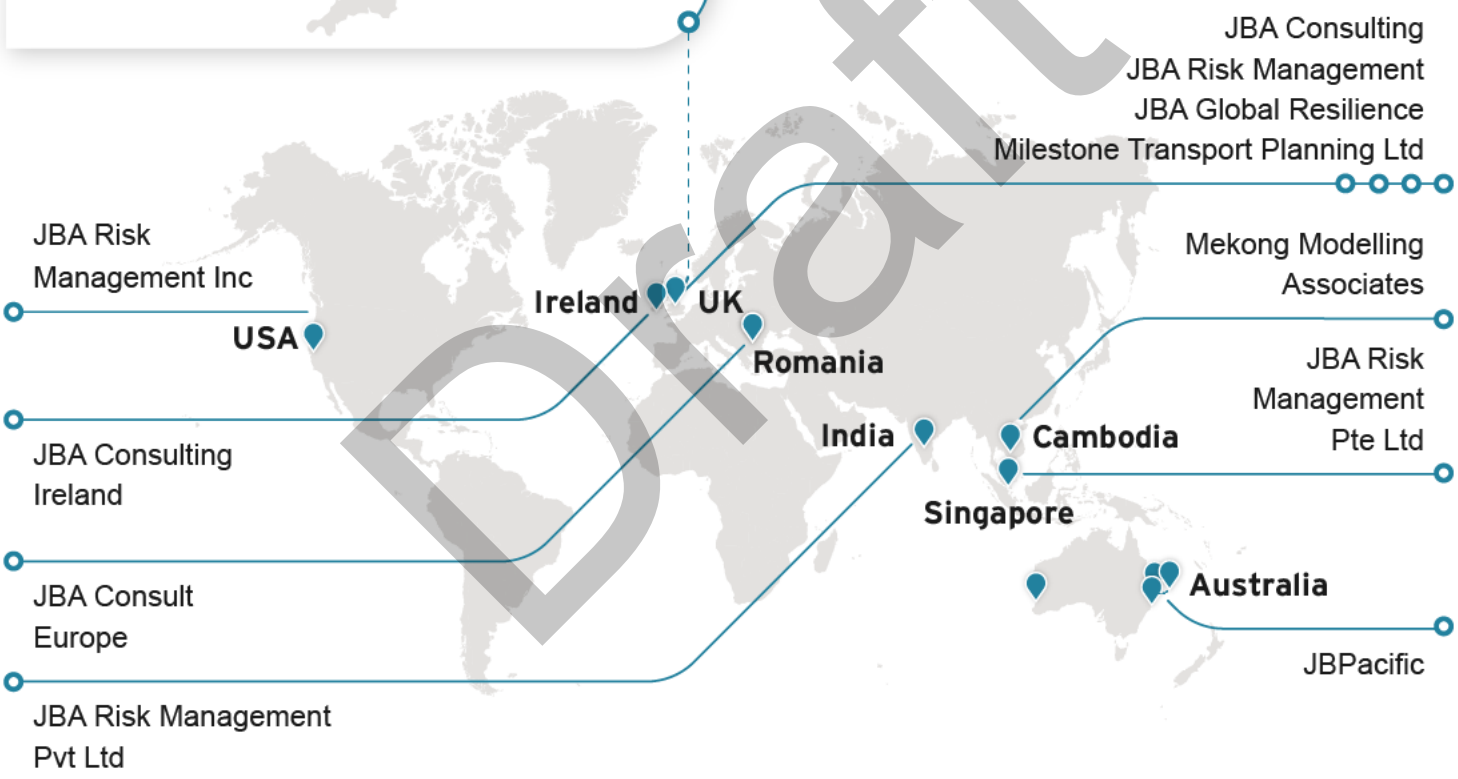

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Registered Office
1 Broughton Park
Old Lane North
Broughton
SKIPTON
North Yorkshire
BD23 3FD
United Kingdom

+44(0) 1756 799919
info@jbaconsulting.com
www.jbaconsulting.com

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Jeremy Benn
Associates Limited
Registered in
England
3246693

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South Oxfordshire and Vale of White Horse Level 2 Strategic Flood Risk Assessment Update

Site AS1 - Land at Berinsfield Garden Village

Draft Report

October 2026

Prepared for:

South Oxfordshire District Council and

Vale of White Horse District Council

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Reviewed by	Laura Thompson-Jones BSc CGeog FRGS Senior Analyst
Authorised by	Mike Williamson BSc MSc CGeog FRGS EADA Project Director

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Contract

JBA Project Manager	Freya Nation
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2026s1132

This report describes work commissioned by South Oxfordshire and Vale of White Horse District Councils. The Client's representative for the contract was Rebekah Goodwill of South Oxfordshire and Vale of White Horse District Councils. Boe Kilshaw of JBA Consulting carried out this work.

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The methodology adopted and the sources of information used by JBA in providing its services are outlined in this Report. The work described in this Report was undertaken between August and October 2026 and is based on the conditions encountered and the information available during the said period. The scope of this Report and the services are accordingly factually limited by these circumstances.

Where assessments of works or costs identified in this Report are made, such assessments are based upon the information available at the time and where appropriate are subject to further investigations or information which may become available.

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Unless otherwise stated in this Report, the assessments made assume that the sites and facilities will continue to be used for their current purpose without significant changes.

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for South Oxfordshire and Vale of White Horse Joint Local Plan Site AS1 - Land at Berinsfield Garden Village. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA' (2024) and the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum' (2026), and read the 'South Oxfordshire and Vale of White Horse District Councils Level 2 SFRA Main Report Update' (2026) and is therefore familiar with the terminology used in this report.

1.1 Site AS1 - Land at Berinsfield Garden Village

- Location: Land at Berinsfield Garden Village (Figure 1-1)
- Existing site use: Agriculture
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Mixed use; mainly residential and employment
- Proposed site use vulnerability: More vulnerable
- Site area: 132.43 ha
- Proposed development impermeable area: 112.6 ha (assumed 85% of site area)
- EA model: N/A
- Watercourse: River Thame to east of site and unnamed drainage ditches that flow through the south west and north east corners of the site
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for more detailed assessment through Level 2 SFRA (Strategic Recommendation B)
    - Subject to Exception Test
    - Assess present day and future modelled fluvial depths, hazards
    - Assess present day and future modelled surface water depths, hazards

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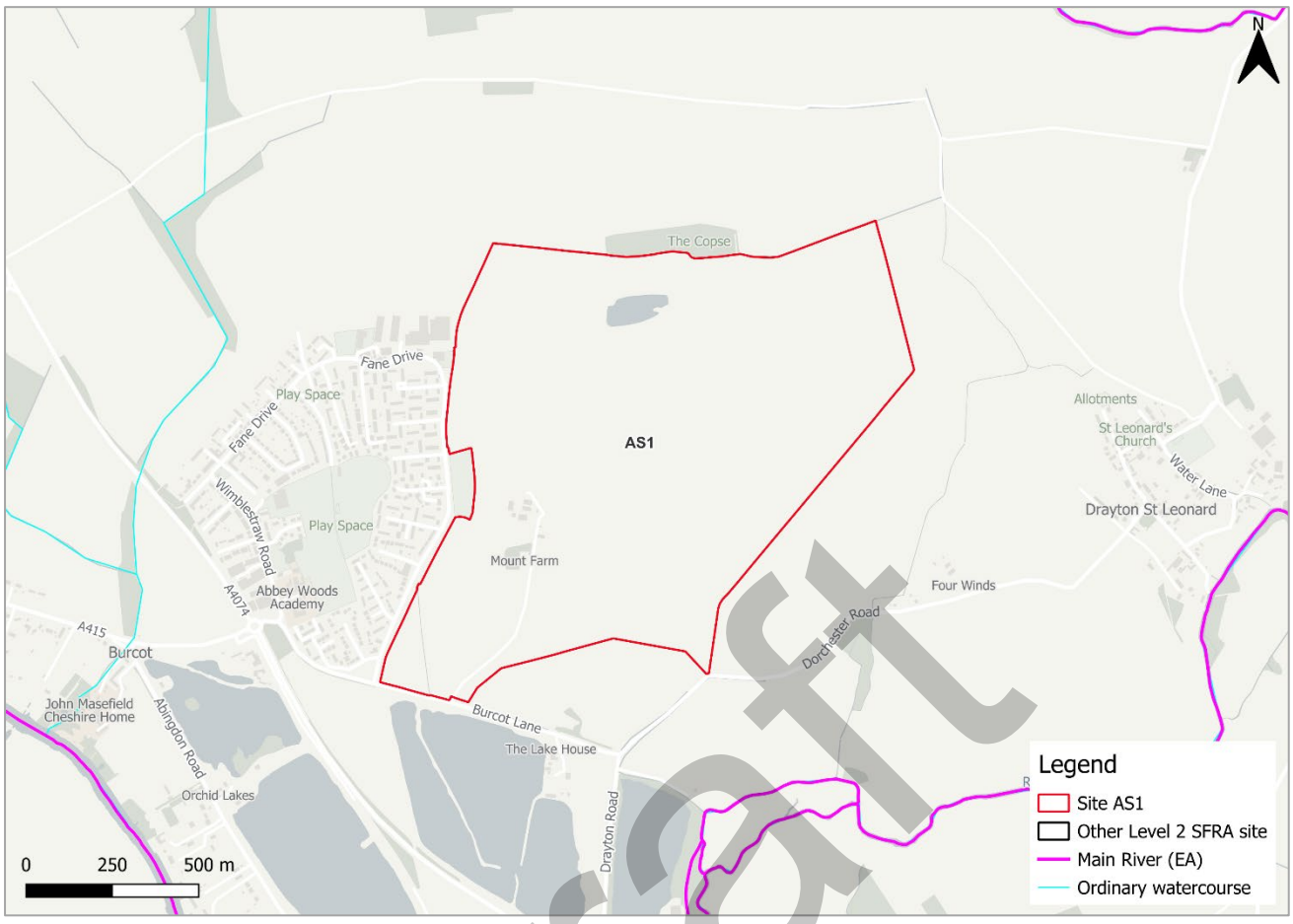

Figure 1-1: Site location

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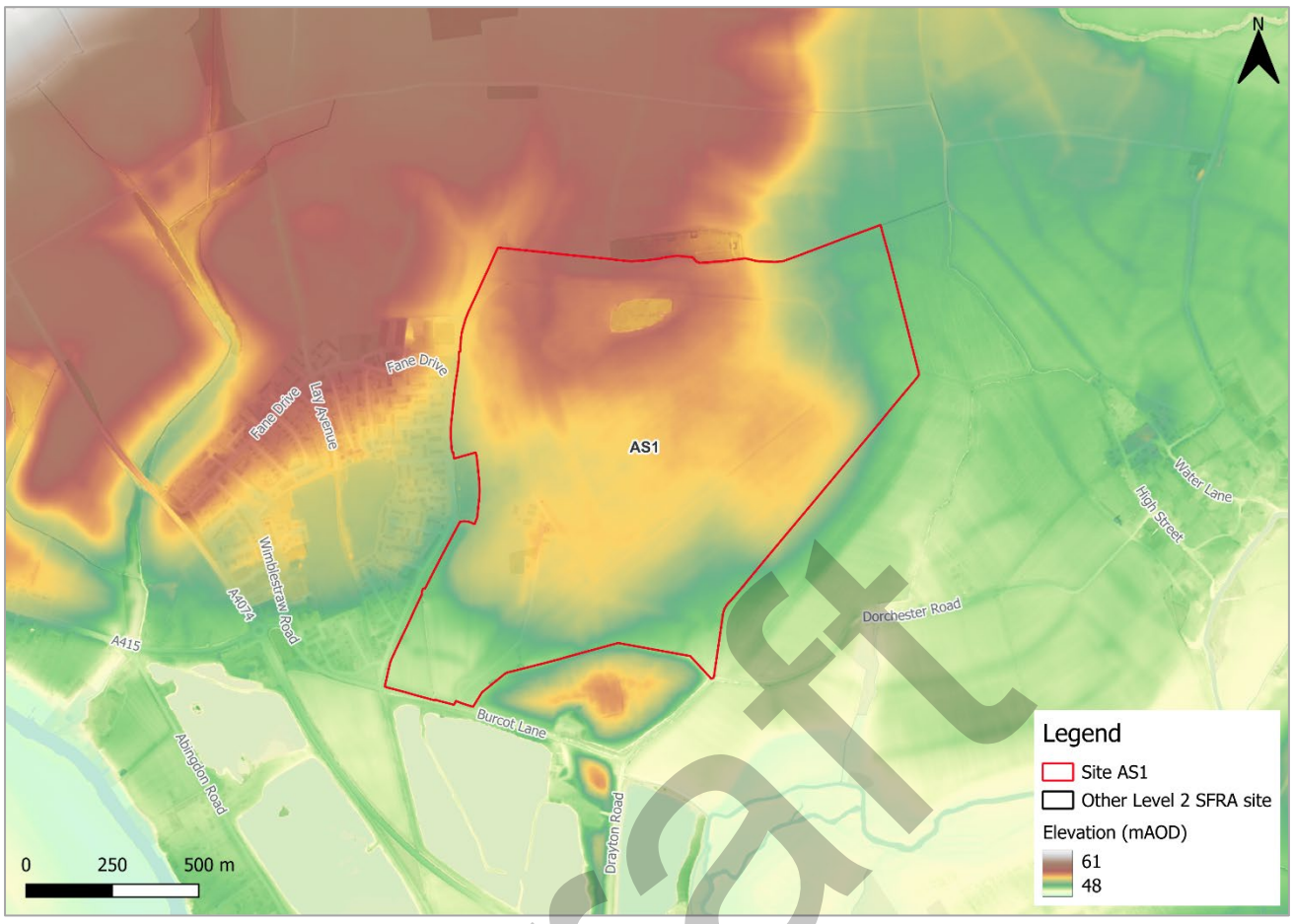

Figure 1-2: Topography

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2 Flood risk from rivers

2.1 Existing risk

2.1.1 Flood Map for Planning and functional floodplain

Based on the Environment Agency's (EA) Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum (2026), the percentage areas of the site within each flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.4).

Approximately 1% of the site modelled to be within Flood Zone 2 and therefore at medium risk of flooding from rivers. The remaining area of the site is modelled to be entirely within Flood Zone 1 and therefore at low risk of flooding from rivers.

The Flood Map for Planning in this location is based on broadscale JFlow modelling. Any site-specific FRA undertaken to inform a planning application should produce a detailed model of the River Thame to understand modelled depths and hazards within the site.

Table 2-1: Existing flood risk based on percentage area of site at risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
99	1	0	0

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Figure 2-1: Existing risk from rivers to the site

2.2 Impacts from climate change

2.2.1 Flood Map for Planning - Flood Zones plus Climate Change

Figure 2-2 shows the EA's Flood Map for Planning - Flood Zones plus Climate Change dataset. Based on this dataset, the site is not shown to be at significant additional risk from climate change.

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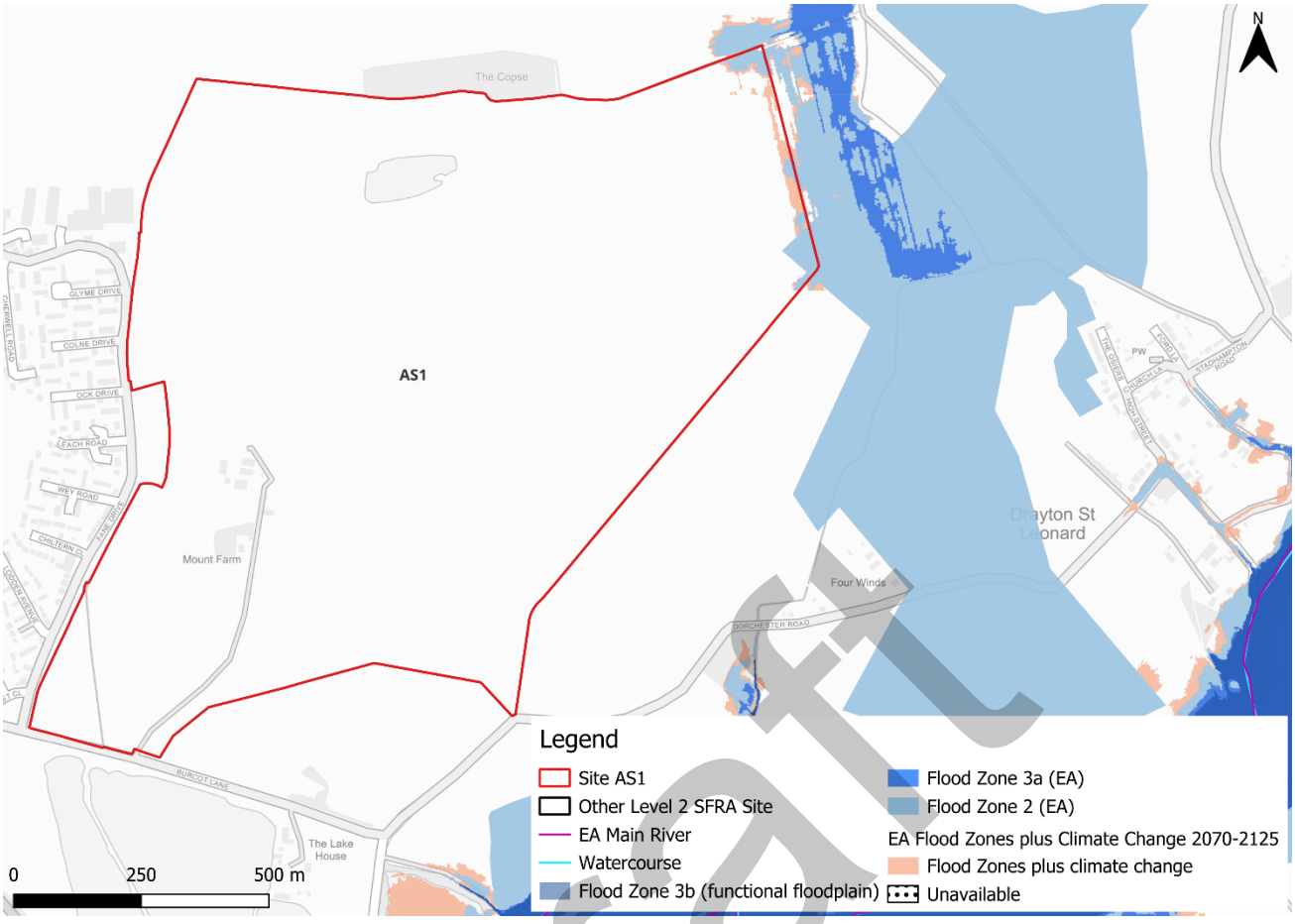

Figure 2-2: EA Flood Zones plus Climate Change Dataset

2.3 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. Historic risk to the site is shown in Figure 2-3 which shows that a small area along the western border of the site has been subject to flooding in the past. The RFO dataset references that the historic event occurred in January 2003 due to channel capacity exceedance of a drain to the west of the site. The River Thame to the south of the site flooded in both 1992 and 2003, with the extent of flooding to the southeast of the site being located approximately 200m from the site boundary.

The RFO dataset also indicates the flood event in January 2003 also impacted a small area close to the road in the south of the site.

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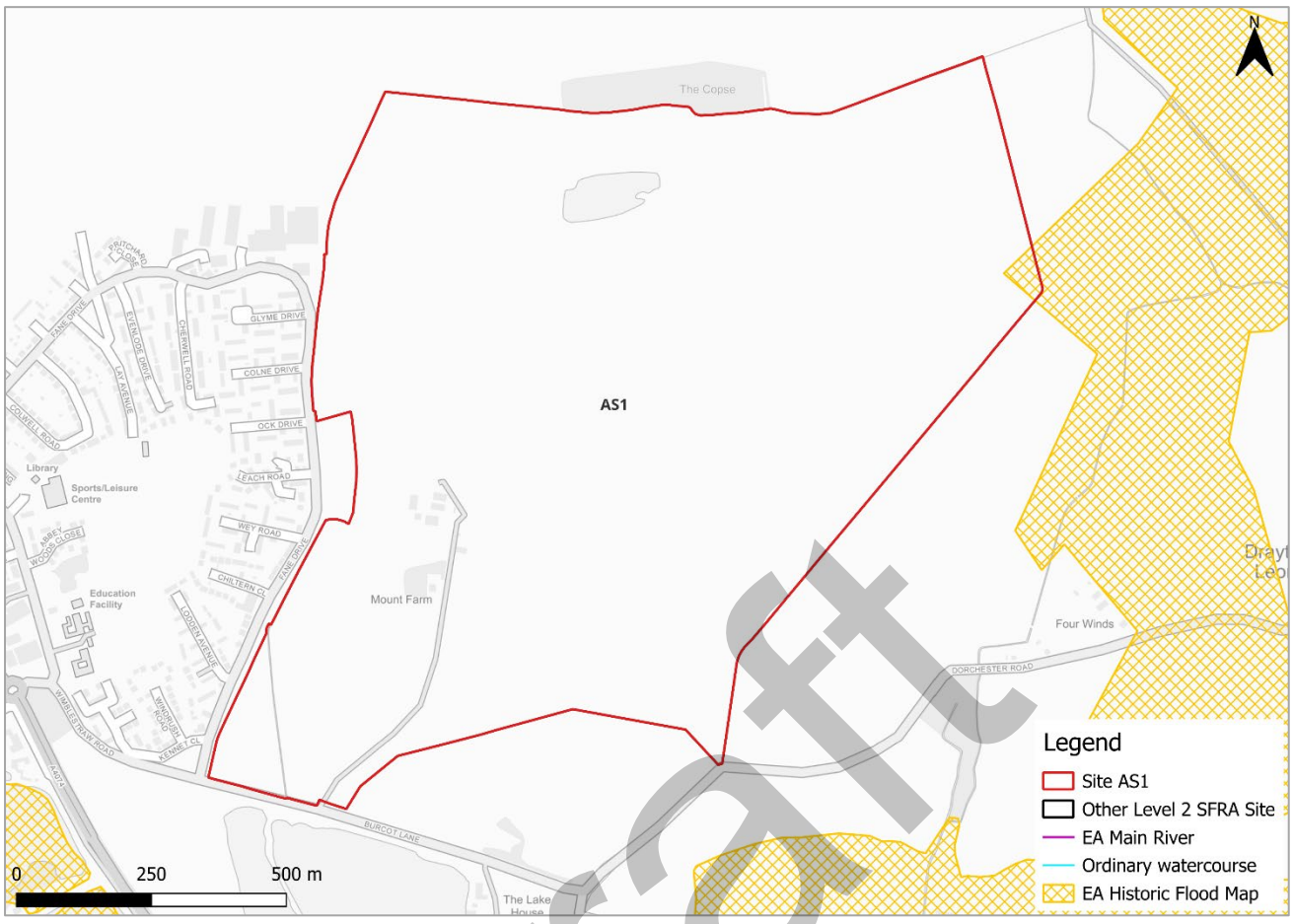

Figure 2-3: Recorded historic flood events onsite and around the site

2.4 Flood risk management

There are no engineered flood defences within the vicinity of the site that are likely to impact fluvial flood risk.

2.4.1 Cumulative impacts

A cumulative impact assessment was completed through the South Oxfordshire and Vale of White Horse Level 1 SFRA Addendum (2026), which aimed to identify catchments sensitive to the cumulative impact of development. Site AS1 (Land at Berinsfield Garden Village) is located within one catchment, namely; Thame (Scotsgrove Brook to Thames). This is ranked as a high sensitivity catchment. Planning considerations for sites at higher sensitivity to the cumulative impacts of development can be found in Appendix D of the Level 1 SFRA Addendum. Cumulative impacts of development should also be considered as part of a site-specific FRA.

2.4.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. Within the south-western corner of the site there is potential for

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floodplain tree planting, which can slow floodwaters and reduce flood peak height. Within the north-eastern corner of the site, there is potential for riparian tree planting, which can slow flows, reduce sediment delivery to the watercourse and reduce bankside erosion. The majority of the site is also identified to have potential for wider catchment tree planting, which can intercept, slow, store and filter water. There is also potential for floodplain reconnection along the drain adjacent to the western site boundary, as well as to the east of the site. These areas are shown in Figure 2-4.

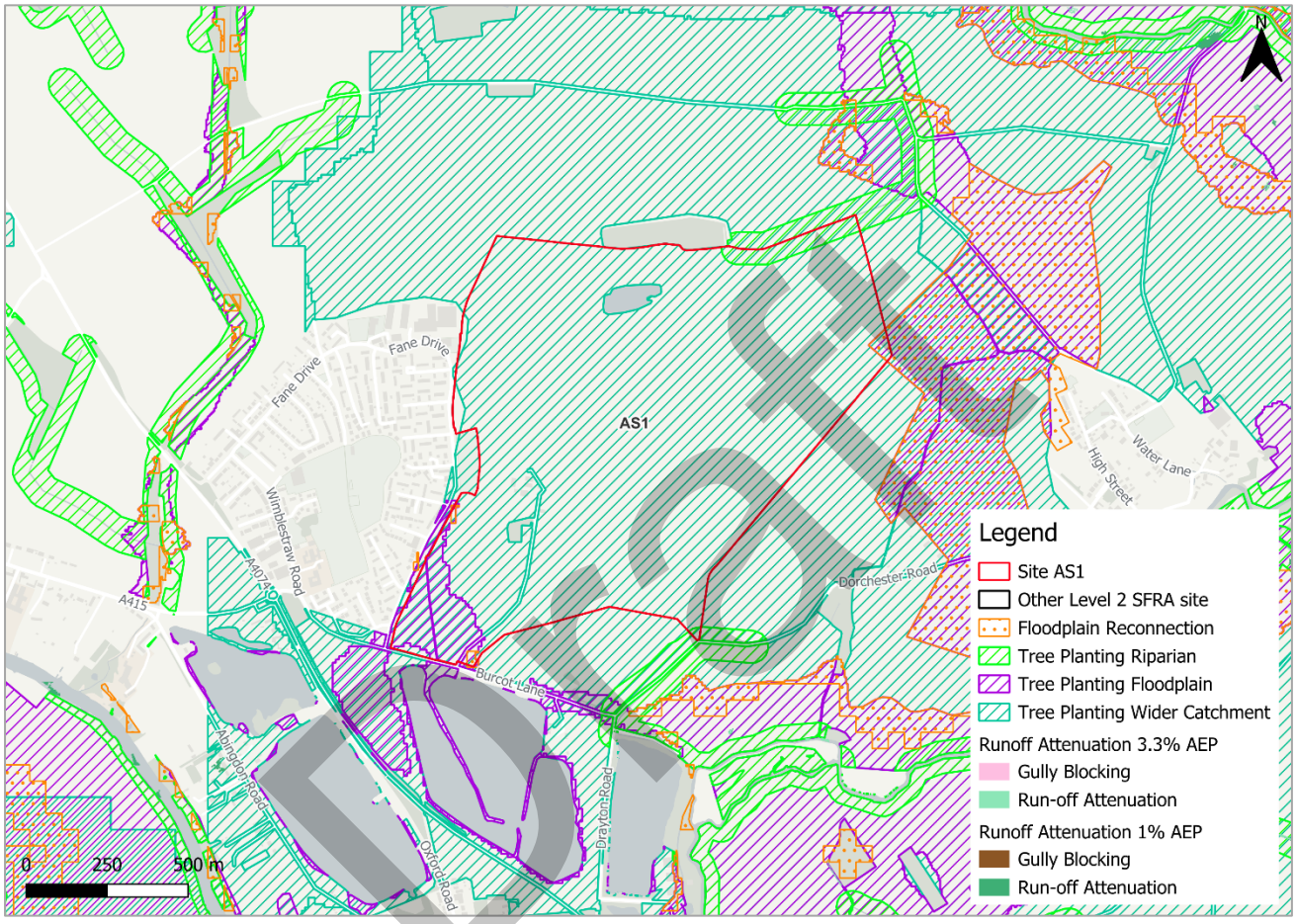

Figure 2-4: Natural Flood Management (NFM) opportunities mapping

2.5 Residual risk

Although a site may be afforded some protection from defences and / or drainage infrastructure, there is always a residual risk of flooding from asset failure i.e. defence breaches, or blockages of culverts or drainage assets. Residual risk at this site comes from the potential blockage or structural failure of the culvert beneath the access track to Mount Farm.

2.5.1 Potential blockage

There is potential residual risk to the site from a possible blockage of the unnamed drain which runs through the southwestern corner of the site and is culverted under the access track to Mount Farm (Figure 2-5). The impact of a blockage of this structure has not been

modelled as part of this Level 2 SFRA, as there is no existing flood model for the watercourse. It is recommended that the site-specific FRA should consider the impact of a blockage of this culvert on residual flood risk to the site.



Figure 2-5: Potential culvert blockage location

2.5.2 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. A "dry day" scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. A "wet day" scenario assumes a worst-case scenario where a reservoir releases water held on a "wet day" when local rivers have already overflowed their banks.

This site is not modelled to be at risk of flooding from reservoirs.

2.6 Emergency Planning

2.6.1 Flood warnings and alerts

The EA operates a Flood Warning Service for properties located within a Flood Warning Area (FWA) for when a flood event is expected to occur. Site AS1 (Land at Berinsfield Garden Village) is not located within a FWA.

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Flood alerts may be issued before a flood warning for properties located within a Flood Alert Area (FAA) to provide advance notice of the possibility of flooding. A flood alert may be issued when there is less confidence that flooding will occur in a FWA. The site is located within a FAA, namely 061WAF19Thame - River Thame, Horsenden Stream and Chalgrove Brook.

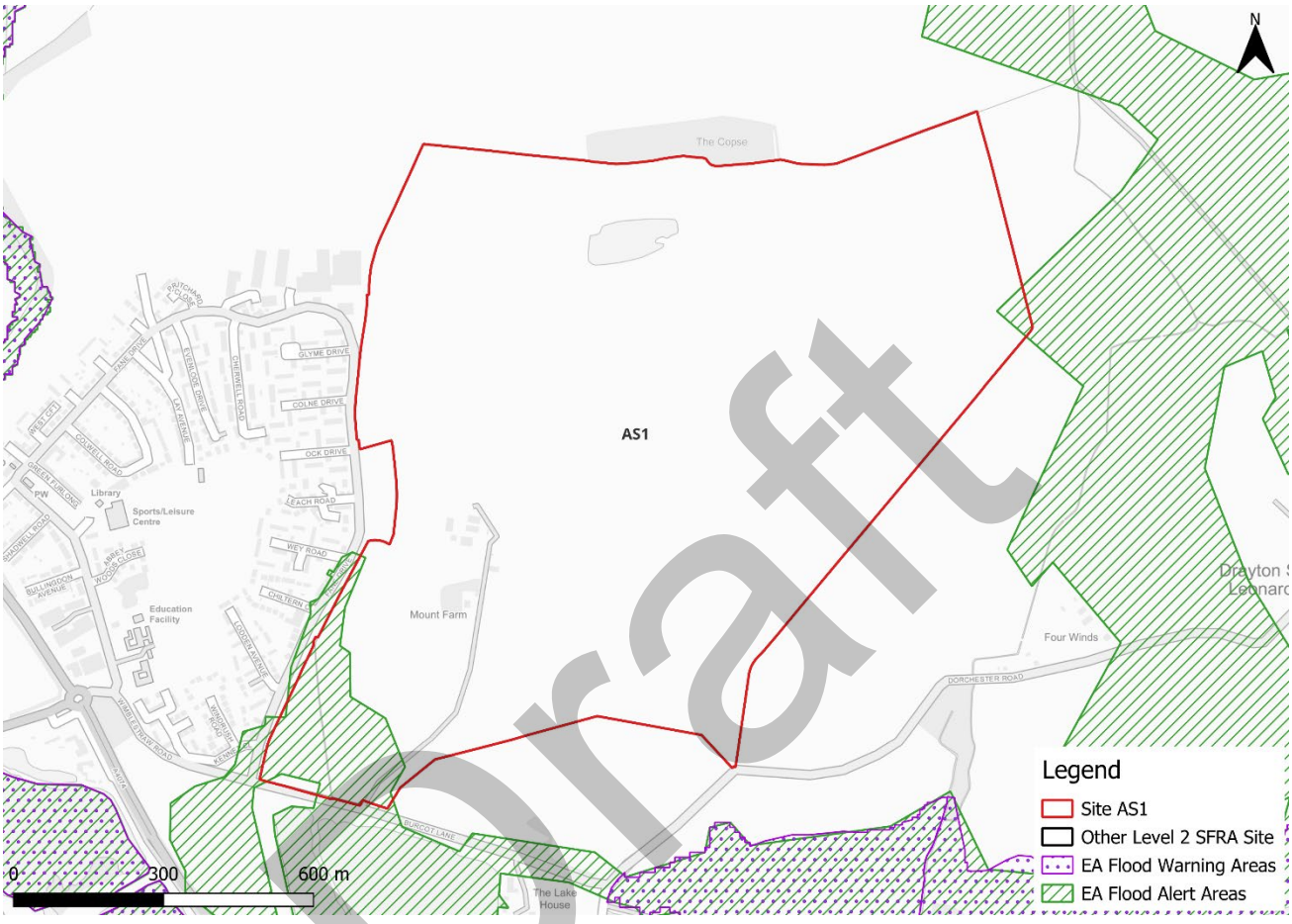

Figure 2-6: EA Flood Warning and Alert Areas

2.6.2 Access and escape routes

Based on the Flood Map for Planning, safe access and escape should be possible via Fane Drive to the west of the site. This route is indicated by the yellow lines in Figure 2-7.

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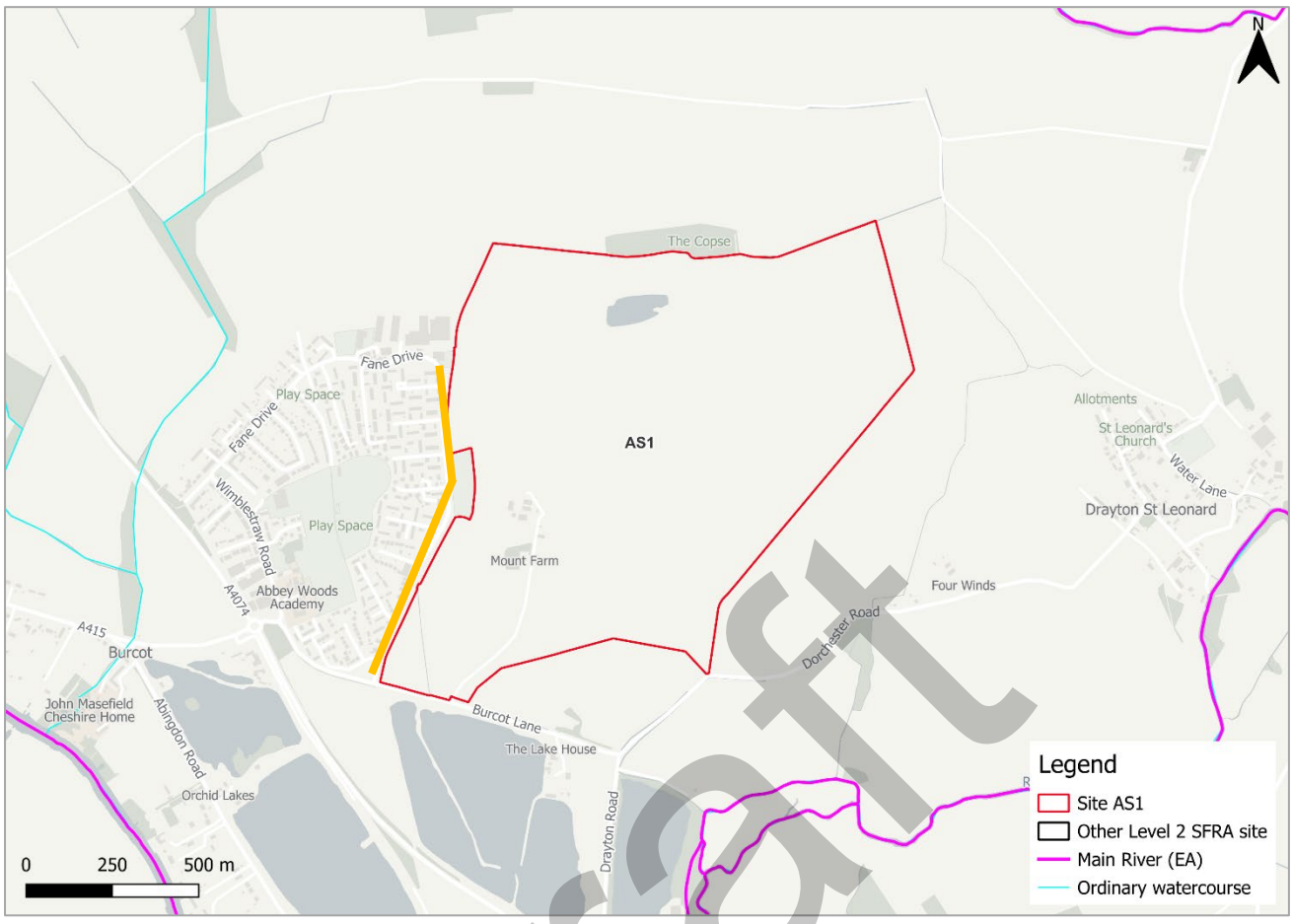

Figure 2-7: Potential access and escape routes

2.7 Observations, mitigation options, site suitability, sequential approach to development management - fluvial

- Observations:
  - The site is modelled to be largely within Flood Zone 1 and is therefore at low risk of flooding from rivers.
  - Development should avoid the area within Flood Zone 2 in the northeast of the site.
  - Any site-specific FRA should develop a detailed model of the River Thame to assess onsite fluvial flood depths, velocities and hazards.
  - The EA Flood Zones plus Climate Change dataset shows the site is not at significant additional risk from climate change. However, as discussed, there is no detailed model of the reach of the River Thame adjacent to the site understand the impact of climate change on fluvial flood depths, velocities and hazards.
- Mitigation:
  - The drain within the southwest of the site should be maintained and included in site design as a green / blue corridor offering multifunctional benefits alongside flood risk mitigation including Biodiversity Net Gain (BNG)

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contributions, and social and amenity benefits. This should be feasible without impacting significantly on plot numbers.
    - The EA flood alert area should continue to be in place to ensure early evacuation of site users before an extreme flood event occurs.
- Residual risk:
    - The site is at potential residual risk from a blockage of the culvert beneath the access track to Mount Farm. The site-specific FRA should consider modelling a blockage scenario to understand whether there would be any additional risk to the site.
    - Areas adjacent to culverts and bridges are at particular risk from the rapid onset of fast flowing and deep flooding, with little or no warning if structures become blocked.
    - Emergency plans must be in place for such areas and safe access and escape routes must be in place for the lifetime of development. Resistance and resilience measures may also need to be put in place to manage residual flood risk when avoidance measures have been exhausted.
    - The LPA should use the information on residual risk in this Level 2 SFRA to state in the local plan strategic policies a preferred mitigation strategy for ensuring development will be safe throughout its lifetime in relation to urban form, risk management and where flood mitigation measures are likely to have wider sustainable design implications (para 042, FRCC-PPG).
- Access and escape:
    - Safe access and escape should be possible via Fane Drive to the west of the site.

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3 Flood risk from surface water

3.1 Existing risk

3.1.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths Present Day

Based on the EA's national scale Flood Map for Planning- Surface Water Spatial Planning Extents Present Day map (September 2026), the majority of the site is at very low risk from surface water flooding, as shown in Table 3-1. Surface water risk is largely confined to topographic low spots across the site (Figure 3-1). There is a larger area of ponding within the southwest of the site in the 0.1% AEP event.

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Depth map, the greatest flood depths are between 0.15 and 0.3m (Figure 3-2).

Safe access and escape routes would likely be achievable via Fane Drive to the west of the site or Burcot Lane to the south of the site.

Table 3-1: Existing surface water flood risk based on percentage area at risk using the Flood Map for Planning - Surface Water Spatial Planning Extent Present Day map

Less than 0.1% AEP event (% area)	0.1% AEP event (% area)	1% AEP event (% area)	3.3% AEP event (% area)
95	3	1	1

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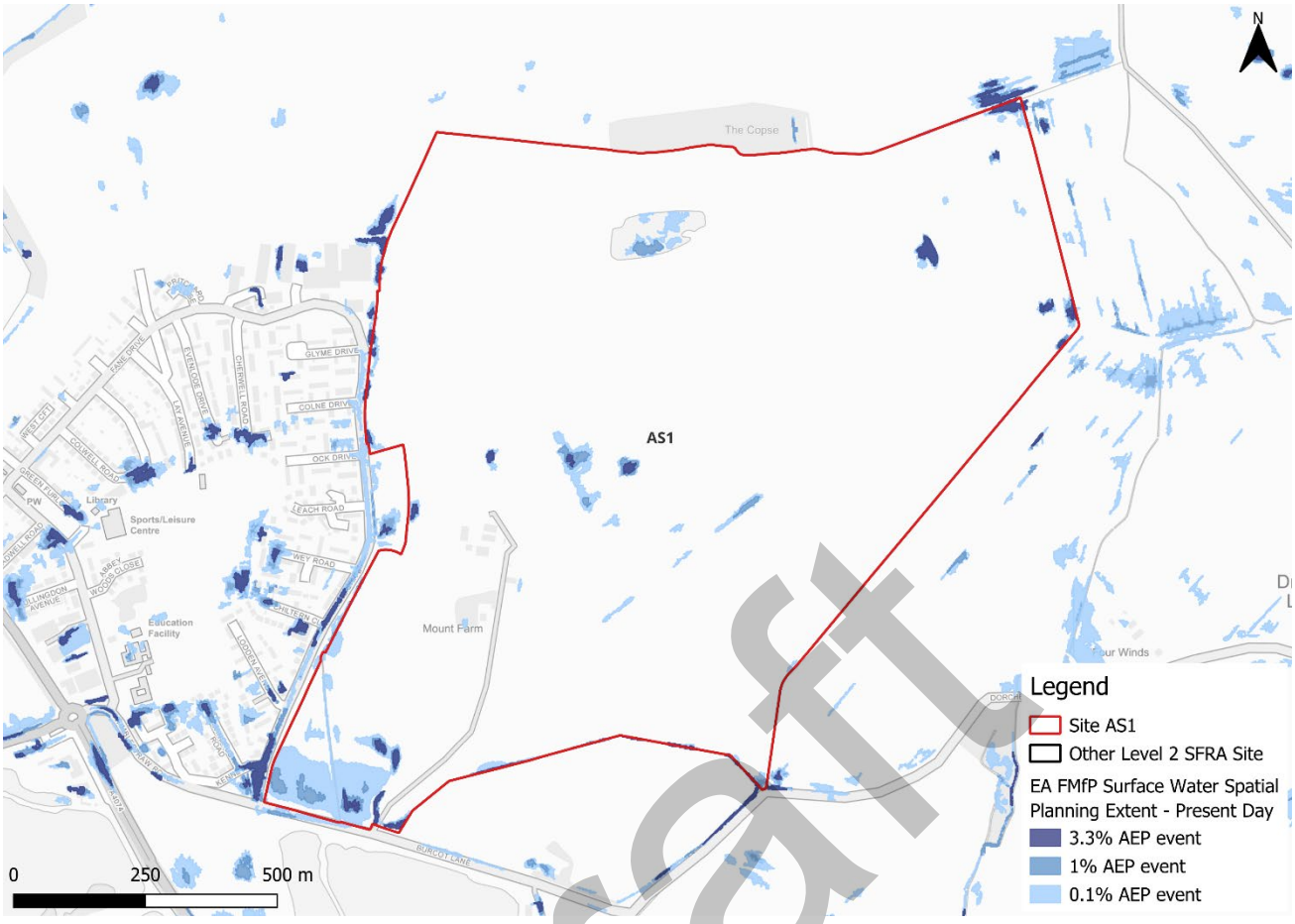

Figure 3-1: Flood Map for Planning - Surface Water Spatial Planning Extents Present Day

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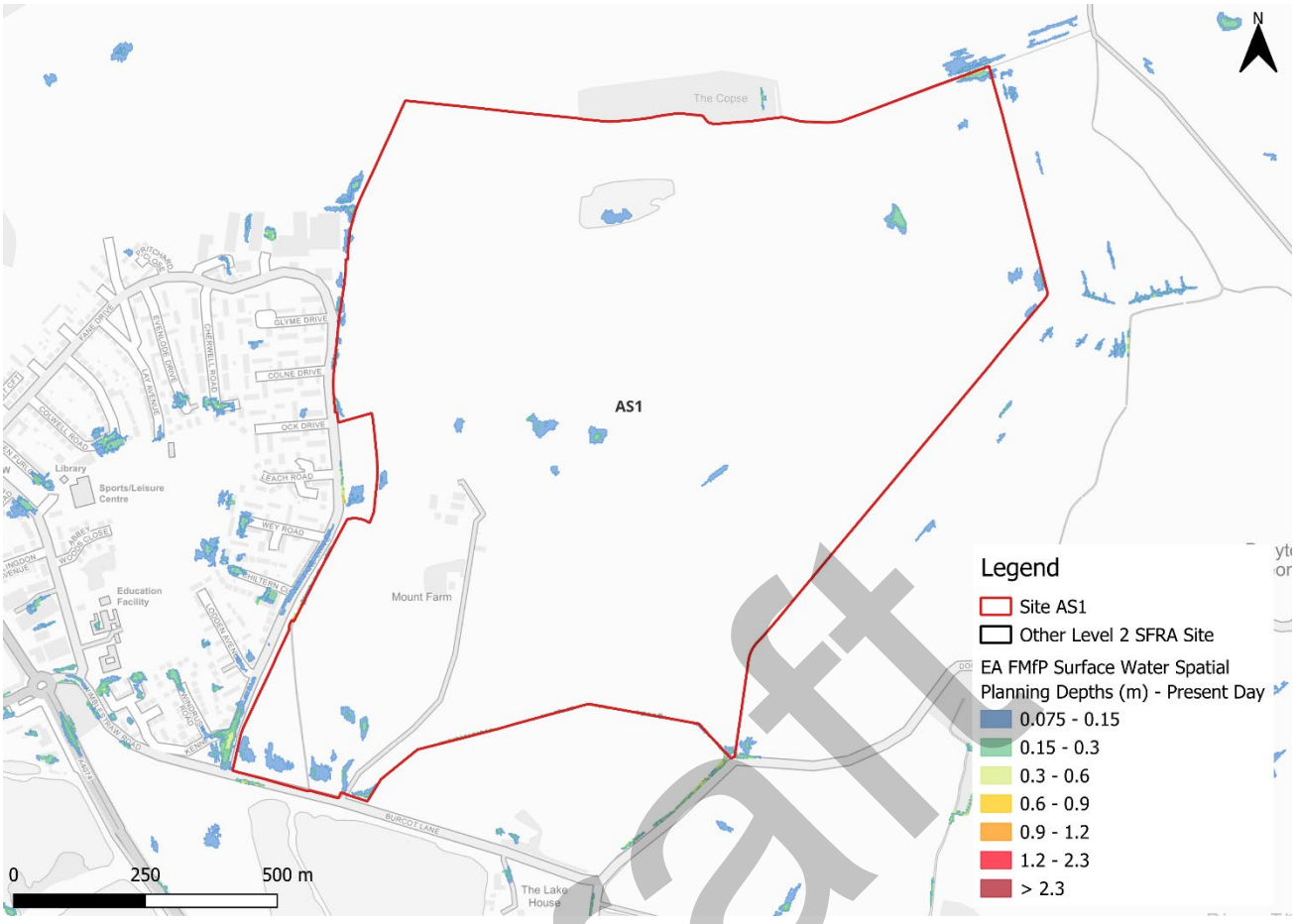

Figure 3-2: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Present Day for the 1% AEP event

3.1.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning data does not include hazard information suitable for planning purposes. Therefore, this Level 2 SFRA considers the third generation Risk of Flooding from Surface Water (RoFSW) hazard mapping in addition to the Flood Map for Planning - Surface Water Spatial Planning extents and depths, as the best available information. Updated surface water hazard information should be confirmed at the site-specific FRA stage.

Based on the EA's national scale third generation RoFSW map, the greatest flood hazard within the site in the medium event is categorised as 'moderate' (Figure 3-3).

There are differences between the Flood Map for Planning - Surface Water Spatial Planning map and the third generation RoFSW hazard mapping. The Flood Map for Planning - Surface Water Spatial Planning data does not map flooding less than 0.075m (7.5cm) in depth. Therefore, where the map may show no flooding, there may be shallow flooding up to a depth of 0.075m. In contrast, the third generation RoFSW does not map flooding with a hazard rating of less than 0.575. This could explain the differences observed between the Flood Map for Planning and third generation RoFSW maps.

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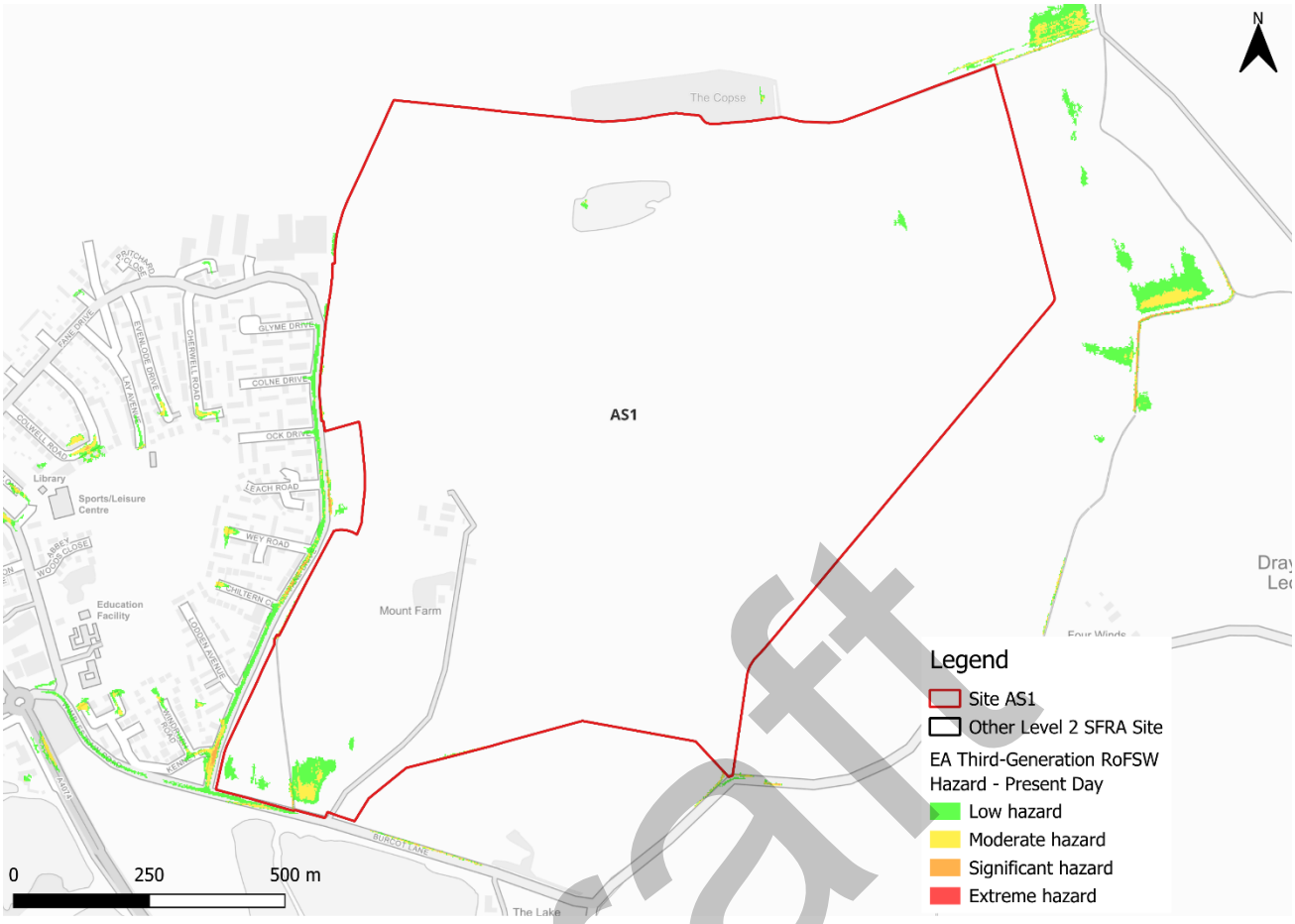

Figure 3-3: Third generation - Risk of Flooding from Surface Water map present day medium risk event surface water flood hazard[1]

3.2 Impacts from climate change

3.2.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths Climate Change

The EA's climate change allowance guidance states that SFRA's should assess the upper end peak rainfall allowance for the 2070s epoch. This dataset is included in the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Climate Change dataset (September 2026). The peak rainfall intensity allowances for the Thames and South Chilterns management catchment are shown in Table 3-2. The allowance for the 0.1% AEP event is not stated in the EA guidance.

[1] Based on Section 7.5 Hazard rating. What is the Risk of Flooding from Surface Water map? Report version 2.0. April 2019. Environment Agency

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Table 3-2: Peak rainfall intensity allowances for the Thames and South Chilterns management catchment

Return period	Central allowance 2070s (% increase)	Upper end allowance 2070s (% increase)
3.3% AEP event	20	35
1% AEP event	25	40

Figure 3-4 shows the surface water flood extents for the 2070s upper end climate change scenario. The areas of ponding across the site, particularly within the southwestern corner, are shown to increase in extent in all events. Surface water flood depths are shown to increase to between 0.3 and 0.6m within the southwest of the site (Figure 3-5).

Both Fane Drive and Burcot Lane are shown to be inundated when considering the impact of climate change on surface water. However, safe access and escape routes via Fane Drive may be achievable given the shallow modelled flood depths along this route.

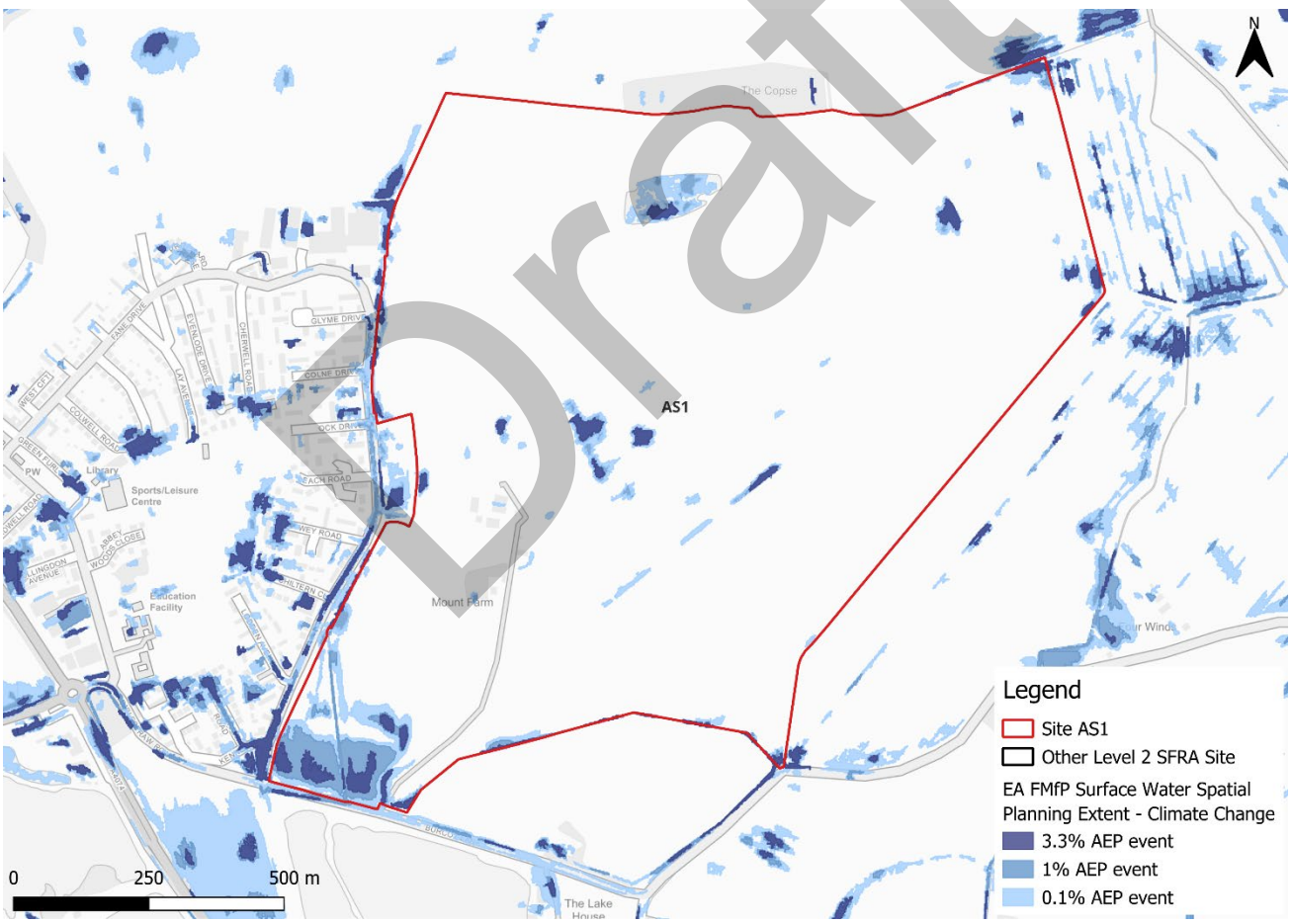

Figure 3-4: Flood Map for Planning- Surface Water Spatial Planning Extents Climate Change (2070s Upper End)

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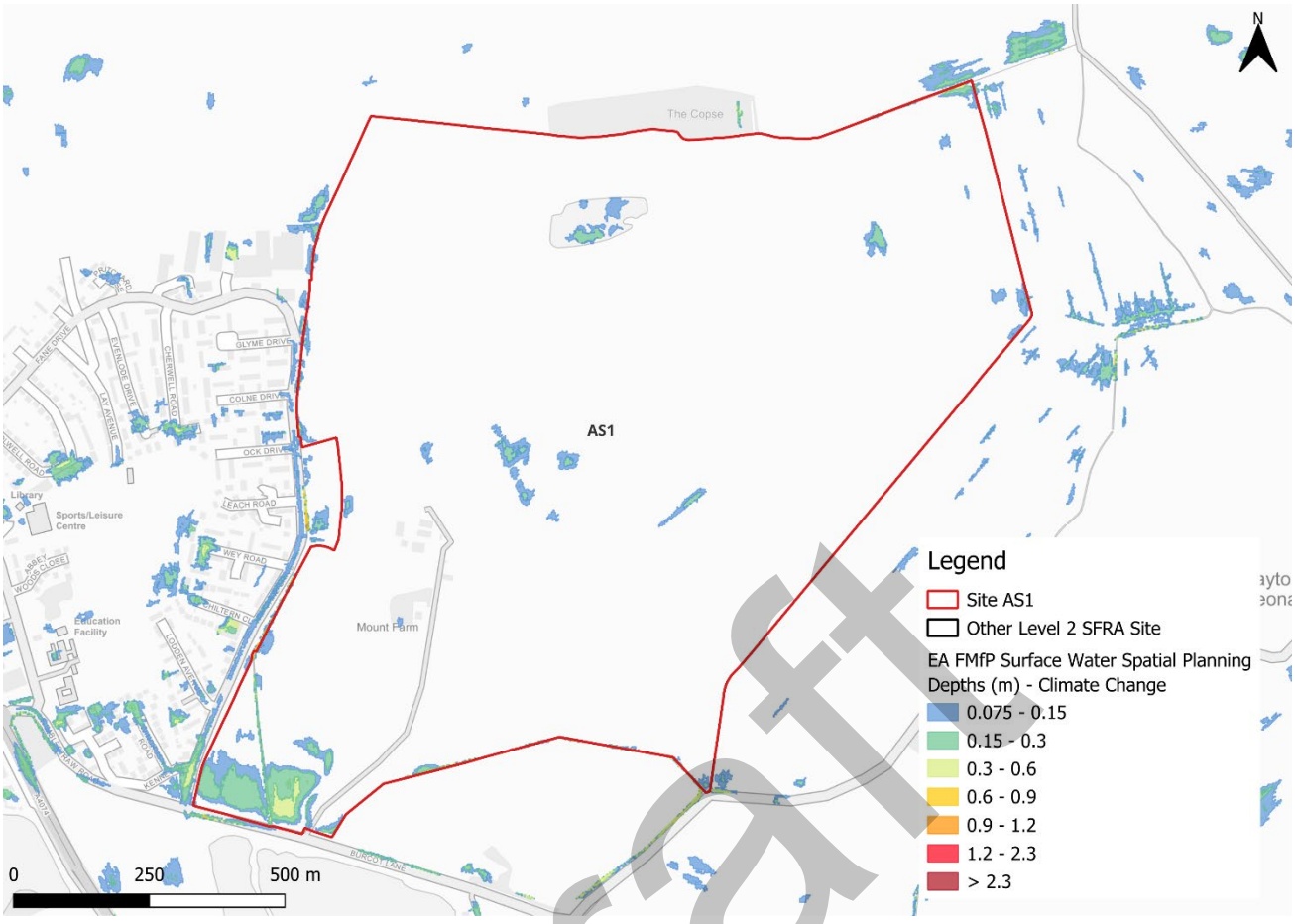

Figure 3-5: Flood Map for Planning- Surface Water Spatial Planning Depths (m) Climate Change for the 1% AEP event (2070s Upper End)

3.2.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning climate change data does not include hazard information suitable for planning purposes. This Level 2 SFRA therefore considers the RoFSW low risk surface water event as a conservative proxy for the medium risk event plus climate change, as the best available information to assess surface water flood hazards. The impact of climate change on surface water flood hazards should be considered at the site-specific FRA stage.

Using the RoFSW low risk event as a proxy, future surface water flood hazard in the medium risk event is mostly categorised as 'moderate', with an area of 'significant' hazard within the southwest of the site (Figure 3-6).

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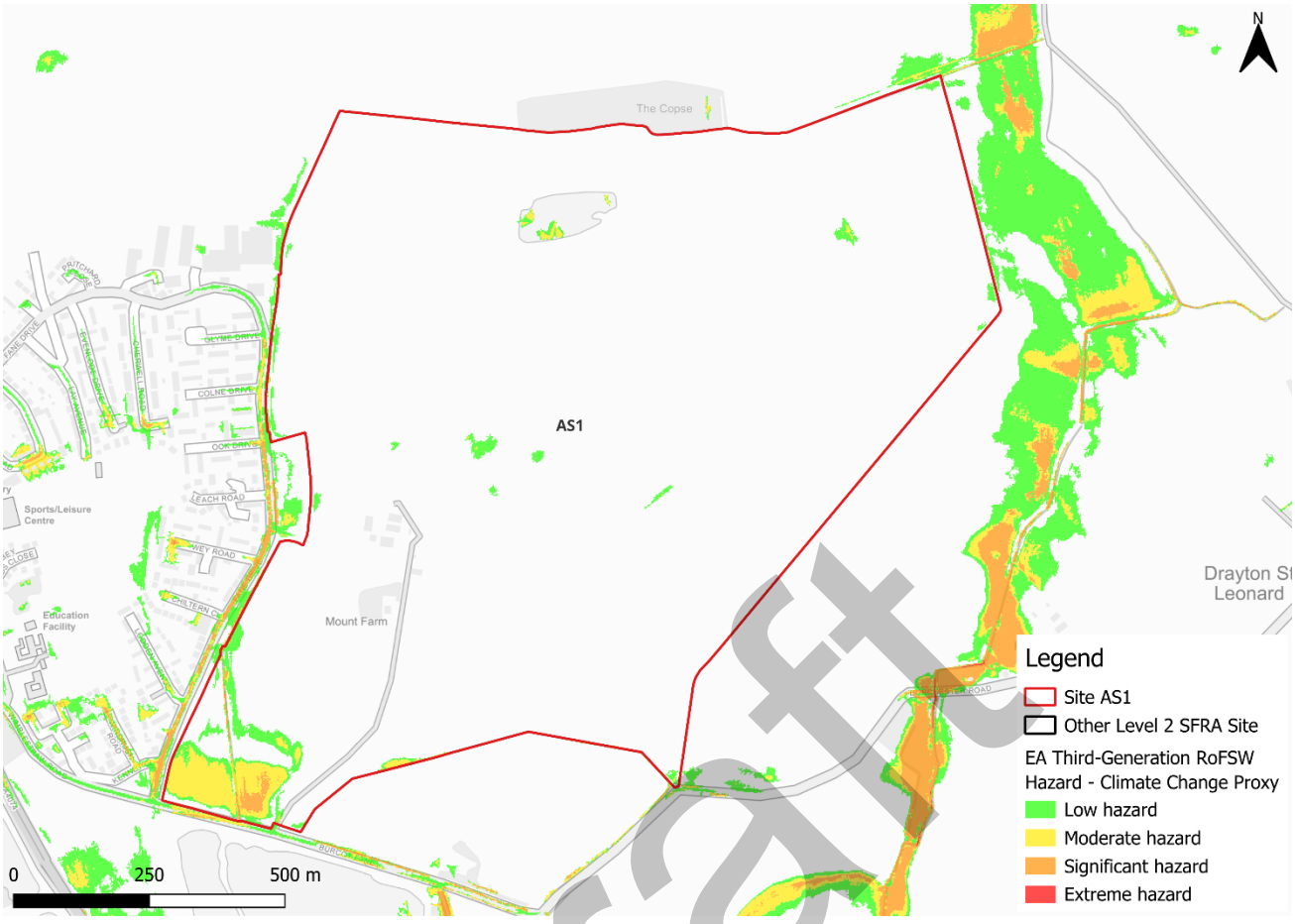

Figure 3-6: Low risk event surface water flood hazard[1], as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options, site suitability, sequential approach to development management - surface water

- Current risk to the site is predominantly very low, with 95% of the site outside of the 0.1% AEP surface water flood event. Surface water risk in the medium risk event is confined to small areas of ponding within topographic low spots, with a larger area of ponding in the southwest of the site.
- Topographic low spots should be considered and included in site design and ideally left in place to flood naturally when required.
- Risk to the site is shown to increase in extent within the site when considering the impact of climate change.
- It is recommended that the southwestern corner of the site should remain as open greenspace that is allowed to flood. Multiple benefits can be achieved by utilising the greenspace for ecological, social and amenity uses, as well as for flood alleviation.
- When a planning application is submitted, a full detailed drainage strategy would be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA.

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- Both Fane Drive and Burcot Lane are shown to be inundated when considering the impact of climate change on surface water. However, safe access and escape routes via Fane Drive may be achievable given the shallow modelled flood depths along this route.

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4 Groundwater, geology and SuDS suitability

Risk of groundwater emergence is assessed in this SFRA using JBA's 5m Groundwater Emergence Map. Figure 4-1 shows the map covering the site the surrounding areas. Table 4-1 explains the risk classifications.

The majority of the site is within an area where there is a risk of groundwater emergence to both surface and subsurface assets. There are areas along the southern and eastern borders of the site where groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots. Ground investigations will be required through the site-specific FRA to ascertain groundwater levels and conditions. Infiltration SuDS are not likely to be suitable for this site.

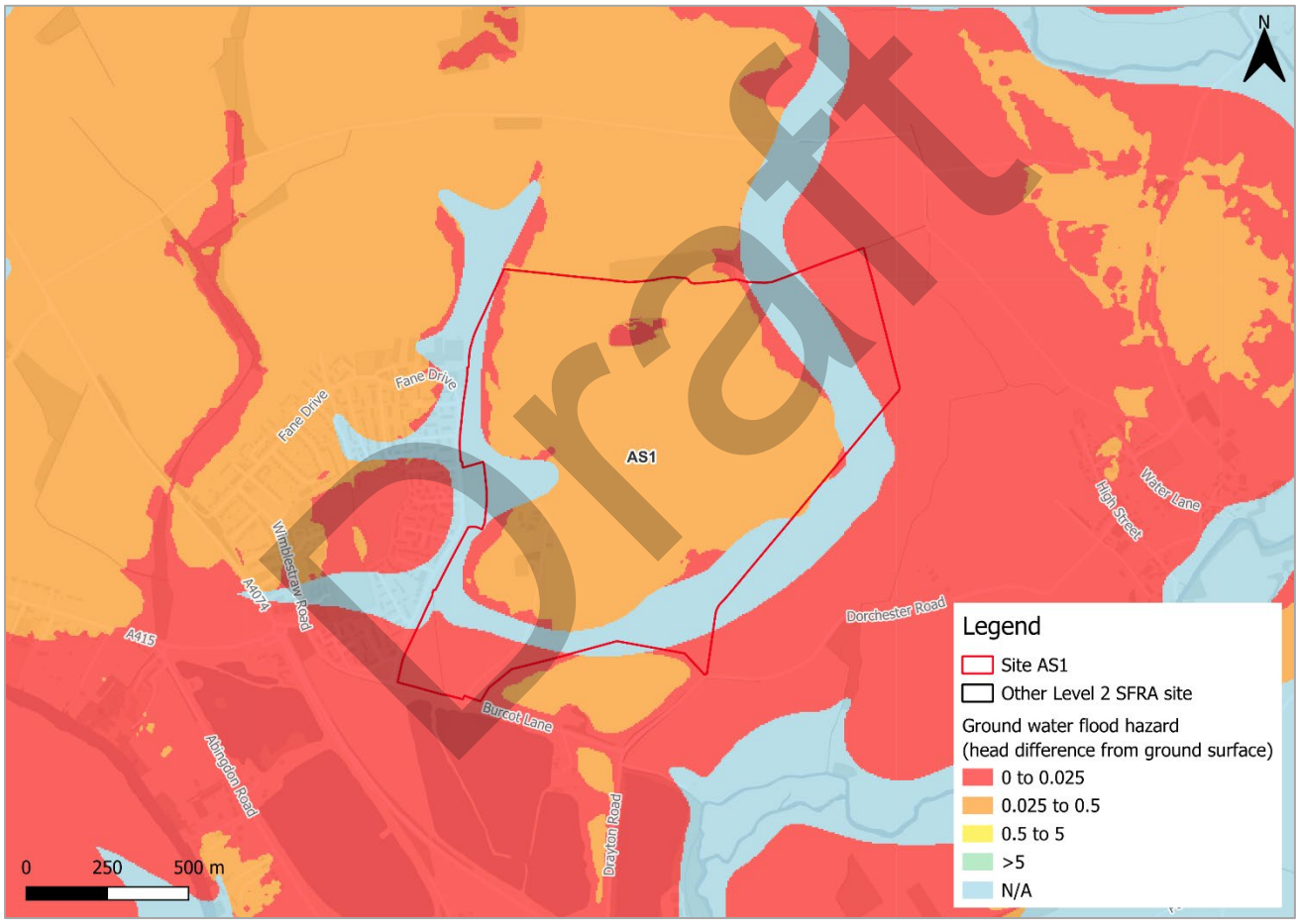

Figure 4-1: JBA 5m Groundwater Emergence Map

Table 4-1: Groundwater Emergence Hazard Classification

Groundwater head difference (m)*	Class label
0 to 0.025	Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
0.025 to 0.5	Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
0.5 to 5	Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event There is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely.
>5	Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event. Groundwater emergence is not likely.
N/A	No risk. This zone is deemed as having a negligible risk from groundwater emergence due to the nature of the local geological deposits.
*Difference is defined as ground surface in mAOD minus modelled groundwater table in mAOD.	

The underlying bedrock within the site is mudstone, sandstone and limestone with superficial deposits of sand and gravel (Figure 4-2). Mudstone, sandstone and limestone generally have low permeability and porosity, reducing the rate of infiltration into the rock. The drainage strategy for the site should investigate water table levels and ground conditions to inform on appropriate SuDS.

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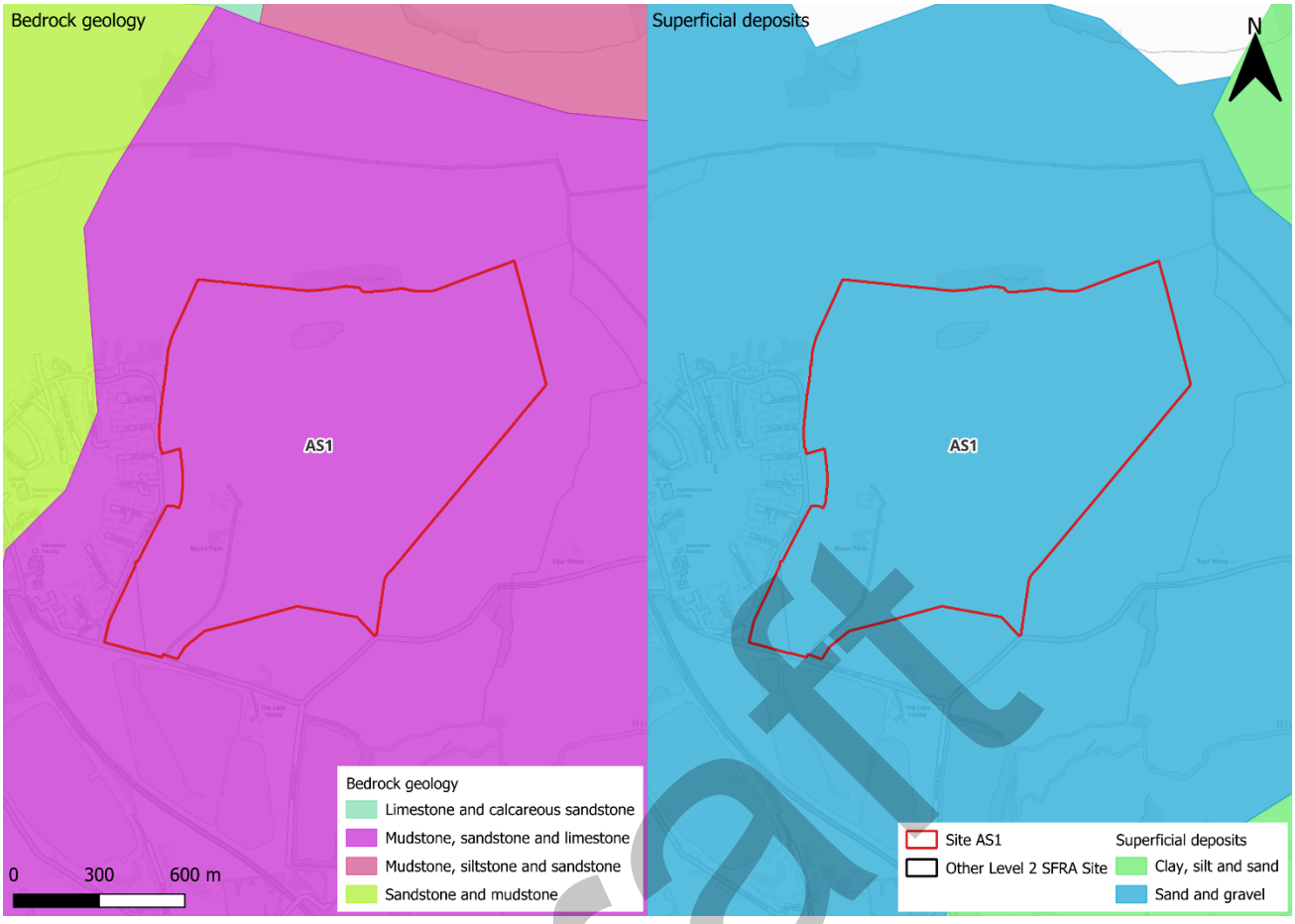

Figure 4-2: BGS Geology - Bedrock and superficial deposits

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5 Overall site assessment

5.1 Can part b) of the exception test be passed?

To pass part b) of the exception test[2], it must be proven that the development can be safe for its lifetime, which is 100 years for residential development and 75 years for non-residential development, taking account of the vulnerability of its users, without increasing risk elsewhere, and, where possible, will reduce flood risk overall. The site is not required to pass the exception test as it is not located in Flood Zone 3a.

5.2 Recommendations and site-specific FRA requirements

Based on the evidence presented in the Level 1 SFRA (2024), Level 1 SFRA Addendum (2026) and this Level 2 SFRA:

- The proposed development of the site would see a change in the risk classification from less vulnerable to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the site-specific FRA must show that the development can be designed to be safe for its lifetime and that there is adequate emergency planning provision (para 006 FRCC-PPG).
- Updated present day and climate change modelling of the River Thame and the unnamed watercourse should be used to update this Level 2 SFRA at the earliest opportunity to provide an up-to-date strategic assessment of flood risk to this site and the surrounding areas. It would be acceptable to update the modelling at the site-specific FRA stage.
- Based on current information, this site could be allocated in the Joint Local Plan based on nominal current and future fluvial risk.
- Based on the information presented in this Level 2 SFRA, it is recommended that the southwestern corner of the site should remain as open greenspace that is allowed to flood. Multiple benefits can be achieved by utilising the greenspace for ecological, social and amenity uses, as well as for flood alleviation.
- Were this site to be allocated based on current information, the LPA must make it clear that this site cannot be developed until the required information detailed in this SFRA on existing and future flood risk from the River Thame and the unnamed watercourse is fully ascertained.
- A detailed drainage strategy will be required for any new development, given the large area of the site.
- Groundwater conditions must be investigated further through the site-specific FRA.
- Opportunities for NFM features to reduce flood risk to the site and surrounding areas should be explored at the site-specific FRA stage.

[2] Policy F6 National Planning Policy Framework 2026

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- Any site-specific FRA should undertake a condition assessment of the drain adjacent to the western site boundary and investigate the impact of a potential blockage of the structures.
- Any site-specific FRA should be carried out in line with the NPPF, FRCC-PPG, EA guidance, South Oxfordshire and Vale of White Horse District Councils Joint Local Plan and LLFA policies, and national and local SuDS policy and guidelines.
- Throughout the site-specific FRA process, consultation should be carried out with the following, where applicable: the LPA; LLFA; emergency planning officers; EA; TW; the highways authorities; and the emergency services.

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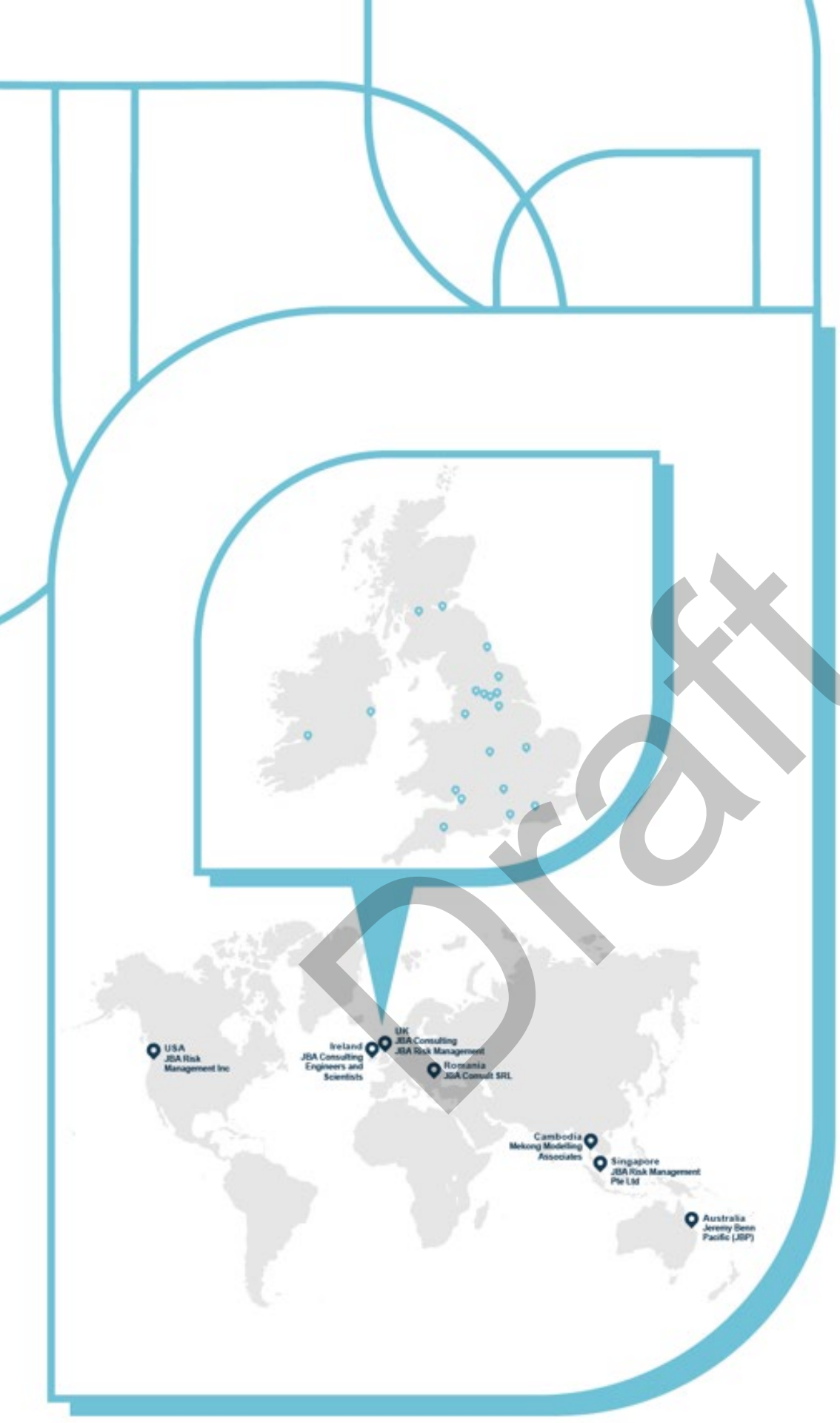

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Registered Office
1 Broughton Park
Old Lane North
Broughton
SKIPTON
North Yorkshire
BD23 3FD
United Kingdom

+44(0)1756 799919
info@jbaconsulting.com
www.jbaconsulting.com
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South Oxfordshire and Vale of White Horse Level 2 Strategic Flood Risk Assessment Update

Site AS2 - Land adjacent to Culham Campus

Draft Report

October 2026

Prepared for:

South Oxfordshire District Council and

Vale of White Horse District Council

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Prepared by	Boe Kilshaw BSc Assistant Analyst
Reviewed by	Laura Thompson-Jones BSc CGeog FRGS Senior Analyst
Authorised by	Mike Williamson BSc MSc CGeog FRGS EADA Project Director

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JBA Project Manager	Freya Nation
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2026s1132

This report describes work commissioned by South Oxfordshire and Vale of White Horse District Councils. The Client's representative for the contract was Rebekah Goodwill of South Oxfordshire and Vale of White Horse District Councils. Boe Kilshaw of JBA Consulting carried out this work.

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for South Oxfordshire and Vale of White Horse Joint Local Plan Site AS2 - Land adjacent to Culham Campus. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA' (2024) and the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum' (2026), and read the 'South Oxfordshire and Vale of White Horse District Councils Level 2 SFRA Main Report Update' (2026) and is therefore familiar with the terminology used in this report.

1.1 Site AS2 - Land Adjacent to Culham Campus

- Location: Land adjacent to Culham Campus (Figure 1-1)
- Existing site use: Agriculture and employment
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Mixed use; mainly residential and employment
- Proposed site use vulnerability: More vulnerable
- Site area: 217.27 ha
- Proposed development impermeable area: 184.8 ha (assumed 85% of site area)
- EA model: Thames (Sandford to Pangbourne) 2018
- Watercourse: River Thames. Unnamed ordinary watercourse flows out of the south east of the site via a culvert.
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for more detailed assessment through Level 2 SFRA (Strategic Recommendation A)
    - Subject to Exception Test
    - Assess present day and future modelled fluvial depths, hazards
    - Assess present day and future modelled surface water depths, hazards

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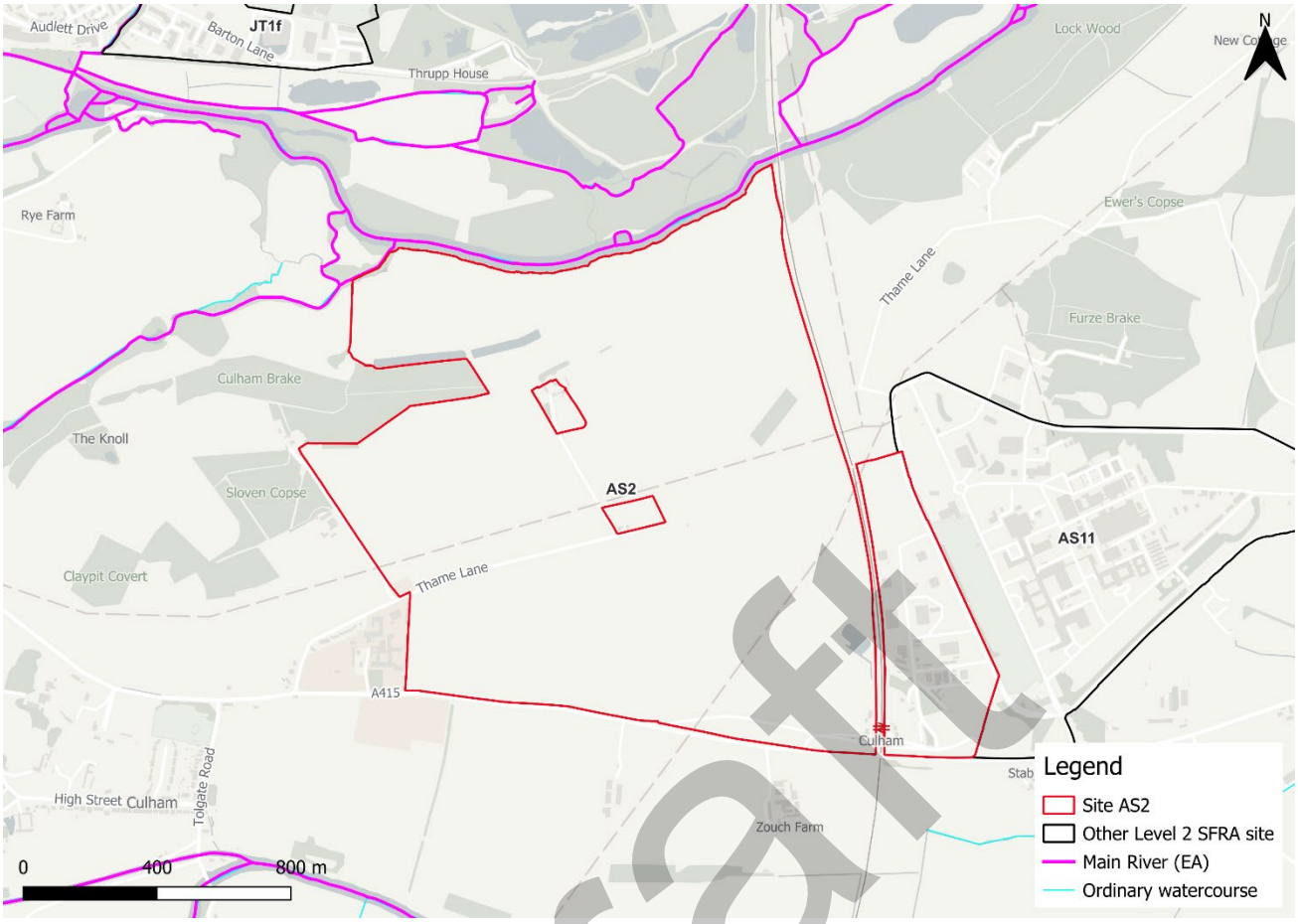

Figure 1-1: Site location

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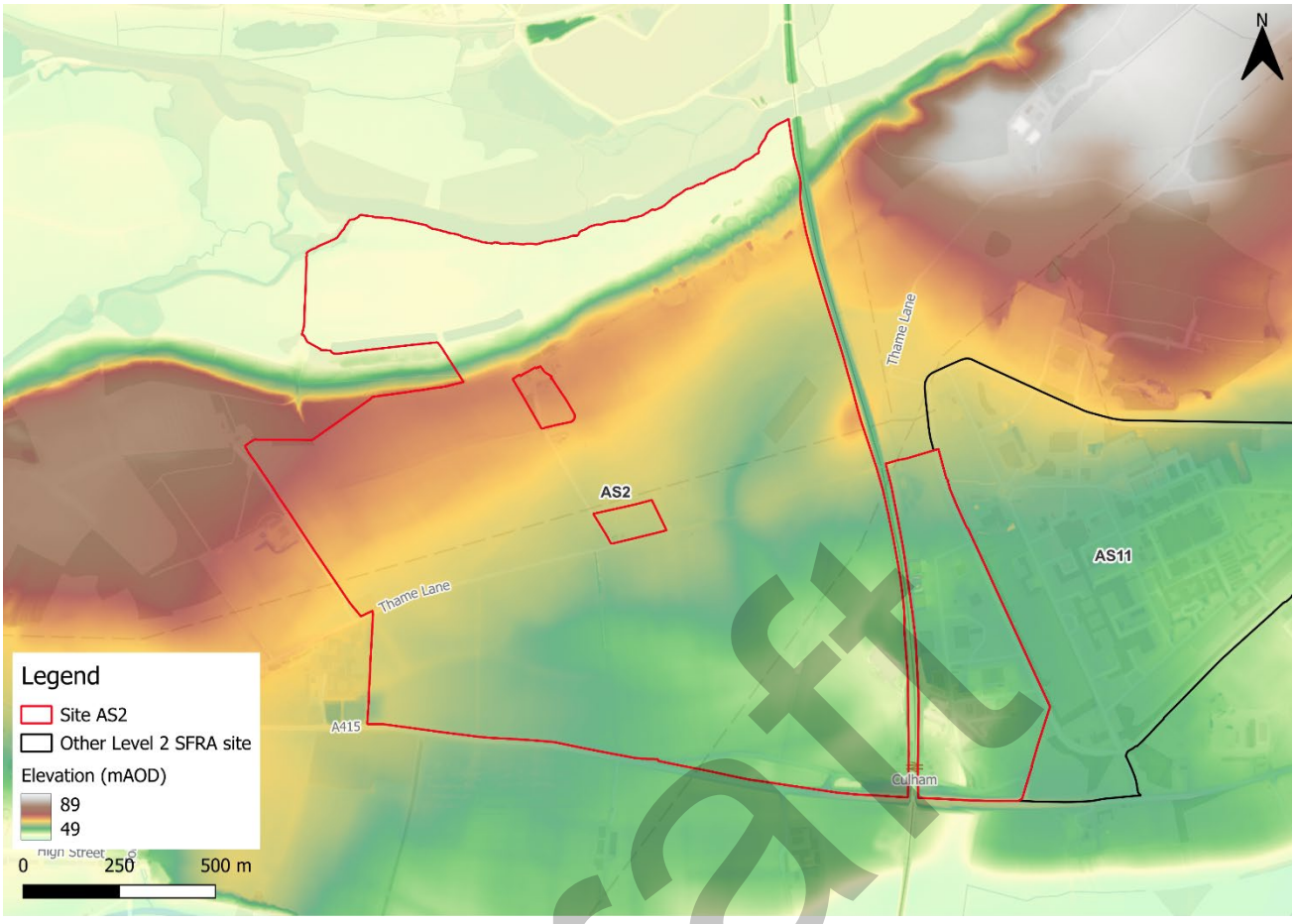

Figure 1-2: Topography

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2 Flood risk from rivers

2.1 Existing risk

2.1.1 Flood Map for Planning and functional floodplain

Based on the Environment Agency's (EA) Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum (2026), the percentage areas of the site within each flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.4).

The area along the northern boundary of the site is located within the functional floodplain. The area of functional floodplain onsite should be left free of vulnerable development. The functional floodplain in this location is based on the 3.3% AEP defended event from the Thames (Sandford to Pangbourne) 2018 model. There is an additional area of fluvial risk to the south of the site within Flood Zone 2 and therefore at medium risk of flooding from rivers.

Table 2-1: Existing flood risk based on percentage area of site at risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
88	2	1	9

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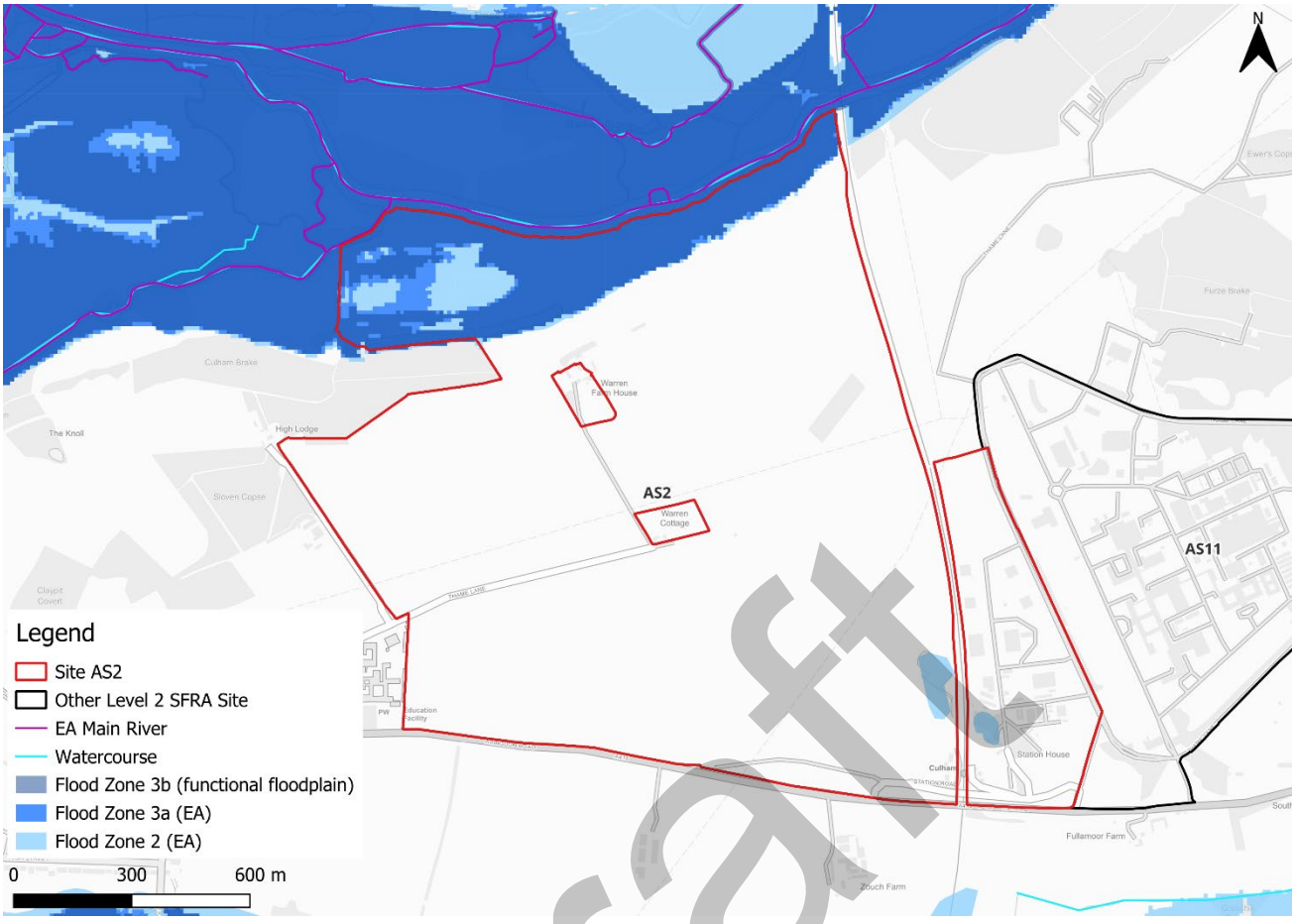

Figure 2-1: Existing risk from rivers to the site

2.1.2 Thames (Sandford to Pangbourne) 2018 model outputs

Figure 2-2 shows the modelled flood depths for the 1% AEP undefended event which is the event Flood Zone 3 of the Flood Map for Planning is based on. Modelled risk to the site is similar to Flood Zone 3 in the vicinity of the site, with the area along the northern boundary of the site modelled to be at risk. Maximum flood depths within the site are modelled to be > 1.2m, located largely within the two ponds. There are also some areas of significant depths towards the northern boundary of the site. Figure 2-3 shows the modelled flood hazard ratings for the 1% AEP undefended event. Modelled flood hazard in the area of the site at fluvial flood risk is largely categorised as 'Danger for some', with some areas categorised as 'Danger for most'. There is no modelled flood risk to the rest of the site in the 1% AEP undefended event.

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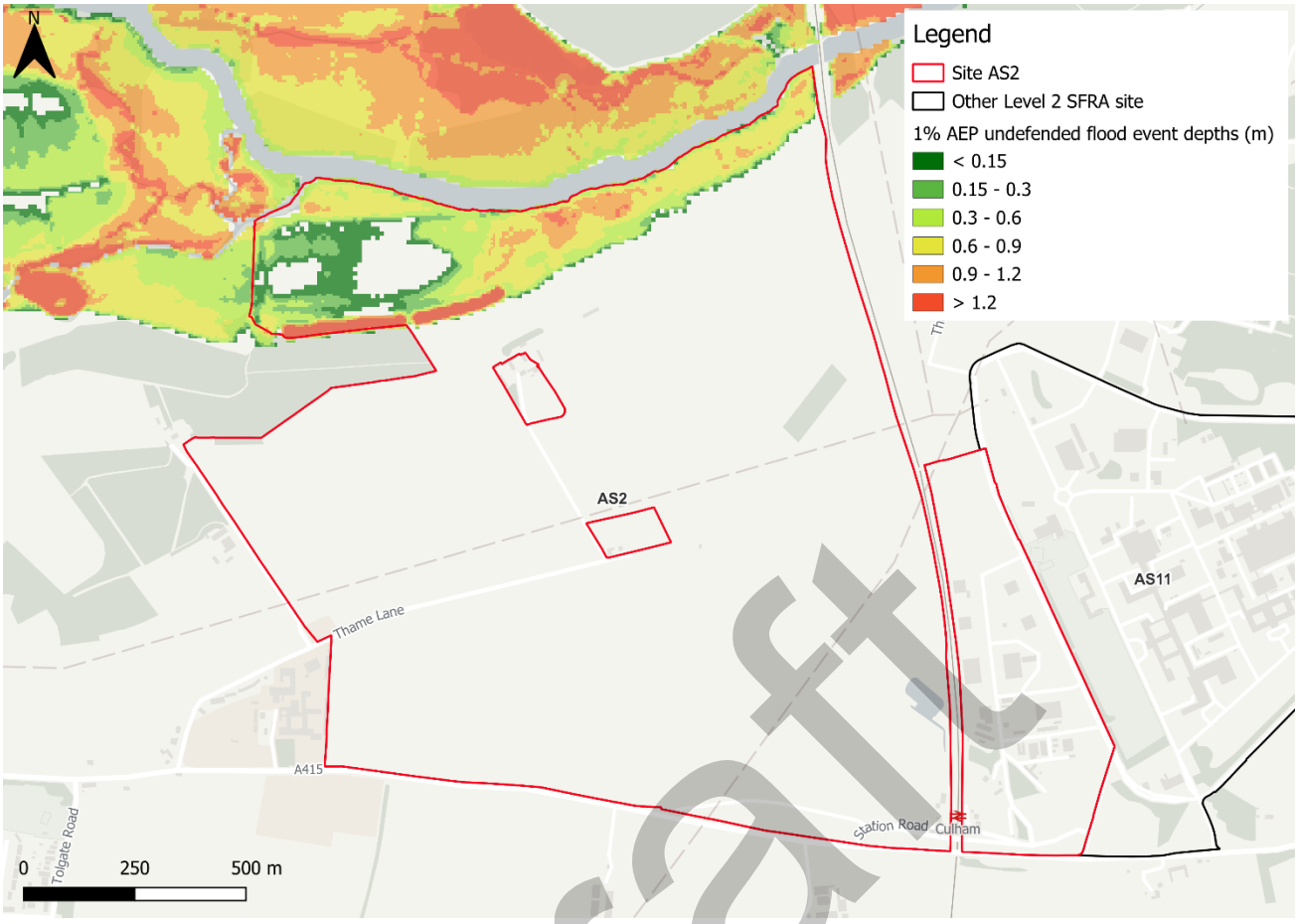

Figure 2-2: Flood depths for 1% AEP undefended flood event

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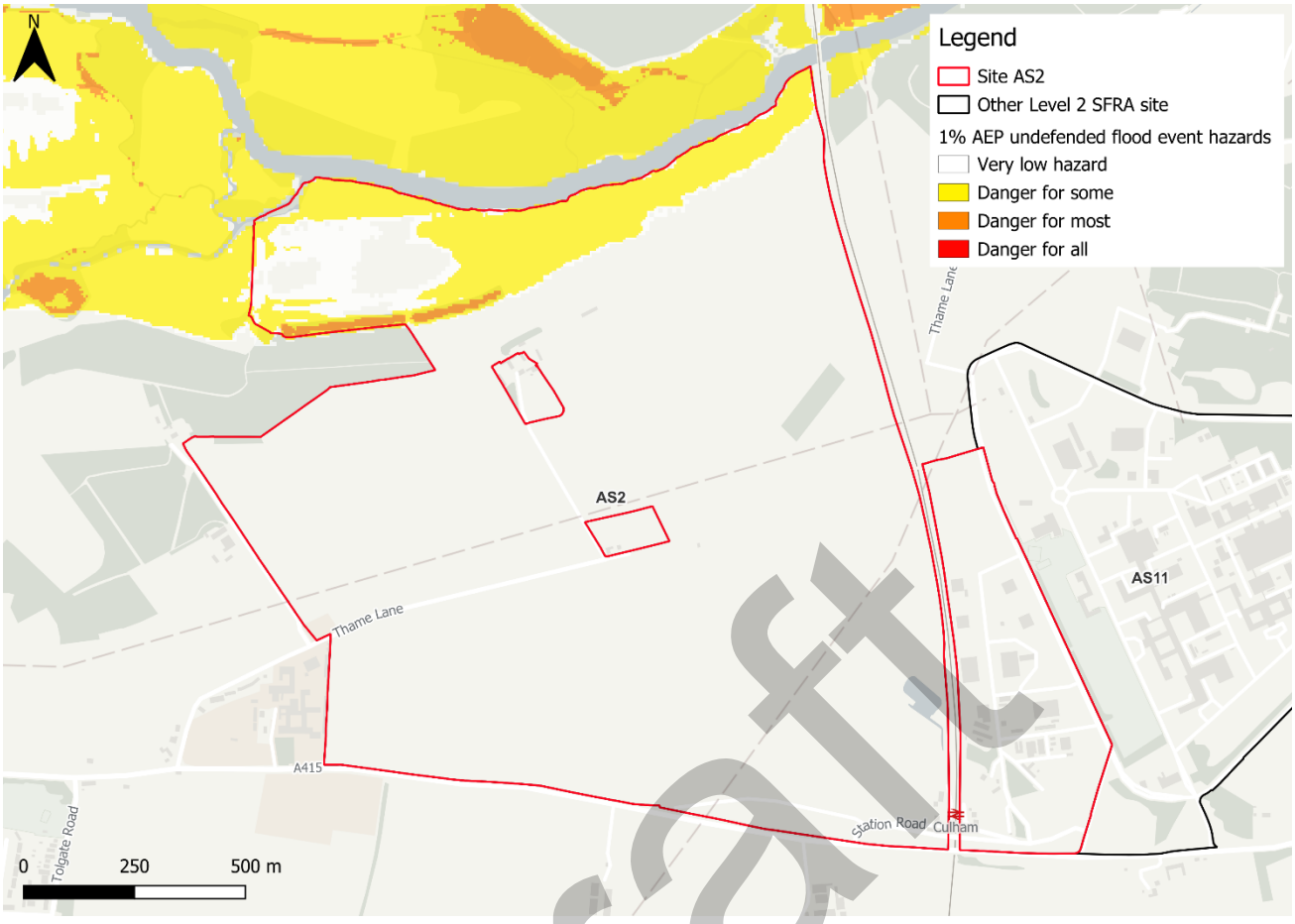

Figure 2-3: Flood hazard[1] for 1% AEP undefended flood event

2.2 Impacts from climate change

2.2.1 Thames (Sandford to Pangbourne) 2018 model outputs

The EA's SFRA guidance states that SFRAs should assess the 2080s central allowance for less vulnerable, more vulnerable, highly vulnerable and water compatible development (Table 2-2). The impacts of climate change on flood risk from the River Thames has not been modelled for this SFRA. The impacts of climate change must be modelled using the EA's latest allowances for peak river flows to inform whether the site can be safe for its lifetime and to assess modelled flood depths and hazards. Therefore, any updates to this Level 2 SFRA and/or any site-specific FRA should include for the most up to date climate change allowances.

[1] Fluvial hazard ratings based on Table 4 of the Supplementary Note on Flood Hazard Ratings and Thresholds for Development Planning and Control Purpose – Clarification of the Table 13.1 of FD2320/TR2 and Figure 3.2 of FD2321/TR1. May 2008. Environment Agency.

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Table 2-2: Climate change allowances for peak river flows for the Gloucestershire and the Vale management catchment

Epoch	Central	Higher Central	Upper End
2020s	11%	17%	33%
2050s	11%	19%	43%
2080s	26%	41%	84%

2.2.2 Flood Map for Planning- Flood Zones plus Climate Change

Figure 2-4 shows the EA's Flood Map for Planning - Flood Zones plus Climate Change dataset. Based on this dataset, the site is not shown to be at significant additional risk from climate change.

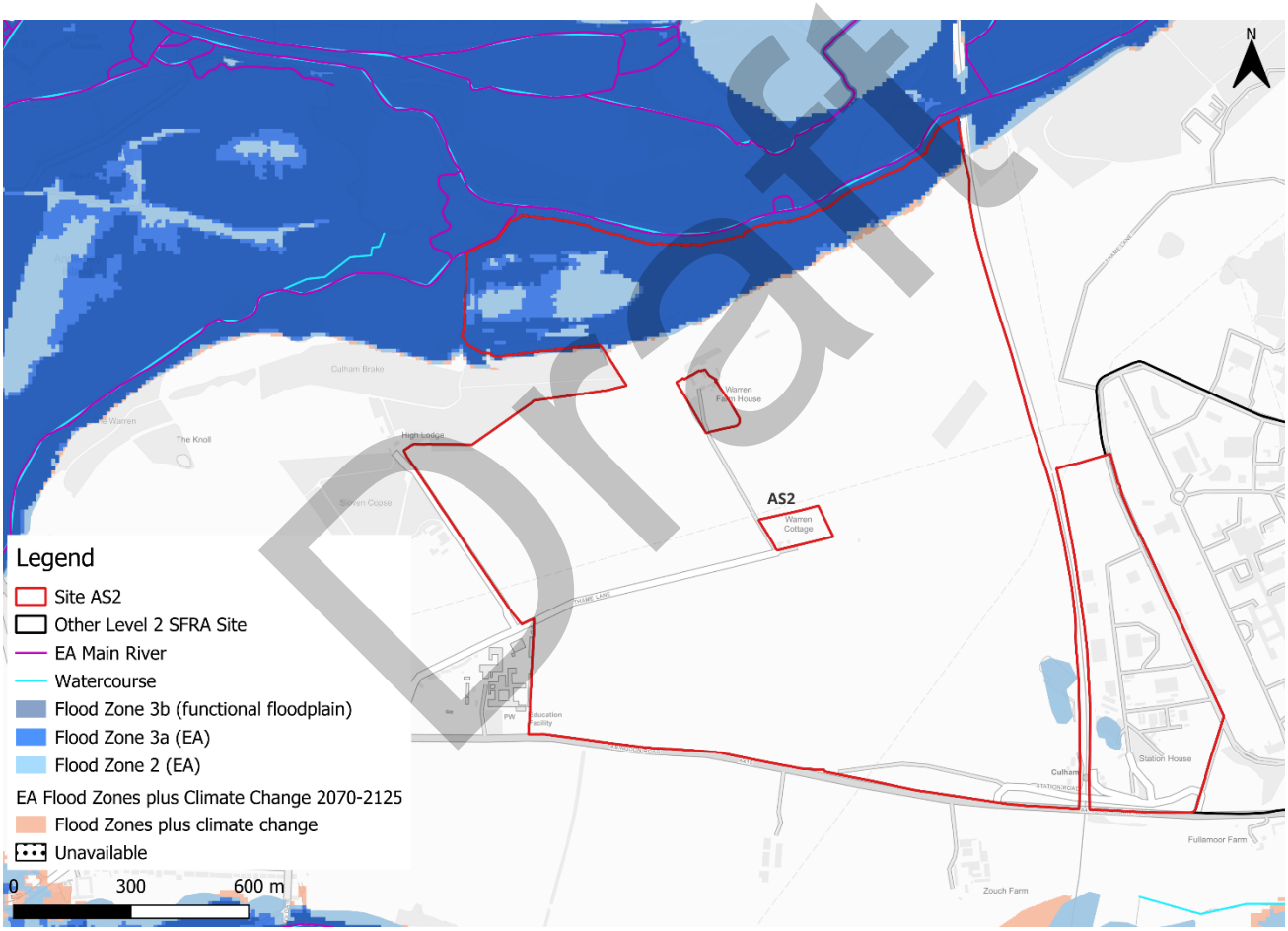

Figure 2-4: Flood Zones plus Climate Change dataset

2.3 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. Historic risk to the site is shown in Figure 2-5 which shows that the area along the northern boundary of the site and a small area within the south of the site have been subject to flooding in the past, relating to an existing on site pond. Any site-specific FRA should assess the current regime providing water to the existing pond.

The RFO dataset references that the area to the north of the site was subject to flooding in spring 1947, summer 1977, winter 1979, winter 2000, winter 2003, summer 2007 and winter 2013/2014 due to fluvial flooding from the River Thames. The northeast of the site has also experienced flooding in the past as a result of surface water. The area within the south of the site was subject to flooding in January 2003. To the southeast of the site, flooding occurred at the high street in 2014/2015, with the cause thought to be surface water flooding.

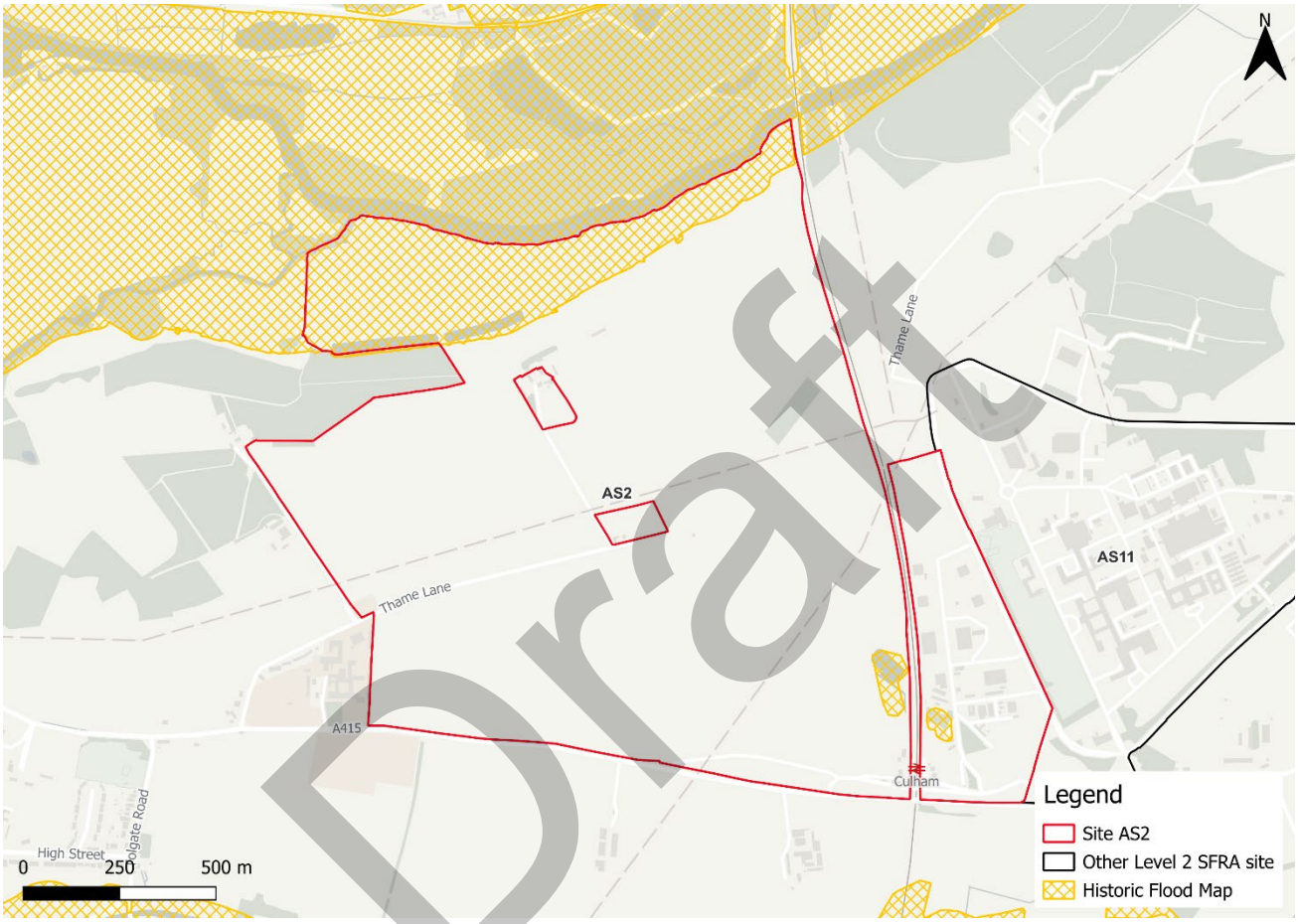

Figure 2-5: Recorded historic flood events onsite and around the site

2.4 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset. There are however areas of natural high ground to the south of the River Thames floodplain, within the north of the site.

2.4.1 Cumulative impacts

A cumulative impact assessment was completed through the South Oxfordshire and Vale of White Horse Level 1 SFRA Addendum (2026), which aimed to identify catchments sensitive to the cumulative impact of development. Site AS2 (Land Adjacent to Culham Campus) is located within one catchment, namely; Thames (Evenlode to Thame). This is ranked as a higher sensitivity catchment. Planning considerations for sites at higher sensitivity to the

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cumulative impacts of development can be found in Appendix D of the Level 1 SFRA Addendum. Cumulative impacts of development should also be considered as part of a site-specific FRA.

2.4.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. Both within and upstream of the site, there are significant opportunities for tree planting within the areas at flood risk to reduce runoff. There is also potential to reconnect the channel to the floodplain, allowing flood water to be stored. These areas are shown in Figure 2-6.

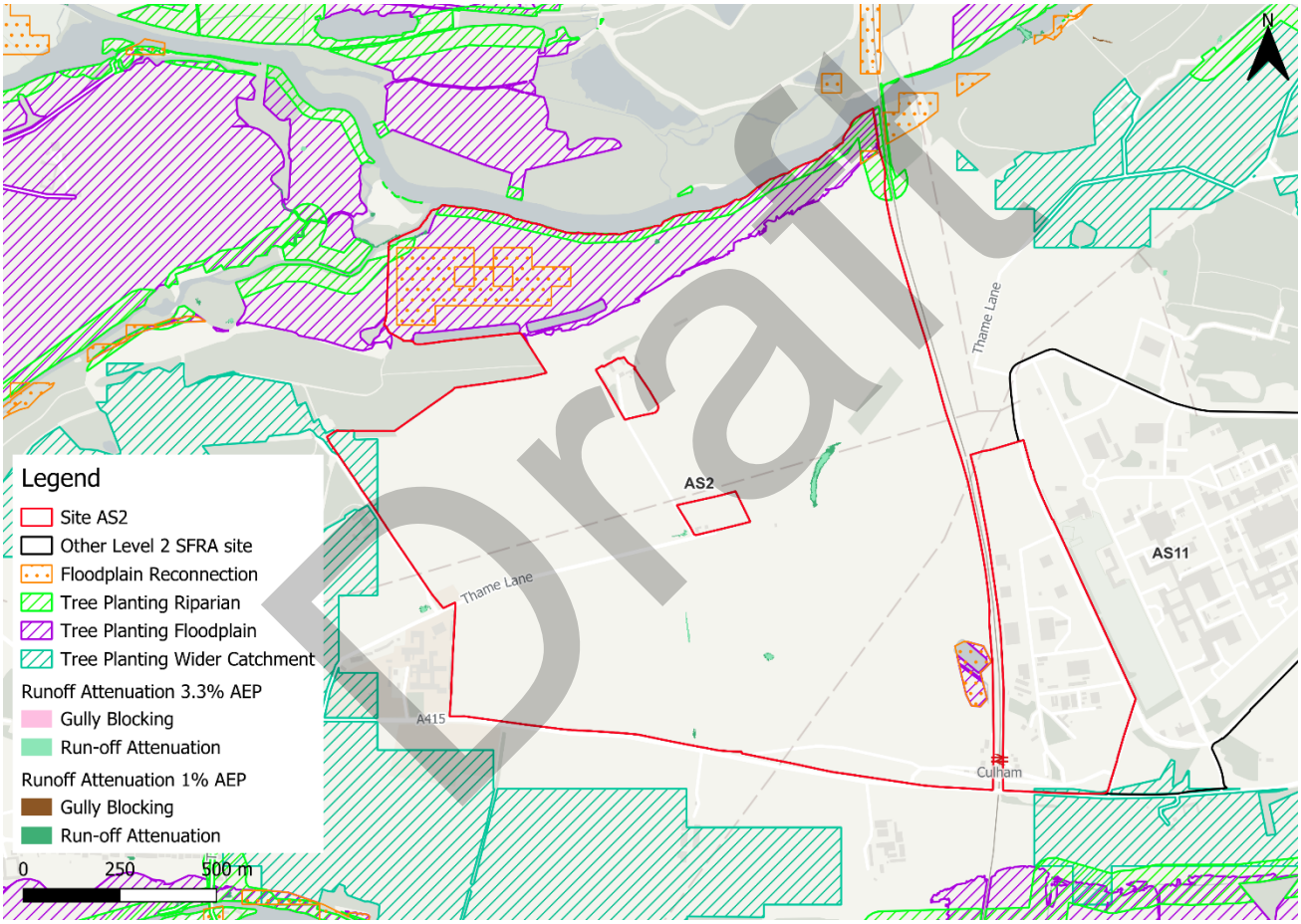

Figure 2-6: Natural Flood Management (NFM) potential mapping

2.5 Residual risk

Although a site may be afforded some protection from defences and / or drainage infrastructure, there is always a residual risk of flooding from asset failure i.e. defence breaches, or blockages of culverts or drainage assets.

There are no assets with the potential to pose a residual risk to the site

2.5.1 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. Figure 2-7 shows the RFM in a "dry day" and "wet day" scenario. A "dry day" scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. A "wet day" scenario assumes a worst-case scenario where a reservoir releases water held on a "wet day" when local rivers have already overflowed their banks.

The site is potentially at risk from two reservoirs which are located in Oxfordshire, namely Farmoor No.1 and Farmoor No.2.

The EA's SFRA guidance states that where a proposed development site is at flood risk from a reservoir, then an assessment into whether the reservoir design or maintenance schedule needs improving should be carried out. Expert advice may be required.

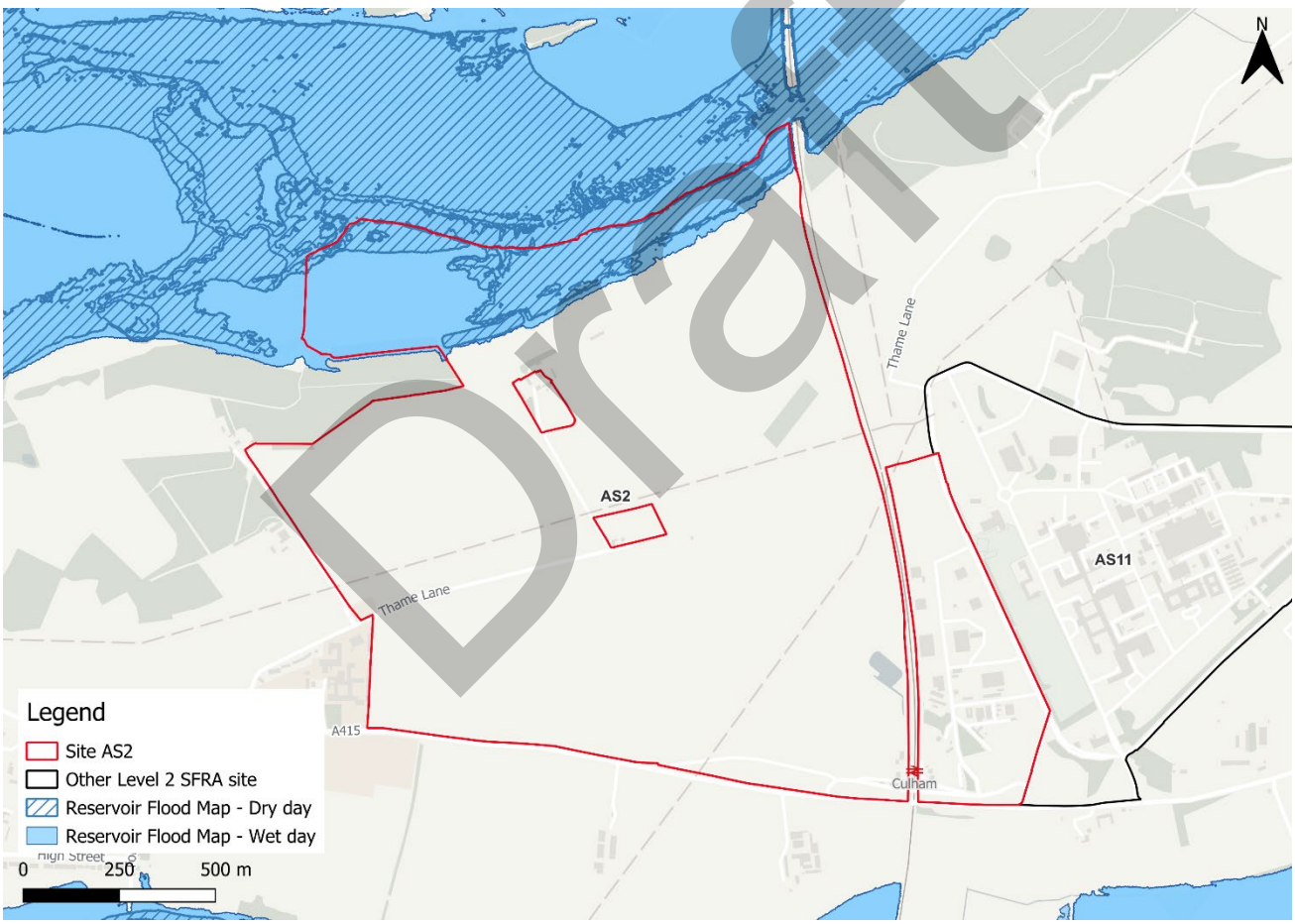

Figure 2-7: Flood risk from reservoirs

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2.6 Emergency Planning

2.6.1 Flood warnings and alerts

The EA operates a Flood Warning Service for properties located within a Flood Warning Area (FWA) for when a flood event is expected to occur. Site AS2 (Land Adjacent to Culham Campus) is located within two FWAs; 061FWF23Abingdon - River Thames in Abingdon-on-Thames and 061FWF23ClfntoWt - River Thames at Clifton Hampden, Dorchester and Little Wittenham, as shown on Figure 2-8.

Flood alerts may be issued before a flood warning for properties located within a Flood Alert Area (FAA) to provide advance notice of the possibility of flooding. A flood alert may be issued when there is less confidence that flooding will occur in a FWA. The site is also located within a FAA, namely 061WAF23Abingdon - River Thames for the Abingdon-on-Thames area, as shown in Figure 2-8.

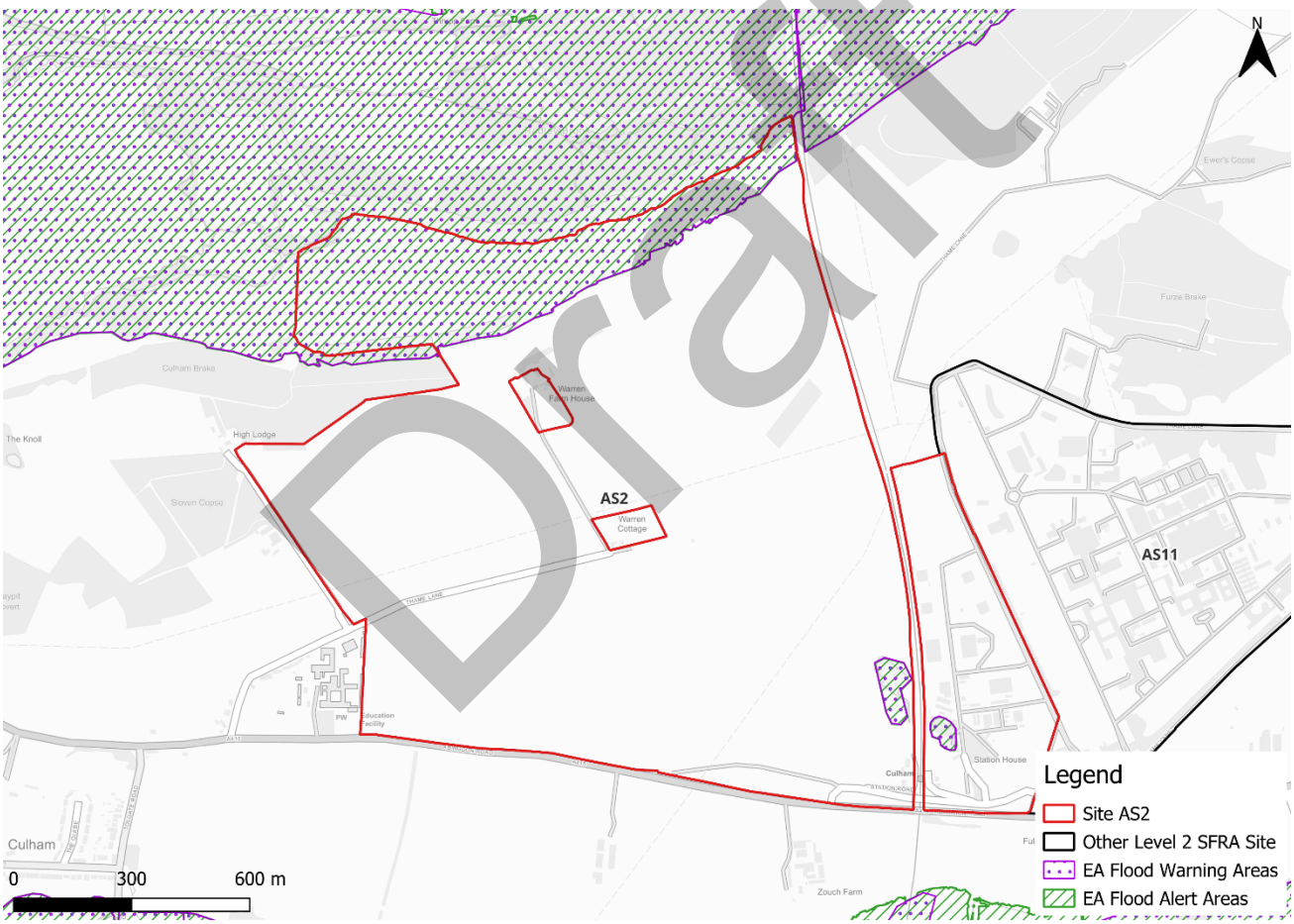

Figure 2-8: EA Flood Warning and Alert Areas

2.6.2 Access and escape routes

Safe access and escape routes could likely be achieved during a flood event via Thame Lane through the west of the site and Abingdon Road (A415) to the south of the site. These routes are indicated by the yellow lines in Figure 2-9.

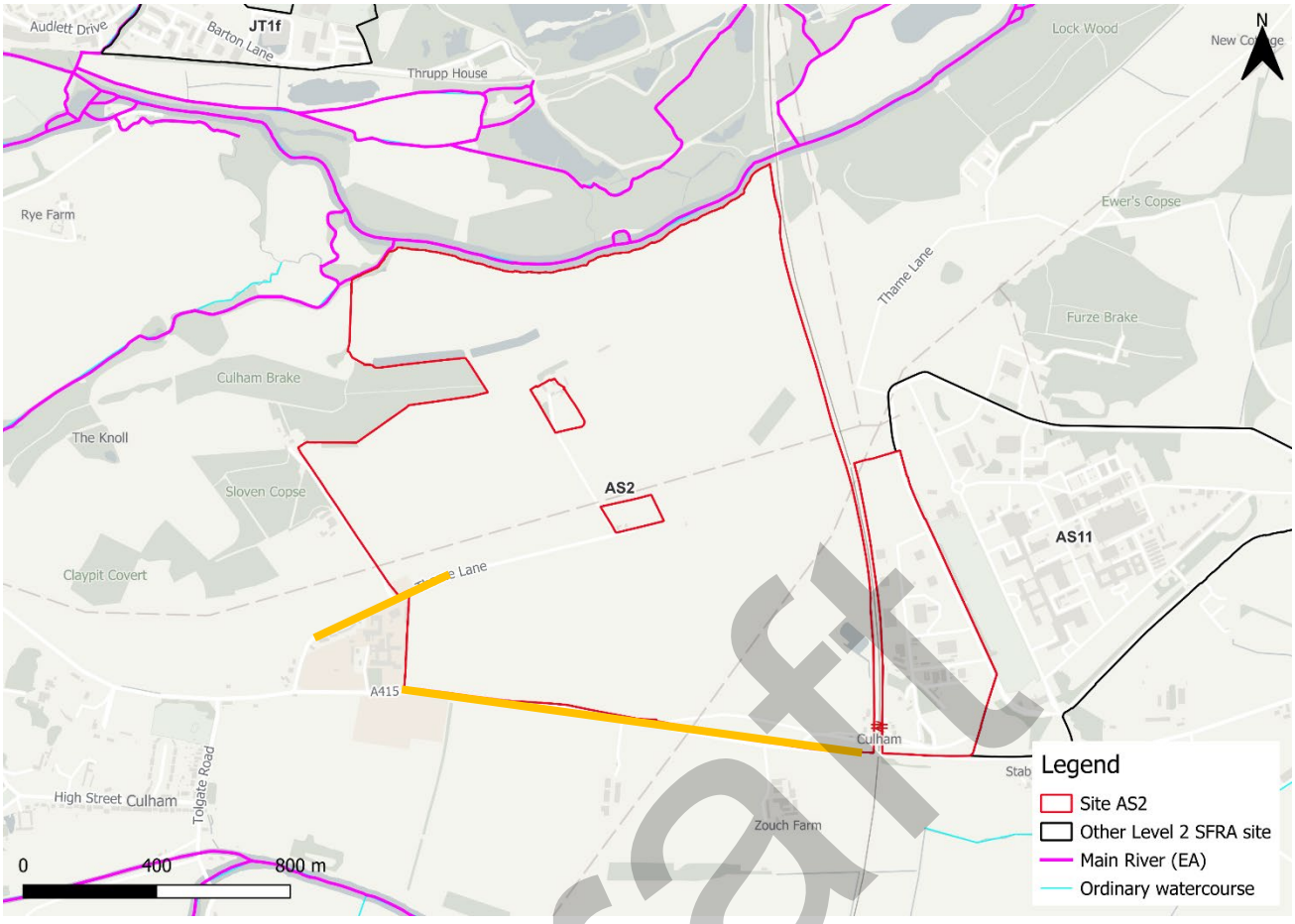

Figure 2-9: Potential access and escape routes

2.7 Observations, mitigation options, site suitability, sequential approach to development management - fluvial

- Observations:
  - The site is modelled to be within the functional floodplain along the northern boundary of the site, adjacent to the River Thames. Vulnerable development is not permitted within the functional floodplain.
  - There should be no development within 8m of the River Thames apart from permitted access. The EA recommend for a 8m no development buffer for all main rivers to enable access for maintenance activities. If feasible, this area would be used as a green / blue corridor which can provide ecological, social and amenity value.
  - A flood risk activity permit may be required if development is planned within 8m of the riverbank. The EA can advise on whether a permit will be required.
  - The site is partially located in Flood Zone 3, as indicated by the EA's Flood Map for Planning and the Thames (Sandford to Pangbourne) 1% AEP undefended event outputs. Greatest depths within the site boundary are modelled to be > 1.2m. More vulnerable development should be directed away from the area of the site within Flood Zone 3.

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- The EA Flood Zones plus Climate Change dataset shows the site is not at significant additional risk from climate change. However, as discussed, there is no detailed climate change modelling available for the reach of the River Thames to the north of the site to understand the impact of climate change on fluvial flood depths, velocities and hazards. Climate change must be modelled at the site-specific FRA stage.

- Mitigation:
  - The area adjacent to the northern site boundary should be maintained and included in site design as a green / blue corridor offering multifunctional benefits alongside flood risk mitigation including Biodiversity Net Gain (BNG) contributions, and social and amenity benefits. This should be feasible without impacting significantly on plot numbers.
  - The EA flood warnings and alerts should continue to be in place to ensure early evacuation of site users before an extreme flood event occurs.
- Residual risk:
  - The site is at potential residual risk from a breach of two reservoirs. Given the potential reservoir risk to the site, developers should consider[2]:
    - Consulting with the local resilience forum for advice on emergency planning,
    - Consulting with relevant reservoir owners to understand the impact development may have on their reservoirs, and
    - Using this Level 2 SFRA to understand whether any proposed development will be safe throughout its lifetime.
- Access and escape:
  - Safe access and escape routes could likely be achieved during a flood event via Thame Lane through the west of the site and Abingdon Road (A415) to the south of the site.

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3 Flood risk from surface water

3.1 Existing risk

3.1.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths Present Day

Based on the EA's national scale Flood Map for Planning- Surface Water Spatial Planning Extents Present Day map (September 2026), the majority of the site is at very low risk from surface water flooding, as shown in Table 3-1. Surface water risk is largely confined to areas of ponding within topographic low spots across the site (Figure 3-1). There is an emerging surface water flow path within the south of the larger site parcel. There are some additional small areas of ponding through the centre of the site.

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Depths Present Day map, the greatest flood depths are between 0.6 and 0.9m, however the majority of the site has depths below 0.3m (Figure 3-2).

Safe access and escape routes should be possible via Thame Lane and Abingdon Road (A415) in all events.

Table 3-1: Existing surface water flood risk based on percentage area at risk using the Flood Map for Planning - Surface Water Spatial Planning Extent Present Day map

Less than 0.1% AEP event (% area)	0.1% AEP event (% area)	1% AEP event (% area)	3.3% AEP event (% area)
95	3	1	1

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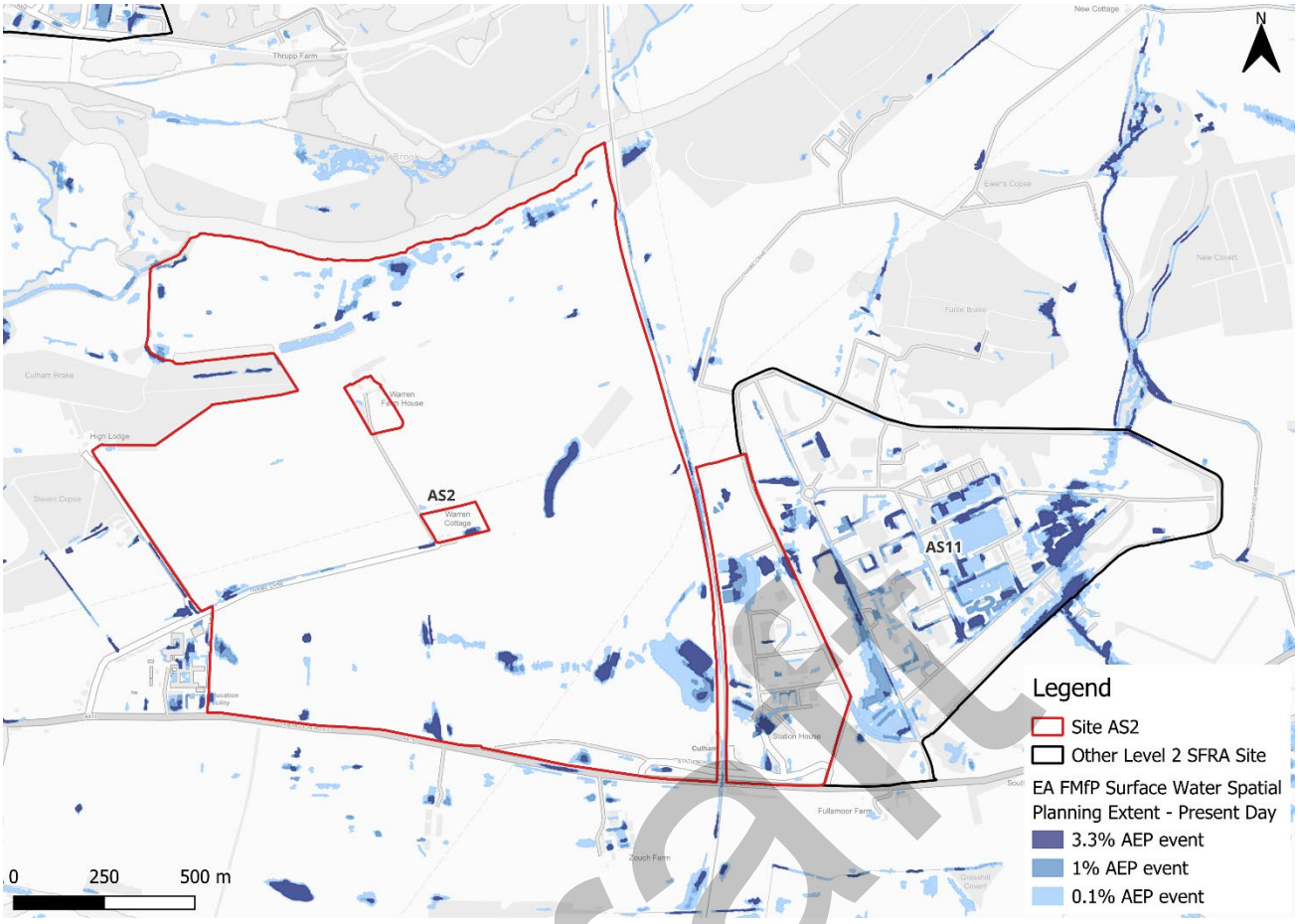

Figure 3-1: Flood Map for Planning - Surface Water Spatial Planning Extents Present Day

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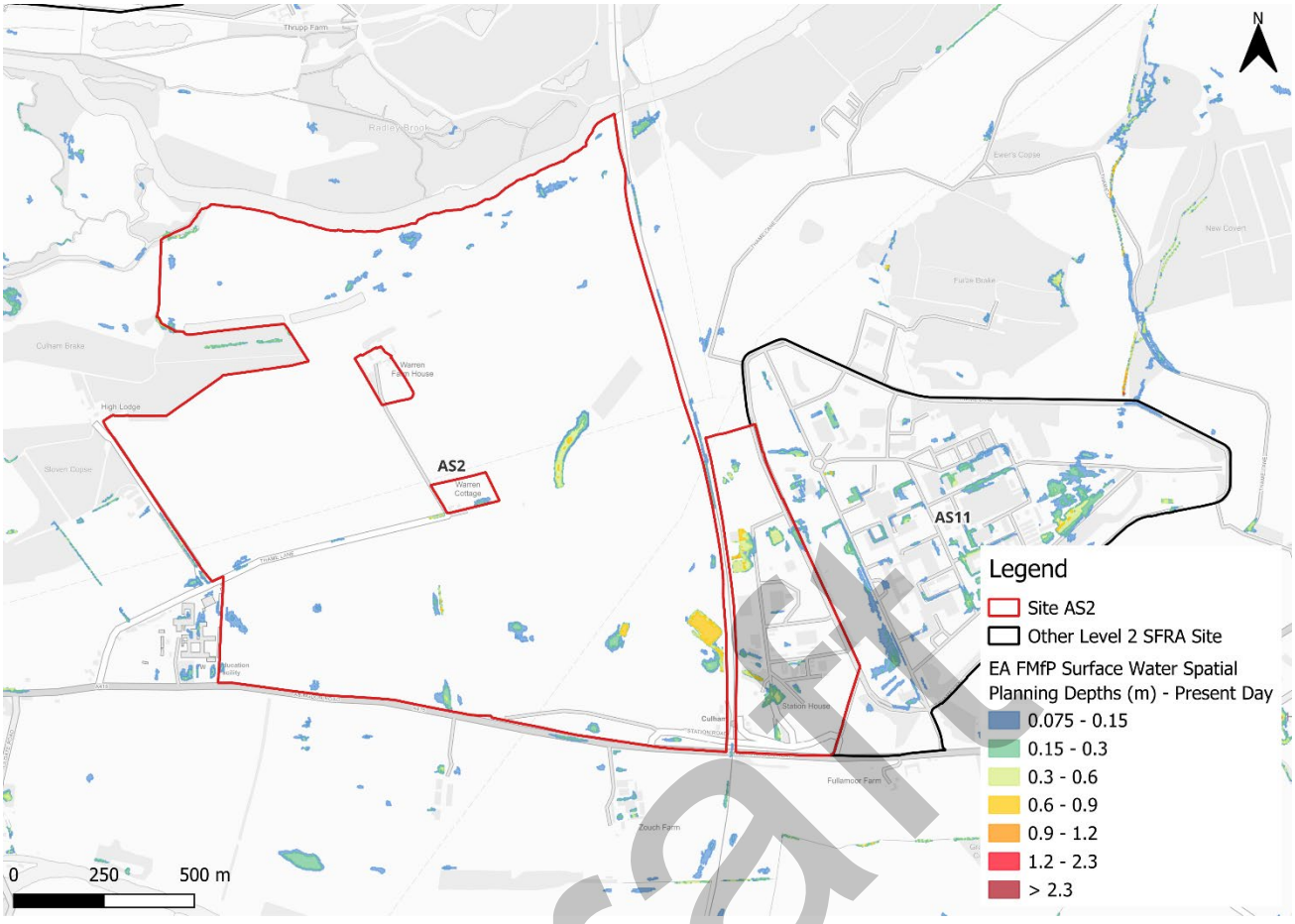

Figure 3-2: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Present Day for the 1% AEP event

3.1.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning data does not include hazard information suitable for planning purposes. Therefore, this Level 2 SFRA considers the third generation Risk of Flooding from Surface Water (RoFSW) hazard mapping in addition to the Flood Map for Planning - Surface Water Spatial Planning extents and depths, as the best available information. Updated surface water hazard information would need to be confirmed at the site-specific FRA stage.

Based on the EA's national scale third generation RoFSW map, the greatest flood hazard within the site in the medium risk event is categorised as 'significant', however is predominantly 'moderate' (Figure 3-3).

There are some differences between the Flood Map for Planning - Surface Water Spatial Planning map and the third generation RoFSW hazard mapping. The Flood Map for Planning - Surface Water Spatial Planning data does not map flooding less than 0.075m (7.5cm) in depth. Therefore, where the map may show no flooding, there may be shallow flooding up to a depth of 0.075m. In contrast, the third generation RoFSW does not map flooding with a hazard rating of less than 0.575. This could explain the differences observed between the Flood Map for Planning and third generation RoFSW maps.

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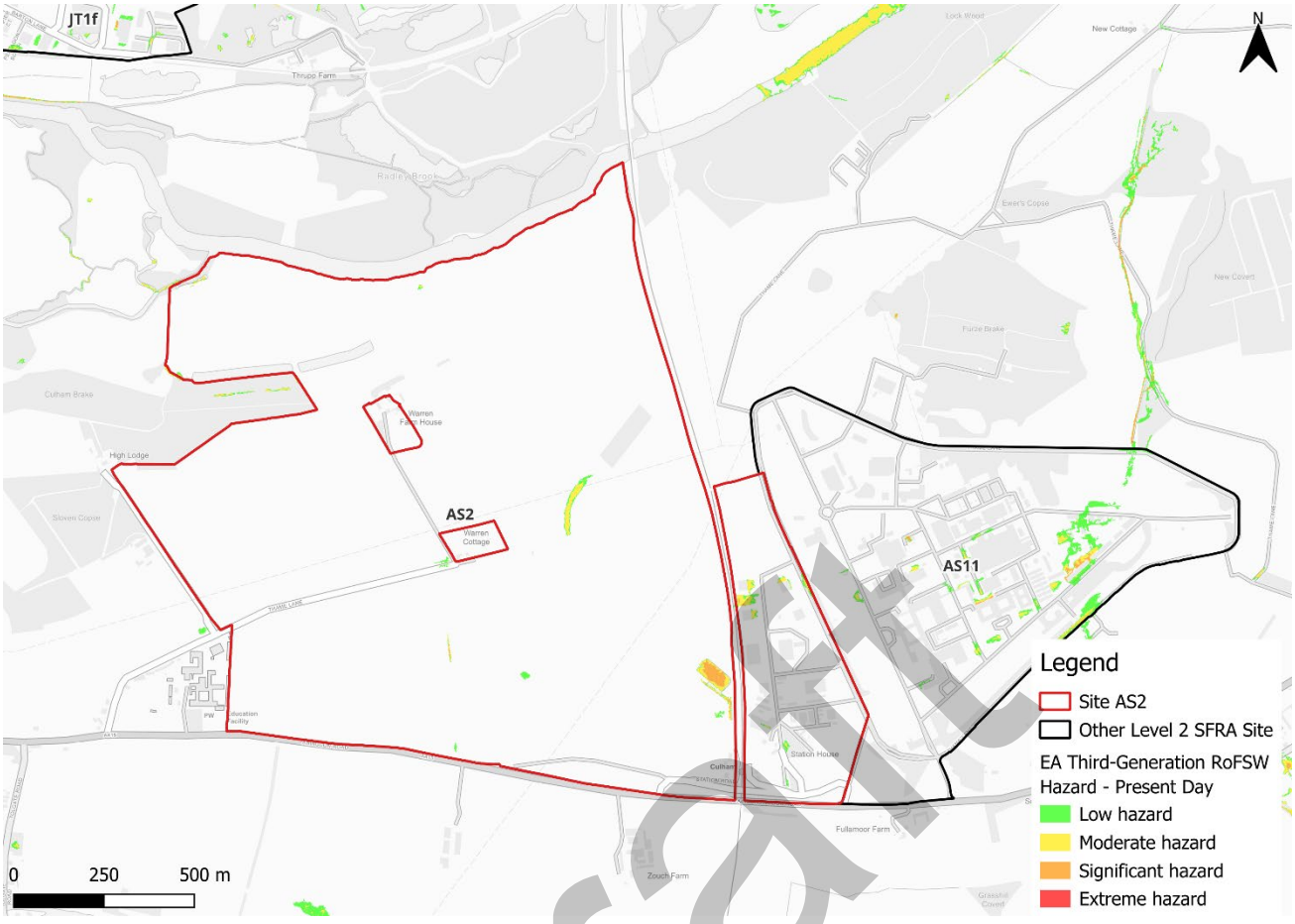

Figure 3-3: Medium risk event surface water flood depths (Third generation - Risk of Flooding from Surface Water map)

3.2 Impacts from climate change

3.2.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths

The EA's climate change allowance guidance states that SFRA's should assess the upper end peak rainfall allowance for the 2070s epoch. This dataset is included in the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Climate Change dataset (September 2026). The peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment are shown in Table 3-2. The allowance for the 0.1% AEP event is not stated in the EA guidance.

Table 3-2: Peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment

Return period	Central allowance 2070s (% increase)	Upper end allowance 2070s (% increase)
3.3% AEP	25	35
1% AEP	25	40

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Figure 3-4 shows the surface water flood extents for the 2070s upper end climate change scenario. Surface water flood risk is shown to increase in extent with climate change, particularly within the southeast of the site. There are two distinct surface water flow paths emerging through the north and south of the site.

The greatest flood depths onsite in the 1% AEP event are shown to increase to between 1.2 and 2.3m, however are less than 0.6m across the majority of the site (Figure 3-5).

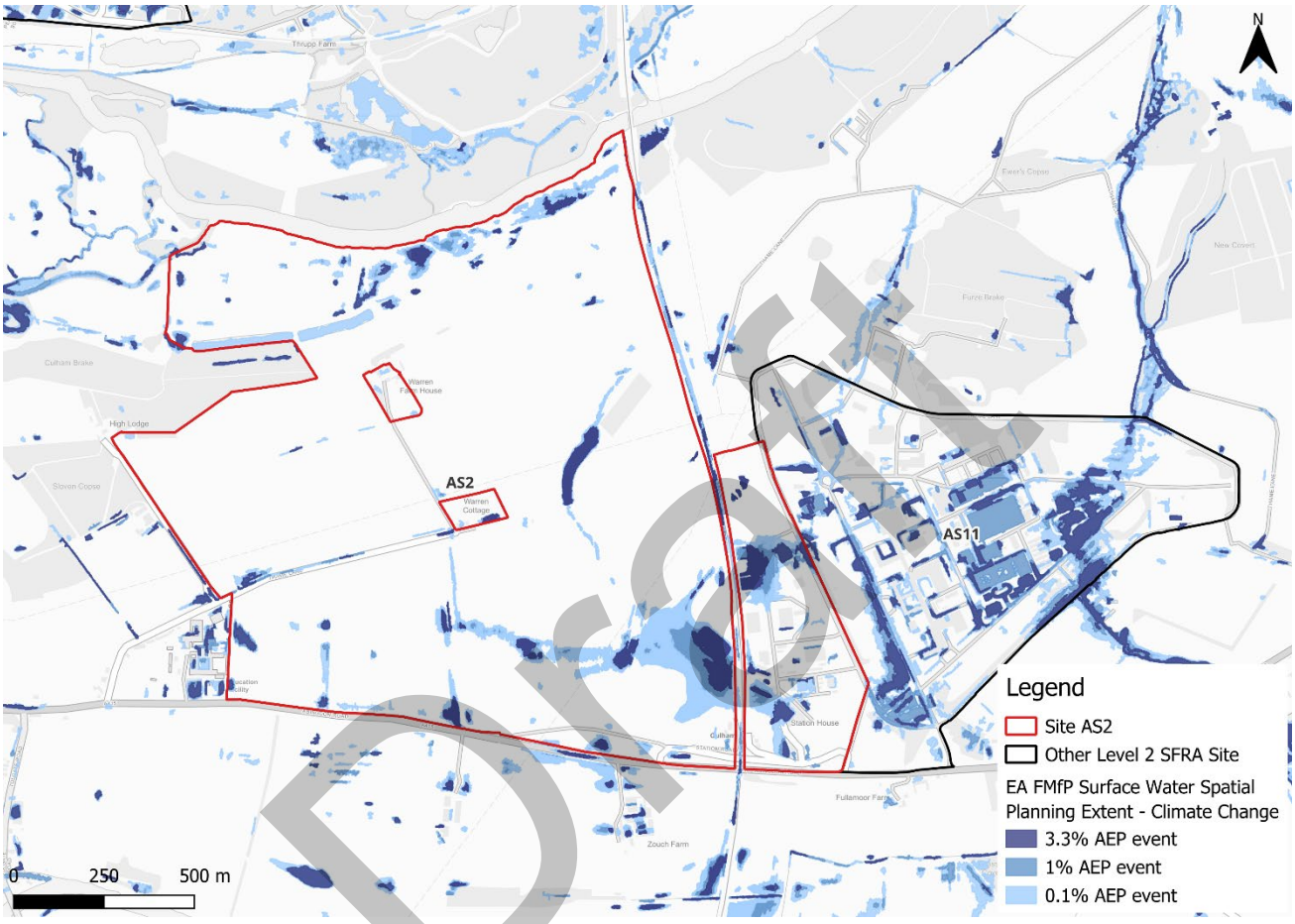

Figure 3-4: Flood Map for Planning - Surface Water Spatial Planning Extents Climate Change (2070s Upper End)

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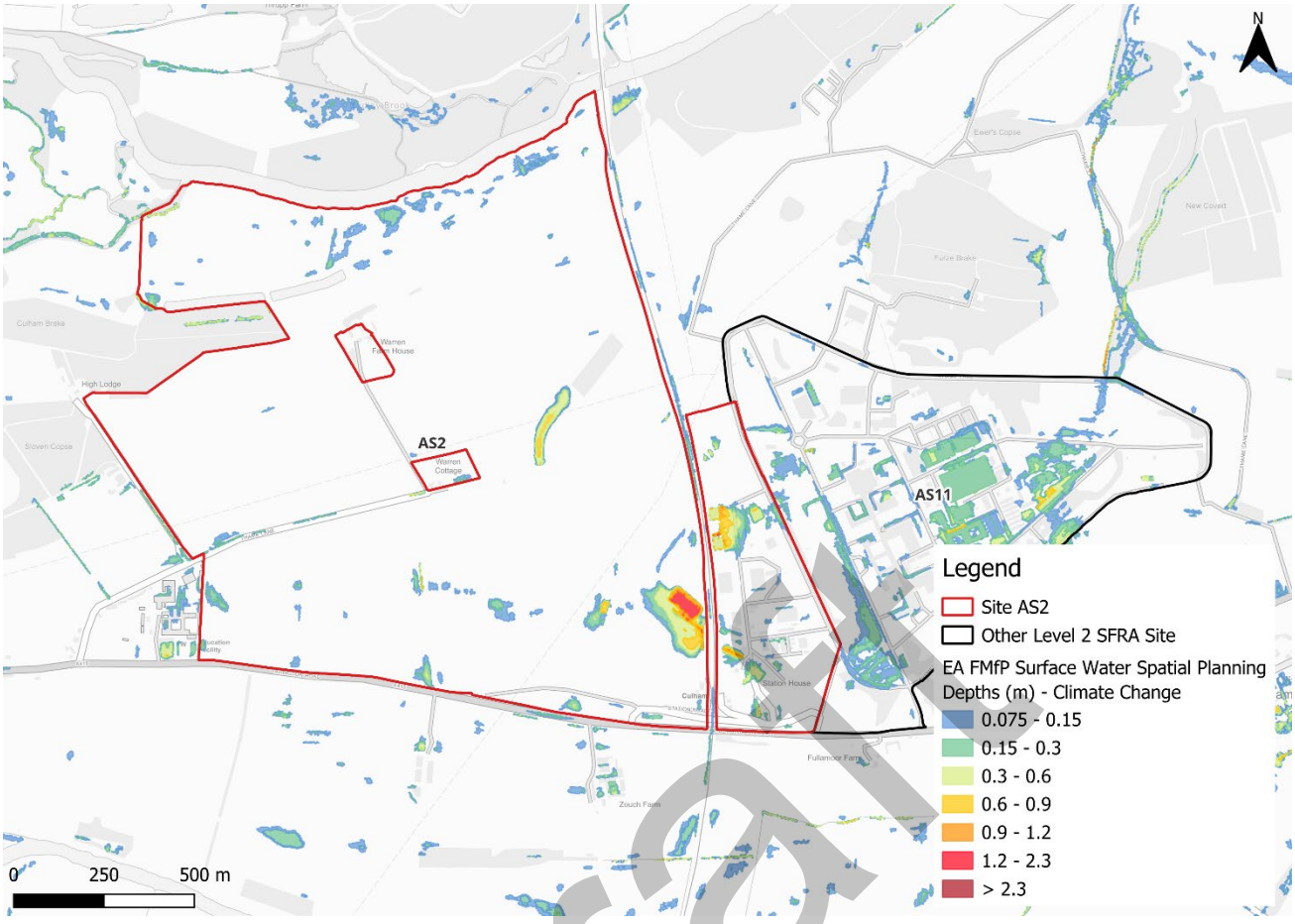

Figure 3-5: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Climate Change for the 1% AEP event (2070s Upper End)

3.2.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning climate change data does not include hazard information suitable for planning purposes. This Level 2 SFRA therefore considers the RoFSW low risk surface water event as a conservative proxy for the medium risk event plus climate change, as the best available information to assess surface water flood hazards. The impact of climate change on surface water flood hazards should be considered at the site-specific FRA stage.

Using the RoFSW low risk event as a proxy, future surface water flood hazard in the medium risk event is categorised as 'significant' within the area of ponding in the southeast of the site (Figure 3-6).

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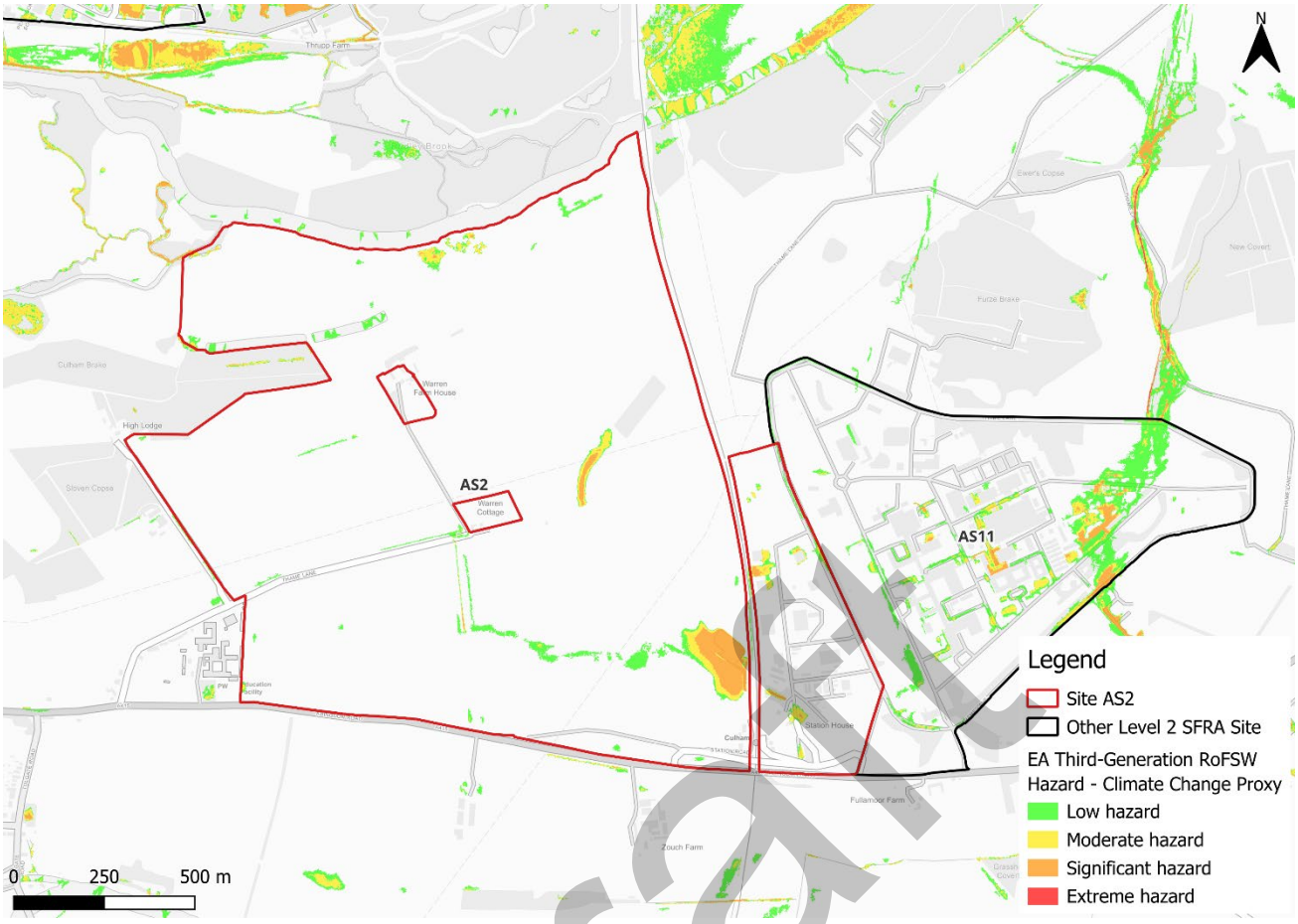

Figure 3-6: Low risk event surface water flood hazard, as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options, site suitability, sequential approach to development management - surface water

- Current risk to the site is predominantly very low, with 95% of the site being at very low surface water flood risk. Surface water risk in the medium risk event is confined to areas of ponding within topographic low spots across the site. There is an emerging surface water flow path within the south of the larger site parcel.
- Risk to site is shown to increase in extent within the site when considering the impact of climate change. There are two distinct flow paths within the north and south of the site when accounting for climate change.
- Topographic low spots and existing flow paths should be considered within site design.
- The drainage strategy must ensure there is no increase in surface water flood risk elsewhere as a result of new development. The developer should aim to achieve betterment of existing runoff rates. The developer should also follow the National SuDS guidance.
- Safe access and escape routes could likely be achieved during a flood event via Thame Lane and Abingdon Road (A415) to the south of the site.

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4 Groundwater, geology and SuDS suitability

Risk of groundwater emergence is assessed in this SFRA using JBA's 5m Groundwater Emergence Map. Figure 4-1 shows the map covering the site and the surrounding areas. Table 4-1 explains the risk classifications.

Risk of groundwater emergence varies across the site. Across the majority of the site, there is a possibility of groundwater emerging at the surface locally. Within the south west of the site, there is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely. Within the area of the site adjacent to the River Thames, and a small area within the smaller site parcel, there is a negligible risk from groundwater emergence. Ground investigations will be required through the site-specific FRA to ascertain groundwater levels and conditions. Infiltration SuDS may not be suitable within the majority of the site.

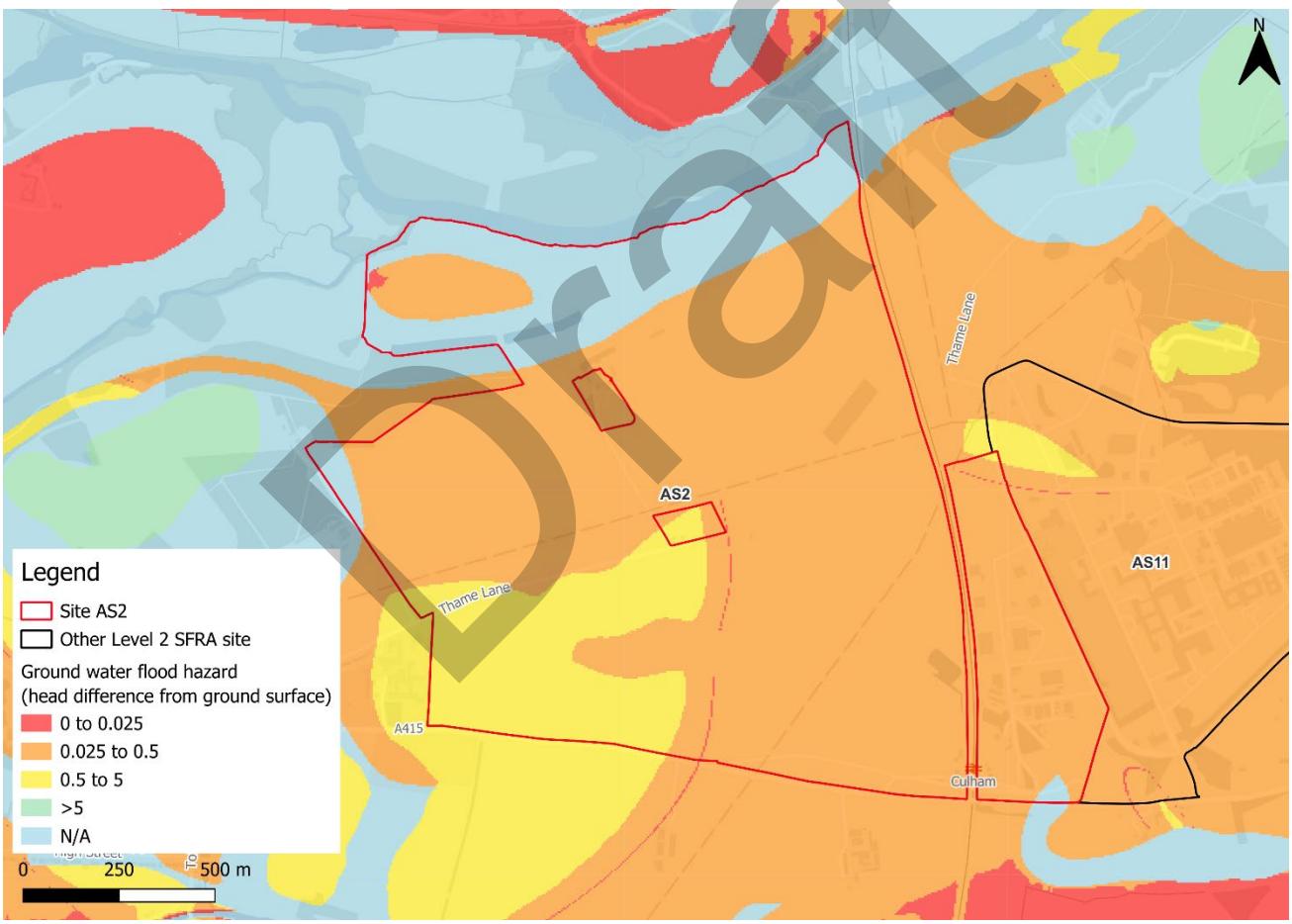

Figure 4-1: JBA 5m Groundwater Emergence Map

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Table 4-1: Groundwater Emergence Hazard Classification

Groundwater head difference (m)*	Class label
0 to 0.025	Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
0.025 to 0.5	Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
0.5 to 5	Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event There is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely.
>5	Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event. Groundwater emergence is not likely.
N/A	No risk. This zone is deemed as having a negligible risk from groundwater emergence due to the nature of the local geological deposits.
*Difference is defined as ground surface in mAOD minus modelled groundwater table in mAOD.	

The underlying bedrock within the site is predominantly mudstone and sandstone. Superficial deposits consist of predominantly clay, silt and sand, with subsequent sand and gravel deposits in the north and south edges of the site (Figure 4-2). Other than sandstone, all these rocks generally have low levels of permeability. This leads to less water infiltrating into the ground and could potentially contribute to lower water table levels. The drainage strategy for the site should investigate water table levels and ground conditions to inform on appropriate SuDS.

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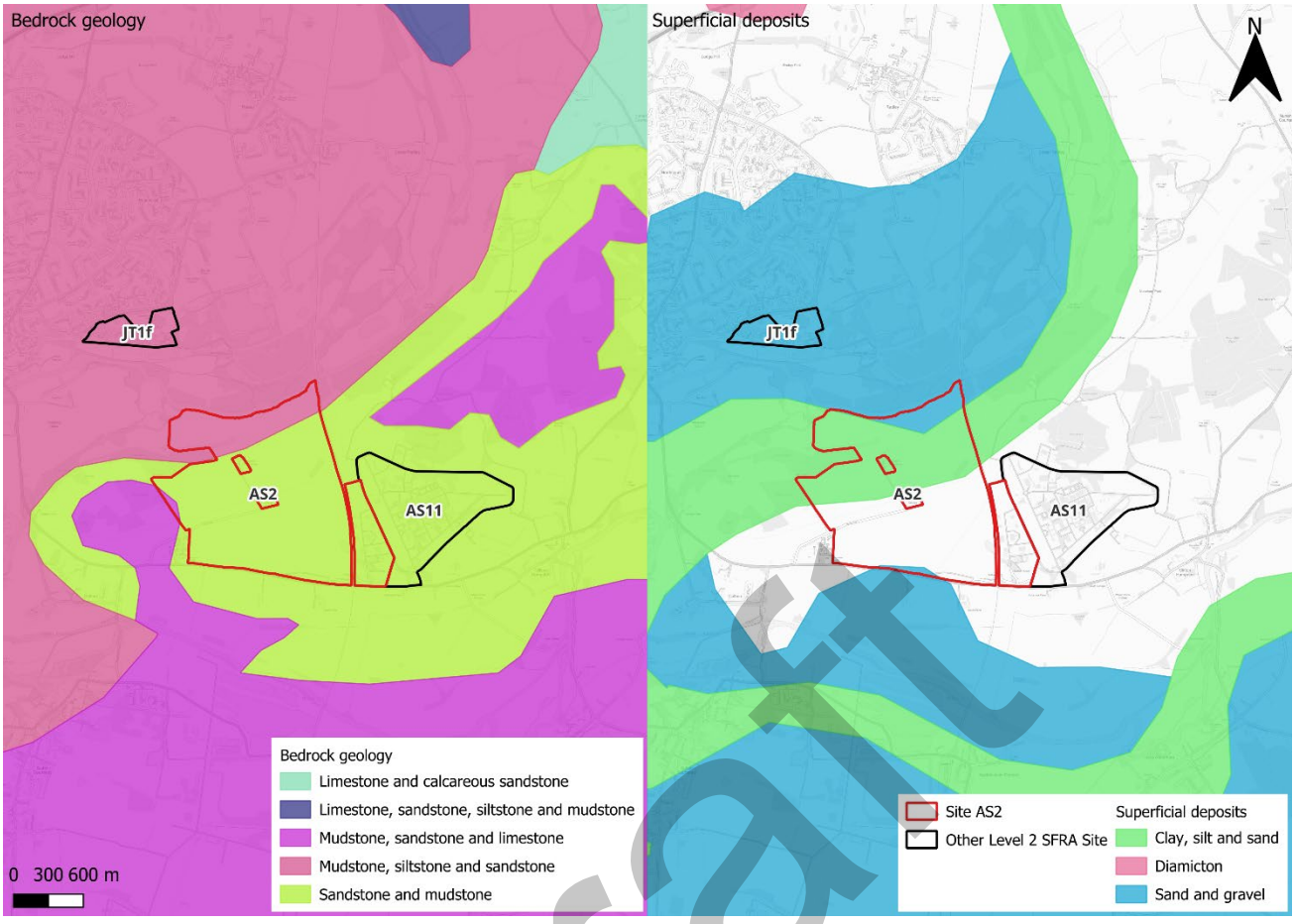

Figure 4-2: BGS Geology - Bedrock and superficial deposits

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5 Overall site assessment

5.1 Can part b) of the exception test be passed?

To pass part b) of the exception test[3], it must be proven that the development can be safe for its lifetime, which is 100 years for residential development and 75 years for non-residential development, taking account of the vulnerability of its users, without increasing risk elsewhere, and, where possible, will reduce flood risk overall.

This site is required to pass the exception test as it is proposed for more vulnerable development within Flood Zone 3a. Based on current information, this site should be able to pass the exception test. However, all the recommendations suggested in this Level 2 SFRA should be considered at the site-specific FRA stage or before any site design planning.

5.2 Recommendations and site-specific FRA requirements

Based on the evidence presented in the Level 1 SFRA (2024), Level 1 SFRA Addendum (2026) and this Level 2 SFRA:

- The proposed development of the site would see a change in the risk classification from less vulnerable to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the site-specific FRA must show that the development can be designed to be safe for its lifetime and that there is adequate emergency planning provision (para 006 FRCC-PPG).
- There should be no vulnerable development within the area of the site covered by the functional floodplain. This should be converted to a blue / green corridor to provide ecological, amenity and social value.
- There should be no development within 8m of the River Thames apart from permitted access. The EA recommend for an 8m no development buffer for all main rivers to enable access for maintenance activities. This should be used as a blue / green corridor to provide ecological, amenity and social value.
- Updated climate change modelling of the River Thames should be used to update this Level 2 SFRA at the earliest opportunity to provide an up-to-date strategic assessment of flood risk to this site and the surrounding areas. It would be acceptable to use updated modelling to suitably assess risk through a site-specific FRA, as well as/instead of a Level 2 SFRA update.
- Based on current information, this site could be allocated in the Joint Local Plan if development avoids the area at modelled fluvial risk in the 0.1% AEP undefended event.
- Were development of this site to proceed, given the proximity of this site to neighbouring site AS11 (Culham Campus), it would be prudent to formulate a strategy to develop these sites in tandem and for consultation between each

[3] Policy F6 National Planning Policy Framework 2026

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developer to take place to ensure a joined-up approach for managing flood risk and drainage is in place.

- Were this site to be allocated based on current information, the LPA must make it clear that this site cannot be developed until the required information detailed in this SFRA on future flood risk from the River Thames is fully ascertained.
- When a planning application is submitted, a full detailed drainage strategy would be required given the large area of the site, and to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA. The existing hydrological environment which feeds the onsite pond should be considered as part of the drainage strategy.
- Groundwater conditions must be investigated further through the site-specific FRA.
- Opportunities for NFM features to reduce flood risk to the site and surrounding areas should be explored at the site-specific FRA stage.
- Any site-specific FRA should be carried out in line with the latest versions of the NPPF; FRCC-PPG; EA online guidance; the Tameside Local Plan, and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with, where applicable, the local planning authority; the lead local flood authority; emergency planning officers; the Environment Agency; United Utilities; the highways authorities; and the emergency services.

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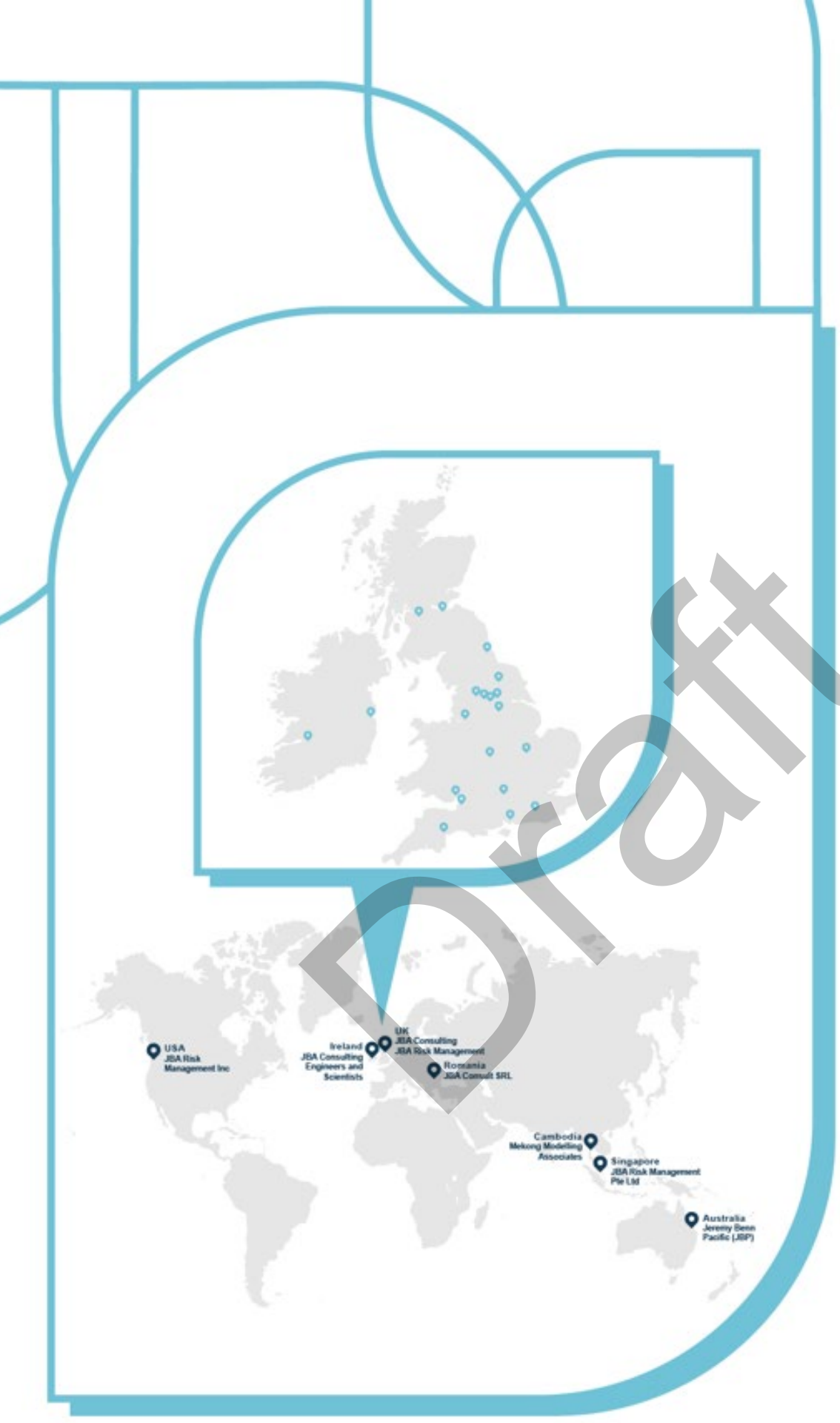

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Registered Office
1 Broughton Park
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Broughton
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North Yorkshire
BD23 3FD
United Kingdom

+44(0)1756 799919
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www.jbaconsulting.com
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South Oxfordshire and Vale of White Horse Level 2 Strategic Flood Risk Assessment Update

Site AS3 - Land South of Grenoble Road, Edge of Oxford

Draft Report

October 2026

Prepared for:

South Oxfordshire District Council and

Vale of White Horse District Council

www.jbaconsulting.com

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Reviewed by	Laura Thompson-Jones BSc CGeog FRGS Senior Analyst
Authorised by	Mike Williamson BSc MSc CGeog FRGS EADA Project Director

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JBA Project Manager	Freya Nation
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2026s1132

This report describes work commissioned by South Oxfordshire and Vale of White Horse District Councils. The Client's representative for the contract was Rebekah Goodwill of South Oxfordshire and Vale of White Horse District Councils. Boe Kilshaw of JBA Consulting carried out this work.

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for South Oxfordshire and Vale of White Horse Joint Local Plan Site AS3 - Land South of Grenoble Road, Edge of Oxford. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA' (2024) and the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum' (2026), and read the 'South Oxfordshire and Vale of White Horse District Councils Level 2 SFRA Main Report Update' (2026) and is therefore familiar with the terminology used in this report.

1.1 Site AS3 - Land South of Grenoble Road, Edge of Oxford

- Location: Land South of Grenoble Road, Edge of Oxford (Figure 1-1)
- Existing site use: Agriculture
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Mixed use; mainly residential and employment
- Proposed site use vulnerability: More vulnerable
- Site area: 136.1 ha
- Proposed development impermeable area: 115.6 ha (assumed 85% of site area)
- EA model: Northfield & Littlemore Brooks 2011
- Watercourse: Northfield Brook / Littlemore Brook. An ordinary watercourse originates within the south of the site and flows northwards. There is a small drainage ditch through the centre of the site.
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for more detailed assessment through Level 2 SFRA (Strategic Recommendation A)
    - Subject to Exception Test
    - Assess present day and future modelled fluvial depths, hazards
    - Assess present day and future modelled surface water depths, hazards

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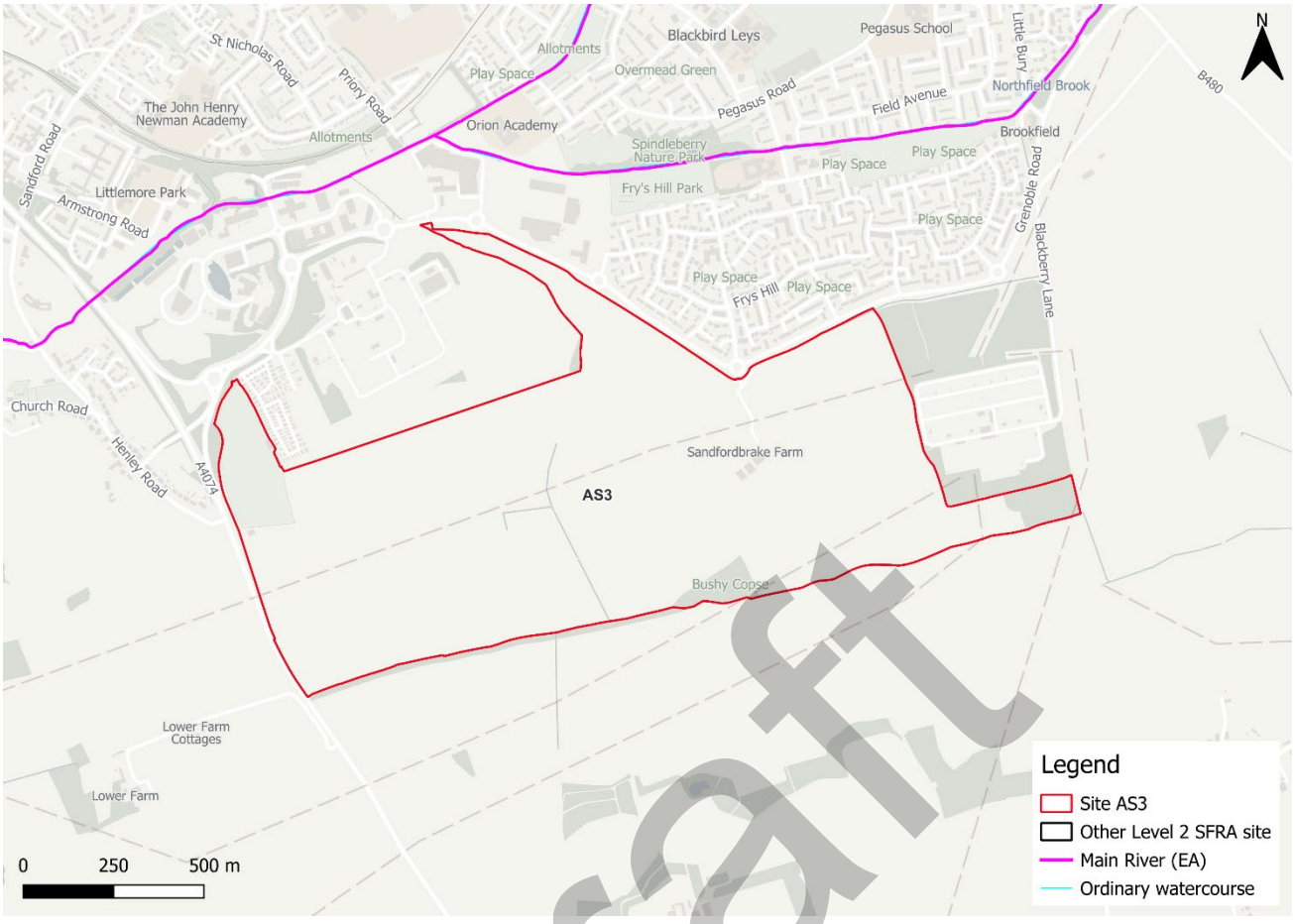

Figure 1-1: Site location

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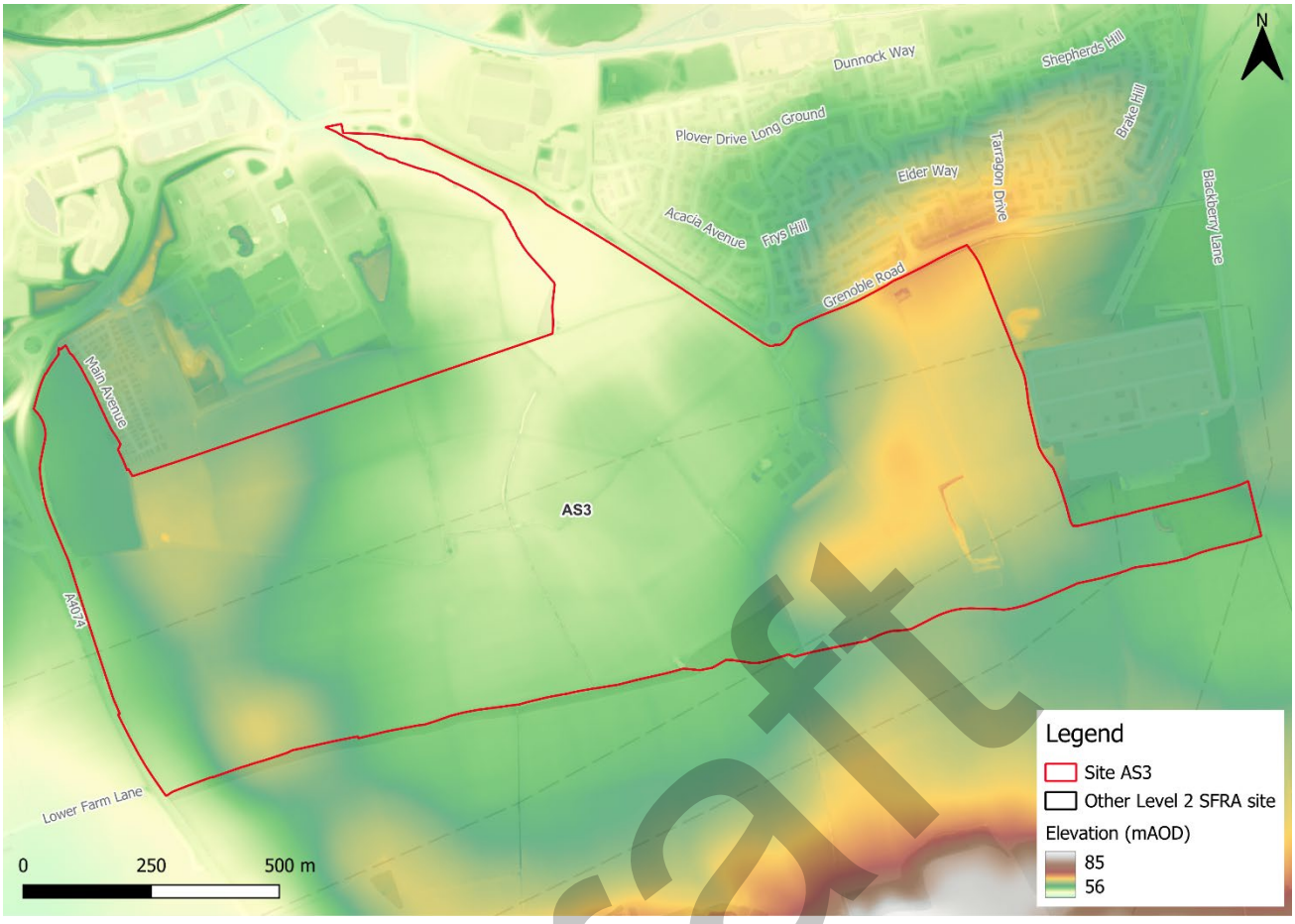

Figure 1-2: Topography

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2 Flood risk from rivers

2.1 Existing risk

2.1.1 Flood Map for Planning and functional floodplain

Based on the Environment Agency's (EA) Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum (2026), the percentage areas of the site within each flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.4).

There is a small drainage ditch running through the centre of the site. A small area of functional floodplain is present along the drainage ditch. The functional floodplain in this location is based on the 1% AEP event from the Northfield & Littlemore Brooks 2011 model. The area of functional floodplain onsite should be left free of vulnerable development. The centre of the site is located within Flood Zone 3a and is therefore at high risk of flooding from rivers. There are also some areas within Flood Zone 2 and therefore at medium risk of flooding from rivers.

Table 2-1: Existing flood risk based on percentage area of site at risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
94	1	4	1

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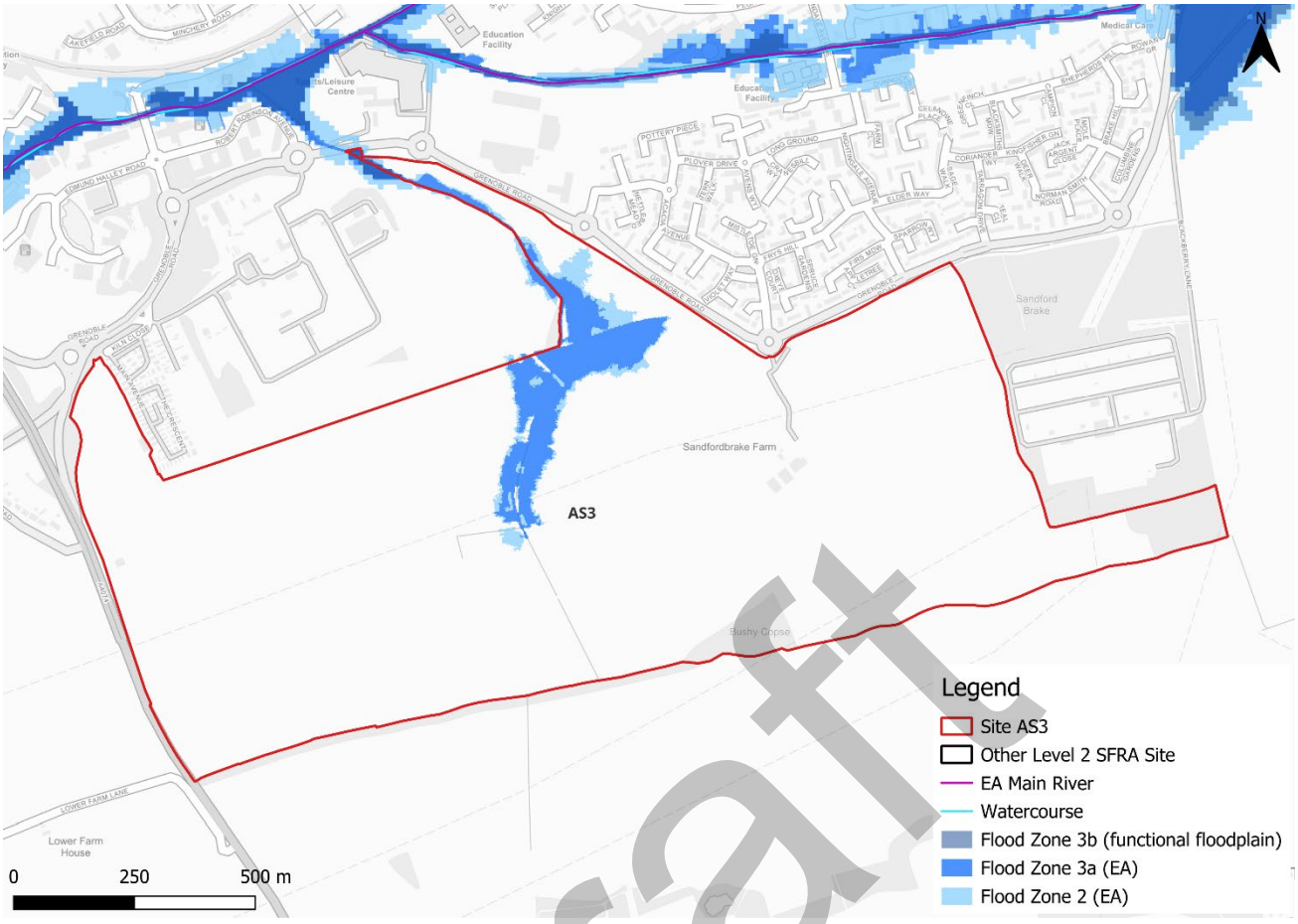

Figure 2-1: Existing risk from rivers to the site

2.1.2 Northfield & Littlemore Brooks 2011 model outputs

Figure 2-2 shows the modelled flood depths for the 1% AEP undefended event which is the event Flood Zone 3 of the Flood Map for Planning is based on. Modelled risk to the site is confined to a short flow path within the north of the site. Flood depths within the site are modelled to be shallow. Figure 2-3 shows the modelled flood hazard ratings for the 1% AEP undefended event. Modelled flood hazard in the area of the site at fluvial flood risk is categorised as very low. There is no modelled flood risk to the rest of the site in the 1% AEP undefended event, based on the Northfield & Littlemore Brooks 2011 model.

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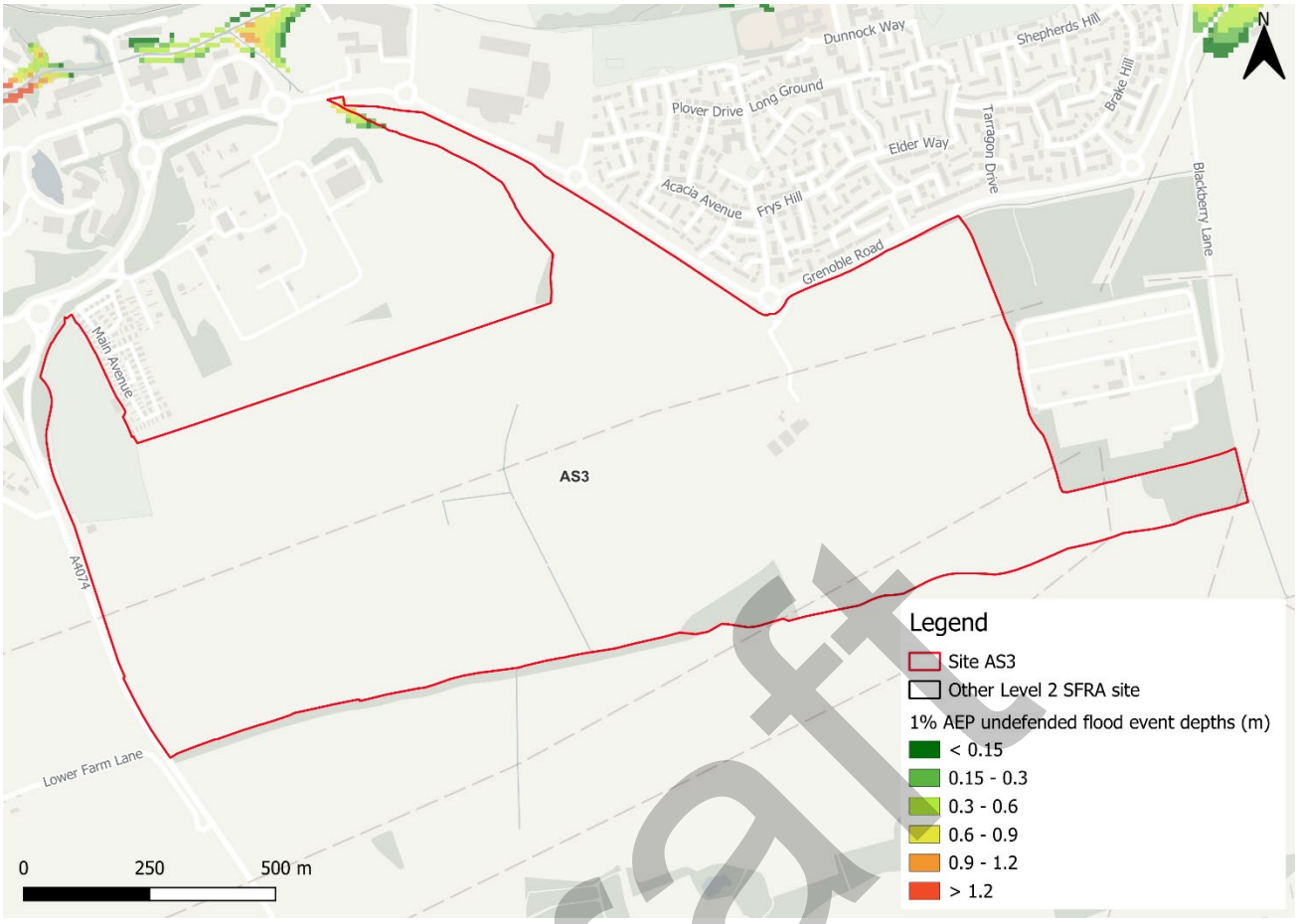

Figure 2-2: Flood depths for 1% AEP undefended flood event

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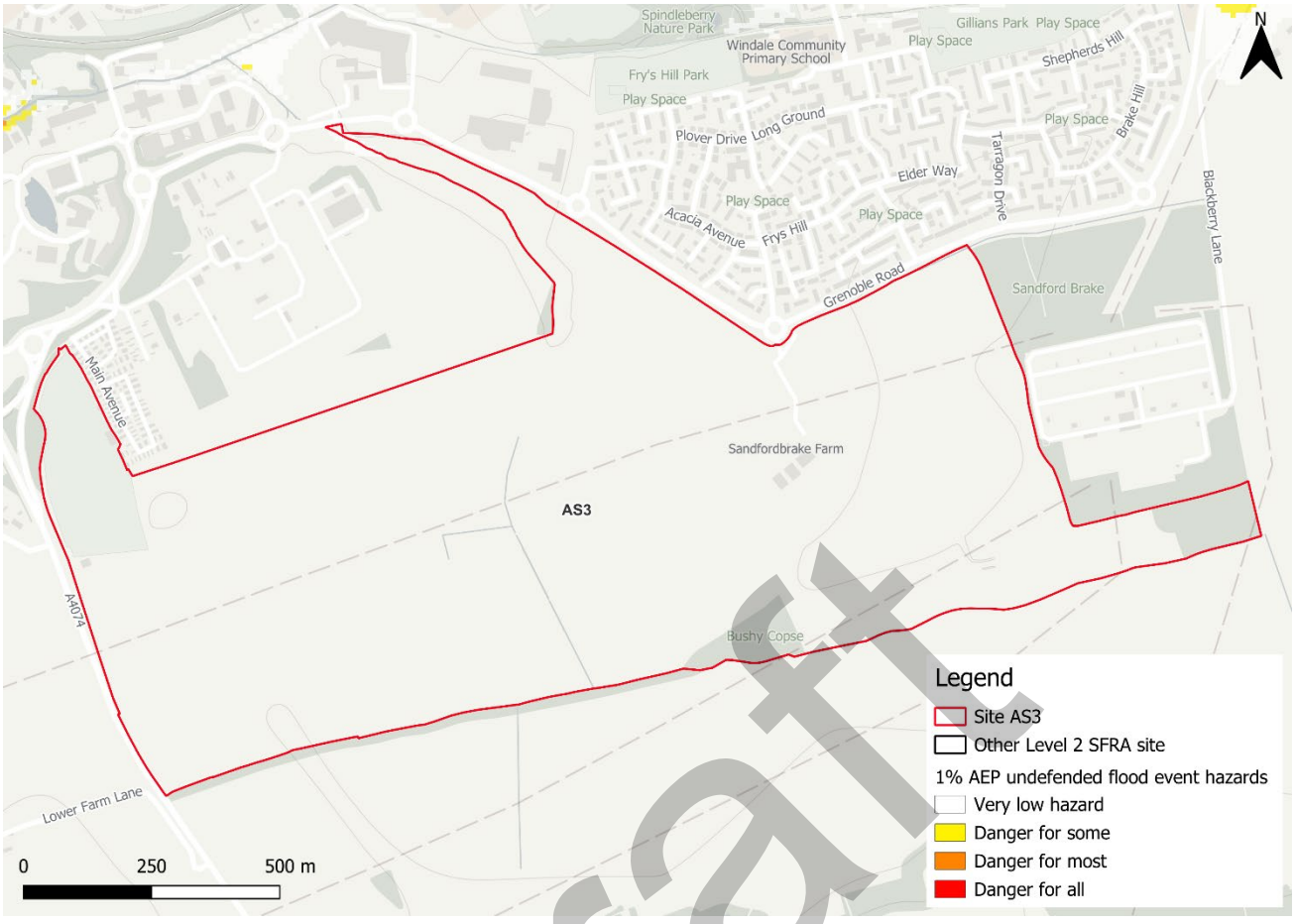

Figure 2-3: Flood hazard[1] for 1% AEP undefended flood event

2.2 Impacts from climate change

2.2.1 Northfield & Littlemore Brooks 2011 model outputs

The EA's SFRA guidance states that SFRAs should assess the 2080s central allowance for less vulnerable, more vulnerable, highly vulnerable and water compatible development (Table 2-2). The impacts of climate change on flood risk from Northfield Brook and Littlemore Brook has not been modelled for this SFRA. The impacts of climate change must be modelled using the EA's latest allowances for peak river flows to inform whether the site can be safe for its lifetime and to assess modelled flood depths and hazards. Therefore, any updates to this Level 2 SFRA and/or any site-specific FRA should include for the most up to date climate change allowances.

[1] Fluvial hazard ratings based on Table 4 of the Supplementary Note on Flood Hazard Ratings and Thresholds for Development Planning and Control Purpose – Clarification of the Table 13.1 of FD2320/TR2 and Figure 3.2 of FD2321/TR1. May 2008. Environment Agency.

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Table 2-2: Climate change allowances for peak river flows for the Gloucestershire and the Vale management catchment

Epoch	Central	Higher Central	Upper End
2020s	11%	17%	33%
2050s	11%	19%	43%
2080s	26%	41%	84%

2.2.2 Flood Map for Planning - Climate Change

Figure 2-4 shows the EA's Flood Map for Planning - Flood Zones plus Climate Change dataset. Based on this dataset, the site is not shown to be at significant additional risk from climate change.

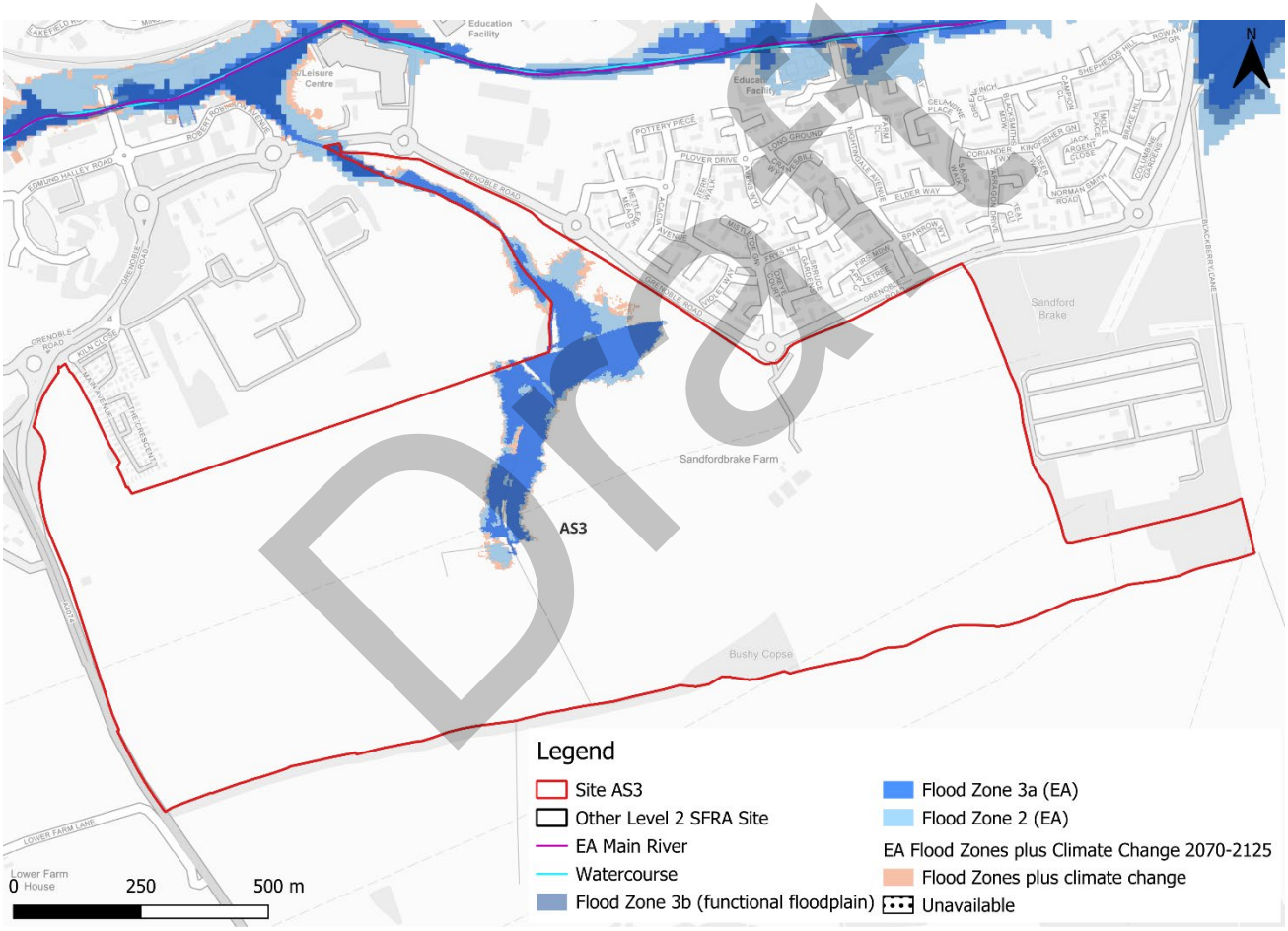

Figure 2-4: Flood Zones plus Climate Change dataset

2.3 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the site. Although no flood incidents have been recorded at the site itself, Church Road to the west of the site was affected by flooding during Winter 2013/2014.

2.4 Flood risk management

2.4.1 Flood defences

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset. There are however areas of natural high ground along the banks of Northfield Brook and Littlemore Brook to the north of the site.

2.4.2 Cumulative impacts

A cumulative impact assessment was completed through the South Oxfordshire and Vale of White Horse Level 1 SFRA Addendum (2026), which aimed to identify catchments sensitive to the cumulative impact of development. Site AS3 (Land South of Grenoble Road, Edge of Oxford) is located within three catchments, namely; Thames (Evenlode to Thame), Baldon Brook (South of Oxford) and Northfield Brook (Source to Thames) at Sandford. The majority of the site is located within a high sensitivity catchment. Planning considerations for sites at high sensitivity to the cumulative impacts of development can be found in Appendix D of the Level 1 SFRA Addendum. Cumulative impacts of development should also be considered as part of a site-specific FRA.

2.4.3 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. Both within and upstream of the site, there are significant opportunities for tree planting to reduce runoff. There is also potential to reconnect the channel to the floodplain, allowing flood water to be stored. These areas are shown in Figure 2-5.

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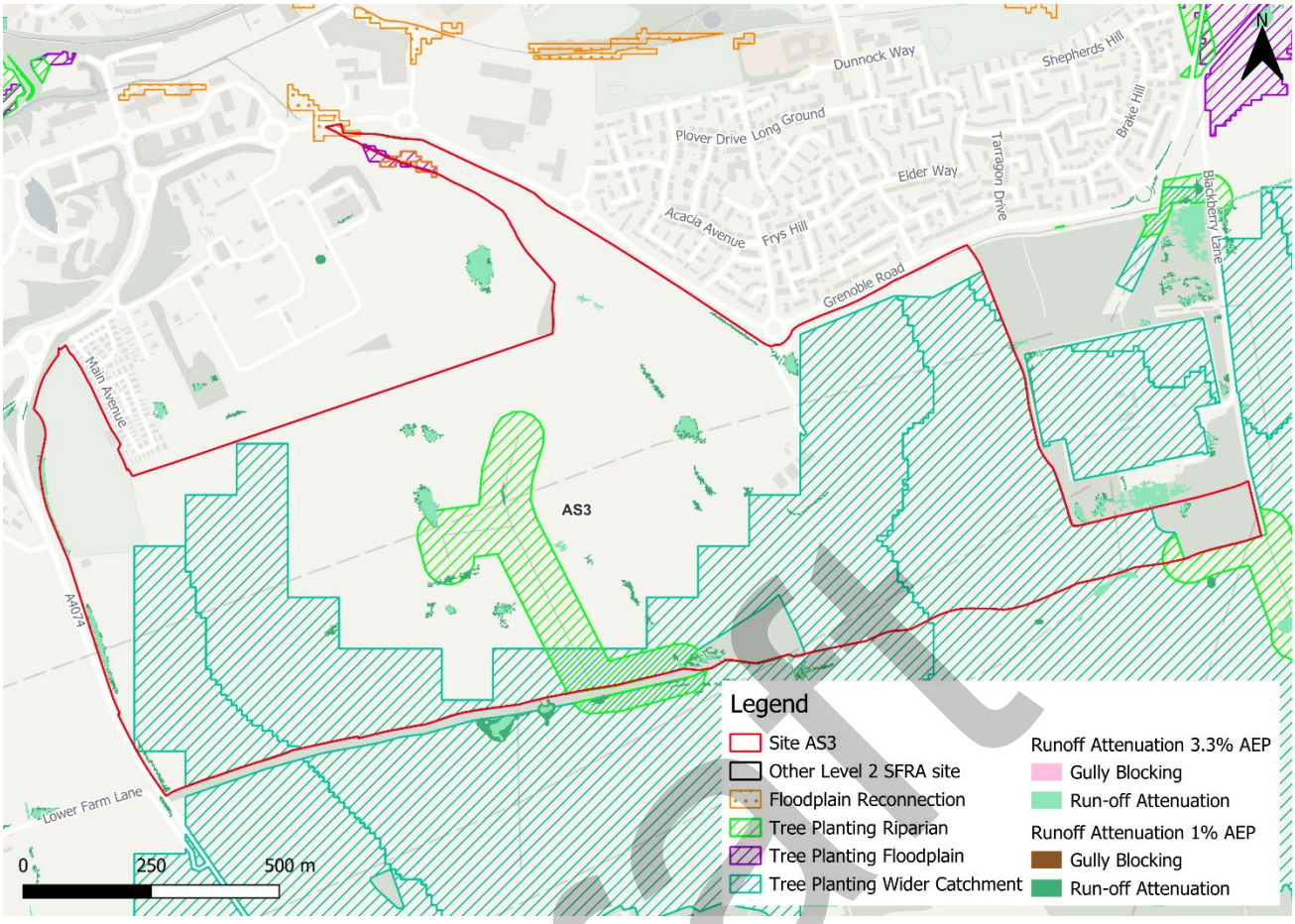

Figure 2-5: Natural Flood Management (NFM) potential mapping

2.5 Residual risk

Although a site may be afforded some protection from defences and / or drainage infrastructure, there is always a residual risk of flooding from asset failure i.e. defence breaches, or blockages of culverts or drainage assets.

There are no assets with the potential to pose a residual risk to the site

2.5.1 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. A "dry day" scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. A "wet day" scenario assumes a worst-case scenario where a reservoir releases water held on a "wet day" when local rivers have already overflowed their banks.

The site is not modelled to be at risk from reservoir flooding.

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2.6 Emergency Planning

2.6.1 Flood warnings and alerts

There are no Flood Warning Areas (FWA) or Flood Alert Areas (FAA) within the vicinity of the site.

2.6.2 Access and escape routes

Based on the Flood Map for Planning, safe access and escape routes could likely be achieved during a flood event via Grenoble Road to the north east of the site. This route is indicated by the yellow lines in Figure 2-6.

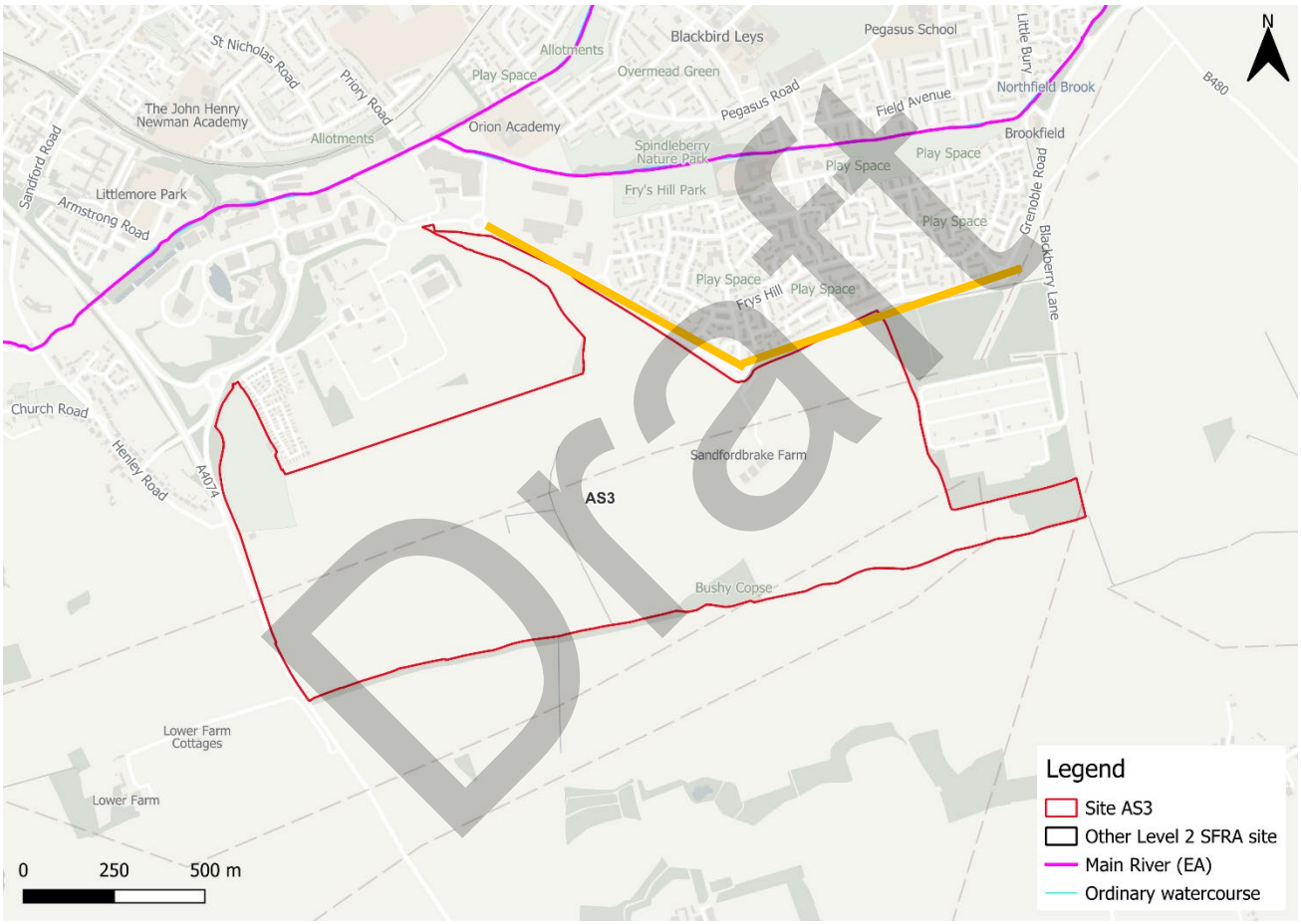

Figure 2-6: Potential access and escape routes

2.7 Observations, mitigation options, site suitability, sequential approach to development management - fluvial

- Observations
  - The site is modelled to be within the functional floodplain along the drainage ditch through the centre of the site. Vulnerable development is not permitted within the functional floodplain.
  - The site is partially located in Flood Zone 3, as indicated by the Northfield & Littlemore Brooks 1% AEP undefended event outputs though depths are

shallow. More vulnerable development should be directed away from the area of the site within Flood Zone 3.
    - The EA Flood Zones plus Climate Change dataset shows the site is not at significant additional risk from climate change. However, as discussed, there is no detailed model of the reach of Littlemore Brook to the north of the site to understand the impact of climate change on fluvial flood depths, velocities and hazards. Climate change must be modelled at the site-specific FRA stage.
- Mitigation:
    - The drainage ditch within the centre of the site should be maintained and included in site design as a green / blue corridor offering multifunctional benefits alongside flood risk mitigation including Biodiversity Net Gain (BNG) contributions, and social and amenity benefits. This should be feasible without impacting significantly on plot numbers.
- Access and escape:
    - Safe access and escape routes could likely be achieved during a flood event via Grenoble Road to the north east of the site

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3 Flood risk from surface water

3.1 Existing risk

3.1.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths Present Day

Based on the EA's national scale Flood Map for Planning- Surface Water Spatial Planning Extents Present Day map (September 2026), the majority of the site is at very low risk from surface water flooding, as shown in Table 3-1. There is significant surface water risk present as a flow path along the drainage ditch through the centre of the site in all events (Figure 3-1). There are also some scattered areas of surface water ponding within topographic low spots.

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Depth map, depths are largely shallow at less than 0.3m, however depths are shown to reach up to 0.9m within the centre of the site (Figure 3-2).

Safe access and escape routes should be possible via Grenoble Road in all events, if access roads within the site avoid the areas of surface water flood risk.

Table 3-1: Existing surface water flood risk based on percentage area at risk using the Flood Map for Planning - Surface Water Spatial Planning Extent Present Day map

Less than 0.1% AEP event (% area)	0.1% AEP event (% area)	1% AEP event (% area)	3.3% AEP event (% area)
82	7	3	8

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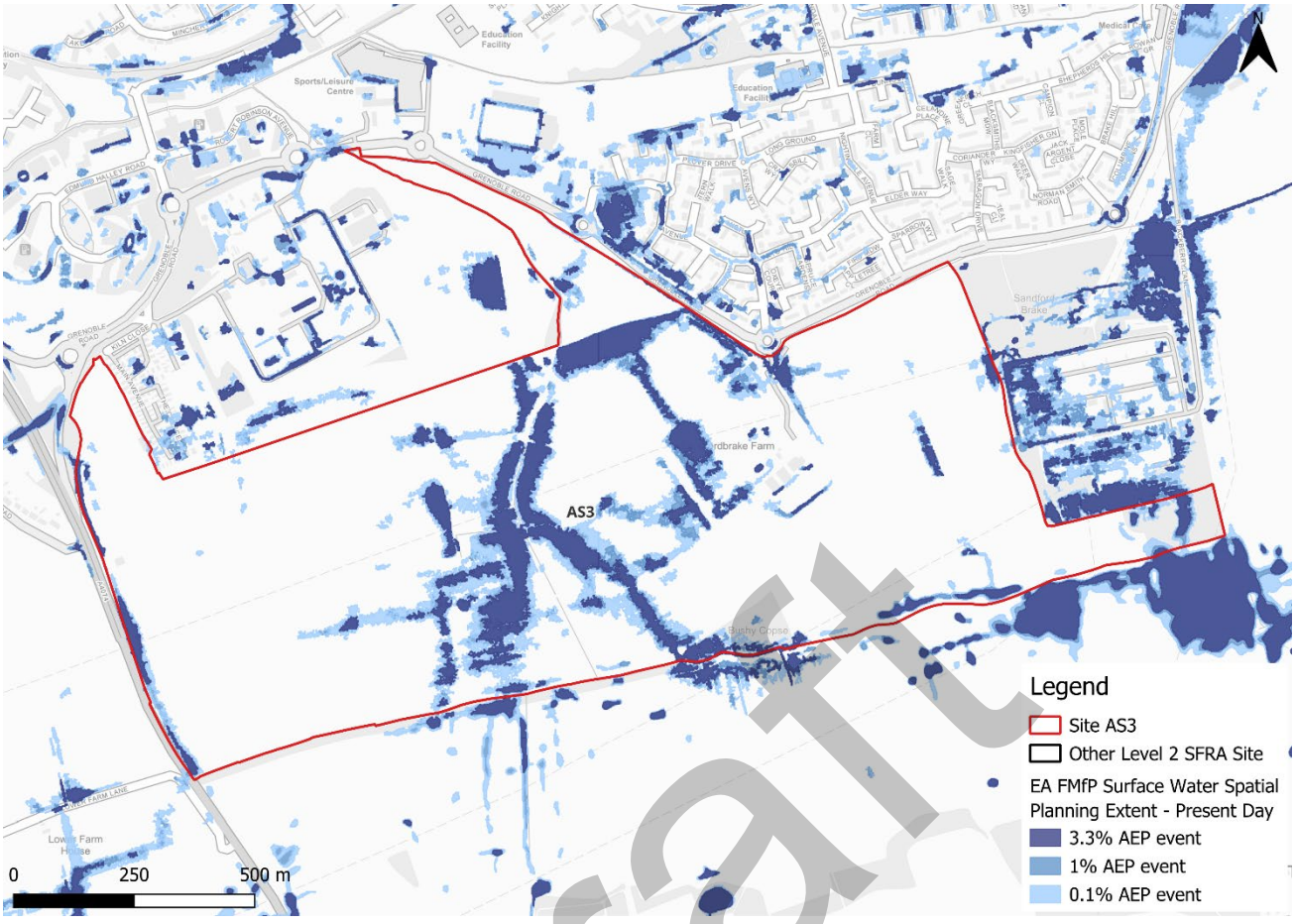

Figure 3-1: Flood Map for Planning - Surface Water Spatial Planning Extents Present Day

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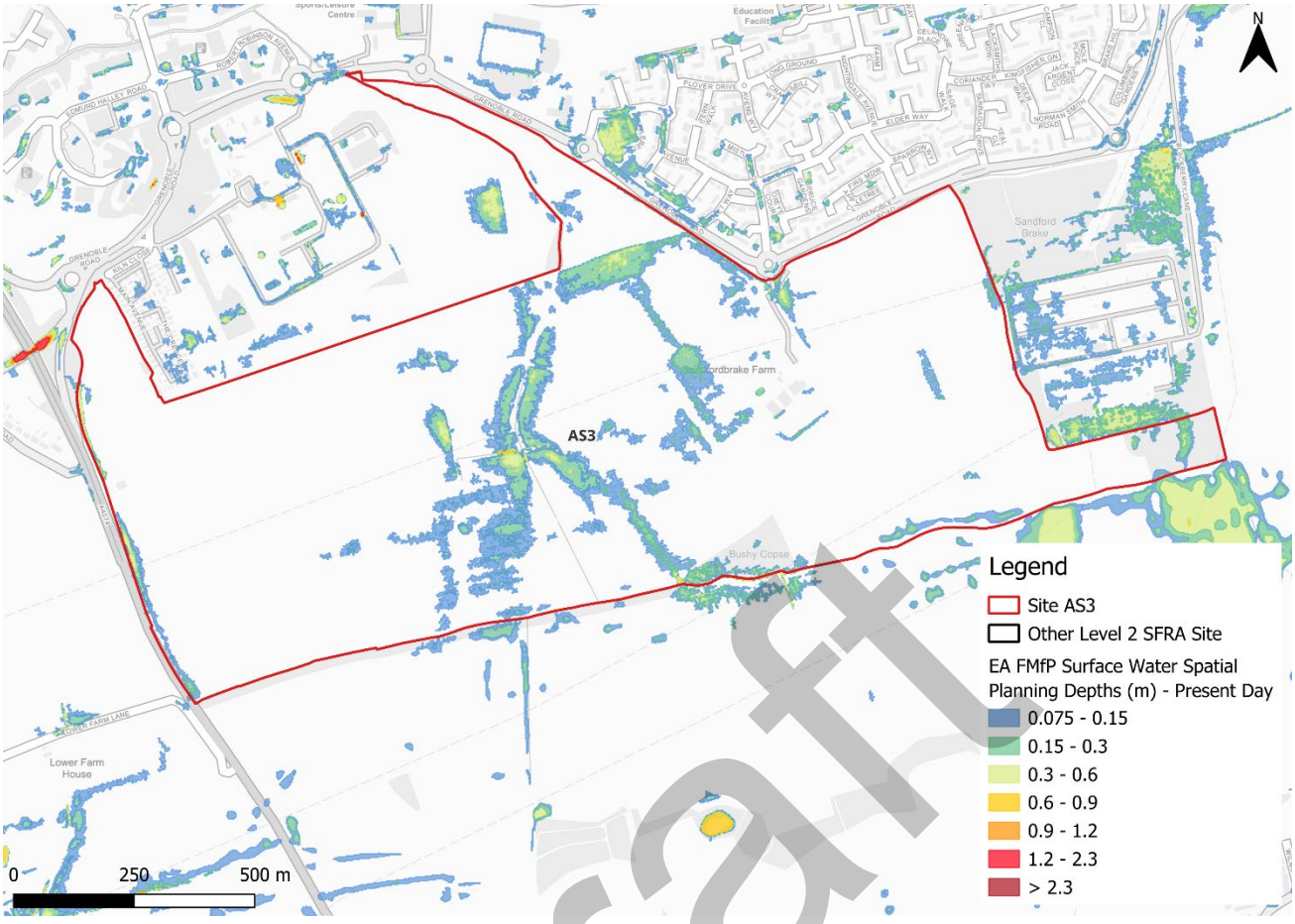

Figure 3-2: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Present Day for the 1% AEP event

3.1.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning data does not include hazard information suitable for planning purposes. Therefore, this Level 2 SFRA considers the third generation Risk of Flooding from Surface Water (RoFSW) hazard mapping in addition to the Flood Map for Planning - Surface Water Spatial Planning extents and depths, as the best available information. Updated surface water hazard information should be confirmed at the site-specific FRA stage.

Based on the EA's national scale third generation RoFSW map, the greatest flood hazard within the site in the medium event is categorised as 'significant', though is largely 'low' and 'moderate' (Figure 3-3).

There are differences between the Flood Map for Planning - Surface Water Spatial Planning map and the third generation RoFSW hazard mapping. The Flood Map for Planning - Surface Water Spatial Planning data does not map flooding less than 0.075m (7.5cm) in depth. Therefore, where the map may show no flooding, there may be shallow flooding up to a depth of 0.075m. In contrast, the third generation RoFSW does not map flooding with a hazard rating of less than 0.575. This could explain the differences observed between the Flood Map for Planning and third generation RoFSW maps.

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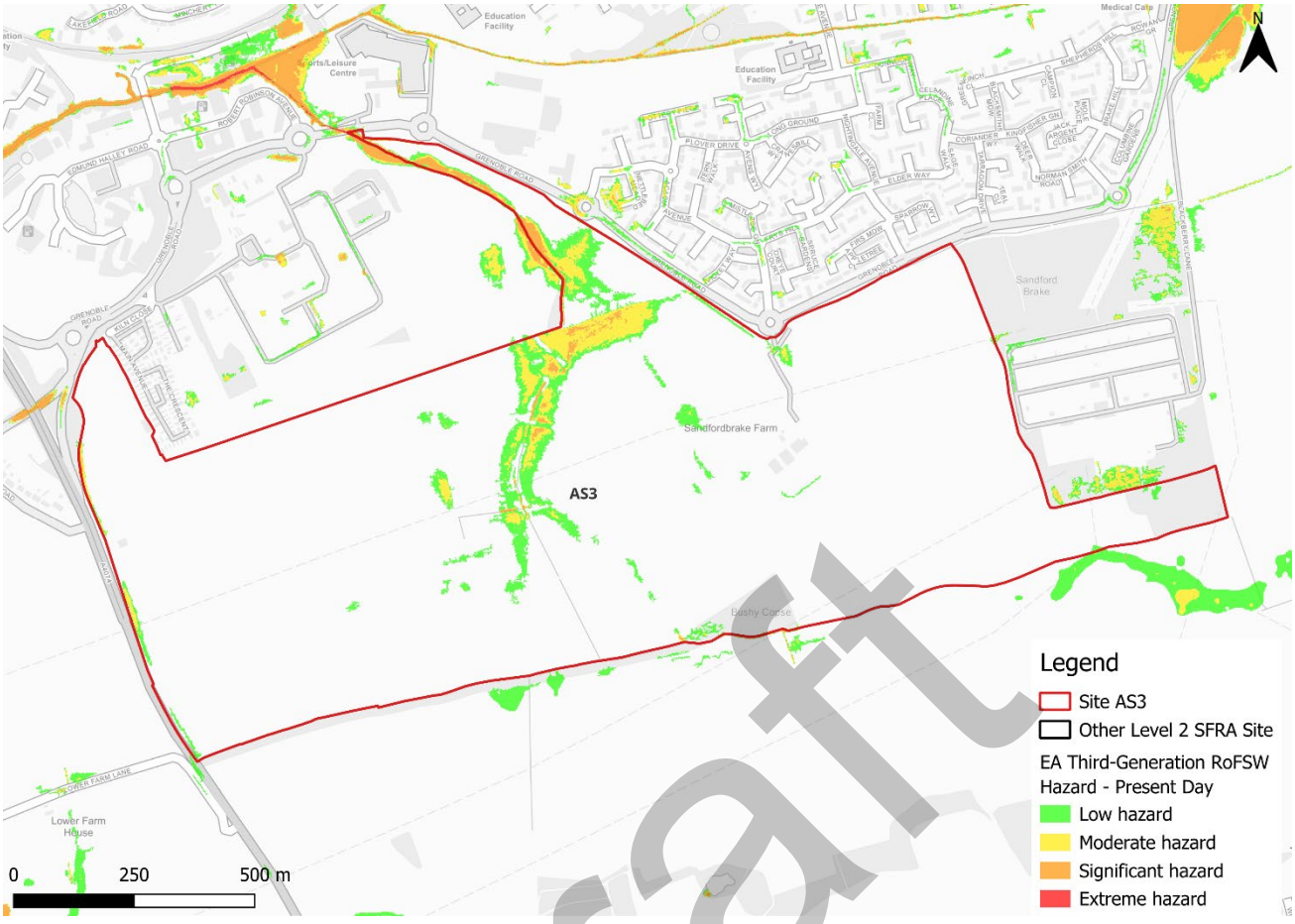

Figure 3-3: Third generation - Risk of Flooding from Surface Water map present day medium risk event surface water flood hazard[2]

3.2 Impacts from climate change

3.2.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths

The EA's climate change allowance guidance states that SFRA's should assess the upper end peak rainfall allowance for the 2070s epoch. This dataset is included in the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Climate Change dataset (September 2026). The peak rainfall intensity allowances for the Gloucestershire and the Vale, and Thames and South Chilterns management catchment are shown in Table 3-2 and Table 3-3. The allowance for the 0.1% AEP event is not stated in the EA guidance.

[2] Based on Section 7.5 Hazard rating. What is the Risk of Flooding from Surface Water map? Report version 2.0. April 2019. Environment Agency

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Table 3-2: Peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment

Return period	Central allowance 2070s (% increase)	Upper end allowance 2070s (% increase)
3.3% AEP	25	35
1% AEP	25	40

Table 3-3: Peak rainfall intensity allowances for the Thames and South Chiltern management catchment

Return period	Central allowance 2070s (% increase)	Upper end allowance 2070s (% increase)
3.3% AEP	25	35
1% AEP	25	40

Figure 3-4 shows the surface water flood extents for the 2070s upper end climate change scenario. Surface water flood risk is shown to increase with climate change. The surface water flow path along the drainage ditch is shown to increase in extent in all events. The greatest flood depths onsite in the 1% AEP event are largely shown to remain at between 0.6 and 0.9m (Figure 3-5).

Safe access and escape routes should remain achievable via Grenoble Road to the northeast of the site in all events.

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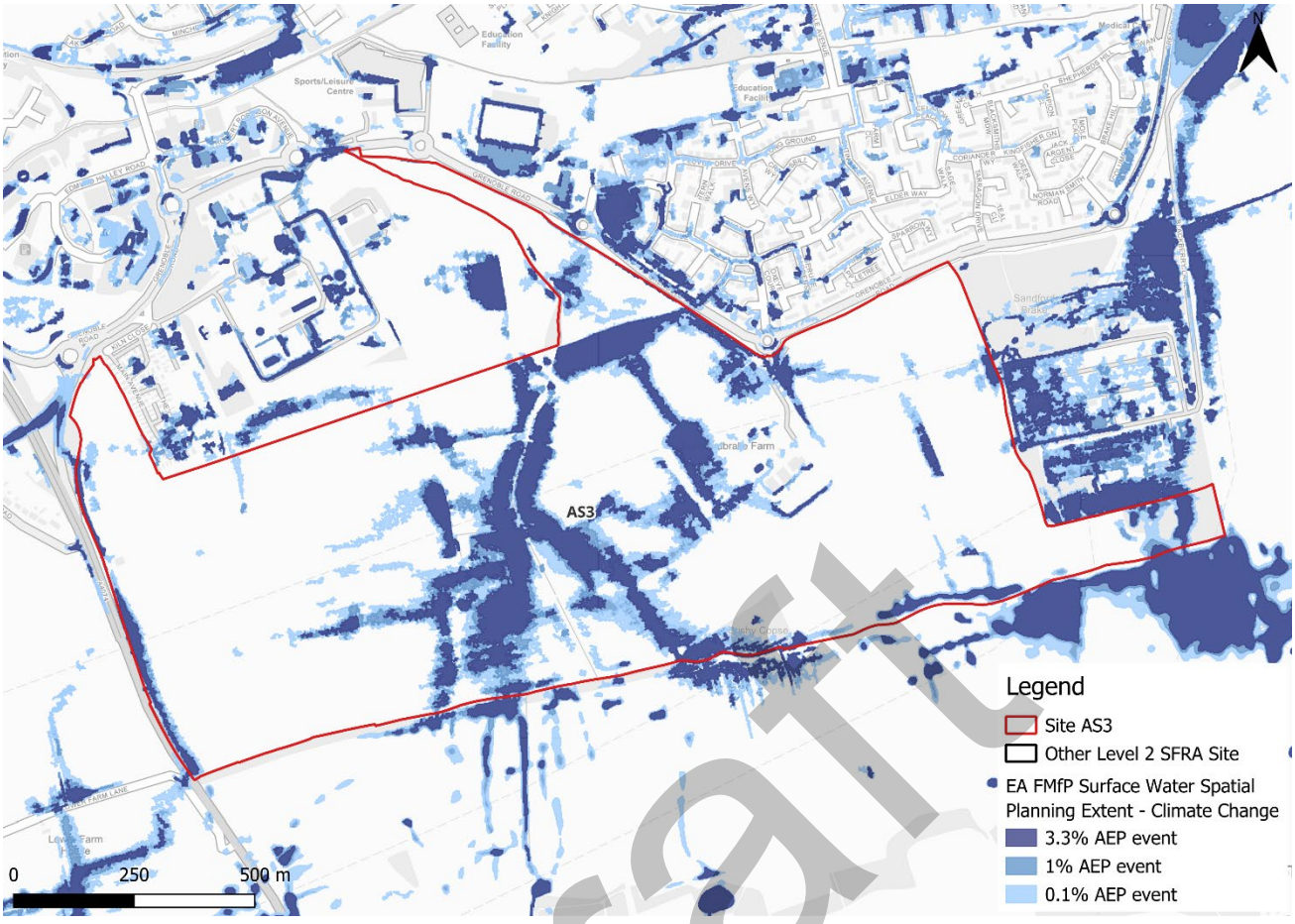

Figure 3-4: Flood Map for Planning- Surface Water Spatial Planning Extents Climate Change (2070s Upper End)

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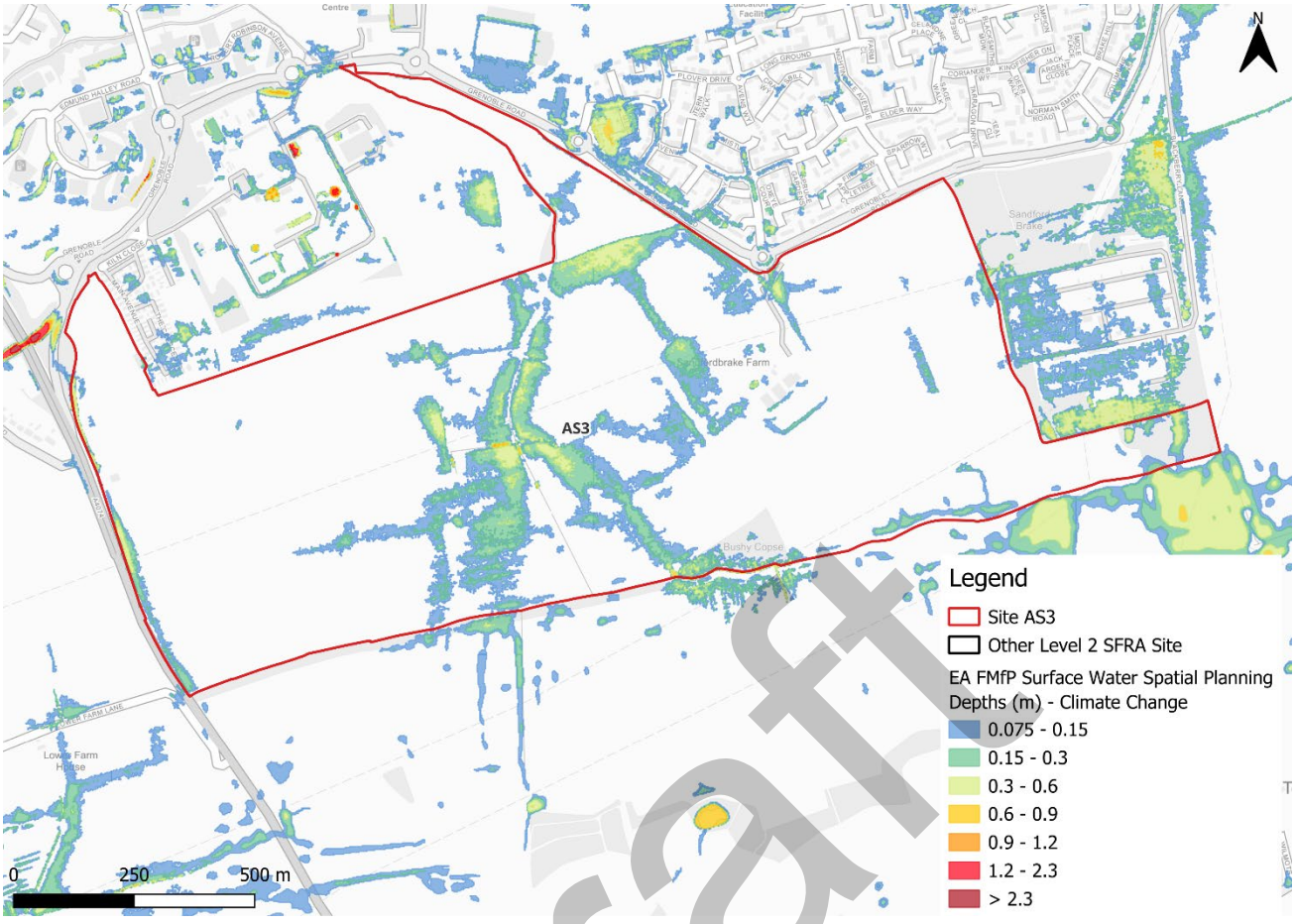

Figure 3-5: Flood Map for Planning- Surface Water Spatial Planning Depths (m) Climate Change for the 1% AEP event (2070s Upper End)

3.2.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning climate change data does not include hazard information suitable for planning purposes. This Level 2 SFRA therefore considers the low risk surface water event as a conservative proxy for the medium risk event plus climate change, as the best available information to assess surface water flood hazards. The impact of climate change on surface water flood hazards should be considered at the site-specific FRA stage.

Using the RoFSW low risk event as a proxy, future surface water flood hazard in the medium risk event is categorised as predominantly 'significant' within the centre and northern areas of the site (Figure 3-6).

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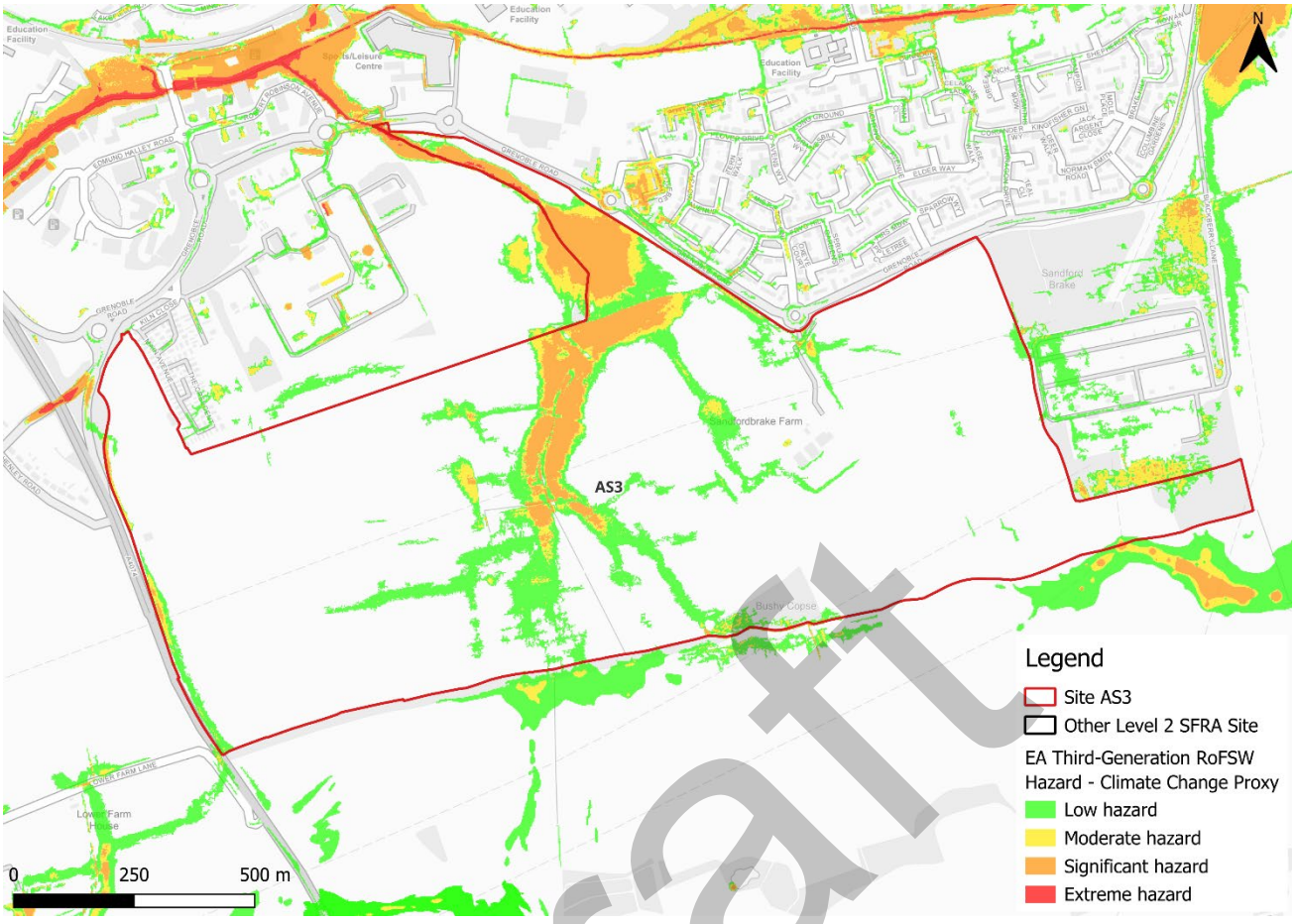

Figure 3-6: Low risk event surface water flood hazard[2], as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options, site suitability, sequential approach to development management - surface water

- Current risk to the site is predominantly very low, with 83% of the site being at very low surface water flood risk. Surface water risk in the 1% AEP event is present along the path of the drainage ditch through the centre of the site. Any existing flow paths should be maintained in site design.
- Risk to site is shown to increase in extent within the site when considering the impact of climate change. There is greater extent of flooding along the drainage ditch through the centre of the site and additional areas of ponding throughout the site.
- The drainage ditch should be kept in place and remain unobstructed. The watercourse should be maintained and included within the landscaping design of the residential development.
- Topographic low spots should be considered and included in site design and ideally left in place to flood naturally when required.
- The drainage strategy must ensure there is no increase in surface water flood risk elsewhere as a result of new development. The developer should aim to

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achieve betterment of existing runoff rates. The developer should also follow the National SuDS guidance.

- Safe access and escape routes should be possible via Grenoble Road in all events. To ensure safe access and escape during a low risk surface water event, any access roads within the site should avoid the significant flow paths within the centre of the site or be raised above the modelled flood level.

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4 Groundwater, geology and SuDS suitability

Risk of groundwater flooding is assessed in this SFRA using JBA's 5m Groundwater Emergence Map. Figure 4-1 shows the map covering the site and the surrounding areas. Table 4-1 explains the risk classifications.

Risk of groundwater emergence varies across the site. Across the majority of the site, there is a possibility of groundwater emerging at the surface locally. Within the north of the site, there is a risk of groundwater emergence to both surface and subsurface assets. Across the rest of the site, there is a negligible risk from groundwater emergence. Ground investigations will be required through the site-specific FRA to ascertain groundwater levels and conditions in the north of the site. SuDS may be suitable for the majority of the site.

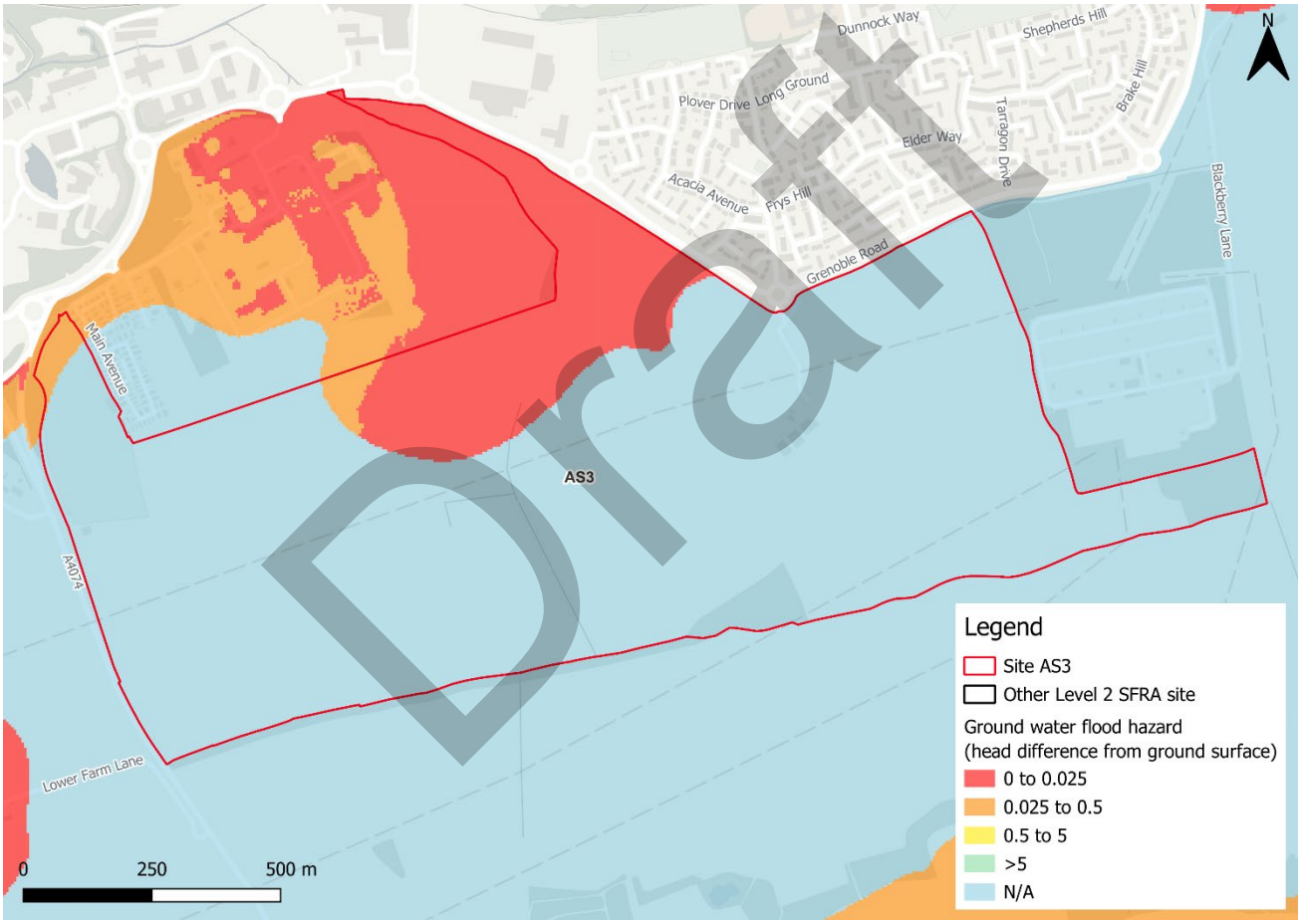

Figure 4-1: JBA 5m Groundwater Emergence Map

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Table 4-1: Groundwater Emergence Hazard Classification

Groundwater head difference (m)*	Class label
0 to 0.025	Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
0.025 to 0.5	Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
0.5 to 5	Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event There is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely.
>5	Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event. Groundwater emergence is not likely.
N/A	No risk. This zone is deemed as having a negligible risk from groundwater emergence due to the nature of the local geological deposits.
*Difference is defined as ground surface in mAOD minus modelled groundwater table in mAOD.	

The underlying bedrock within the site is predominantly mudstone, siltstone and sandstone. The north of the site has bedrock consisting of limestone, sandstone, siltstone and mudstone (Figure 4-2). These bedrocks primarily have low permeability and porosity, reducing the rate of infiltration into the rock. The drainage strategy for the site should investigate water table levels and ground conditions to inform on appropriate SuDS.

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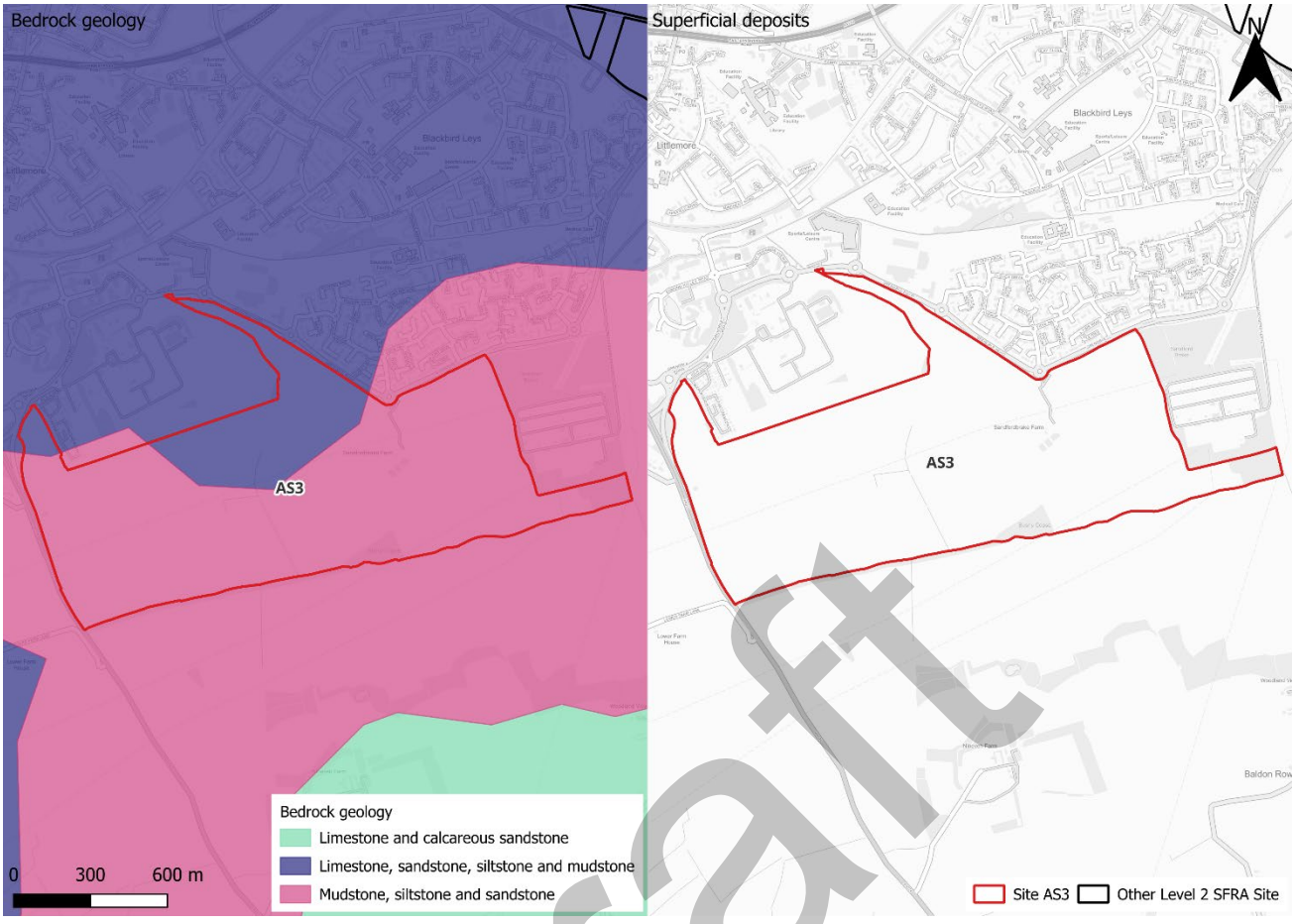

Figure 4-2: BGS Geology - Bedrock and superficial deposits

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5 Overall site assessment

5.1 Can part b) of the exception test be passed?

To pass part b) of the exception test[3], it must be proven that the development can be safe for its lifetime, which is 100 years for residential development and 75 years for non-residential development, taking account of the vulnerability of its users, without increasing risk elsewhere, and, where possible, will reduce flood risk overall.

This site is required to pass the exception test as it is proposed for more vulnerable development within Flood Zone 3a. Based on current information, this site should be able to pass the exception test. However, all the recommendations suggested in this Level 2 SFRA should be considered at the site-specific FRA stage or before any site design planning.

5.2 Recommendations and site-specific FRA requirements

Based on the evidence presented in the Level 1 SFRA (2024), Level 1 SFRA Addendum (2026) and this Level 2 SFRA:

- The proposed development of the site would see a change in the risk classification from less vulnerable to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the site-specific FRA must show that the development can be designed to be safe for its lifetime and that there is adequate emergency planning provision (para 006 FRCC-PPG).
- There should be no vulnerable development within the area of the site covered by the functional floodplain. This should be converted to a blue / green corridor to provide ecological, amenity and social value.
- Updated climate change modelling of Northfield Brook and Littlemore Brook should be used to update this Level 2 SFRA at the earliest opportunity to provide an up-to-date strategic assessment of flood risk to this site and the surrounding areas. It would be acceptable to use updated modelling to suitably assess risk through a site-specific FRA, as well as/instead of a Level 2 SFRA update.
- This site could be allocated in the Joint Local Plan, based on current information, if vulnerable development avoids the area of functional floodplain and significant surface water flow path along the drainage ditch through the centre of the site.
- Were this site to be allocated based on current information, the LPA must make it clear that this site cannot be developed until the required information detailed in this SFRA on future flood risk from Northfield Brook and Littlemore Brook is fully ascertained.
- The drainage ditch should be kept in place and remain unobstructed. The watercourse should be maintained and included within the landscaping design of the residential development.

[3] Policy F6 National Planning Policy Framework 2026

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- Appropriate evacuation and emergency planning arrangements should be in place to ensure site users can be safely evacuated in advance of the extreme surface water event.
- A detailed drainage strategy will be required for any new development, given the large area of the site.
- Groundwater conditions must be investigated further through the site-specific FRA.
- Opportunities for NFM features to reduce flood risk to the site and surrounding areas should be explored at the site-specific FRA stage.
- Any site-specific FRA should be carried out in line with the NPPF, FRCC-PPG, EA guidance, South Oxfordshire and Vale of White Horse District Councils Joint Local Plan and LLFA policies, and national and local SuDS policy and guidelines.
- Throughout the site-specific FRA process, consultation should be carried out with the following, where applicable: the LPA; LLFA; emergency planning officers; EA; TW; the highways authorities; and the emergency services.

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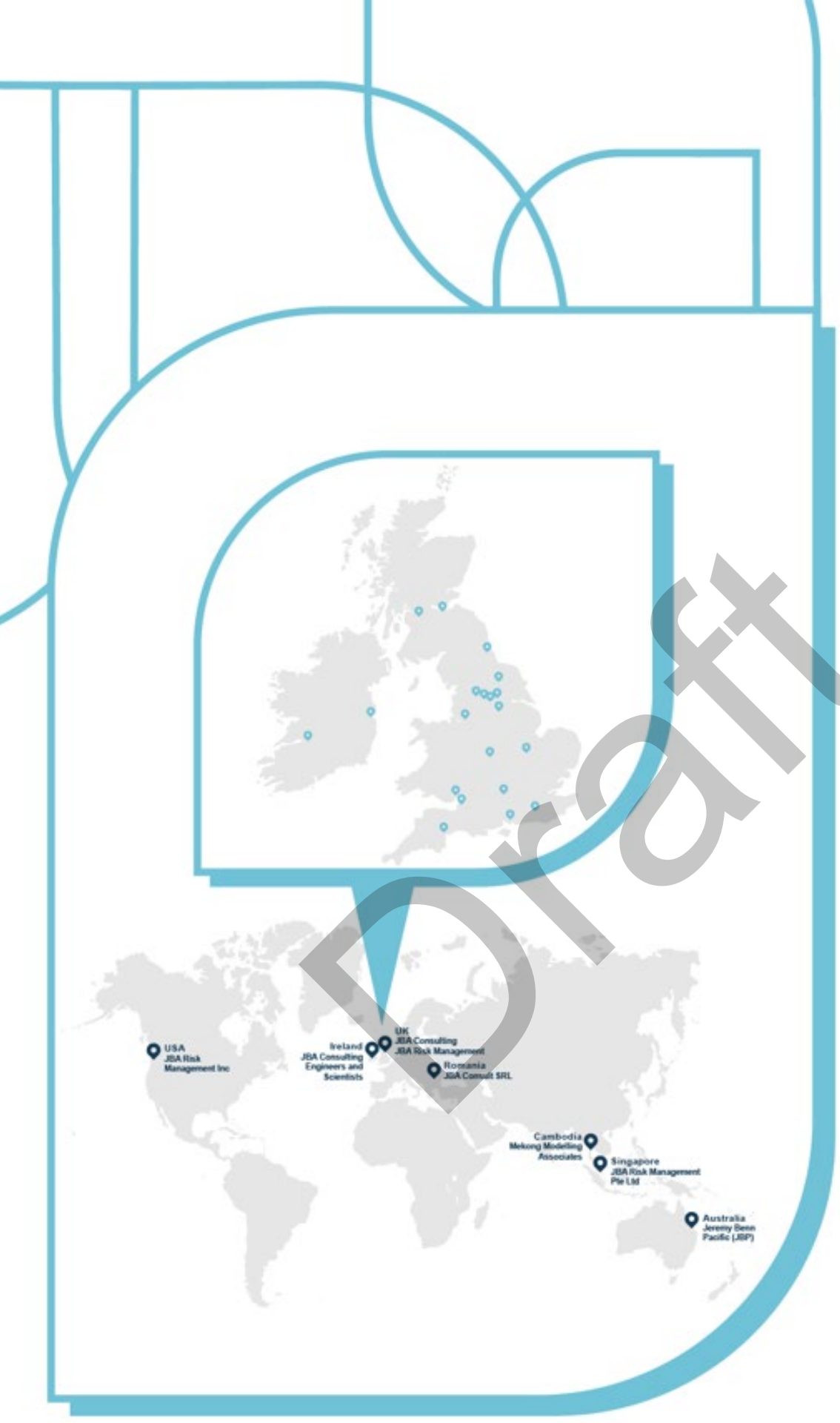

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Registered Office
1 Broughton Park
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North Yorkshire
BD23 3FD
United Kingdom

+44(0)1756 799919
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South Oxfordshire and Vale of White Horse Level 2 Strategic Flood Risk Assessment Update

Site AS4 - Land at Northfield, Edge of Oxford

Draft Report

October 2026

Prepared for:

South Oxfordshire District Council and

Vale of White Horse District Council

www.jbaconsulting.com

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Reviewed by	Laura Thompson-Jones BSc CGeog FRGS Senior Analyst
Authorised by	Mike Williamson BSc MSc CGeog FRGS EADA Project Director

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JBA Project Manager	Freya Nation
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2026s1132

This report describes work commissioned by South Oxfordshire and Vale of White Horse District Councils. The Client's representative for the contract was Rebekah Goodwill of South Oxfordshire and Vale of White Horse District Councils. Boe Kilshaw of JBA Consulting carried out this work.

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for South Oxfordshire and Vale of White Horse Joint Local Plan Site AS4 - Land at Northfield, Edge of Oxford. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA' (2024) and the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum' (2026), and read the 'South Oxfordshire and Vale of White Horse District Councils Level 2 SFRA Main Report Update' (2026) and is therefore familiar with the terminology used in this report.

1.1 Site AS4 - Land at Northfield, Edge of Oxford

- Location: Land at Northfield, Edge of Oxford (Figure 1-1)
- Existing site use: Agriculture
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Mainly residential
- Proposed site use vulnerability: More vulnerable
- Site area: 68.00 ha
- Proposed development impermeable area: 57.9 ha (assumed 85% of site area)
- EA model: Northfield & Littlemore Brooks 2011
- Watercourse: Northfield Brook. A culverted watercourse is present within the western corner of the site.
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for more detailed assessment through Level 2 SFRA (Strategic Recommendation A)
    - Subject to Exception Test
    - Assess present day and future modelled fluvial depths, hazards
    - Assess present day and future modelled surface water depths, hazards

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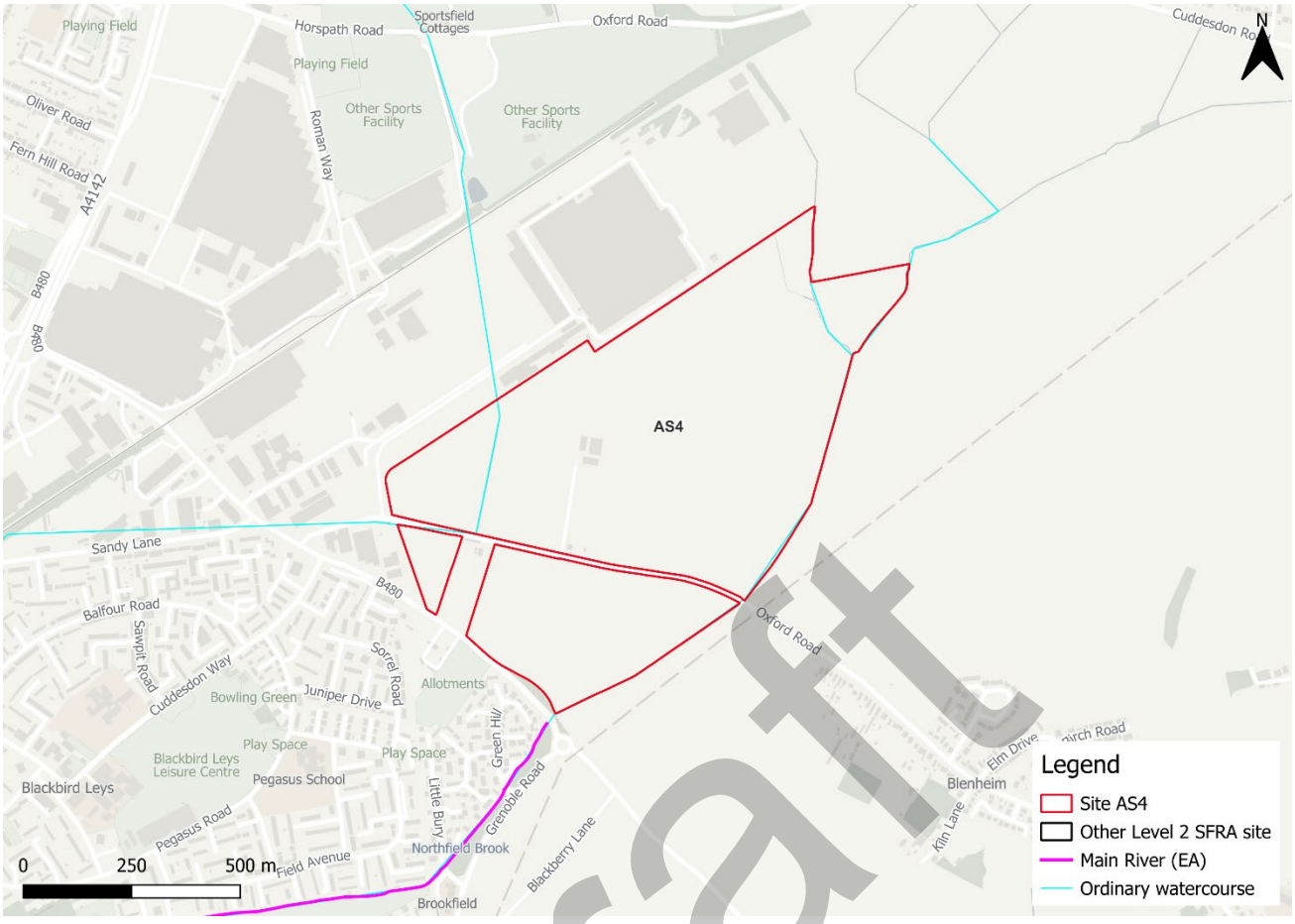

Figure 1-1: Site location

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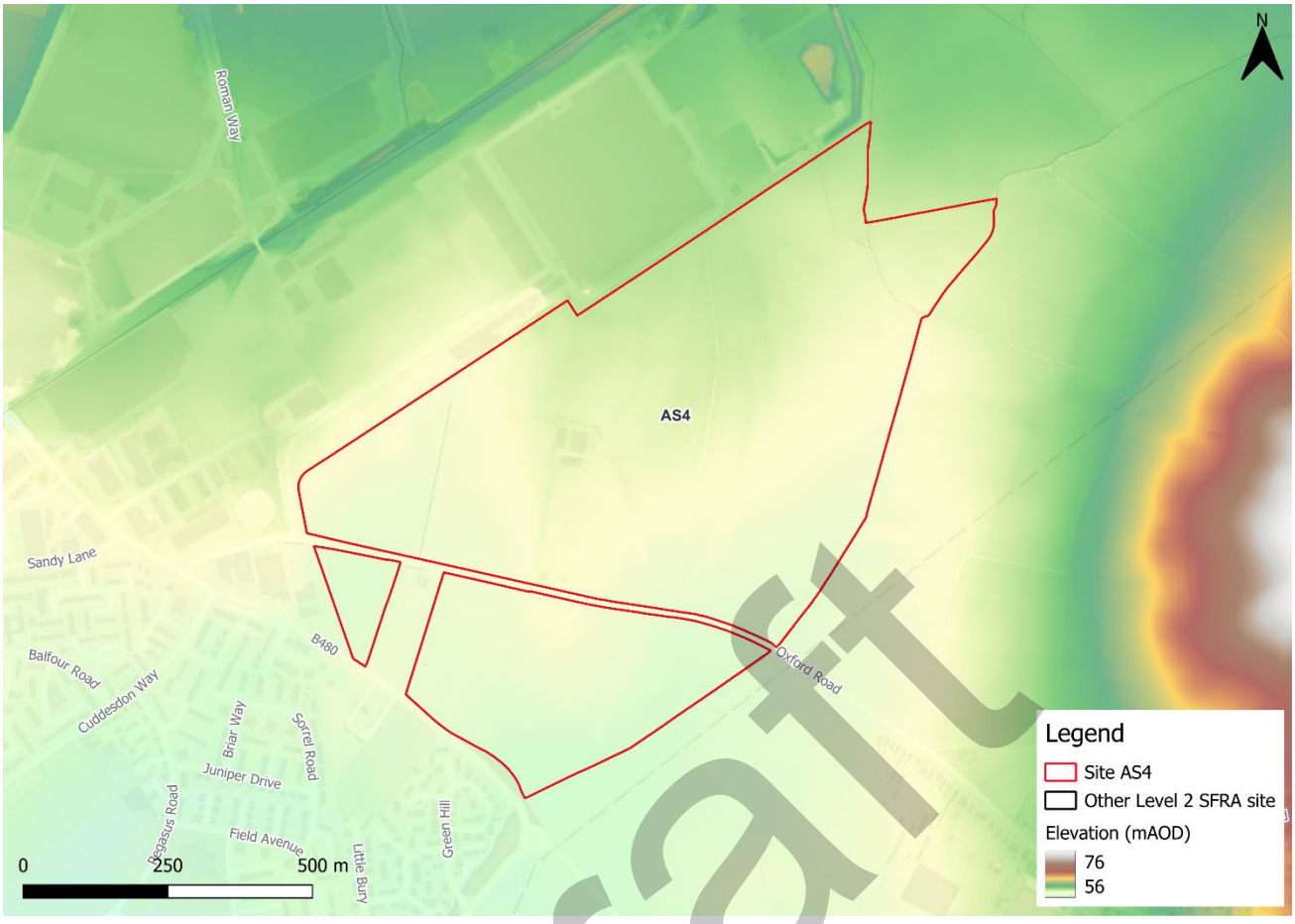

Figure 1-2: Topography

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2 Flood risk from rivers

2.1 Existing risk

2.1.1 Flood Map for Planning and functional floodplain

Based on the Environment Agency's (EA) Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum (2026), the percentage areas of the site within each flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.3).

Northfield Brook runs along the eastern boundary of the site. Flood Zone 3b is present along Northfield Brook, impacting the area adjacent to the eastern boundary of the larger site parcel and the site parcel to the south. The functional floodplain in this location is based on the 1% AEP event from the Northfield & Littlemore Brooks 2011 model. The area of functional floodplain onsite should be left free of vulnerable development.

There should be no development over the culverted watercourse beneath the west of the site. Note that the path of the culvert represented within the watercourse mapping may not be accurate. The actual path of the culvert should be confirmed with the LLFA.

Table 2-1: Existing flood risk based on percentage area of site at risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
82	3	3	12

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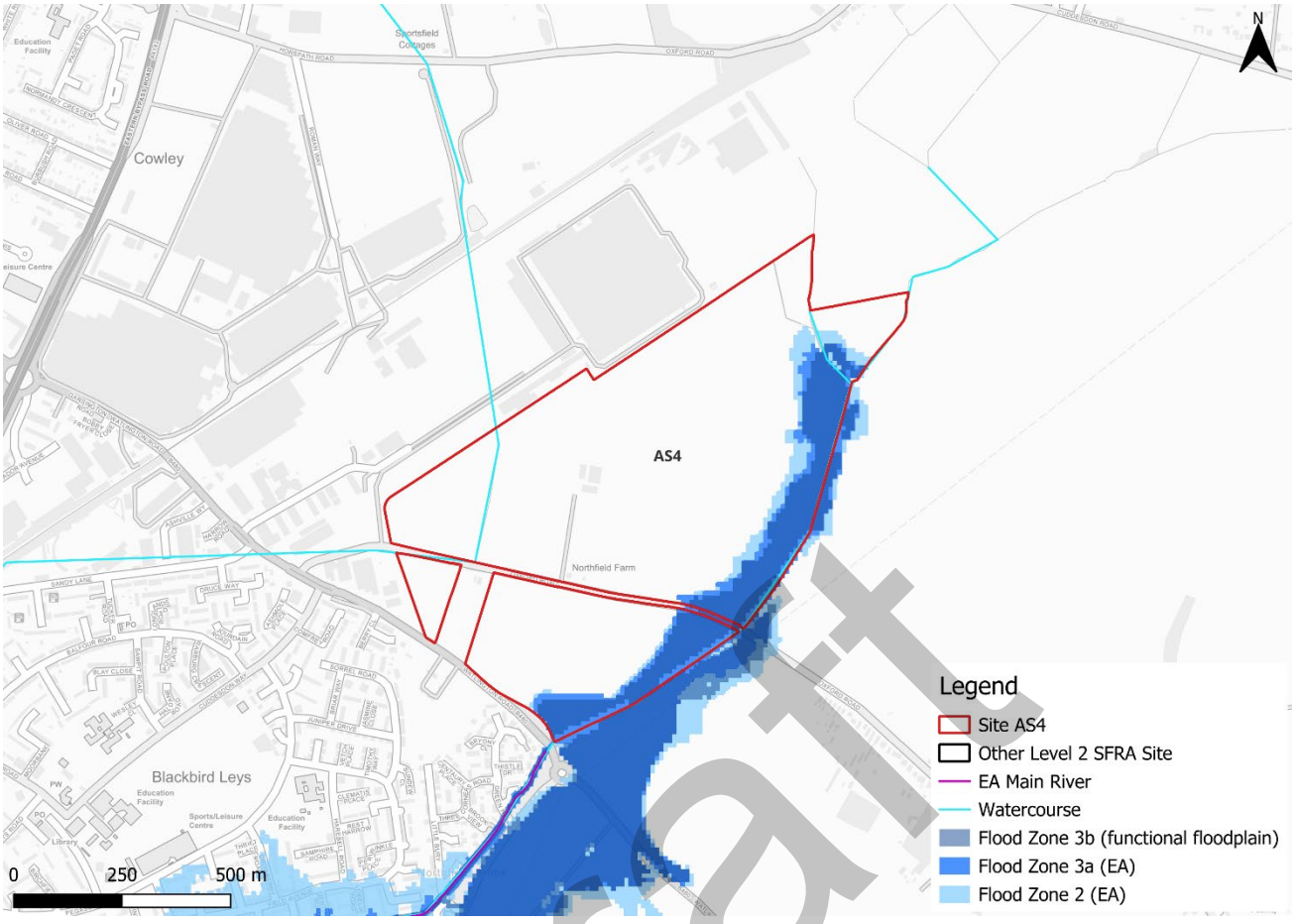

Figure 2-1: Existing risk from rivers to the site

2.1.2 Northfield & Littlemore Brooks 2011 model outputs

Figure 2-2 shows the modelled flood depths for the 1% AEP undefended event which is the event Flood Zone 3 of the Flood Map for Planning is based on. Modelled risk to the site is confined to the area adjacent to Northfield Brook along the eastern boundary of the site, impacting the larger site parcel and the smaller parcel to the south. Maximum flood depths within the site are largely modelled to be between 0.6 and 0.9 m. Figure 2-3 shows the modelled flood hazard ratings for the 1% AEP undefended event. Modelled flood hazard in the area of the site at fluvial flood risk is categorised as very low. There is no modelled flood risk to the rest of the site in the 1% AEP undefended event.

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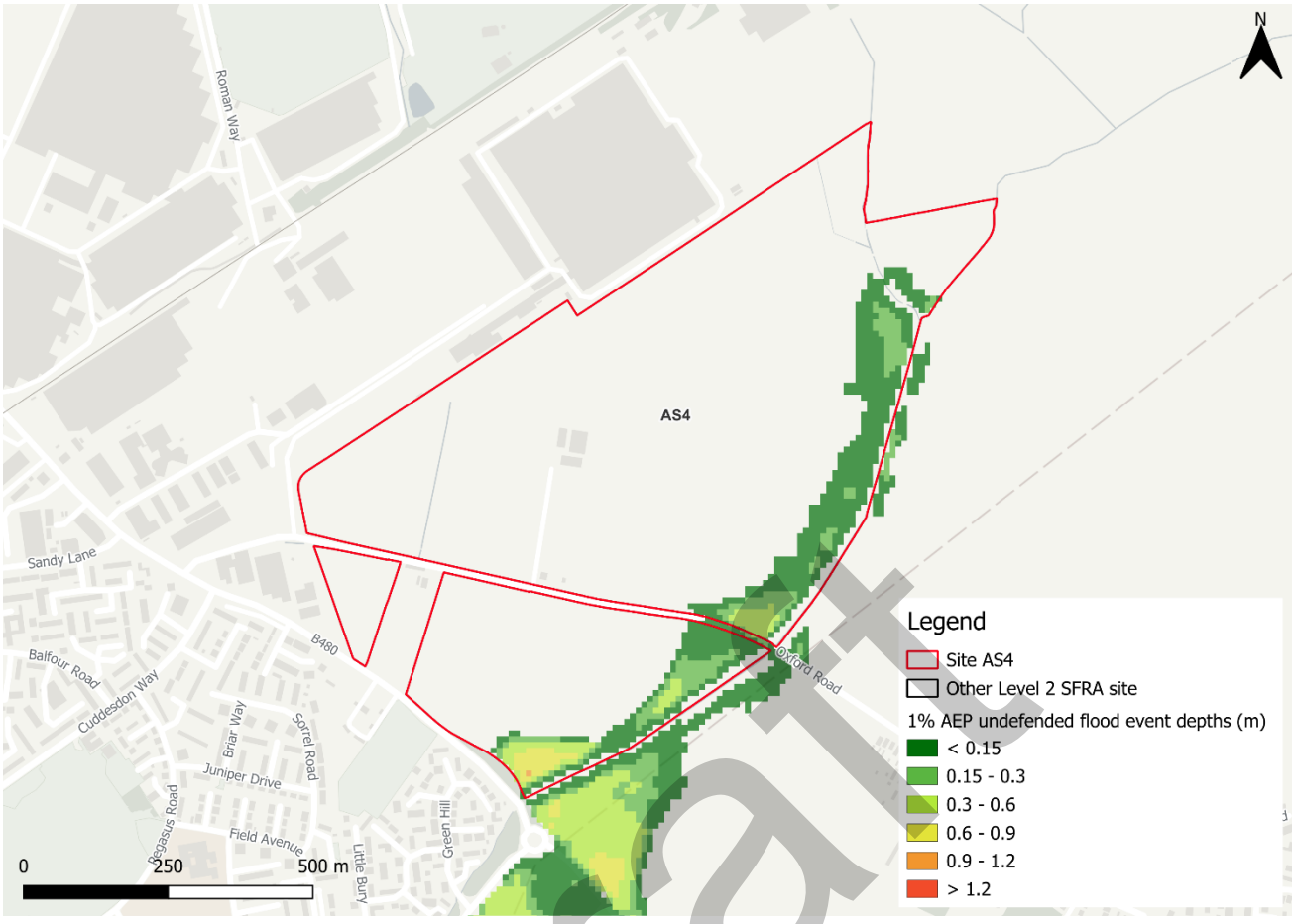

Figure 2-2: Flood depths for 1% AEP undefended flood event

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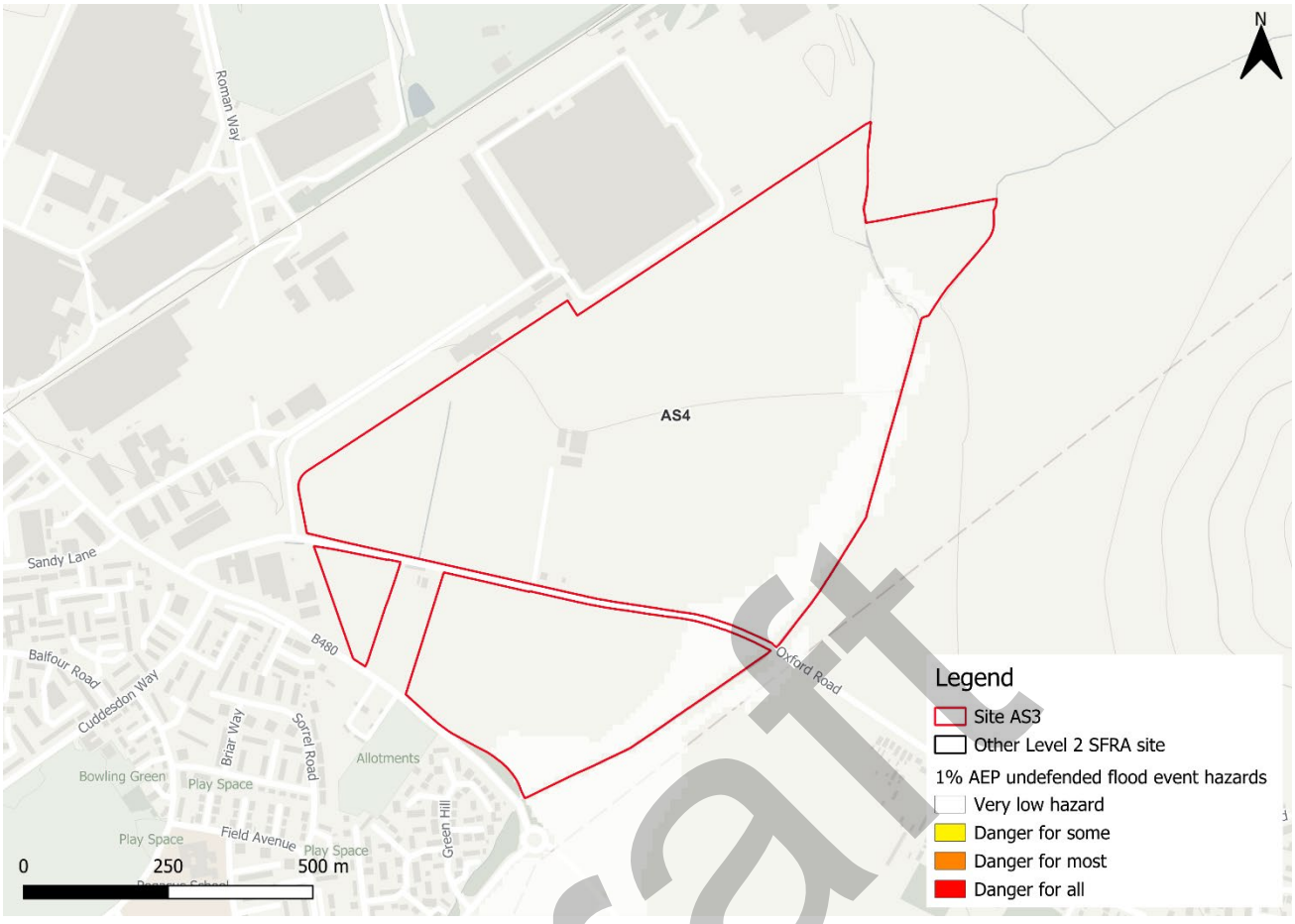

Figure 2-3: Flood hazard[1] for 1% AEP undefended flood event

2.2 Impacts from climate change

2.2.1 Northfield & Littlemore Brooks 2011 model outputs

The EA's SFRA guidance states that SFRAs should assess the 2080s central allowance for less vulnerable, more vulnerable, highly vulnerable and water compatible development (Table 2-2). The impacts of climate change on flood risk from Northfield Brook and Littlemore Brook has not been modelled for this SFRA. The impacts of climate change must be modelled using the EA's latest allowances for peak river flows to inform whether the site can be safe for its lifetime and to assess modelled flood depths and hazards. Therefore, any updates to this Level 2 SFRA and/or any site-specific FRA should include for the most up to date climate change allowances.

[1] Fluvial hazard ratings based on Table 4 of the Supplementary Note on Flood Hazard Ratings and Thresholds for Development Planning and Control Purpose – Clarification of the Table 13.1 of FD2320/TR2 and Figure 3.2 of FD2321/TR1. May 2008. Environment Agency.

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Table 2-2: Climate change allowances for peak river flows for the Gloucestershire and the Vale management catchment

Epoch	Central	Higher Central	Upper End
2020s	11%	17%	33%
2050s	11%	19%	43%
2080s	26%	41%	84%

2.2.2 Flood Map for Planning- Flood Zones plus Climate Change

Figure 2-4 shows the EA's Flood Map for Planning - Flood Zones plus Climate Change dataset. Based on this dataset, the site is not shown to be at significant additional risk from climate change.

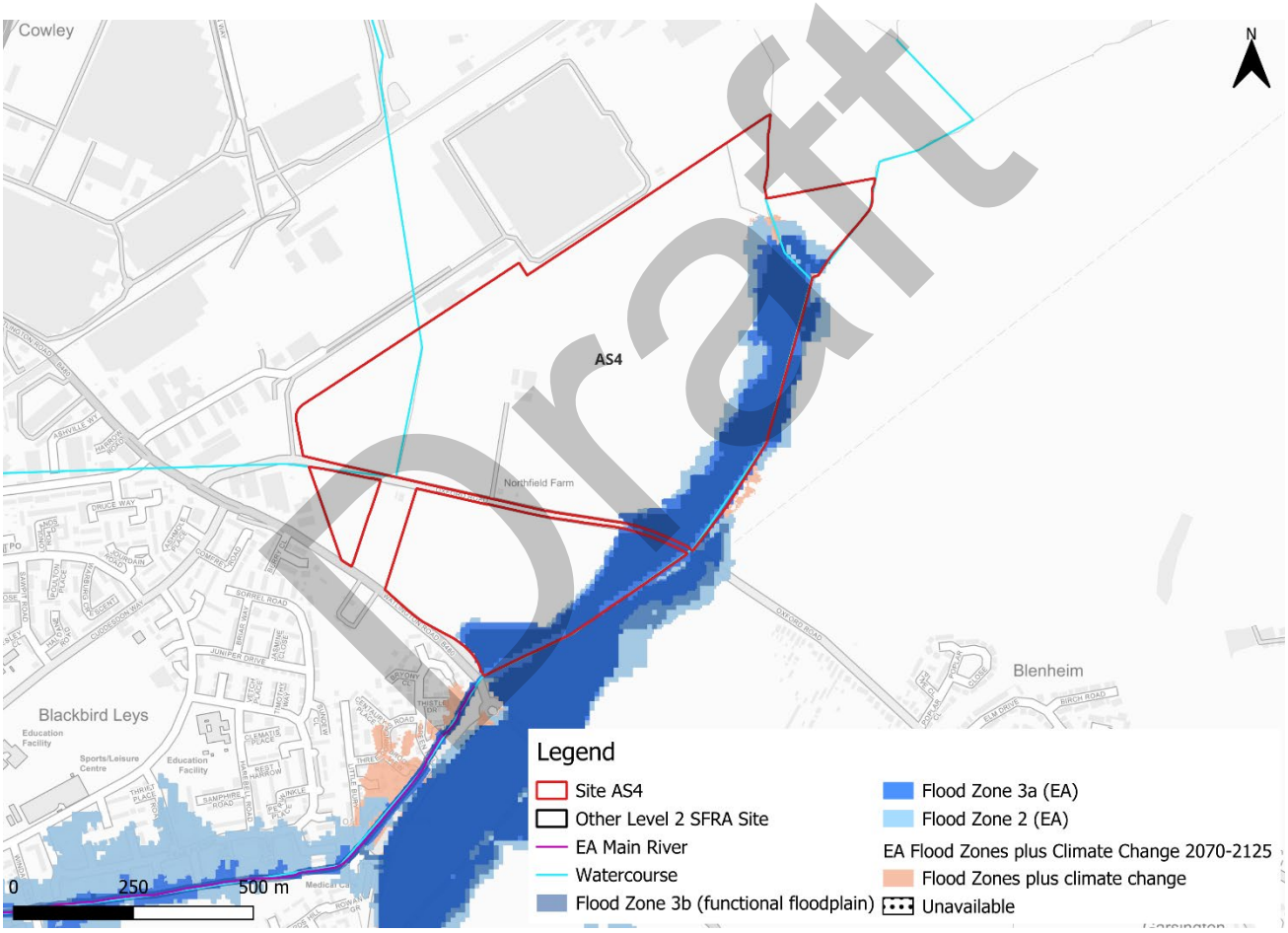

Figure 2-4: Flood Zones plus Climate Change Dataset

2.3 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

2.4 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

2.4.1 Cumulative impacts

A cumulative impact assessment was completed through the South Oxfordshire and Vale of White Horse Level 1 SFRA Addendum (2026), which aimed to identify catchments sensitive to the cumulative impact of development. Site AS4 (Land at Northfield, Edge of Oxford) is located within one catchment, namely; Northfield Brook (Source to Thames) at Sandford. This is ranked as a high sensitivity catchment. Planning considerations for sites at high sensitivity to the cumulative impacts of development can be found in Appendix D of the Level 1 SFRA Addendum. Cumulative impacts of development should also be considered as part of a site-specific FRA.

2.4.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. Both within and upstream of the site, there are significant opportunities for tree planting to reduce runoff. There is potential to reconnect the channel to the floodplain, allowing flood water to be stored. There are also some areas of potential for runoff attenuation features. These areas are shown in Figure 2-5.

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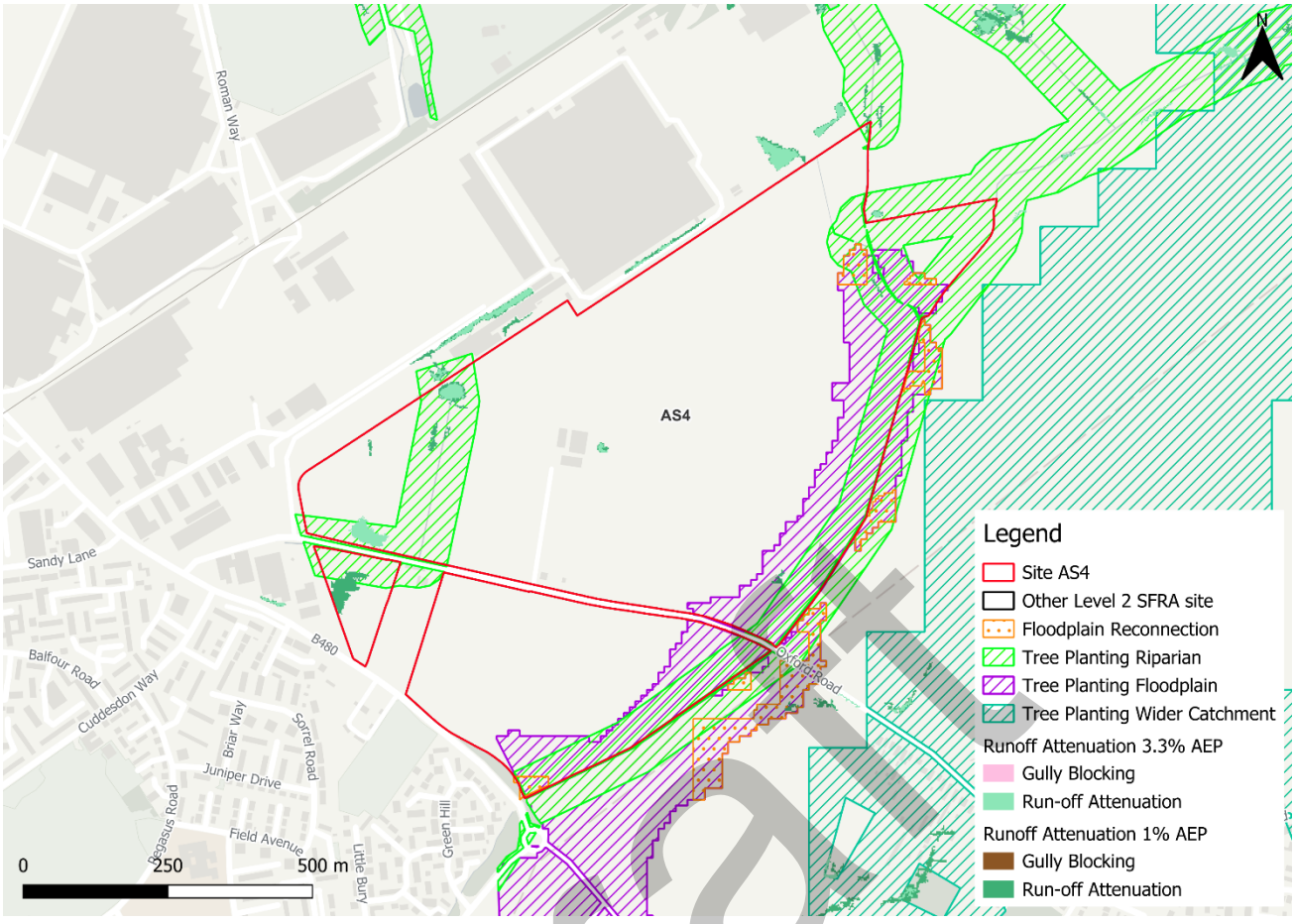

Figure 2-5: Natural Flood Management (NFM) potential mapping

2.5 Residual risk

Although a site may be afforded some protection from defences and / or drainage infrastructure, there is always a residual risk of flooding from asset failure i.e. defence breaches, or blockages of culverts or drainage assets. Residual risk at this site comes from the potential blockage or structural failure of the culvert along Northfield Brook which runs beneath the B480.

2.5.1 Potential blockage

There is potential residual risk to the site from a possible blockage of the culvert along Northfield Brook which runs beneath the B480 to the south of the site (Figure 2-6). The impact of a blockage of this structure has not been modelled as part of this Level 2 SFRA. It is recommended that the site-specific FRA should consider the impact of a blockage of this culvert on residual flood risk to the site.

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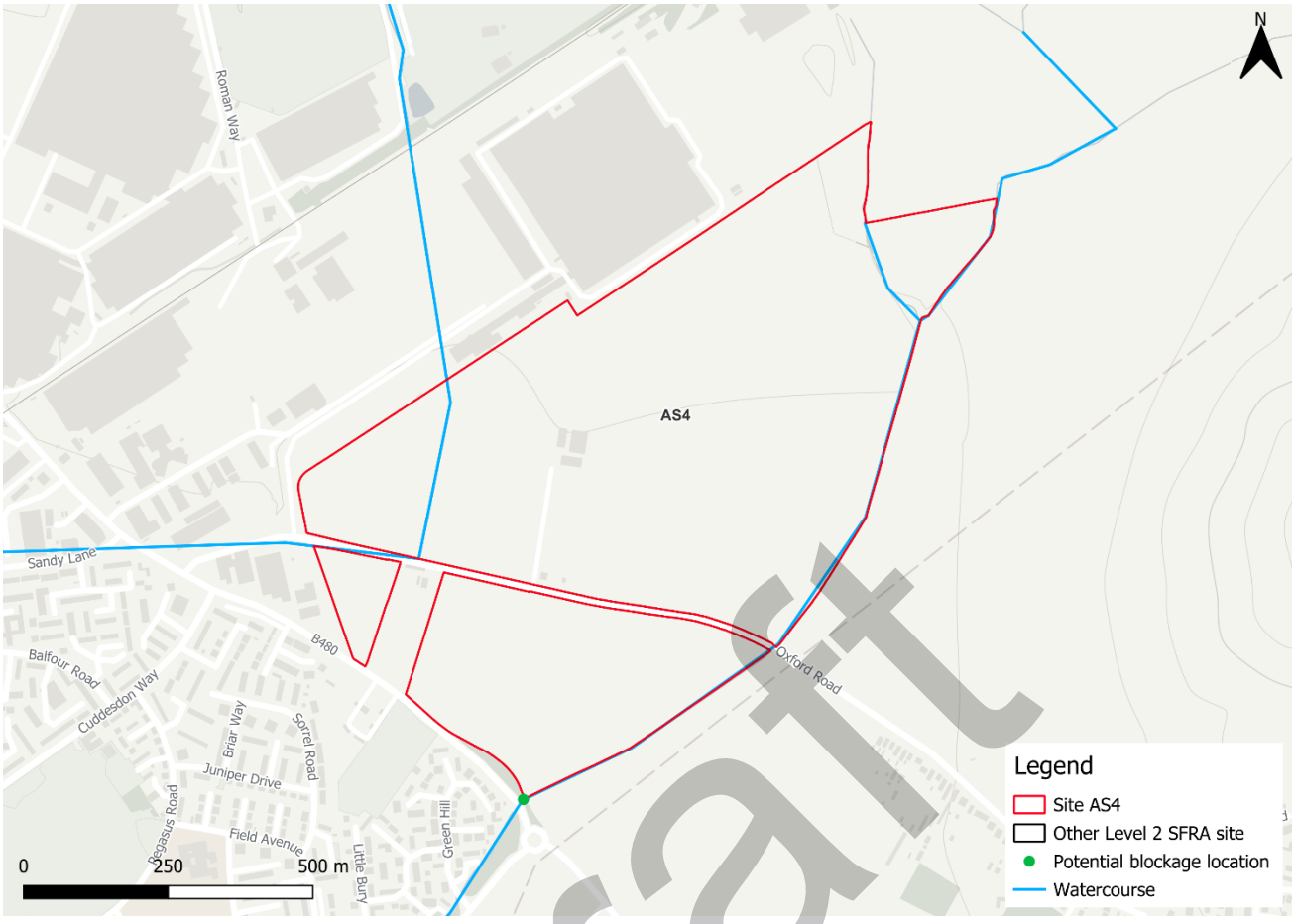

Figure 2-6: Potential blockage location

2.5.2 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. A "dry day" scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. A "wet day" scenario assumes a worst-case scenario where a reservoir releases water held on a "wet day" when local rivers have already overflowed their banks.

The site is not modelled to be at risk from reservoir flooding.

2.6 Emergency Planning

2.6.1 Flood warnings and alerts

There are no Flood Warning Areas (FWA) or Flood Alert Areas (FAA) within the vicinity of the site.

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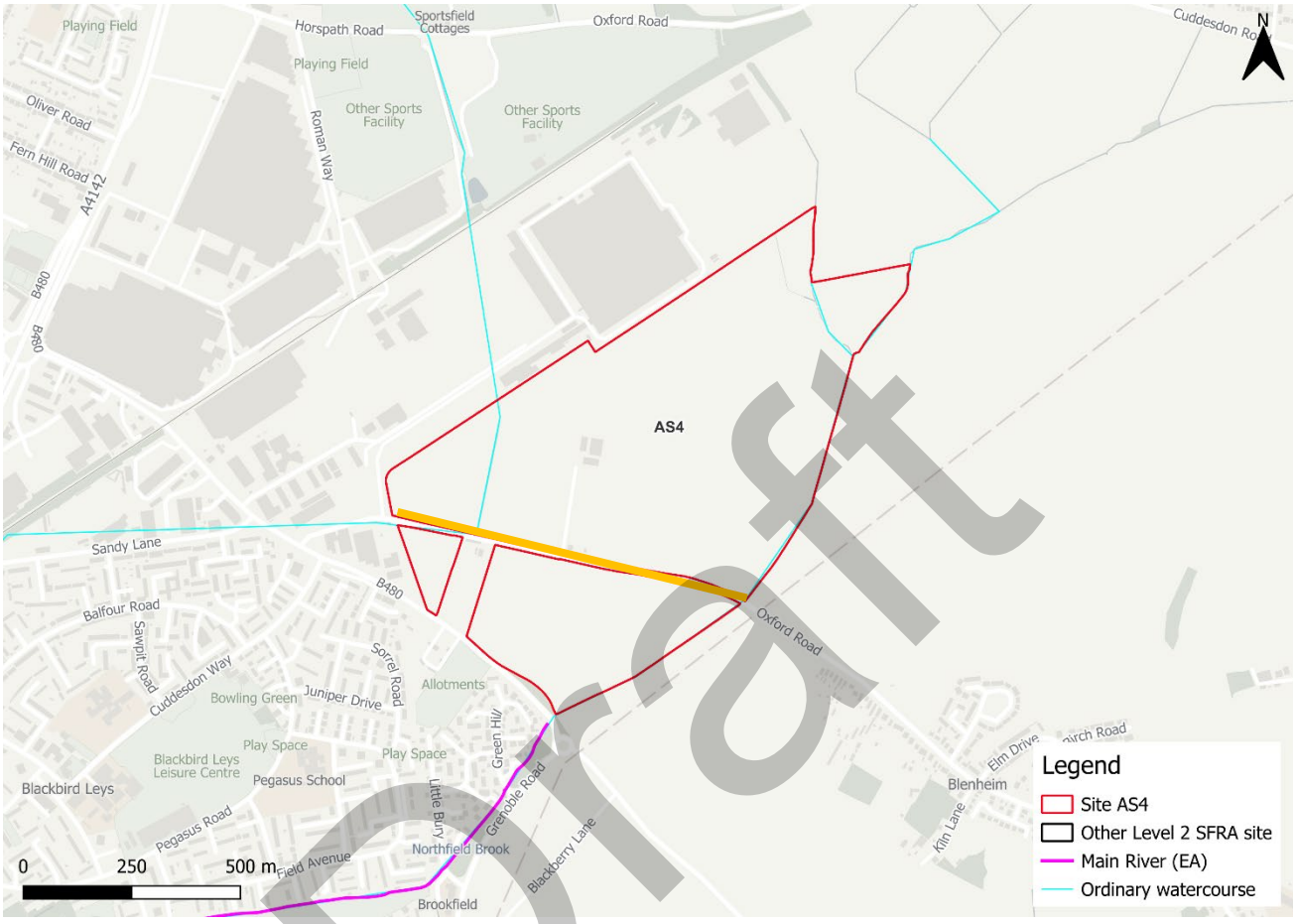
2.6.2 Access and escape routes

Safe access and escape routes could likely be achieved during a flood event via Oxford Road which is located between the northern and southern site parcels. This route is indicated by the yellow line in Figure 2-9.



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2.7 Observations, mitigation options, site suitability, sequential approach to development management - fluvial

- Observations:
  - The site is modelled to be within the functional floodplain along Northfield rook. Vulnerable development is not permitted within the functional floodplain. This area should be maintained and included in site design as a green / blue corridor offering multifunctional benefits alongside flood risk mitigation including Biodiversity Net Gain (BNG) contributions, and social and amenity benefits. This should be feasible without impacting significantly on plot numbers.
  - The site is partially located in Flood Zone 3, as indicated by the Northfield & Littlemore Brooks 1% AEP undefended event outputs though depths are shallow. More vulnerable development should be directed away from the area of the site within Flood Zone 3.

- The EA Flood Zones plus Climate Change dataset shows the site is not at significant additional risk from climate change. However, as discussed, there is no detailed model of the reach of Northfield Brook to the east of the site to understand the impact of climate change on fluvial flood depths, velocities and hazards. Climate change must be modelled at the site-specific FRA stage.

- Mitigation:
  - The area adjacent to Northfield Brook should be maintained and included in site design as a green / blue corridor offering multifunctional benefits alongside flood risk mitigation including Biodiversity Net Gain (BNG) contributions, and social and amenity benefits. This should be feasible without impacting significantly on plot numbers.
- Residual risk:
  - The site is at potential residual risk from a blockage of the culvert along Northfield Brook which runs beneath the B480. The site-specific FRA should consider modelling a blockage scenario to understand whether there would be any additional risk to the site.
  - Areas adjacent to culverts and bridges are at particular risk from the rapid onset of fast flowing and deep flooding, with little or no warning if structures become blocked.
  - Emergency plans must be in place for such areas and safe access and escape routes must be in place for the lifetime of development. Resistance and resilience measures may also need to be put in place to manage residual flood risk when avoidance measures have been exhausted.
  - The LPA should use the information on residual risk in this Level 2 SFRA to state in the local plan strategic policies a preferred mitigation strategy for ensuring development will be safe throughout its lifetime in relation to urban form, risk management and where flood mitigation measures are likely to have wider sustainable design implications (para 042, FRCC-PPG).
- Access and escape:
  - Safe access and escape routes could likely be achieved during a flood event via Oxford Road which is located between the northern and southern site parcels.

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3 Flood risk from surface water

3.1 Existing risk

3.1.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths Present Day

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Extents Present Day map (September 2026), the site is predominantly at very low risk from surface water flooding, as shown in Table 3-1.

In the 1% AEP event, surface water risk is largely confined to a flow path along Northfield Brook in the east of the site (Figure 3-1). There is an additional flow path through the west of the site and some scattered areas of surface water ponding within topographic low spots.

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Depth map, depths are largely below 0.6m, with an area of depths up to 1.2m in the south west of the southern site parcel (Figure 3-2).

Oxford Road is modelled to remain as safe access and escape route.

Table 3-1: Existing surface water flood risk based on percentage area at risk using the Flood Map for Planning - Surface Water Spatial Planning Extent Present Day map

Less than 0.1% AEP event (% area)	0.1% AEP event (% area)	1% AEP event (% area)	3.3% AEP event (% area)
89	5	3	3

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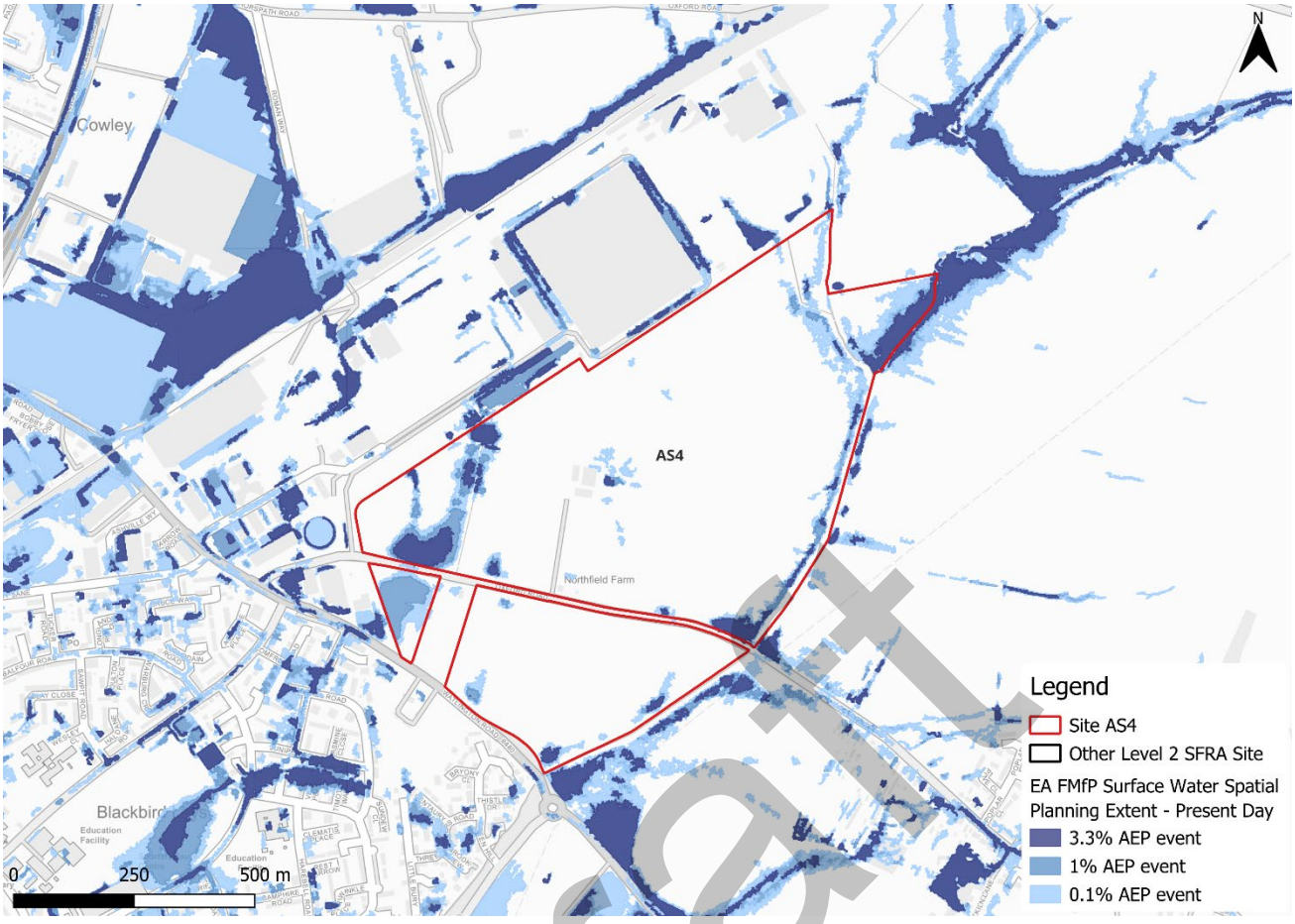

Figure 3-1: Flood Map for Planning - Surface Water Spatial Planning Extents Present Day

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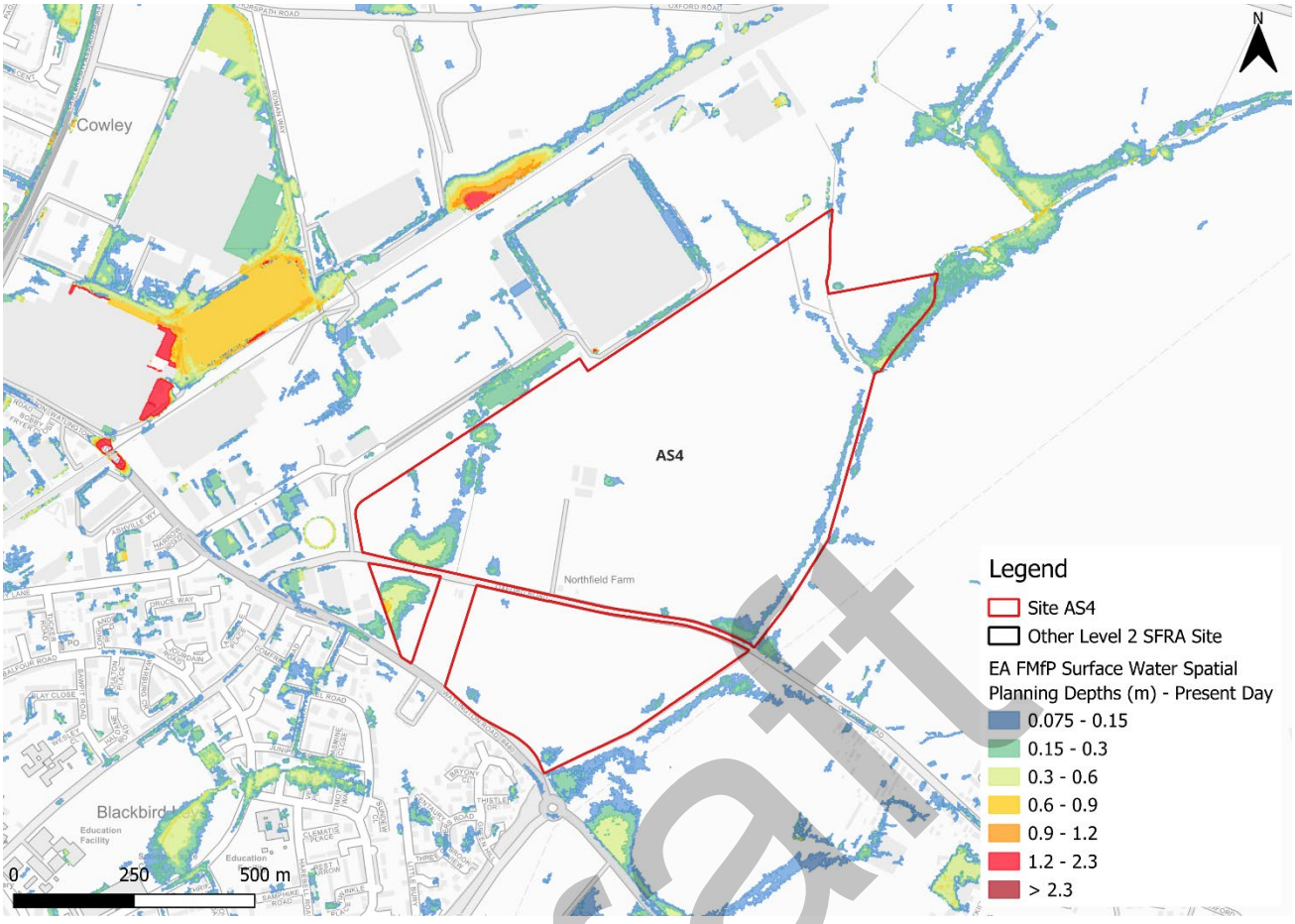

Figure 3-2: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Present Day for the 1% AEP event

3.1.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning data does not include hazard information suitable for planning purposes. Therefore, this Level 2 SFRA considers the third generation Risk of Flooding from Surface Water (RoFSW) hazard mapping in addition to the Flood Map for Planning - Surface Water Spatial Planning extents and depths, as the best available information. Updated surface water hazard information would need to be confirmed at the site-specific FRA stage.

Based on the EA's national scale third generation RoFSW map, the greatest flood hazard within the site in the medium risk event is categorised as 'significant', however is predominantly 'low' and 'moderate' (Figure 3-3).

There are some differences between the Flood Map for Planning - Surface Water Spatial Planning map and the third generation RoFSW hazard mapping. The Flood Map for Planning - Surface Water Spatial Planning data does not map flooding less than 0.075m (7.5cm) in depth. Therefore, where the map may show no flooding, there may be shallow flooding up to a depth of 0.075m. In contrast, the third generation RoFSW does not map flooding with a hazard rating of less than 0.575. This could explain the differences observed between the Flood Map for Planning and third generation RoFSW maps.

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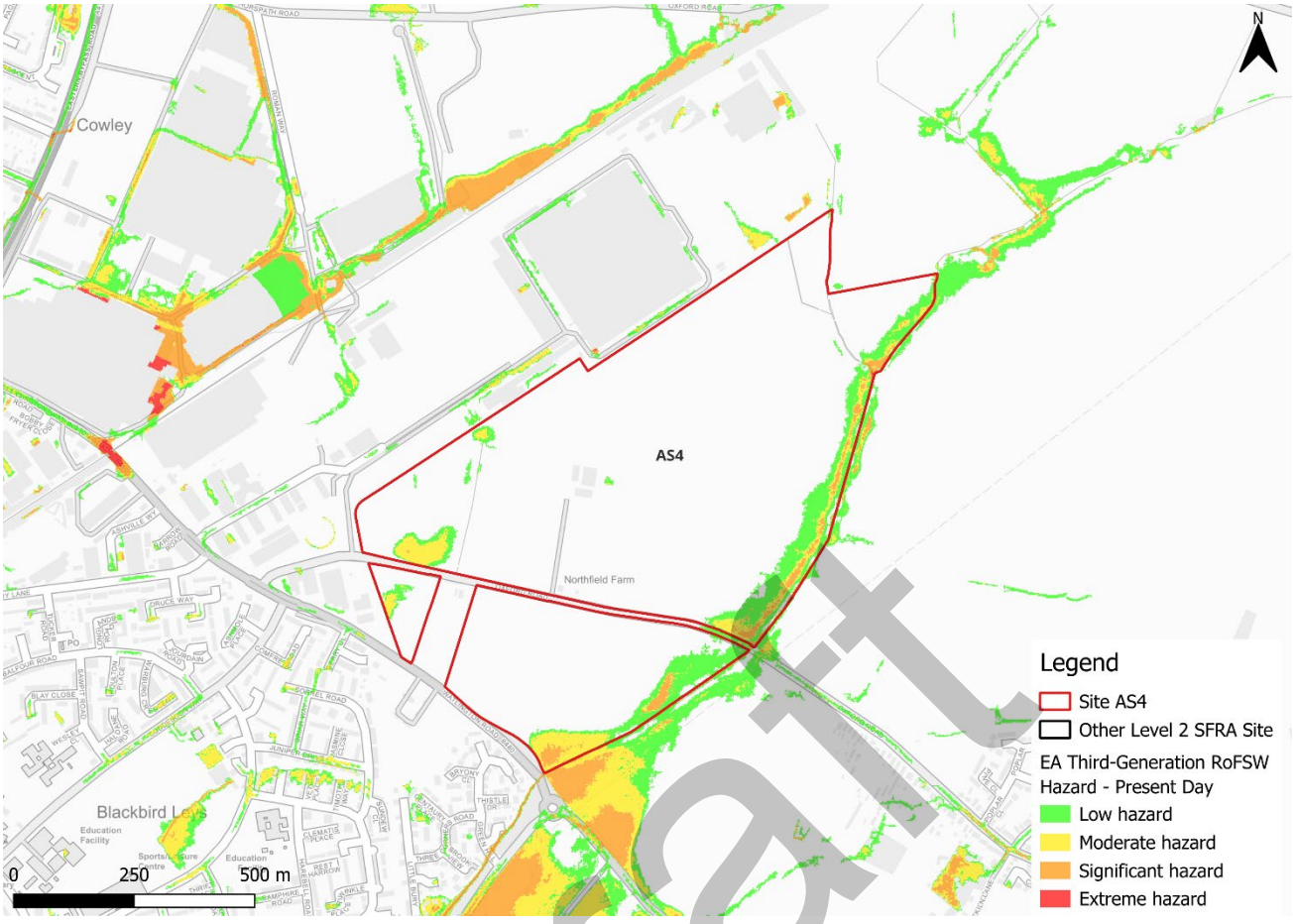

Figure 3-3: Third generation - Risk of Flooding from Surface Water map present day 1% AEP event surface water flood hazard[2]

3.2 Impacts from climate change

3.2.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths

The EA's climate change allowance guidance states that SFRA's should assess the upper end peak rainfall allowance for the 2070s epoch. This dataset is included in the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Climate Change dataset (September 2026). The peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment are shown in Table 3-2. The allowance for the 0.1% AEP event is not stated in the EA guidance.

2 Based on Section 7.5 Hazard rating. What is the Risk of Flooding from Surface Water map? Report version 2.0. April 2019. Environment Agency

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Table 3-2: Peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment

Return period	Central allowance 2070s (% increase)	Upper end allowance 2070s (% increase)
3.3% AEP	25	35
1% AEP	25	40

Figure 3-4 shows the surface water flood extents for the 2070s upper end climate change scenario. Surface water flood risk is modelled to increase in extent with climate change in all events. There are also some additional areas of scattered surface water ponding.

The greatest flood depths onsite in the 1% AEP event are modelled to remain between 0.6 and 0.9m along the flow path in the west of the site (Figure 3-5).

Safe access and escape routes are likely to remain achievable via Oxford Road.

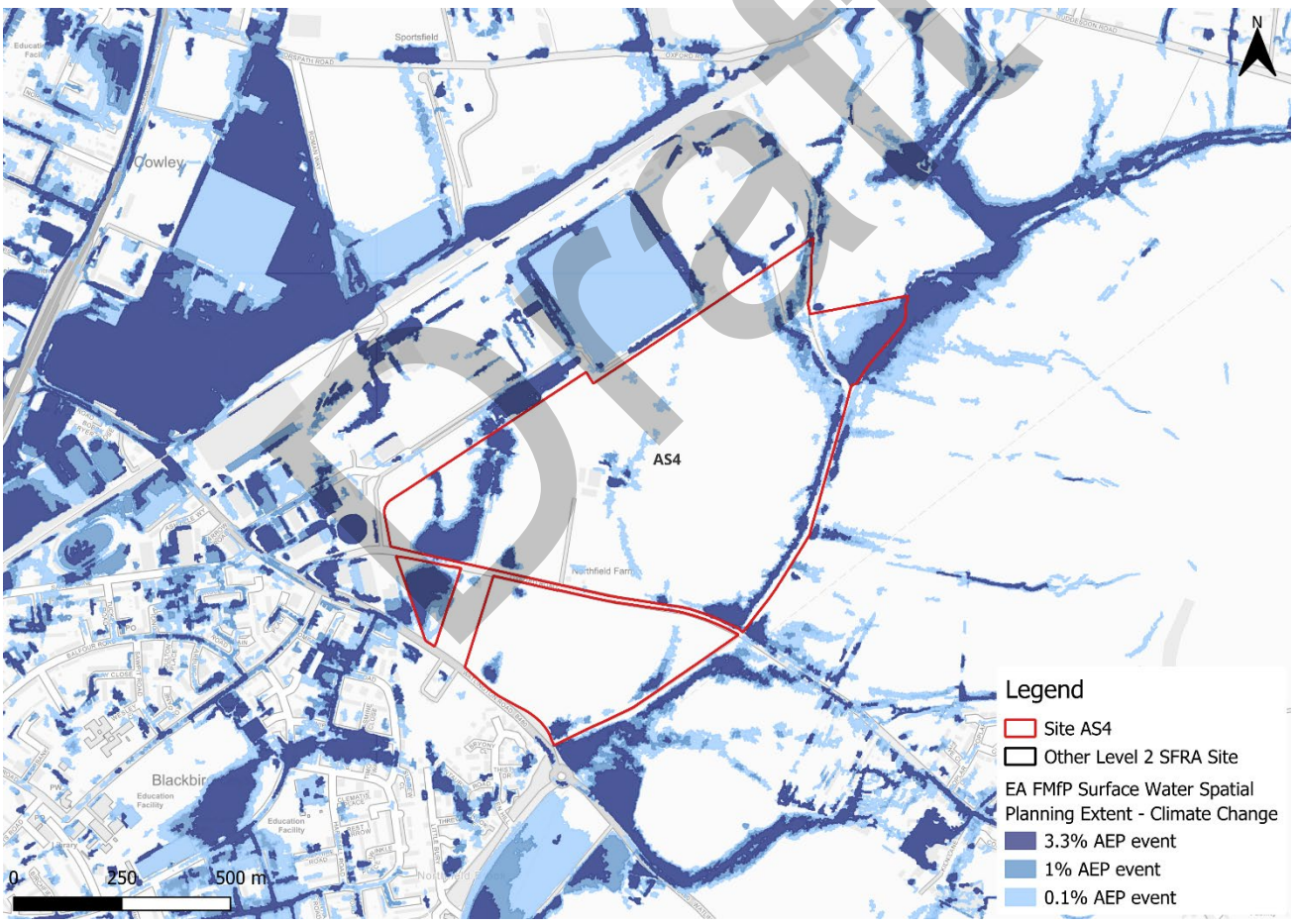

Figure 3-4: Flood Map for Planning - Surface Water Spatial Planning Extents Climate Change (2070s Upper End)

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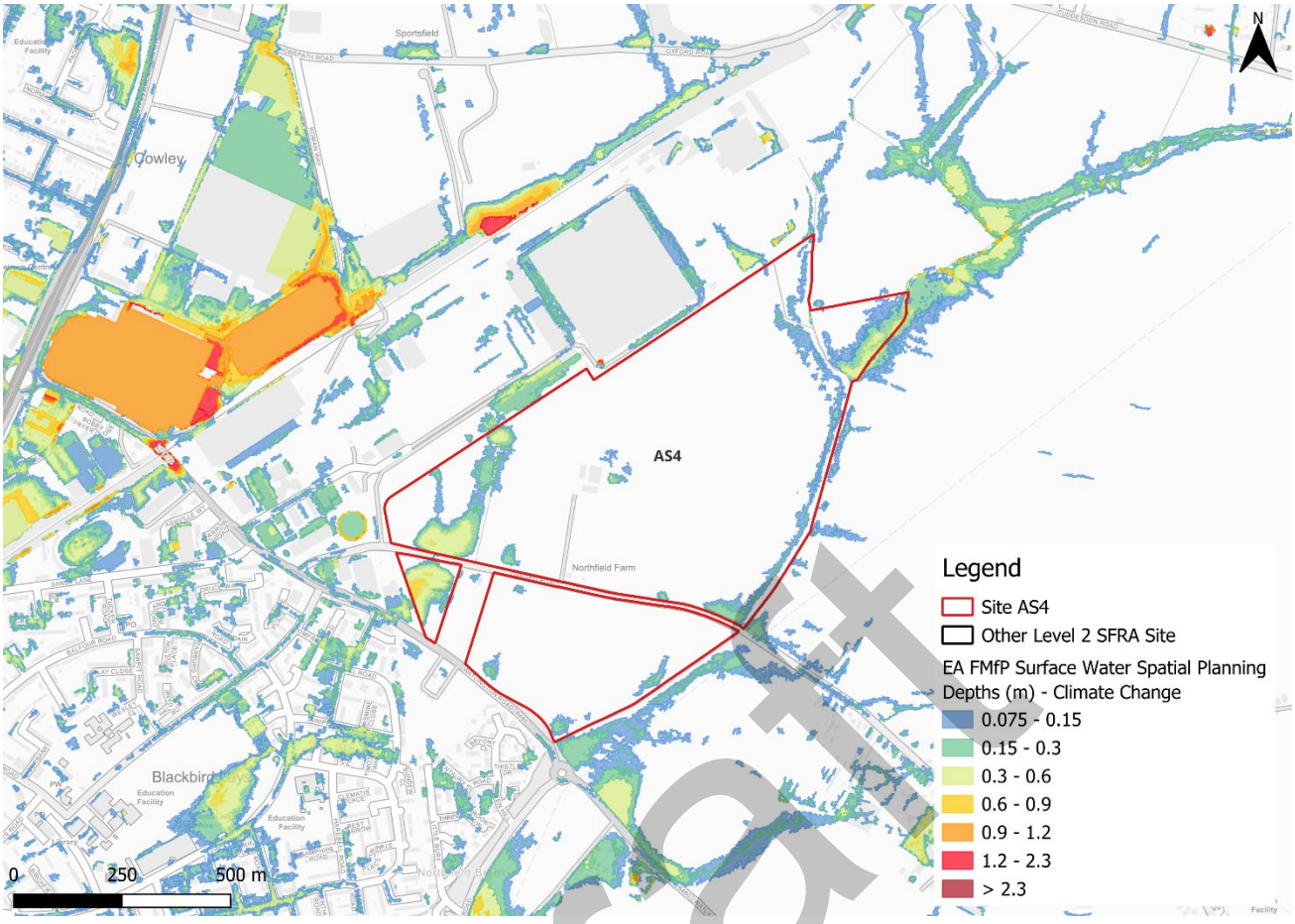

Figure 3-5: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Climate Change for the 1% AEP event (2070s Upper End)

3.2.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning climate change data does not include hazard information suitable for planning purposes. This Level 2 SFRA therefore considers the RoFSW low risk surface water event as a conservative proxy for the medium risk event plus climate change, as the best available information to assess surface water flood hazards. The impact of climate change on surface water flood hazards should be considered at the site-specific FRA stage.

Using the RoFSW low risk event as a proxy, future surface water flood hazard in the medium risk event is categorised as 'significant' (Figure 3-6)

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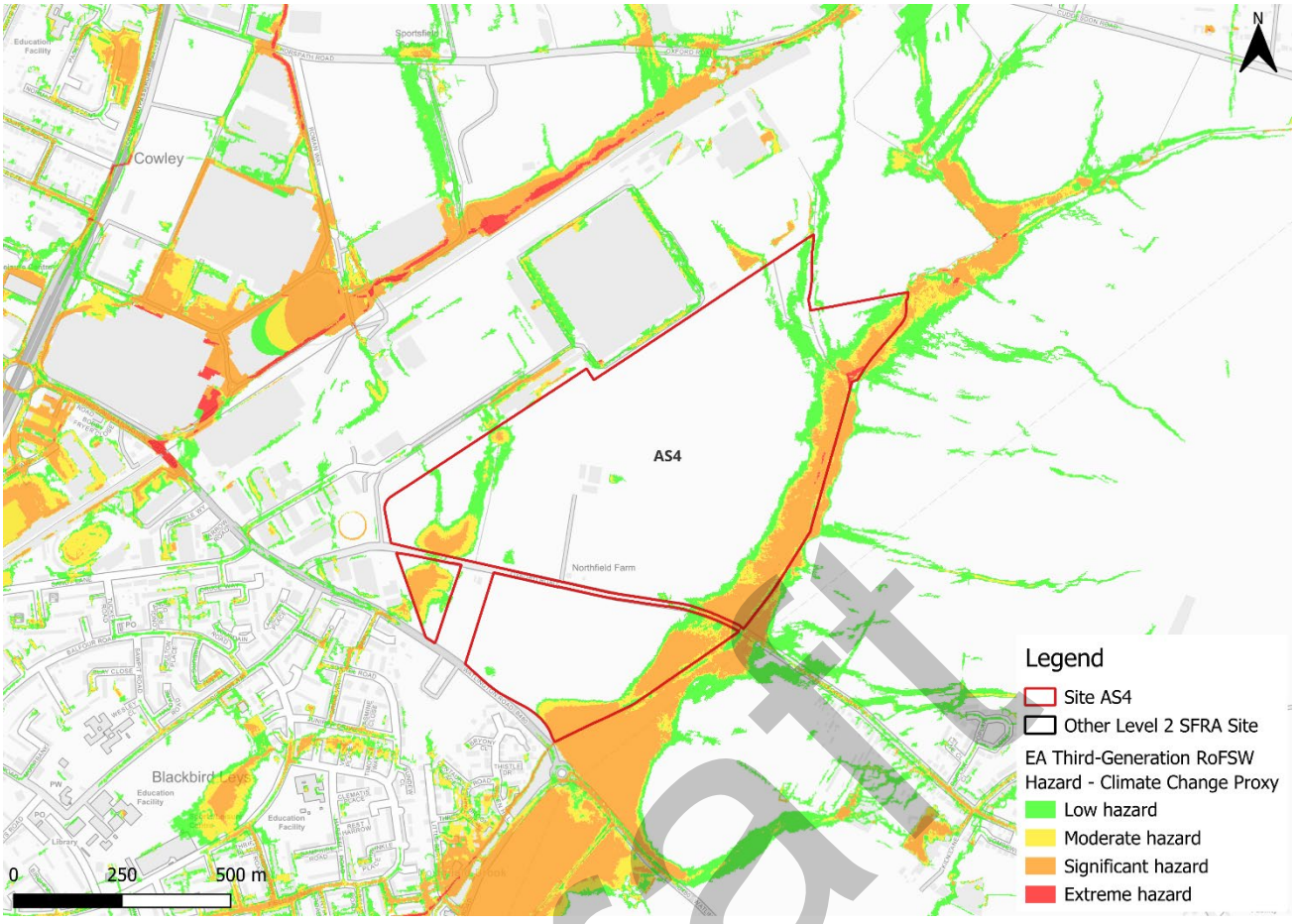

Figure 3-6: Low risk event surface water flood hazard, as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

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3.3 Observations, mitigation options, site suitability, sequential approach to development management - surface water

- Current risk to the site is predominantly very low, with 88% of the site being outside of the 0.1% AEP surface water flood extent. Surface water risk in the medium risk event is present along the western boundary, and also the eastern boundary of the site adjacent to Northfield Brook, with some scattered areas of ponding across the remaining area of the site.
- Within the climate change scenarios, risk is shown to increase in extent in all events, with some additional scattered areas of ponding across the site in the 0.1% AEP event.
- Topographic low spots and flow paths should be considered and included in site design and ideally left in place to flood naturally when required.
- It is recommended that the area adjacent to Northfield Brook should remain as open greenspace that is allowed to flood. Multiple benefits can be achieved by utilising the greenspace for ecological, social and amenity uses, as well as for flood alleviation.
- The drainage strategy must ensure there is no increase in surface water flood risk elsewhere as a result of new development. The developer should aim to

achieve betterment of existing runoff rates. The developer should also follow the National SuDS guidance.

- Safe access and escape routes are likely to be achievable via Oxford Road which runs between the northern and southern site parcels.

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4 Groundwater, geology and SuDS suitability

Risk of groundwater emergence is assessed in this SFRA using JBA's 5m Groundwater Emergence Map. Figure 4-1 shows the map for Site AS4 (Land at Northfield, Edge of Oxford) and the surrounding areas and Table 4-1 explains the risk classifications.

Risk of groundwater emergence is varied across the site. The site predominantly has a risk of groundwater emergence to both surface and subsurface assets. Within the centre of the larger site parcel, there is a negligible risk from groundwater emergence. Ground investigations will be required through the site-specific FRA to ascertain groundwater levels and conditions. Groundwater conditions are mostly not suited to infiltration SuDS.

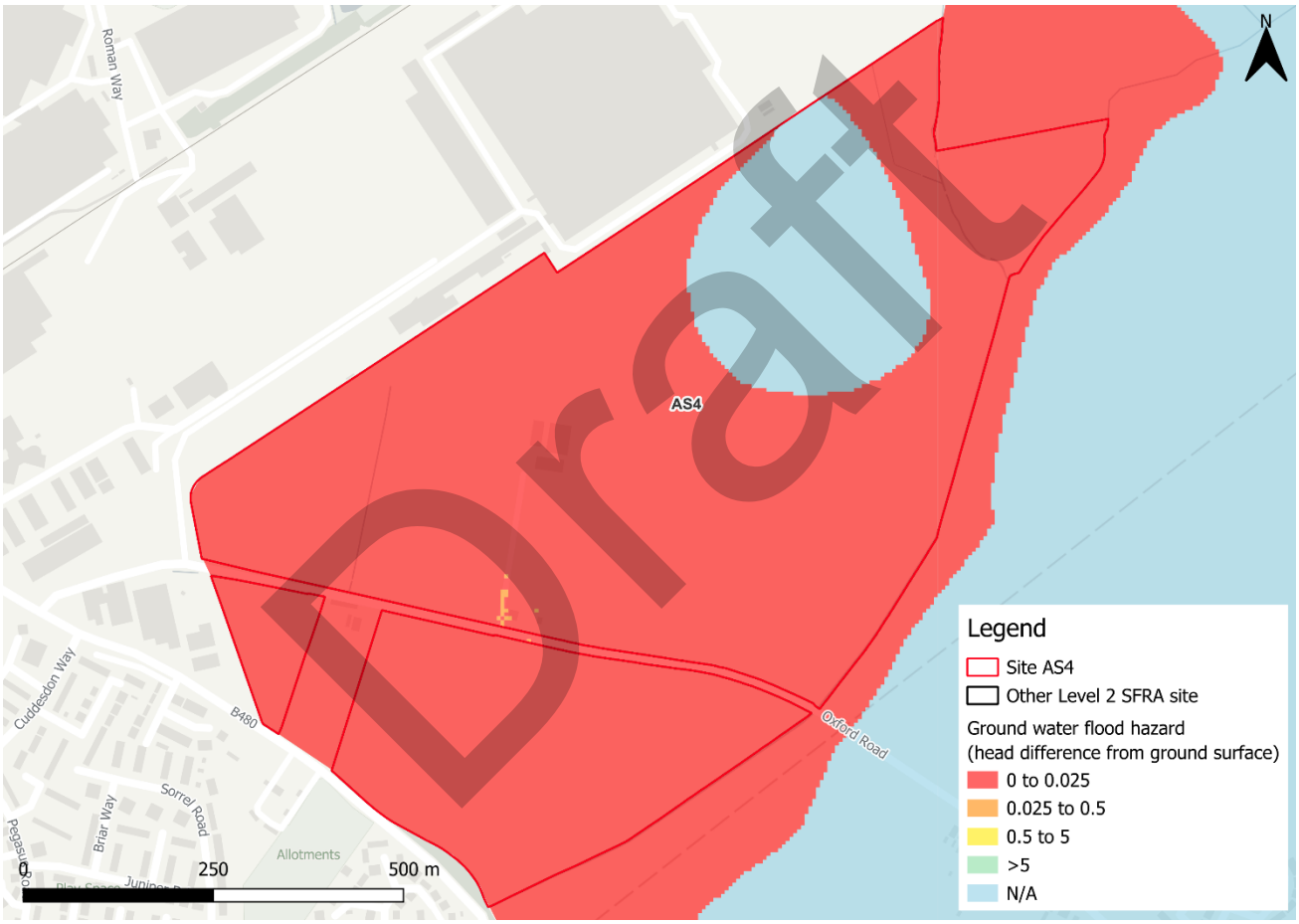

Figure 4-1: JBA 5m Groundwater Emergence Map

Table 4-1: Groundwater Emergence Hazard Classification

Groundwater head difference (m)*	Class label
0 to 0.025	Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
0.025 to 0.5	Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
0.5 to 5	Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event There is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely.
>5	Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event. Groundwater emergence is not likely.
N/A	No risk. This zone is deemed as having a negligible risk from groundwater emergence due to the nature of the local geological deposits.
*Difference is defined as ground surface in mAOD minus modelled groundwater table in mAOD.	

The underlying bedrock within the site is limestone, sandstone, siltstone and mudstone (Figure 4-2). Other than sandstone, all these rocks generally have low levels of permeability. This leads to less water infiltrating into the ground and could potentially contribute to lower water table levels. The drainage strategy for the site should investigate water table levels and ground conditions to inform on appropriate SuDS.

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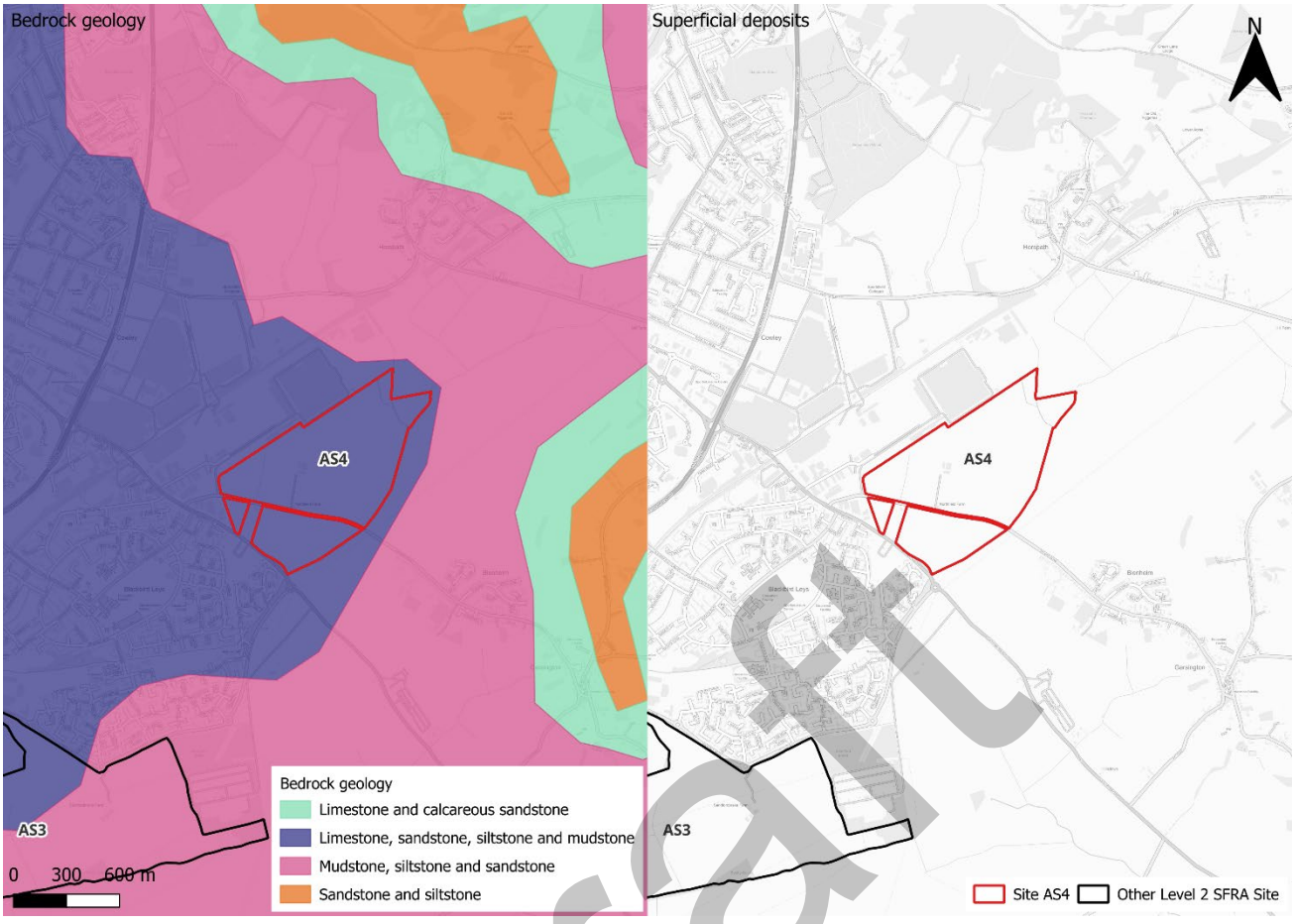

Figure 4-2: BGS Geology - Bedrock and superficial deposits

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5 Overall site assessment

5.1 Can part b) of the exception test be passed?

To pass part b) of the exception test[3], it must be proven that the development can be safe for its lifetime, which is 100 years for residential development, taking account of the vulnerability of its users, without increasing risk elsewhere, and, where possible, will reduce flood risk overall.

This site is required to pass the exception test as it is proposed for more vulnerable development within Flood Zone 3a. Based on current information this site should be able to pass the exception test. However, all the recommendations suggested in this Level 2 SFRA should be considered at the site-specific FRA stage or before any site design planning.

5.2 Recommendations and site-specific FRA requirements

Based on the evidence presented in the Level 1 SFRA (2024), Level 1 SFRA Addendum (2026) and this Level 2 SFRA:

- The proposed development of the site would see a change in the risk classification from less vulnerable to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the site-specific FRA must show that the development can be designed to be safe for its lifetime and that there is adequate emergency planning provision (para 006 FRCC-PPG).
- There should be no vulnerable development within the area of the site covered by the functional floodplain. This should be converted to a blue / green corridor to provide ecological, amenity and social value.
- Updated climate change modelling of Northfield Brook should be used to update this Level 2 SFRA at the earliest opportunity to provide an up-to-date strategic assessment of flood risk to this site and the surrounding areas. It would be acceptable to use updated modelling to suitably assess risk through a site-specific FRA, as well as/instead of a Level 2 SFRA update.
- This site could be allocated if development avoids the area of functional floodplain and significant surface water flow path along the eastern boundary of the site.
- There is a culverted watercourse through the west of the site. There should be no development over the culverted watercourse beneath the site. Note that the path of the culvert represented within the watercourse mapping may not be accurate. The actual path of the culvert should be confirmed with the LLFA.
- Were this site to be allocated based on current information, the LPA must make it clear that this site cannot be developed until the required information detailed in this SFRA on future flood risk from the Northfield Brook is fully ascertained.

[3] Policy F6 National Planning Policy Framework 2026

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- A detailed drainage strategy will be required for any new development, given the large area of the site.
- Groundwater conditions must be investigated further through a site-specific FRA.
- Opportunities for NFM features to reduce flood risk to the site and surrounding areas should be explored at the site-specific FRA stage.
- Any site-specific FRA should undertake a condition assessment of the culvert beneath the B480 and investigate the impact of a potential blockage of this structure.
- Any site-specific FRA should be carried out in line with the NPPF, FRCC-PPG, EA guidance, South Oxfordshire and Vale of White Horse District Councils Joint Local Plan and LLFA policies, and national and local SuDS policy and guidelines.
- Throughout the site-specific FRA process, consultation should be carried out with the following, where applicable: the LPA; LLFA; emergency planning officers; EA; TW; the highways authorities; and the emergency services.

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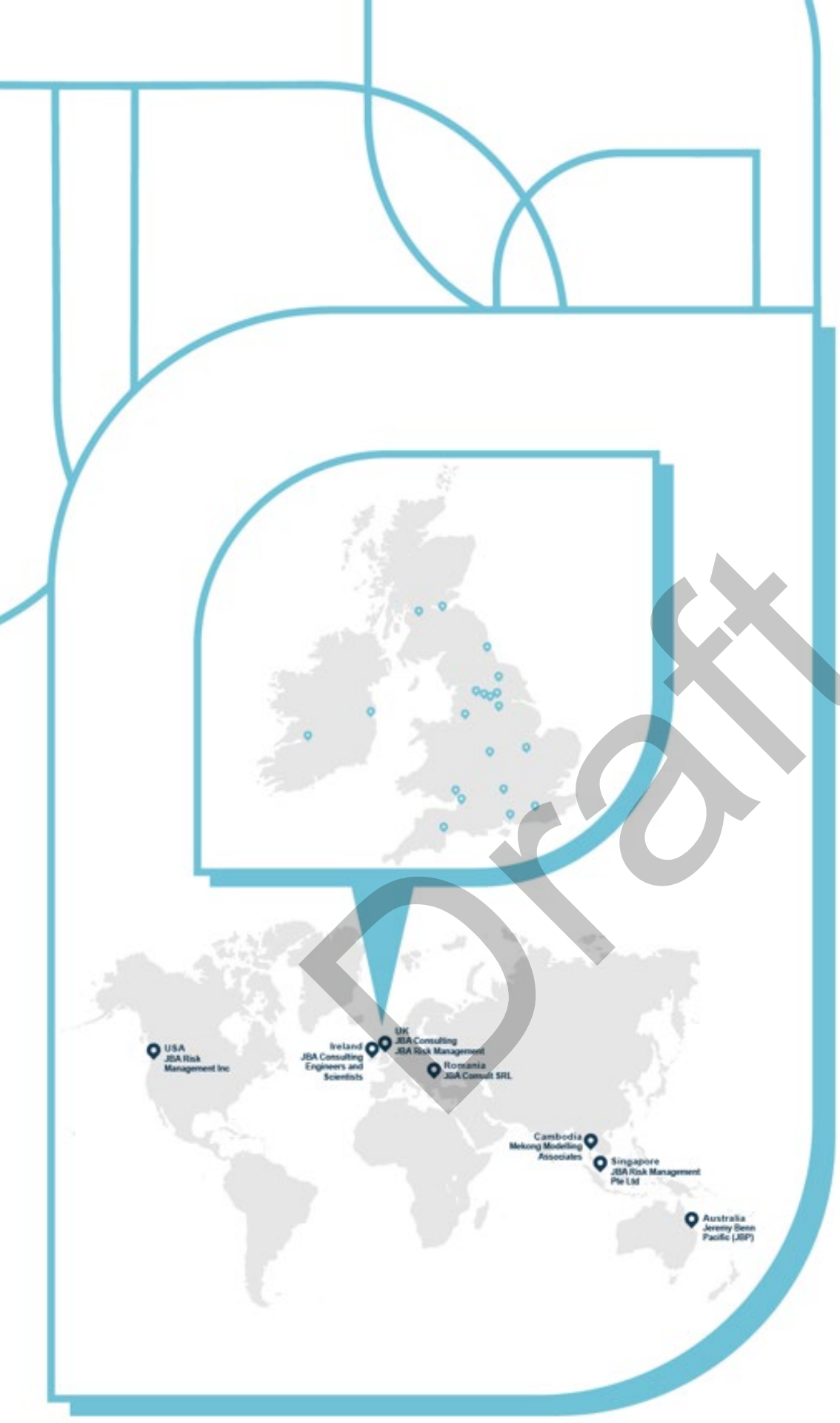

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Registered Office
1 Broughton Park
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North Yorkshire
BD23 3FD
United Kingdom

+44(0)1756 799919
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South Oxfordshire and Vale of White Horse Level 2 Strategic Flood Risk Assessment Update

Site AS5 - Land at Bayswater Brook, Edge of Oxford

Draft Report

October 2026

Prepared for:

South Oxfordshire District Council and

Vale of White Horse District Council

www.jbaconsulting.com

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Reviewed by	Laura Thompson-Jones BSc CGeog FRGS Senior Analyst
Authorised by	Mike Williamson BSc MSc CGeog FRGS EADA Project Director

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Contract

JBA Project Manager	Freya Nation
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2026s1132

This report describes work commissioned by South Oxfordshire and Vale of White Horse District Councils. The Client's representative for the contract was Rebekah Goodwill of South Oxfordshire and Vale of White Horse District Councils. Boe Kilshaw of JBA Consulting carried out this work.

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for South Oxfordshire and Vale of White Horse Joint Local Plan Site AS5 - Land at Bayswater Brook, Edge of Oxford. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA' (2024) and the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum' (2026), and read the 'South Oxfordshire and Vale of White Horse District Councils Level 2 SFRA Main Report Update' (2026) and is therefore familiar with the terminology used in this report.

1.1 Site AS5 - Land at Bayswater Brook, Edge of Oxford

- Location: Land at Bayswater Brook, Edge of Oxford (Figure 1-1)
- Existing site use: Agriculture
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Mainly residential
- Proposed site use vulnerability: More vulnerable
- Site area: 105 ha
- Proposed development impermeable area: 89.3 ha (assumed 85% of site area)
- Watercourse: Bayswater Brook. Sydlings Brook extends from the north of the site as a tributary to Bayswater Brook. Several ordinary watercourses flow south through the site, providing land drainage.
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for more detailed assessment through Level 2 SFRA (Strategic Recommendation A)
    - Subject to Exception Test
    - Assess present day and future modelled fluvial water depths, hazards
    - Assess present day and future modelled surface water depths, hazards

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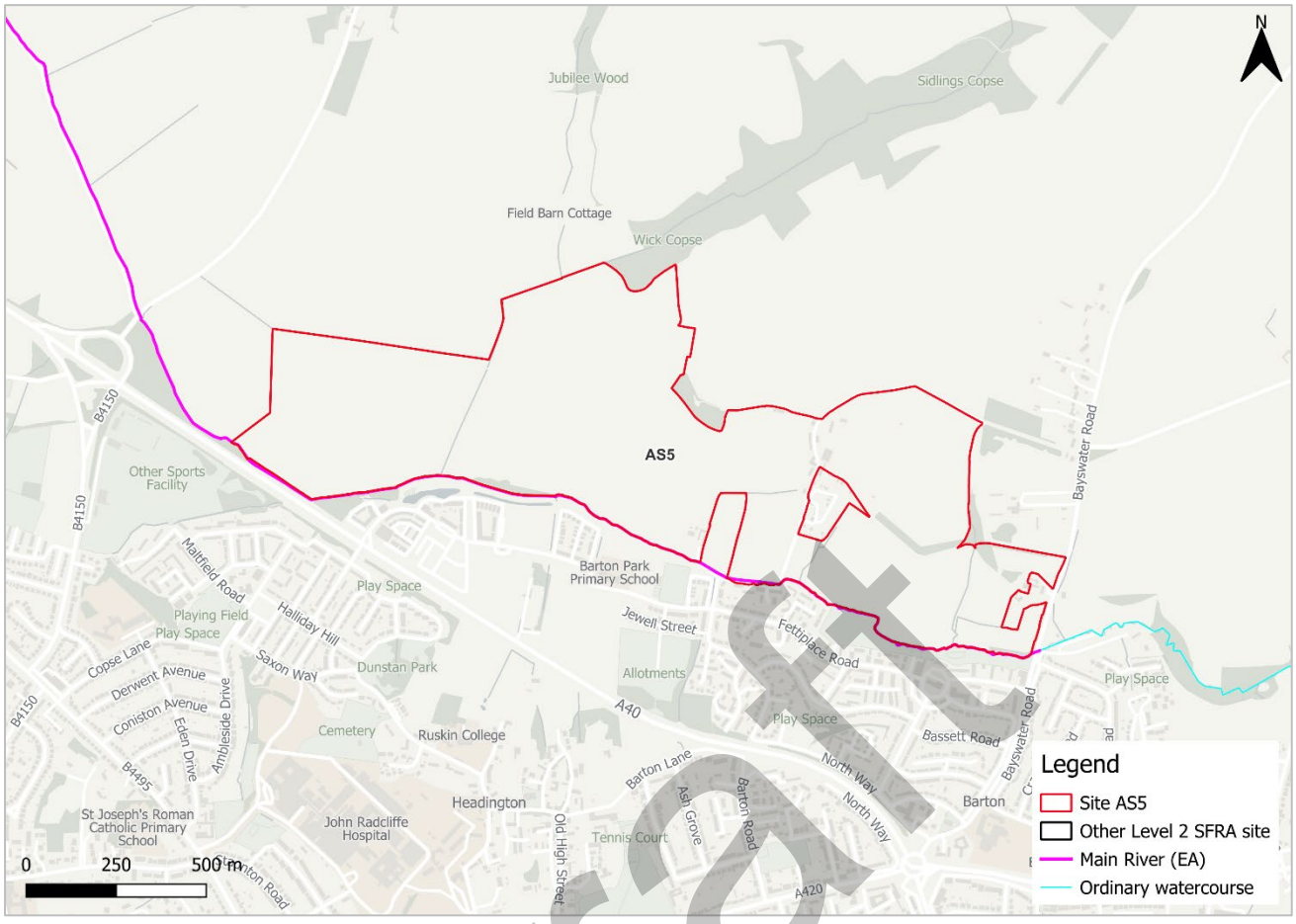

Figure 1-1: Site location

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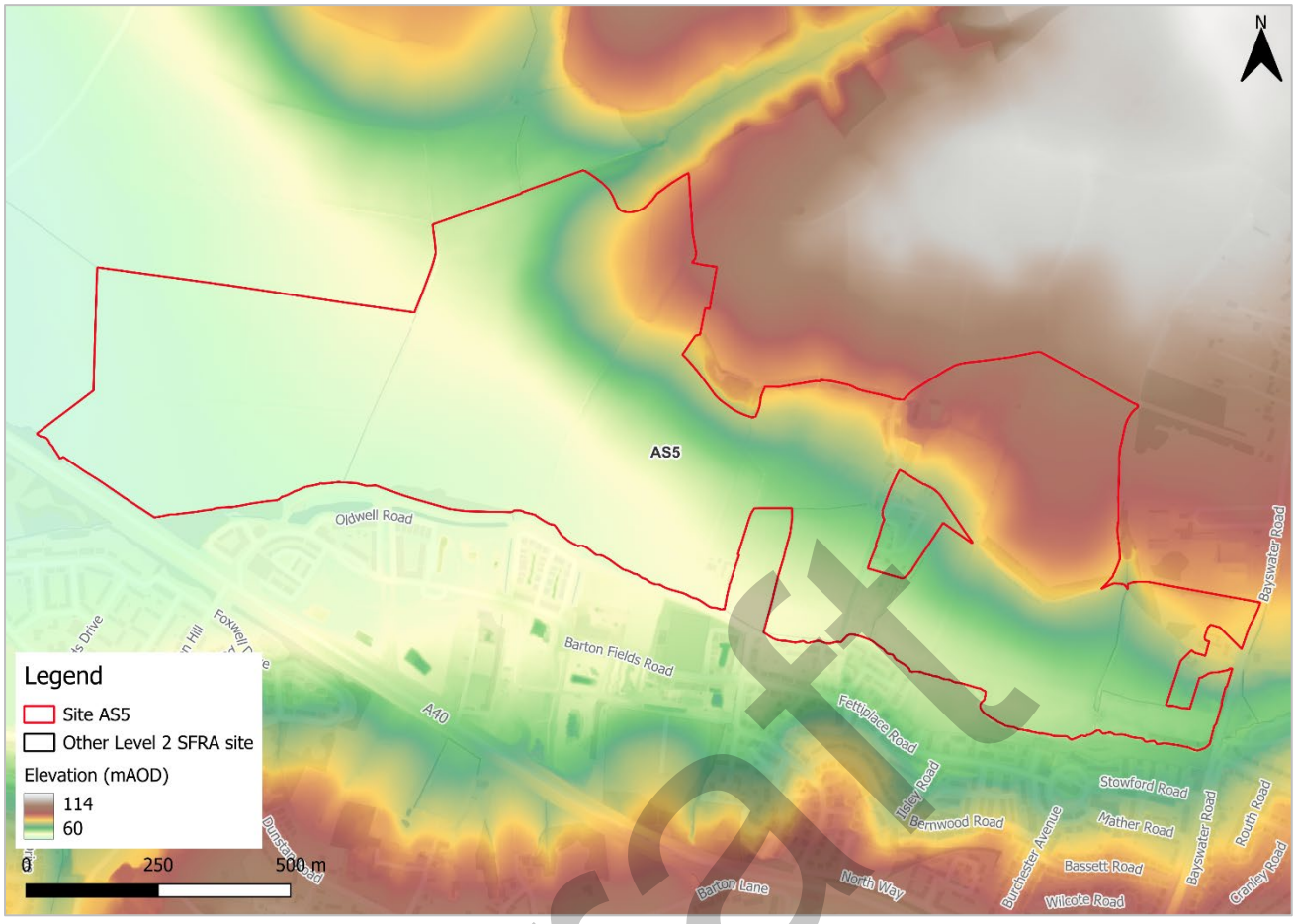

Figure 1-2: Topography

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2 Flood risk from rivers

2.1 Existing risk

2.1.1 Flood Map for Planning and functional floodplain

Based on the Environment Agency's (EA) Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum (2026), the percentage areas of the site within each flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.4).

The area along the southern boundary of the site is located within the functional floodplain, adjacent to Bayswater Brook. There should be no vulnerable development in the area of the site within the functional floodplain. The functional floodplain in this location is based on the EA Rivers and Sea 3.3% AEP defended extent.

1% of the site is modelled to be within Flood Zone 3a, and therefore at high risk of flooding from rivers, and a further 3% of the site is modelled to be within Flood Zone 2, and therefore at low risk of flooding from rivers.

The EA should be consulted on the data source of the Flood Map for Planning in this location. If the Flood Map for Planning is based on a detailed model of Bayswater Brook, any updates to this Level 2 SFRA and/or any site-specific FRA should make use of this model to understand modelled depths and hazards within the site.

Sydlings Brook runs through the centre of the site. Note that Sydlings Brook has been modelled as part of the application.

Table 2-1: Existing flood risk based on percentage area of site at risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
86	3	1	10

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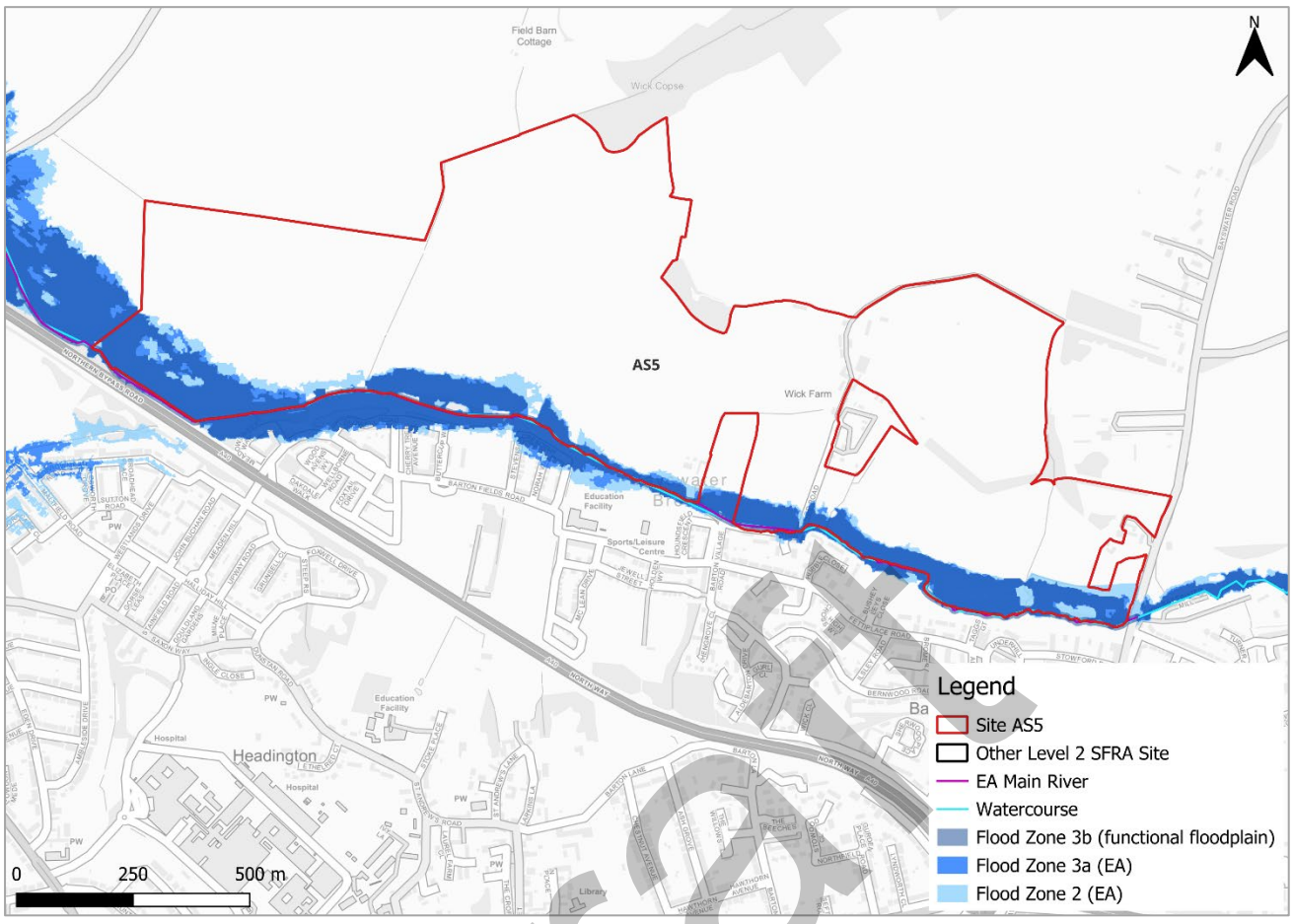

Figure 2-1: Existing risk from rivers to the site

2.2 Impacts from climate change

2.2.1 Detailed model outputs - climate change

The EA's SFRA guidance states that SFRAs should assess the 2080s central allowance for less vulnerable, more vulnerable, highly vulnerable and water compatible development (Table 2-2). The impacts of climate change on flood risk from Bayswater Brook has not been modelled for this SFRA, as a model covering Bayswater Brook was not made available for consideration. The impacts of climate change must be modelled using the EA's latest allowances for peak river flows to inform whether the site can be safe for its lifetime and to assess modelled flood depths and hazards. Therefore, any updates to this Level 2 SFRA and/or any site-specific FRA should include for the most up to date climate change allowances.

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Table 2-2: Climate change allowances for peak river flows for the Cherwell and Ray management catchment

Epoch	Central	Higher Central	Upper End
2020s	6%	11%	24%
2050s	4%	10%	27%
2080s	15%	25%	49%

2.2.2 Flood Map for Planning - Flood Zones plus Climate Change

Figure 2-2 shows the EA's Flood Map for Planning - Flood Zones plus Climate Change dataset. Based on this dataset, the site is not shown to be at significant additional risk from climate change.

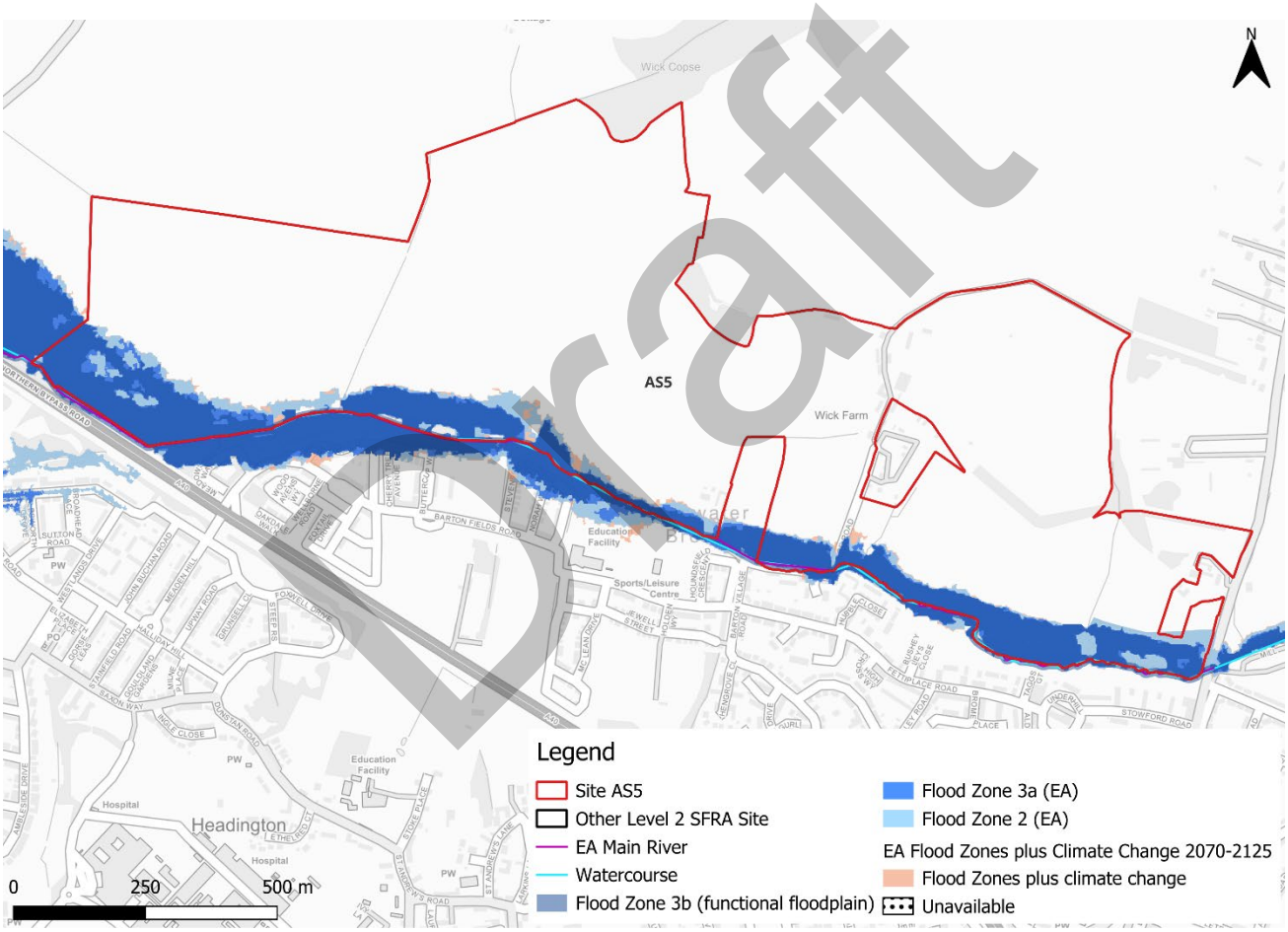

Figure 2-2: Flood Zones plus Climate Change dataset

2.3 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. Historic risk to the site is shown in Figure 2-3 which shows that an area within the south east of the site has been subject to flooding in the past. The RFO dataset references that the historic event occurred in Autumn 1992 due to channel capacity exceedance of Bayswater Brook.

The LPA historic flood incident records indicate that Barton Village Road to the south of the site has experienced flooding in the past, partially as a result of a restriction in flow along Bayswater Brook at a road crossing.

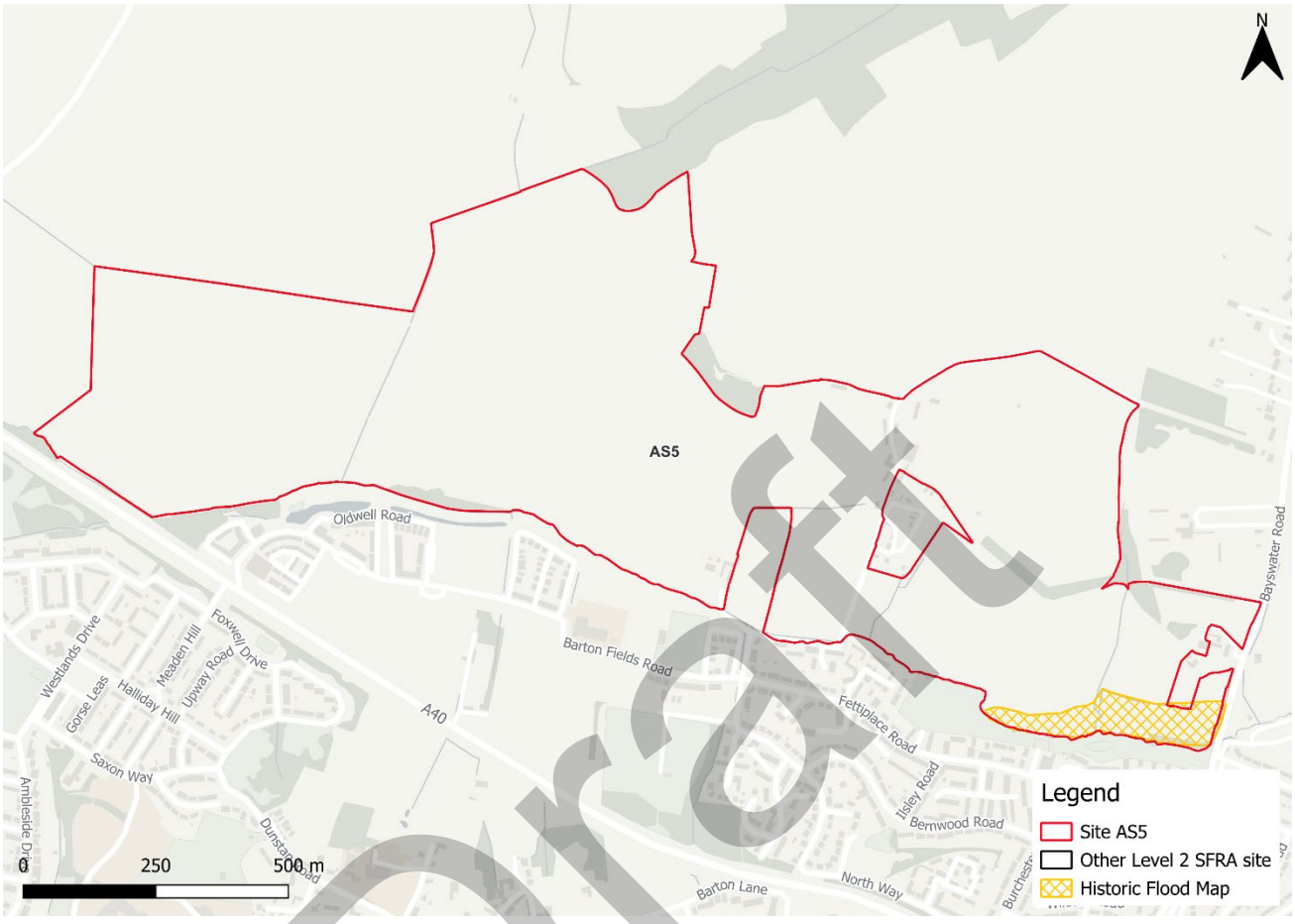

Figure 2-3: Recorded historic flood events onsite and around the site

2.4 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset. There are however areas of natural high ground along the banks of Bayswater Brook to the south of the site boundary.

2.4.1 Cumulative impacts

A cumulative impact assessment was completed through the South Oxfordshire and Vale of White Horse Level 1 SFRA Addendum (2026), which aimed to identify catchments sensitive to the cumulative impact of development. Site AS5 (Land at Bayswater Brook, Edge of Oxford) is located within one catchment, namely; Bayswater Brook. This is ranked as a medium sensitivity catchment. Planning considerations for sites at medium sensitivity to the cumulative impacts of development can be found in Appendix D of the Level 1 SFRA Addendum. Cumulative impacts of development should also be considered as part of a site-specific FRA.

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2.4.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. Both within and upstream of the site, there is the potential for tree planting to slow floodwaters, reduce flood peak height and reduce sediment delivery to the watercourse. There is also potential for floodplain reconnection along the banks of Bayswater Brook, to allow water to be stored during times of flood. These areas are shown on Figure 2-4.

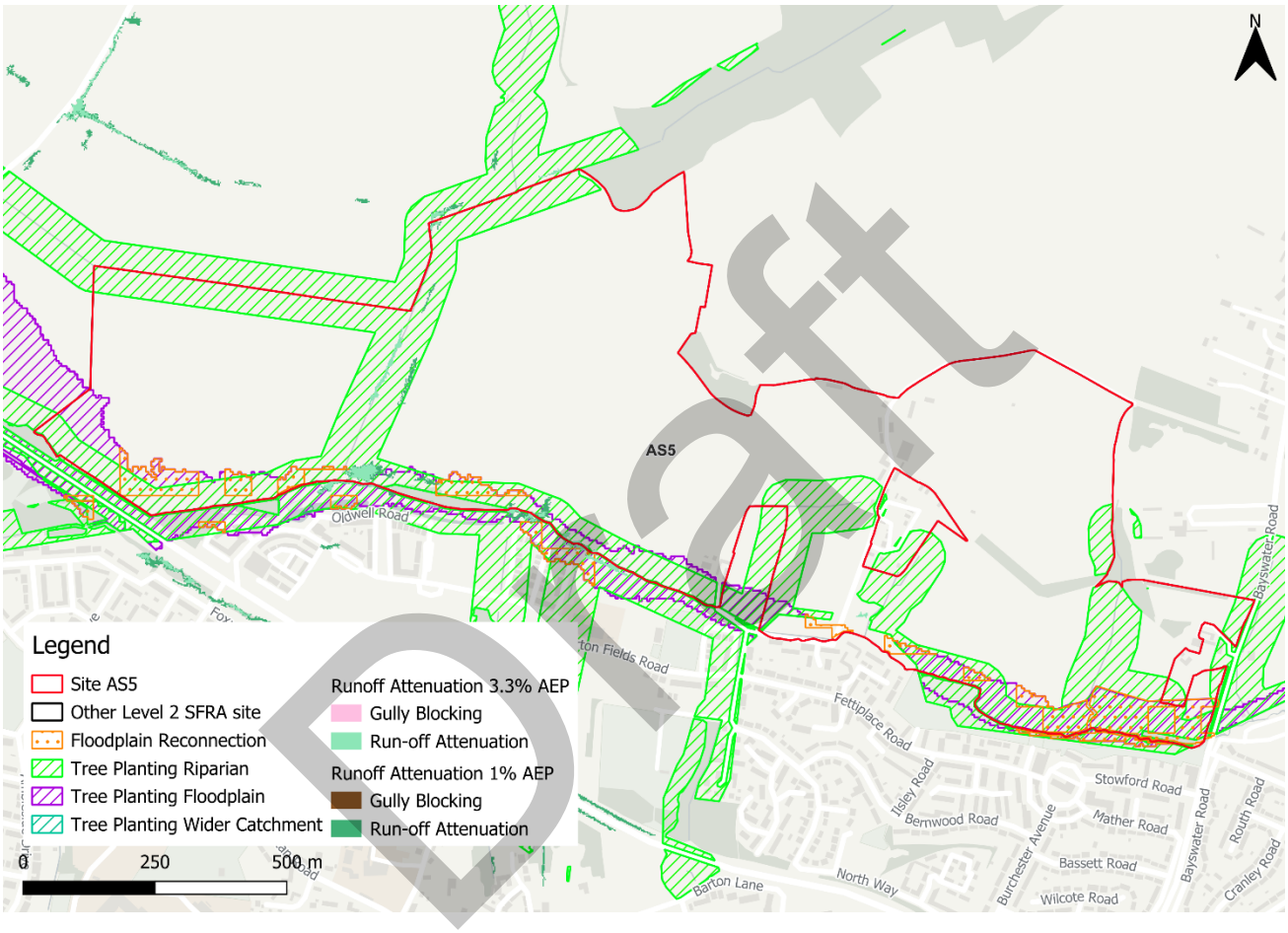

Figure 2-4: Natural Flood Management (NFM) potential mapping

2.5 Residual risk

Although a site may be afforded some protection from defences and / or drainage infrastructure, there is always a residual risk of flooding from asset failure i.e. defence breaches, or blockages of culverts or drainage assets.

There are no assets with the potential to pose a residual risk to the site

2.5.1 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. A "dry day" scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir

and the watercourses upstream and downstream of the reservoir are at a normal level. A "wet day" scenario assumes a worst-case scenario where a reservoir releases water held on a "wet day" when local rivers have already overflowed their banks.

This site is not modelled to be at risk of flooding from reservoirs.

2.6 Emergency Planning

2.6.1 Flood warnings and alerts

There are no Flood Warning Areas (FWA) or Flood Alert Areas (FAA) within the vicinity of the site.

2.6.2 Access and escape routes

Safe access and escape routes should be achievable via Bayswater Road to the east of the site. This route is indicated by the yellow line in Figure 2-5.

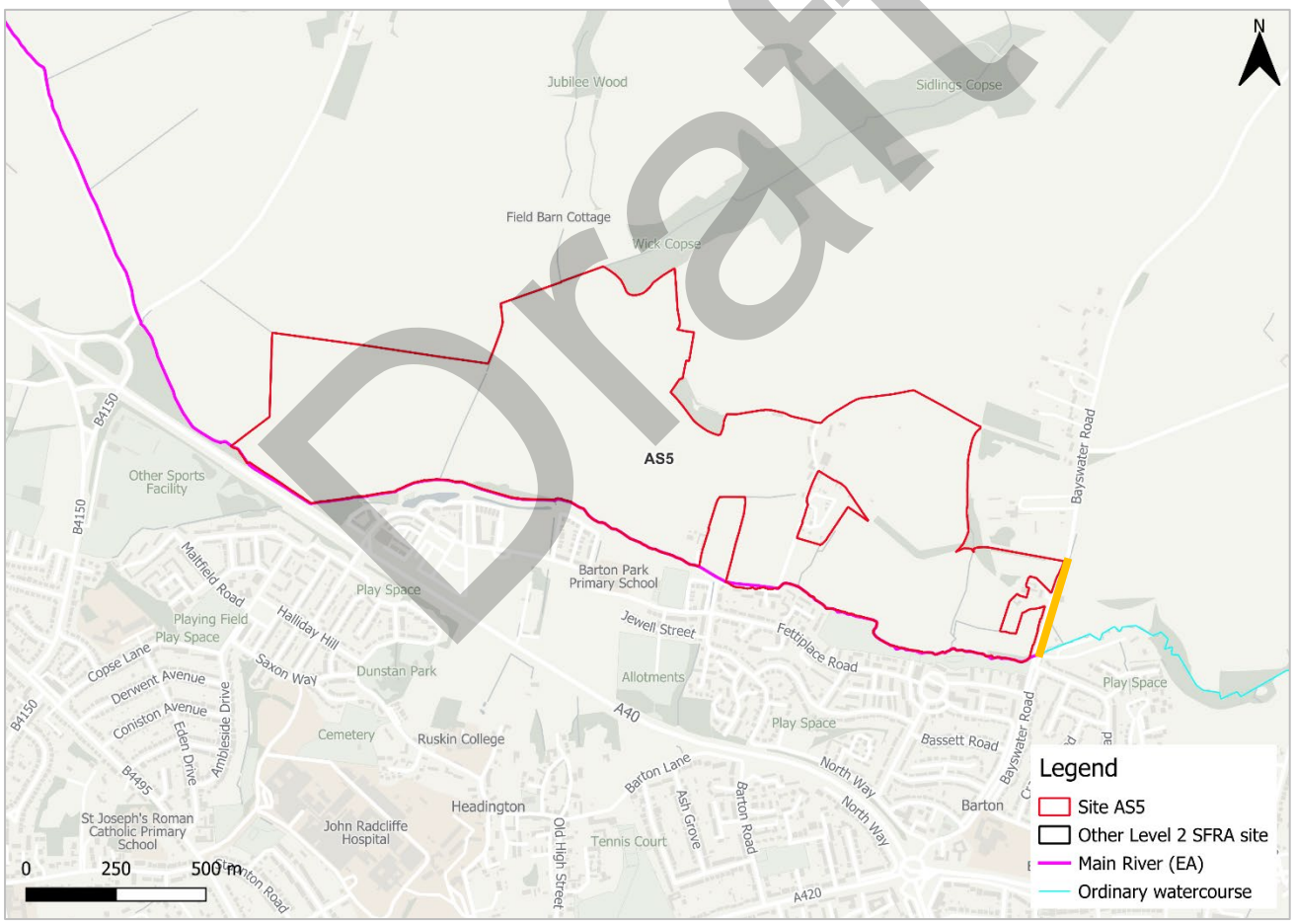

Figure 2-5: Potential access and escape routes

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2.7 Observations, mitigation options, site suitability, sequential approach to development management - fluvial

- Observations:
  - The site is modelled to be within the functional floodplain within the south of the site, adjacent to Bayswater Brook. Vulnerable development is not permitted within the functional floodplain.
  - There should be no development within 8m of Bayswater Brook apart from permitted access. The EA recommend for a 8m no development buffer for all main rivers to enable access for maintenance activities. If feasible, this area would be used as a green / blue corridor which can provide ecological, social and amenity value.
  - A flood risk activity permit may be required if development is planned within 8m of the riverbank. The EA can advise on whether a permit will be required. If feasible, this area would be used as a green / blue corridor which can provide ecological, social and amenity value.
  - The EA should be consulted on the data source of the Flood Map for Planning in this location. If the Flood Map for Planning is based on a detailed model of Bayswater Brook, any updates to this Level 2 SFRA and/or any site-specific FRA should make use of this model and include for the most up to date climate change allowances.
  - It would be acceptable to use updated climate change modelling to suitably assess risk through a site-specific FRA, as well as/instead of a Level 2 SFRA update.
  - The EA Flood Zones plus Climate Change dataset shows the site is not at significant additional risk from climate change. However, as discussed, there is no detailed model of the reach of Bayswater Brook to the south of the site to understand the impact of climate change on fluvial flood depths, velocities and hazards. Climate change must be modelled at the site-specific FRA stage.
- Mitigation:
  - The area adjacent to Bayswater Brook to the south of the site should be maintained and included in site design as a green / blue corridor offering multifunctional benefits alongside flood risk mitigation including Biodiversity Net Gain (BNG) contributions, and social and amenity benefits. This should be feasible without impacting significantly on plot numbers.
  - Given the historic flood risk to Barton Village Road, site design should aim to provide improvements to drainage within the site to reduce risk to the road.
- Access and escape:
  - Safe access and escape routes could likely be achievable via Bayswater Road to the east of the site.

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3 Flood risk from surface water

3.1 Existing risk

3.1.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths Present Day

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Extents Present Day map (September 2026), the site is predominantly outside of the 0.1% AEP event extent (Table 3-1).

Surface water risk is largely confined to two distinct flow paths through the site (Figure 3-1), one adjacent to the channel of Bayswater Brook and the other extending through the site from the north to the west. There are also some scattered areas of surface water ponding within topographic low spots.

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Depth map, the greatest flood depths within the site are between 0.6 and 0.9m, however are predominantly less than 0.3m (Figure 3-2).

Safe access and escape routes would likely be achievable via Bayswater Road in all events.

Table 3-1: Existing surface water flood risk based on percentage area at risk using the Flood Map for Planning - Surface Water Spatial Planning Extent Present Day map

Less than 0.1% AEP event (% area)	0.1% AEP event (% area)	1% AEP event (% area)	3.3% AEP event (% area)
94	3	1	2

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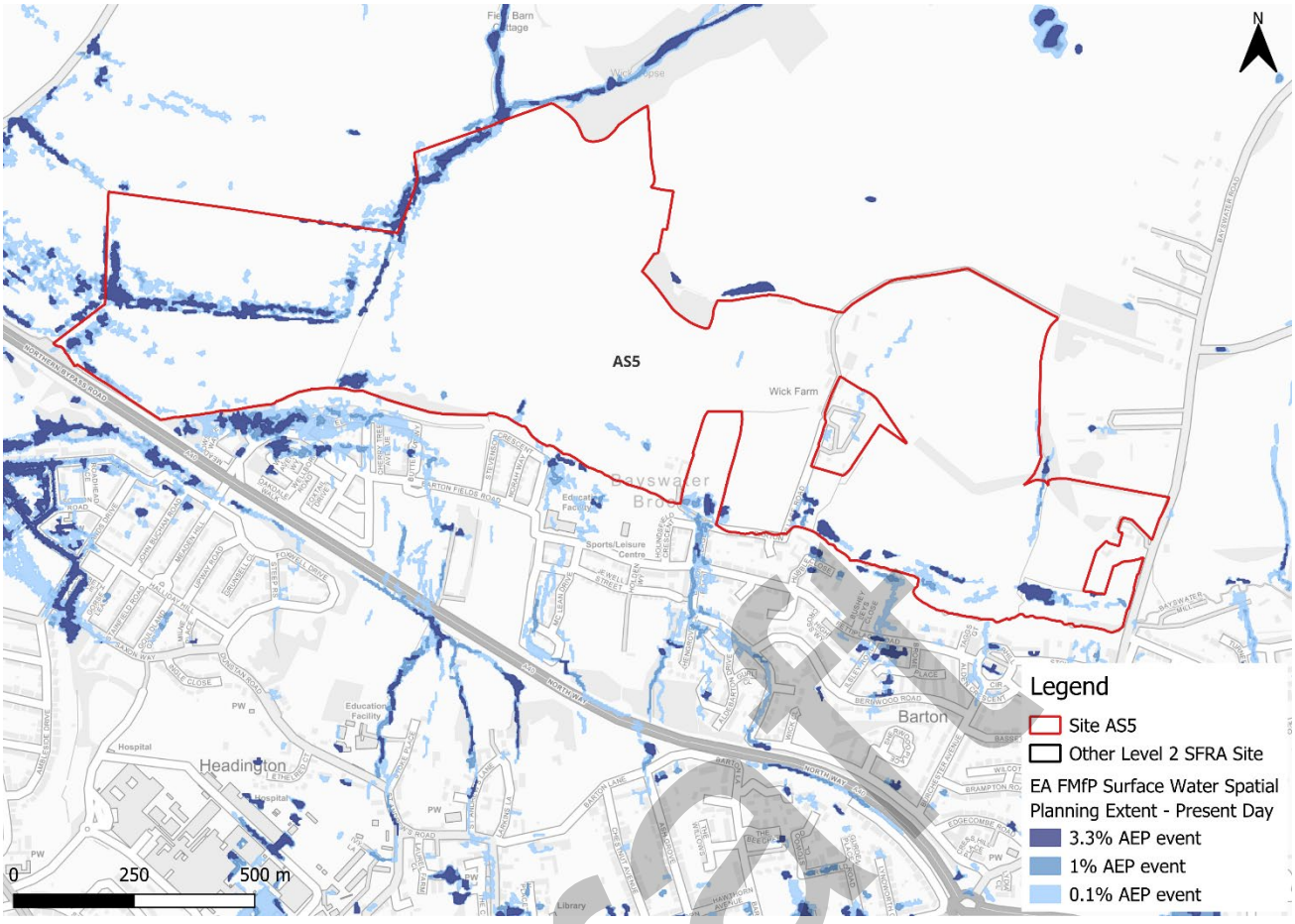

Figure 3-1: Flood Map for Planning - Surface Water Spatial Planning Extents Present Day

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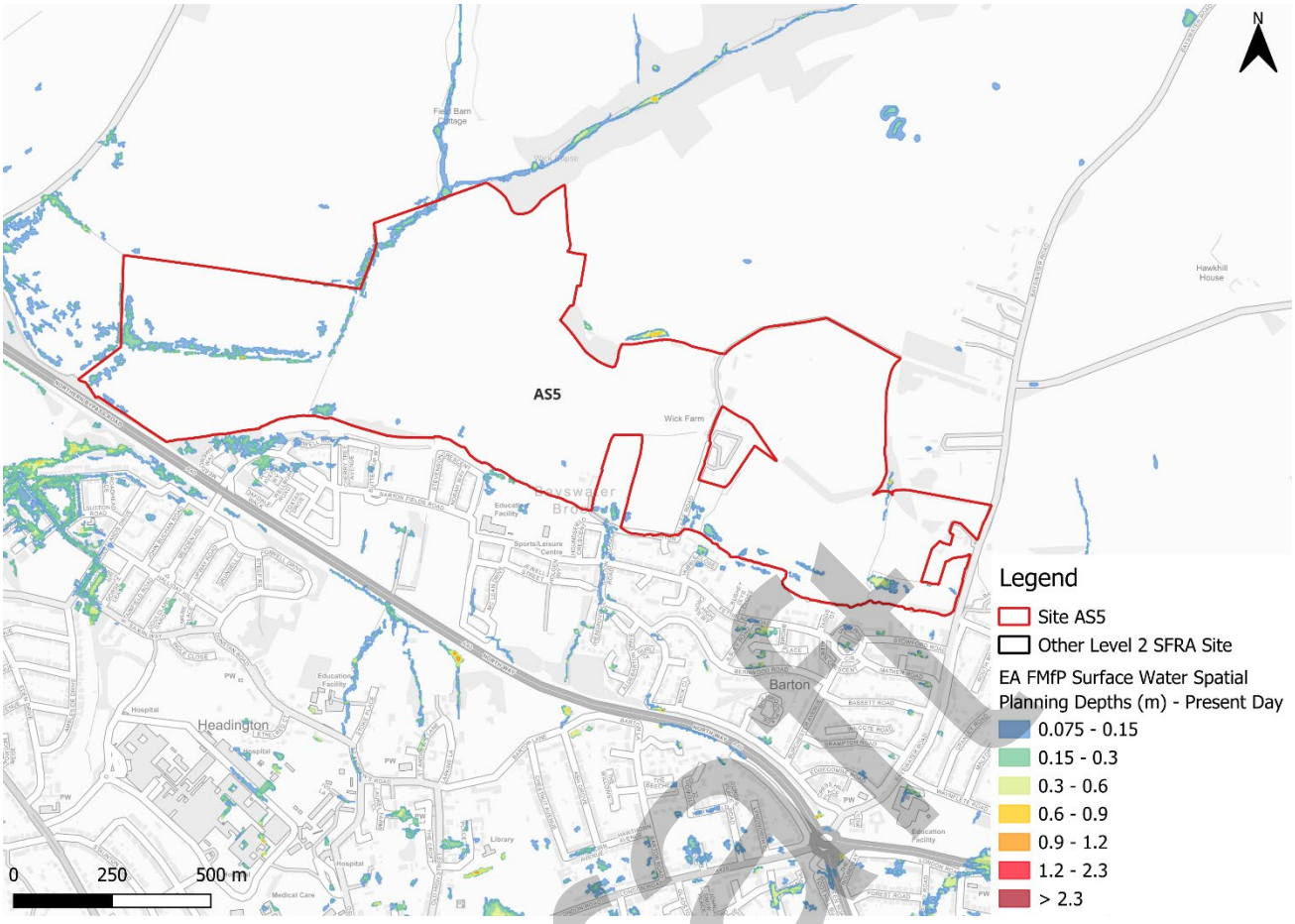

Figure 3-2: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Present Day for the 1% AEP event

3.1.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning data does not include hazard information suitable for planning purposes. Therefore, this Level 2 SFRA considers the third generation Risk of Flooding from Surface Water (RoFSW) hazard mapping in addition to the Flood Map for Planning - Surface Water Spatial Planning extents and depths, as the best available information. Updated surface water hazard information would need to be confirmed at the site-specific FRA stage.

Based on the EA's national scale third generation RoFSW map, the greatest flood hazard within the site in the medium risk event is categorised as 'significant' adjacent to the channel of Bayswater Brook, however is predominantly categorised as 'low' (Figure 3-3).

There are differences between the Flood Map for Planning - Surface Water Spatial Planning map and the third generation RoFSW hazard mapping. The Flood Map for Planning - Surface Water Spatial Planning data does not map flooding less than 0.075m (7.5cm) in depth. Therefore, where the map may show no flooding, there may be shallow flooding up to a depth of 0.075m. In contrast, the third generation RoFSW does not map flooding with a hazard rating of less than 0.575. This could explain the differences observed between the Flood Map for Planning and third generation RoFSW maps.

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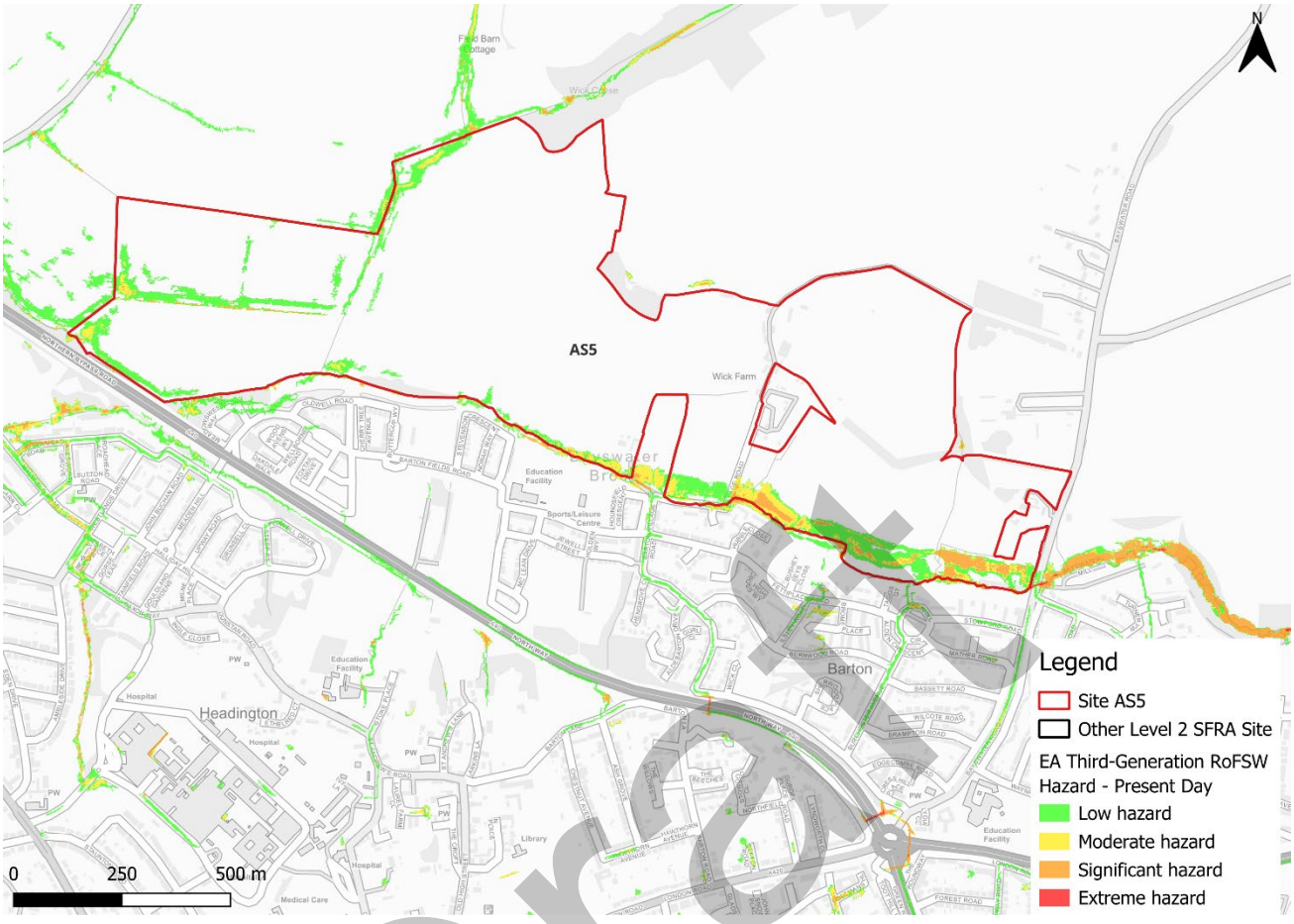

Figure 3-3: Third generation - Risk of Flooding from Surface Water map present day 1% AEP event surface water flood hazard[1]

3.2 Impacts from climate change

3.2.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths

The EA's climate change allowance guidance states that SFRA's should assess the upper end peak rainfall allowance for the 2070s epoch. This dataset is included in the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Climate Change dataset (September 2026). The peak rainfall intensity allowances for the Cherwell and Ray management catchment are shown in Table 3-2. The allowance for the 0.1% AEP event is not stated in the EA guidance.

1 Based on Section 7.5 Hazard rating. What is the Risk of Flooding from Surface Water map? Report version 2.0. April 2019. Environment Agency

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Table 3-2: Peak rainfall intensity allowances for the Cherwell and Ray management catchment

Return period	Central allowance 2070s (% increase)	Upper end allowance 2070s (% increase)
3.3% AEP	25	35
1% AEP	25	40

Figure 3-4 shows the surface water flood extents for the 2070s upper end climate change scenario. Surface water flood risk is likely to significantly increase with climate change, particularly within the west of the site. The two flow paths through the site are modelled to become more prominent in the 3.3% AEP event, with some additional areas of scattered ponding across the site.

Flood depths are shown to remain at between 0.6 and 0.9m, however are predominantly less than 0.3m (Figure 3-5).

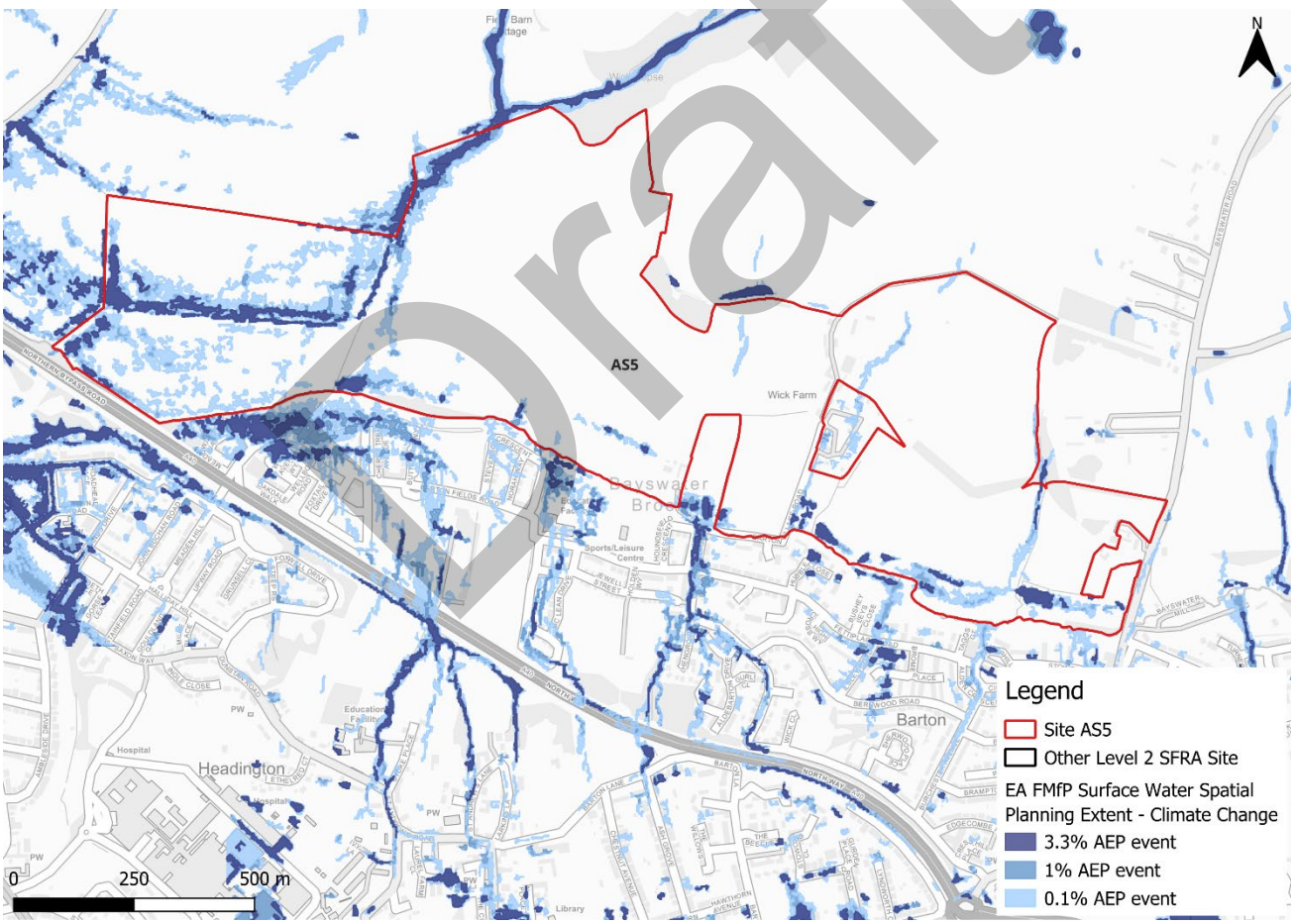

Figure 3-4: Flood Map for Planning - Surface Water Spatial Planning Extents Climate Change (2070s Upper End)

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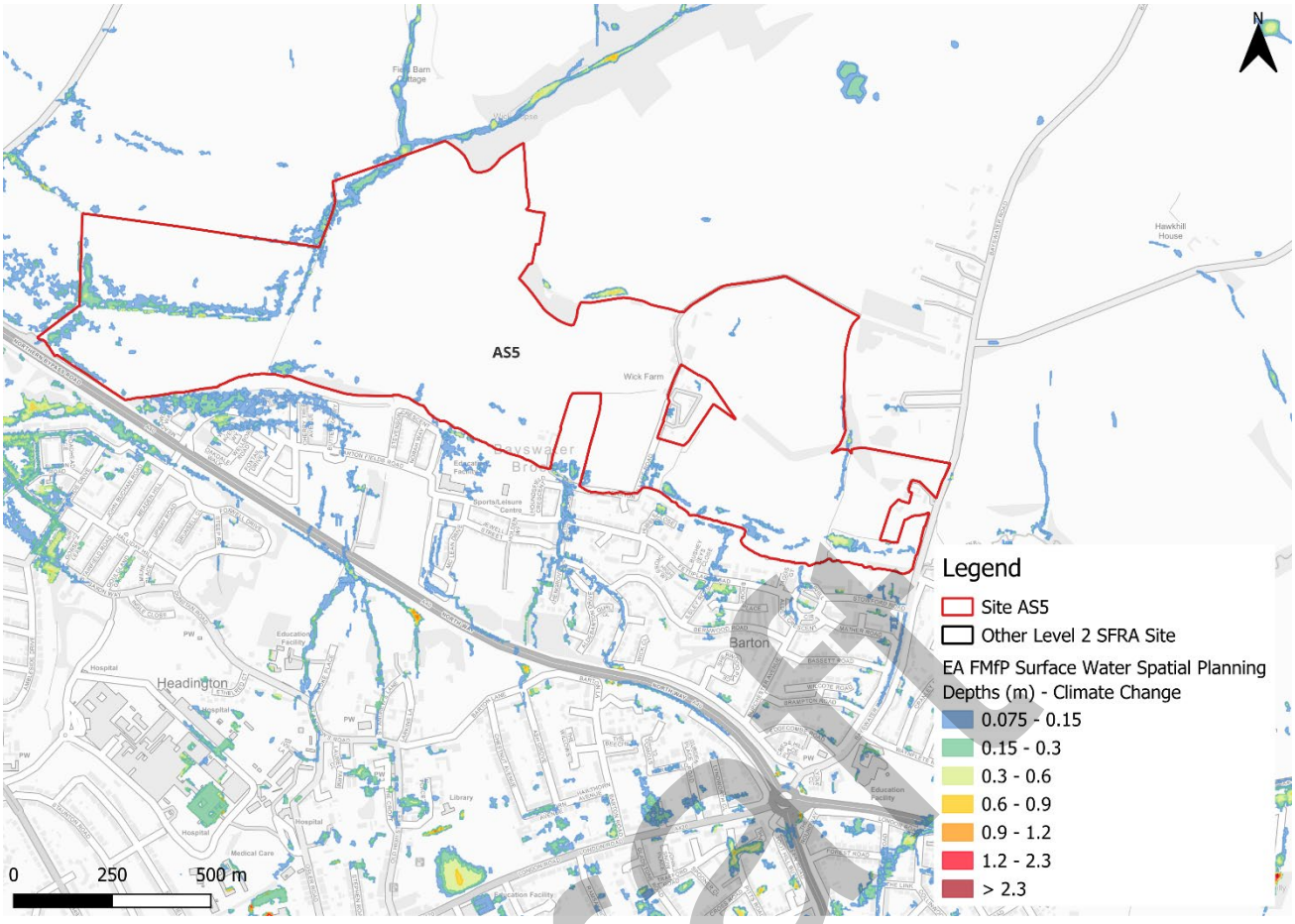

Figure 3-5: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Climate Change for the 1% AEP event (2070s Upper End)

3.2.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning climate change data does not include hazard information suitable for planning purposes. This Level 2 SFRA therefore considers the RoFSW low risk surface water event as a conservative proxy for the medium risk event plus climate change, as the best available information to assess surface water flood hazards. The impact of climate change on surface water flood hazards should be considered at the site-specific FRA stage.

Using the RoFSW low risk event as a proxy, future surface water flood hazard in the medium risk event is categorised as 'significant', with some small areas categorised as 'extreme' (Figure 3-6).

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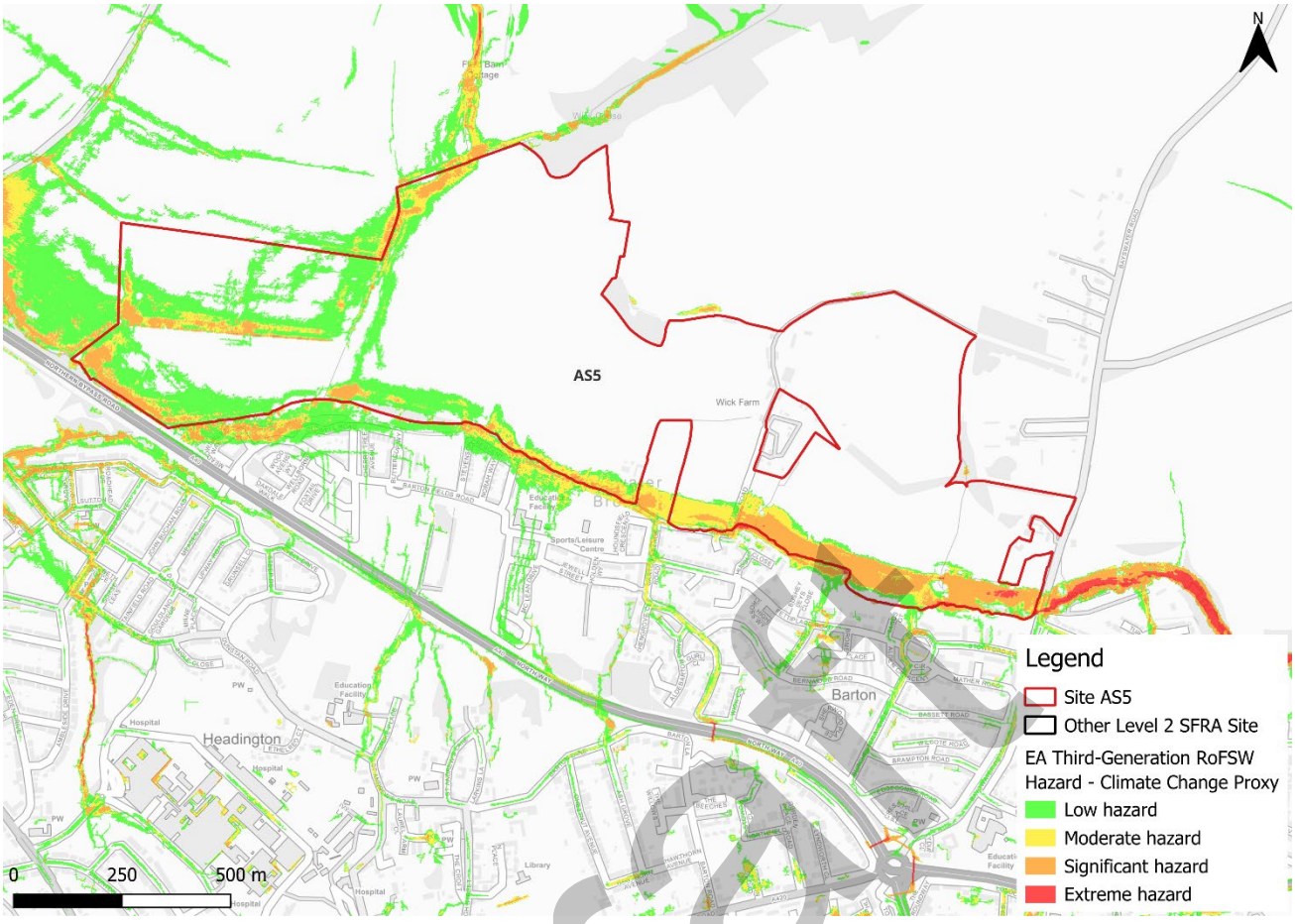

Figure 3-6: Low risk event surface water flood hazard[1], as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options, site suitability, sequential approach to development management - surface water

- Current risk to the site is predominantly very low, with approximately 94% of the site being outside of the 0.1% AEP surface water flood extent. Surface water risk is present along two distinct flowpaths within the south of the site and from the north, with some scattered areas of ponding across the site.
- Topographic low spots and flow paths should be considered and included in site design and ideally left in place to flood naturally when required.
- Risk is shown to significantly increase in extent when considering climate change, particularly within west of the site, however flood depths remain predominantly low.
- The drainage ditches through the centre of the site should be kept in place and remain unobstructed. The watercourse should be maintained and included within the landscaping design of the residential development.
- The drainage strategy must ensure there is no increase in surface water flood risk elsewhere as a result of new development. The developer should aim to achieve betterment of existing runoff rates. The developer should also follow the National SuDS guidance.

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- Safe access and escape routes would likely be achievable via Bayswater Road in all events.

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4 Groundwater, geology and SuDS suitability

Risk of groundwater emergence is assessed in this SFRA using JBA's 5m Groundwater Emergence Map. Figure 4-1 shows the map covering the site the surrounding areas. Table 4-1 explains the risk classifications.

The majority of the site is in an area where there is negligible groundwater emergence risk. There are areas to the west and north of the site where there is a risk of groundwater emergence to both surface and subsurface assets. Ground investigations will be required through the site-specific FRA to ascertain groundwater levels and conditions. Infiltration SuDS will likely not be achievable within most of the site, and areas for potential SuDS within the southern and central areas will require investigation to inform on appropriate SuDS types.

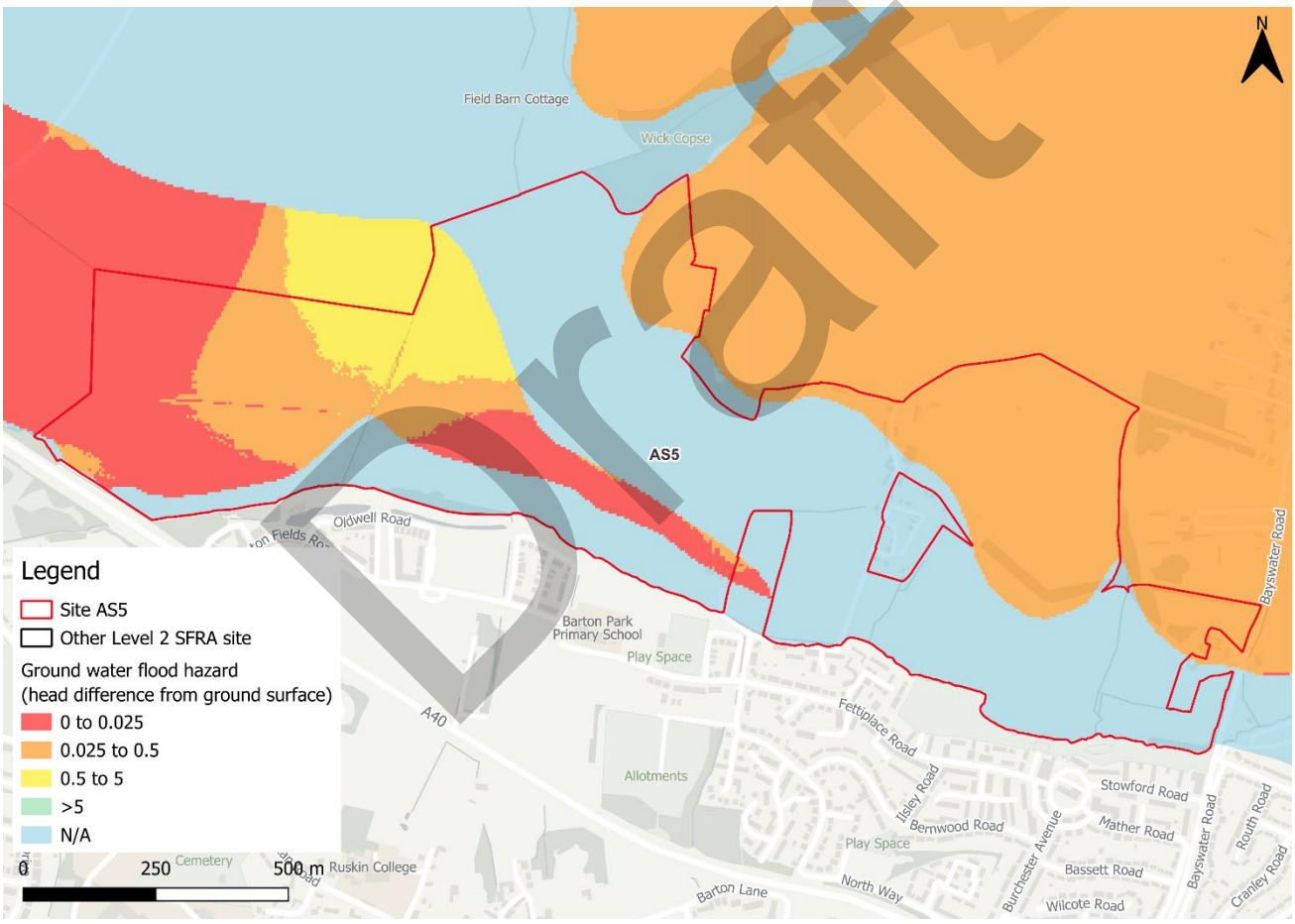

Figure 4-1: JBA 5m Groundwater Emergence Map

Table 4-1: Groundwater Emergence Hazard Classification

Groundwater head difference (m)*	Class label
0 to 0.025	Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
0.025 to 0.5	Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
0.5 to 5	Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event There is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely.
>5	Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event. Groundwater emergence is not likely.
N/A	No risk. This zone is deemed as having a negligible risk from groundwater emergence due to the nature of the local geological deposits.
*Difference is defined as ground surface in mAOD minus modelled groundwater table in mAOD.	

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The underlying bedrock within the site is predominantly mudstone, siltstone and sandstone. The north east of the site contains bedrock of limestone, sandstone, siltstone and mudstone (Figure 4-2). Other than sandstone, all these rocks generally have low levels of permeability. This leads to less water infiltrating into the ground and could potentially contribute to lower water table levels. The drainage strategy for the site should investigate water table levels and ground conditions to inform on appropriate SuDS.

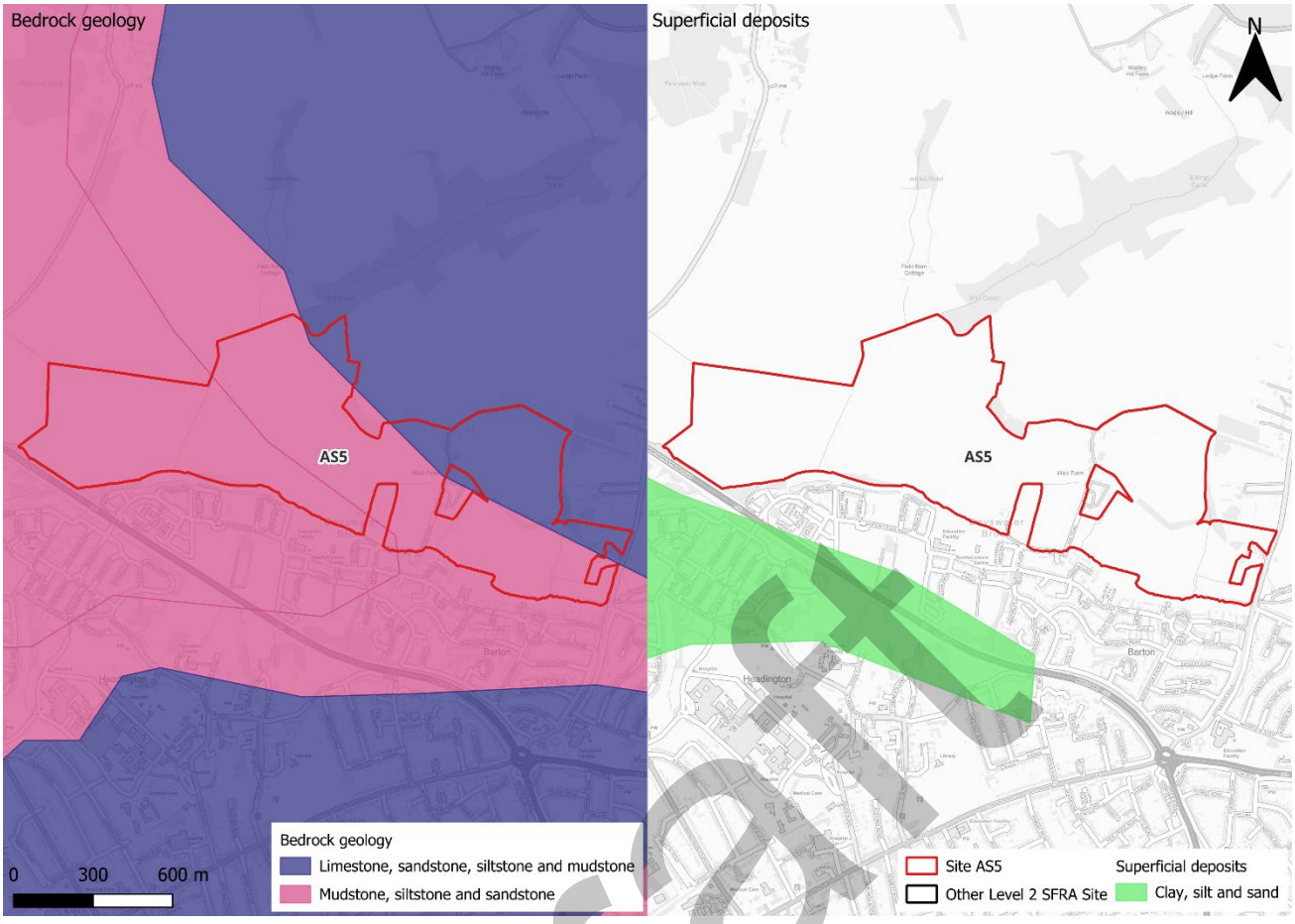

Figure 4-2: BGS Geology - Bedrock and superficial deposits

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5 Overall site assessment

5.1 Can part b) of the exception test be passed?

To pass part b) of the exception test[2], it must be proven that the development can be safe for its lifetime, which is 100 years for residential development, taking account of the vulnerability of its users, without increasing risk elsewhere, and, where possible, will reduce flood risk overall.

This site is required to pass the exception test as it is proposed for more vulnerable development within Flood Zone 3a. Based on current information, this site should be able to pass the exception test. However, all the recommendations suggested in this Level 2 SFRA should be considered at the site-specific FRA stage or before any site design planning.

5.2 Recommendations and site-specific FRA requirements

Based on the evidence presented in the Level 1 SFRA (2024), Level 1 SFRA Addendum (2026) and this Level 2 SFRA:

- The proposed development of the site would see a change in the risk classification from less vulnerable to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the site-specific FRA must show that the development can be designed to be safe for its lifetime and that there is adequate emergency planning provision (para 006 FRCC-PPG).
- This site could be allocated if development avoids the area at modelled fluvial and surface water risk. There should be no vulnerable development within the functional floodplain.
- There should be no development within 8m of Bayswater Brook apart from permitted access. The EA recommend for an 8m no development buffer for all main rivers to enable access for maintenance activities. This should be converted to a blue / green corridor to provide ecological, amenity and social value.
- Updated present day and climate change modelling of Bayswater Brook and Sydlings Brook should be used to update this Level 2 SFRA at the earliest opportunity to provide an up-to-date strategic assessment of flood risk to this site and the surrounding areas. It would be acceptable to use updated modelling to suitably assess risk through a site-specific FRA, as well as/instead of a Level 2 SFRA update.
- Were this site to be allocated based on current information, the LPA must make it clear that this site cannot be developed until the required information detailed in this SFRA on existing and future flood risk from Bayswater Brook and Sydlings Brook is fully ascertained.

[2] Policy F6 National Planning Policy Framework 2026

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- The drainage ditches should be kept in place and remain unobstructed. The watercourse should be maintained and included within the landscaping design of the residential development.
- A detailed drainage strategy will be required for any new development, given the large area of the site.
- Groundwater conditions must be investigated further.
- Opportunities for NFM features to reduce flood risk to the site and surrounding areas should be explored at the site-specific FRA stage.
- Given the historic flood risk to Barton Village Road, site design should aim to provide improvements to drainage within the site to reduce risk to the road.
- Any site-specific FRA should consider improvements within site design to reduce flood risk to Barton Village Road.
- Any site-specific FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; South Oxfordshire and Vale of White Horse District Councils Joint Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the site-specific FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; TW; the highways authorities; and the emergency services.

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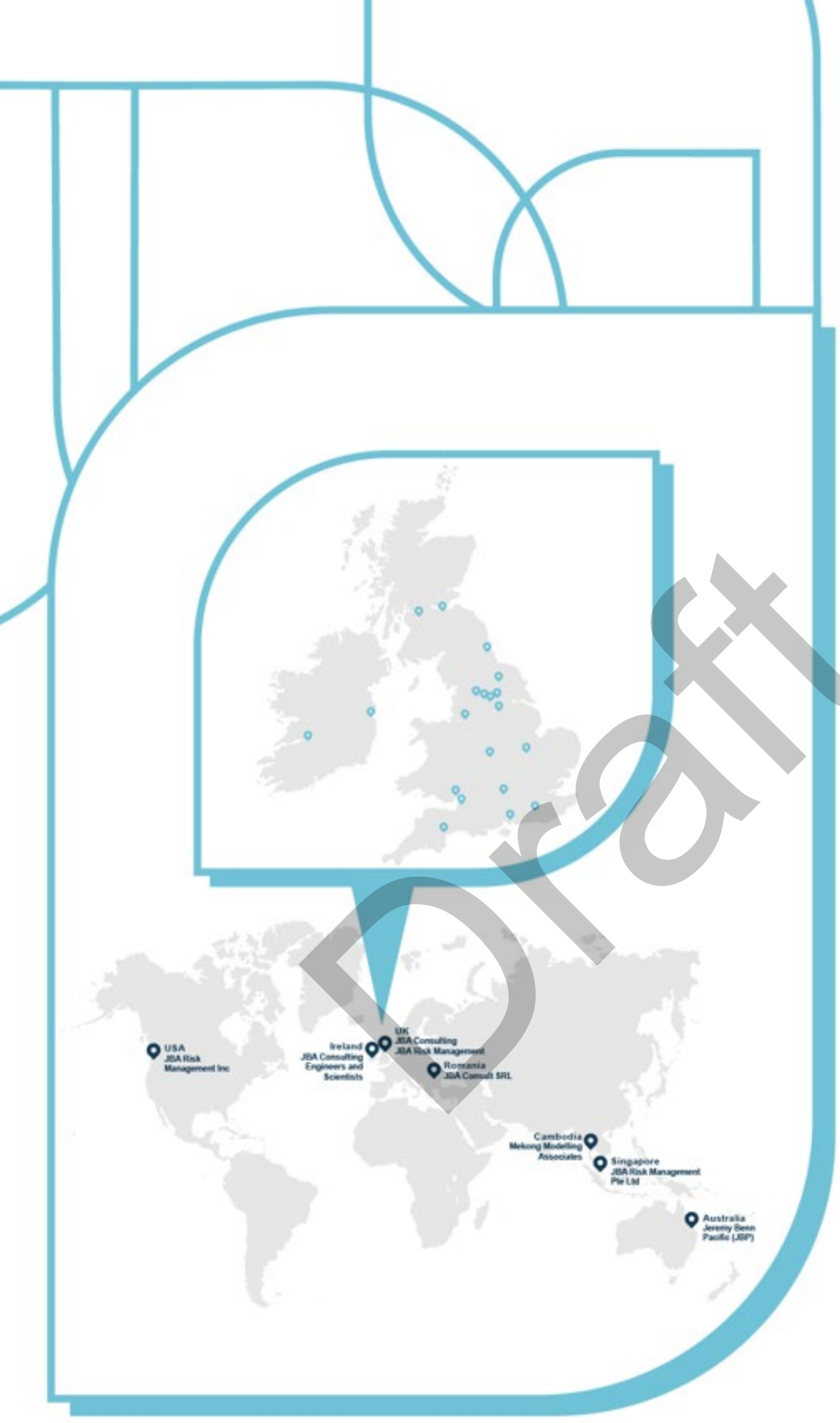

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JBA consulting

Offices at

Bristol
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1 Broughton Park
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BD23 3FD
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+44(0)1756 799919
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www.jbaconsulting.com
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South Oxfordshire and Vale of White Horse Level 2 Strategic Flood Risk Assessment Update

Site AS6 - Rich's Sidings and Broadway, Didcot

Draft Report

October 2026

Prepared for:

South Oxfordshire District Council and

Vale of White Horse District Council

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Prepared by	Boe Kilshaw BSc Assistant Analyst
Reviewed by	Laura Thompson-Jones BSc CGeog FRGS Senior Analyst
Authorised by	Mike Williamson BSc MSc CGeog FRGS EADA Project Director

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JBA Project Manager	Freya Nation
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2026s1132

This report describes work commissioned by South Oxfordshire and Vale of White Horse District Councils. The Client's representative for the contract was Rebekah Goodwill of South Oxfordshire and Vale of White Horse District Councils. Boe Kilshaw of JBA Consulting carried out this work.

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for South Oxfordshire and Vale of White Horse Joint Local Plan Site AS6 - Rich's Sidings and Broadway, Didcot. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA' (2024) and the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum' (2026), and read the 'South Oxfordshire and Vale of White Horse District Councils Level 2 SFRA Main Report Update' (2026) and is therefore familiar with the terminology used in this report.

1.1 Site AS6 - Rich's Sidings and Broadway, Didcot

- Location: Rich's Sidings and Broadway, Didcot (Figure 1-1)
- Existing site use: Brownfield; retail / commercial
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Mixed use; mainly residential and employment
- Proposed site use vulnerability: More vulnerable
- Site area: 2.96 ha
- Proposed development impermeable area: 2.6 ha (assumed 85% of site area)
- Watercourse: N/A
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for more detailed assessment through Level 2 SFRA (Strategic Recommendation B)
    - Assess present day and future modelled surface water depths, hazards

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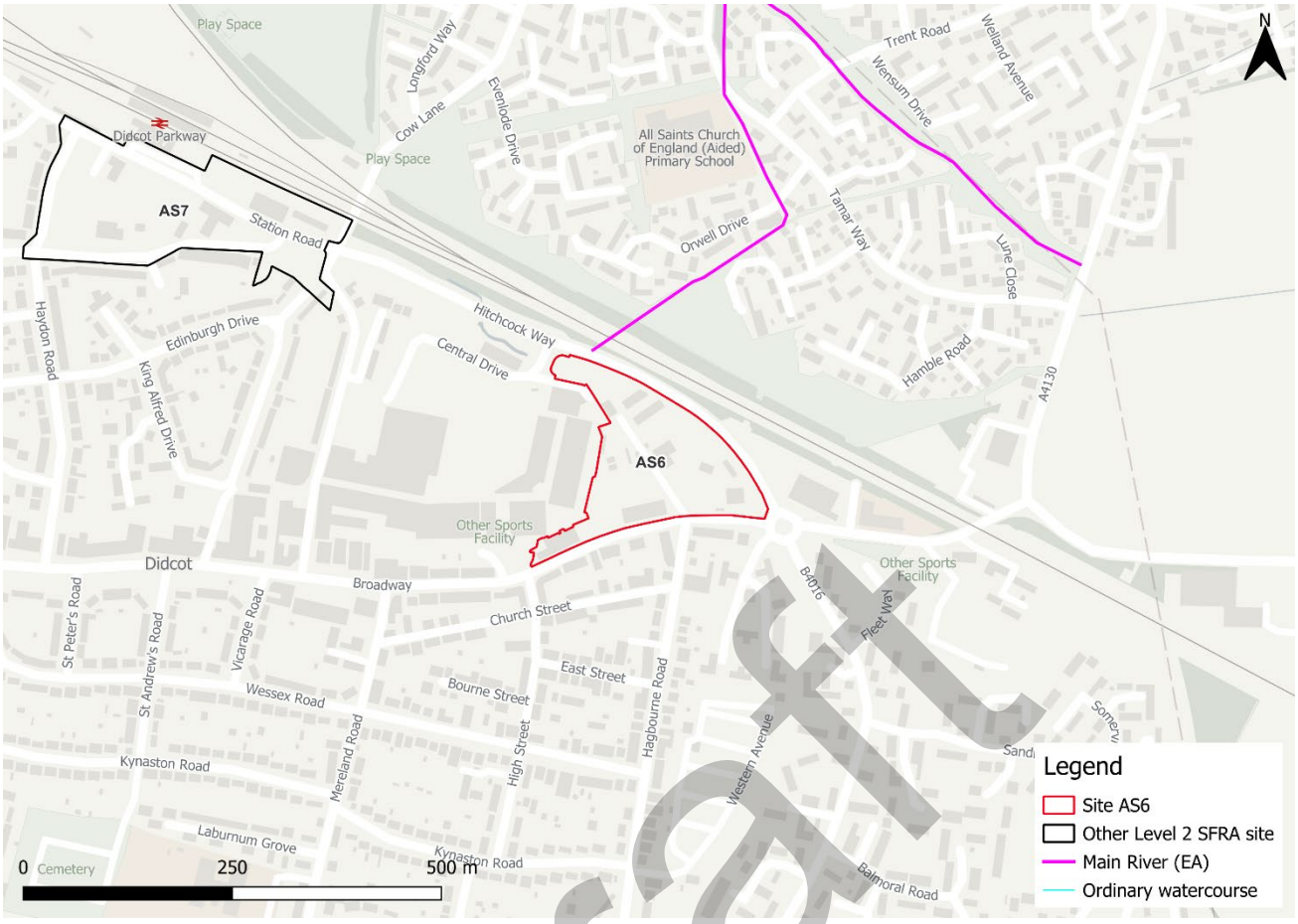

Figure 1-1: Site location

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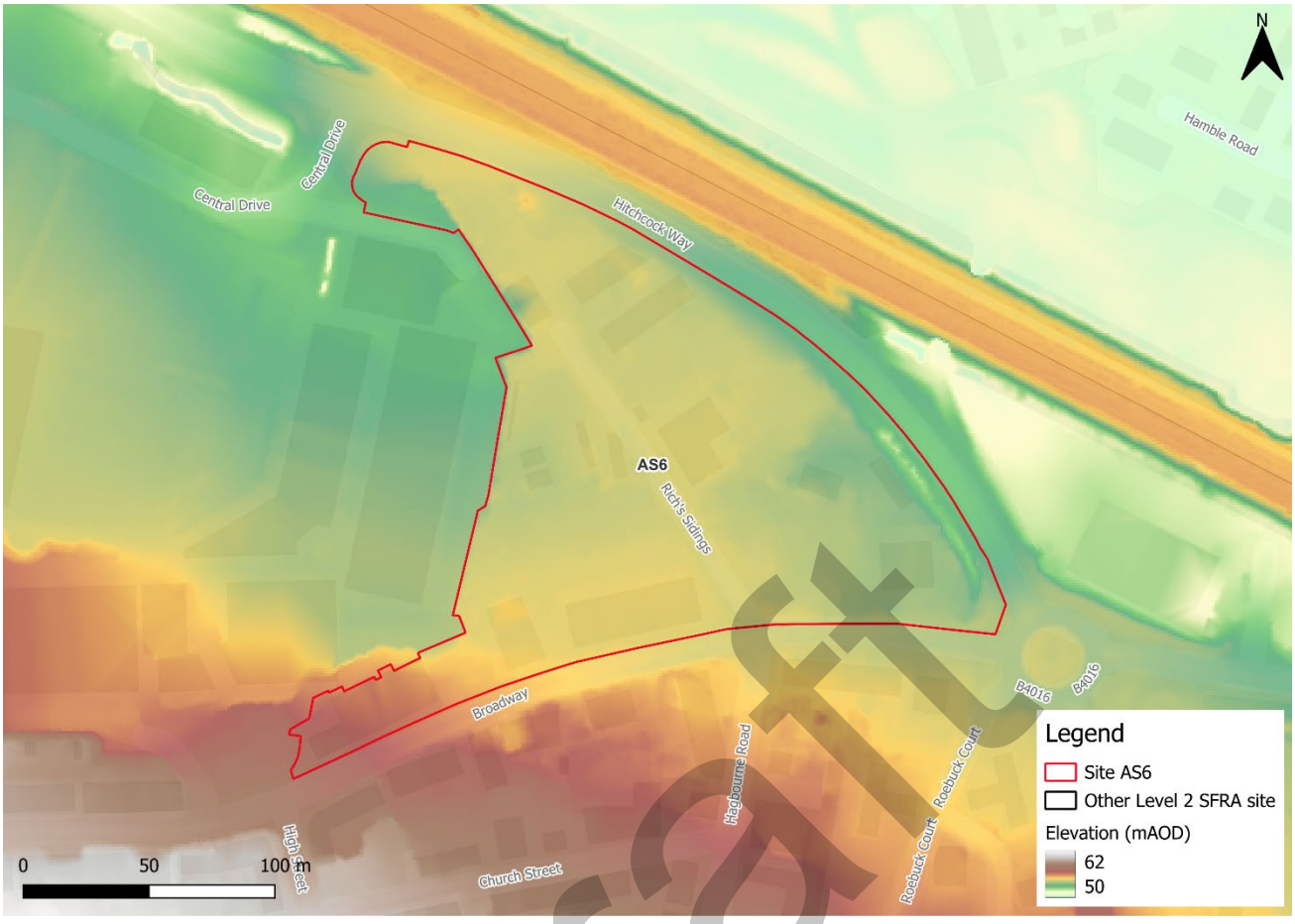

Figure 1-2: Topography

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2 Flood risk from rivers

2.1 Existing risk

2.1.1 Flood Map for Planning and functional floodplain

Based on the Environment Agency's (EA) Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum (2026), the percentage areas of the site within each flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.4).

The site is entirely within Flood Zone 1 and therefore at low risk of flooding from rivers.

Table 2-1: Existing flood risk based on percentage area of site at risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

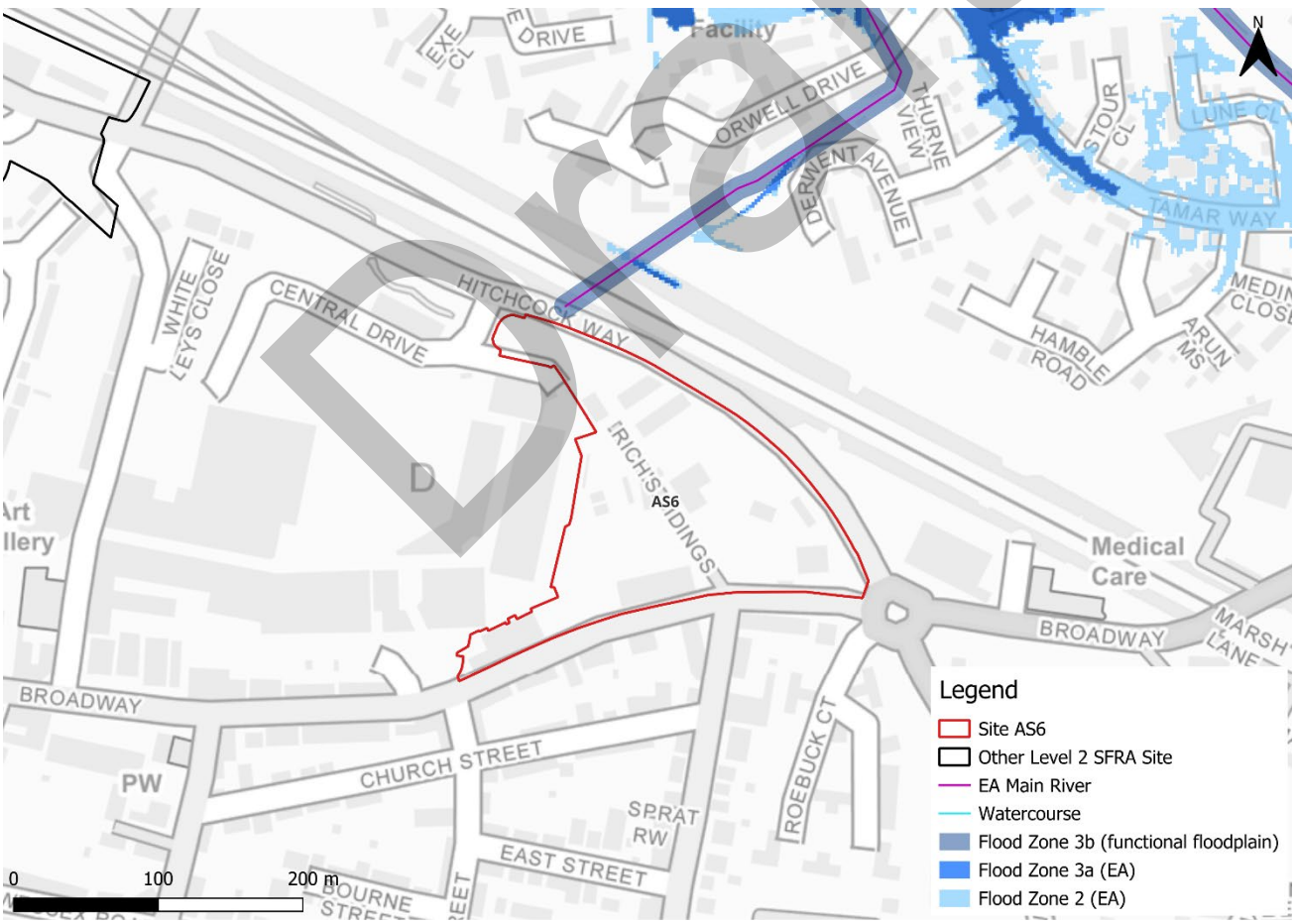

Figure 2-1: Existing risk from rivers to the site

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2.2 Impacts from climate change

2.2.1 Flood Map for Planning - Flood Zones plus Climate Change

The EA's Flood Map for Planning - Flood Zones plus Climate Change dataset shows the site is not at risk from fluvial climate change.

2.3 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

2.4 Flood risk management

The site doesn't benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

2.4.1 Cumulative impacts

A cumulative impact assessment was completed through the South Oxfordshire and Vale of White Horse Level 1 SFRA Addendum (2026), which aimed to identify catchments sensitive to the cumulative impact of development. Site AS6 (Rich's Sidings and Broadway, Didcot) is located within one catchment, namely; Moor Ditch and Ladygrove Ditch. This is ranked as a medium sensitivity catchment. Planning considerations for sites at medium sensitivity to the cumulative impacts of development can be found in Appendix D of the Level 1 SFRA Addendum. Cumulative impacts of development should also be considered as part of a site-specific FRA.

2.4.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. There are not any applicable areas that could benefit this site.

2.5 Residual risk

Although a site may be afforded some protection from defences and / or drainage infrastructure, there is always a residual risk of flooding from asset failure i.e. defence breaches, or blockages of culverts or drainage assets.

There are no assets with the potential to pose a residual risk to the site.

2.5.1 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. A "dry day" scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. A

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"wet day" scenario assumes a worst-case scenario where a reservoir releases water held on a "wet day" when local rivers have already overflowed their banks.

The site is not modelled to be at risk from reservoir flooding.

2.6 Emergency Planning

2.6.1 Flood warnings and alerts

There are no Flood Warning Areas (FWA) or Flood Alert Areas (FAA) within the vicinity of the site.

2.6.2 Access and escape routes

Safe access and escape routes should be achievable via Broadway to the south of the site. This route is indicated by the yellow line in Figure 2-2.

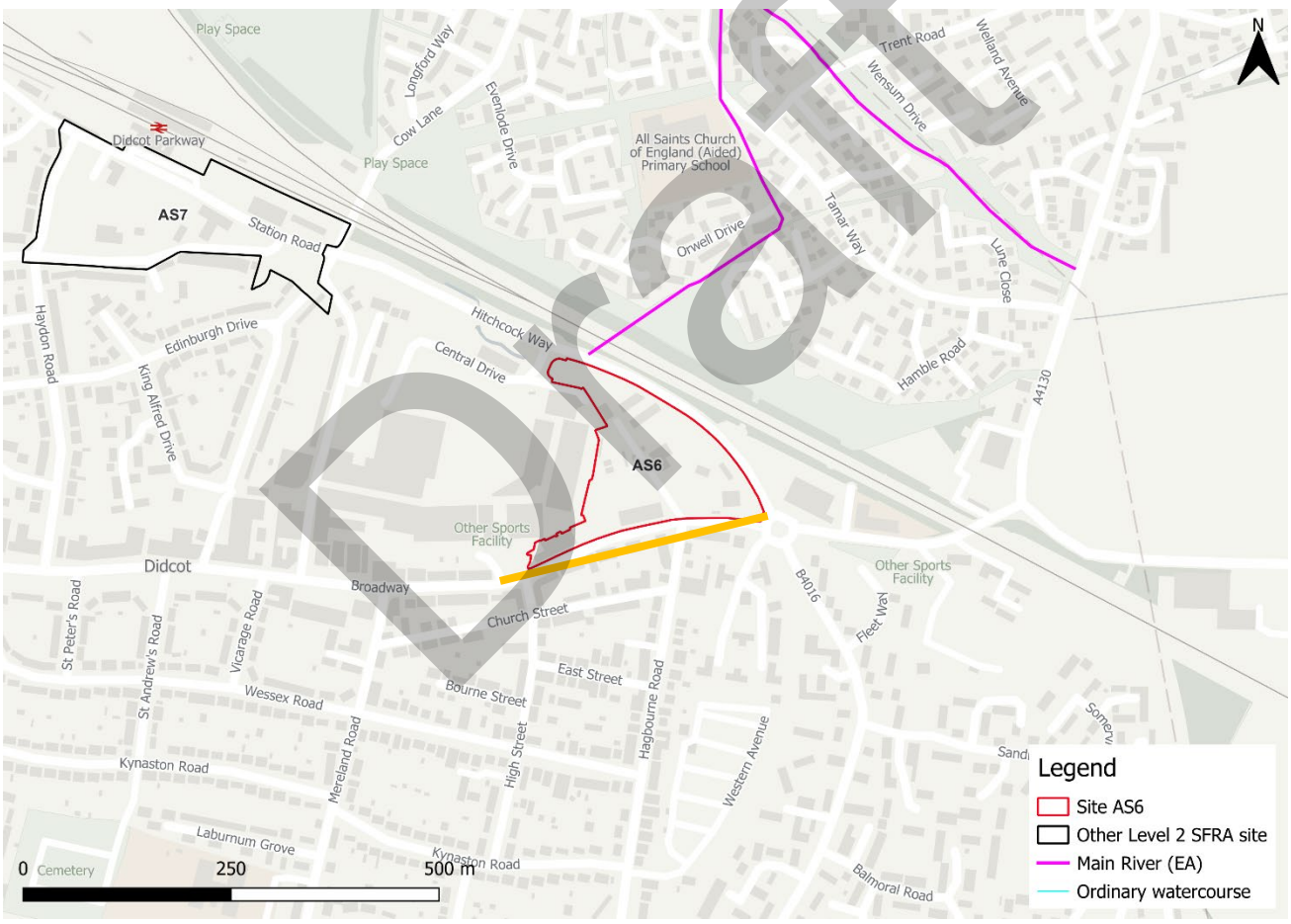

Figure 2-2: Potential access and escape routes

2.7 Observations, mitigation options, site suitability, sequential approach to development management - fluvial

- Observations:
  - The site is wholly within Flood Zone 1 and therefore at low risk of flooding from rivers.
  - The site is not shown to be at additional risk of fluvial flooding when considering climate change.
- Access and escape:
  - Safe access and escape routes can be achieved via Broadway to the south of the site.

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3 Flood risk from surface water

3.1 Existing risk

3.1.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths Present Day

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Extents Present Day map (September 2026), the site is predominantly at very low risk from surface water flooding, as shown in Table 3-1.

Surface water risk is largely confined to topographic low spots across the site, with a short flow path along the eastern boundary (Figure 3-1). Risk is constrained by the existing development within the site.

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Depth map, depths across the site are largely shallow, however the greatest depths are reaching 1.2m adjacent to Hitchcock Way (Figure 3-2).

Safe access and escape routes would likely be achievable via Broadway to the south of the site.

Table 3-1: Existing surface water flood risk based on percentage area at risk using the Flood Map for Planning - Surface Water Spatial Planning Extent Present Day map

Less than 0.1% AEP event (% area)	0.1% AEP event (% area)	1% AEP event (% area)	3.3% AEP event (% area)
92	3	1	4

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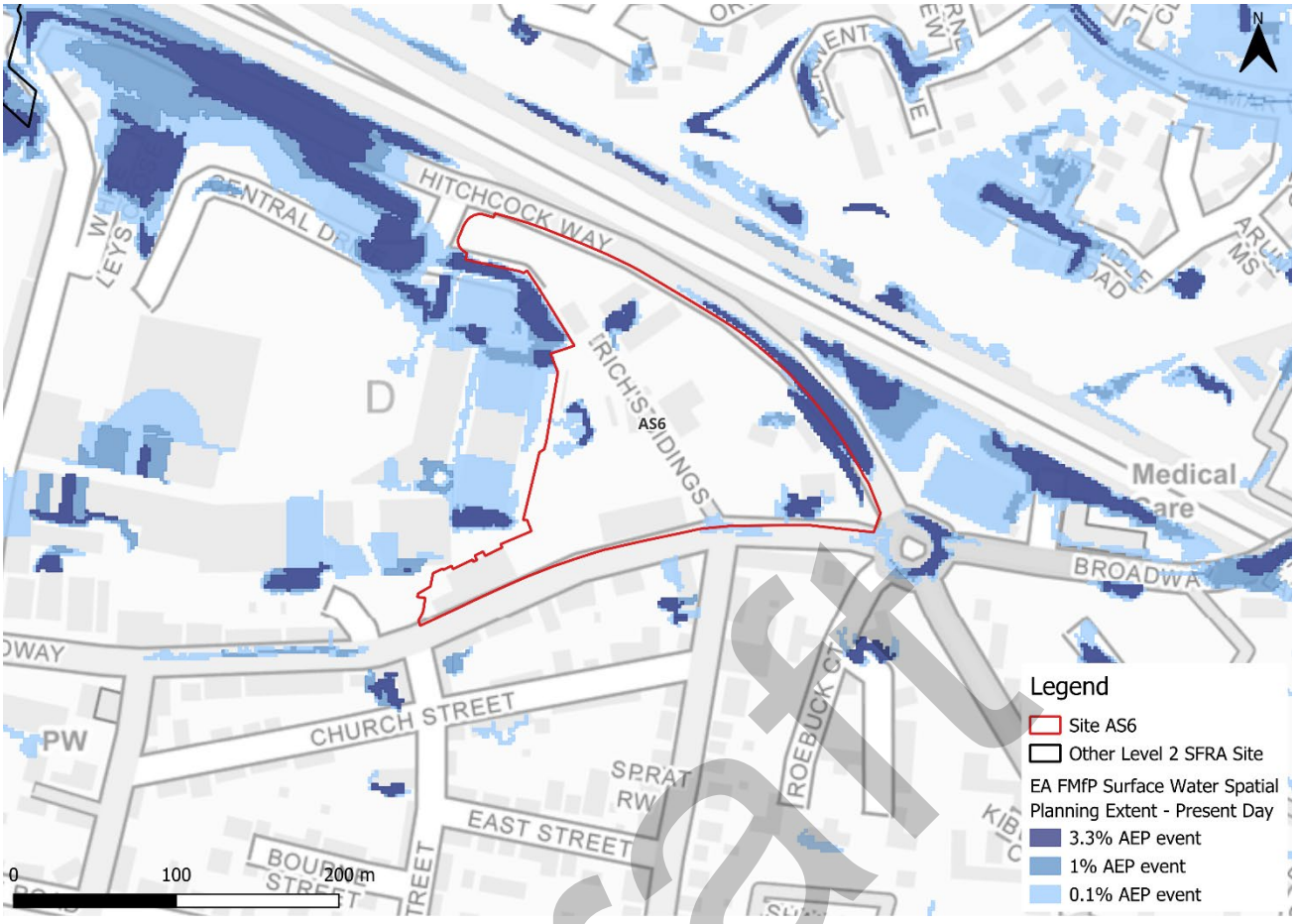

Figure 3-1: Flood Map for Planning - Surface Water Spatial Planning Extents Present Day

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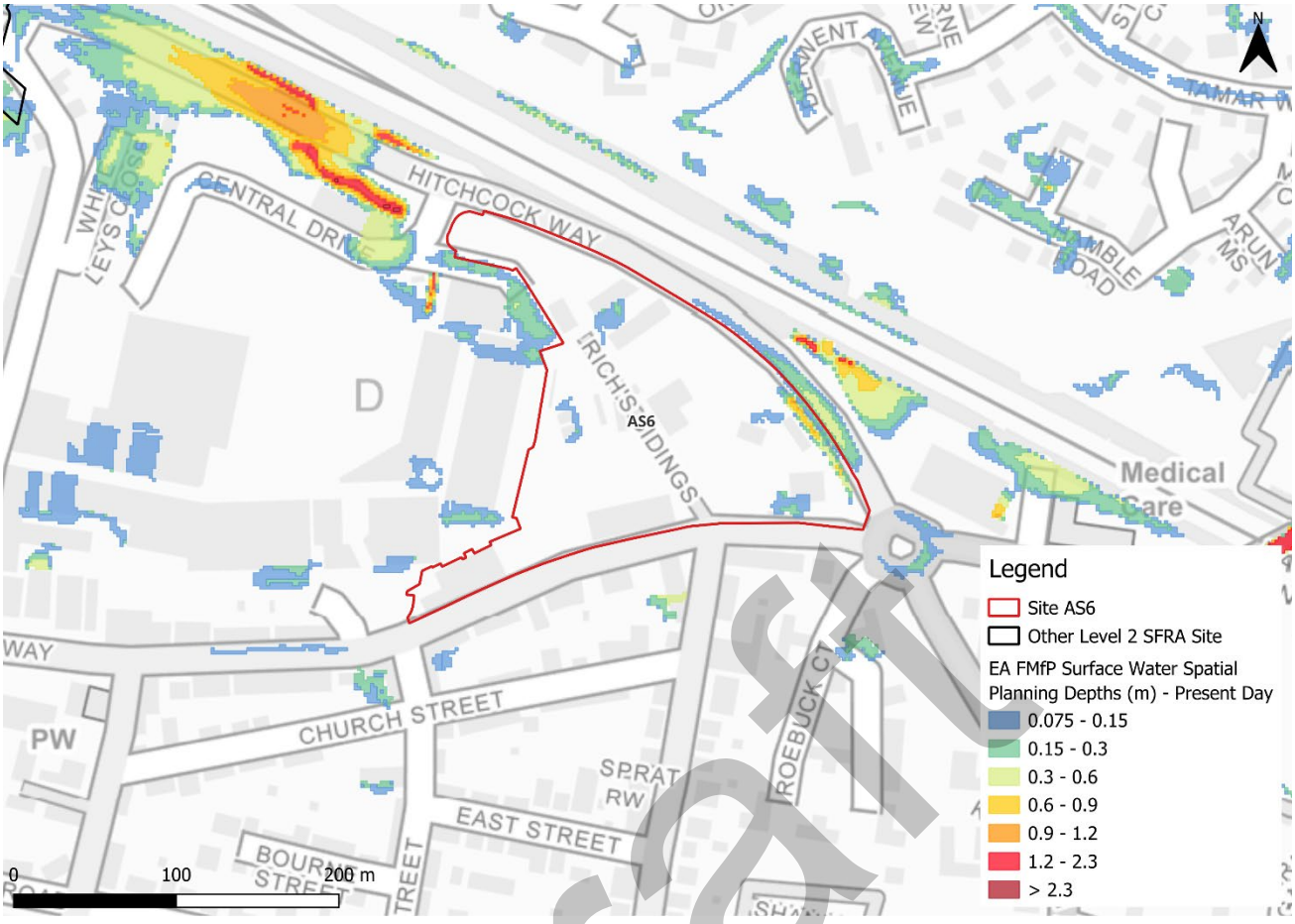

Figure 3-2: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Present Day for the 1% AEP event

3.1.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning data does not include hazard information suitable for planning purposes. Therefore, this Level 2 SFRA considers the third generation Risk of Flooding from Surface Water (RoFSW) hazard mapping in addition to the Flood Map for Planning - Surface Water Spatial Planning extents and depths, as the best available information. Updated surface water hazard information should be confirmed at the site-specific FRA stage.

Based on the EA's national scale third generation RoFSW map, the greatest flood hazard within the site in the medium event is categorised as 'significant' (Figure 3-3).

There are differences between the Flood Map for Planning - Surface Water Spatial Planning map and the third generation RoFSW hazard mapping. The Flood Map for Planning - Surface Water Spatial Planning data does not map flooding less than 0.075m (7.5cm) in depth. Therefore, where the map may show no flooding, there may be shallow flooding up to a depth of 0.075m. In contrast, the third generation RoFSW does not map flooding with a hazard rating of less than 0.575. This could explain the differences observed between the Flood Map for Planning and third generation RoFSW maps.

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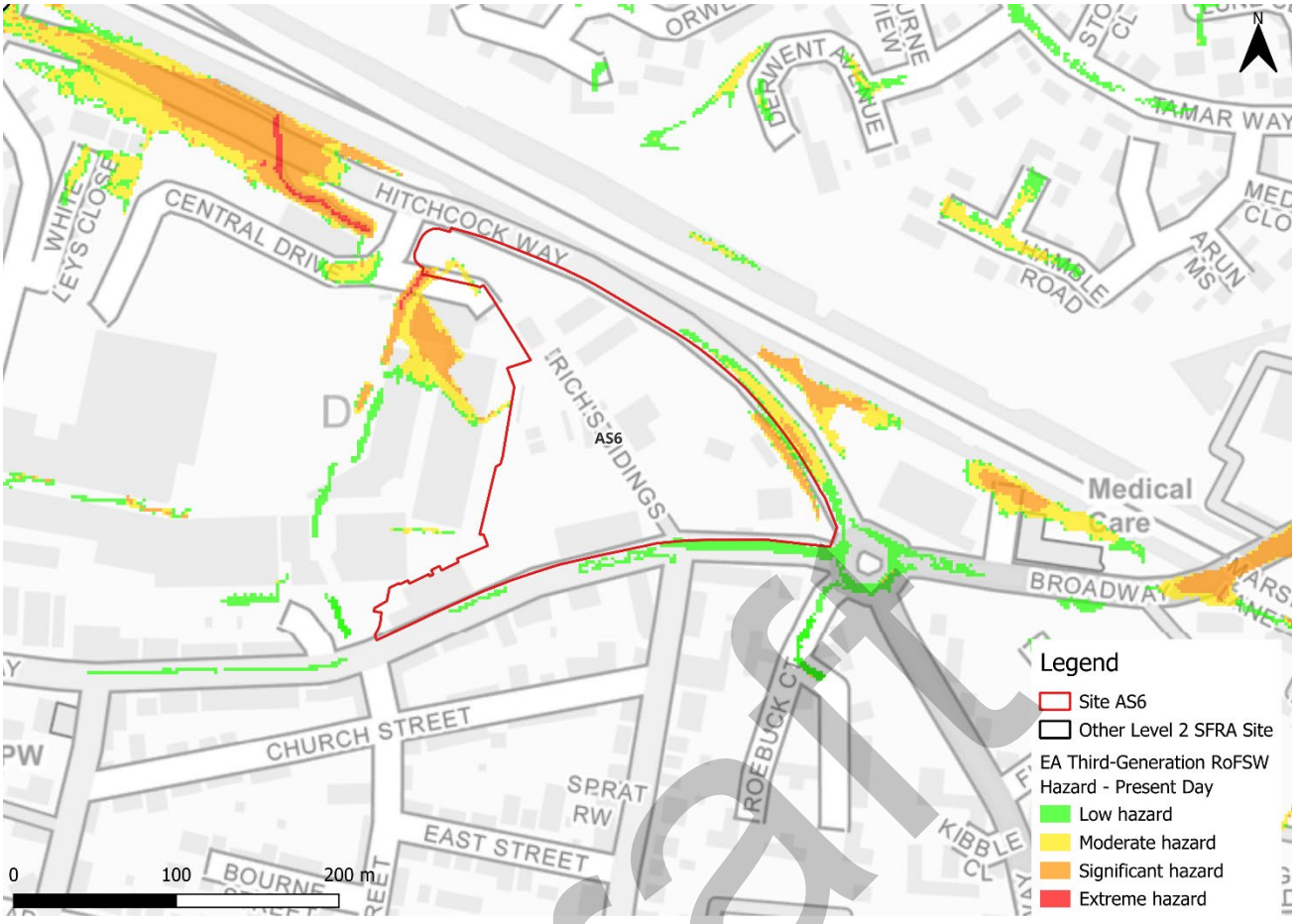

Figure 3-3: Third generation - Risk of Flooding from Surface Water map present day 1% AEP event surface water flood hazard[1]

3.2 Impacts from climate change

3.2.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths

The EA's climate change allowance guidance states that SFRA's should assess the upper end peak rainfall allowance for the 2070s epoch. This dataset is included in the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Climate Change dataset (September 2026). The peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment are shown in Table 3-2. The allowance for the 0.1% AEP event is not stated in the EA guidance.

1 Based on Section 7.5 Hazard rating. What is the Risk of Flooding from Surface Water map? Report version 2.0. April 2019. Environment Agency

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Table 3-2: Peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment

Return period	Central allowance 2070s (% increase)	Upper end allowance 2070s (% increase)
3.3% AEP	25	35
1% AEP	25	40

Figure 3-4 shows the surface water flood extents for the 2070s upper end climate change scenario. Surface water flood risk is modelled to increase in extent with climate change in all events. The greatest surface water flood depths are shown in remain at up to 1.2m within the east of the site, however largely remain shallow (Figure 3-5).

Safe access and escape routes would likely remain achievable via Broadway to the south of the site.

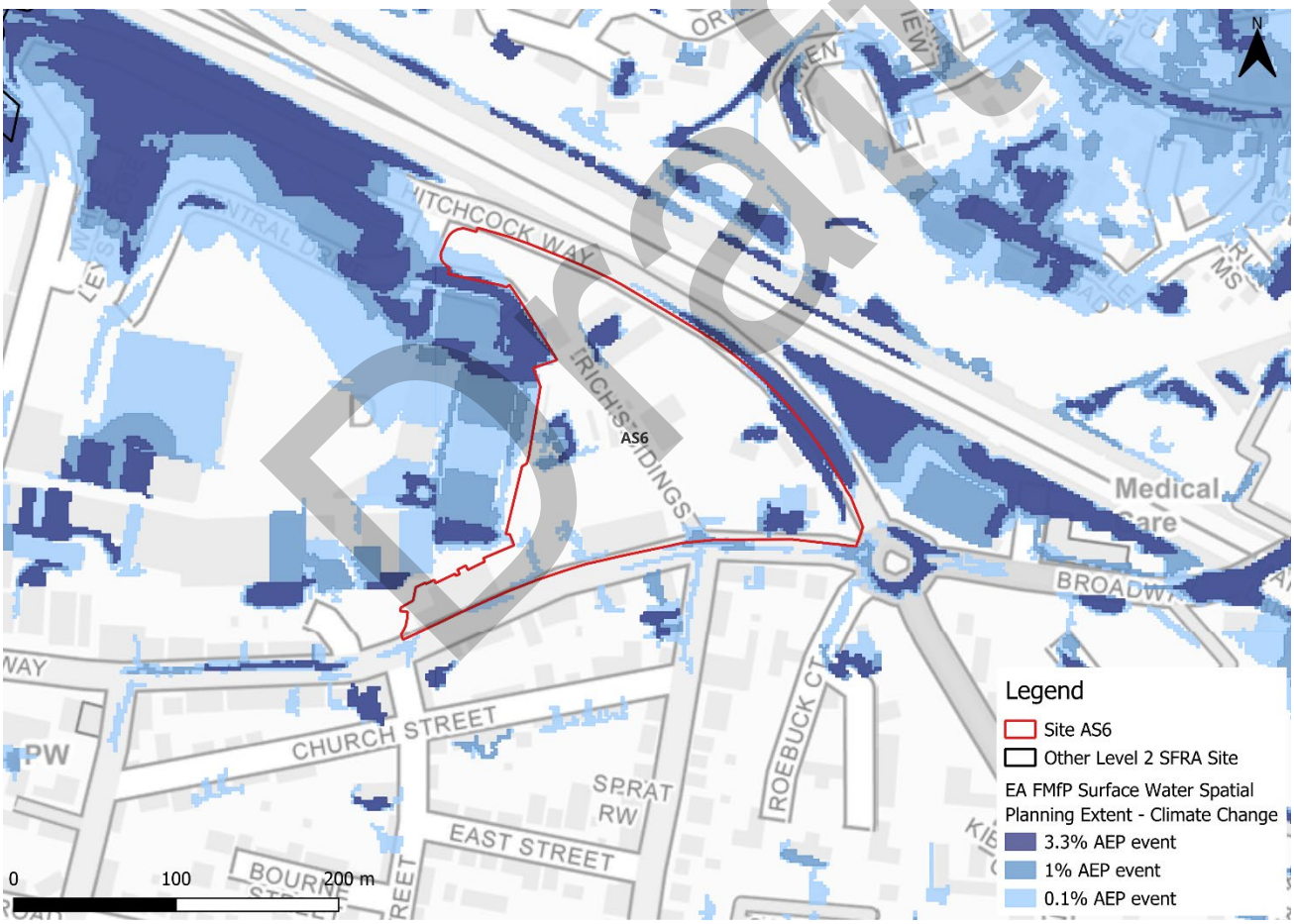

Figure 3-4: Flood Map for Planning- Surface Water Spatial Planning Extents Climate Change (2070s Upper End)

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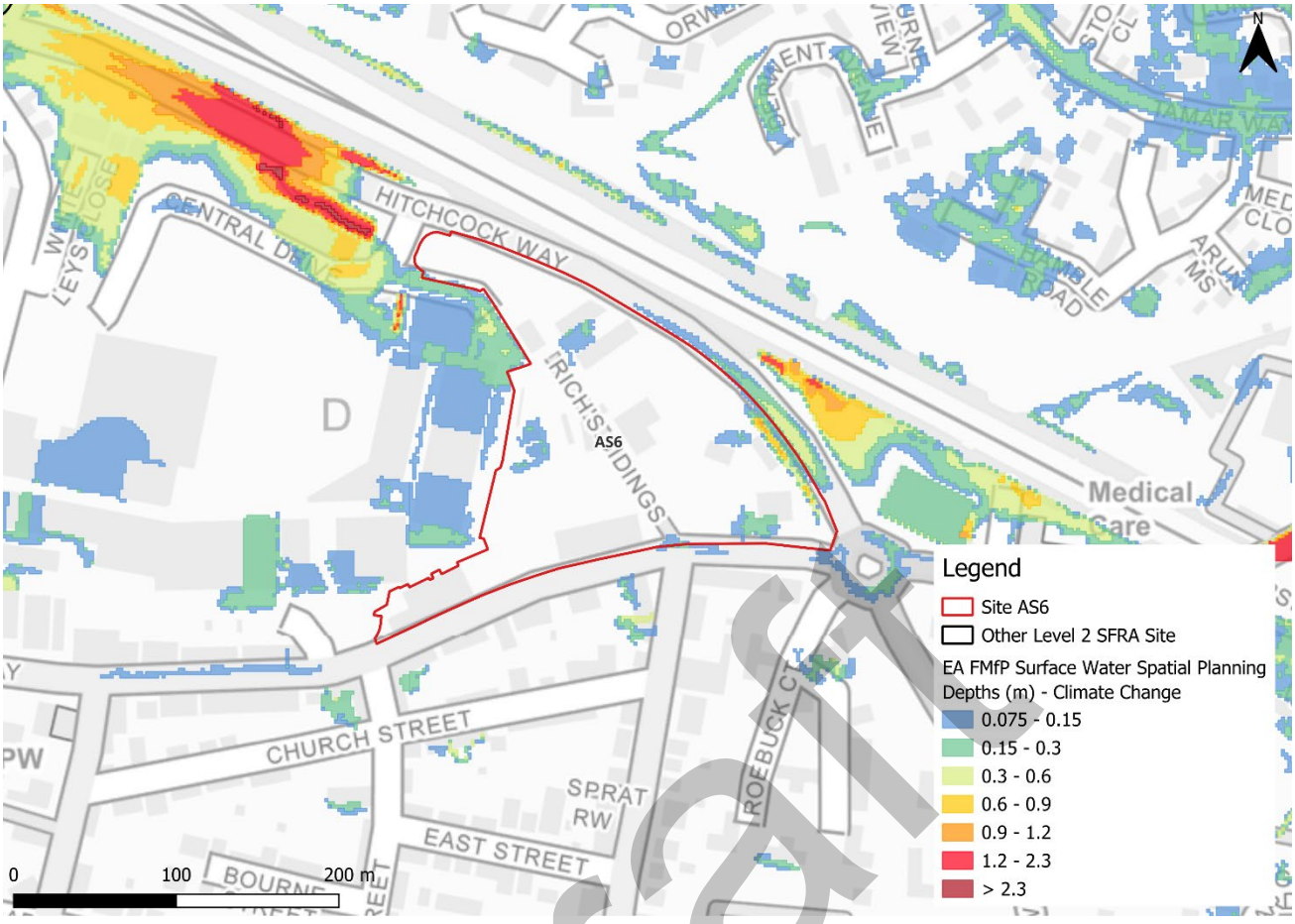

Figure 3-5: Flood Map for Planning- Surface Water Spatial Planning Depths (m) Climate Chane for the 1% AEP event (2070s Upper End)

3.2.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning climate change data does not include hazard information suitable for planning purposes. This Level 2 SFRA therefore considers the RoFSW low risk surface water event as a conservative proxy for the medium risk event plus climate change, as the best available information to assess surface water flood hazards. The impact of climate change on surface water flood hazards should be considered at the site-specific FRA stage.

Using the RoFSW low risk event as a proxy, future surface water flood hazard in the medium risk event is categorised as 'significant' (Figure 3-6).

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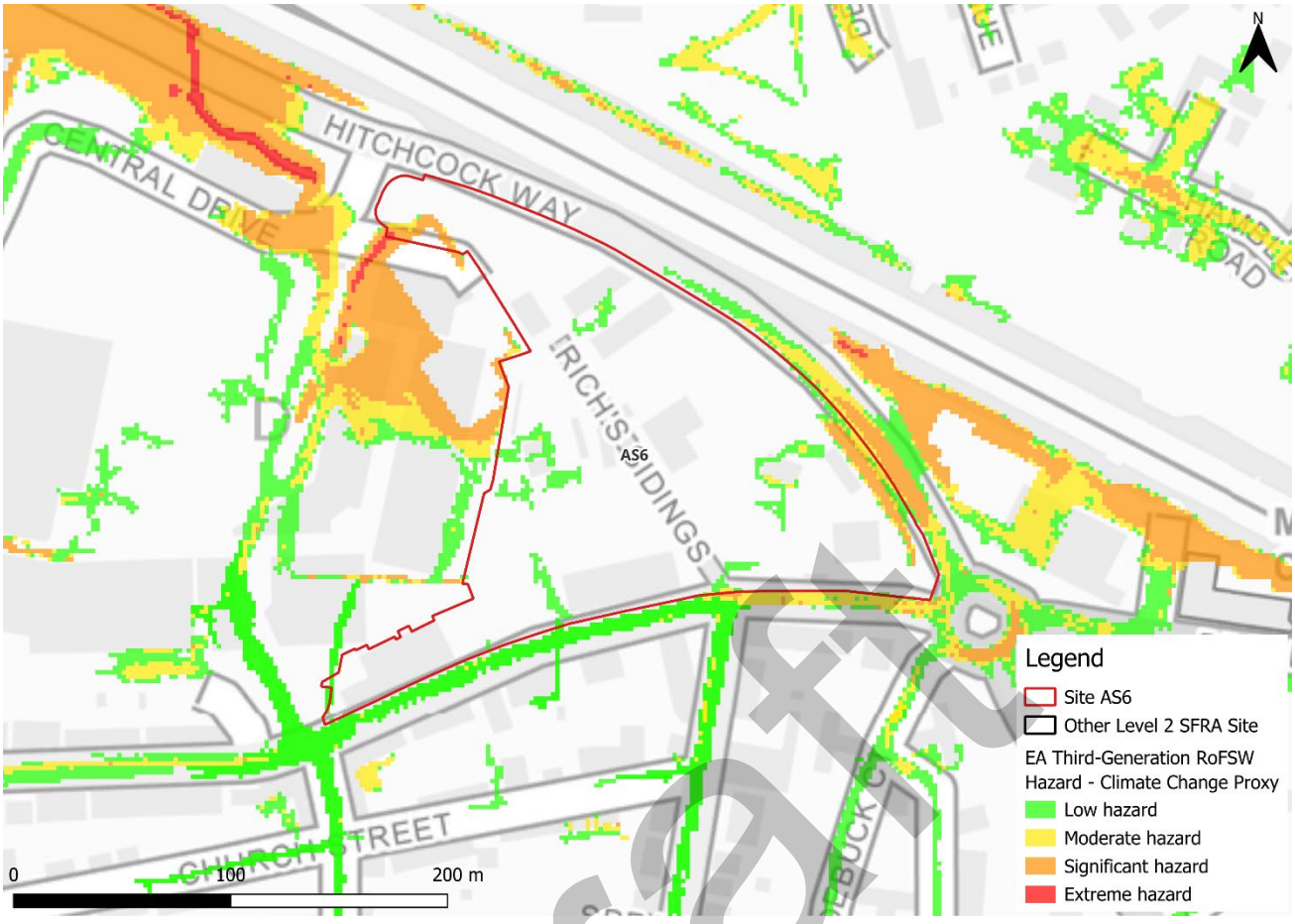

Figure 3-6: Low risk event surface water flood hazard[1], as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options, site suitability, sequential approach to development management - surface water

- Current risk to the site is predominantly very low, with 92% of the site being outside of the 0.1% AEP surface water flood extent. Surface water risk is largely confined to a flow path along the eastern boundary of the site, with some scattered areas of ponding in all events.
- When considering climate change, risk is largely similar to the present day events, with a greater extent of ponding in topographic low spots.
- Topographic low spots and flow paths should be considered and included in site design and ideally left in place to flood naturally when required.
- If any structures are demolished for new development, a drainage strategy would therefore be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA. The developer should also follow the National SuDS guidance.
- Assessment of the current drainage system in place should be carried out to ascertain any current capacity issues and whether the current system could

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accommodate the proposed development or whether further capacity will be required.

- Safe access and escape routes could likely be achieved via Broadway to the south of the site.

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4 Groundwater, geology and SuDS suitability

Risk of groundwater emergence is assessed in this SFRA using JBA's 5m Groundwater Emergence Map. Figure 4-1 shows the map covering the site and the surrounding areas. Table 4-1 explains the risk classifications.

The entirety of the site is in an area where there is negligible groundwater emergence risk. Groundwater conditions may therefore be suited to infiltration SuDS.



Figure 4-1: JBA 5m Groundwater Emergence Map

Table 4-1: Groundwater Emergence Hazard Classification

Groundwater head difference (m)*	Class label
0 to 0.025	Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
0.025 to 0.5	Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
0.5 to 5	Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event There is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely.
>5	Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event. Groundwater emergence is not likely.
N/A	No risk. This zone is deemed as having a negligible risk from groundwater emergence due to the nature of the local geological deposits.
*Difference is defined as ground surface in mAOD minus modelled groundwater table in mAOD.	

The underlying bedrock within the site is mudstone, sandstone, and limestone (Figure 4-2). Other than sandstone, all these rocks generally have low levels of permeability. This leads to less water infiltrating into the ground and could potentially contribute to lower water table levels.

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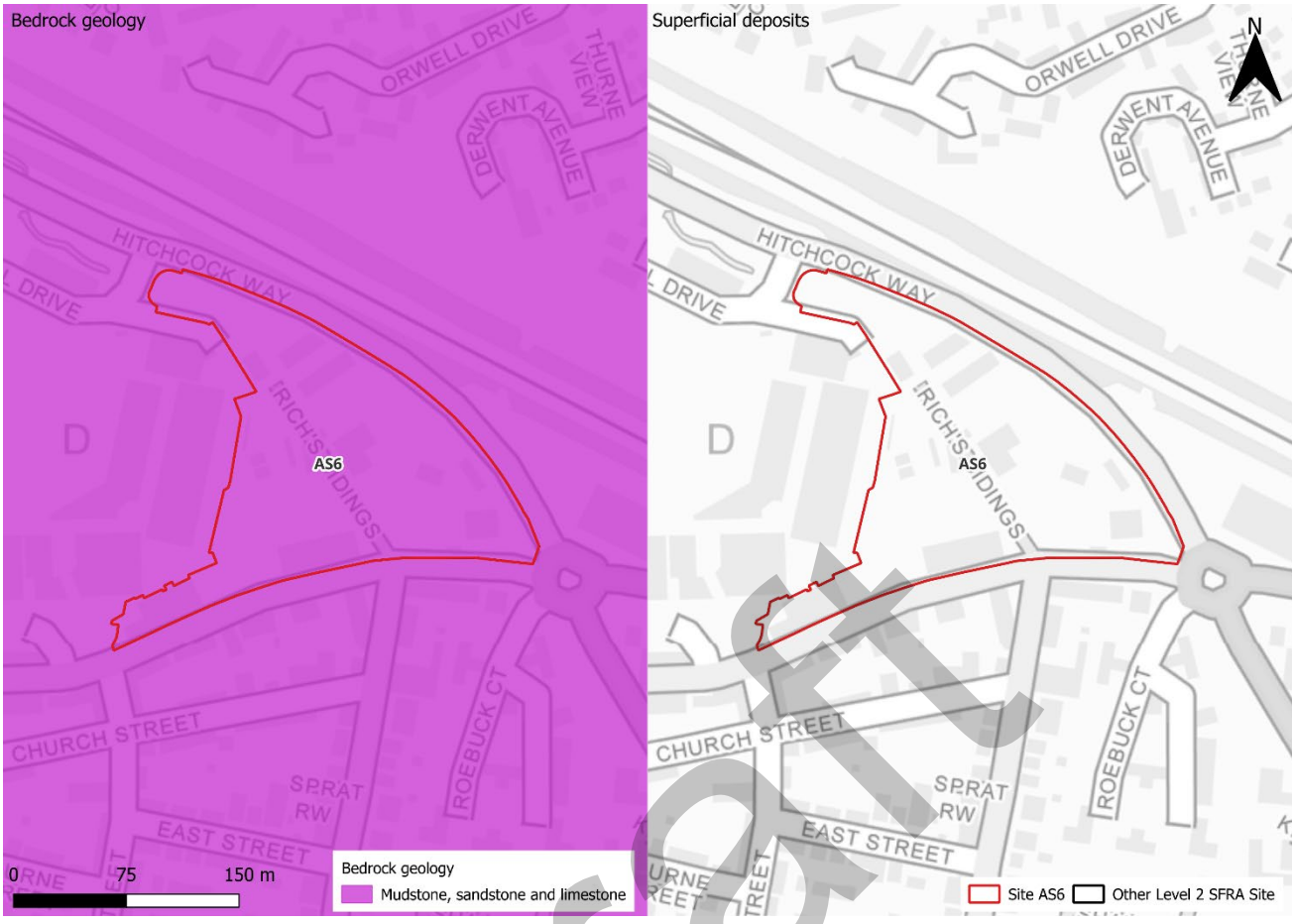

Figure 4-2: BGS Geology - Bedrock and superficial deposits

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5 Overall site assessment

5.1 Can part b) of the exception test be passed?

To pass part b) of the exception test[2], it must be proven that the development can be safe for its lifetime, which is 100 years for residential development and 75 years for non-residential development, taking account of the vulnerability of its users, without increasing risk elsewhere, and, where possible, will reduce flood risk overall. The site is not required to pass the exception test as it is not located within Flood Zone 3a.

5.2 Recommendations and site-specific FRA requirements

Based on the evidence presented in the Level 1 SFRA (2024), Level 1 SFRA Addendum (2026) and this Level 2 SFRA:

- The proposed development of the site would see a change in the risk classification from less vulnerable to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the site-specific FRA must show that the development can be designed to be safe for its lifetime and that there is adequate emergency planning provision (para 014 FRCC-PPG).
- The surface water risk on the short flow path should remain as open greenspace and be allowed to flood. A surface water drainage strategy, proportionate to the risk, will be required to show that surface water flood risk can be managed onsite.
- The Groundwater Flood Map (Figure 4-1) indicates that ground conditions may be suitable for infiltration SuDS. This should be further explored through an appropriate ground survey as part of the site-specific FRA and drainage strategy.
- It is assumed the current structures will be demolished for new housing units. A drainage strategy would therefore be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. Runoff rates should return to greenfield rates, to reduce flood risk downstream. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA.
- Any site-specific FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; South Oxfordshire and Vale of White Horse District Councils Joint Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the site-specific FRA process, consultation should be carried out with the following, where applicable: the LPA; LLFA; emergency planning officers; EA; TW; the highways authorities; and the emergency services.

[2] Policy F6 National Planning Policy Framework 2026

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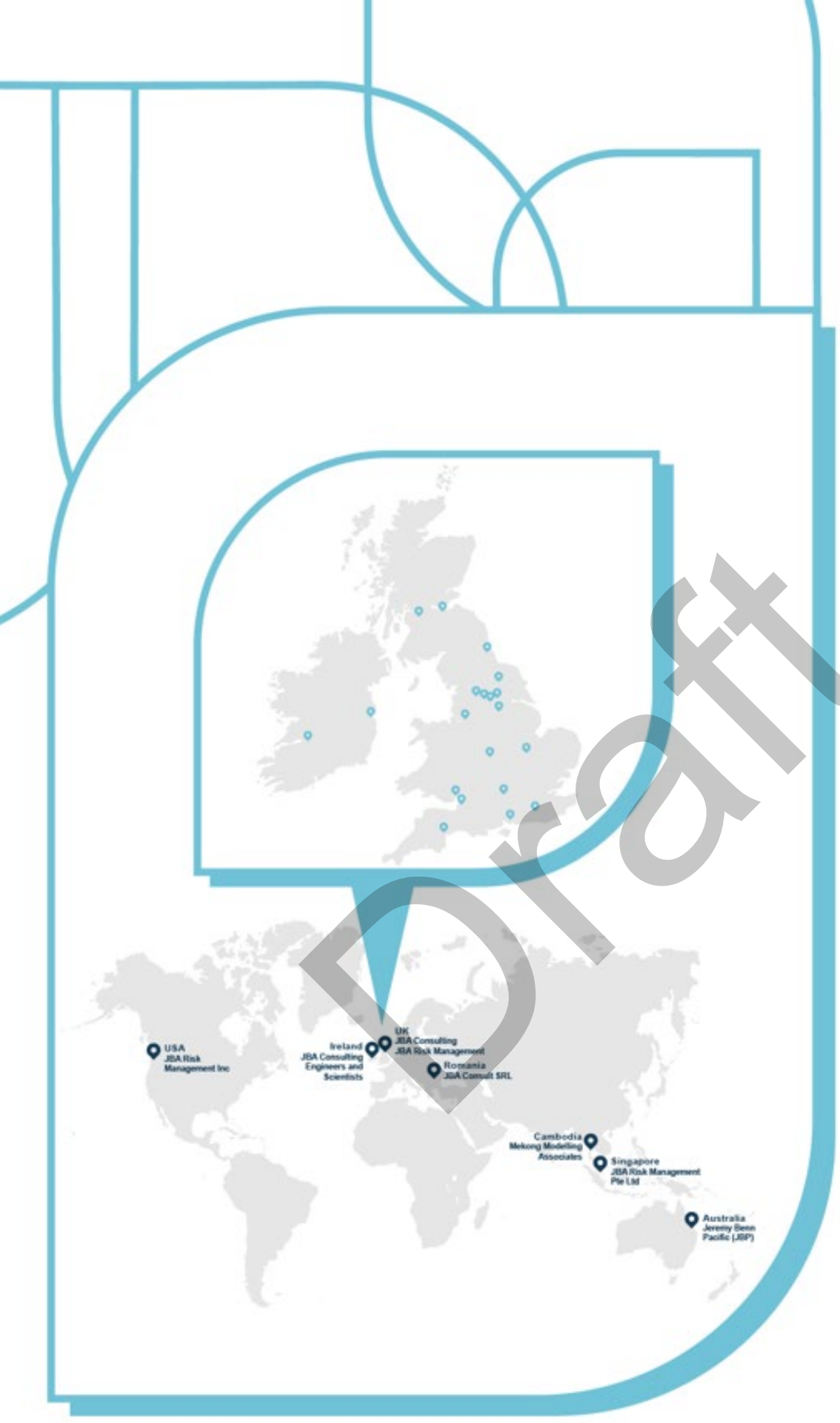

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Warrington

Registered Office
1 Broughton Park
Old Lane North
Broughton
SKIPTON
North Yorkshire
BD23 3FD
United Kingdom

+44(0)1756 799919
info@jbaconsulting.com
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Site AS7 - Didcot Gateway, Didcot

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Authorised by	Mike Williamson BSc MSc CGeog FRGS EADA Project Director

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JBA Project Manager	Freya Nation
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2026s1132

This report describes work commissioned by South Oxfordshire and Vale of White Horse District Councils. The Client's representative for the contract was Rebekah Goodwill of South Oxfordshire and Vale of White Horse District Councils. Boe Kilshaw of JBA Consulting carried out this work.

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for South Oxfordshire and Vale of White Horse Joint Local Plan Site AS7 - Didcot Gateway, Didcot. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA' (2024) and the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum' (2026), and read the 'South Oxfordshire and Vale of White Horse District Councils Level 2 SFRA Main Report Update' (2026) and is therefore familiar with the terminology used in this report.

1.1 Site AS7 - Didcot Gateway, Didcot

- Location: Didcot Gateway, Didcot (Figure 1-1)
- Existing site use: Brownfield; commercial and car park
- Existing site use vulnerability: Less Vulnerable
- Proposed site use: Mixed use; mainly residential and employment
- Proposed site use vulnerability: More Vulnerable
- Site area: 4.34 ha
- Proposed development impermeable area: 3.7 ha (assumed 85% of site area)
- Watercourse: N/A
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for more detailed assessment through Level 2 SFRA (Strategic Recommendation B)
    - Site has partial planning permission
    - Assess present day and future surface water depths, hazards

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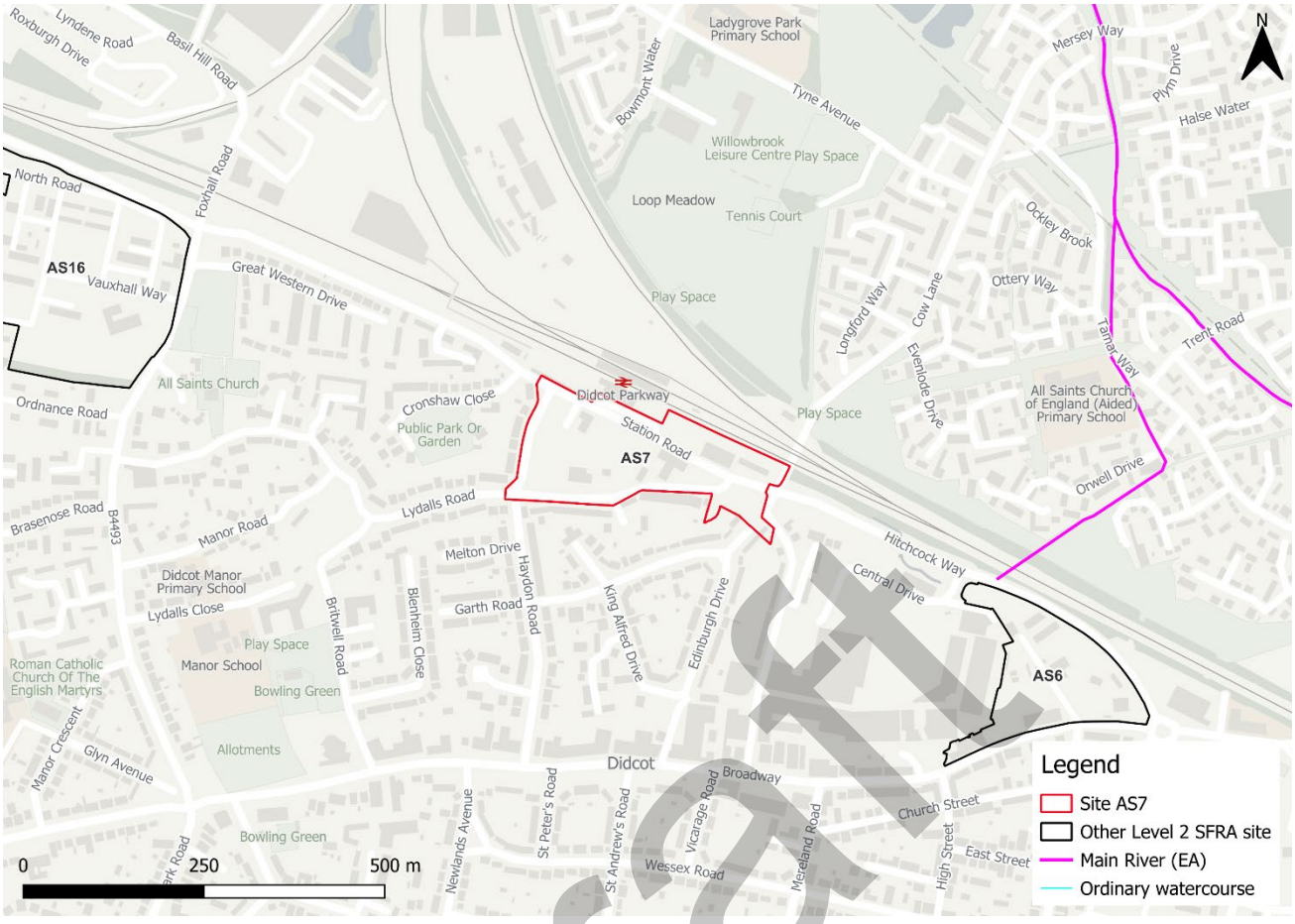

Figure 1-1: Site location

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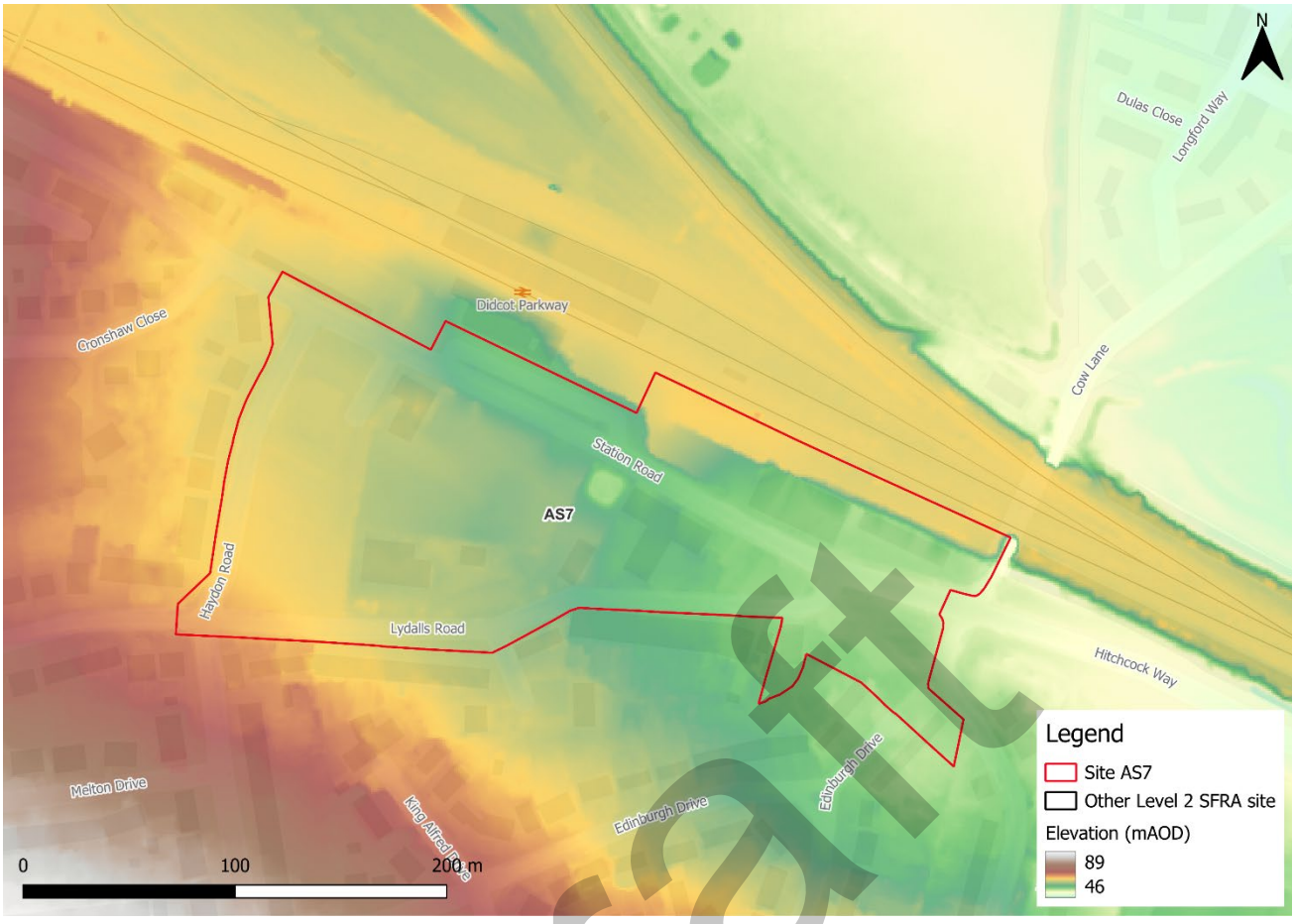

Figure 1-2: Topography

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2 Flood risk from rivers

2.1 Existing risk

2.1.1 Flood Map for Planning and functional floodplain

Based on the Environment Agency's (EA) Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum (2026), the percentage areas of the site within each flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.4).

The site is entirely within Flood Zone 1 and therefore at low risk of flooding from rivers.

Table 2-1: Existing flood risk based on percentage area of site at risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

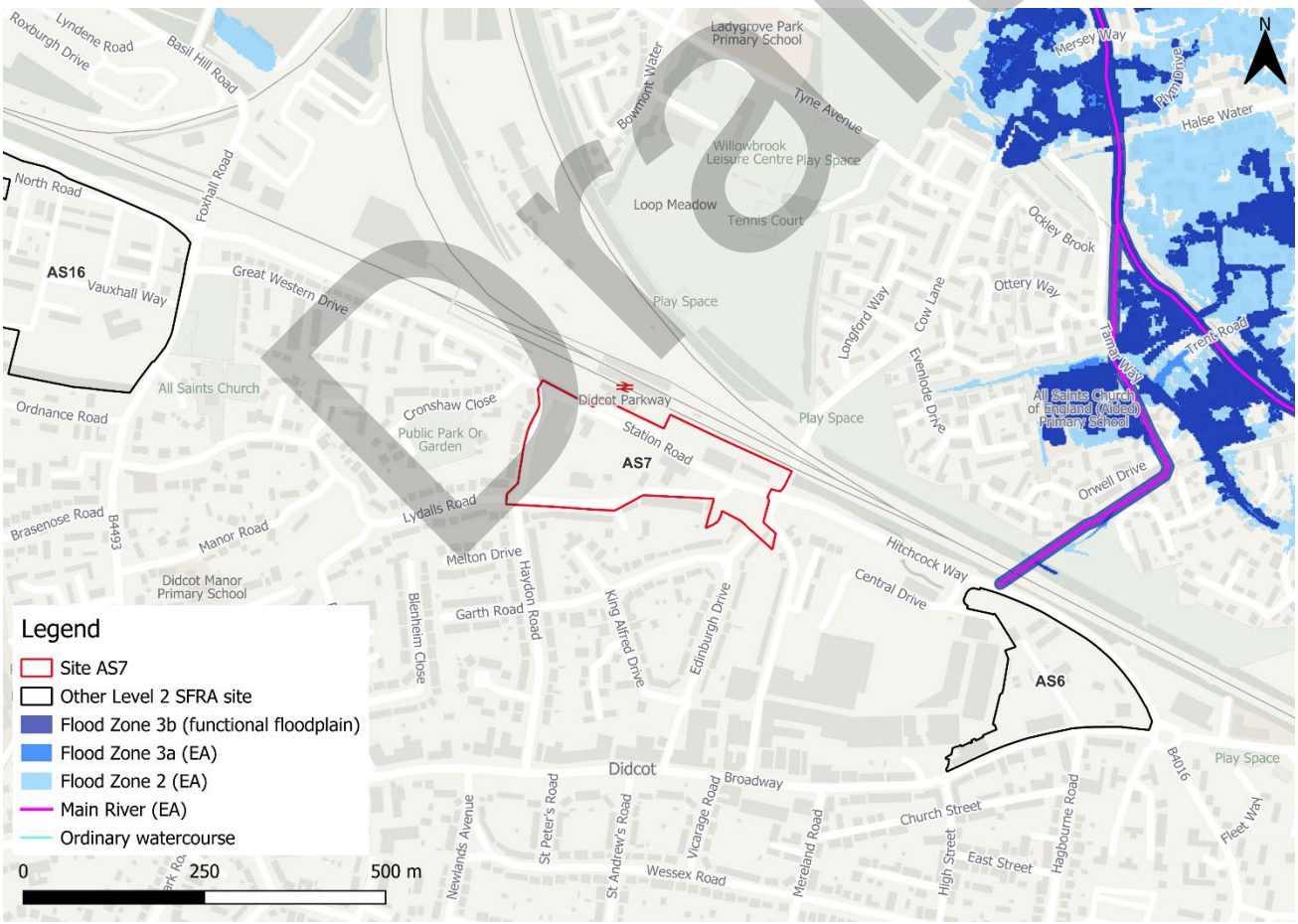

Figure 2-1: Existing risk from rivers to the site

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2.2 Impacts from climate change

2.2.1 Flood Map for Planning - Flood Zones plus Climate Change

The EA's Flood Map for Planning - Flood Zones plus Climate Change dataset shows the site is not at risk from fluvial climate change.

2.3 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

The LPA historic flood records indicate that flooding has been experienced at the end of Edinburgh Drive, along the boundary of the site, in 2016. Additionally, it is noted that Didcot railway station experienced flooding in 2018.

2.4 Flood risk management

The site doesn't benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

2.4.1 Cumulative impacts

A cumulative impact assessment was completed through the South Oxfordshire and Vale of White Horse Level 1 SFRA Addendum (2026), which aimed to identify catchments sensitive to the cumulative impact of development. Site AS7 (Didcot Gateway, Didcot) is located within one catchment, namely; Moor Ditch and Ladygrove Ditch. This is ranked as a medium sensitivity catchment. Planning considerations for sites at medium sensitivity to the cumulative impacts of development can be found in Appendix D of the Level 1 SFRA Addendum. Cumulative impacts of development should also be considered as part of a site-specific FRA.

2.4.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. There are not any applicable areas that could benefit this site.

2.5 Residual risk

Although a site may be afforded some protection from defences and / or drainage infrastructure, there is always a residual risk of flooding from asset failure i.e. defence breaches, or blockages of culverts or drainage assets.

There are no assets with the potential to pose a residual risk to the site

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2.5.1 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. A "dry day" scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. A "wet day" scenario assumes a worst-case scenario where a reservoir releases water held on a "wet day" when local rivers have already overflowed their banks.

The site is not modelled to be at risk from reservoir flooding.

2.6 Emergency Planning

2.6.1 Flood warnings and alerts

There are no Flood Warning Areas (FWA) or Flood Alert Areas (FAA) within the vicinity of the site.

2.6.2 Access and escape routes

Safe access and escape routes should be achievable via Lydalls Road and Haydon Road to the south of the site. These routes are indicated by the yellow lines in Figure 2-2.

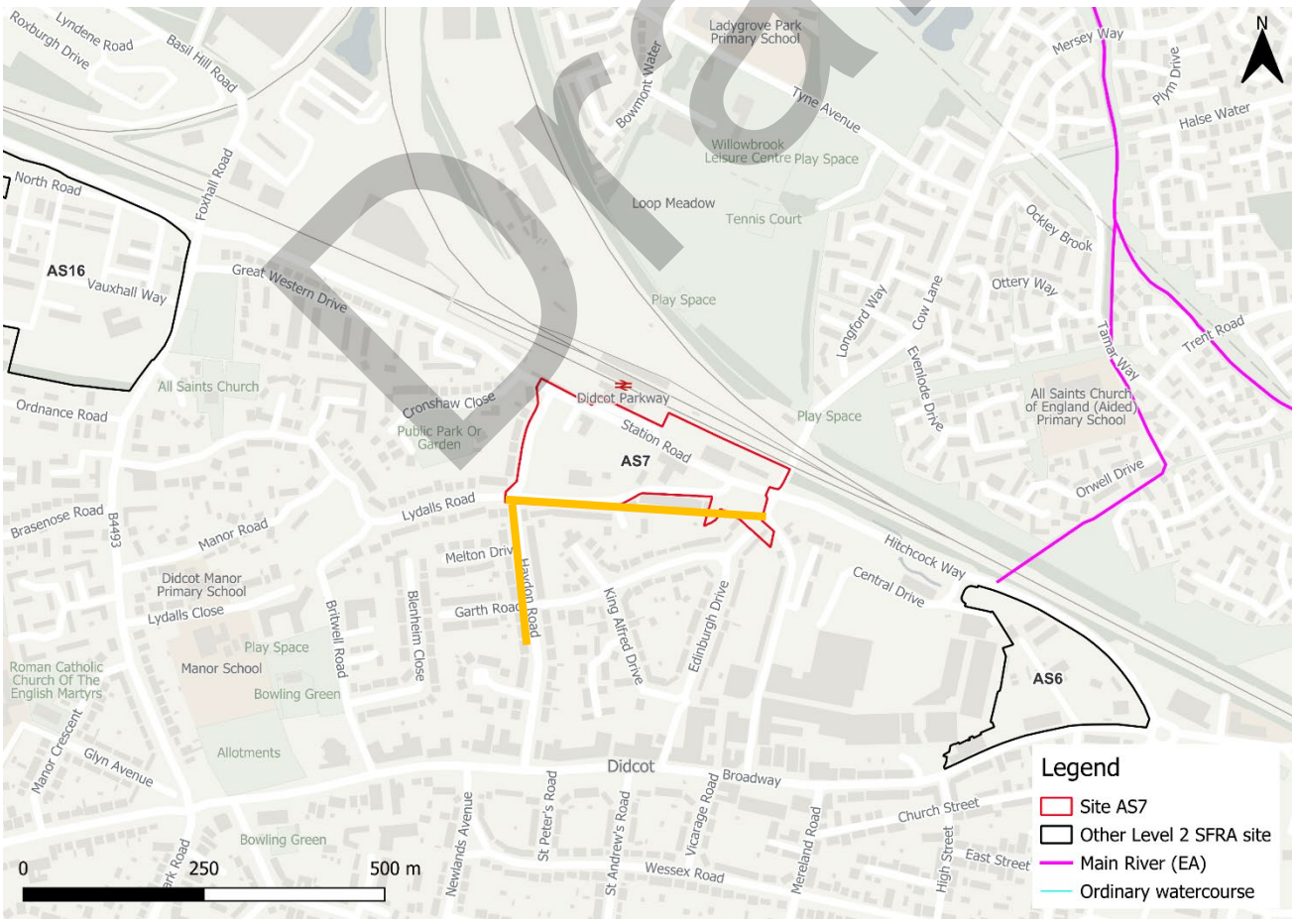

Figure 2-2: Potential access and escape routes

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2.7 Observations, mitigation options, site suitability, sequential approach to development management - fluvial

- Observations:
  - The site is wholly within Flood Zone 1 and therefore at low risk of flooding from rivers.
  - The site is not shown to be at additional risk of fluvial flooding when considering climate change.
- Access and escape:
  - Safe access and escape routes should be achievable via Lydalls Road and Haydon Road to the south of the site .

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3 Flood risk from surface water

3.1 Existing risk

3.1.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths Present Day

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Extents Present Day map (September 2026), the majority of the site is at very low to low risk from surface water flooding, as shown in Table 3-1.

Surface water risk is largely confined to the hardstanding roads through the site, with an area of ponding in the centre of the site (Figure 3-1). Surface water risk is constrained by the existing development within the site.

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Depth map, depths are largely shallow, with depths of up to 0.6m along Station Road to the north of the site (Figure 3-2).

Safe access and escape routes would likely be achievable via Lydalls Road and Haydon Road to the south of the site.

Table 3-1: Existing surface water flood risk based on percentage area at risk using the Flood Map for Planning - Surface Water Spatial Planning Extent Present Day map

Less than 0.1% AEP event (% area)	0.1% AEP event (% area)	1% AEP event (% area)	3.3% AEP event (% area)
73	12	7	8

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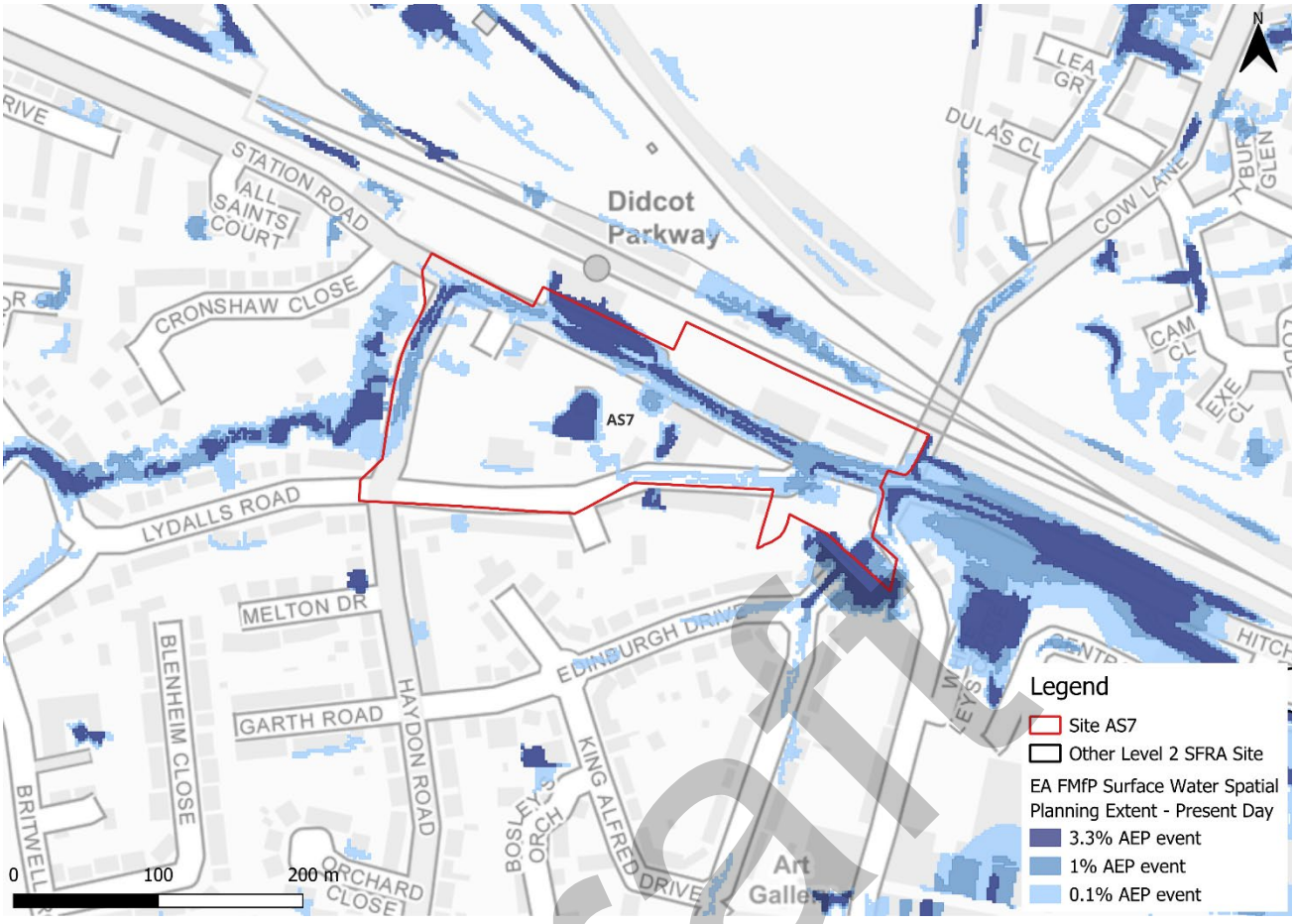

Figure 3-1: Flood Map for Planning - Surface Water Spatial Planning Extents Present Day

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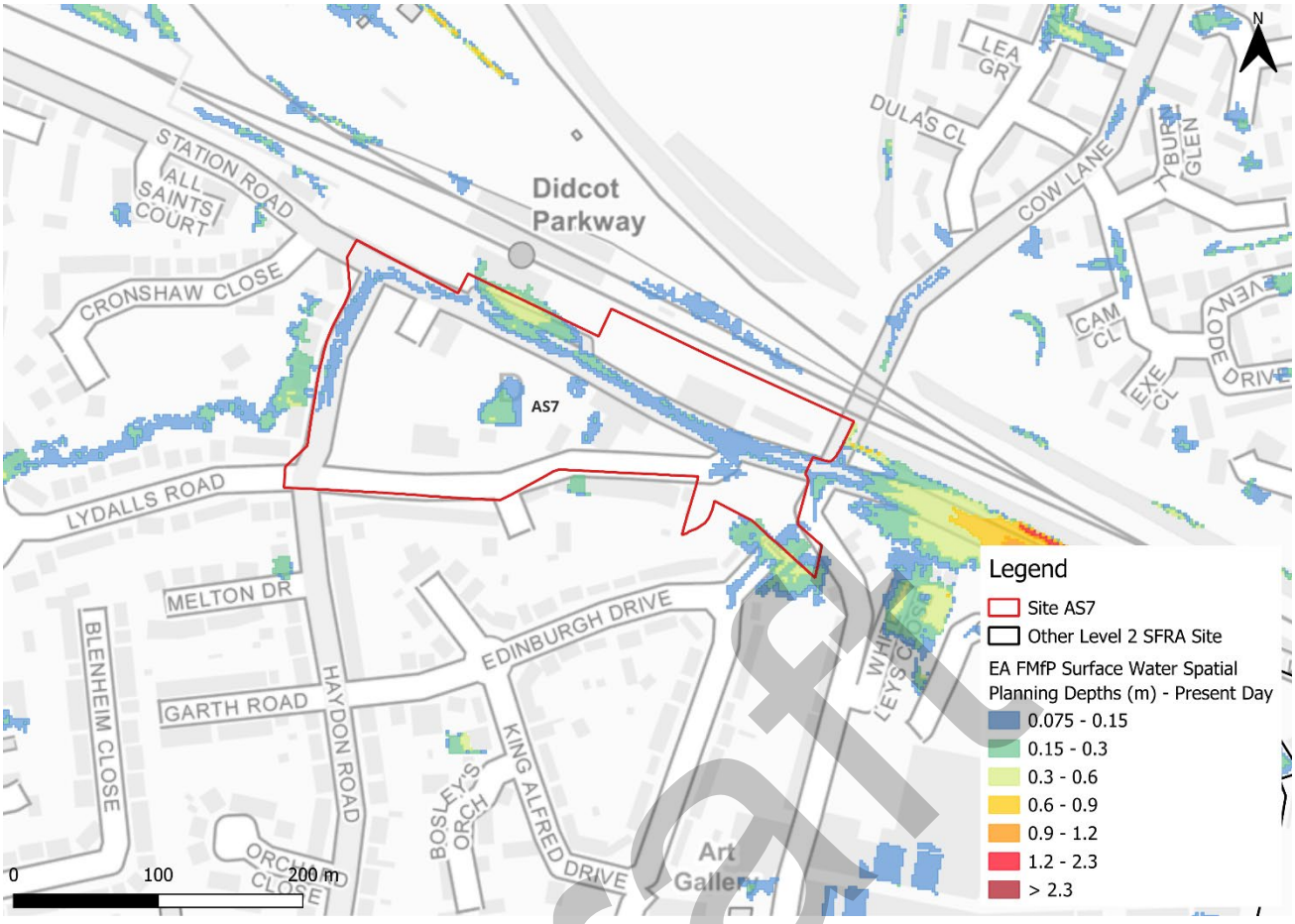

Figure 3-2: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Present Day for the 1% AEP event

3.1.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning data does not include hazard information suitable for planning purposes. Therefore, this Level 2 SFRA considers the third generation Risk of Flooding from Surface Water (RoFSW) hazard mapping in addition to the Flood Map for Planning - Surface Water Spatial Planning extents and depths, as the best available information. Updated surface water hazard information should be confirmed at the site-specific FRA stage.

Based on the EA's national scale third generation RoFSW map, the greatest flood hazard within the site in the medium event is categorised as 'significant' (Figure 3-3).

There are differences between the Flood Map for Planning - Surface Water Spatial Planning map and the third generation RoFSW hazard mapping. The Flood Map for Planning - Surface Water Spatial Planning data does not map flooding less than 0.075m (7.5cm) in depth. Therefore, where the map may show no flooding, there may be shallow flooding up to a depth of 0.075m. In contrast, the third generation RoFSW does not map flooding with a hazard rating of less than 0.575. This could explain the differences observed between the Flood Map for Planning and third generation RoFSW maps.

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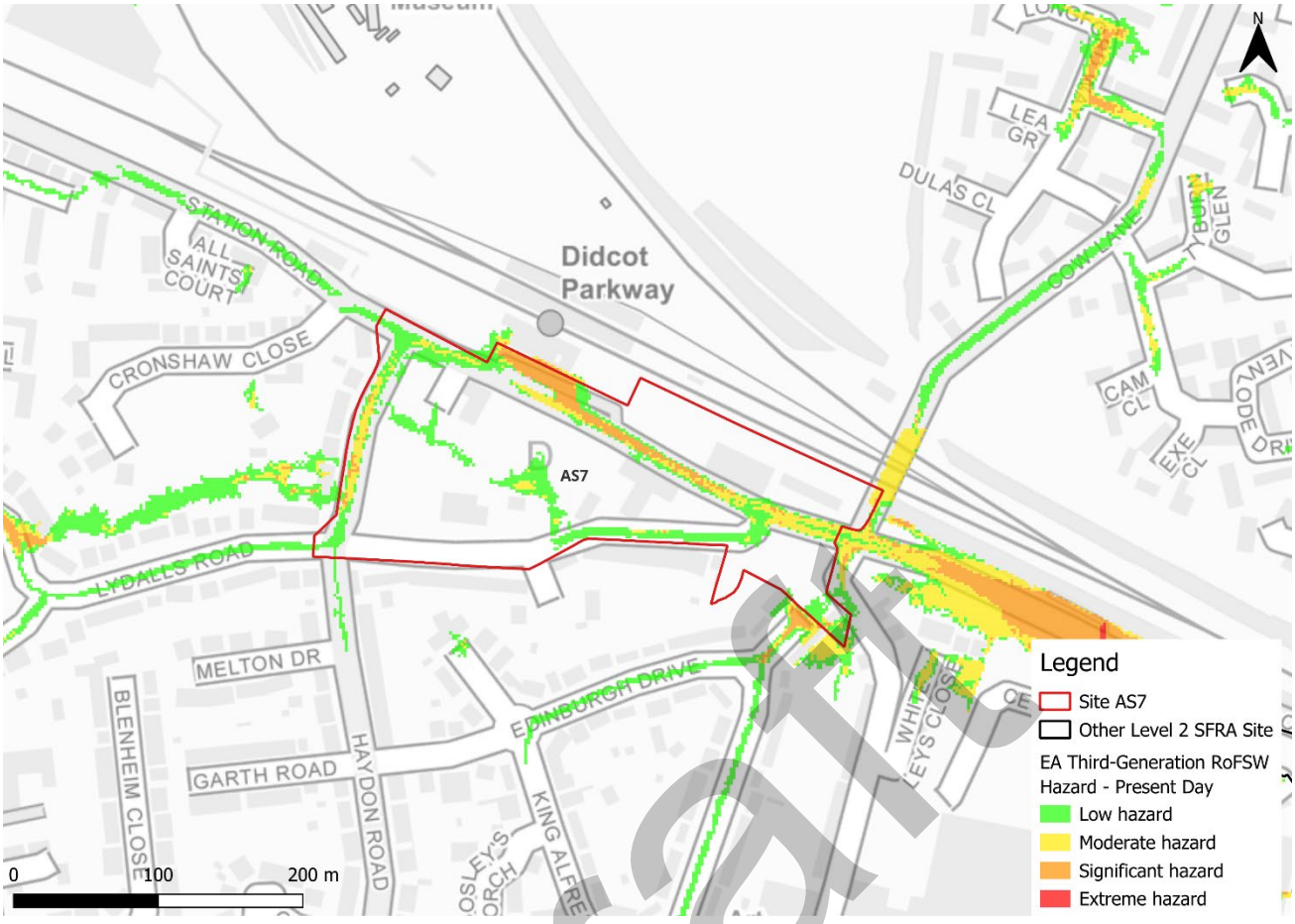

Figure 3-3: Third generation - Risk of Flooding from Surface Water map present day 1% AEP event surface water flood hazard[1]

3.2 Impacts from climate change

3.2.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths

The EA's climate change allowance guidance states that SFRA's should assess the upper end peak rainfall allowance for the 2070s epoch. This dataset is included in the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Climate Change dataset (September 2026). The peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment are shown in Table 3-2. The allowance for the 0.1% AEP event is not stated in the EA guidance.

1 Based on Section 7.5 Hazard rating. What is the Risk of Flooding from Surface Water map? Report version 2.0. April 2019. Environment Agency

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Table 3-2: Peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment

Return period	Central allowance 2070s (% increase)	Upper end allowance 2070s (% increase)
3.3% AEP	25	35
1% AEP	25	40

Figure 3-4 shows the surface water flood extents for the 2070s upper end climate change scenario. Surface water flood risk is modelled to increase in extent with climate change. There is a greater area of surface water flooding along the hardstanding roads through the site, with a larger area of ponding in topographic low spots. Surface water flood depths are modelled to remain at up to 0.6m within the north of the site (Figure 3-5).

Safe access and escape routes should remain achievable via Lydalls Road and Haydon Road to the south of the site.

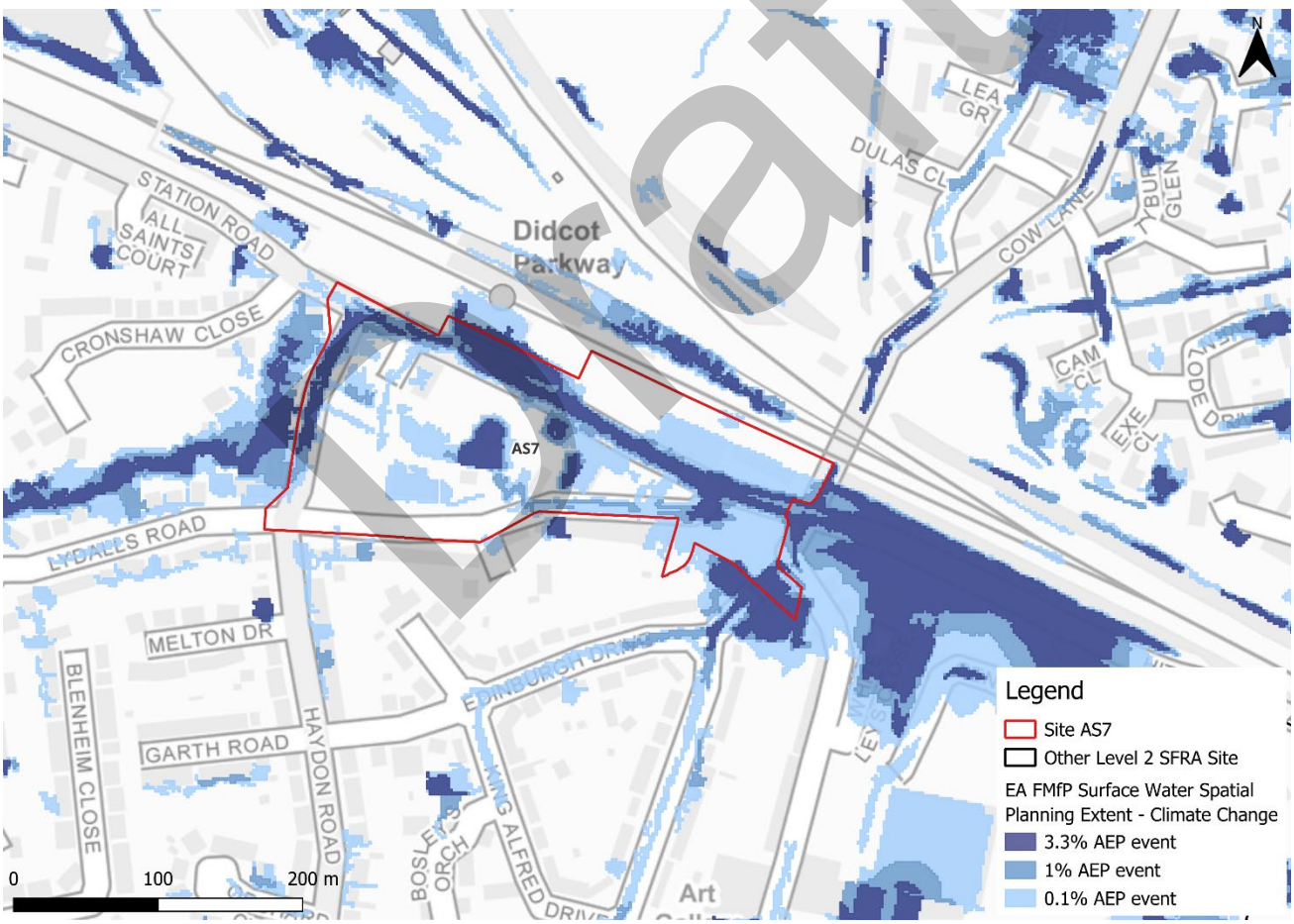

Figure 3-4: Flood Map for Planning - Surface Water Spatial Planning Extents Climate Change (2070s Upper End)

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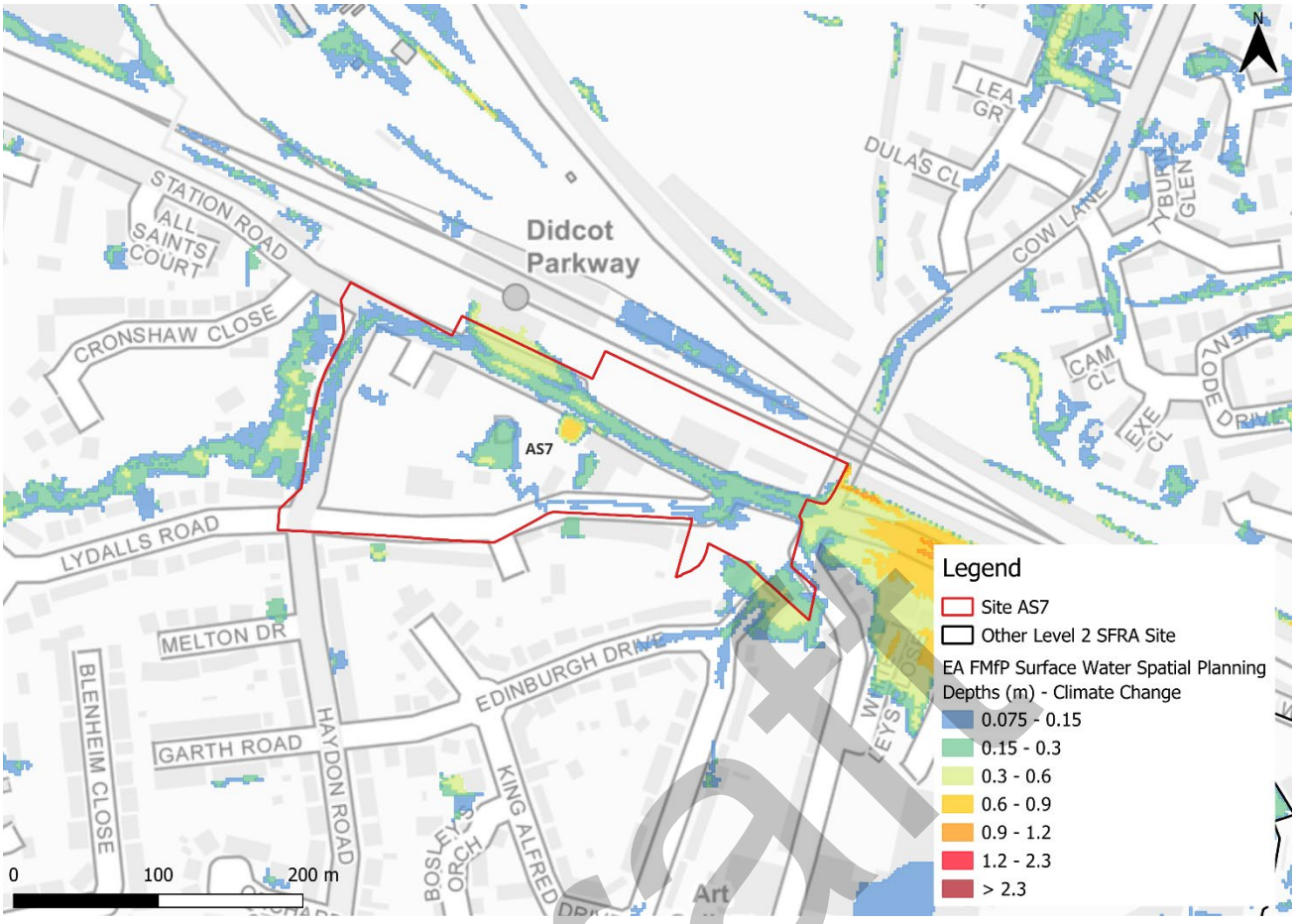

Figure 3-5: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Climate Change for the 1% AEP event (2070s Upper End)

3.2.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning climate change data does not include hazard information suitable for planning purposes. This Level 2 SFRA therefore considers the RoFSW low risk surface water event as a conservative proxy for the medium risk event plus climate change, as the best available information to assess surface water flood hazards. The impact of climate change on surface water flood hazards should be considered at the site-specific FRA stage.

Using the RoFSW low risk event as a proxy, future surface water flood hazard in the medium risk event is categorised as 'significant' (Figure 3-6)

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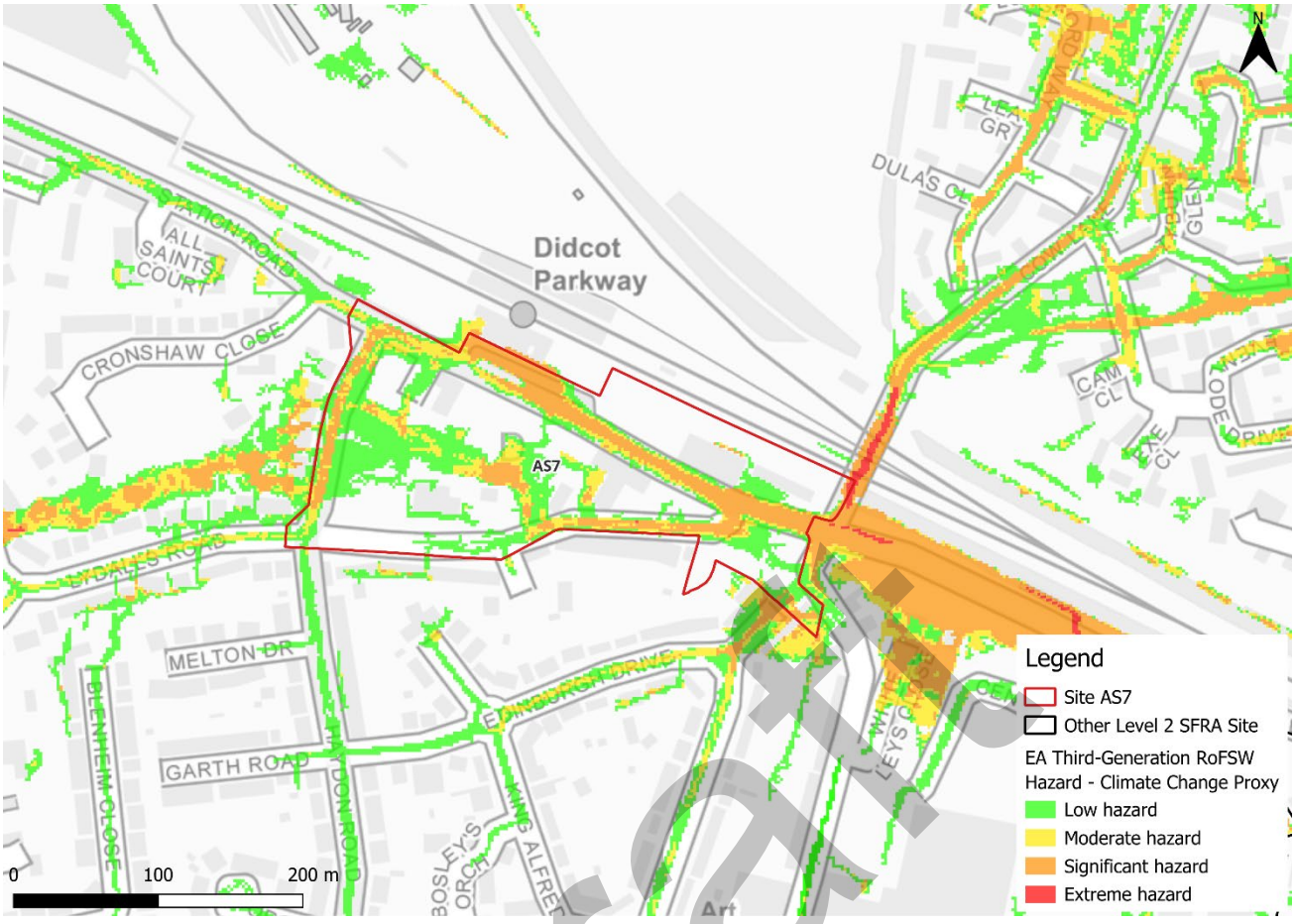

Figure 3-6: Low risk event surface water flood hazard[1], as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options, site suitability, sequential approach to development management - surface water

- Current risk to the site is predominantly very low, with 73% of the site being outside of the 0.1% AEP surface water flood extent. Surface water risk is largely confined to the hardstanding roads through the site and an area of ponding adjacent to the station building.
- Risk to the site is shown to increase in extent within the site when considering the impact of climate change. There are additional areas of ponding across the site.
- Topographic low spots should be considered and included in site design and ideally left in place to flood naturally when required.
- If any current structures are demolished for new housing units, a drainage strategy would therefore be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA. The developer should also follow the National SuDS guidance.
- Assessment of the current drainage system in place should be carried out to ascertain any current capacity issues and whether the current system could

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accommodate the proposed residential development or whether further capacity will be required. Discharge rates from the site should be returned to greenfield rates as a minimum due to historic flooding downstream.

- Safe access and escape routes would likely be achievable via Lydalls Road and Haydon Road to the south of the site.

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4 Groundwater, geology and SuDS suitability

Risk of groundwater emergence is assessed in this SFRA using JBA's 5m Groundwater Emergence Map. Figure 4-1 shows the map covering the site and the surrounding areas. Table 4-1 explains the risk classifications.

The entirety of the site is in an area where there is negligible groundwater emergence risk. Groundwater conditions may therefore be suited to infiltration SuDS.



Figure 4-1: JBA 5m Groundwater Emergence Map

Table 4-1: Groundwater Emergence Hazard Classification

Groundwater head difference (m)*	Class label
0 to 0.025	Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
0.025 to 0.5	Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
0.5 to 5	Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event There is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely.
>5	Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event. Groundwater emergence is not likely.
N/A	No risk. This zone is deemed as having a negligible risk from groundwater emergence due to the nature of the local geological deposits.
*Difference is defined as ground surface in mAOD minus modelled groundwater table in mAOD.	

The underlying bedrock within the site is mudstone, sandstone, and limestone (Figure 4-2). Other than sandstone, all these rocks generally have low levels of permeability. This leads to less water infiltrating into the ground and could potentially contribute to lower water table levels.

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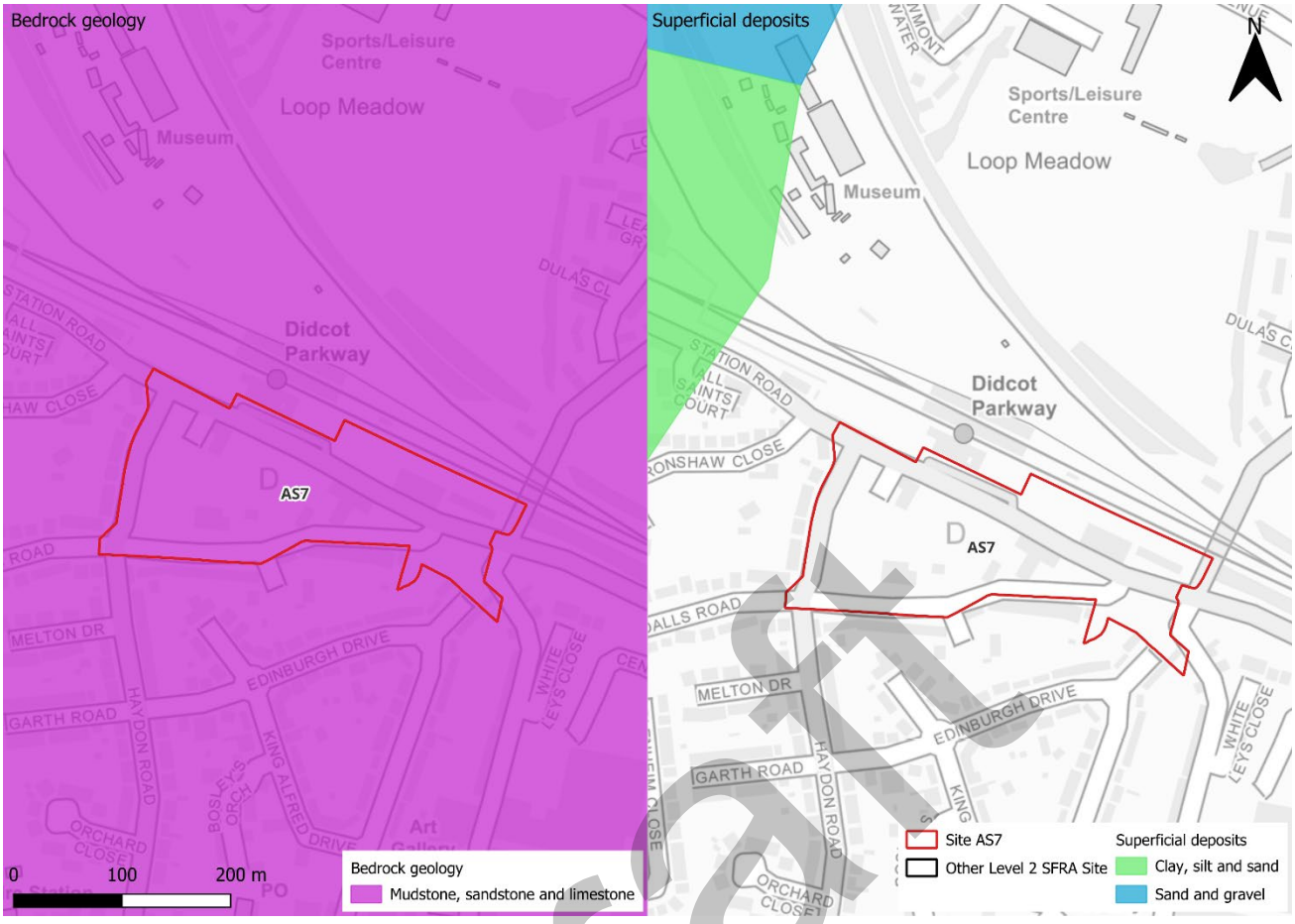

Figure 4-2: BGS Geology - Bedrock and superficial deposits

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5 Overall site assessment

5.1 Can part b) of the exception test be passed?

To pass part b) of the exception test[2], it must be proven that the development can be safe for its lifetime, which is 100 years for residential development and 75 years for non-residential development, taking account of the vulnerability of its users, without increasing risk elsewhere, and, where possible, will reduce flood risk overall. The site is not required to pass the exception test as it is not located within Flood Zone 3a.

5.2 Recommendations and site-specific FRA requirements

Based on the evidence presented in the Level 1 SFRA (2024), Level 1 SFRA Addendum (2026) and this Level 2 SFRA:

- The proposed development of the site would see a change in the risk classification from less vulnerable to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the site-specific FRA must show that the development can be designed to be safe for its lifetime and that there is adequate emergency planning provision (para 006 FRCC-PPG).
- Based on current information, this site could be allocated if development avoids the area at modelled surface water flood risk. Surface water risk should be attenuated onsite and included in site design and layout.
- A drainage strategy will be required for any new development. The use of infiltration SuDS should be investigated.
- Assessment of the current drainage system in place should be carried out to ascertain any current capacity issues and whether the current system could accommodate the proposed residential development or whether further capacity will be required. Discharge rates from the site should be returned to greenfield rates as a minimum due to historic flooding downstream.
- The Council highways department should be consulted, along with Thames Water and the LLFA regarding existing highway drainage networks, surface water sewers and LLFA assets, and whether increased capacities may be required to enable sustainable development in the long term.
- Any site-specific FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; South Oxfordshire and Vale of White Horse District Councils Joint Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the site-specific FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; TW; the highways authorities; and the emergency services.

[2] Policy F6 National Planning Policy Framework 2026

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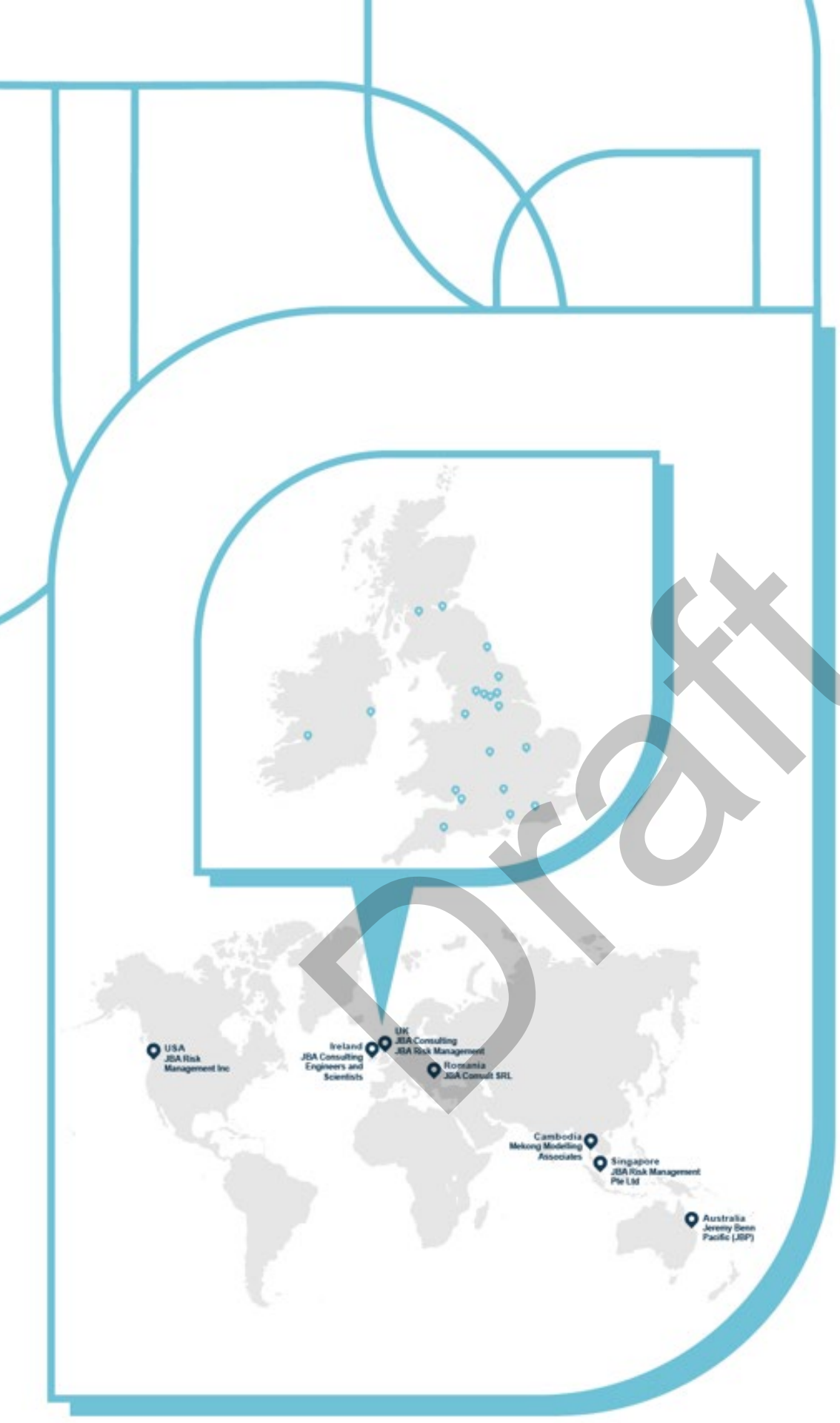

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Registered Office
1 Broughton Park
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Broughton
SKIPTON
North Yorkshire
BD23 3FD
United Kingdom

+44(0)1756 799919
info@jbaconsulting.com
www.jbaconsulting.com
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South Oxfordshire and Vale of White Horse Level 2 Strategic Flood Risk Assessment Update

Site AS8 - North West of Grove, Grove

Draft Report

October 2026

Prepared for:

South Oxfordshire District Council and

Vale of White Horse District Council

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Reviewed by	Laura Thompson-Jones BSc CGeog FRGS Senior Analyst
Authorised by	Mike Williamson BSc MSc CGeog FRGS EADA Project Director

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JBA Project Manager	Freya Nation
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2026s1132

This report describes work commissioned by South Oxfordshire and Vale of White Horse District Councils. The Client's representative for the contract was Rebekah Goodwill of South Oxfordshire and Vale of White Horse District Councils. Boe Kilshaw of JBA Consulting carried out this work.

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for South Oxfordshire and Vale of White Horse Joint Local Plan Site AS8 - North West of Grove, Grove. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA' (2024) and the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum' (2026), and read the 'South Oxfordshire and Vale of White Horse District Councils Level 2 SFRA Main Report Update' (2026) and is therefore familiar with the terminology used in this report.

1.1 Site AS8 - North West of Grove, Grove

- Location: North West of Grove, Grove (Figure 1-1)
- Existing site use: Greenfield
- Existing site use vulnerability: Water compatible
- Proposed site use: Mainly residential
- Proposed site use vulnerability: More vulnerable
- Site area: 28.35 ha
- Proposed development impermeable area: 24.1 ha (assumed 85% of site area)
- Watercourse: N/A
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for more detailed assessment through Level 2 SFRA (Strategic Recommendation B)
    - Assess present day and future modelled surface water depths, hazards

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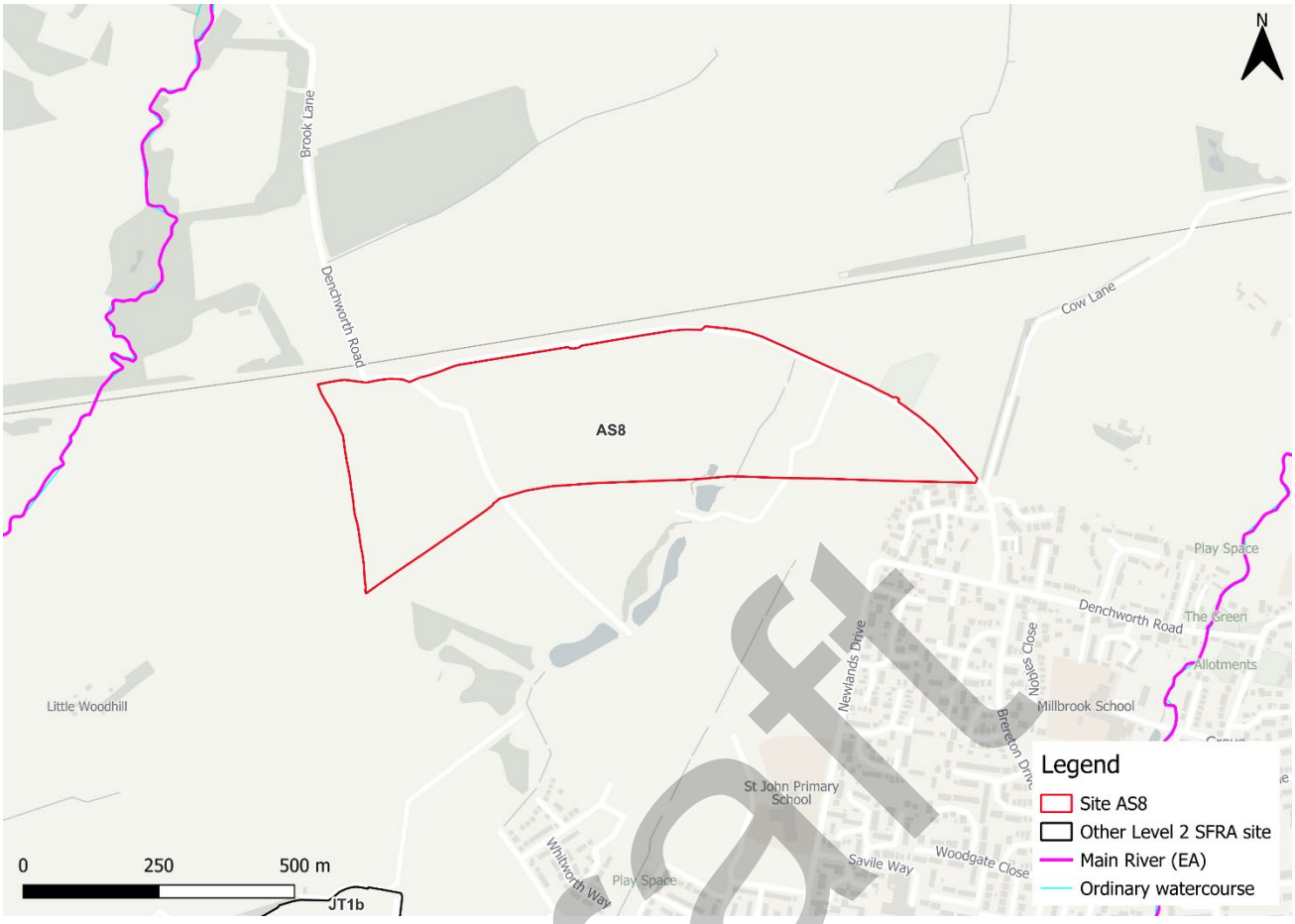

Figure 1-1: Site location

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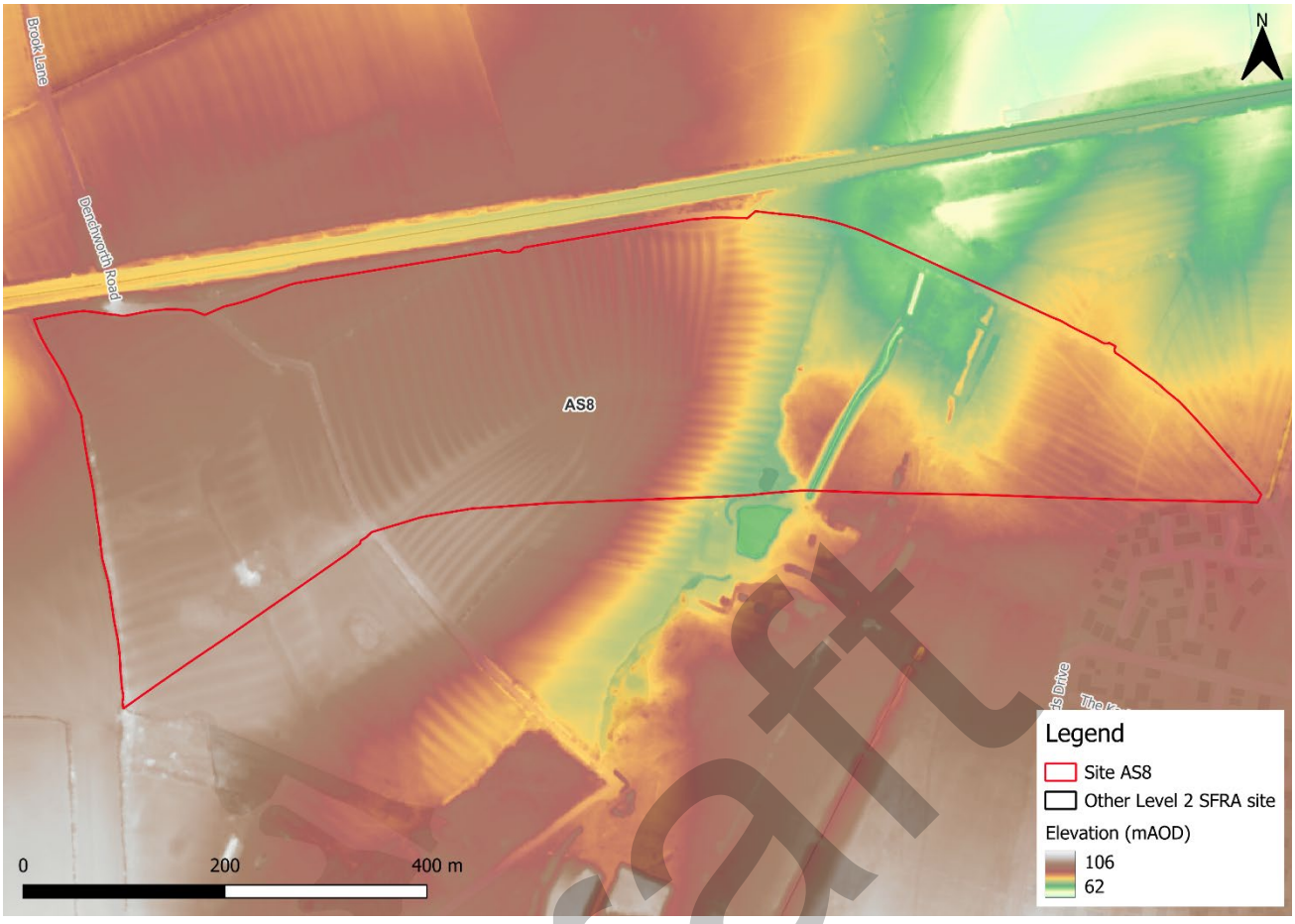

Figure 1-2: Topography

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2 Flood risk from rivers

2.1 Existing risk

2.1.1 Flood Map for Planning and functional floodplain

Based on the Environment Agency's (EA) Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum (2026), the percentage areas of the site within each flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.4).

The site is entirely within Flood Zone 1 and therefore at low risk of flooding from rivers.

Table 2-1: Existing flood risk based on percentage area of site at risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

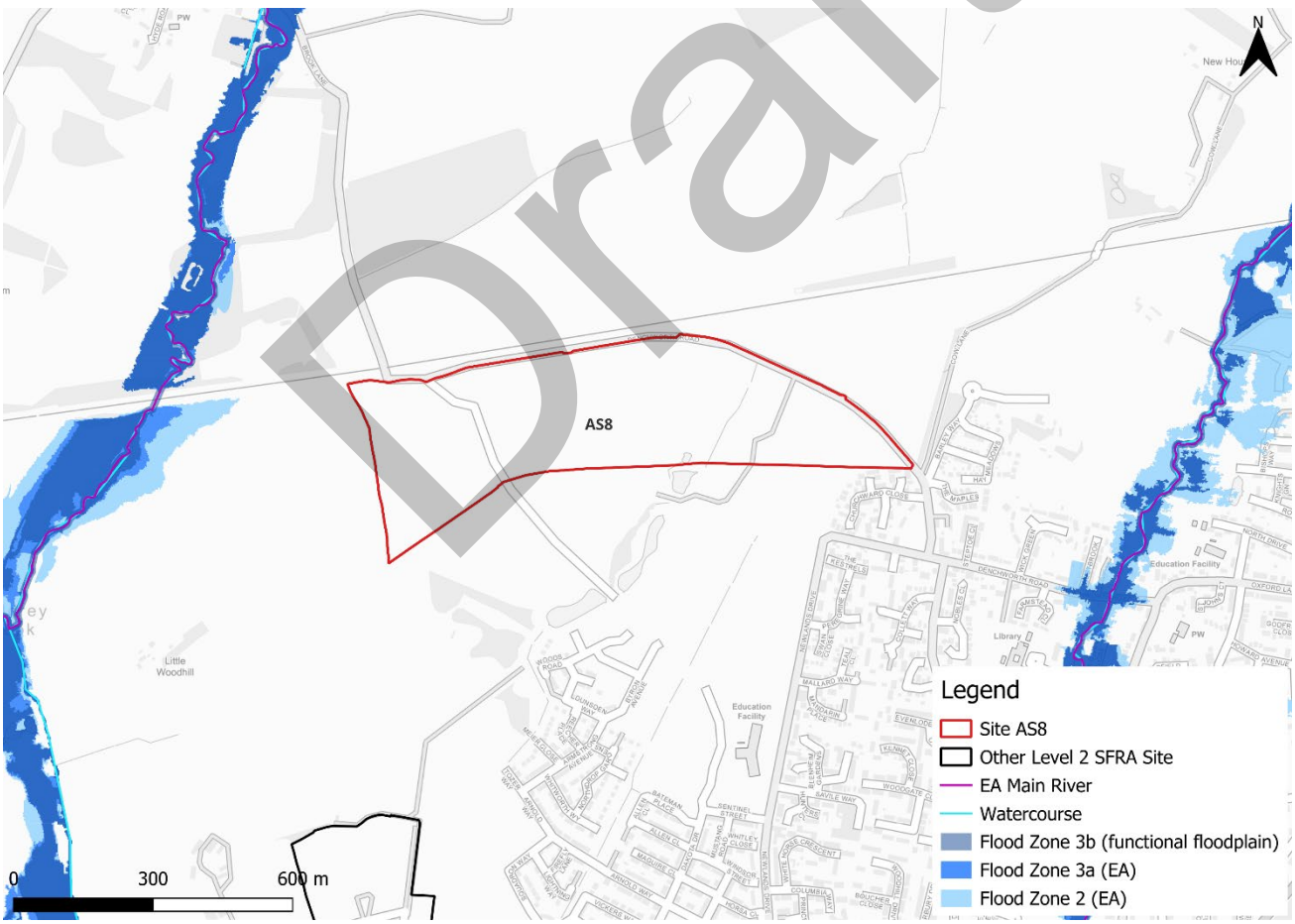

Figure 2-1: Existing risk from rivers to the site

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2.2 Impacts from climate change

2.2.1 Flood Map for Planning - Flood Zones plus Climate Change

The EA's Flood Map for Planning - Flood Zones plus Climate Change dataset does not show the site to be at future fluvial risk.

2.3 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

Vale of White Horse records indicate that in 2007, Denchworth Road flooded within this location, and was impassable. This corresponds to the area of flooding indicated on the Risk of Flooding from Surface Water (RoFSW) map.

2.4 Flood risk management

The site doesn't benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

2.4.1 Cumulative impacts

A cumulative impact assessment was completed through the South Oxfordshire and Vale of White Horse Level 1 SFRA Addendum (2026), which aimed to identify catchments sensitive to the cumulative impact of development. Site AS8 (North West of Grove, Grove) is located within one catchment, namely; Childrey Brook and tributaries. This is ranked as a high sensitivity catchment. Planning considerations for sites at high sensitivity to the cumulative impacts of development can be found in Appendix D of the Level 1 SFRA Addendum. Cumulative impacts of development should also be considered as part of a site-specific FRA.

2.4.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. Both within and upstream of the site, there are significant opportunities for tree planting to reduce runoff. There are also opportunities for runoff attenuation features, to slow the rate of runoff downstream. These areas are shown in Figure 2-2.

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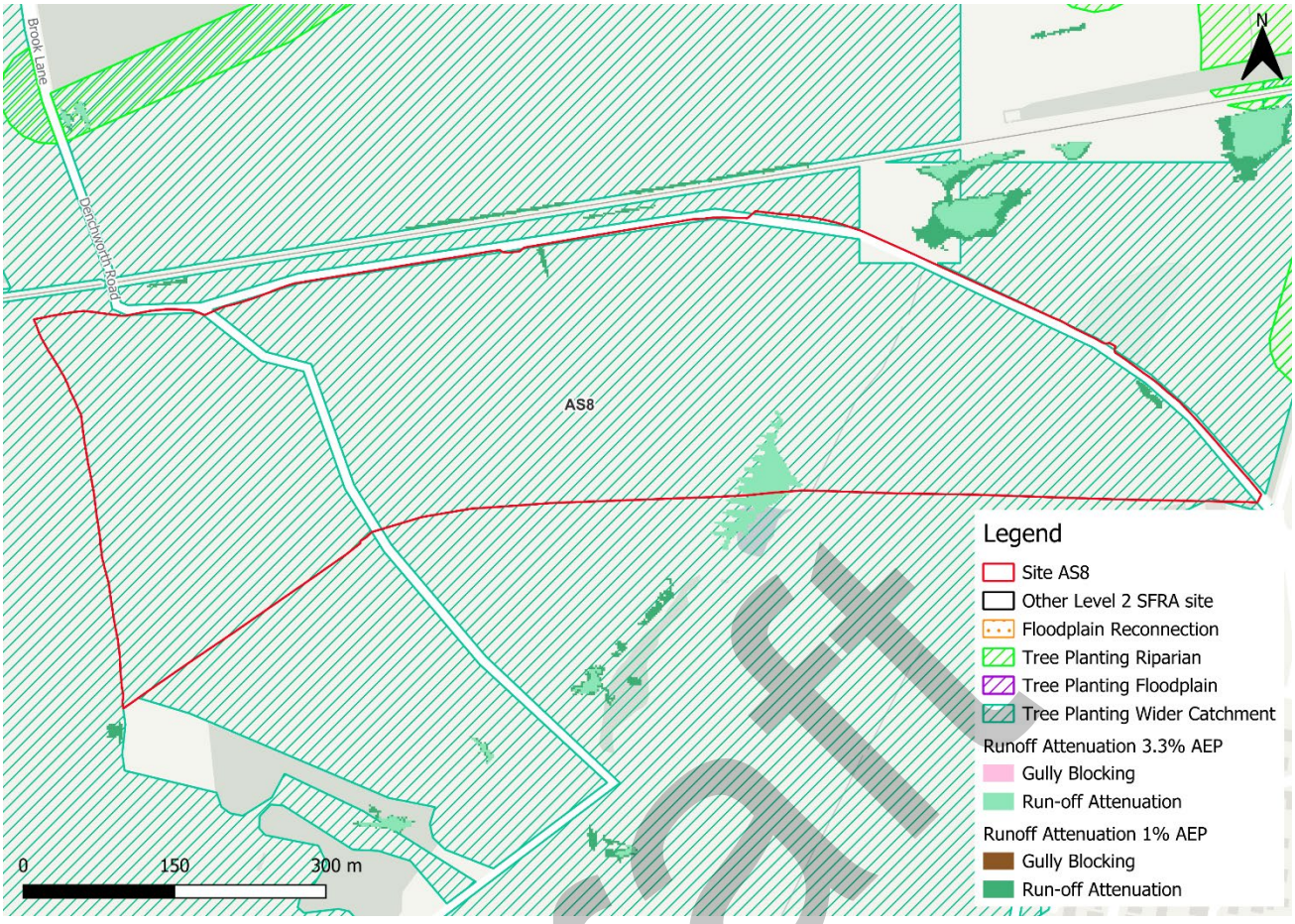

Figure 2-2: Natural Flood Management (NFM) potential mapping

2.5 Residual risk

Although a site may be afforded some protection from defences and / or drainage infrastructure, there is always a residual risk of flooding from asset failure i.e. defence breaches, or blockages of culverts or drainage assets.

There are no assets with the potential to pose a residual risk to the site

2.5.1 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. A "dry day" scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. A "wet day" scenario assumes a worst-case scenario where a reservoir releases water held on a "wet day" when local rivers have already overflowed their banks.

The site is not modelled to be at risk from reservoir flooding.

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2.6 Emergency Planning

2.6.1 Flood warnings and alerts

There are no Flood Warning Areas (FWA) or Flood Alert Areas (FAA) within the vicinity of the site.

2.6.2 Access and escape routes

Safe access and escape routes should be achievable via Denchworth Road to the north of the site. This route is indicated by the yellow line in Figure 2-3.

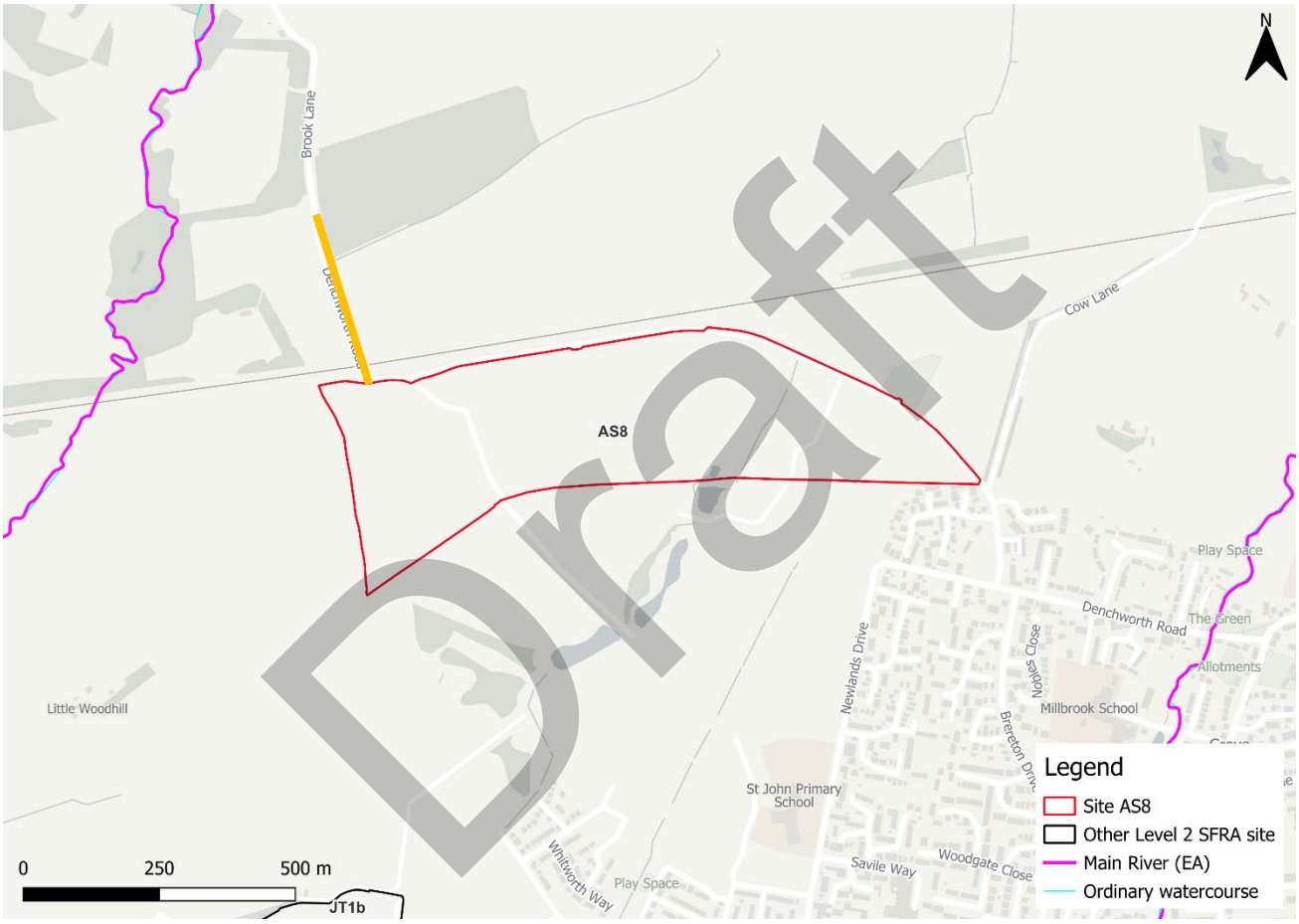

Figure 2-3: Potential access and escape routes

2.7 Observations, mitigation options, site suitability, sequential approach to development management - fluvial

- Observations:
  - The site is wholly within Flood Zone 1 and therefore at low risk of flooding from rivers.
  - The site is not shown to be at additional risk of fluvial flooding when considering climate change.
- Access and escape:

- Safe access and escape routes should be achievable via Denchworth Road to the north of the site.

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3 Flood risk from surface water

3.1 Existing risk

3.1.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths Present Day

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Extents Present Day map (September 2026), the majority of the site is at very low risk from surface water flooding, as shown in Table 3-1.

Surface water risk is present within a flow path through the centre of the site, with an area of ponding along the northern site boundary (Figure 3-1). There are also a number of short flow paths along the drainage ditches present onsite.

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Depth map, the greatest flood depths onsite are between 1.2 and 2.3m, however depths are largely less than 0.6m across the majority of the site (Figure 3-2).

Safe access and escape routes would likely be achievable via Denchworth Road to the north of the site.

Table 3-1: Existing surface water flood risk based on percentage area at risk using the Flood Map for Planning - Surface Water Spatial Planning Extent Present Day map

Less than 0.1% AEP event (% area)	0.1% AEP event (% area)	1% AEP event (% area)	3.3% AEP event (% area)
85	4	3	8

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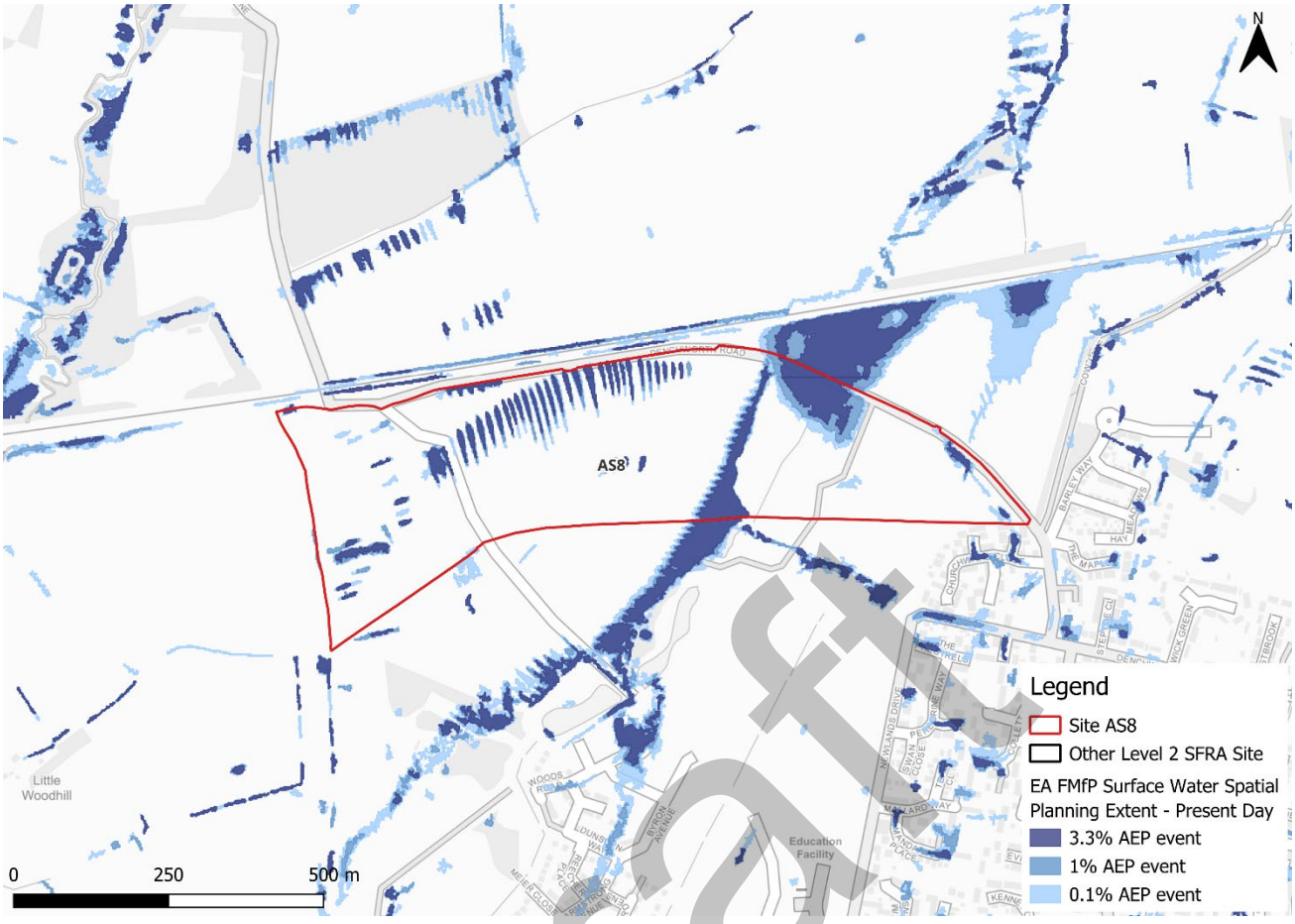

Figure 3-1: Flood Map for Planning - Surface Water Spatial Planning Extents Present Day

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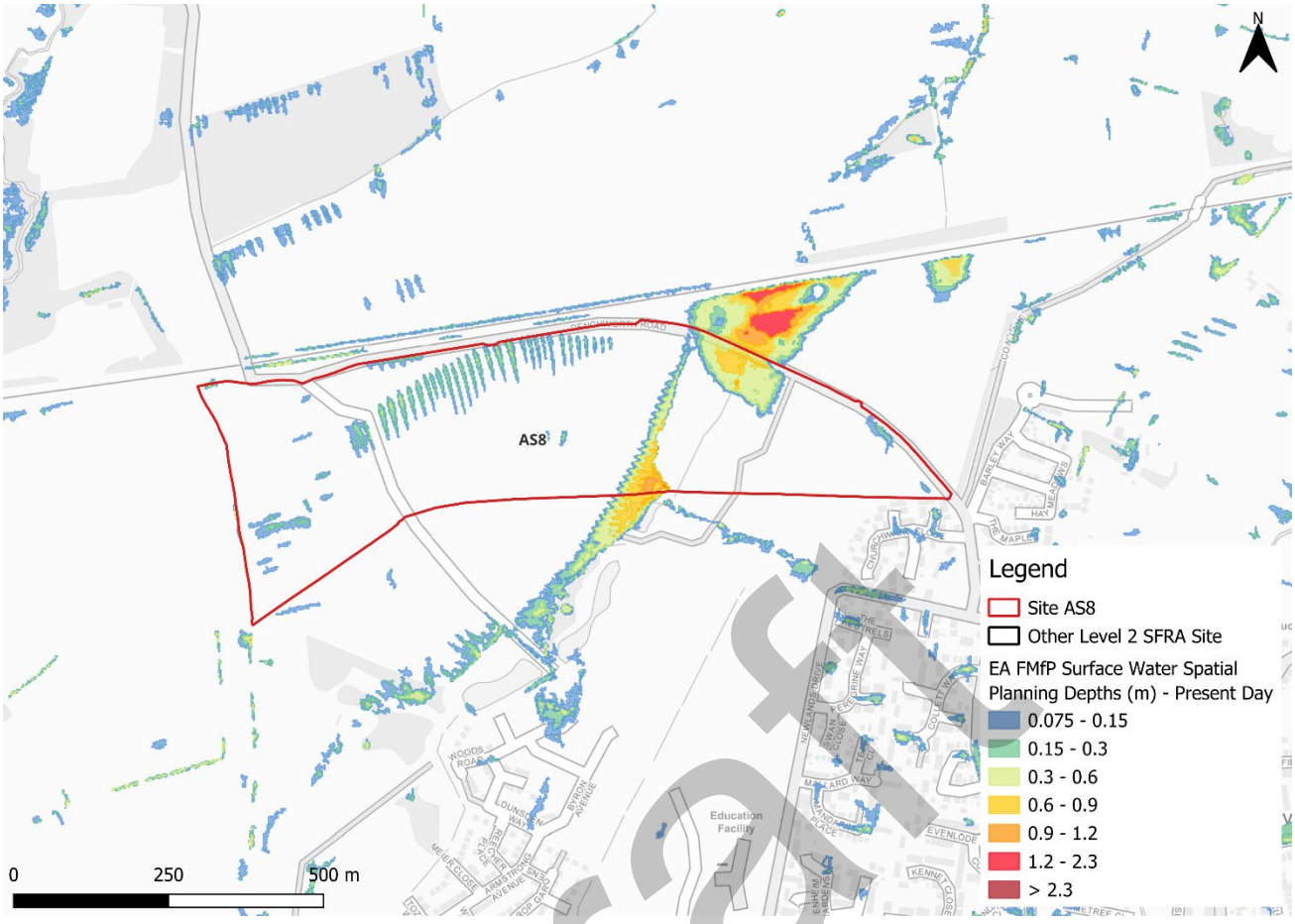

Figure 3-2: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Present Day for the 1% AEP event

3.1.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning data does not include hazard information suitable for planning purposes. Therefore, this Level 2 SFRA considers the third generation Risk of Flooding from Surface Water (RoFSW) hazard mapping in addition to the Flood Map for Planning - Surface Water Spatial Planning extents and depths, as the best available information. Updated surface water hazard information should be confirmed at the site-specific FRA stage.

Based on the EA's national scale third generation RoFSW map, the greatest flood hazard within the site in the medium event is categorised as 'significant' (Figure 3-3).

There are differences between the Flood Map for Planning - Surface Water Spatial Planning map and the third generation RoFSW hazard mapping. The Flood Map for Planning - Surface Water Spatial Planning data does not map flooding less than 0.075m (7.5cm) in depth. Therefore, where the map may show no flooding, there may be shallow flooding up to a depth of 0.075m. In contrast, the third generation RoFSW does not map flooding with a hazard rating of less than 0.575. This could explain the differences observed between the Flood Map for Planning and third generation RoFSW maps.

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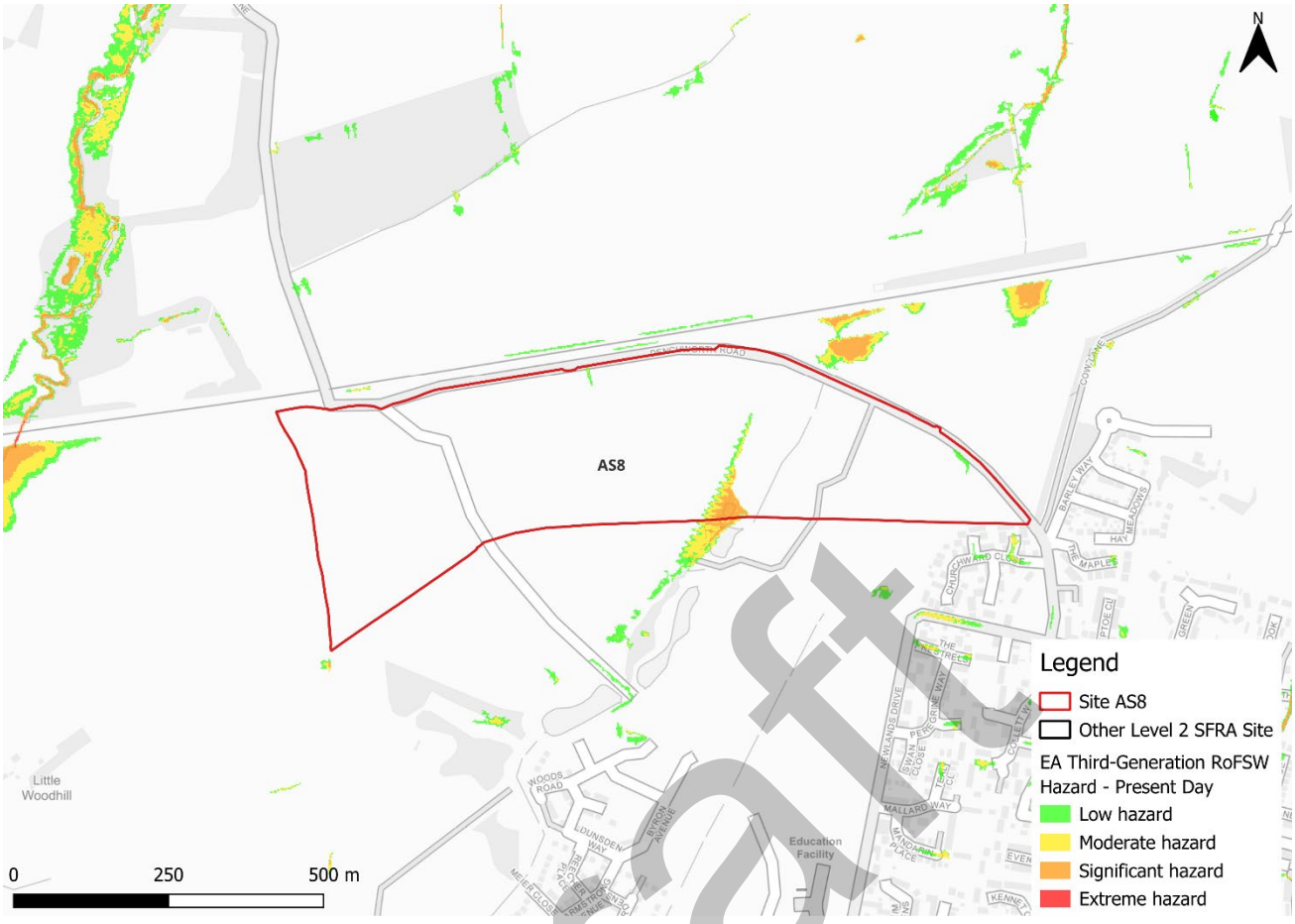

Figure 3-3: Third generation - Risk of Flooding from Surface Water map present day medium risk event surface water flood hazard[1]

3.2 Impacts from climate change

3.2.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths

The EA's climate change allowance guidance states that SFRA's should assess the upper end peak rainfall allowance for the 2070s epoch. This dataset is included in the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Climate Change dataset (September 2026). The peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment are shown in Table 3-2. The allowance for the 0.1% AEP event is not stated in the EA guidance.

1 Based on Section 7.5 Hazard rating. What is the Risk of Flooding from Surface Water map? Report version 2.0. April 2019. Environment Agency

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Table 3-2: Peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment

Return period	Central allowance 2070s (% increase)	Upper end allowance 2070s (% increase)
3.3% AEP	25	35
1% AEP	25	40

Figure 3-4 shows the surface water flood extents for the 2070s upper end climate change scenario. Surface water flood risk is shown to increase in extent in all events, particularly within the northeast of the site. There are a number of additional areas of scattered ponding within the centre of the site.

Greatest flood depths are shown to remain at between 1.2 and 2.3m, with a greater area of the site with flood depths of up to 0.9m (Figure 3-5).

Safe access and escape routes would likely remain achievable via Denchworth Road to the north of the site.

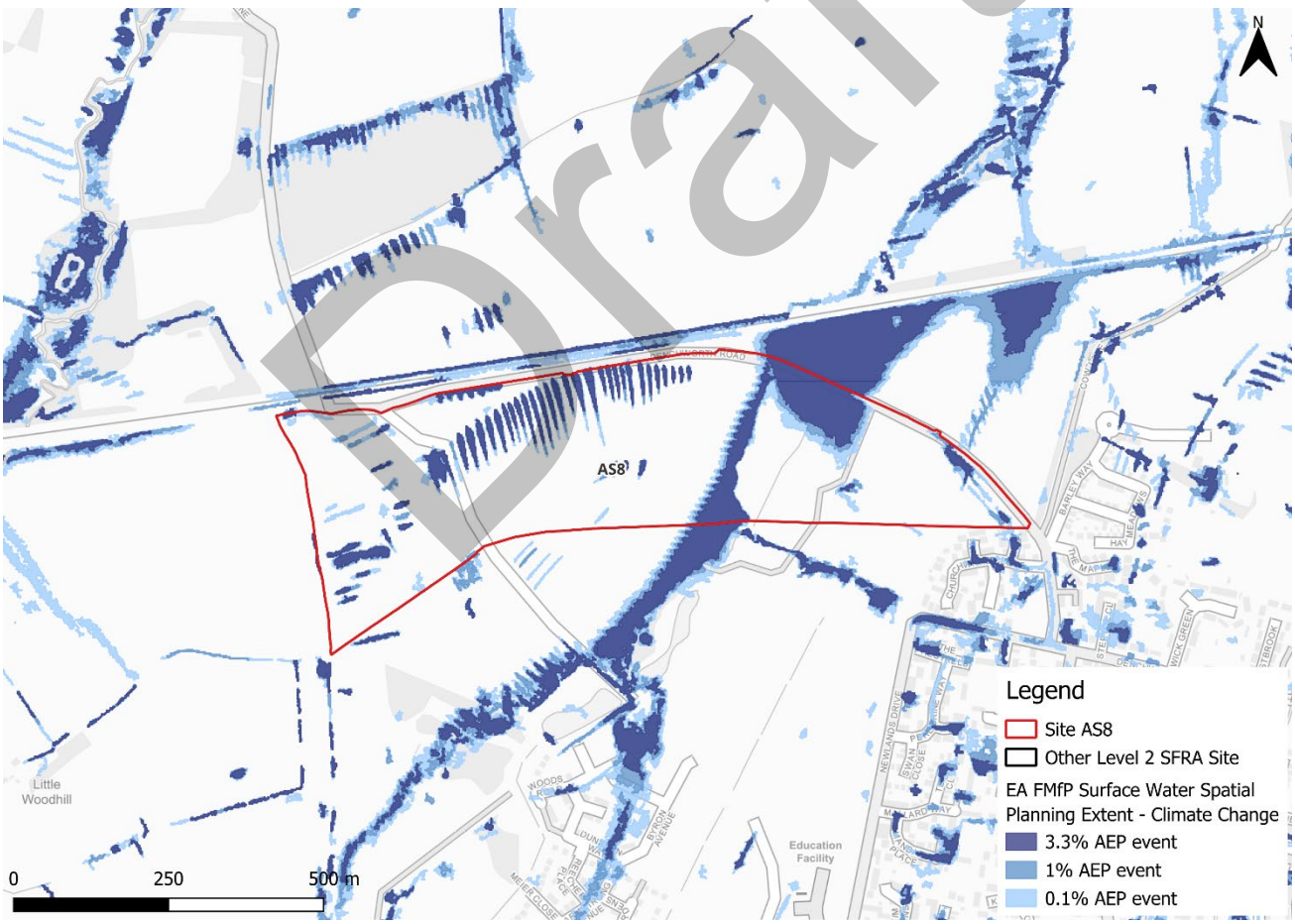

Figure 3-4: Flood Map for Planning - Surface Water Spatial Planning Extents Climate Change (2070s Upper End)

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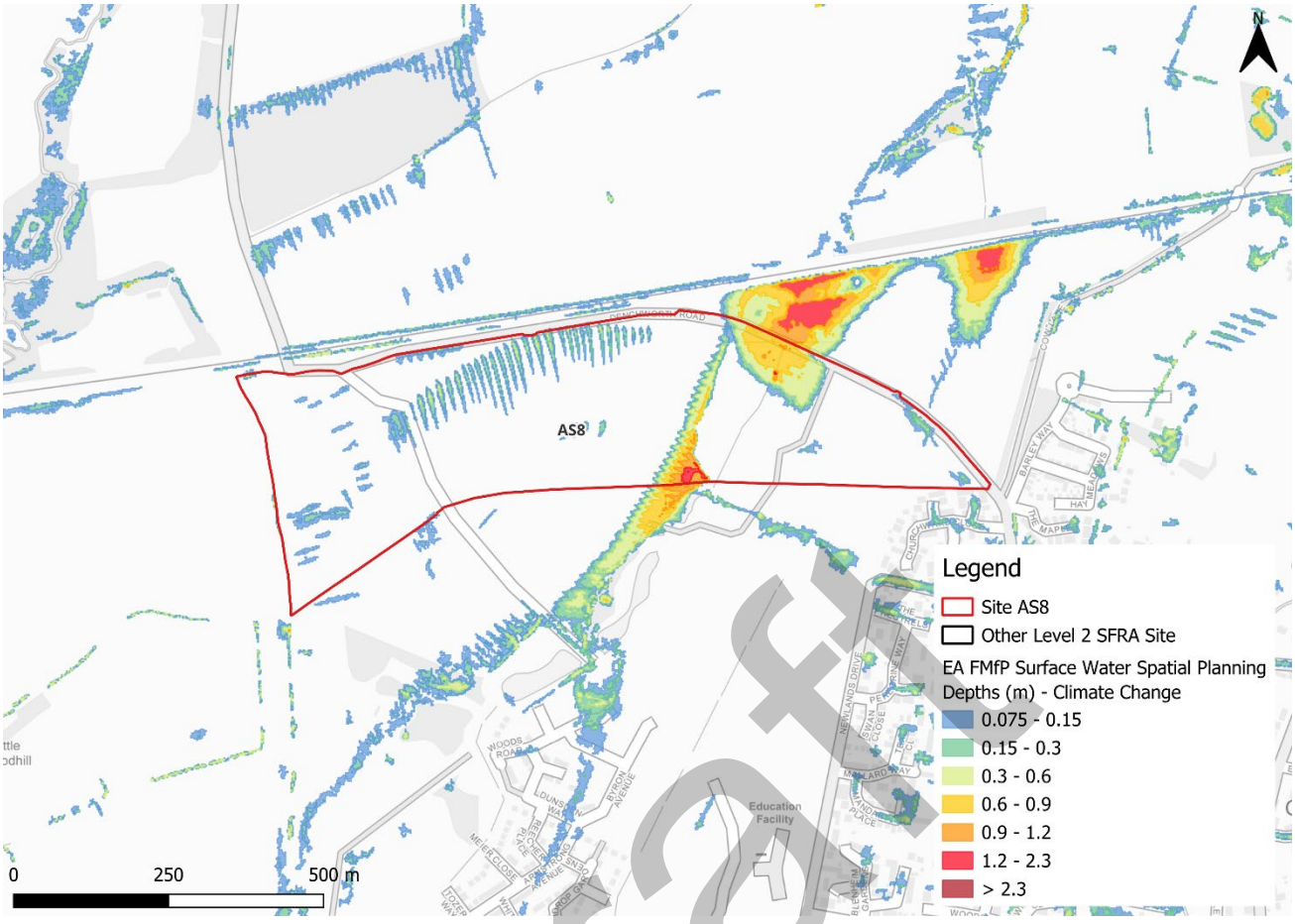

Figure 3-5: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Climate Change for the 1% AEP event (2070s Upper End)

3.2.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning climate change data does not include hazard information suitable for planning purposes. This Level 2 SFRA therefore considers the RoFSW low risk surface water event as a conservative proxy for the medium risk event plus climate change, as the best available information to assess surface water flood hazards. The impact of climate change on surface water flood hazards should be considered at the site-specific FRA stage.

Using the RoFSW low risk event as a proxy, future surface water flood hazard in the medium risk event is categorised 'significant' within the flow path through the centre of the site (Figure 3-6).

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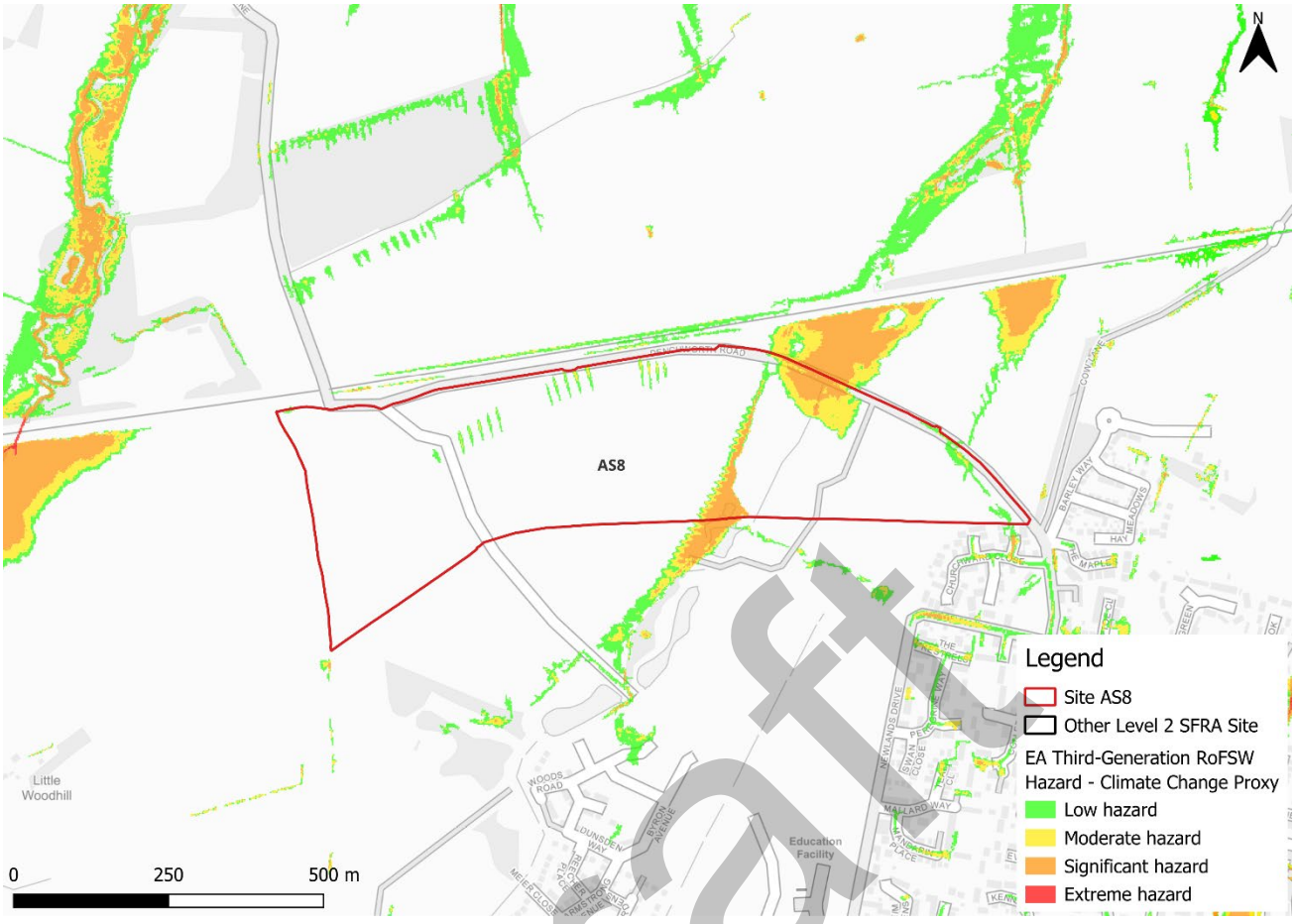

Figure 3-6: Low risk event surface water flood hazard[1], as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options, site suitability, sequential approach to development management - surface water

- Current risk to the site is predominantly very low, with 85% of the site being at very low surface water flood risk. Surface water risk is present within a flow path through the centre of the site, with areas of scattered ponding within topographic low spots across the remaining area of the site.
- Topographic low spots and flow paths should be considered and included in site design and ideally left in place to flood naturally when required.
- Risk to site is shown to increase in extent within the site when considering the impact of climate change, particularly within the northeast of the site. There are also a number of additional areas of ponding.
- The drainage strategy must ensure there is no increase in surface water flood risk elsewhere as a result of new development. The developer should aim to achieve betterment of existing runoff rates. The developer should also follow the National SuDS guidance.
- Safe access and escape routes would likely be achievable via Denchworth Road to the north of the site in all events.

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4 Groundwater, geology and SuDS suitability

Risk of groundwater emergence is assessed in this SFRA using JBA's 5m Groundwater Emergence Map. Figure 4-1 shows the map covering the site and the surrounding areas. Table 4-1 explains the risk classifications.

The risk of groundwater emergence varies across the site. Within large areas of the site, there is a risk of groundwater emergence to surface and subsurface assets. There is negligible groundwater risk through the centre of the site. Ground investigations will be required through the site-specific FRA to ascertain groundwater levels and conditions and advise on the use of infiltration SuDS within the site.



Figure 4-1: JBA 5m Groundwater Flood Map

Table 4-1: Groundwater Emergence Hazard Classification

Groundwater head difference (m)*	Class label
0 to 0.025	Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
0.025 to 0.5	Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
0.5 to 5	Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event There is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely.
>5	Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event. Groundwater emergence is not likely.
N/A	No risk. This zone is deemed as having a negligible risk from groundwater emergence due to the nature of the local geological deposits.
*Difference is defined as ground surface in mAOD minus modelled groundwater table in mAOD.	

The underlying bedrock within the site is predominantly mudstone, sandstone, and limestone. The north eastern area of the site has underlying bedrock of mudstone, siltstone and sandstone (Figure 4-2). Other than sandstone, all these rocks generally have low levels of permeability. This leads to less water infiltrating into the ground and could potentially contribute to lower water table levels. The drainage strategy for the site should investigate water table levels and ground conditions to inform on appropriate SuDS.

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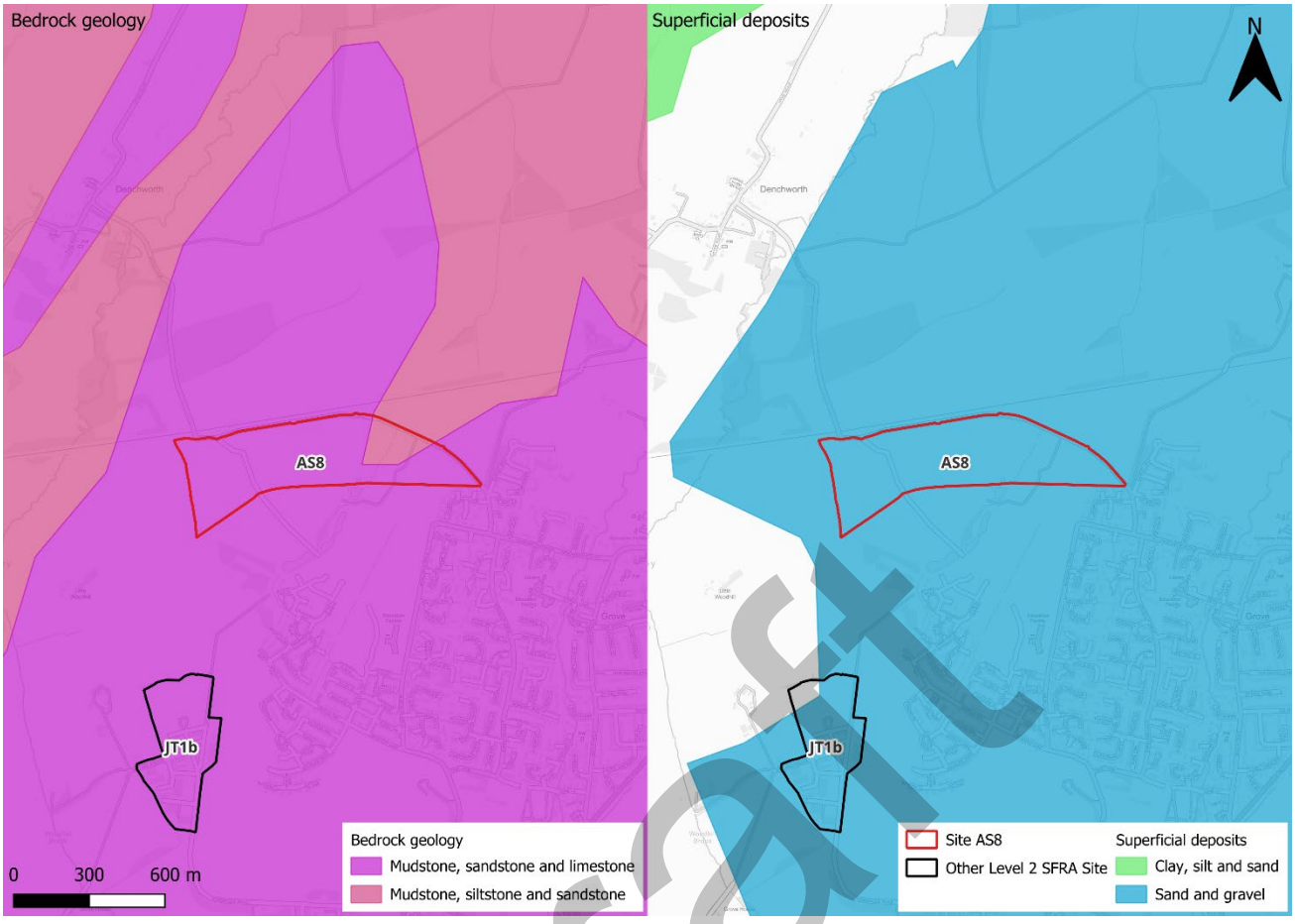

Figure 4-2: BGS Geology - Bedrock and superficial deposits

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5 Overall site assessment

5.1 Can part b) of the exception test be passed?

To pass part b) of the exception test[2], it must be proven that the development can be safe for its lifetime, which is 100 years for residential development, taking account of the vulnerability of its users, without increasing risk elsewhere, and, where possible, will reduce flood risk overall. The site is not required to pass the exception test as it is not located within Flood Zone 3a.

5.2 Recommendations and site-specific FRA requirements

Based on the evidence presented in the Level 1 SFRA (2024), Level 1 SFRA Addendum (2026) and this Level 2 SFRA:

- The proposed development of the site would see a change in the risk classification from water compatible to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the site-specific FRA must show that the development can be designed to be safe for its lifetime and that there is adequate emergency planning provision (para 014 FRCC-PPG).
- Based on current information, this site could be allocated if development avoids the areas of significant surface water ponding onsite. Surface water risk should be attenuated onsite and included in site design and layout.
- A detailed drainage strategy will be required for any new development, given the flow paths and ponding present on a large site. The use of infiltration SuDS should be investigated.
- Opportunities for NFM features to reduce flood risk to the site and surrounding areas should be explored at the site-specific FRA stage.
- Any site-specific FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; South Oxfordshire and Vale of White Horse District Councils Joint Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the site-specific FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; TW; the highways authorities; and the emergency services.

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[2] Policy F6 National Planning Policy Framework 2026

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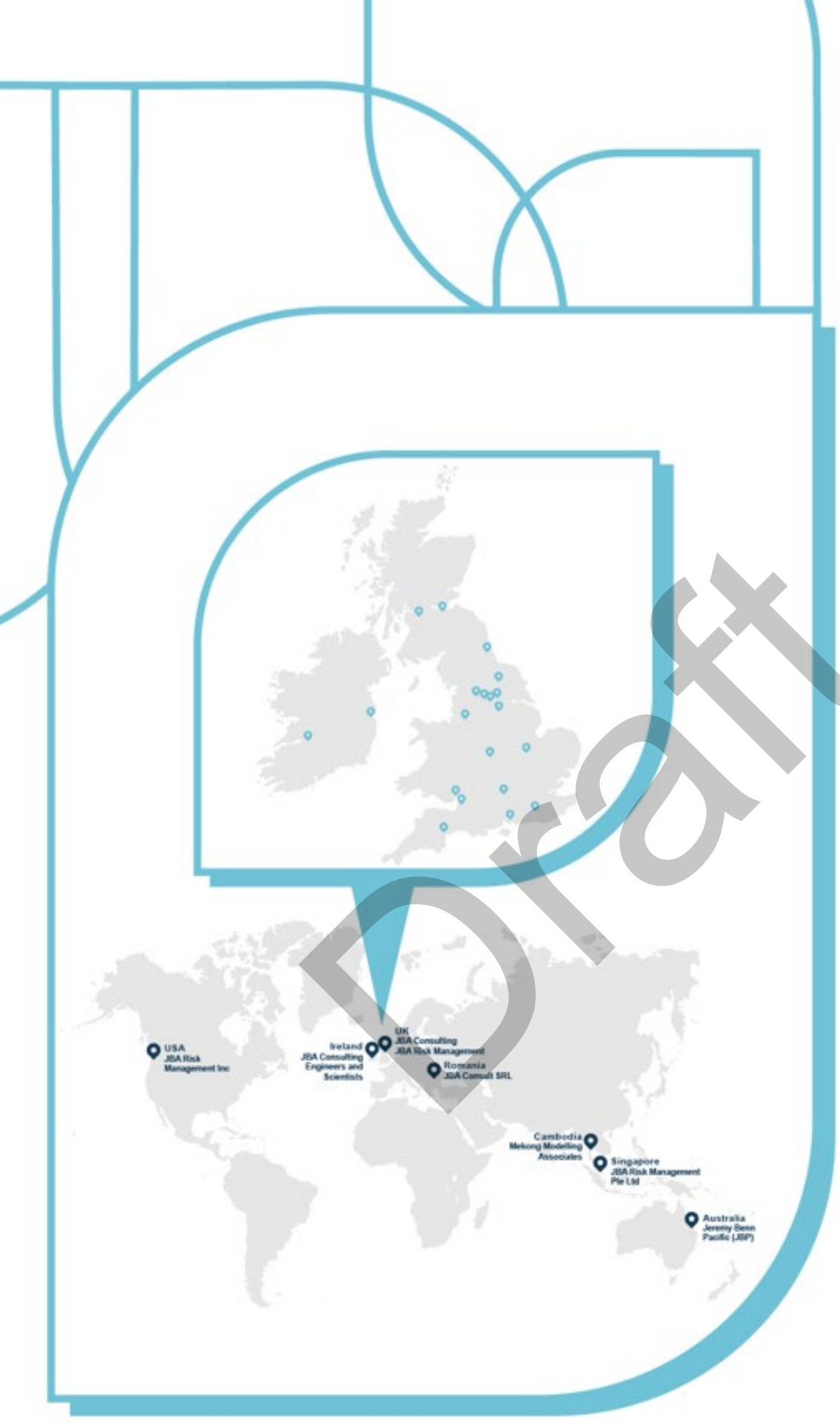

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Wallingford
Warrington

Registered Office
1 Broughton Park
Old Lane North
Broughton
SKIPTON
North Yorkshire
BD23 3FD
United Kingdom

+44(0)1756 799919
info@jbaconsulting.com
www.jbaconsulting.com
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South Oxfordshire and Vale of White Horse Level 2 Strategic Flood Risk Assessment Update

Site AS9 - North West of Valley Park, Didcot

Draft Report

October 2026

Prepared for:

South Oxfordshire District Council and

Vale of White Horse District Council

www.jbaconsulting.com

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Reviewed by	Laura Thompson-Jones BSc CGeog FRGS Senior Analyst
Authorised by	Mike Williamson BSc MSc CGeog FRGS EADA Project Director

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Contract

JBA Project Manager	Freya Nation
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2026s1132

This report describes work commissioned by South Oxfordshire and Vale of White Horse District Councils. The Client's representative for the contract was Rebekah Goodwill of South Oxfordshire and Vale of White Horse District Councils. Boe Kilshaw of JBA Consulting carried out this work.

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The methodology adopted and the sources of information used by JBA in providing its services are outlined in this Report. The work described in this Report was undertaken between August and October 2026 and is based on the conditions encountered and the information available during the said period. The scope of this Report and the services are accordingly factually limited by these circumstances.

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for South Oxfordshire and Vale of White Horse Joint Local Plan Site AS9 - North West of Valley Park, Didcot. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA' (2024) and the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum' (2026), and read the 'South Oxfordshire and Vale of White Horse District Councils Level 2 SFRA Main Report Update' (2026) and is therefore familiar with the terminology used in this report.

1.1 Site AS9 - North West of Valley Park, Didcot

- Location: North West of Valley Park, Didcot (Figure 1-1)
- Existing site use: Agriculture
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Mainly residential
- Proposed site use vulnerability: More vulnerable
- Site area: 33.25 ha
- Proposed development impermeable area: 28.3 ha (assumed 85% of site area)
- EA model: Didcot Valley Park 2019 / Moor Ditch (Didcot to Thames Confluence) 2007
- Watercourse: Unnamed drain
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for more detailed assessment through Level 2 SFRA (Strategic Recommendation A)
    - Assess present day and future modelled fluvial depths, hazards
    - Assess present day and future modelled surface water depths, hazards

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Figure 1-1: Site location

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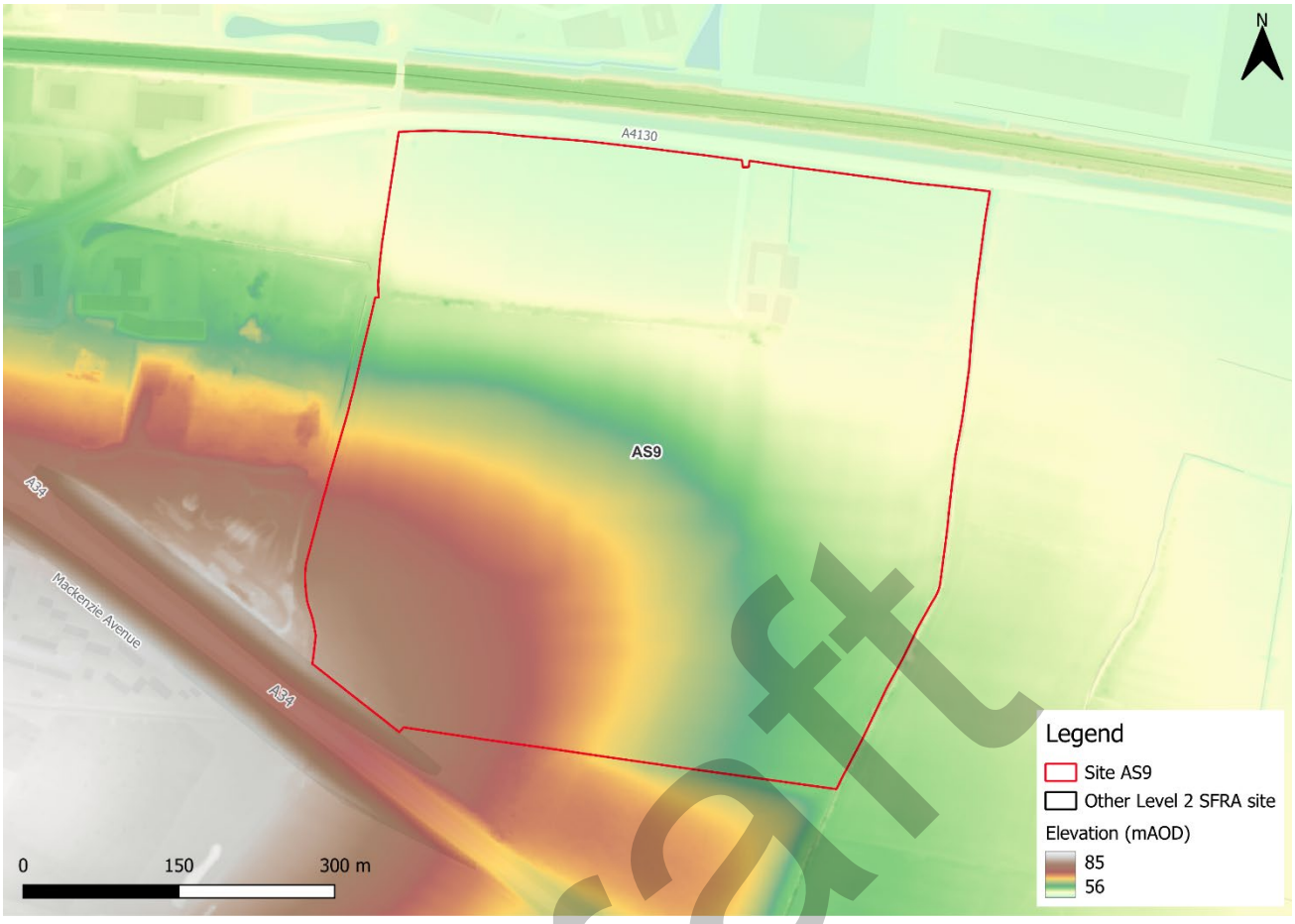

Figure 1-2: Topography

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2 Flood risk from rivers

2.1 Existing risk

2.1.1 Flood Map for Planning and functional floodplain

Based on the Environment Agency's (EA) Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum (2026), the percentage areas of the site within each flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.4).

The areas along the northern and eastern boundaries of the site are located within Flood Zone 3b. The area of functional floodplain onsite should be left free of vulnerable development. The functional floodplain in this location is based on the 1% AEP event from both the Moor Ditch (Didcot to Thames Confluence) 2007 and Didcot Valley Park 2019 models. A further 3% of the site is within Flood Zone 2 and therefore at medium risk of flooding from rivers. The rest of the site is within Flood Zone 1 and therefore at low risk of flooding from rivers.

Table 2-1: Existing flood risk based on percentage area of site at risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
83	3	0	14

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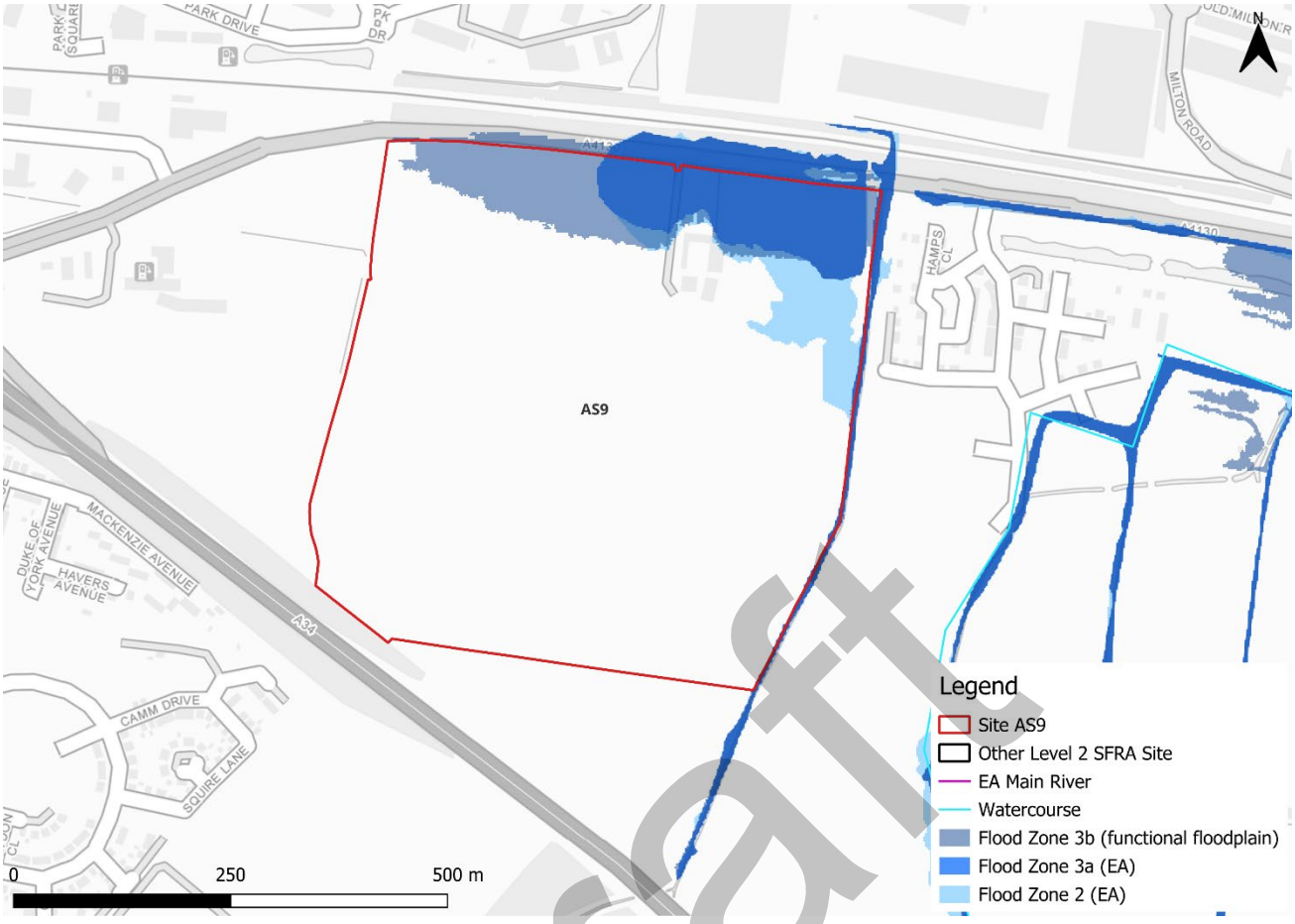

Figure 2-1: Existing risk from rivers to the site

2.1.2 Didcot Valley Park 2019 model outputs

The Didcot Valley Park 2019 model cannot be used to fully inform this SFRA, due to required results files not being provided for consideration. The fluvial risk information to inform the suitability for allocation of this site, and all other sites in the model domain, is therefore limited. The information required for the SFRA that is not available includes:

- Flood depth information
- Flood hazard information

The only modelled fluvial flood risk information available for consideration for this site is the flood extent for the 1% AEP undefended event provided by the EA.

Figure 2-2 shows the modelled flood extent for the 1% AEP undefended event which is the event Flood Zone 3 of the Flood Map for Planning is based on. Modelled risk to the site is similar to Flood Zone 3 in the vicinity of the site, with the area along the northern and eastern boundaries of the site modelled to be at risk. There is no modelled flood risk to the rest of the site in the 1% AEP undefended event.

The Didcot Valley Park 2019 model has superseded the Moor Ditch (Didcot to Thames Confluence) 2007 model in the location of site AS9 (North West of Valley Park, Didcot). However, as modelled flood depths are available for the Moor Ditch model, they have been included within this assessment as an indicative estimation of modelled flood depths. Note

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that this information was modelled in 2007 thus is likely to be based on outdated hydrology, terrain data and channel and structure survey. The Moor Ditch (Didcot to Thames Confluence) 2007 model results are discussed in Section 2.1.3.

Modelled flood depth and hazard information for the Didcot Valley Park 2019 model must be considered to inform on flood risk to the site. Therefore, any updates to this Level 2 SFRA and/or any site-specific FRA should include for deriving this modelled information.



Figure 2-2: Flood extent for 1% AEP undefended flood event

2.1.3 Moor Ditch (Didcot to Thames Confluence) 2007 model outputs

Flood depth information is available for present day flood events, derived through a 1D mapping process. However, as discussed above, this information has now been superseded by the Didcot Valley Park 2019 model and is only included within this assessment as an indication of modelled flood depths in the absence of modelled depths from the most recent modelling.

Figure 2-3 shows the modelled flood depths for the 1% AEP undefended event which is the event Flood Zone 3 of the Flood Map for Planning is based on. Maximum modelled flood depths within the area of the site modelled to be at risk in the Didcot Valley Park 2019 model are between 0.9 and 1.2 m. Flood hazards are not available for the Moor Ditch (Didcot to Thames Confluence) 2007 model.



Figure 2-3: Flood depths for 1% AEP undefended flood event based on the superseded Moor Ditch 2007 model

2.2 Impacts from climate change

2.2.1 Detailed model outputs - climate change

The EA's SFRA guidance states that SFRAs should assess the 2080s central allowance for less vulnerable, more vulnerable, highly vulnerable and water compatible development (Table 2-2). The impacts of climate change on flood risk from the unnamed drain (Didcot Valley Park 2019 model) has not been modelled for this SFRA. The impacts of climate change must be modelled using the EA's latest allowances for peak river flows to inform whether the site can be safe for its lifetime and to assess modelled flood depths and hazards. Therefore, any updates to this Level 2 SFRA and/or any site-specific FRA should include for the most up to date climate change allowances.

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Table 2-2: Climate change allowances for peak river flows for the Gloucestershire and the Vale management catchment

Epoch	Central	Higher Central	Upper End
2020s	11%	17%	33%
2050s	11%	19%	43%
2080s	26%	41%	84%

2.2.2 Flood Map for Planning - Flood Zones plus Climate Change

Figure 2-4 shows the EA's Flood Map for Planning - Flood Zones plus Climate Change dataset. Based on this dataset, the site is not shown to be at significant additional risk from climate change. There is a slightly greater extent of flooding within the northeastern corner of the site.



Figure 2-4: Flood Zones plus Climate Change Dataset

2.3 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

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2.4 Flood risk management

The site doesn't benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

2.4.1 Cumulative impacts

A cumulative impact assessment was completed through the South Oxfordshire and Vale of White Horse Level 1 SFRA Addendum (2026), which aimed to identify catchments sensitive to the cumulative impact of development. Site AS9 (North West of Valley Park, Didcot) is located within one catchment, namely; Moor Ditch and Ladygrove Ditch. This is ranked as a medium sensitivity catchment. Planning considerations for sites at medium sensitivity to the cumulative impacts of development can be found in Appendix D of the Level 1 SFRA Addendum. Cumulative impacts of development should also be considered as part of a site-specific FRA.

2.4.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. Both within and upstream of the site, there are significant opportunities for tree planting to reduce runoff downstream. There is also potential to reconnect the channel to the floodplain, allowing flood water to be stored. There are some additional areas within the site that have the potential for runoff attenuation features. These areas are shown in Figure 2-5.

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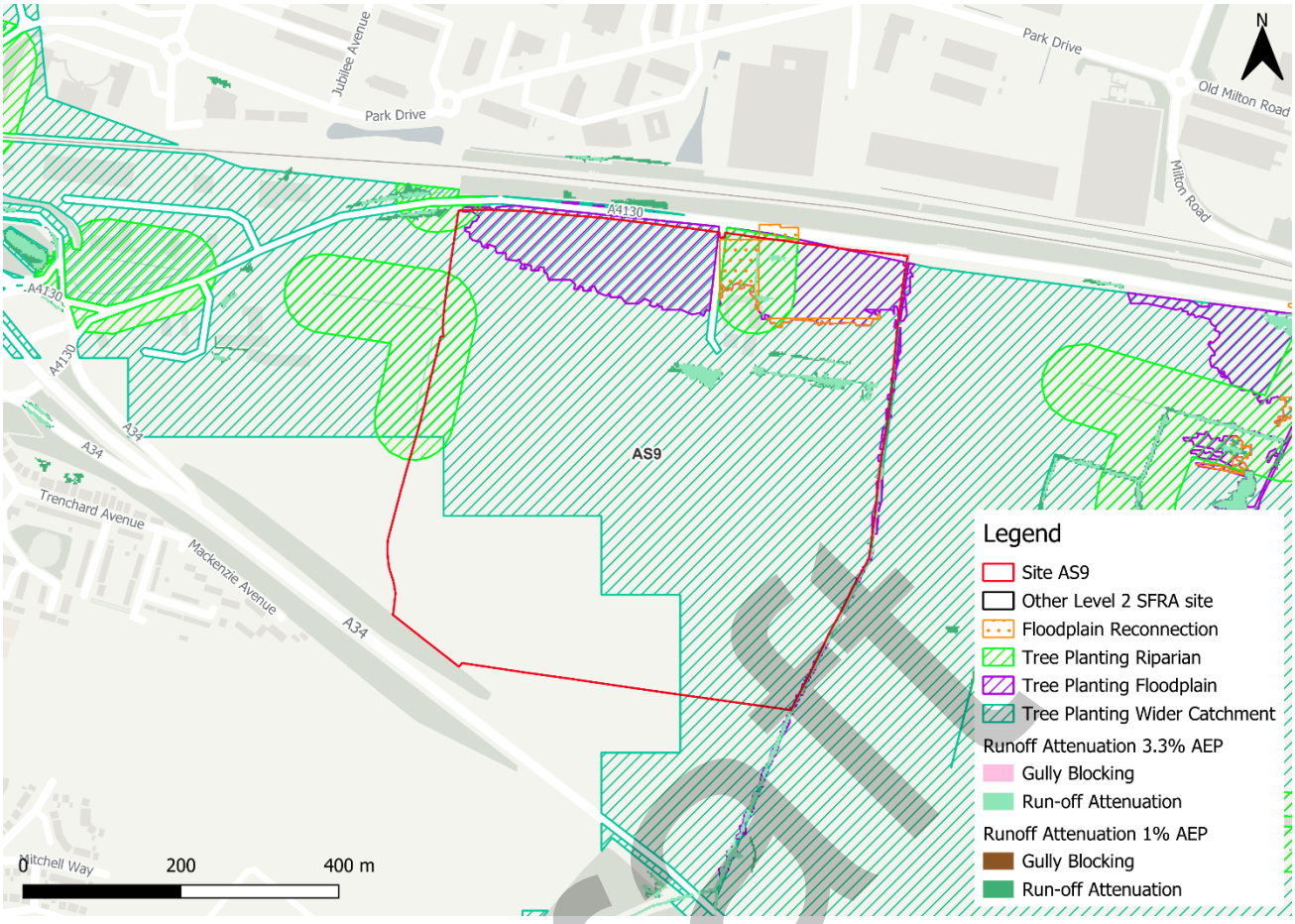

Figure 2-5: Natural Flood Management (NFM) potential mapping

2.5 Residual risk

Although a site may be afforded some protection from defences and / or drainage infrastructure, there is always a residual risk of flooding from asset failure i.e. defence breaches, or blockages of culverts or drainage assets.

There are no assets with the potential to pose a residual risk to the site

2.5.1 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. A "dry day" scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. A "wet day" scenario assumes a worst-case scenario where a reservoir releases water held on a "wet day" when local rivers have already overflowed their banks.

The site is not modelled to be at risk from reservoir flooding.

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2.6 Emergency Planning

2.6.1 Flood warnings and alerts

The EA operates a Flood Warning Service for properties located within a Flood Warning Area (FWA) for when a flood event is expected to occur. Site AS9 (North West of Valley Park, Didcot) is not located within a FWA.

Flood alerts may be issued before a flood warning for properties located within a Flood Alert Area (FAA) to provide advance notice of the possibility of flooding. A flood alert may be issued when there is less confidence that flooding will occur in a FWA. The site is located within one FAA, along the northern boundary of the site, namely 061WAF23Ginge - Ginge Brook (Figure 2-6).

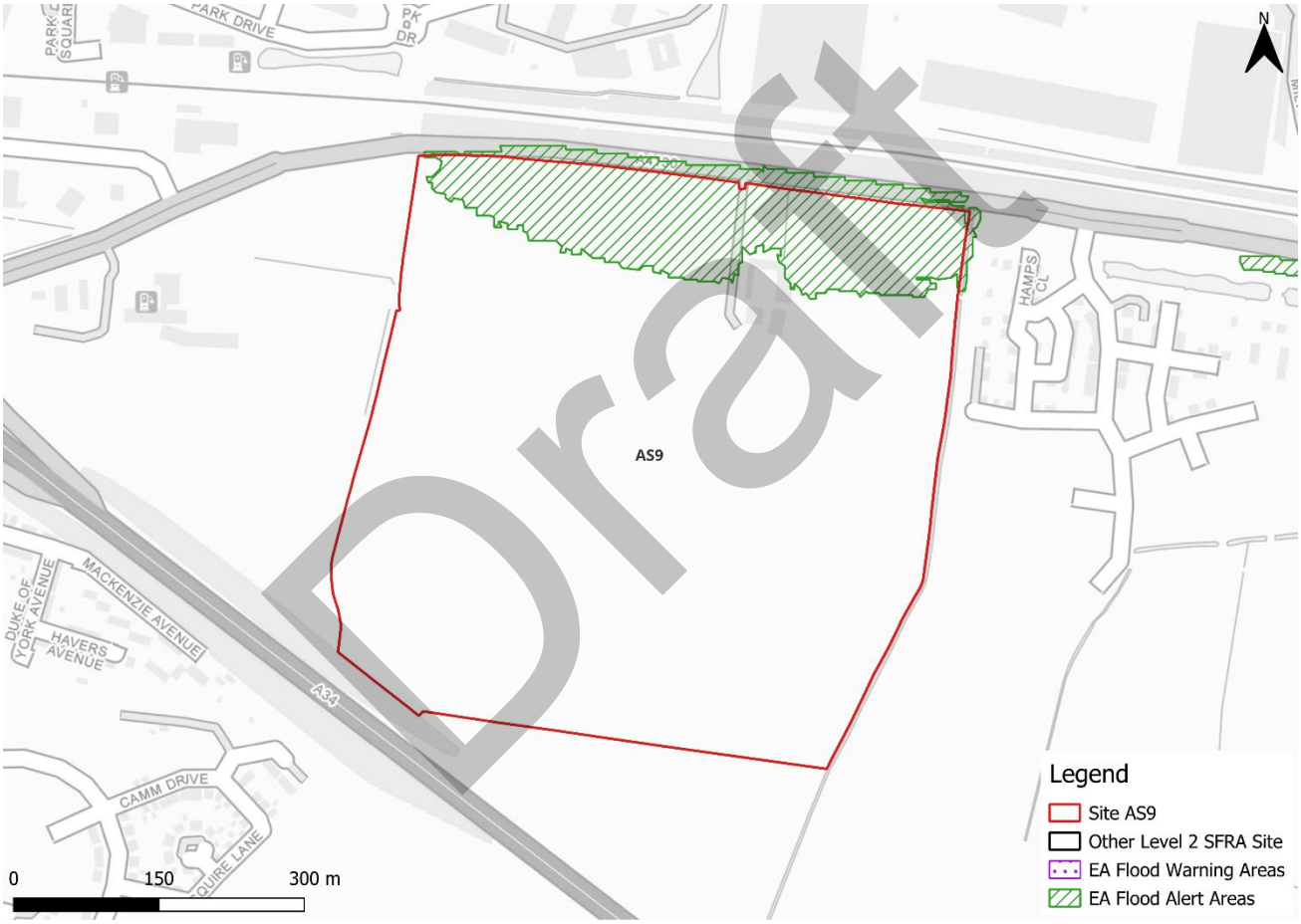

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Figure 2-6: EA Flood Warning and Alert Areas

2.6.2 Access and escape routes

Safe access and escape routes could likely be achieved during a flood event via the A4130 to the north of the site. Access roads may need to be situated to the west of the site given the potential impact of flooding along the northern boundary of the site. This route is indicated by the yellow line in Figure 2-7.



Figure 2-7: Potential access and escape routes

2.7 Observations, mitigation options, site suitability, sequential approach to development management - fluvial

- Observations:
  - The site is modelled to be within the functional floodplain within the north of the site and within the unnamed drain which runs along the eastern site boundary. Vulnerable development is not permitted within the area of functional floodplain.
  - No modelled flood depth or hazard information is available for the Didcot Valley Park 2019 model. The superseded Moor Ditch (Didcot to Thames Confluence) 2007 model outputs have been used to provide an indicative idea of flood depths within the area at risk. Maximum modelled flood depths within the area of the site modelled to be at risk in the Didcot Valley Park 2019 model are between 0.9 and 1.2 m.
  - Modelled depth and hazard information was not available for the Didcot Valley Park 2019 model. This should be considered as part of a site-specific FRA, as well as/instead of a Level 2 SFRA update.
  - The EA Flood Zones plus Climate Change dataset shows the site is not at significant additional risk from climate change. However, as discussed, there is no detailed modelling available to understand the impact of climate change

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on fluvial flood depths, velocities and hazards. Climate change must be modelled at the site-specific FRA stage.

- Mitigation:
  - The area of functional floodplain within the north of the site and the areas adjacent to the unnamed drain should be maintained and included in site design as a green / blue corridor offering multifunctional benefits alongside flood risk mitigation including Biodiversity Net Gain (BNG) contributions, and social and amenity benefits. This should be feasible without impacting significantly on plot numbers.
  - The EA flood alert areas should continue to be in place to ensure early evacuation of site users before an extreme flood event occurs.
- Access and escape:
  - Safe access and escape routes could likely be achieved during a flood event via the A4130 to the north of the site. Access roads may need to be situated to the west of the site given the potential impact of flooding along the northern boundary of the site.

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3 Flood risk from surface water

3.1 Existing risk

3.1.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths Present Day

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Extents Present Day map (September 2026), the site is predominantly situated outside of the 0.1% AEP event (Table 3-1).

Surface water risk is largely confined to the north of the site (Figure 3-1). There is an area of ponding along the northern boundary of the site which is likely a result of the topographic low spot behind the raised A4130 road infrastructure. There are some additional small areas of ponding through the centre of the site that become predominant in all events.

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Depths Present Day map, the greatest flood depths between 0.9 and 1.2m, however the site is predominantly at depths of less than 0.6m (Figure 3-2).

Safe access and escape routes may be possible via the A4130 if access roads are situated to the west.

Table 3-1: Existing surface water flood risk based on percentage area at risk using the Flood Map for Planning - Surface Water Spatial Planning Extent Present Day map

Less than 0.1% AEP event (% area)	0.1% AEP event (% area)	1% AEP event (% area)	3.3% AEP event (% area)
92	3	1	4

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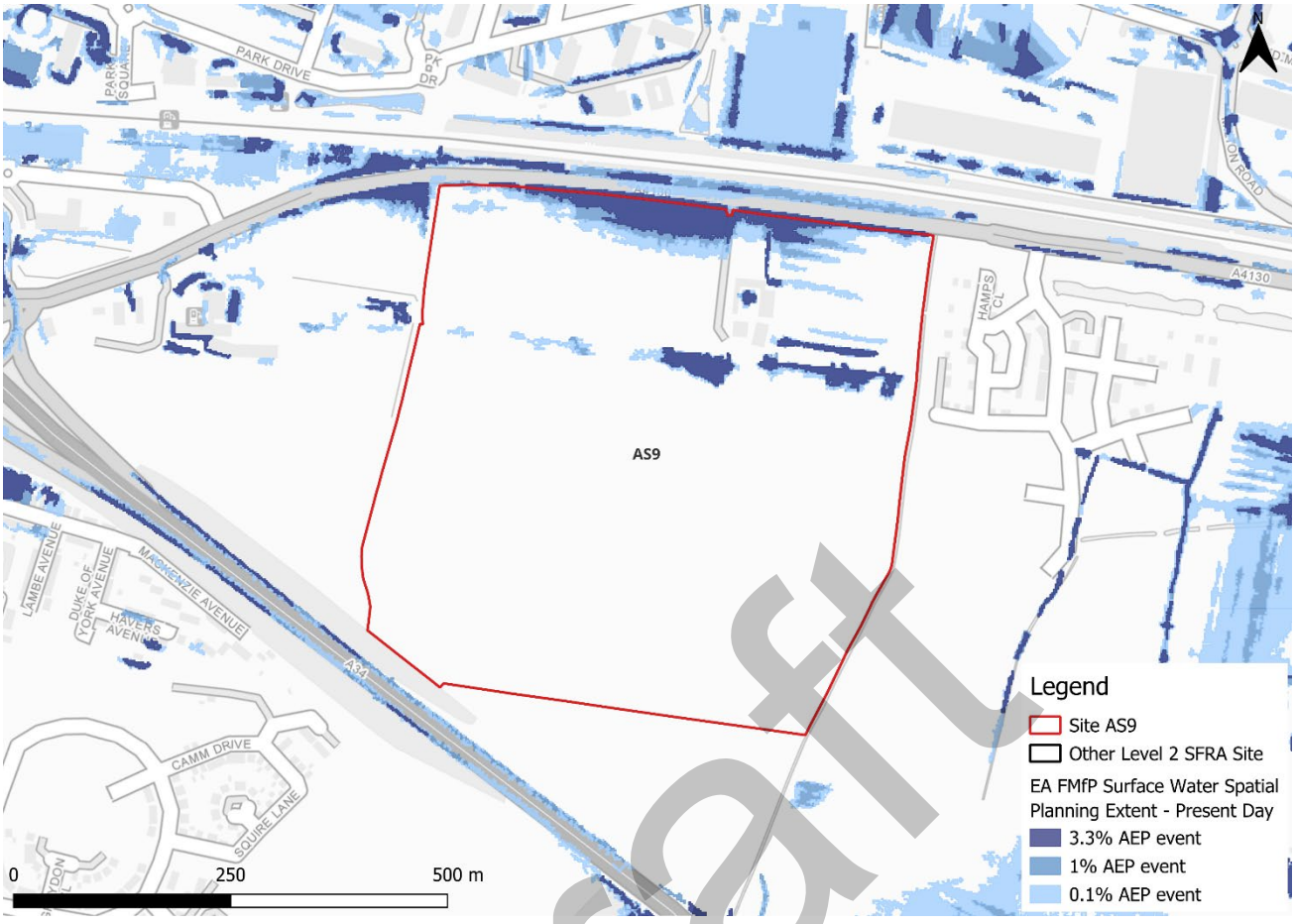

Figure 3-1: Flood Map for Planning - Surface Water Spatial Planning Extents Present Day

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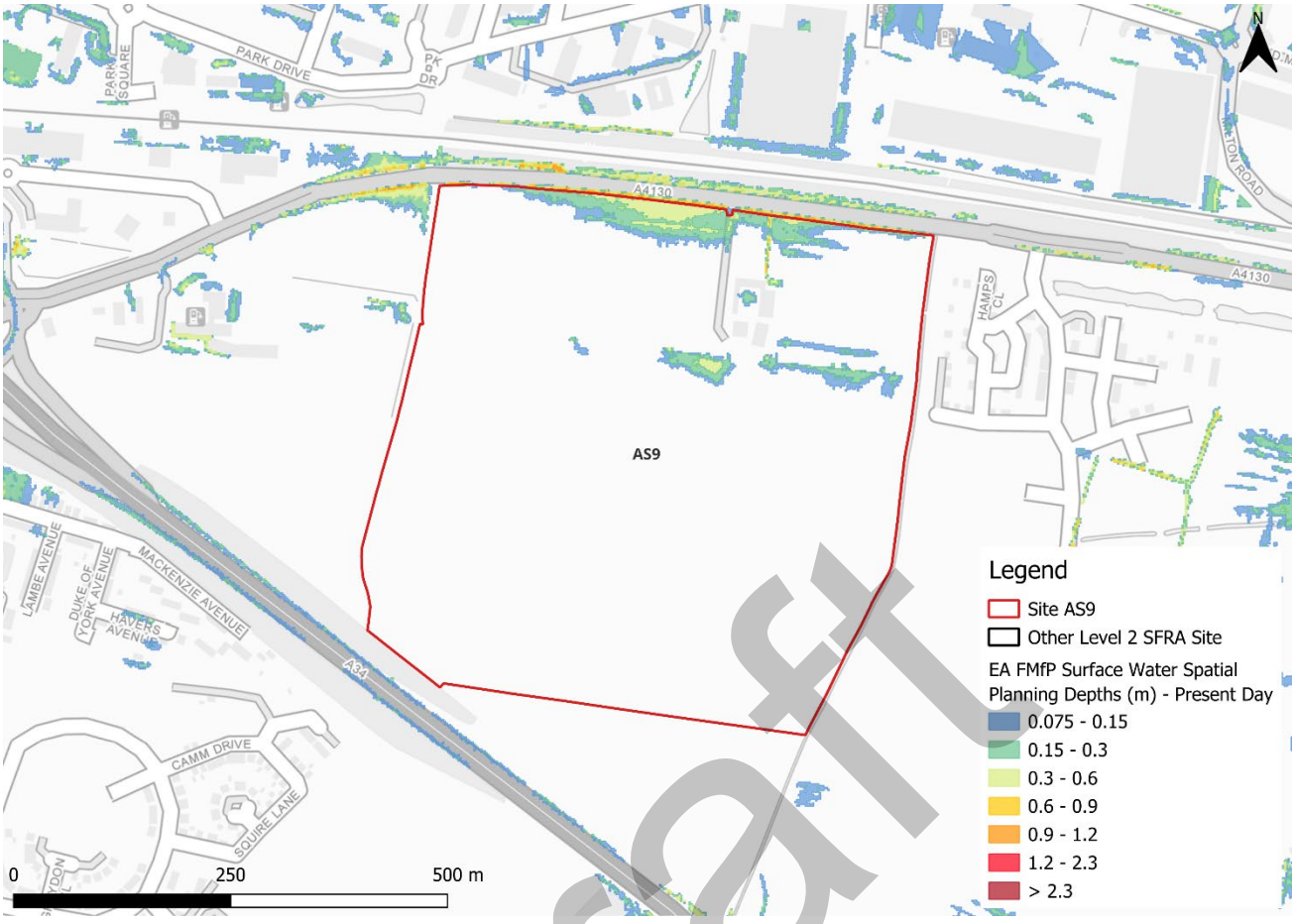

Figure 3-2: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Present Day for the 1% AEP event

3.1.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning data does not include hazard information suitable for planning purposes. Therefore, this Level 2 SFRA considers the third generation Risk of Flooding from Surface Water (RoFSW) hazard mapping in addition to the Flood Map for Planning - Surface Water Spatial Planning extents and depths, as the best available information. Updated surface water hazard information would need to be confirmed at the site-specific FRA stage.

Based on the EA's national scale third generation RoFSW map, the greatest flood hazard within the site in the medium risk event is categorised as 'significant', however is predominantly 'moderate' (Figure 3-3).

There are some differences between the Flood Map for Planning - Surface Water Spatial Planning map and the third generation RoFSW hazard mapping. The Flood Map for Planning - Surface Water Spatial Planning data does not map flooding less than 0.075m (7.5cm) in depth. Therefore, where the map may show no flooding, there may be shallow flooding up to a depth of 0.075m. In contrast, the third generation RoFSW does not map flooding with a hazard rating of less than 0.575. This could explain the differences observed between the Flood Map for Planning and third generation RoFSW maps.

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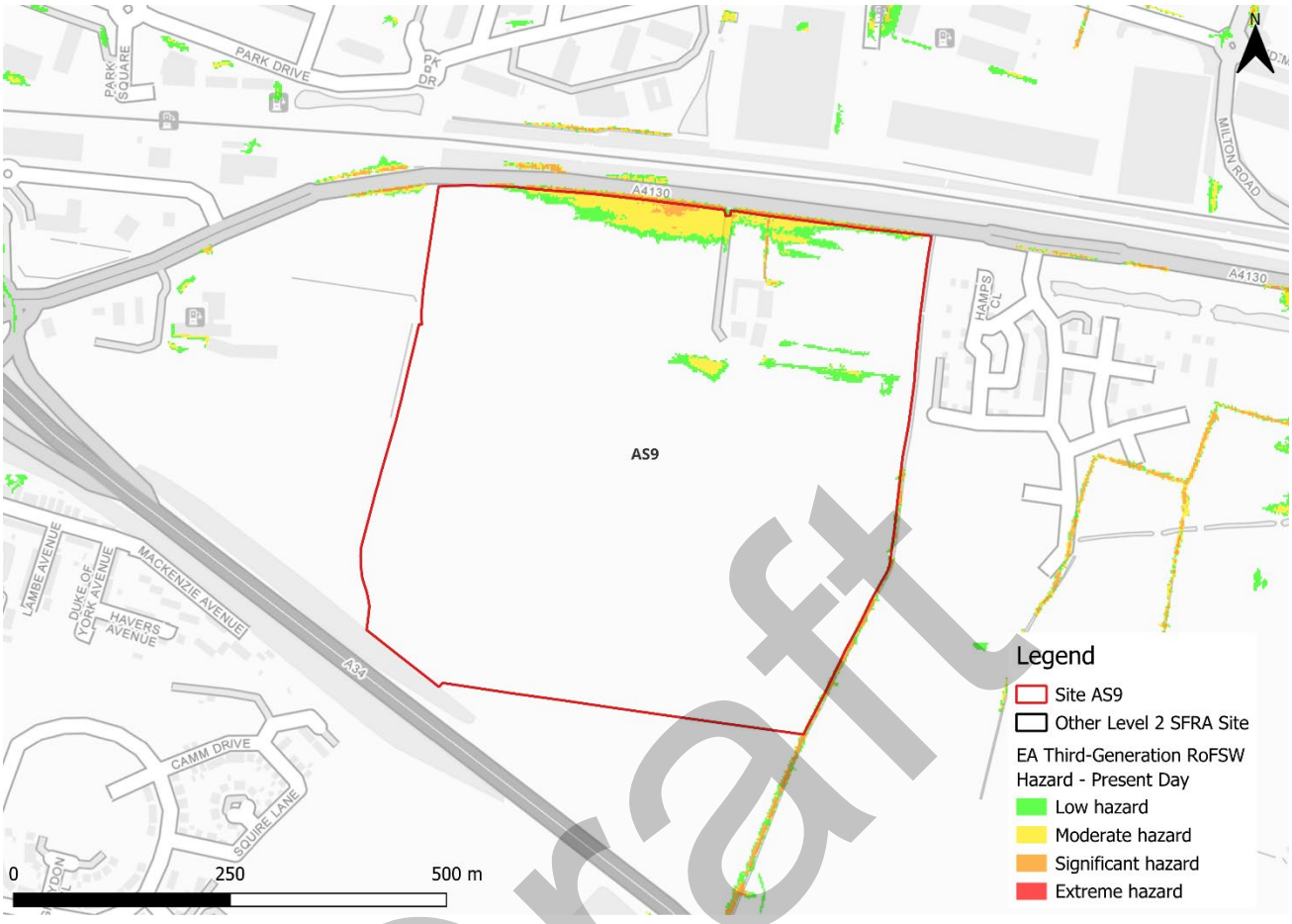

Figure 3-3: Third generation - Risk of Flooding from Surface Water map present day 1% AEP event surface water flood hazard[1]

3.2 Impacts from climate change

3.2.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths

The EA's climate change allowance guidance states that SFRA's should assess the upper end peak rainfall allowance for the 2070s epoch. This dataset is included in the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Climate Change dataset (September 2026). The peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment are shown in Table 3-2. The allowance for the 0.1% AEP event is not stated in the EA guidance.

1 Based on Section 7.5 Hazard rating. What is the Risk of Flooding from Surface Water map? Report version 2.0. April 2019. Environment Agency

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Table 3-2: Peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment

Return period	Central allowance 2070s (% increase)	Upper end allowance 2070s (% increase)
3.3% AEP	25	35
1% AEP	25	40

Figure 3-4 shows the surface water flood extents for the 2070s upper end climate change scenario. Surface water flood extents are shown to increase in all events, particularly within the north of the site. There are also some additional areas of scattered ponding in the 0.1% AEP event. Greatest flood depths are modelled to remain at between 0.9 and 1.2 m (Figure 3-5).

Safe access and escape routes may be challenging to achieve, however could be feasible if access routes via the west are sought.

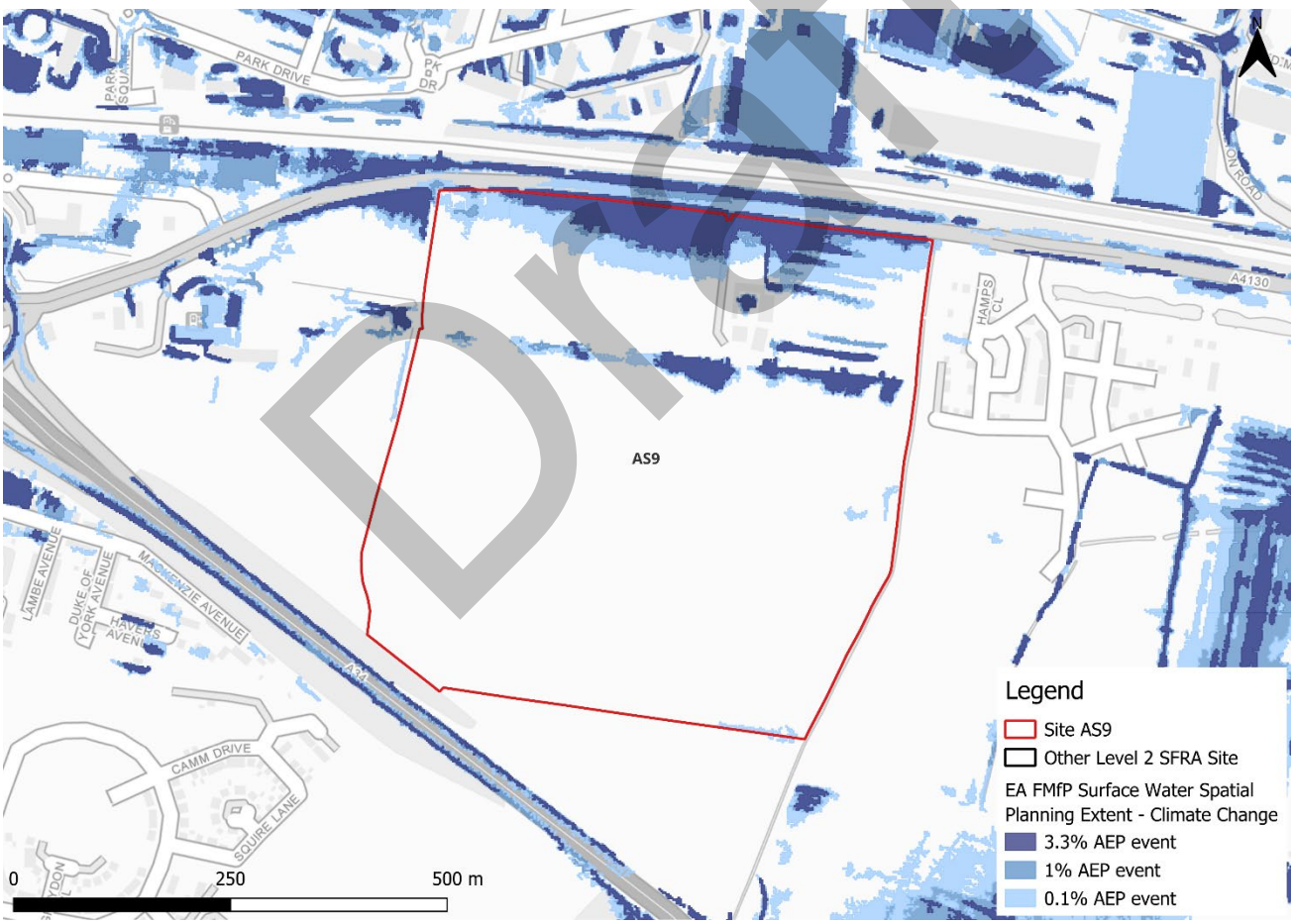

Figure 3-4: Flood Map for Planning - Surface Water Spatial Planning Extents Climate Change (2070s Upper End)

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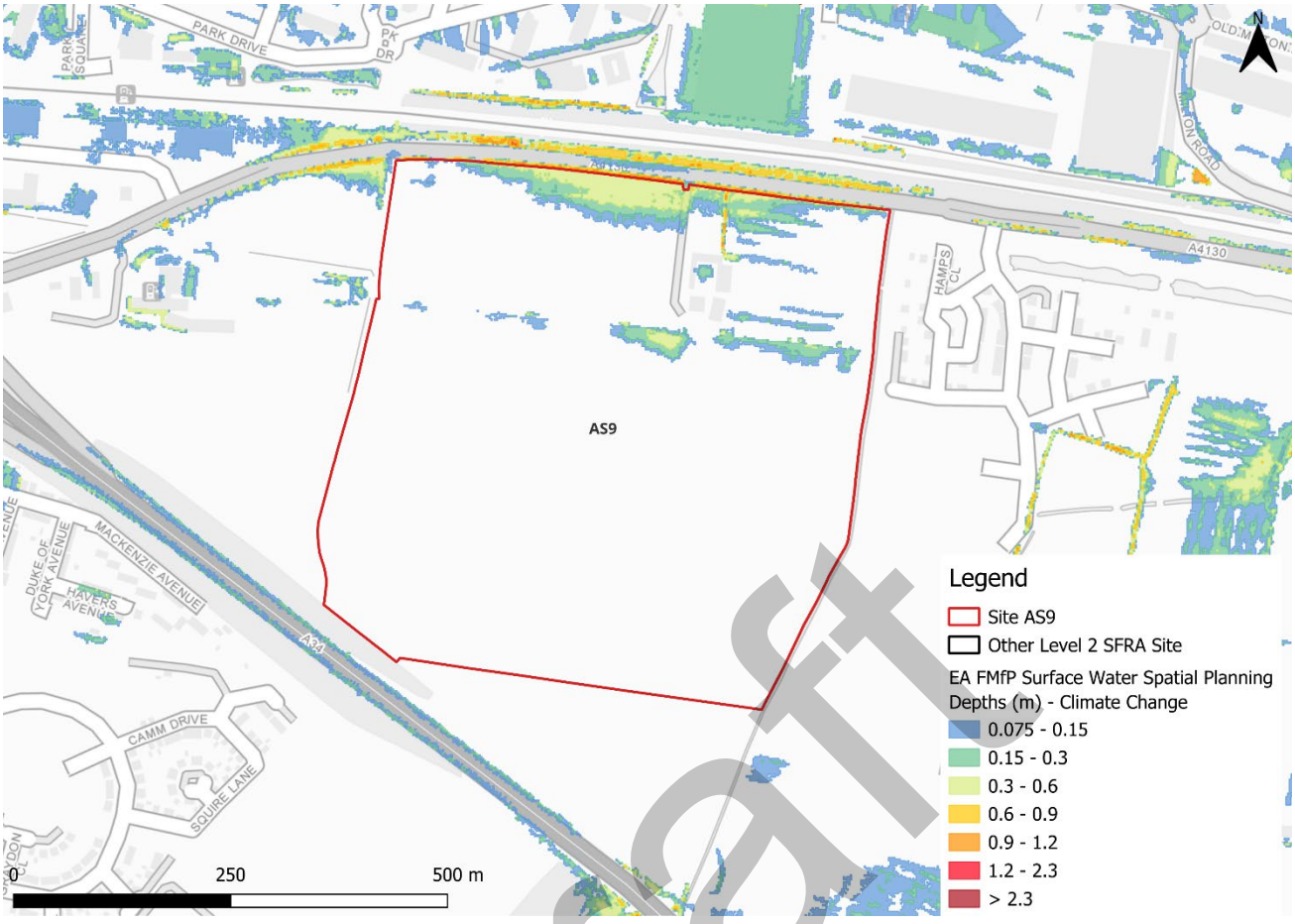

Figure 3-5: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Climate Change for the 1% AEP event (2070s Upper End)

3.2.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning climate change data does not include hazard information suitable for planning purposes. This Level 2 SFRA therefore considers the RoFSW low risk surface water event as a conservative proxy for the medium risk event plus climate change, as the best available information to assess surface water flood hazards. The impact of climate change on surface water flood hazards should be considered at the site-specific FRA stage.

Using the RoFSW low risk event as a proxy, future surface water flood hazard in the medium risk event is categorised as 'significant' adjacent to the northern site boundary (Figure 3-6).

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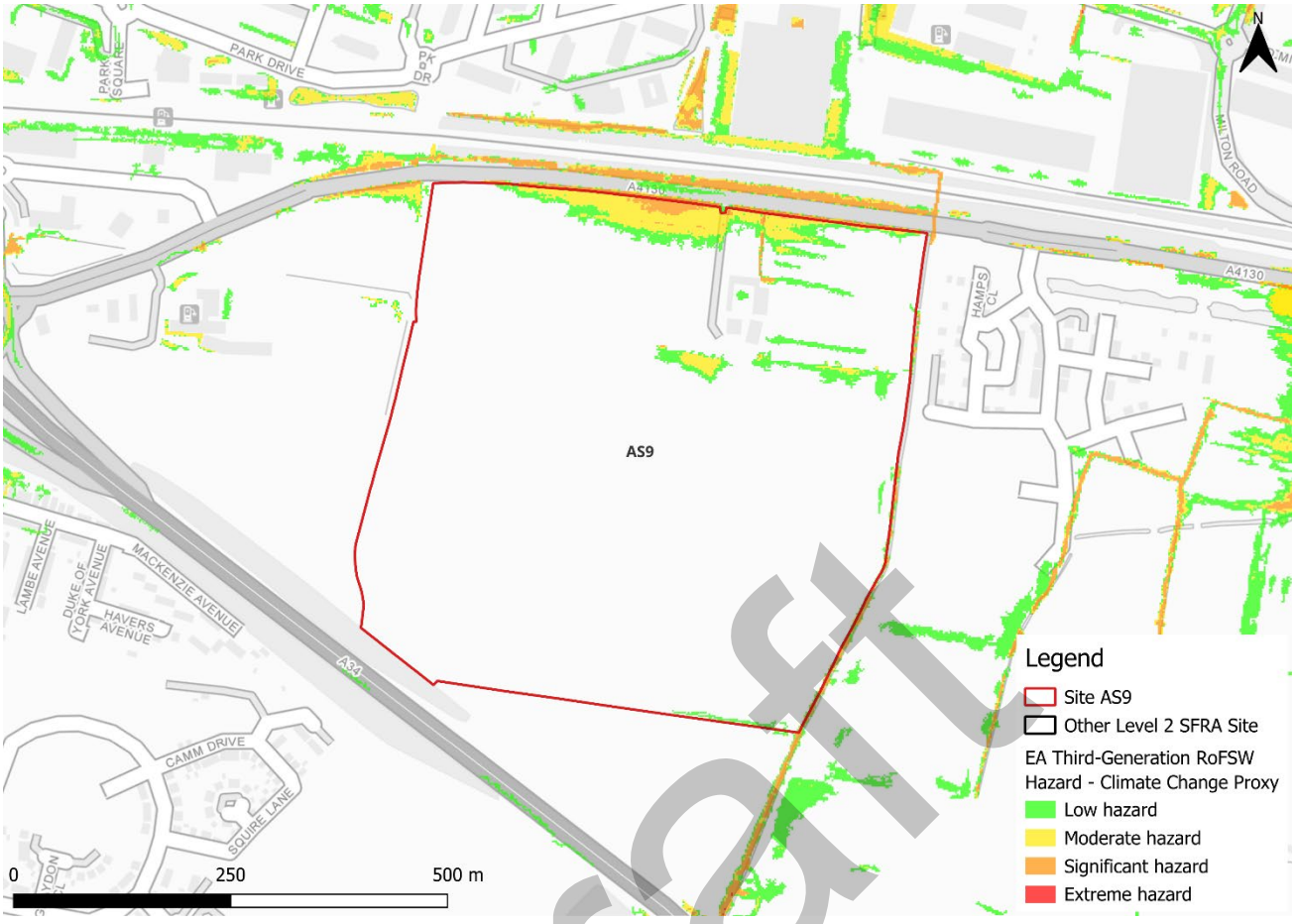

Figure 3-6: Low risk event surface water flood hazard[1], as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options, site suitability, sequential approach to development management - surface water

- Current risk to the site is predominantly very low, with 92% of the site being outside of the 0.1% AEP surface water flood extent. Surface water risk is confined to areas of ponding within topographic low spots in the north and centre of the site.
- Topographic low spots should be considered and included in site design and ideally left in place to flood naturally when required.
- Risk to the site is shown to increase in extent within the site when considering the impact of climate change, particularly within the area of ponding in the north of the site.
- Surface water flood hazards, including for the impact of climate change, should be considered further through the site-specific FRA and drainage strategy.
- The drainage strategy must ensure there is no increase in surface water flood risk elsewhere as a result of new development. The developer should aim to achieve betterment of existing runoff rates. The developer should also follow the National SuDS guidance.

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- Safe access and escape routes may be challenging to achieve, however could be feasible if access routes via the west are sought.

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4 Groundwater, geology and SuDS suitability

Risk of groundwater emergence is assessed in this SFRA using JBA's 5m Groundwater Emergence Map. Figure 4-1 shows the map covering the sites and the surrounding areas. Table 4-1 explains the risk classifications.

The entirety of the site is in an area where there is negligible groundwater emergence risk. Groundwater conditions may therefore be suited to infiltration SuDS.



Figure 4-1: JBA 5m Groundwater Emergence Map

Table 4-1: Groundwater Emergence Hazard Classification

Groundwater head difference (m)*	Class label
0 to 0.025	Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
0.025 to 0.5	Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
0.5 to 5	Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event There is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely.
>5	Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event. Groundwater emergence is not likely.
N/A	No risk. This zone is deemed as having a negligible risk from groundwater emergence due to the nature of the local geological deposits.
*Difference is defined as ground surface in mAOD minus modelled groundwater table in mAOD.	

The underlying bedrock within the site is mudstone, sandstone, and limestone. Superficial deposits consist of clay, silt and sand in the northern area of the site (Figure 4-2). Other than sandstone, all these rocks generally have low levels of permeability. This leads to less water infiltrating into the ground and could potentially contribute to lower water table levels.

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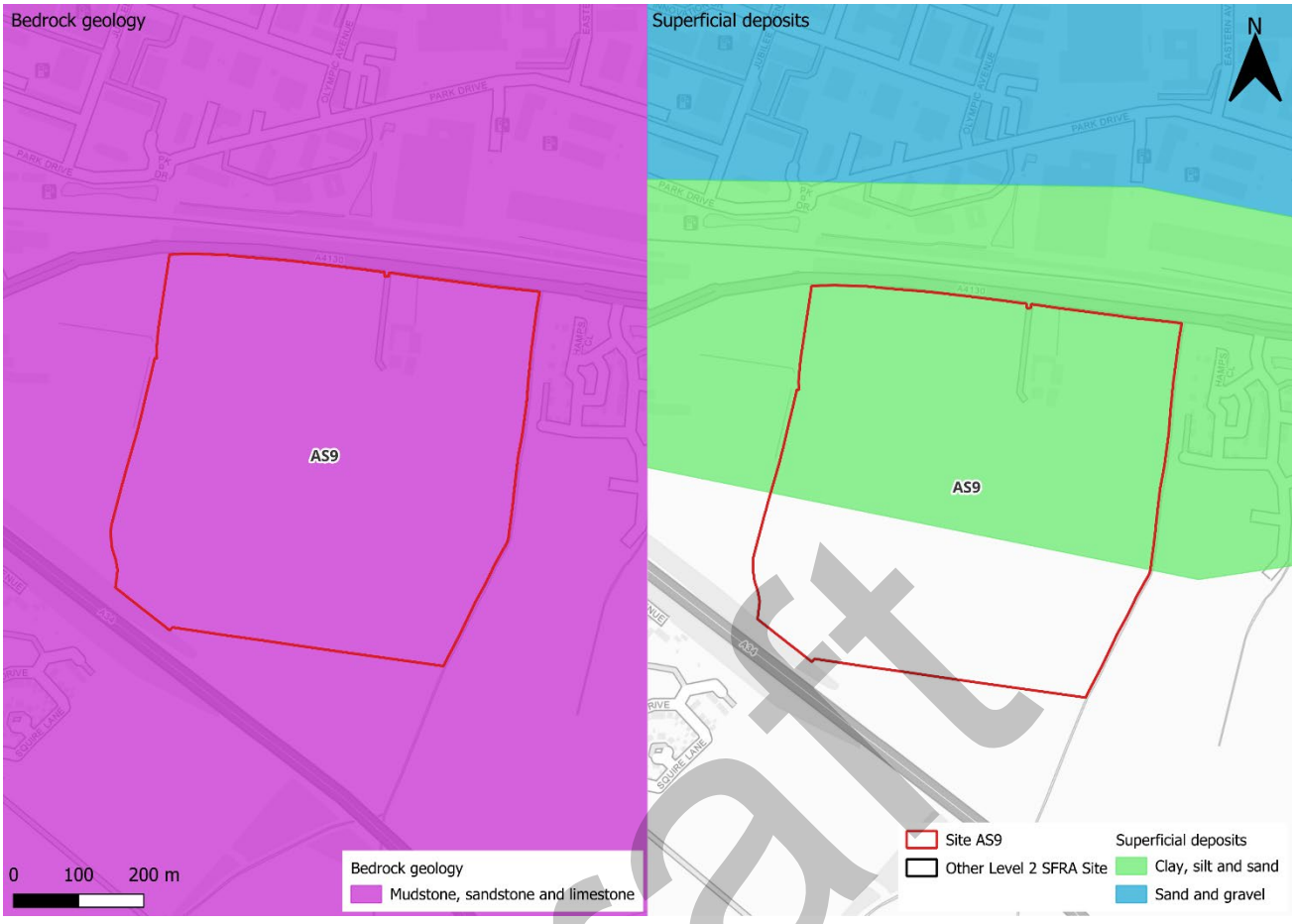

Figure 4-2: BGS Geology - Bedrock and superficial deposits

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5 Overall site assessment

5.1 Can part b) of the exception test be passed?

This site is not required to pass part b) of the exception test[2] as it is not located within Flood Zone 3a. However, it must still be proven that the development can be safe for its lifetime, which is generally considered to be 100 years for residential development. The site is not required to pass the exception test as it is not located within Flood Zone 3a, and it is expected that vulnerable development will avoid the area of functional floodplain.

5.2 Recommendations and site-specific FRA requirements

Based on the evidence presented in the Level 1 SFRA (2024), Level 1 SFRA Addendum (2026) and this Level 2 SFRA:

- The proposed development of the site would see a change in the risk classification from less vulnerable to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the site-specific FRA must show that the development can be designed to be safe for its lifetime and that there is adequate emergency planning provision (para 006 FRCC-PPG).
- There should be no vulnerable development within the area of the site within the functional floodplain. This should be converted to a blue / green corridor to provide ecological, amenity and social value.
- Present day depth and hazard information and updated climate change modelling from the Didcot Valley Park 2019 model should be used to update this Level 2 SFRA at the earliest opportunity to provide an up-to-date strategic assessment of flood risk to this site and the surrounding areas. It would be acceptable to use updated modelling to suitably assess risk through a site-specific FRA, as well as/instead of a Level 2 SFRA update.
- It should be possible to allocate this site if development avoids the area north of the site within the functional floodplain and surface water flood risk.
- Were this site to be allocated based on current information, the LPA must make it clear that this site cannot be developed until the required information detailed in this SFRA on present day and future flood risk from the unnamed drain is fully ascertained.
- The unnamed drain should be kept in place and remain unobstructed. The watercourse should be maintained and included within the landscaping design of the development.
- A drainage strategy will be required for any new development. The use of infiltration SuDS should be investigated.
- Opportunities for NFM features to reduce flood risk to the site and surrounding areas should be explored at the site-specific FRA stage.

[2] Policy F6 National Planning Policy Framework 2026

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- Any site-specific FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; South Oxfordshire and Vale of White Horse District Councils Joint Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with, where applicable, the local planning authority; the lead local flood authority; emergency planning officers; the Environment Agency; United Utilities; the highways authorities; and the emergency services.

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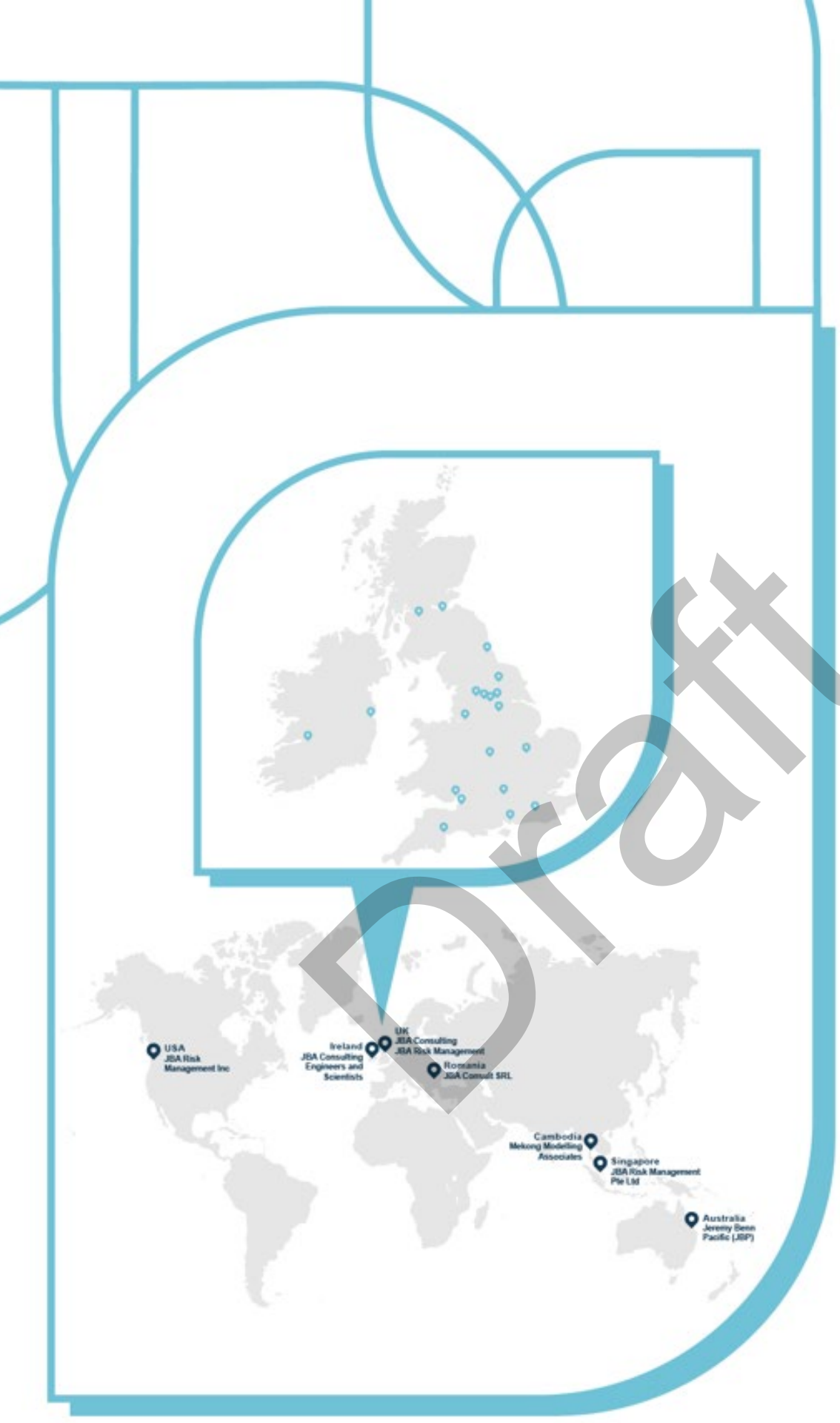

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South Oxfordshire and Vale of White Horse Level 2 Strategic Flood Risk Assessment Update

Site AS10 - Land at Dalton Barracks Garden Village, Shippon

Draft Report

October 2026

Prepared for:

South Oxfordshire District Council and

Vale of White Horse District Council

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Prepared by	Boe Kilshaw BSc Assistant Analyst
Reviewed by	Laura Thompson-Jones BSc CGeog FRGS Senior Analyst
Authorised by	Mike Williamson BSc MSc CGeog FRGS EADA Project Director

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JBA Project Manager	Freya Nation
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
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This report describes work commissioned by South Oxfordshire and Vale of White Horse District Councils. The Client's representative for the contract was Rebekah Goodwill of South Oxfordshire and Vale of White Horse District Councils. Boe Kilshaw of JBA Consulting carried out this work.

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for South Oxfordshire and Vale of White Horse Joint Local Plan Site AS10 - Land at Dalton Barracks Garden Village, Shippon. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA' (2024) and the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum' (2026), and read the 'South Oxfordshire and Vale of White Horse District Councils Level 2 SFRA Main Report Update' (2026) and is therefore familiar with the terminology used in this report.

1.1 Site AS10 - Land at Dalton Barracks Garden Village, Shippon

- Location: Land at Dalton Barracks Garden Village, Shippon (Figure 1-1)
- Existing site use: Brownfield; mixed use. Eastern third of the site currently developed for residential uses.
- Existing site use vulnerability: More vulnerable
- Proposed site use: Mixed use; mainly residential and employment
- Proposed site use vulnerability: More vulnerable
- Site area: 145.41 ha
- Proposed development impermeable area: 76.9 ha (assumed 85% of site area, outside of the area provided as open green space)
- EA model: N/A
- Watercourse: Sandford Brook
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for more detailed assessment through Level 2 SFRA (Strategic Recommendation A)
    - Assess present day and future modelled fluvial depths, hazards
    - Assess present day and future modelled surface water depths, hazards
    - Potential residual risk from the culvert under Grange Mill Lane

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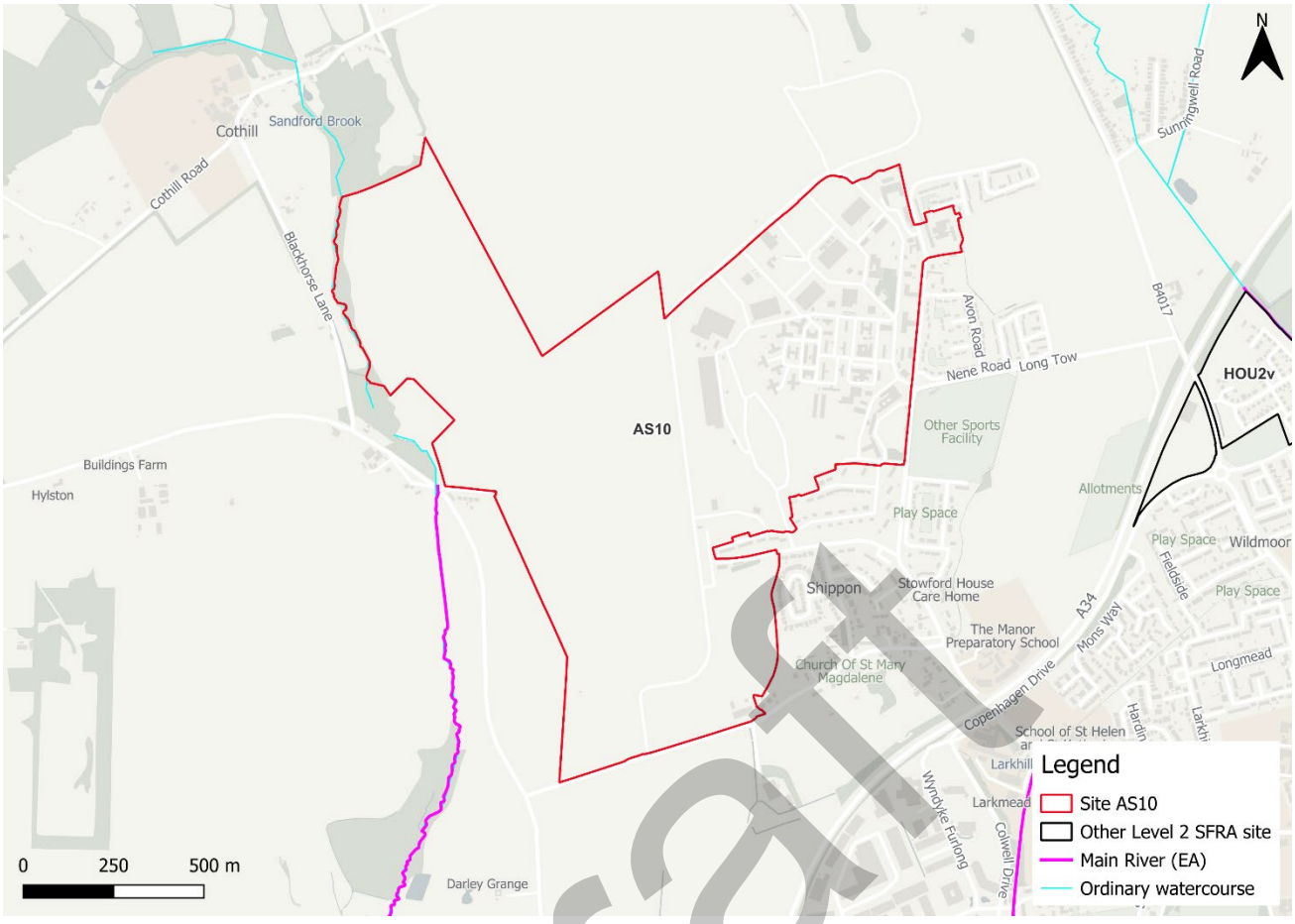

Figure 1-1: Site location

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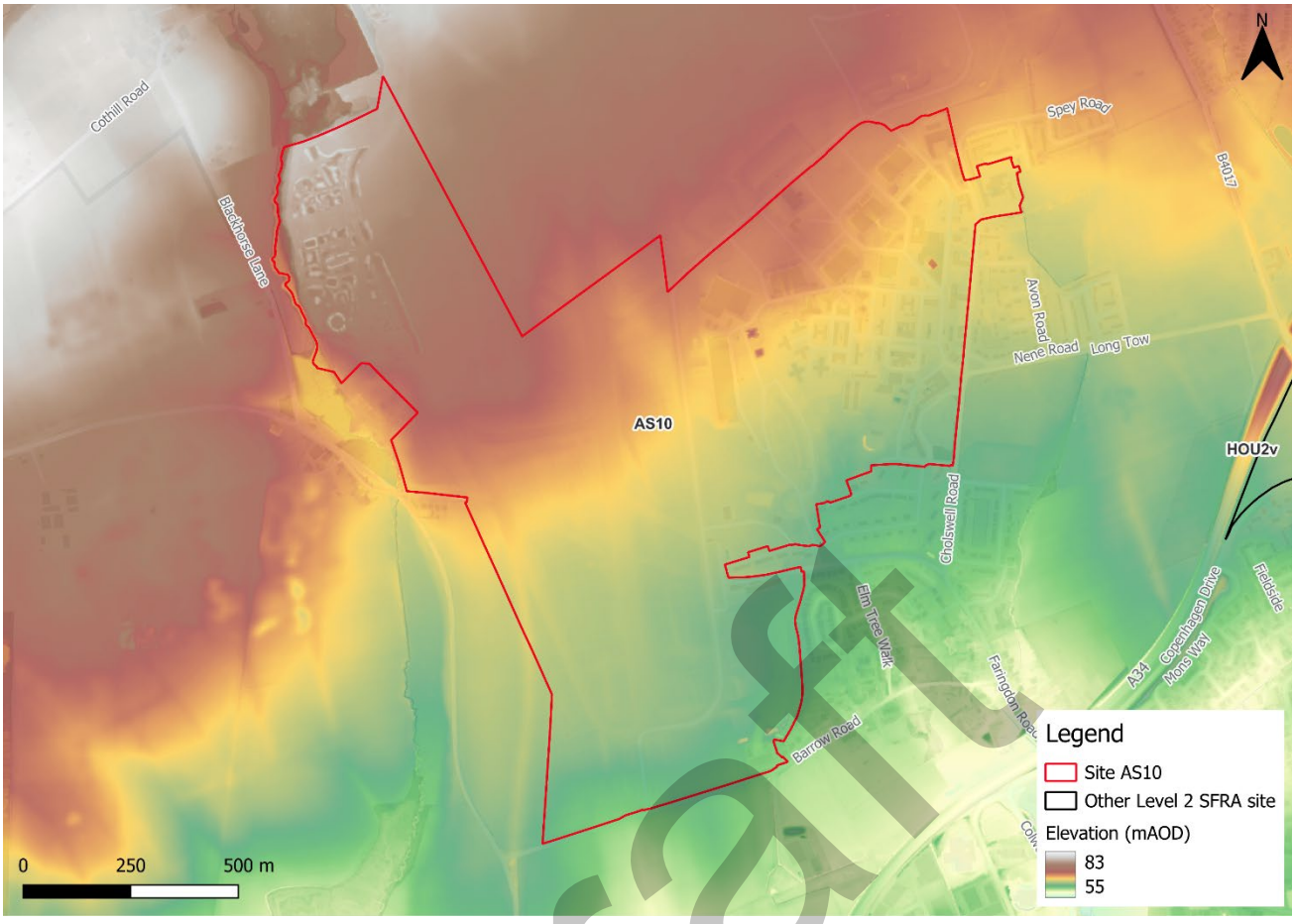

Figure 1-2: Topography

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2 Flood risk from rivers

2.1 Existing risk

2.1.1 Flood Map for Planning and functional floodplain

Based on the Environment Agency's (EA) Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum (2026), the percentage areas of the site within each flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.4).

The site is predominantly located within Flood Zone 1 and therefore at low risk of flooding from rivers. Flood Zone 3b is present along the north western boundary of the site, however this is only 0.2% of the total site area and is located within the intended parkland and SSSI buffer. There should be no vulnerable development in the area of the site within the functional floodplain. The functional floodplain in this location is based on the 3.3% AEP defended event of the EA's Flood Map for Planning, originating from the new national fluvial modelling.

Table 2-1: Existing flood risk based on percentage area of site at risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
99.8	0	0	0.2

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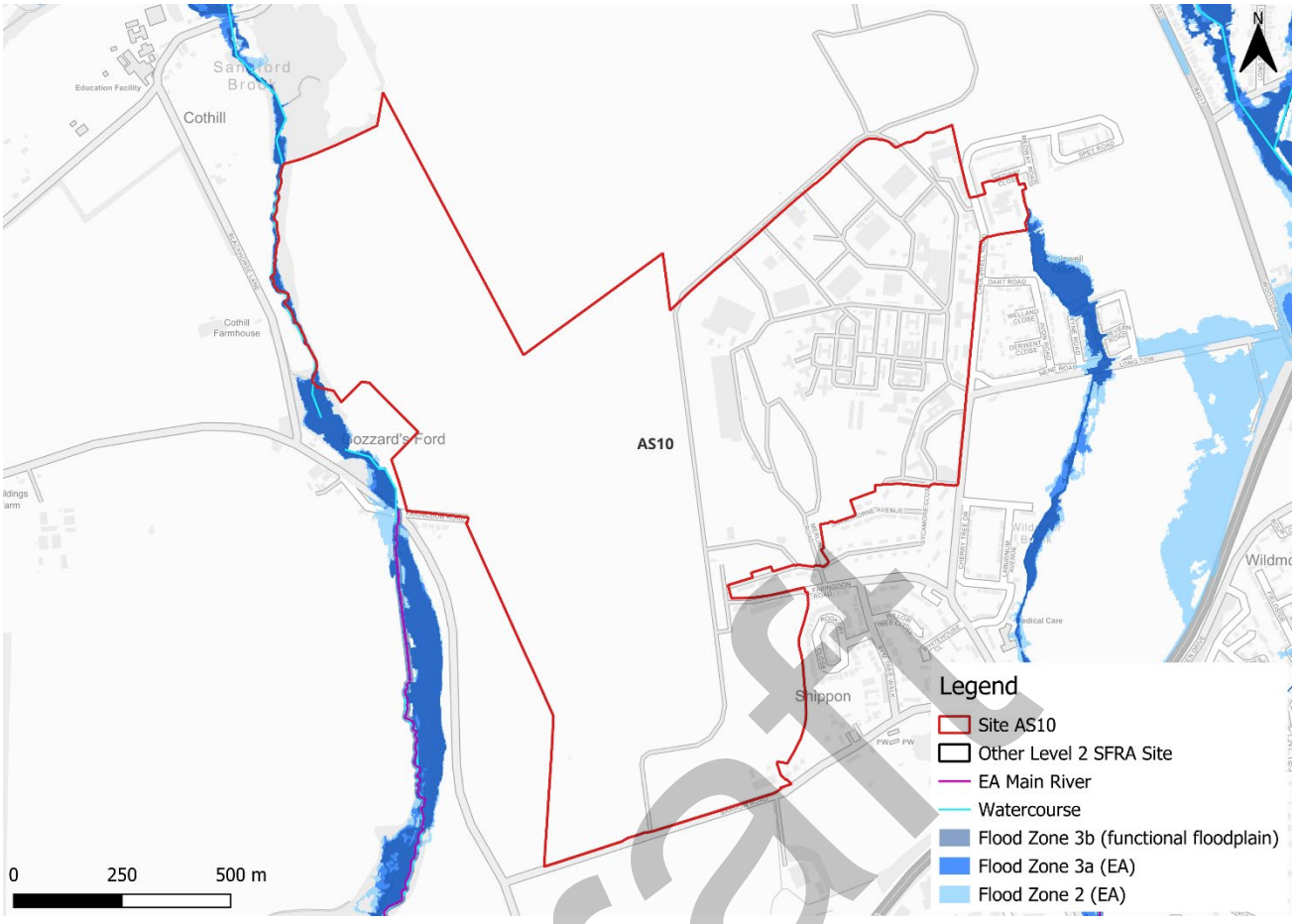

Figure 2-1: Existing risk from rivers to the site

2.2 Impacts from climate change

2.2.1 Detailed model outputs - climate change

The EA's SFRA guidance states that SFRAs should assess the 2080s central allowance for less vulnerable, more vulnerable, highly vulnerable and water compatible development (Table 2-2). The impact of climate change on flood risk from Sandford Brook has not been modelled for this SFRA, as a model covering Sandford Brook was not made available for consideration. The impacts of climate change must be modelled using the EA's latest allowances for peak river flows to inform whether the site can be safe for its lifetime and to assess modelled flood depths and hazards. Therefore, any updates to this Level 2 SFRA and/or any site-specific FRA should include for the most up to date climate change allowances.

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Table 2-2: Climate change allowances for peak river flows for the Gloucestershire and the Vale management catchment

Epoch	Central	Higher Central	Upper End
2020s	11%	17%	33%
2050s	11%	19%	43%
2080s	26%	41%	84%

2.2.2 Flood Map for Planning - Flood Zones plus Climate Change

Figure 2-2 shows the EA's Flood Map for Planning - Flood Zones plus Climate Change dataset. Based on this dataset, the site is not shown to be at additional risk from climate change.

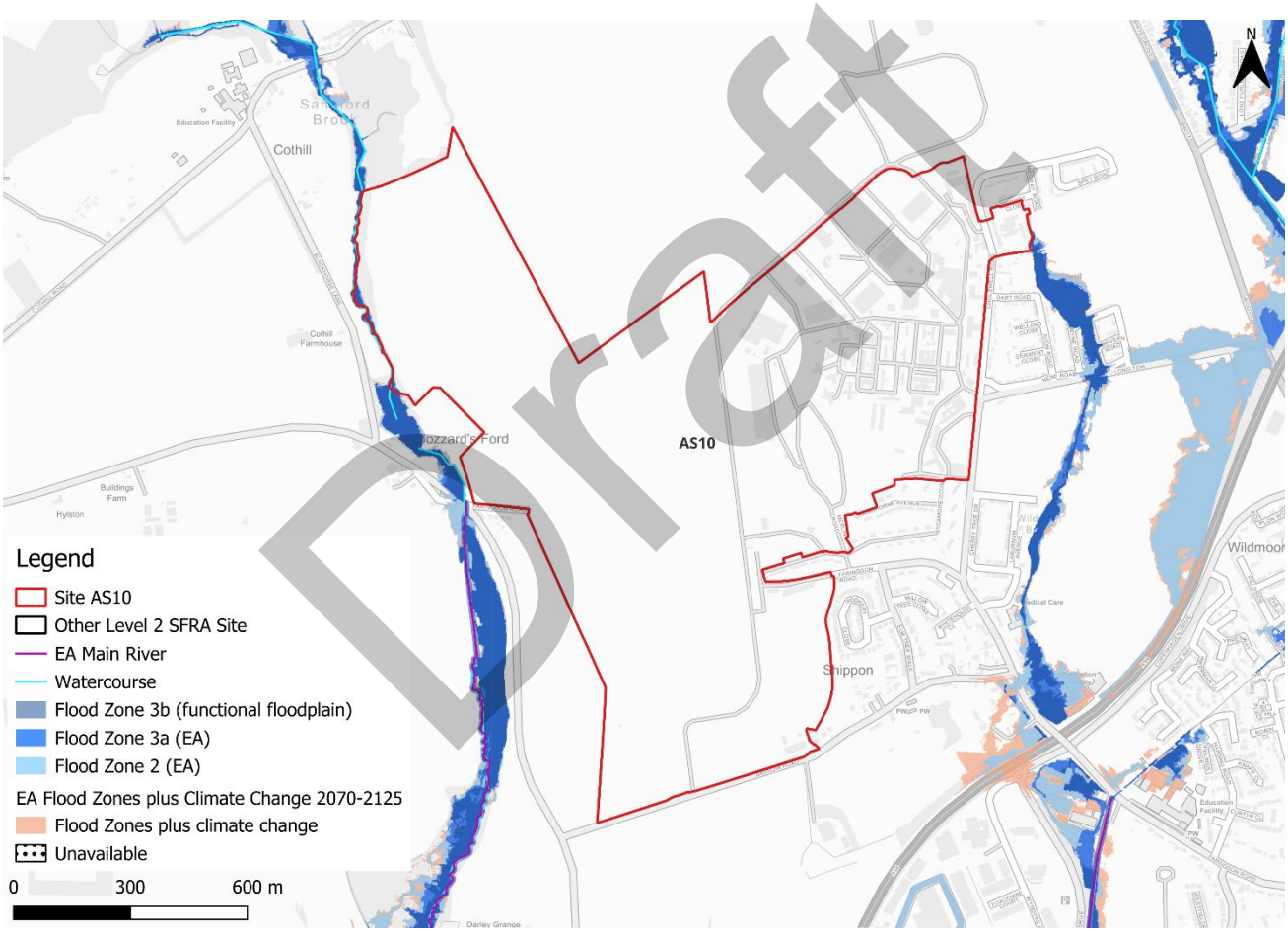

Figure 2-2: Flood Zones plus Climate Change dataset

2.3 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flooding incidents to the site. Historic flood incidents within the vicinity of the site are shown in Figure 2-3, which indicates areas to the east and south of the site have been subject to flooding in the past. The RFO dataset

references that a historic event occurred in 2007 due to surface water flooding or channel capacity exceedance.

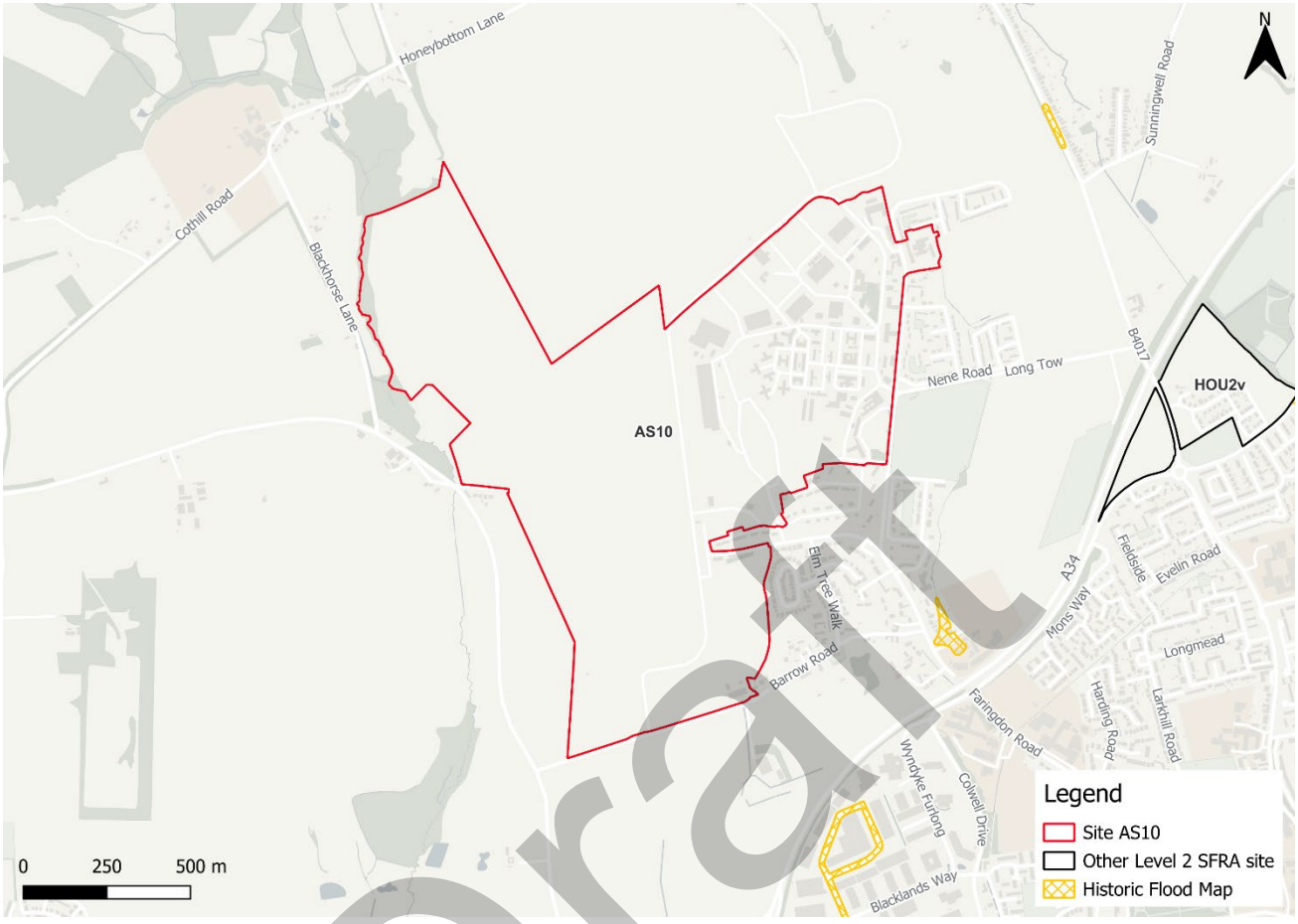

Figure 2-3: Recorded historic flood events onsite and around the site

2.4 Flood risk management

The site doesn't benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset. There are however areas of natural high ground along Sandford Brook to the south of the site.

2.4.1 Cumulative impacts

A cumulative impact assessment was completed through the South Oxfordshire and Vale of White Horse Level 1 SFRA Addendum (2026), which aimed to identify catchments sensitive to the cumulative impact of development. Site AS10 (Land at Dalton Barracks Garden Village, Shippon) is located within two catchments, namely; Sandford Brook (source to Ock) and Ock and tributaries (Land Brook confluence to Thames). The majority of the site is located within a higher sensitivity catchment. Planning considerations for sites at higher sensitivity to the cumulative impacts of development can be found in Appendix D of the Level 1 SFRA Addendum. Cumulative impacts of development should also be considered as part of a site-specific FRA.

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2.4.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. Along the western boundary of the site, there is potential for woodland planting, which can slow flows, reduce sediment delivery to the watercourse and reduce bankside erosion. Along Sandford Brook, there is also potential for runoff attenuation features. These areas are shown in Figure 2-4.

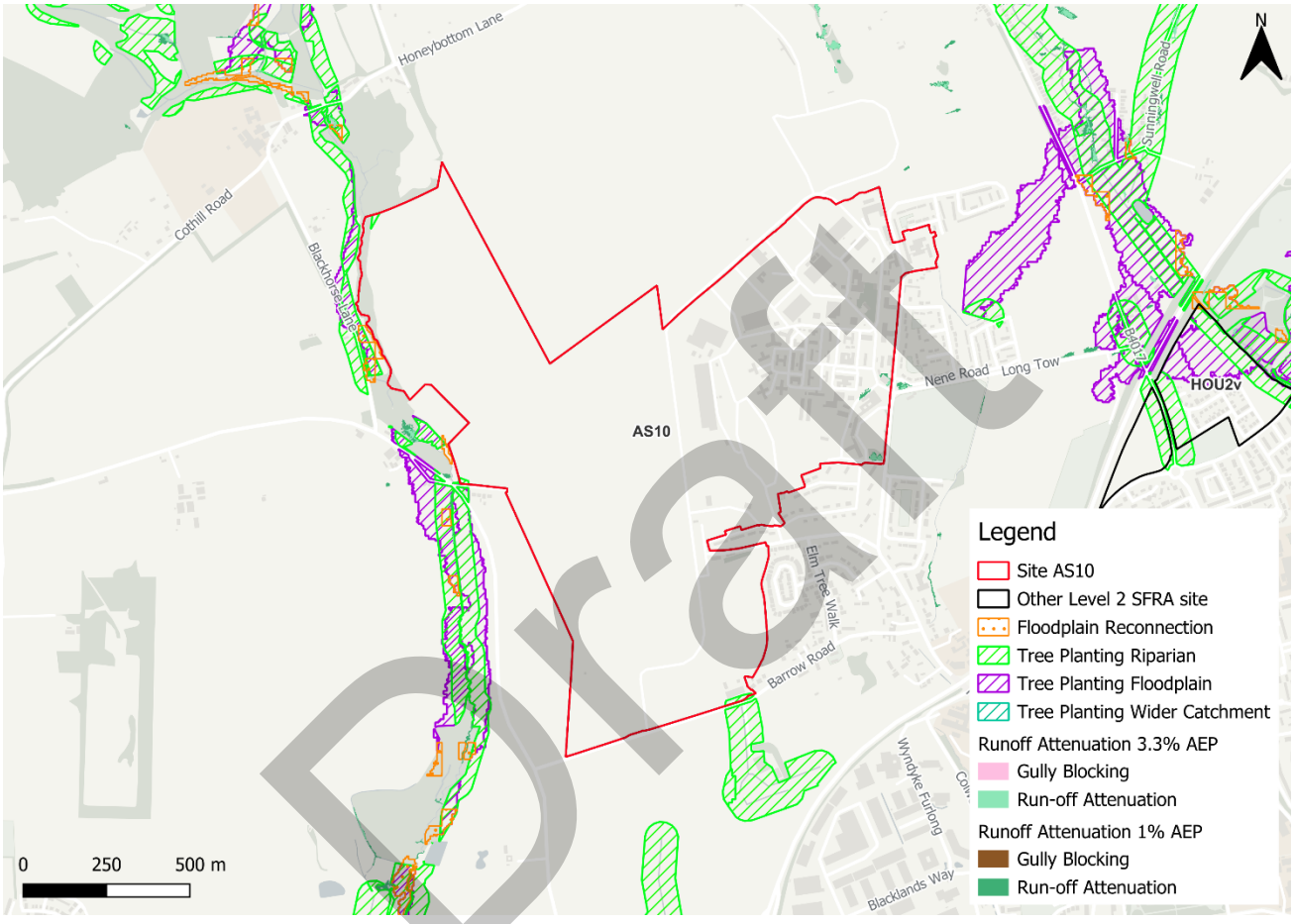

Figure 2-4: Natural Flood Management (NFM) opportunities mapping

2.5 Residual risk

Although a site may be afforded some protection from defences and / or drainage infrastructure, there is always a residual risk of flooding from asset failure i.e. defence breaches, or blockages of culverts or drainage assets. Residual risk at this site comes from the potential blockage or structural failure of the culvert along Sandford Brook which runs beneath Faringdon Road.

2.5.1 Potential blockage

There is potential residual risk to the site from a possible blockage of the culvert along Sandford Brook which runs beneath Faringdon Road to the west of the site (Figure 2-5). The impact of a blockage of this structure has not been modelled as part of this Level 2

SFRA, as there is no available flood model for the watercourse. It is recommended that the site-specific FRA should consider the impact of a blockage of this culvert on residual flood risk to the site.



Figure 2-5: Potential blockage location

2.5.2 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. A "dry day" scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. A "wet day" scenario assumes a worst-case scenario where a reservoir releases water held on a "wet day" when local rivers have already overflowed their banks.

This site is not modelled to be at risk of flooding from reservoirs.

2.6 Emergency Planning

2.6.1 Flood warnings and alerts

The EA operates a Flood Warning Service for properties located within a Flood Warning Area (FWA) for when a flood event is expected to occur. The site is not located within a FWA.

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Flood alerts may be issued before a flood warning for properties located within a Flood Alert Area (FAA) to provide advance notice of the possibility of flooding. A flood alert may be issued when there is less confidence that flooding will occur in a FWA. A small area to the north west of the site is located within a FAA, namely 061WAF17Ock - River Ock catchment (Figure 2-6).

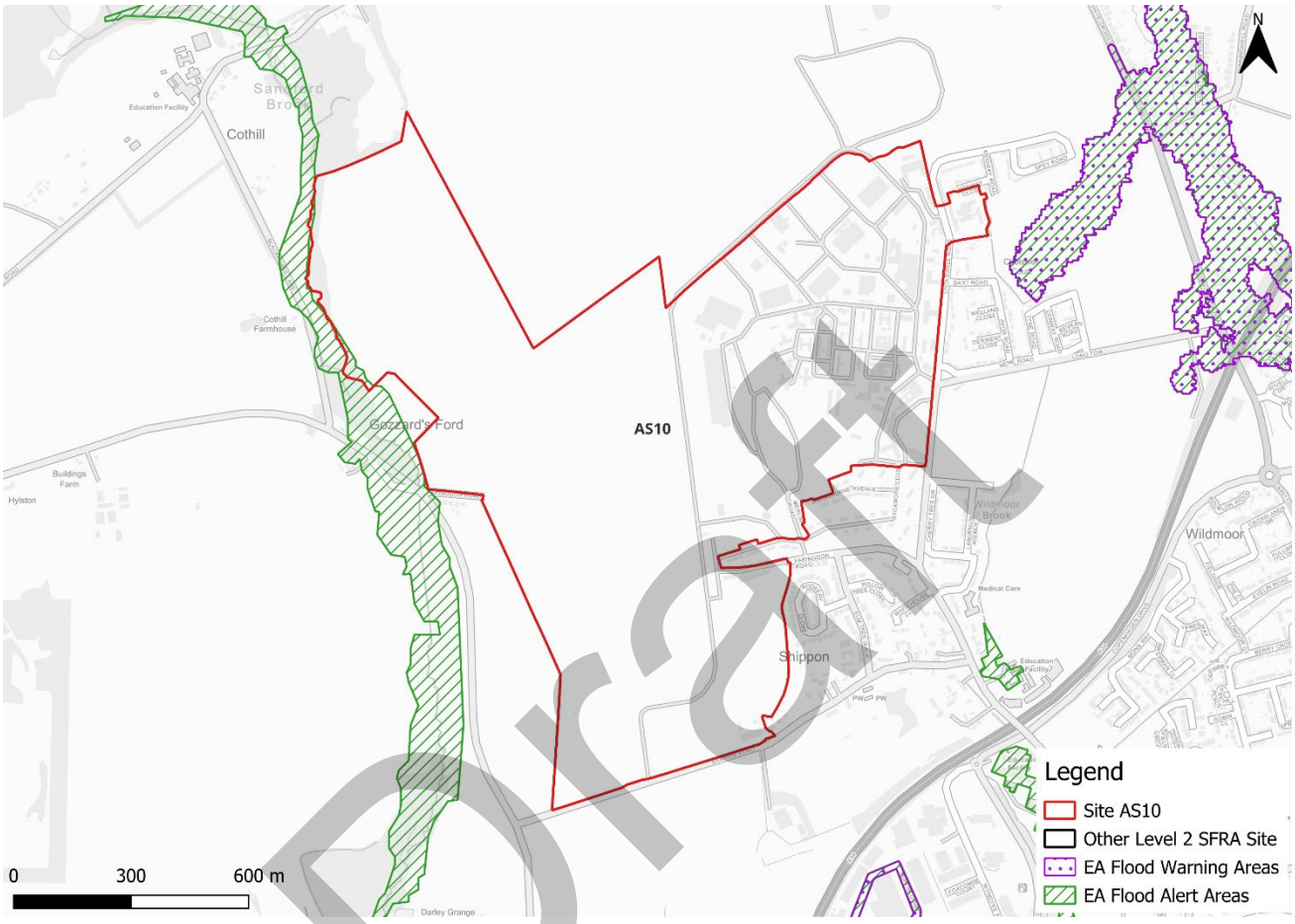

Figure 2-6: EA Flood Warning and Alert Areas

2.6.2 Access and escape routes

Based on the Flood Map for Planning, safe access and escape routes could likely be achieved during a flood event via Barrow Road to the south of the site and Faringdon Road to the east. These routes are indicated by the yellow lines in Figure 2-7.

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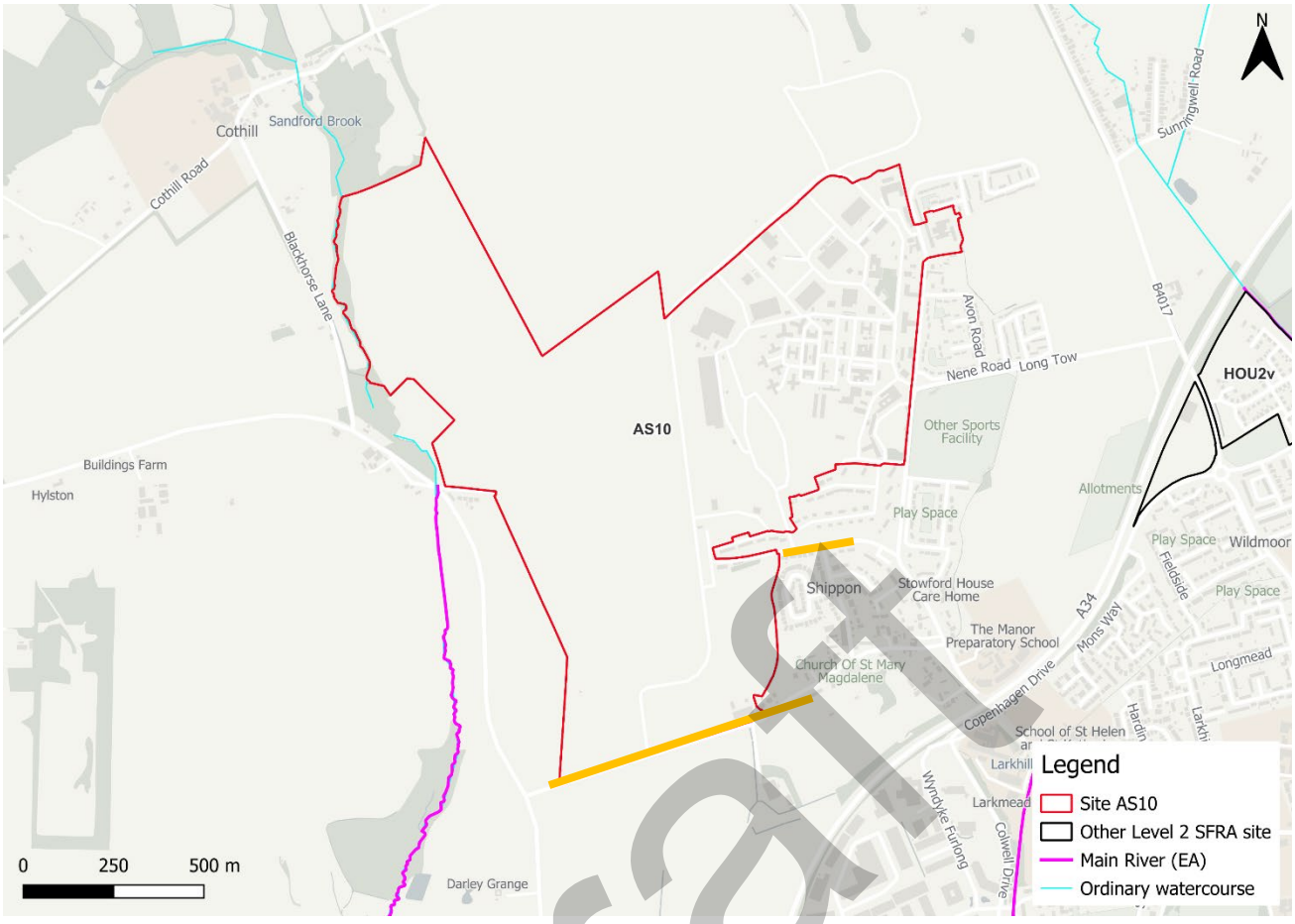

Figure 2-7: Potential access and escape routes

2.7 Observations, mitigation options, site suitability, sequential approach to development management - fluvial

- Observations:
  - The site is modelled to be nominally within the functional floodplain along the northwestern boundary of the site, adjacent to Sandford Brook, comprising less than 1% of the total site area. Vulnerable development is not permitted within the functional floodplain.
  - There should be no development within 8m of Sandford Brook apart from permitted access. The EA recommend for a 8m no development buffer for all main rivers to enable access for maintenance activities. This should cover the area within the functional floodplain. If feasible, this area would be used as a green / blue corridor which can provide ecological, social and amenity value.
  - A flood risk activity permit may be required if development is planned within 8m of the riverbank. The EA can advise on whether a permit will be required. If feasible, this area would be used as a green / blue corridor which can provide ecological, social and amenity value.
  - The EA Flood Zones plus Climate Change dataset shows the site is not at significant additional risk from climate change. However, as discussed, there is no detailed model of the reach of Sandford Brook adjacent to the site

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understand the impact of climate change on fluvial flood depths, velocities and hazards.

- Mitigation:
  - The area adjacent to Sandford Brook should be maintained and included in site design as a green / blue corridor offering multifunctional benefits alongside flood risk mitigation including Biodiversity Net Gain (BNG) contributions, and social and amenity benefits. This should be feasible without impacting significantly on plot numbers.
  - The EA flood alert area should continue to be in place to ensure early evacuation of site users before an extreme flood event occurs.
- Residual risk:
  - The site is at potential residual risk from a blockage of the culvert along Sandford Brook which runs beneath Faringdon Road. The site-specific FRA should consider modelling a blockage scenario to understand whether there would be any additional risk to the site.
  - Areas adjacent to culverts and bridges are at particular risk from the rapid onset of fast flowing and deep flooding, with little or no warning if structures become blocked.
  - Emergency plans must be in place for such areas and safe access and escape routes must be in place for the lifetime of development. Resistance and resilience measures may also need to be put in place to manage residual flood risk when avoidance measures have been exhausted.
  - The LPA should use the information on residual risk in this Level 2 SFRA to state in the local plan strategic policies a preferred mitigation strategy for ensuring development will be safe throughout its lifetime in relation to urban form, risk management and where flood mitigation measures are likely to have wider sustainable design implications (para 042, FRCC-PPG).
- Access and escape:
  - Safe access and escape routes could likely be achieved during a flood event via Barrow Road to the south of the site and Faringdon Road to the east.

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3 Flood risk from surface water

3.1 Existing risk

3.1.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths Present Day

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Extents Present Day map (September 2026), the majority of the site is at very low risk from surface water flooding, as shown in Table 3-1.

In all events, surface water risk is largely confined to topographic low spots and hardstanding roads within the site (Figure 3-1).

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Depths Present Day map, the greatest flood depths within the site are between 0.3 and 0.6m, however are predominantly less than 0.3m across the majority of the area at risk (Figure 3-2).

Safe access and escape routes could likely be achieved during a flood event via Barrow Road to the south of the site and Faringdon Road to the east.

Table 3-1: Existing surface water flood risk based on percentage area at risk using the Flood Map for Planning - Surface Water Spatial Planning Extent Present Day map

Less than 0.1% AEP event (% area)	0.1% AEP event (% area)	1% AEP event (% area)	3.3% AEP event (% area)
92	4	2	2

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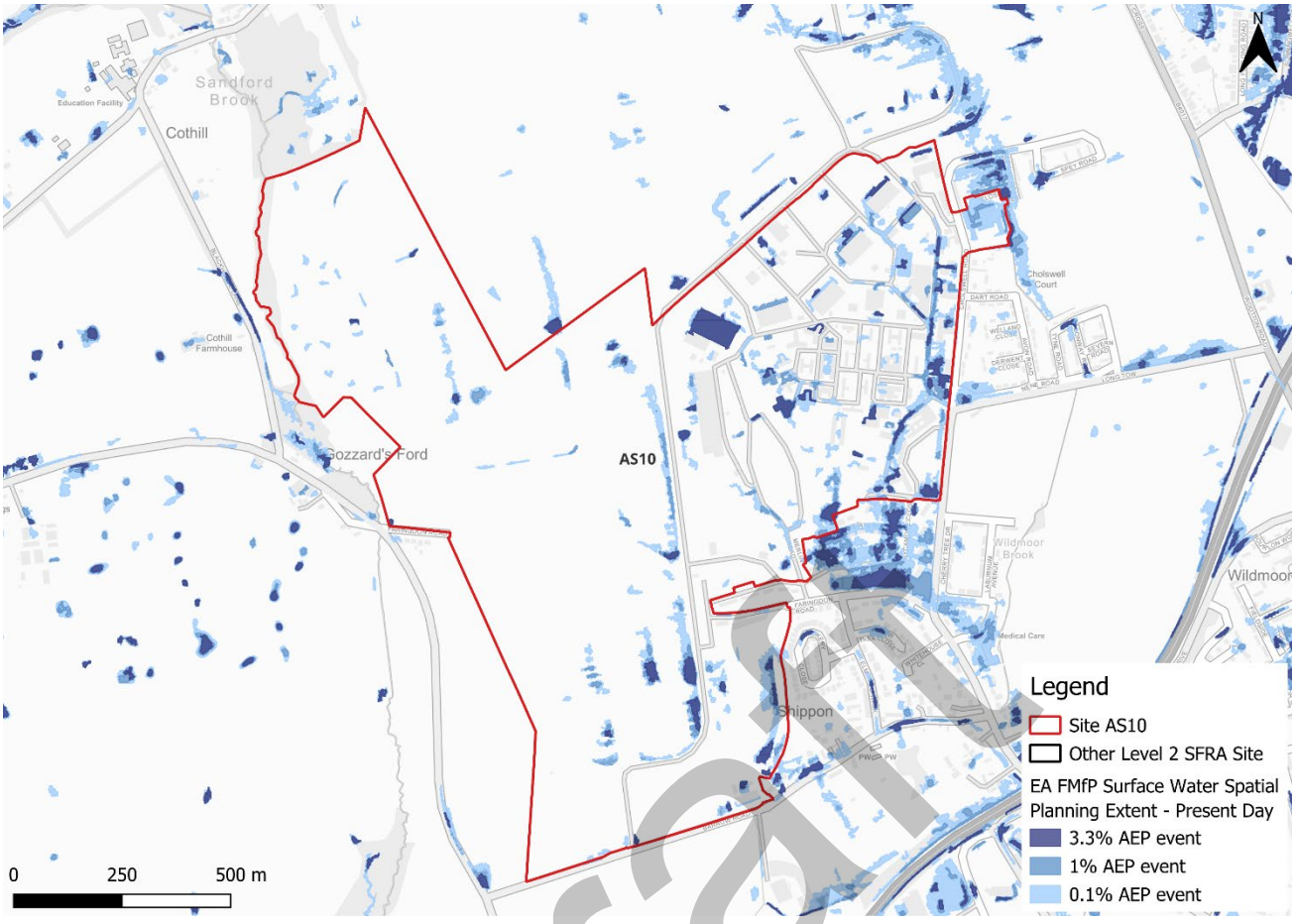

Figure 3-1: Flood Map for Planning - Surface Water Spatial Planning Extents Present Day

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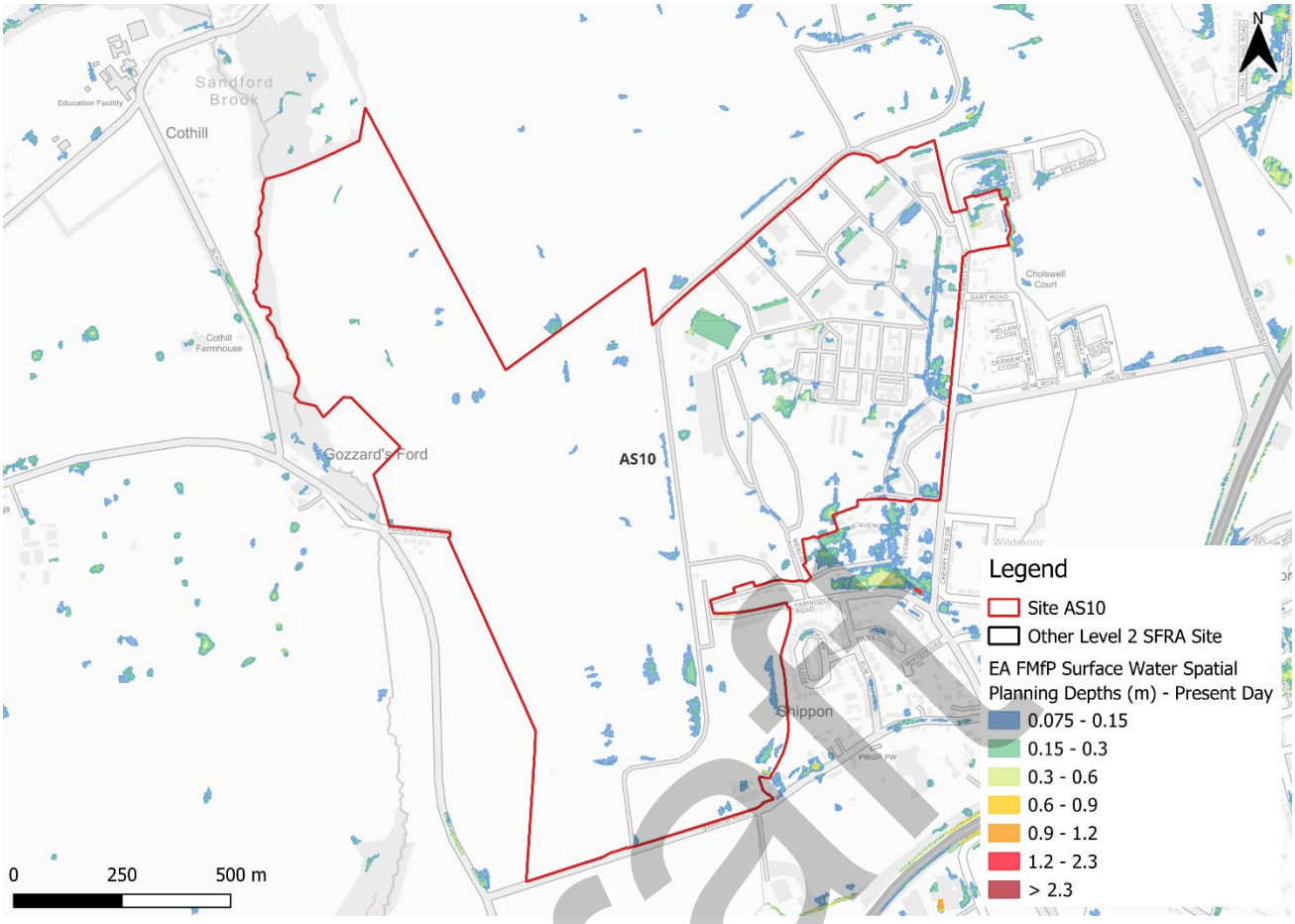

Figure 3-2: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Present Day for the 1% AEP event

3.1.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning data does not include hazard information suitable for planning purposes. Therefore, this Level 2 SFRA considers the third generation Risk of Flooding from Surface Water (RoFSW) hazard mapping in addition to the Flood Map for Planning - Surface Water Spatial Planning extents and depths, as the best available information. Updated surface water hazard information should be confirmed at the site-specific FRA stage.

Based on the EA's national scale third generation RoFSW map, the greatest flood hazard within the site in the medium risk event is 'moderate' but is predominantly categorised as 'low' (Figure 3-3).

There are differences between the Flood Map for Planning - Surface Water Spatial Planning map and the third generation RoFSW hazard mapping. The Flood Map for Planning - Surface Water Spatial Planning data does not map flooding less than 0.075m (7.5cm) in depth. Therefore, where the map may show no flooding, there may be shallow flooding up to a depth of 0.075m. In contrast, the third generation RoFSW does not map flooding with a hazard rating of less than 0.575. This could explain the differences observed between the Flood Map for Planning and third generation RoFSW maps.

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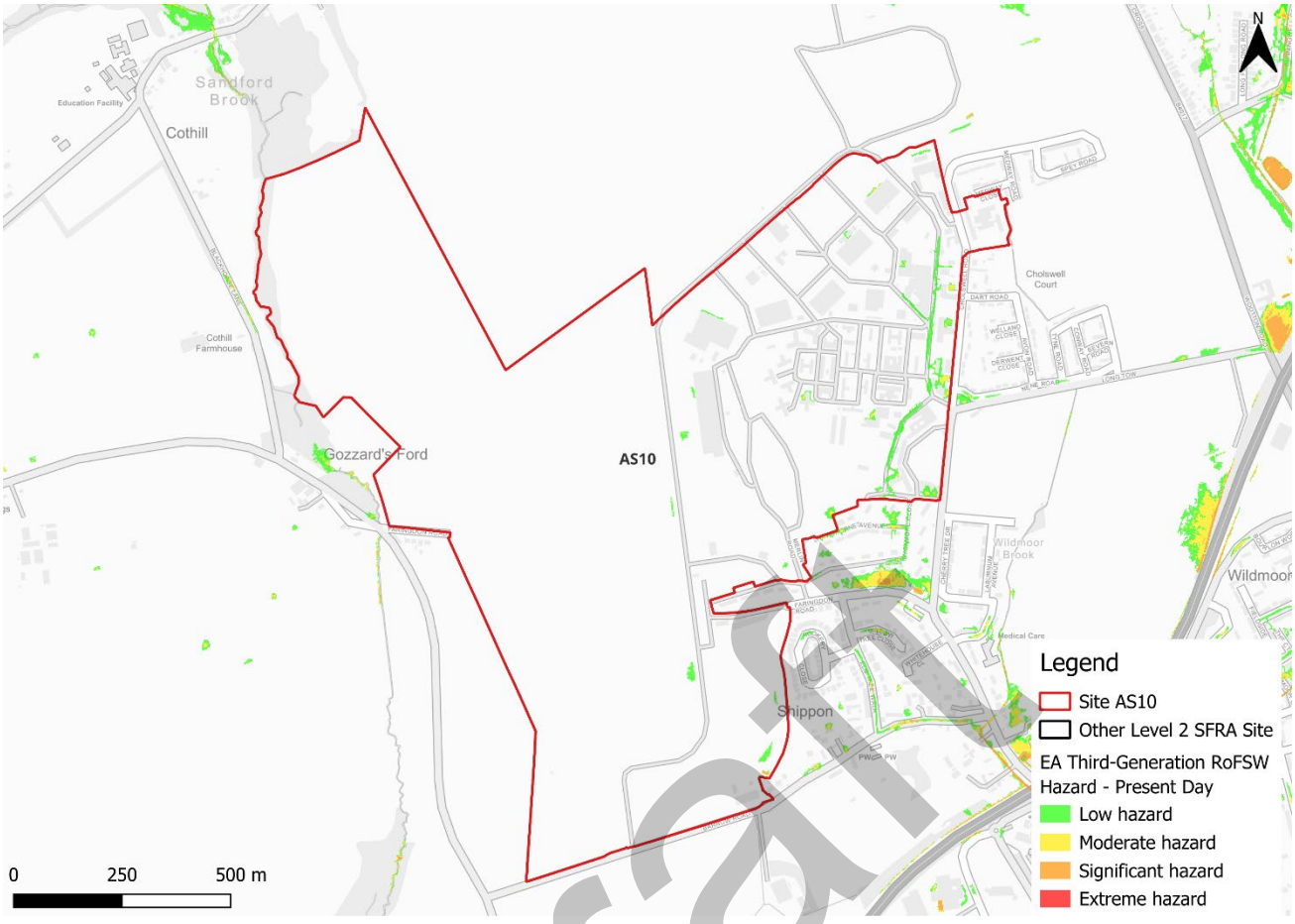

Figure 3-3: Third generation - Risk of Flooding from Surface Water map present day 1% AEP event surface water flood hazard[1]

3.2 Impacts from climate change

3.2.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths

The EA's climate change allowance guidance states that SFRA's should assess the upper end peak rainfall allowance for the 2070s epoch. This dataset is included in the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Climate Change dataset (September 2026). The peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment are shown in Table 3-2. The allowance for the 0.1% AEP event is not stated in the EA guidance.

1 Based on Section 7.5 Hazard rating. What is the Risk of Flooding from Surface Water map? Report version 2.0. April 2019. Environment Agency

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Table 3-2: Peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment

Return period	Central allowance 2070s (% increase)	Upper end allowance 2070s (% increase)
3.3% AEP	25	35
1% AEP	25	40

Figure 3-4 shows the surface water flood extents for the 2070s upper end climate change scenario. Surface water flood risk is shown to increase in extent during all events. There are a number of additional surface water flow paths present within the 0.1% AEP event, with some additional areas of ponding.

Flood depths are modelled to remain at between 0.3 and 0.6m within the east of the site, however larger proportions of the site are modelled to reach these depths (Figure 3-5),

Safe access and escape routes would likely remain achievable via Barrow Road to the south of the site and Faringdon Road to the east.

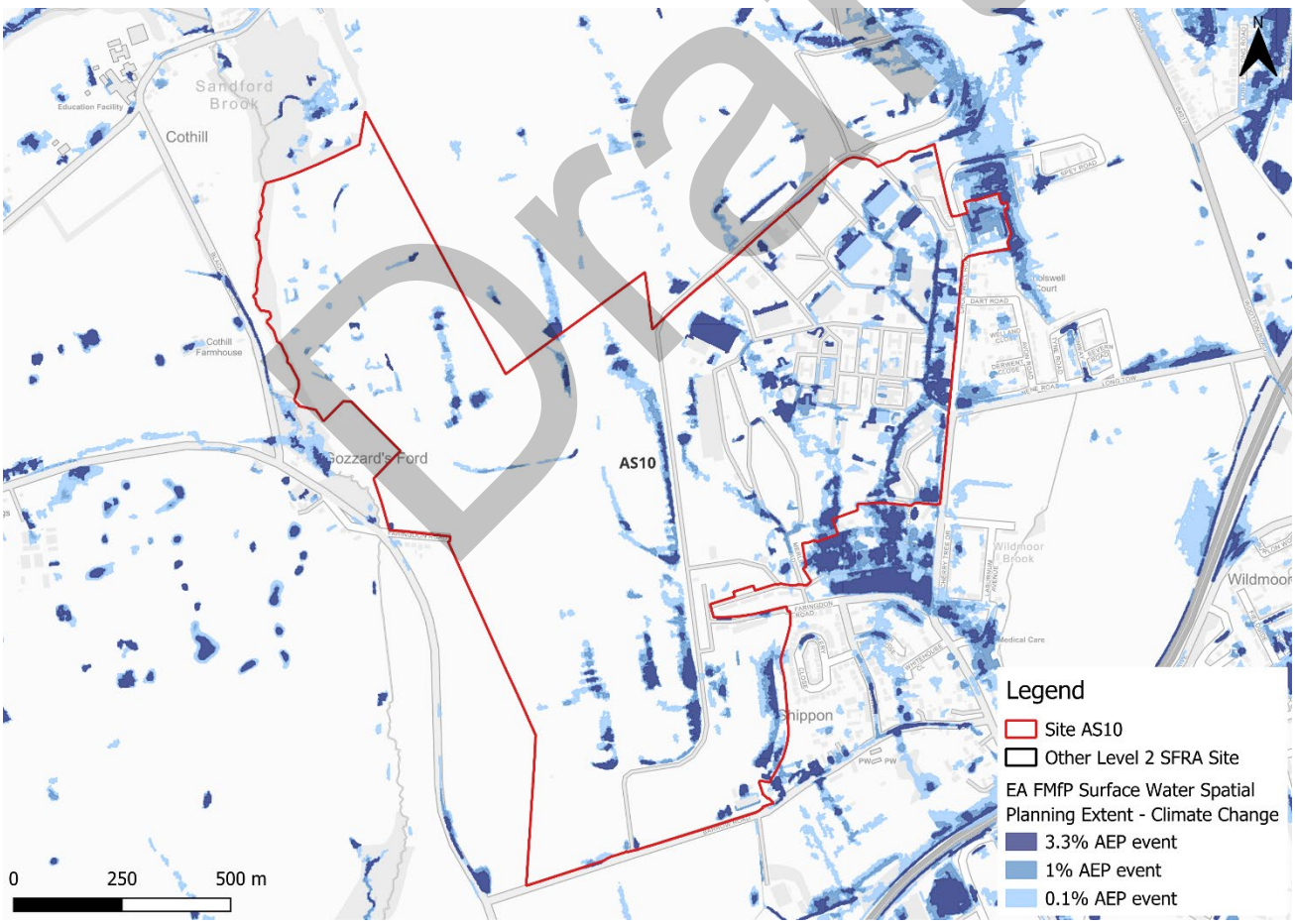

Figure 3-4: Flood Map for Planning - Surface Water Spatial Planning Extents Climate Change (2070s Upper End)

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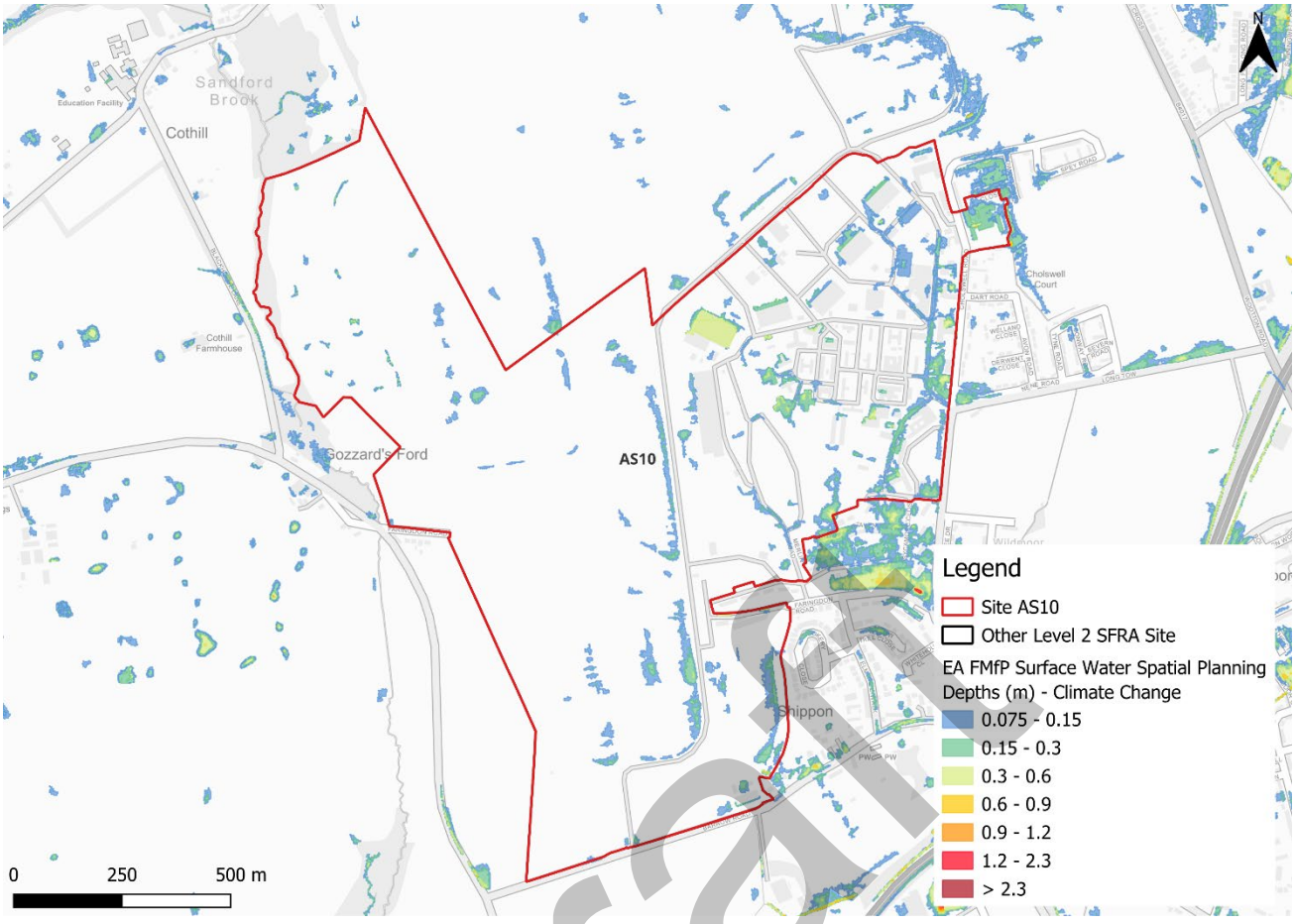

Figure 3-5: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Climate Change for the 1% AEP event (2070s Upper End)

3.2.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning climate change data does not include hazard information suitable for planning purposes. This Level 2 SFRA therefore considers the RoFSW low risk surface water event as a conservative proxy for the medium risk event plus climate change, as the best available information to assess surface water flood hazards. The impact of climate change on surface water flood hazards should be considered at the site-specific FRA stage.

Using the RoFSW low risk event as a proxy, future surface water flood hazard in the medium risk event is predominantly categorised as 'low', however could reach 'significant' along the roads within the east of the site (Figure 3-6).

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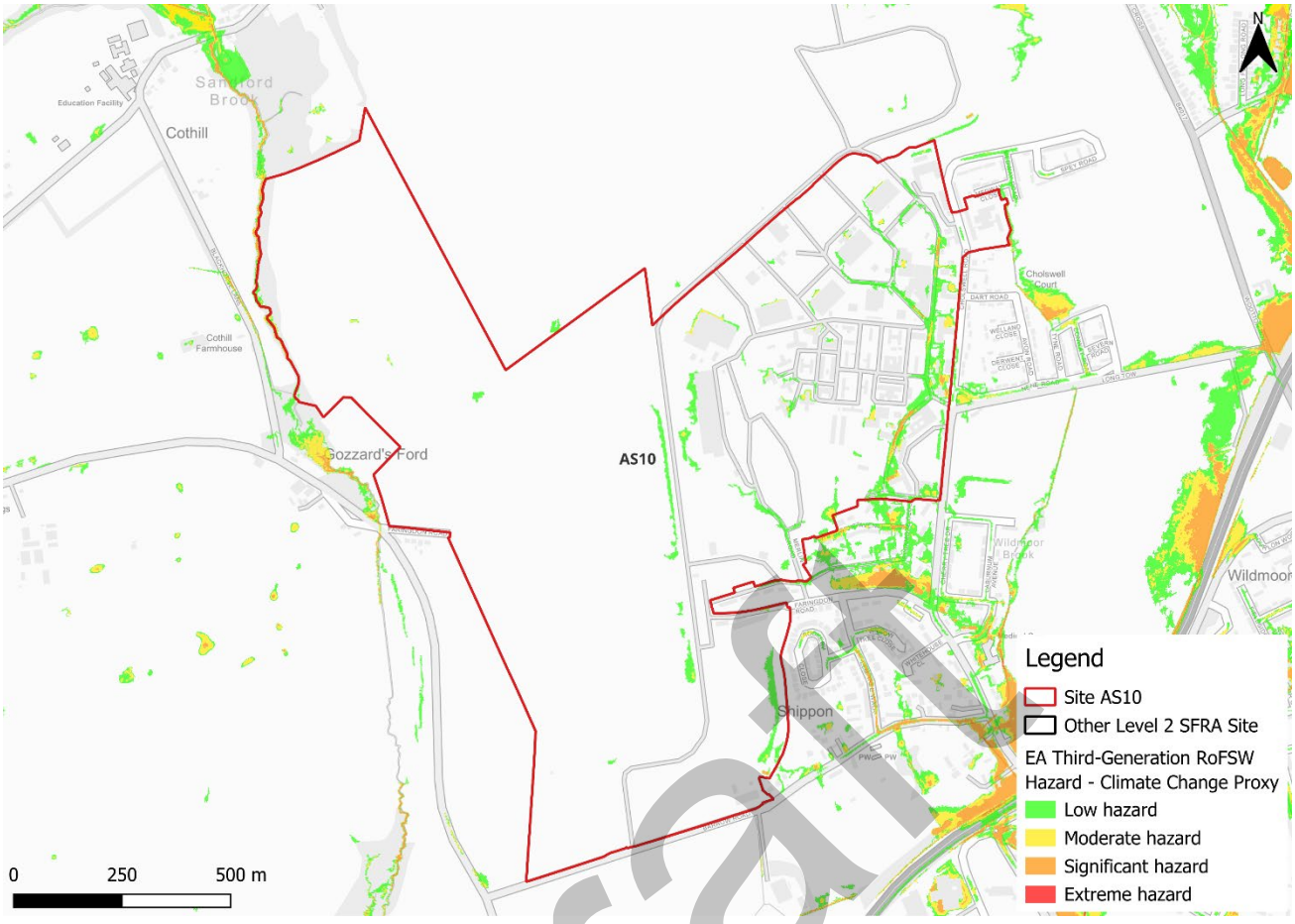

Figure 3-6 Low risk event surface water flood hazard[1], as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options, site suitability, sequential approach to development management - surface water

- Current risk to the site is predominantly very low, with 92% of the site being outside of the 0.1% AEP surface water flood event. In all events, surface water risk is largely confined to the eastern side of the site, with some scattered areas of ponding in the west. Surface water risk is constrained by the existing development within the site.
- Risk is shown to increase in all events in comparison to the present day when considering the impact of climate change.
- Topographic low spots should be considered and included in site design and ideally left in place to flood naturally when required.
- If any structures are demolished for new development, a drainage strategy would therefore be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA. The developer should also follow the National SuDS guidance.
- Assessment of the current drainage system in place should be carried out to ascertain any current capacity issues and whether the current system could

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accommodate the proposed development or whether further capacity will be required.

- Safe access and escape routes could likely be achieved during a flood event via Barrow Road to the south of the site and Faringdon Road to the east.

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4 Groundwater, geology and SuDS suitability

Risk of groundwater emergence is assessed in this SFRA using JBA's 5m Groundwater Emergence Map. Figure 4-1 shows the map for covering the site and the surrounding areas. Table 4-1 explains the risk classifications.

Risk of groundwater emergence varies across the site. The majority of the site is within an area where there is risk of groundwater emergence to both surface and subsurface assets. The northwest of the site is within an area where there is potential for groundwater to emerge at the surface locally. Within the south of the site, there is a negligible risk from groundwater emergence. Ground investigations will be required through the site-specific FRA to ascertain groundwater levels and conditions. Infiltration SuDS may be suitable within the south of the site, however are unlikely to be suitable for the majority of the site.

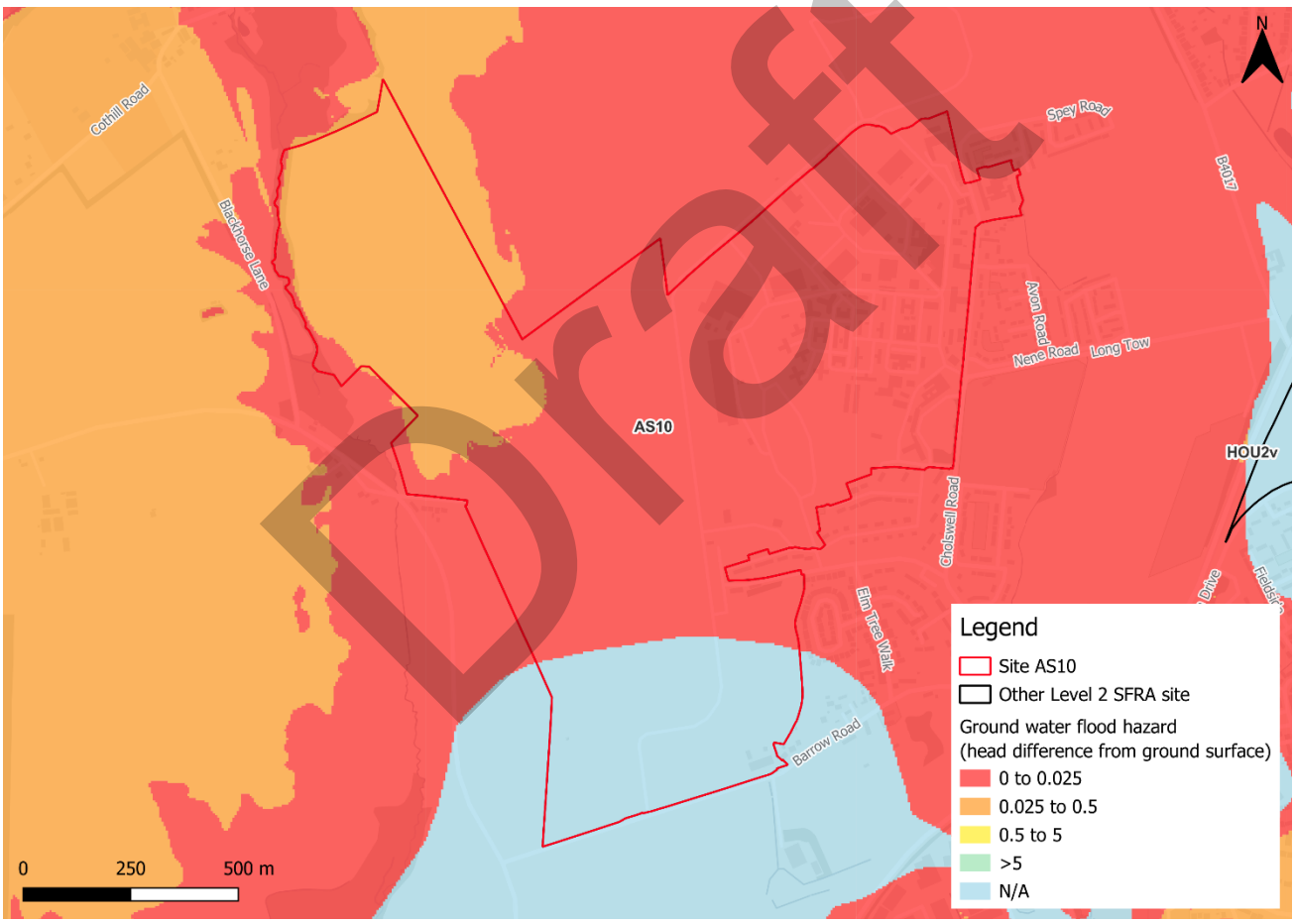

Figure 4-1: JBA 5m Groundwater Emergence Map

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Table 4-1: Groundwater Emergence Hazard Classification

Groundwater head difference (m)*	Class label
0 to 0.025	Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
0.025 to 0.5	Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
0.5 to 5	Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event There is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely.
>5	Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event. Groundwater emergence is not likely.
N/A	No risk. This zone is deemed as having a negligible risk from groundwater emergence due to the nature of the local geological deposits.
*Difference is defined as ground surface in mAOD minus modelled groundwater table in mAOD.	

The underlying bedrock within the site is predominantly limestone, sandstone, siltstone and mudstone. The south of the site contains bedrock of mudstone, sandstone, and limestone (Figure 4-2). Other than sandstone, all these rocks generally have low levels of permeability. This leads to less water infiltrating into the ground and could potentially contribute to lower water table levels. The drainage strategy for the site should investigate water table levels and ground conditions to inform on appropriate SuDS.

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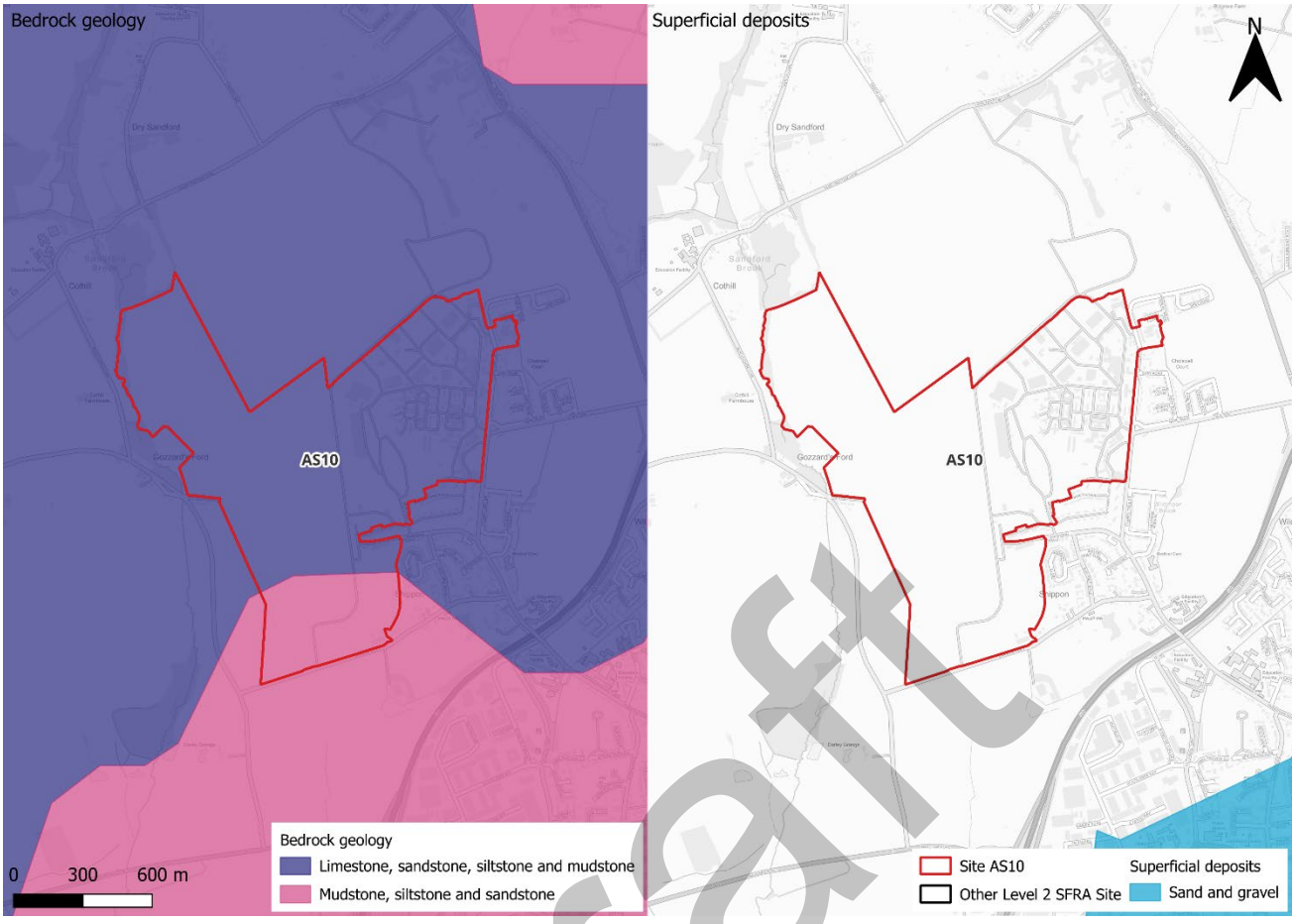

Figure 4-2: BGS Geology - Bedrock and superficial deposits

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5 Overall site assessment

5.1 Can part b) of the exception test be passed?

To pass part b) of the exception test[2], it must be proven that the development can be safe for its lifetime, which is 100 years for residential development and 75 years for non-residential development, taking account of the vulnerability of its users, without increasing risk elsewhere, and, where possible, will reduce flood risk overall. The site is not required to pass the exception test as it is not located within Flood Zone 3a, and it is expected that vulnerable development will avoid the area of functional floodplain.

5.2 Recommendations and site-specific FRA requirements

Based on the evidence presented in the Level 1 SFRA (2024), Level 1 SFRA Addendum (2026) and this Level 2 SFRA:

- Updated present day and climate change modelling of Sandford Brook should be used to update this Level 2 SFRA at the earliest opportunity to provide an up-to-date strategic assessment of flood risk to this site and surrounding areas. It would be acceptable to update the modelling at the site-specific FRA stage.
- There should be no vulnerable development within the area of the site covered by the functional floodplain. This should be converted to a blue / green corridor to provide ecological, amenity and social value.
- Based on current information, this site could be allocated in the Joint Local Plan if vulnerable development avoids the area of functional floodplain along the western site boundary.
- The existing flow path within the east of the site drains through Shippon. Where surface water flow paths extend south of Faringdon Road, there has been flooding at the culvert to Barrow Road. Any discharge from the site to this network will need to suitably assess the existing capacity. Reductions in discharge rates should be sought through a site-specific FRA and a detailed drainage strategy.
- Were this site to be allocated based on current information, the LPA must make it clear that this site cannot be developed until the required information detailed in this SFRA on existing and future flood risk from Sandford Brook is fully ascertained.
- A detailed drainage strategy will be required for any new development, given the flow paths and ponding present on this site.
- Groundwater conditions must be investigated further through the site-specific FRA.
- Opportunities for NFM features to reduce flood risk to the site and surrounding areas should be explored at the site-specific FRA stage.

[2] Policy F6 National Planning Policy Framework 2026

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- Any site-specific FRA should undertake a condition assessment of the culvert beneath Faringdon Road and investigate the impact of a potential blockage of this structure.
- Any site-specific FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; South Oxfordshire and Vale of White Horse District Councils Joint Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the site-specific FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; TW; the highways authorities; and the emergency services

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BD23 3FD
United Kingdom

+44(0)1756 799919
info@jbaconsulting.com
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South Oxfordshire and Vale of White Horse Level 2 Strategic Flood Risk Assessment Update

Site AS11 - Culham Campus

Draft Report

October 2026

Prepared for:

South Oxfordshire District Council and

Vale of White Horse District Council

www.jbaconsulting.com

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Reviewed by	Laura Thompson-Jones BSc CGeog FRGS Senior Analyst
Authorised by	Mike Williamson BSc MSc CGeog FRGS EADA Project Director

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JBA Project Manager	Freya Nation
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2026s1132

This report describes work commissioned by South Oxfordshire and Vale of White Horse District Councils. The Client's representative for the contract was Rebekah Goodwill of South Oxfordshire and Vale of White Horse District Councils. Boe Kilshaw of JBA Consulting carried out this work.

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for South Oxfordshire and Vale of White Horse Joint Local Plan Site AS11 - Culham Campus. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA' (2024) and the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum' (2026), and read the 'South Oxfordshire and Vale of White Horse District Councils Level 2 SFRA Main Report Update' (2026) and is therefore familiar with the terminology used in this report.

1.1 Site AS11 - Culham Campus

- Location: Culham Campus (Figure 1-1)
- Existing site use: Brownfield; industrial
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Mainly employment
- Proposed site use vulnerability: Less vulnerable
- Site area: 77.29 ha
- Proposed development impermeable area: 65.8 ha (assumed 85% of site area)
- Watercourse: N/A
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for more detailed assessment through Level 2 SFRA (Strategic Recommendation B)
    - Site has partial planning permission
    - Assess present day and future surface water depths, hazards

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Figure 1-1: Site location

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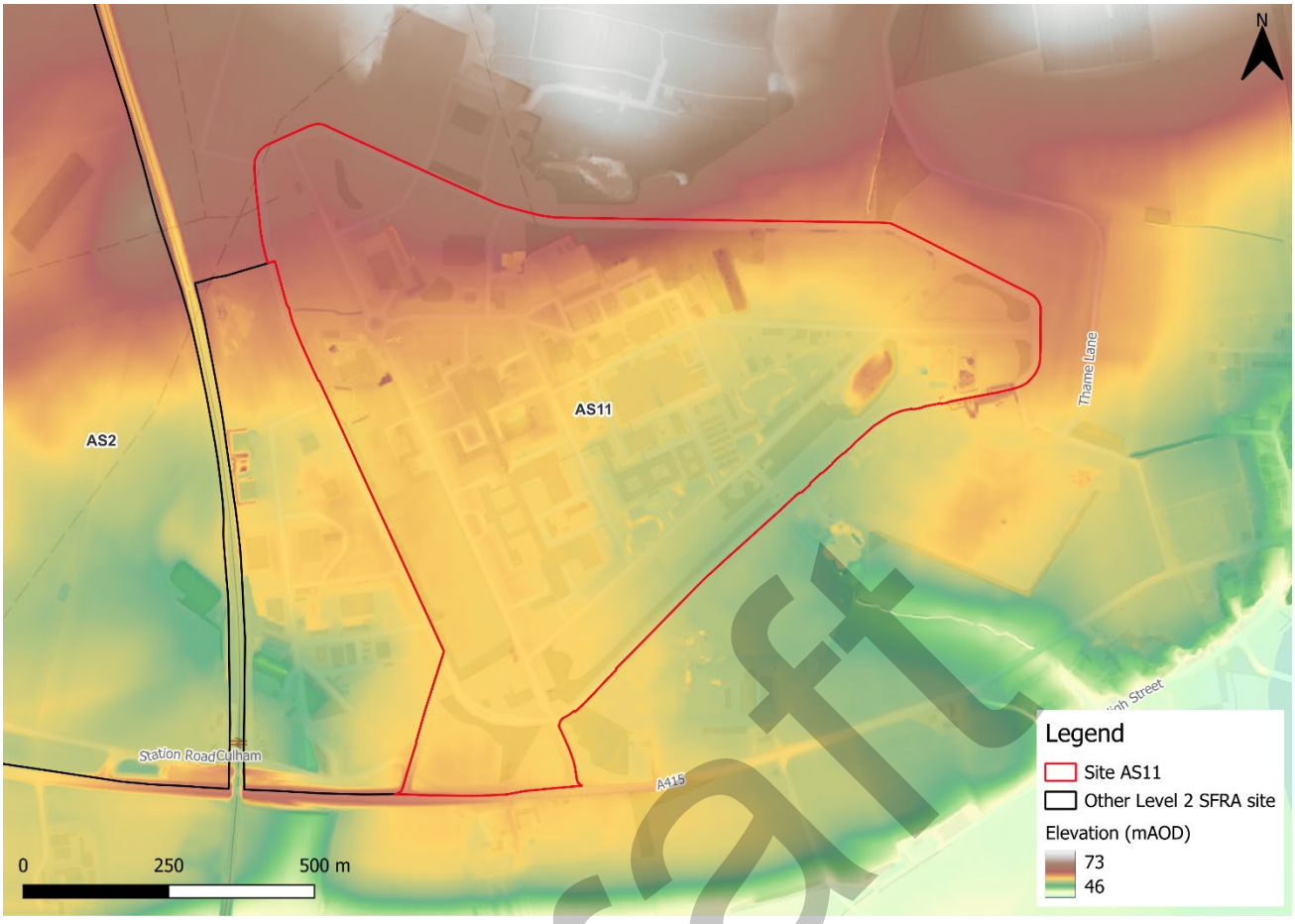

Figure 1-2: Topography

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2 Flood risk from rivers

2.1 Existing risk

2.1.1 Flood Map for Planning and functional floodplain

Based on the Environment Agency's (EA) Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum (2026), the percentage areas of the site within each flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.4).

The site is entirely within Flood Zone 1 and therefore at low risk of flooding from rivers.

Table 2-1: Existing flood risk based on percentage area of site at risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

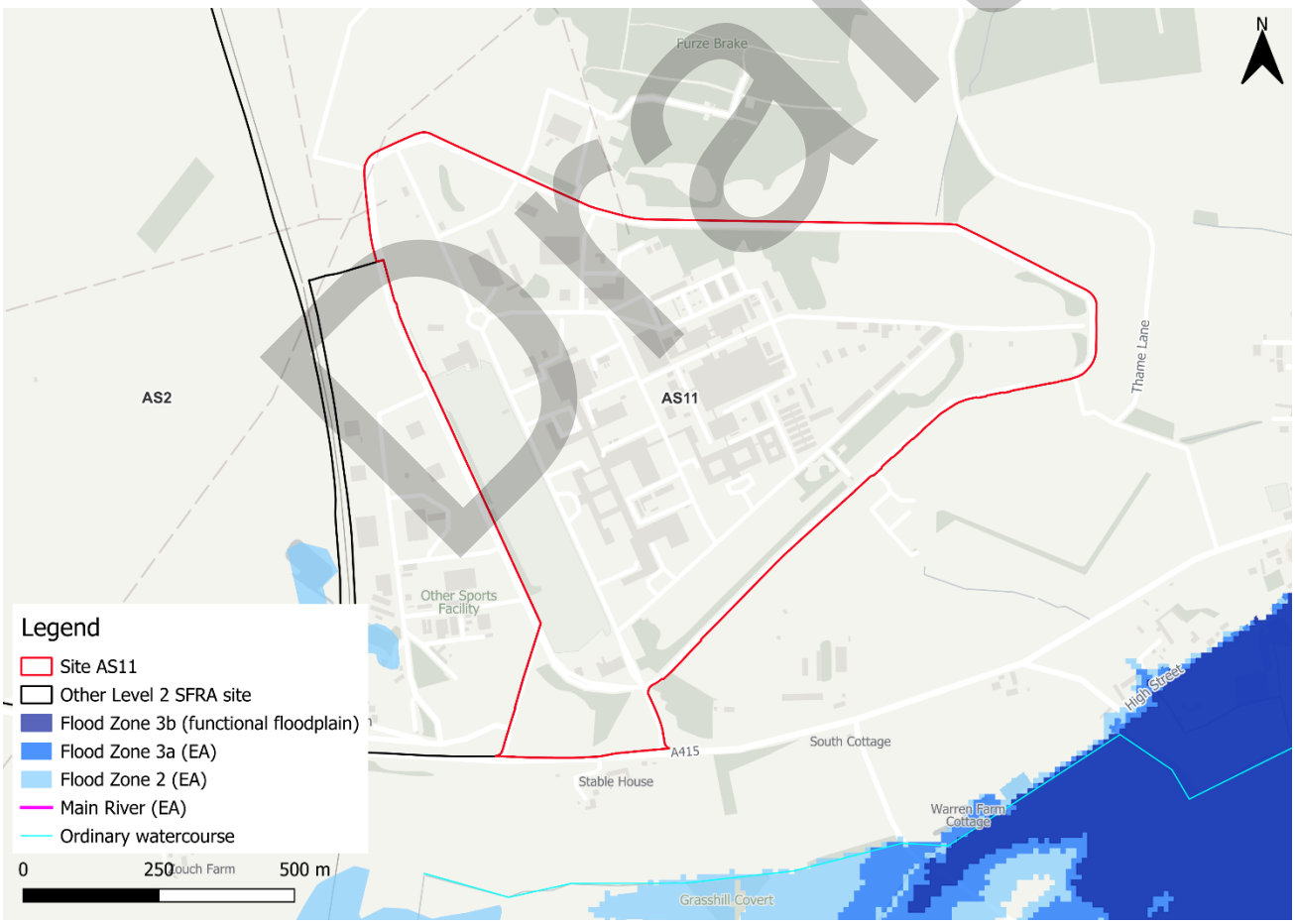

Figure 2-1: Existing risk from rivers to the site

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2.2 Impacts from climate change

2.2.1 Flood Map for Planning - Flood Zones plus Climate Change

The EA's Flood Map for Planning - Flood Zones plus Climate Change dataset does not show the site to be at future fluvial risk.

2.3 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

2.4 Flood risk management

The site doesn't benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

2.4.1 Cumulative impacts

A cumulative impact assessment was completed through the South Oxfordshire and Vale of White Horse Level 1 SFRA Addendum (2026), which aimed to identify catchments sensitive to the cumulative impact of development. Site AS11 (Culham Campus) is located within one catchment, namely; Thames (Evenlode to Thame). This is ranked as a higher sensitivity catchment. Planning considerations for sites at higher sensitivity to the cumulative impacts of development can be found in Appendix D of the Level 1 SFRA Addendum. Cumulative impacts of development should also be considered as part of a site-specific FRA.

2.4.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. Both upstream of and within the site, there are opportunities for tree planting to reduce runoff. There is also a small area within the east of the site with potential for runoff attenuation features. These areas are shown in Figure 2-2.

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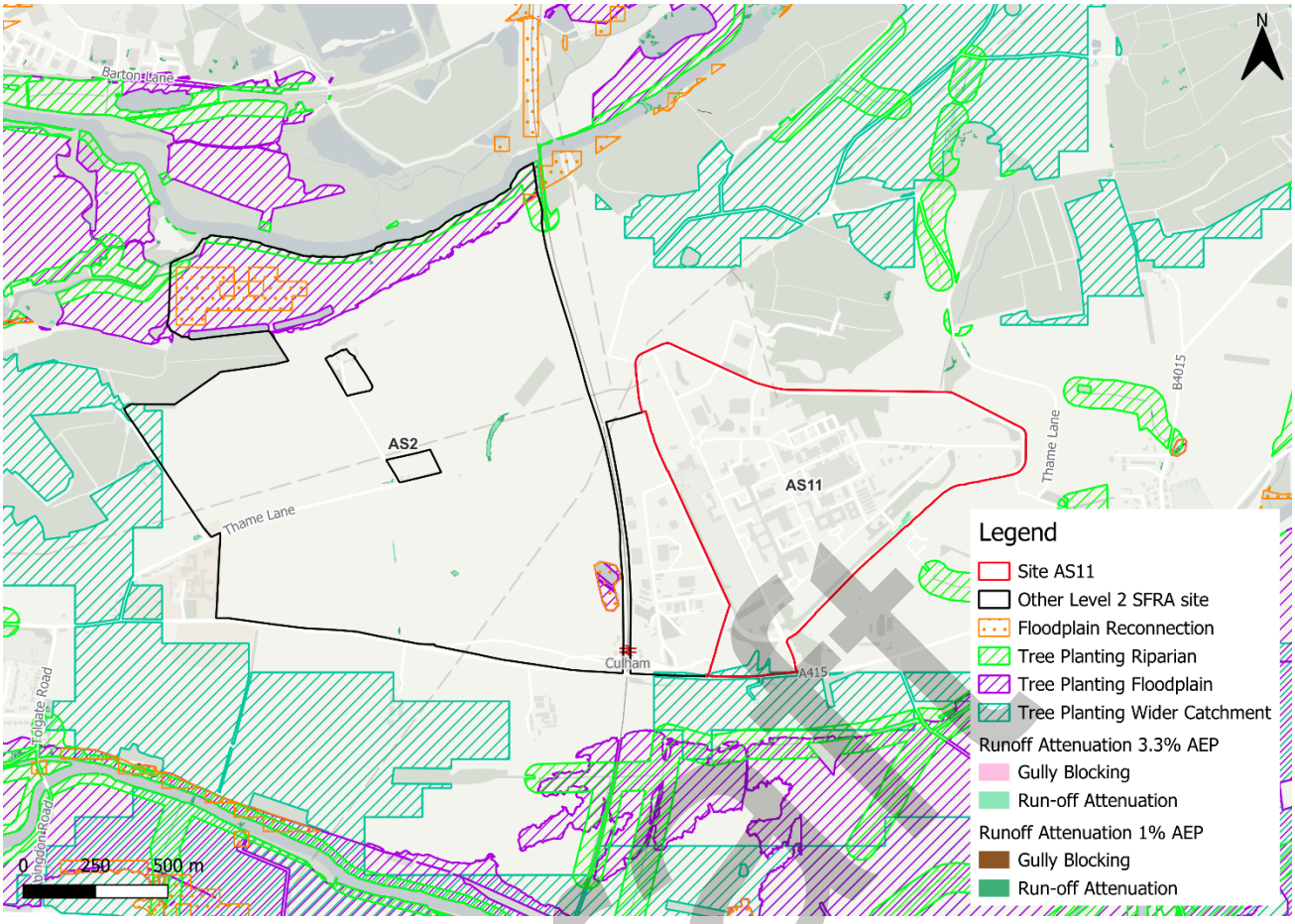

Figure 2-2: Natural Flood Management (NFM) potential mapping

2.5 Residual risk

Although a site may be afforded some protection from defences and / or drainage infrastructure, there is always a residual risk of flooding from asset failure i.e. defence breaches, or blockages of culverts or drainage assets.

There are no assets with the potential to pose a residual risk to the site

2.5.1 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. A "dry day" scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. A "wet day" scenario assumes a worst-case scenario where a reservoir releases water held on a "wet day" when local rivers have already overflowed their banks.

The site is not modelled to be at risk from reservoir flooding.

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2.6 Emergency Planning

2.6.1 Flood warnings and alerts

There are no Flood Warning Areas (FWA) or Flood Alert Areas (FAA) within the vicinity of the site.

2.6.2 Access and escape routes

Safe access and escape routes should be achievable via Abingdon Road (A415) to the south of the site. This route is indicated by the yellow line in Figure 2-3.

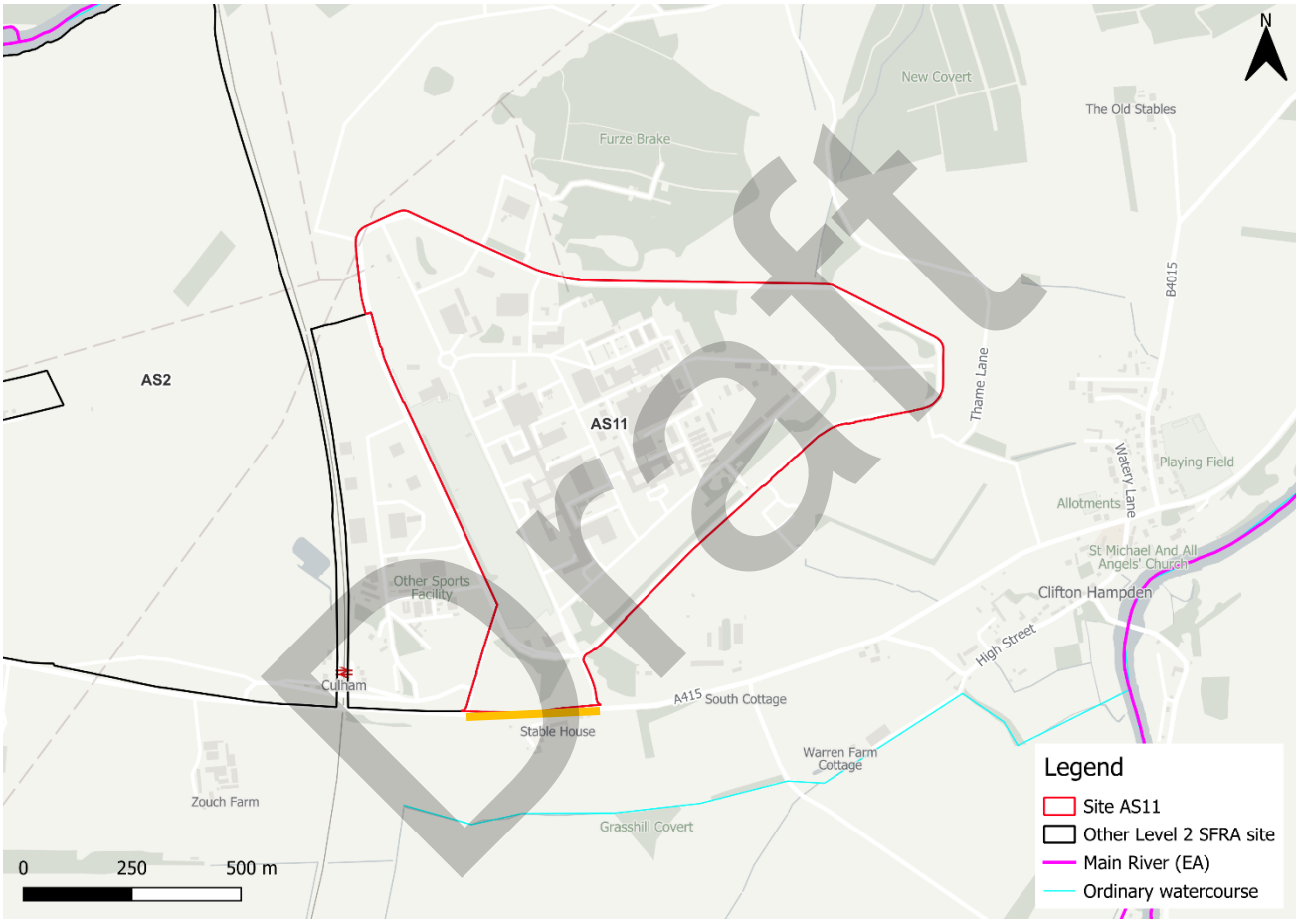

Figure 2-3: Potential access and escape routes

2.7 Observations, mitigation options, site suitability, sequential approach to development management - fluvial

- Observations:
  - The site is wholly within Flood Zone 1 and therefore at low risk of flooding from rivers.
  - The site is not shown to be at additional risk of fluvial flooding when considering climate change.
- Access and escape:

- Safe access and escape routes should be achievable via Abingdon Road (A415) to the south of the site.

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3 Flood risk from surface water

3.1 Existing risk

3.1.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths Present Day

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Extents Present Day map (September 2026), the majority of the site is at very low risk from surface water flooding, as shown in Table 3-1.

There is a surface water flow path through the east of the site, constrained by the existing development present onsite. There are also some scattered areas of surface water ponding within topographic low spots (Figure 3-1).

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Depths Present Day map, the greatest onsite flood depths are between 0.6 and 0.9m within the east of the site, however are largely less than 0.3m across the remaining area of the site (Figure 3-2).

Safe access and escape routes would likely be achievable via Abingdon Road (A415) to the south of the site.

Table 3-1: Existing surface water flood risk based on percentage area at risk using the Flood Map for Planning - Surface Water Spatial Planning Extent Present Day map

Less than 0.1% AEP event (% area)	0.1% AEP event (% area)	1% AEP event (% area)	3.3% AEP event (% area)
79	12	3	4

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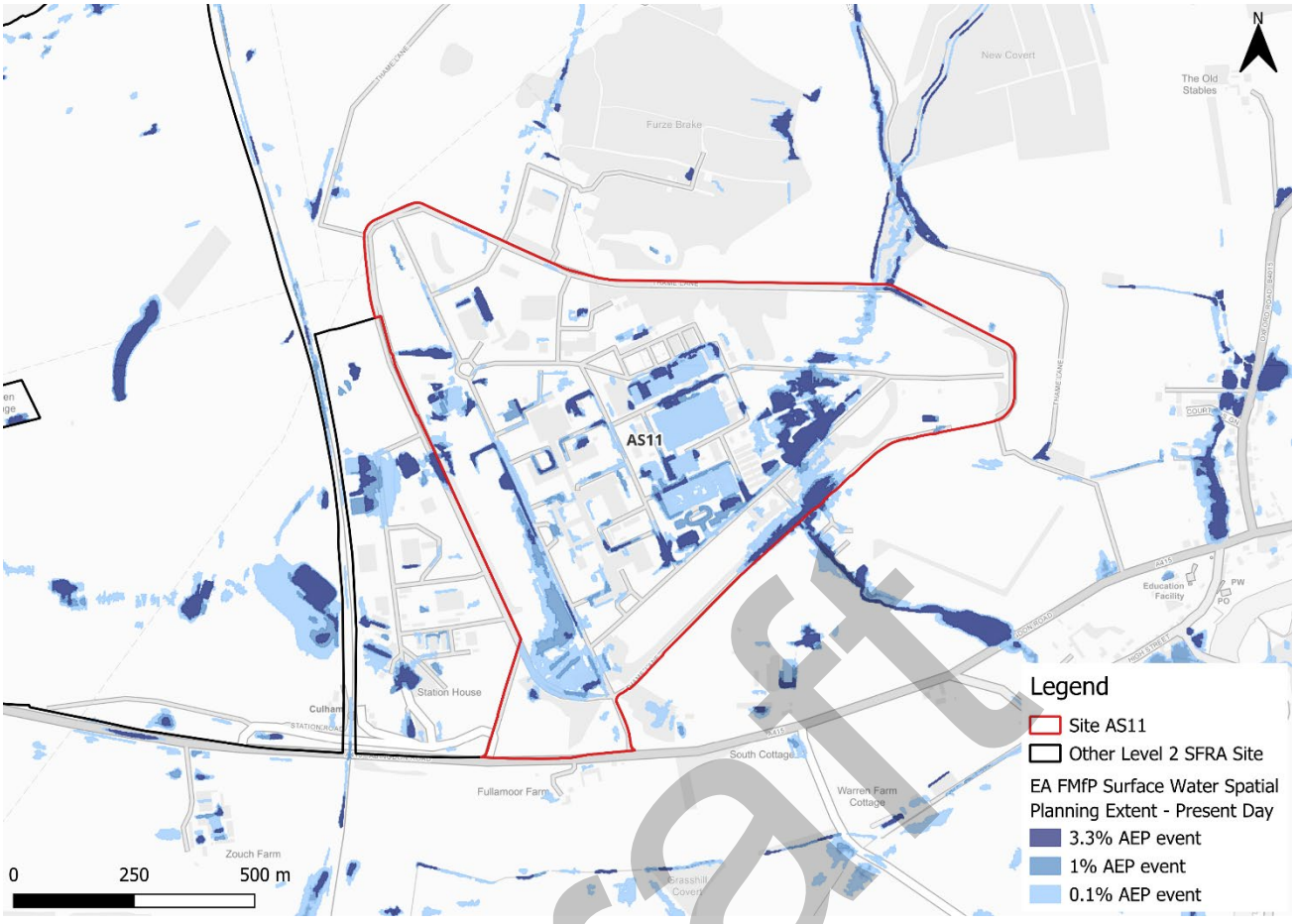

Figure 3-1: Flood Map for Planning - Surface Water Spatial Planning Extents Present Day

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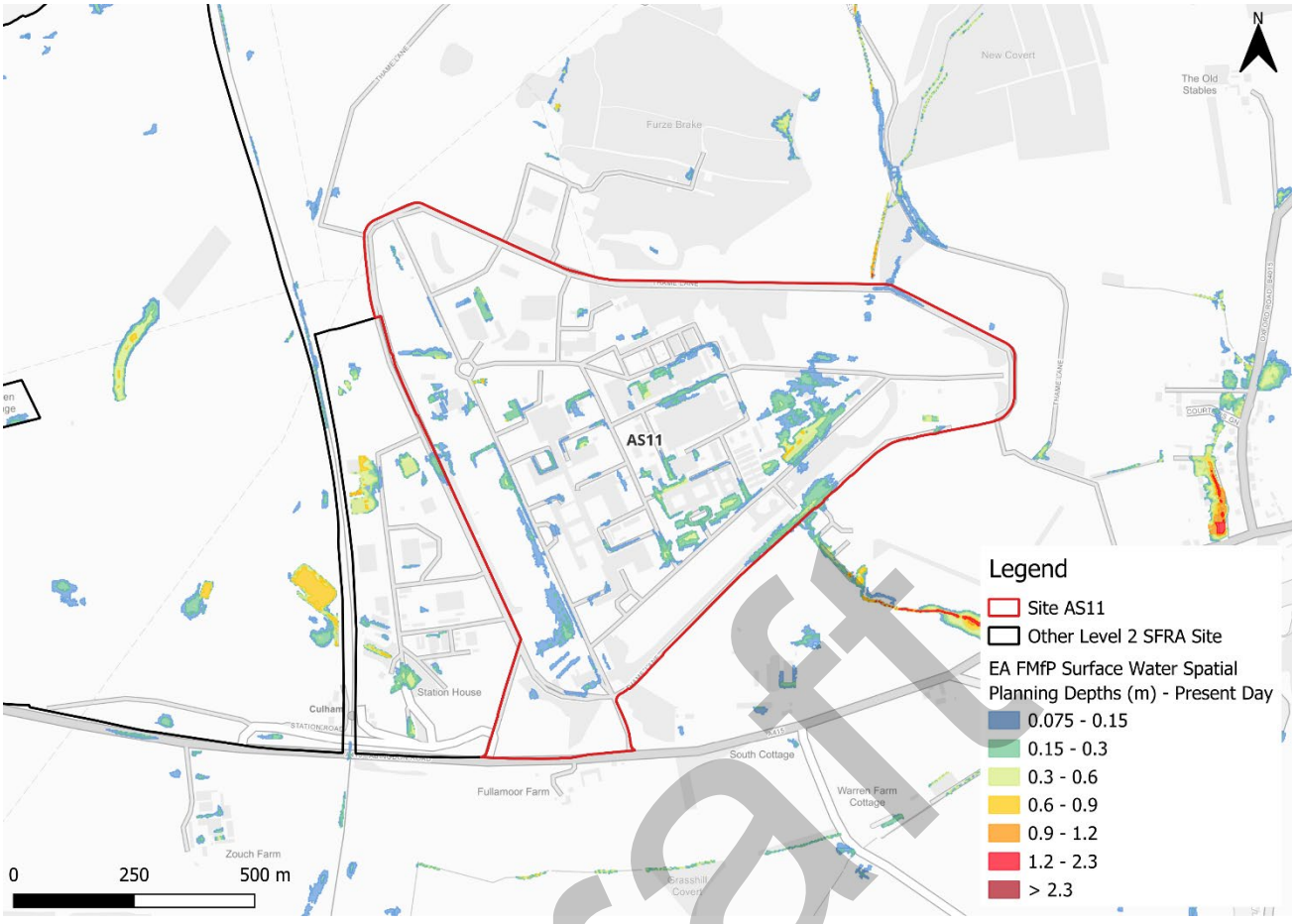

Figure 3-2: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Present Day for the 1% AEP event

3.1.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning data does not include hazard information suitable for planning purposes. Therefore, this Level 2 SFRA considers the third generation Risk of Flooding from Surface Water (RoFSW) hazard mapping in addition to the Flood Map for Planning - Surface Water Spatial Planning extents and depths, as the best available information. Updated surface water hazard information should be confirmed at the site-specific FRA stage.

Based on the EA's national scale third generation RoFSW map, the greatest flood hazard within the site in the medium event is 'significant', but is predominantly categorised as 'low' (Figure 3-3).

There are differences between the Flood Map for Planning - Surface Water Spatial Planning map and the third generation RoFSW hazard mapping. The Flood Map for Planning - Surface Water Spatial Planning data does not map flooding less than 0.075m (7.5cm) in depth. Therefore, where the map may show no flooding, there may be shallow flooding up to a depth of 0.075m. In contrast, the third generation RoFSW does not map flooding with a hazard rating of less than 0.575. This could explain the differences observed between the Flood Map for Planning and third generation RoFSW maps.

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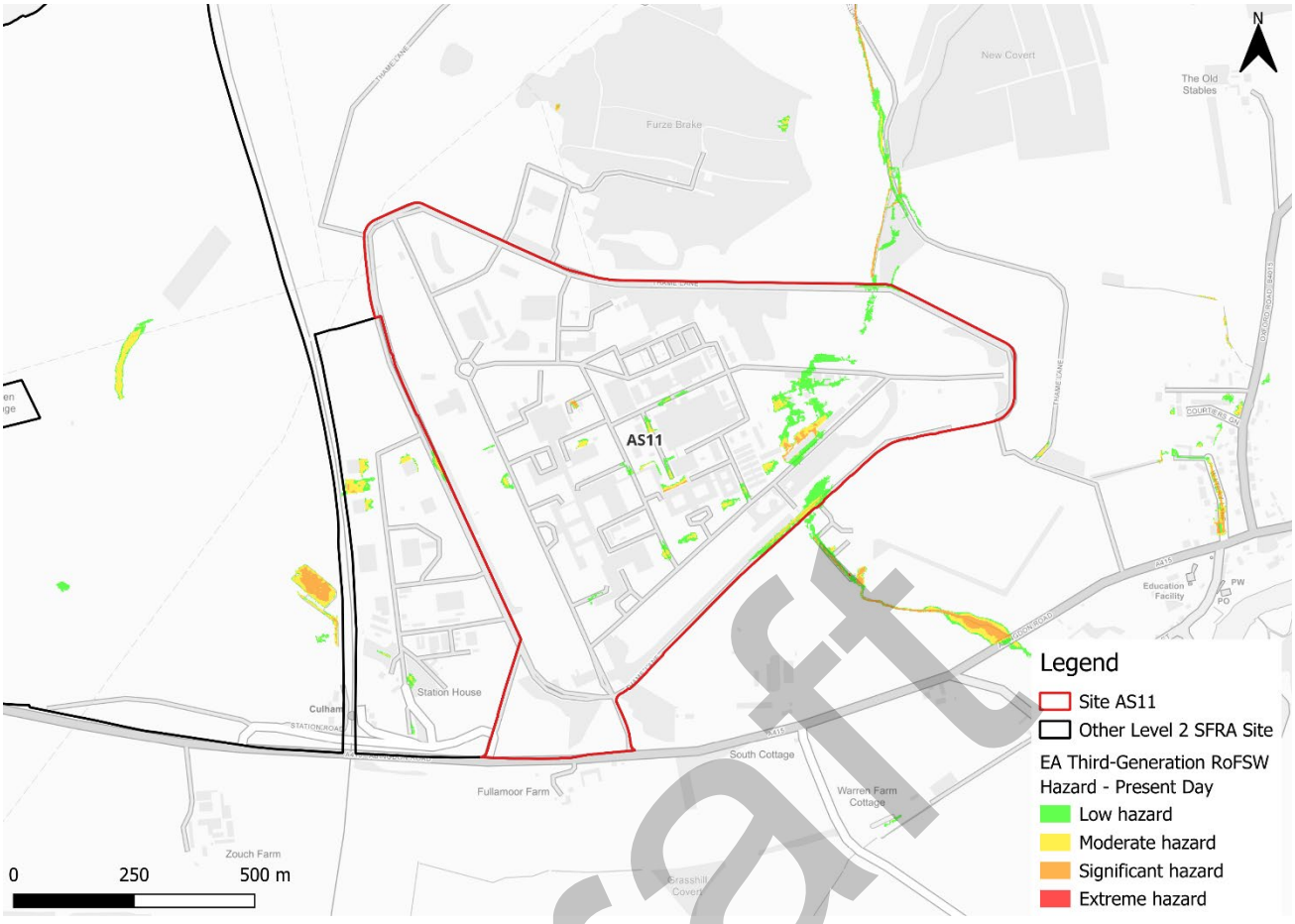

Figure 3-3: Third generation - Risk of Flooding from Surface Water map present day 1% AEP event surface water flood hazard[1]

3.2 Impacts from climate change

3.2.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths

The EA's climate change allowance guidance states that SFRA's should assess the upper end peak rainfall allowance for the 2070s epoch. This dataset is included in the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Climate Change dataset (September 2026). The peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment are shown in Table 3-2. The allowance for the 0.1% AEP event is not stated in the EA guidance.

1 Based on Section 7.5 Hazard rating. What is the Risk of Flooding from Surface Water map? Report version 2.0. April 2019. Environment Agency

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Table 3-2: Peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment

Return period	Central allowance 2070s (% increase)	Upper end allowance 2070s (% increase)
3.3% AEP	25	35
1% AEP	25	40

Figure 3-4 shows the surface water flood extents for the 2070s upper end climate change scenario. Surface water flood risk is shown to increase in extent in all events. The flow path within the east of the site is modelled to become more prominent, with larger areas of ponding across the rest of the site. There is an additional emerging flow path within the west of the site.

Flood depths are shown to remain at between 0.6 and 0.9m within the east of the site, with depths of less than 0.3m covering the majority of the rest of the site (Figure 3-5).

Safe access and escape routes are likely to remain achievable via Abingdon Road (A415) to the south of the site.

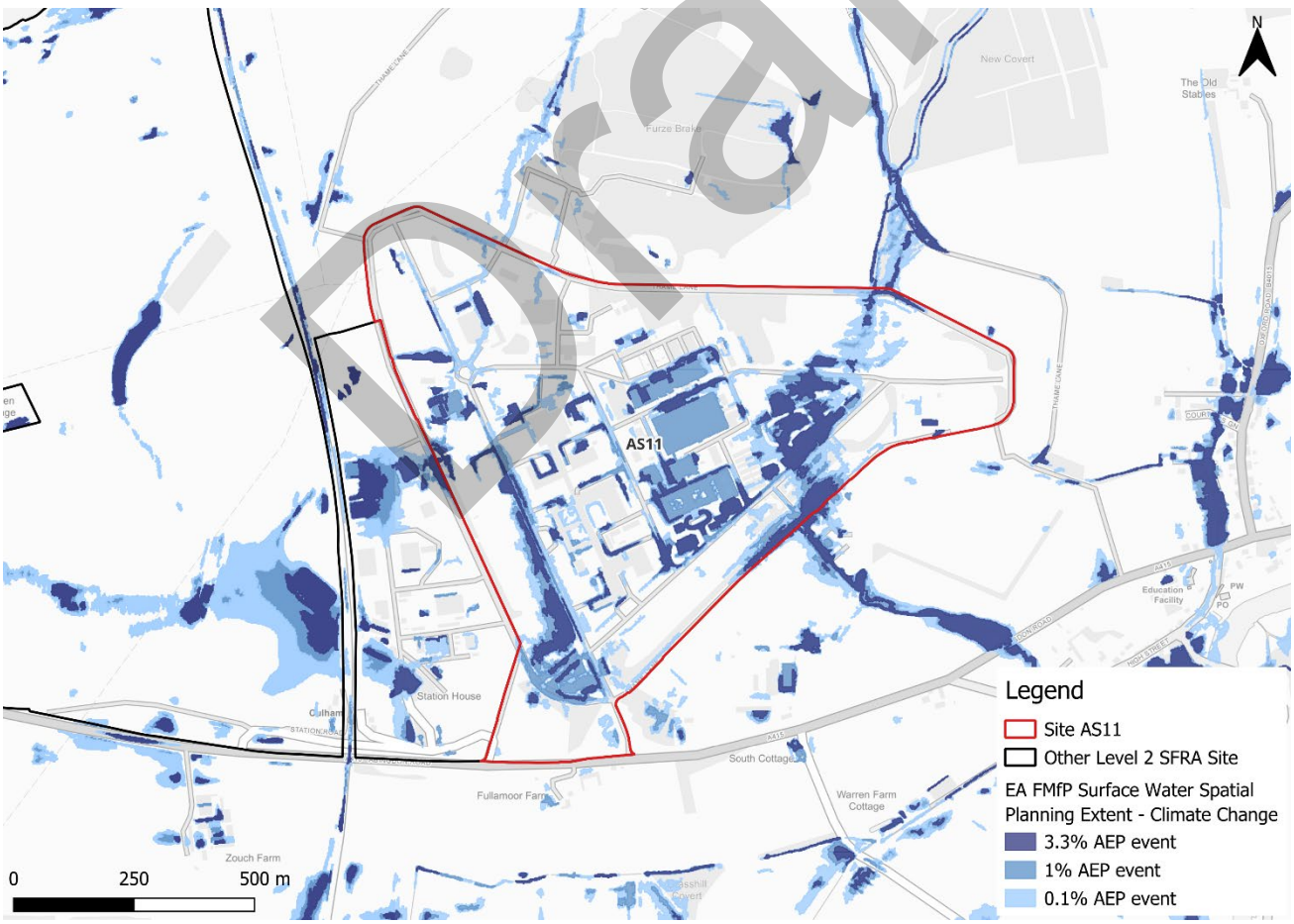

Figure 3-4: Flood Map for Planning - Surface Water Spatial Planning Extents Climate Change (2070s Upper End)

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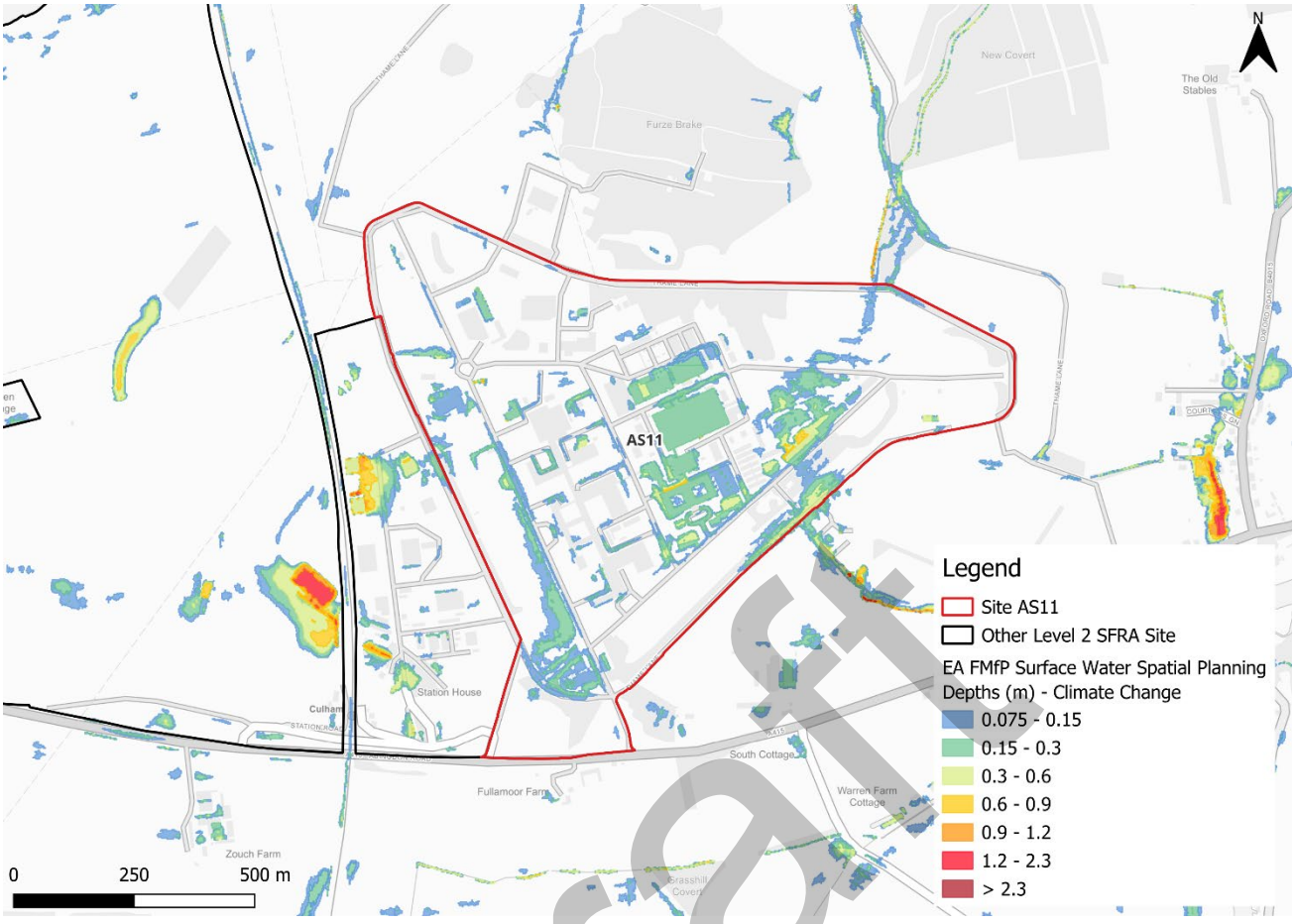

Figure 3-5: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Climate Change for the 1% AEP event (2070s Upper End)

3.2.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning climate change data does not include hazard information suitable for planning purposes. This Level 2 SFRA therefore considers the RoFSW low risk surface water event as a conservative proxy for the medium risk event plus climate change, as the best available information to assess surface water flood hazards. The impact of climate change on surface water flood hazards should be considered at the site-specific FRA stage.

Using the RoFSW low risk event as a proxy, future surface water flood hazard in the medium risk event remains predominantly 'low', however could reach 'significant' within the east of the site (Figure 3-6).

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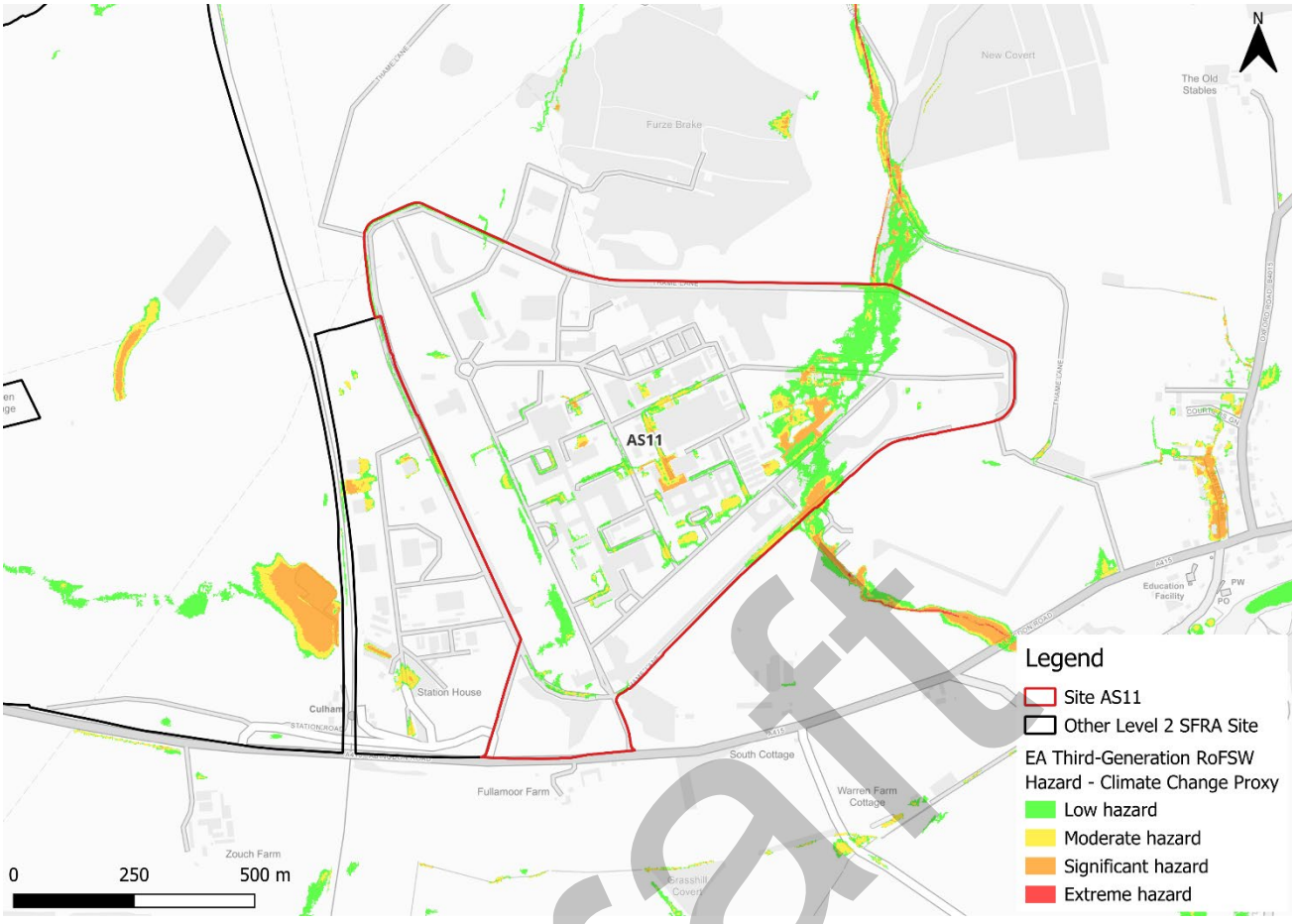

Figure 3-6: Low risk event surface water flood hazard[1], as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options, site suitability, sequential approach to development management - surface water

- Current risk to the site is predominantly very low, with 79% of the site being outside of the 0.1% AEP surface water flood extent. Surface water risk is present along a flow path through the east of the site, with some scattered areas of ponding across the site, constrained by the existing development.
- Risk to the site is shown to increase in extent within the site when considering the impact of climate change. The flow path and ponding within the site are shown to increase in extent significantly.
- Topographic low spots and flow paths should be considered and included in site design and ideally left in place to flood naturally when required.
- Assessment of the current drainage system in place should be carried out to ascertain any current capacity issues and whether the current system could accommodate the proposed residential development or whether further capacity will be required.
- There is an existing culverted watercourse running through the site, which should be surveyed and assessed for any improvements which may be required.
- Options to de-culvert should be explored within the site masterplan development.

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- When a planning application is submitted, a full detailed drainage strategy would be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA.
- Safe access and escape routes would likely be achievable via Abingdon Road (A415) to the south of the site.

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4 Groundwater, geology and SuDS suitability

Risk of groundwater emergence is assessed in this SFRA using JBA's 5m Groundwater Emergence Map. Figure 4-1 shows the map covering the site and the surrounding areas. Table 4-1 explains the risk classifications.

Across the majority of the site there is a risk of groundwater emergence to surface and subsurface assets. There are some areas within the north of the site where there is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely. Ground investigations will be required through the site-specific FRA to ascertain groundwater levels and conditions and investigate SuDS feasibility.

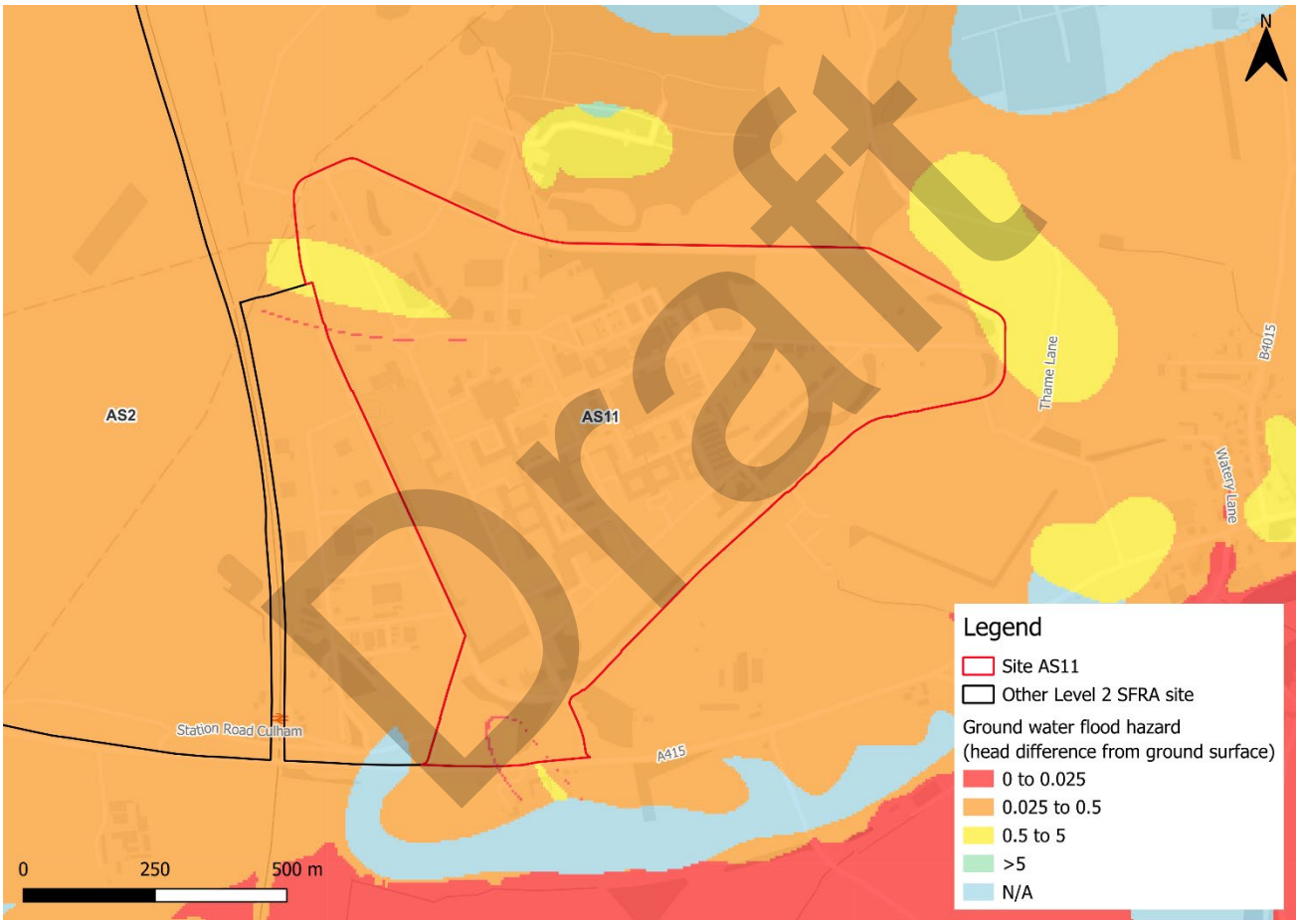

Figure 4-1: JBA 5m Groundwater Emergence Map

Table 4-1: Groundwater Emergence Hazard Classification

Groundwater head difference (m)*	Class label
0 to 0.025	Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
0.025 to 0.5	Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
0.5 to 5	Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event There is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely.
>5	Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event. Groundwater emergence is not likely.
N/A	No risk. This zone is deemed as having a negligible risk from groundwater emergence due to the nature of the local geological deposits.
*Difference is defined as ground surface in mAOD minus modelled groundwater table in mAOD.	

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The underlying bedrock within the site is sandstone and mudstone (Figure 4-2). Other than sandstone, these rocks generally have low levels of permeability. This leads to less water infiltrating into the ground and could potentially contribute to lower water table levels. The drainage strategy for the site should investigate water table levels and ground conditions to inform on appropriate SuDS.

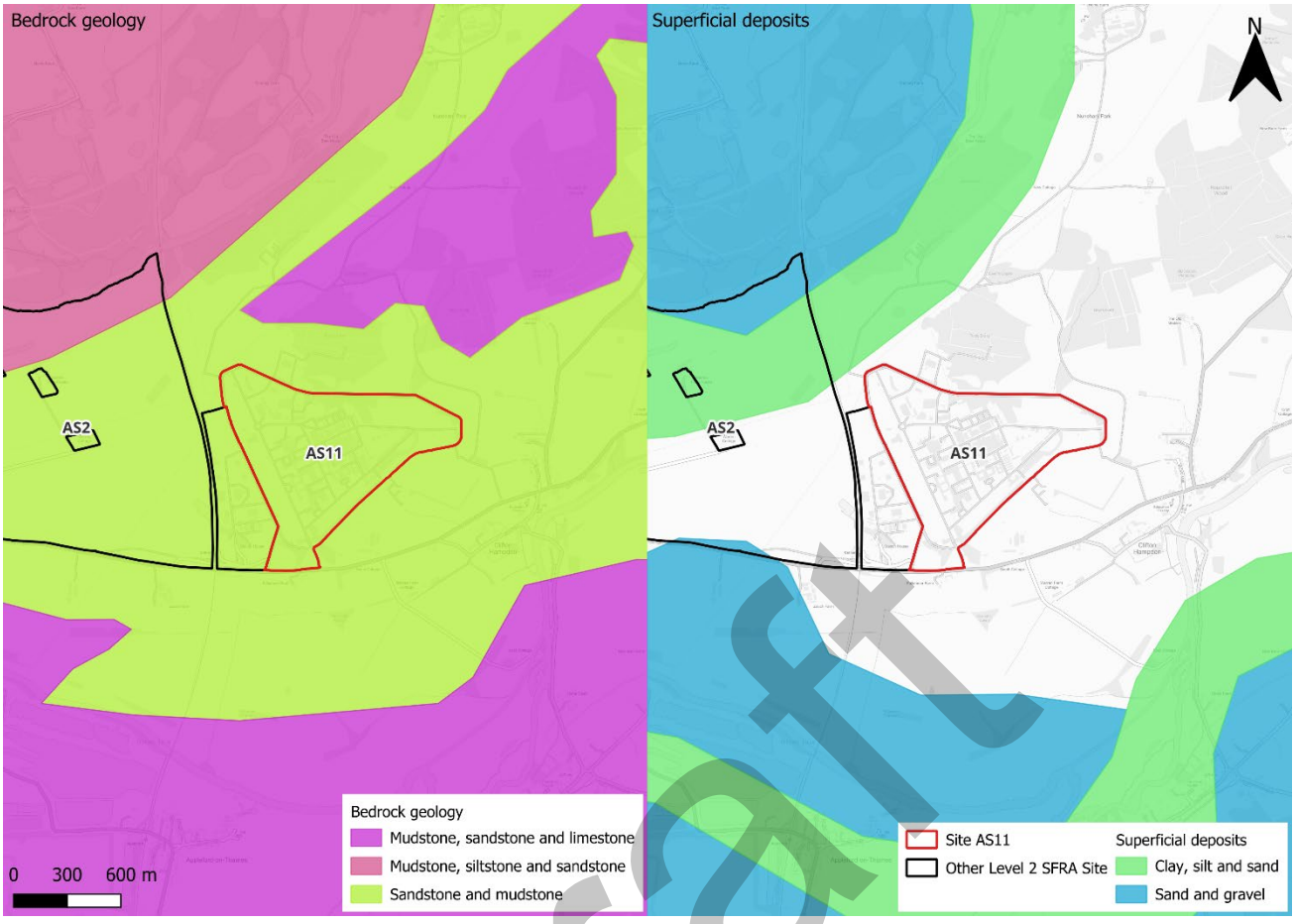

Figure 4-2: BGS Geology - Bedrock and superficial deposits

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5 Overall site assessment

5.1 Can part b) of the exception test be passed?

To pass part b) of the exception test[2], it must be proven that the development can be safe for its lifetime, which is 75 years for non-residential development, taking account of the vulnerability of its users, without increasing risk elsewhere, and, where possible, will reduce flood risk overall. The site is not required to pass the exception test as it is proposed for less vulnerable uses.

5.2 Recommendations and site-specific FRA requirements

Based on the evidence presented in the Level 1 SFRA (2024), Level 1 SFRA Addendum (2026) and this Level 2 SFRA:

- Based on current information, this site could be allocated given its location within Flood Zone 1.
- Development design and layout should include for the surface water flow path through the east of the site. A detailed drainage strategy will be required for any new development, given the large area of the site.
- Options to de-culvert should be explored within the site masterplan development.
- Groundwater conditions must be investigated further through the site-specific FRA.
- Opportunities for NFM features to reduce flood risk to the site and surrounding areas should be explored at the site-specific FRA stage.
- Any site-specific FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; South Oxfordshire and Vale of White Horse District Councils Joint Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the site-specific FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; TW; the highways authorities; and the emergency services.

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[2] Policy F6 National Planning Policy Framework 2026

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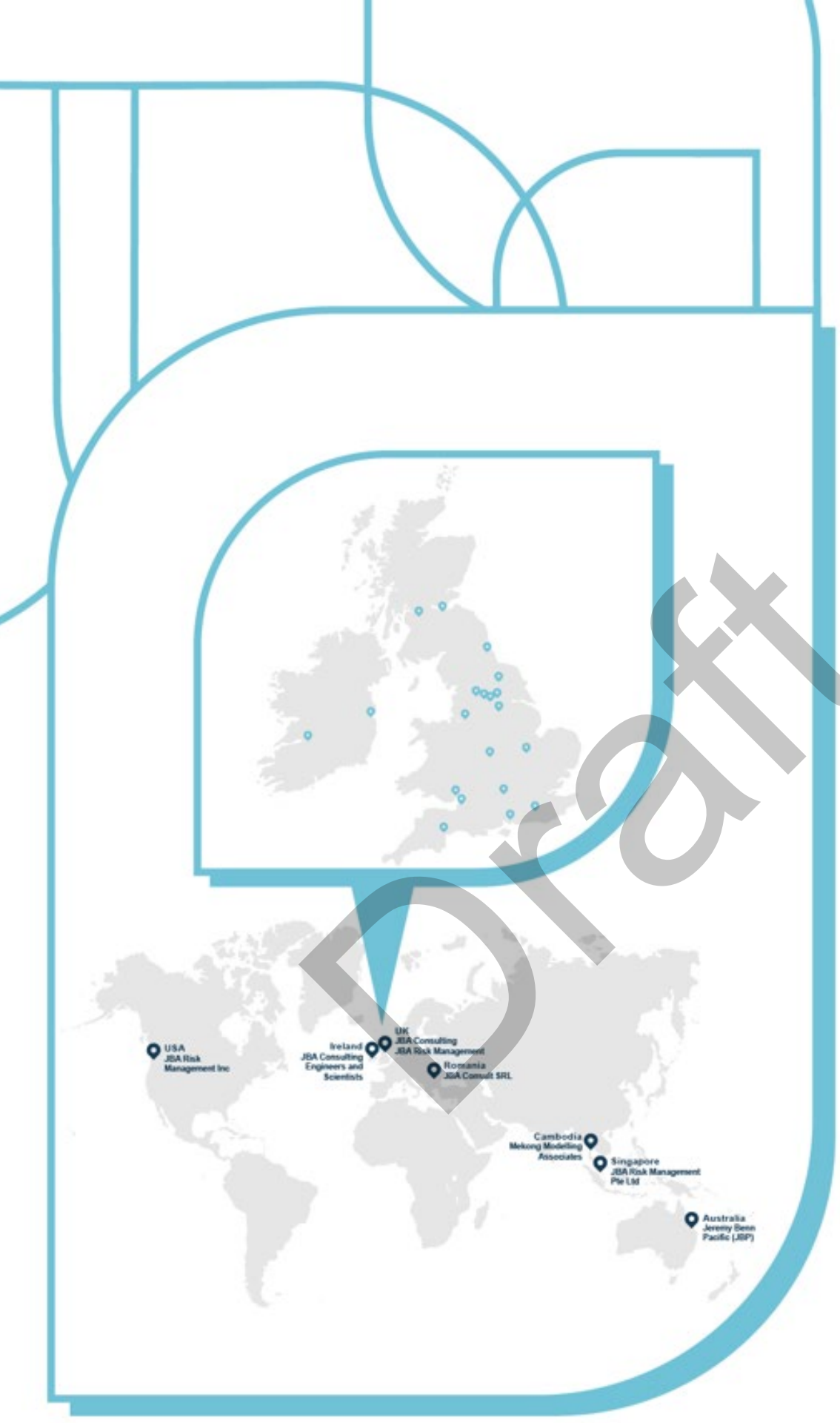

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Registered Office
1 Broughton Park
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Broughton
SKIPTON
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BD23 3FD
United Kingdom

+44(0)1756 799919
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www.jbaconsulting.com
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South Oxfordshire and Vale of White Horse Level 2 Strategic Flood Risk Assessment Update

Site AS12 - Harwell Campus

Draft Report

October 2026

Prepared for:

South Oxfordshire District Council and

Vale of White Horse District Council

www.jbaconsulting.com

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Reviewed by	Laura Thompson-Jones BSc CGeog FRGS Senior Analyst
Authorised by	Mike Williamson BSc MSc CGeog FRGS EADA Project Director

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Contract

JBA Project Manager	Freya Nation
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2026s1132

This report describes work commissioned by South Oxfordshire and Vale of White Horse District Councils. The Client's representative for the contract was Rebekah Goodwill of South Oxfordshire and Vale of White Horse District Councils. Boe Kilshaw of JBA Consulting carried out this work.

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for South Oxfordshire and Vale of White Horse Joint Local Plan Site AS12 - Harwell Campus. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA' (2024) and the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum' (2026), and read the 'South Oxfordshire and Vale of White Horse District Councils Level 2 SFRA Main Report Update' (2026) and is therefore familiar with the terminology used in this report.

1.1 Site AS12 - Harwell Campus

- Location: Harwell Campus (Figure 1-1)
- Existing site use: Brownfield; industrial
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Mainly employment
- Proposed site use vulnerability: Less vulnerable
- Site area: 282.05 ha
- Proposed development impermeable area: 240 ha (assumed 85% of site area)
- Watercourse: N/A
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for more detailed assessment through Level 2 SFRA (Strategic Recommendation B)
    - Site has partial planning permission
    - Assess present day and future surface water depths, hazards

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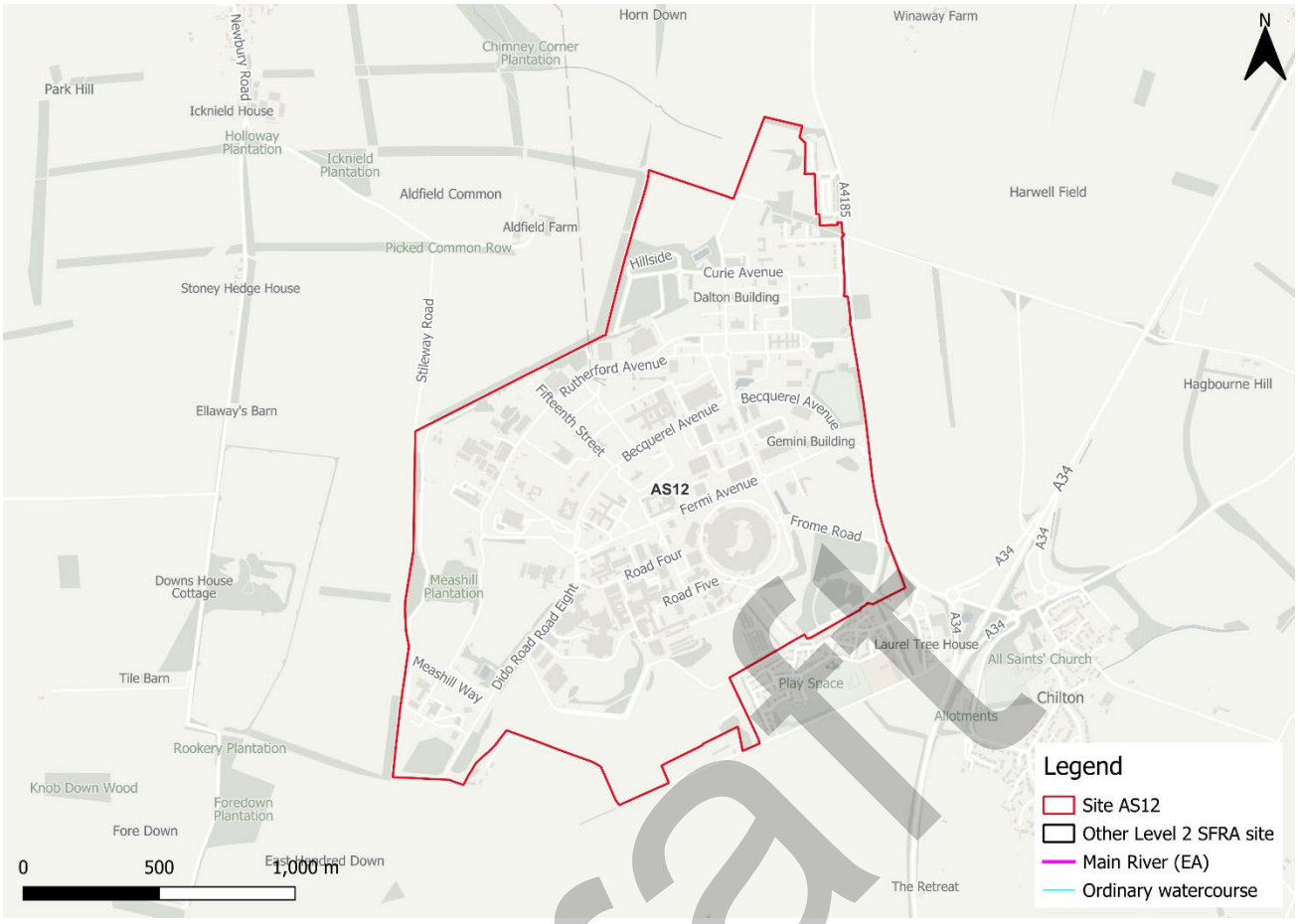

Figure 1-1: Existing site location boundary

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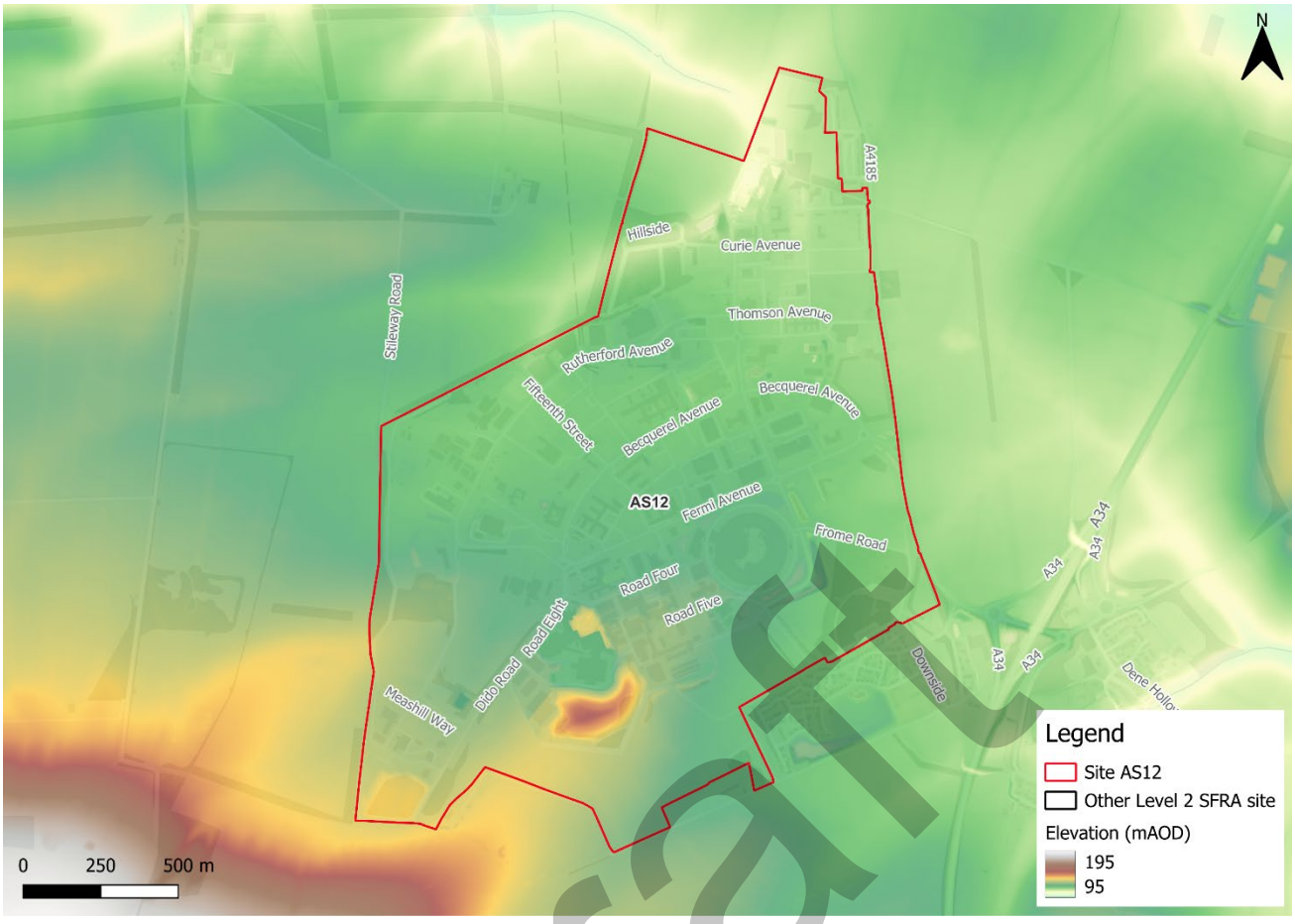

Figure 1-2: Topography

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2 Flood risk from rivers

2.1 Existing risk

2.1.1 Flood Map for Planning and functional floodplain

Based on the Environment Agency's (EA) Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum (2026), the percentage areas of the site within each flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.4).

The site is entirely within Flood Zone 1 and therefore at low risk of flooding from rivers.

Table 2-1: Existing flood risk based on percentage area of site at risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

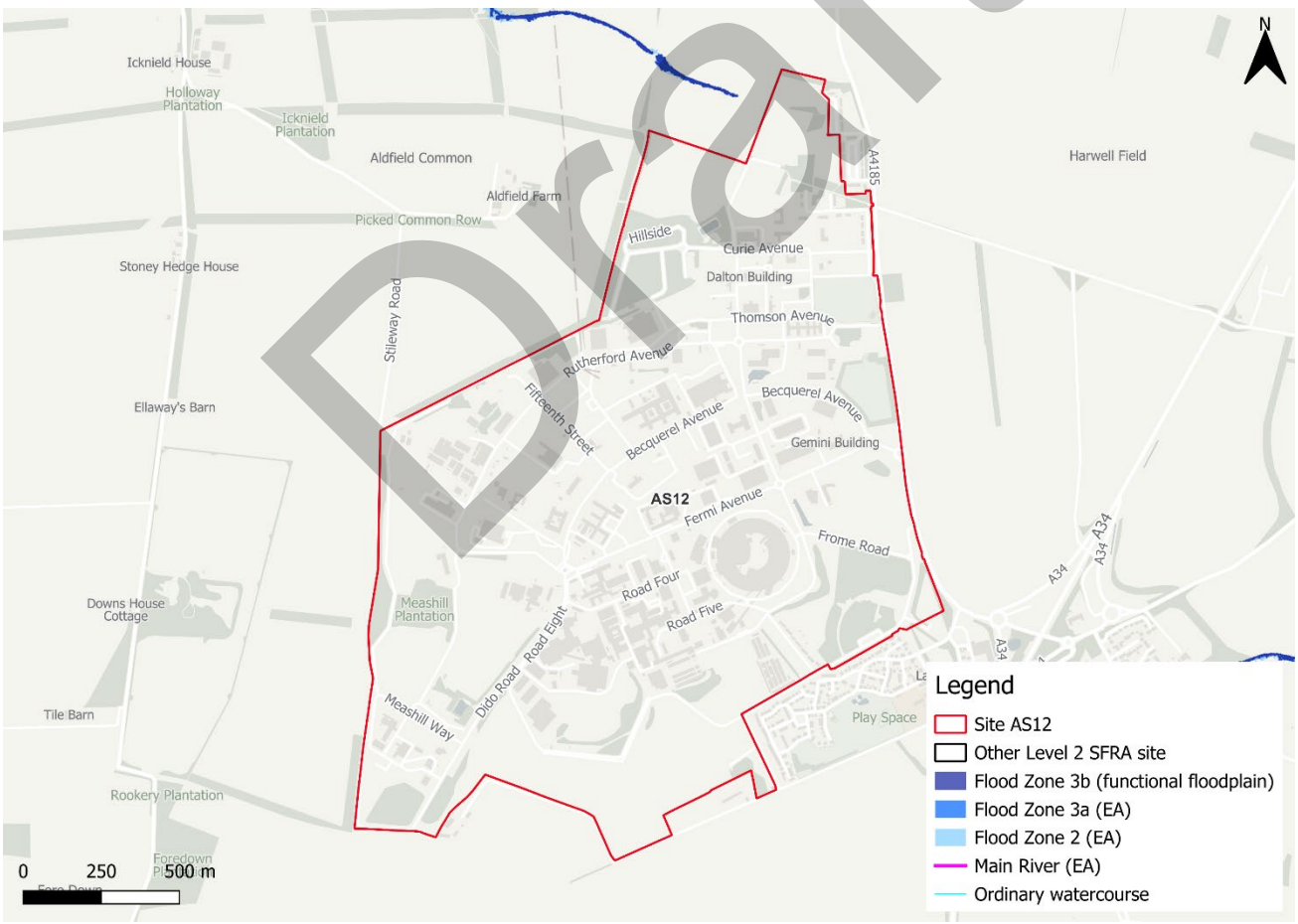

Figure 2-1: Existing risk from rivers to the site

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2.2 Impacts from climate change

2.2.1 Flood Map for Planning - Climate Change

The site is not shown to be at additional fluvial risk when considering climate change, based on the EA's Flood Map for Planning - Climate Change dataset.

2.3 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

2.4 Flood risk management

The site doesn't benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

2.4.1 Cumulative impacts

A cumulative impact assessment was completed through the South Oxfordshire and Vale of White Horse Level 1 SFRA Addendum (2026), which aimed to identify catchments sensitive to the cumulative impact of development. Site AS12 (Harwell Campus) is located within two catchments, namely; Ginge Brook and Mill Brook and Mill Brook and Bradfords Brook system, Wallingford. These are ranked as high and low sensitivity catchments respectively. Planning considerations for sites at higher sensitivity to the cumulative impacts of development can be found in Appendix D of the Level 1 SFRA Addendum. Cumulative impacts of development should also be considered as part of a site-specific FRA.

2.4.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. There are not any applicable areas that could benefit this site.

2.5 Residual risk

Although a site may be afforded some protection from defences and / or drainage infrastructure, there is always a residual risk of flooding from asset failure i.e. defence breaches, or blockages of culverts or drainage assets.

There are no assets with the potential to pose a residual risk to the site

2.5.1 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. A "dry day" scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. A

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"wet day" scenario assumes a worst-case scenario where a reservoir releases water held on a "wet day" when local rivers have already overflowed their banks.

The site is not modelled to be at risk from reservoir flooding.

2.6 Emergency Planning

2.6.1 Flood warnings and alerts

There are no Flood Warning Areas (FWA) or Flood Alert Areas (FAA) within the vicinity of the site.

2.6.2 Access and escape routes

Safe access and escape routes should be achievable via Newbury Road (A4185) to the east of the site. This route is indicated by the yellow line in Figure 2-2.

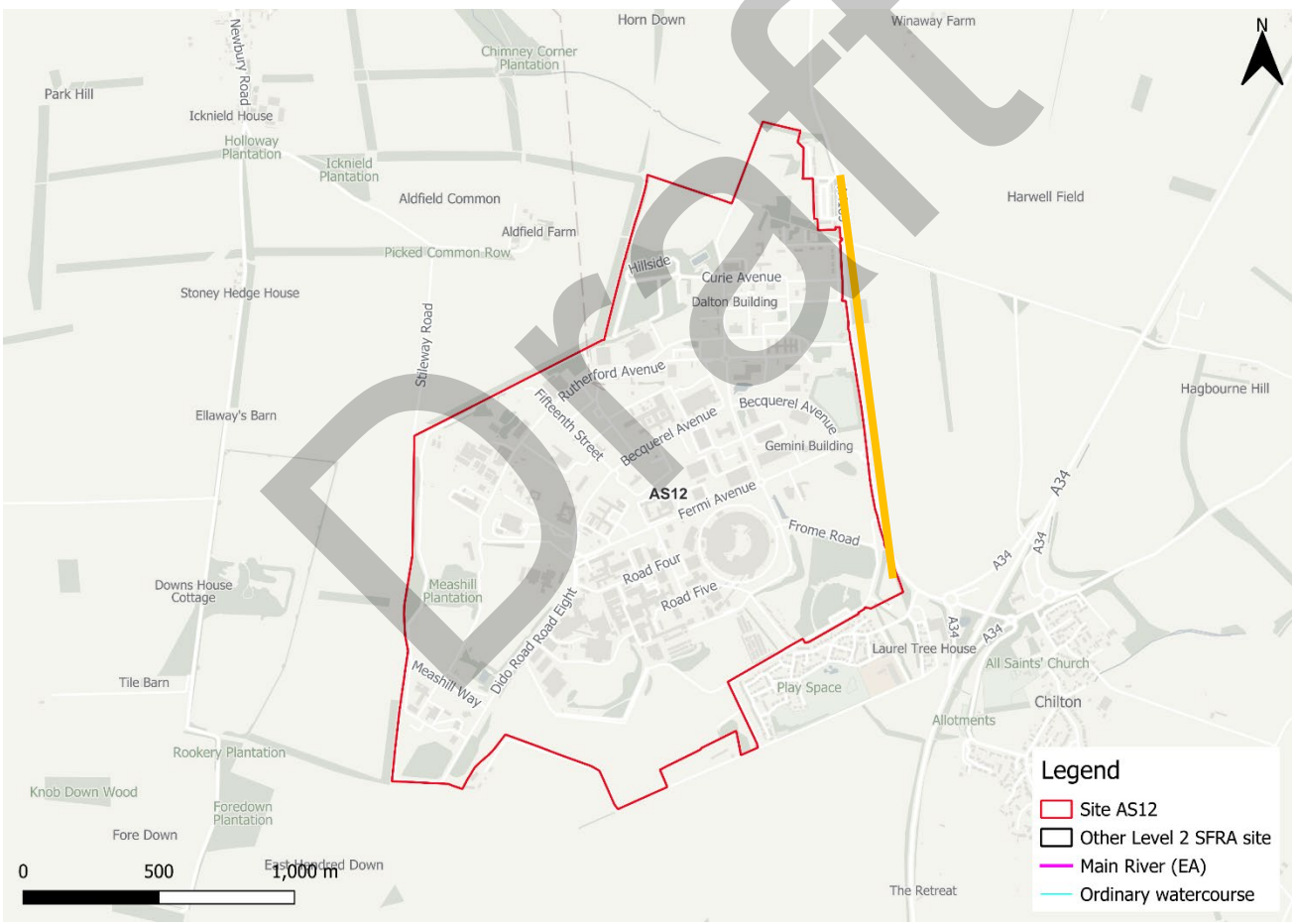

Figure 2-2: Potential access and escape routes

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2.7 Observations, mitigation options, site suitability, sequential approach to development management - fluvial

- Observations:
  - The site is located wholly within Flood Zone 1 and therefore at low risk of flooding from rivers.
  - The site is not shown to be at additional risk from climate change.
- Access and escape:
  - Safe access and escape routes should be achievable via Newbury Road (A4185) to the east of the site.

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3 Flood risk from surface water

3.1 Existing risk

3.1.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths Present Day

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Extents Present Day map (June 2026), the majority of the site is at very low risk from surface water flooding, as shown in Table 3-1.

Surface water risk is largely confined to scattered areas of ponding across the site and is constrained by the existing development within the site (Figure 3-1).

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Depths Present Day map, the greatest flood depths are shown to be greater than 1.2m within a small area in the centre of the site, however the site is predominantly at risk of depths less than 0.3m (Figure 3-2).

Safe access and escape routes would likely be achievable via Newbury Road (A4185) to the east of the site in all events.

Table 3-1: Existing surface water flood risk based on percentage area at risk using the Flood Map for Planning - Surface Water Spatial Planning Extent Present Day map

Less than 0.1% AEP event (% area)	0.1% AEP event (% area)	1% AEP event (% area)	3.3% AEP event (% area)
93	6	1	0

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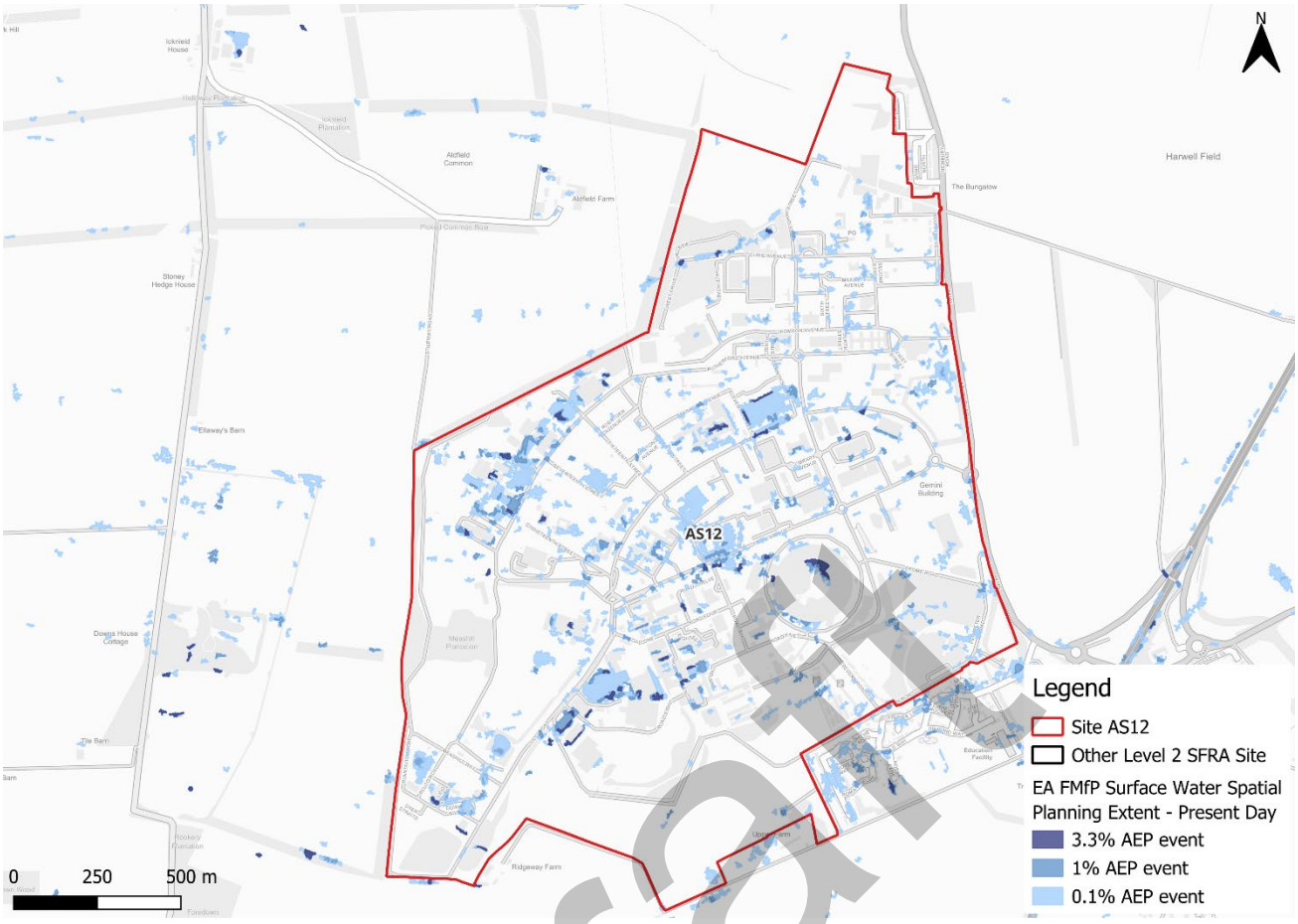

Figure 3-1: Flood Map for Planning - Surface Water Spatial Planning Extents Present Day

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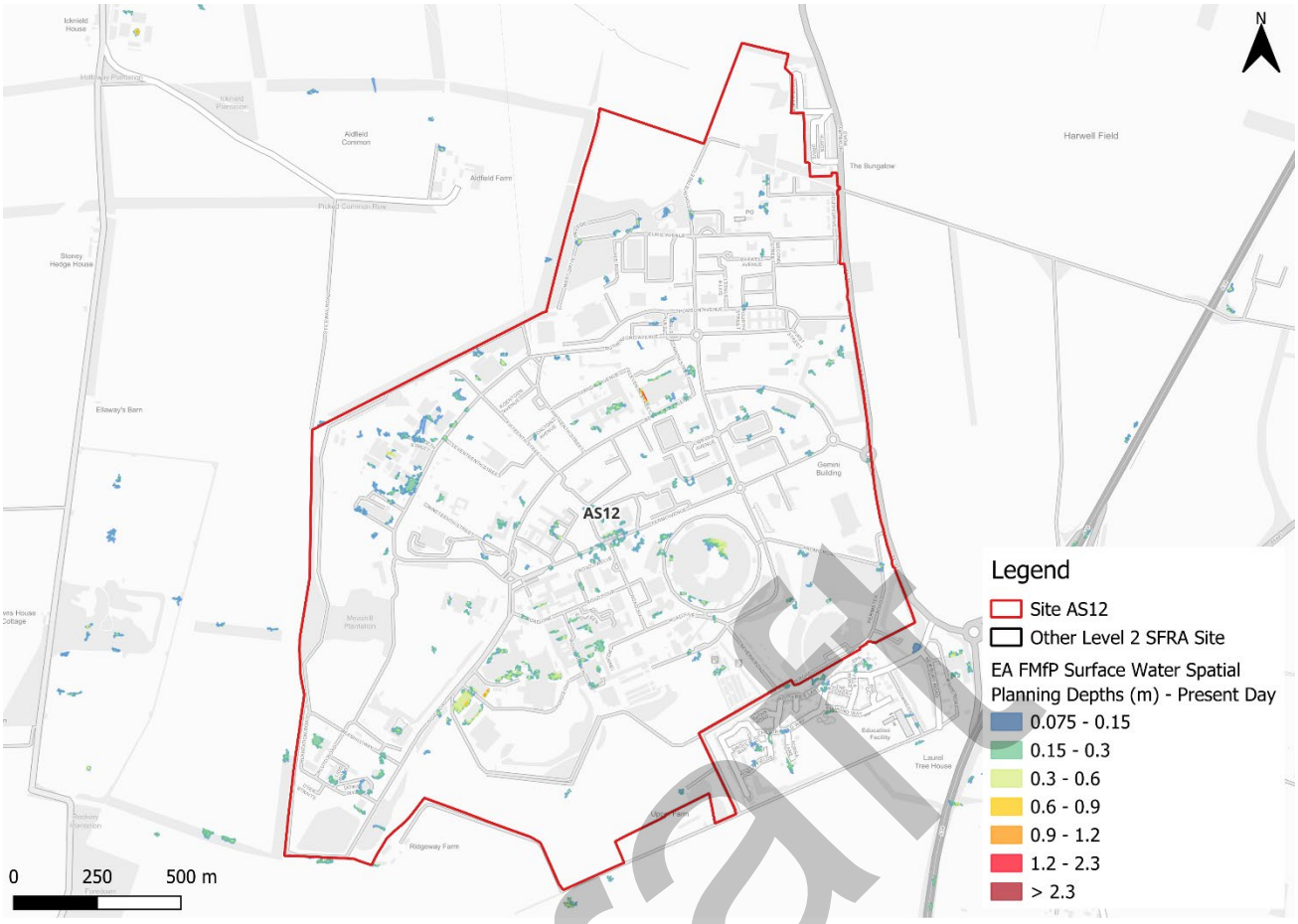

Figure 3-2: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Present Day for the 1% AEP event

3.1.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning data does not include hazard information suitable for planning purposes. Therefore, this Level 2 SFRA considers the third generation Risk of Flooding from Surface Water (RoFSW) hazard mapping in addition to the Flood Map for Planning - Surface Water Spatial Planning extents and depths, as the best available information. Updated surface water hazard information would need to be confirmed at the site-specific FRA stage.

Based on the EA's national scale third generation RoFSW map, the greatest flood hazard within the site in the medium risk event is categorised as 'moderate', however is predominantly 'low' (Figure 3-3).

There are some differences between the Flood Map for Planning - Surface Water Spatial Planning map and the third generation RoFSW hazard mapping. The Flood Map for Planning - Surface Water Spatial Planning data does not map flooding less than 0.075m (7.5cm) in depth. Therefore, where the map may show no flooding, there may be shallow flooding up to a depth of 0.075m. In contrast, the third generation RoFSW does not map flooding with a hazard rating of less than 0.575. This could explain the differences observed between the Flood Map for Planning and third generation RoFSW maps.

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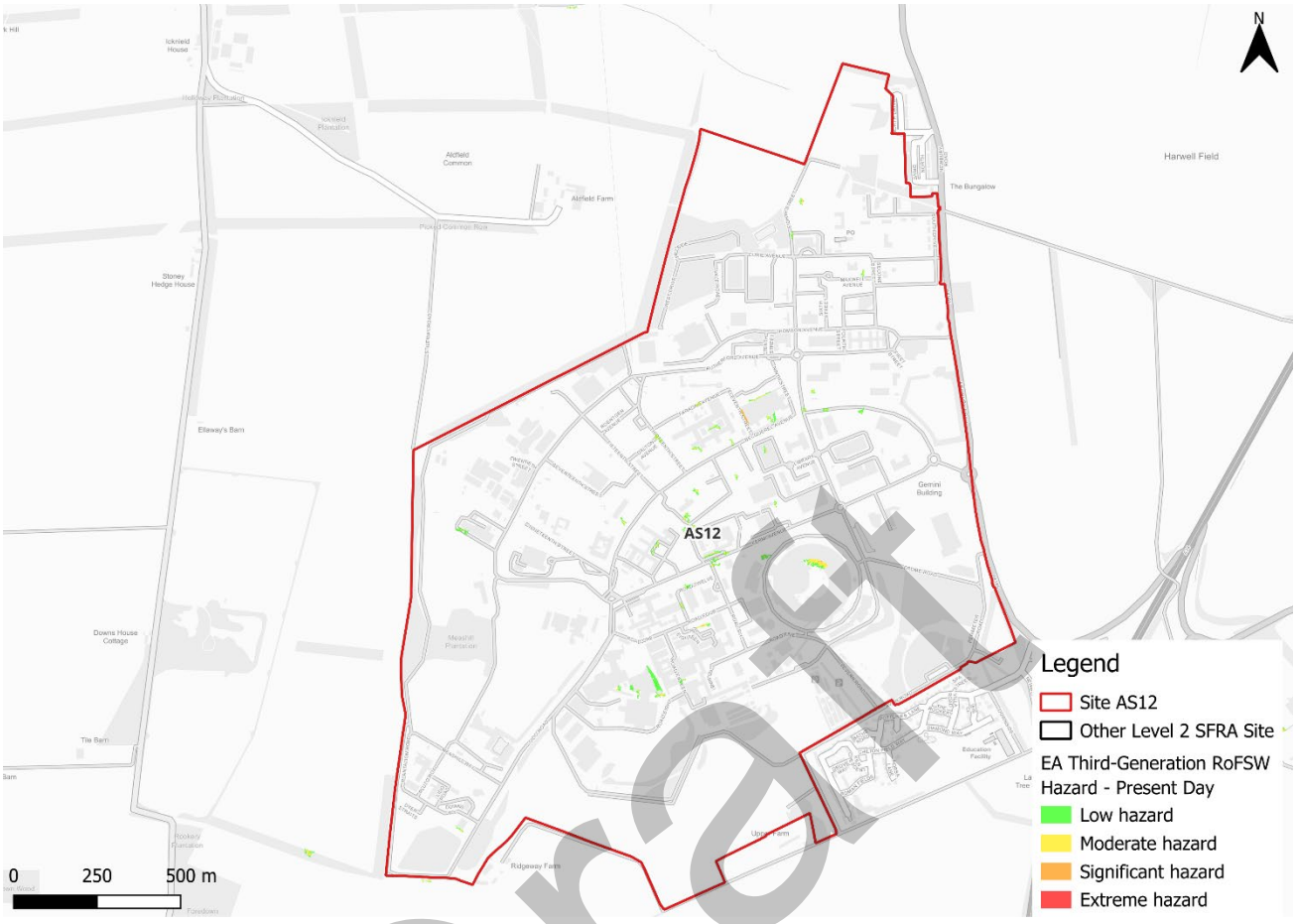

Figure 3-3: Third generation - Risk of Flooding from Surface Water map present day 1% AEP event surface water flood hazard[1]

3.2 Impacts from climate change

3.2.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths

The EA's climate change allowance guidance states that SFRA's should assess the upper end peak rainfall allowance for the 2070s epoch. This dataset is included in the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Climate Change dataset (June 2026). The peak rainfall intensity allowances for the Thames and South Chilterns and Gloucestershire and the Vale management catchments are shown in Table 3-2 and Table 3-3 respectively. The allowance for the 0.1% AEP event is not stated in the EA guidance.

1 Based on Section 7.5 Hazard rating. What is the Risk of Flooding from Surface Water map? Report version 2.0. April 2019. Environment Agency

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Table 3-2: Peak rainfall intensity allowances for the Thames and South Chilterns management catchment

Return period	Central allowance 2070s (% increase)	Upper end allowance 2070s (% increase)
3.3% AEP	25	35
1% AEP	25	40

Table 3-3: Peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment

Return period	Central allowance 2070s (% increase)	Upper end allowance 2070s (% increase)
3.3% AEP	25	35
1% AEP	25	40

Figure 3-4 shows the surface water flood extents for the 2070s upper end climate change scenario. The areas of ponding across the site are shown to increase in extent in all events. Greatest flood depths are shown to remain at greater than 1.2m in an area of ponding in the centre of the site (Figure 3-5).

Safe access and escape routes should remain achievable via Newbury Road (A4185) to the east of the site.

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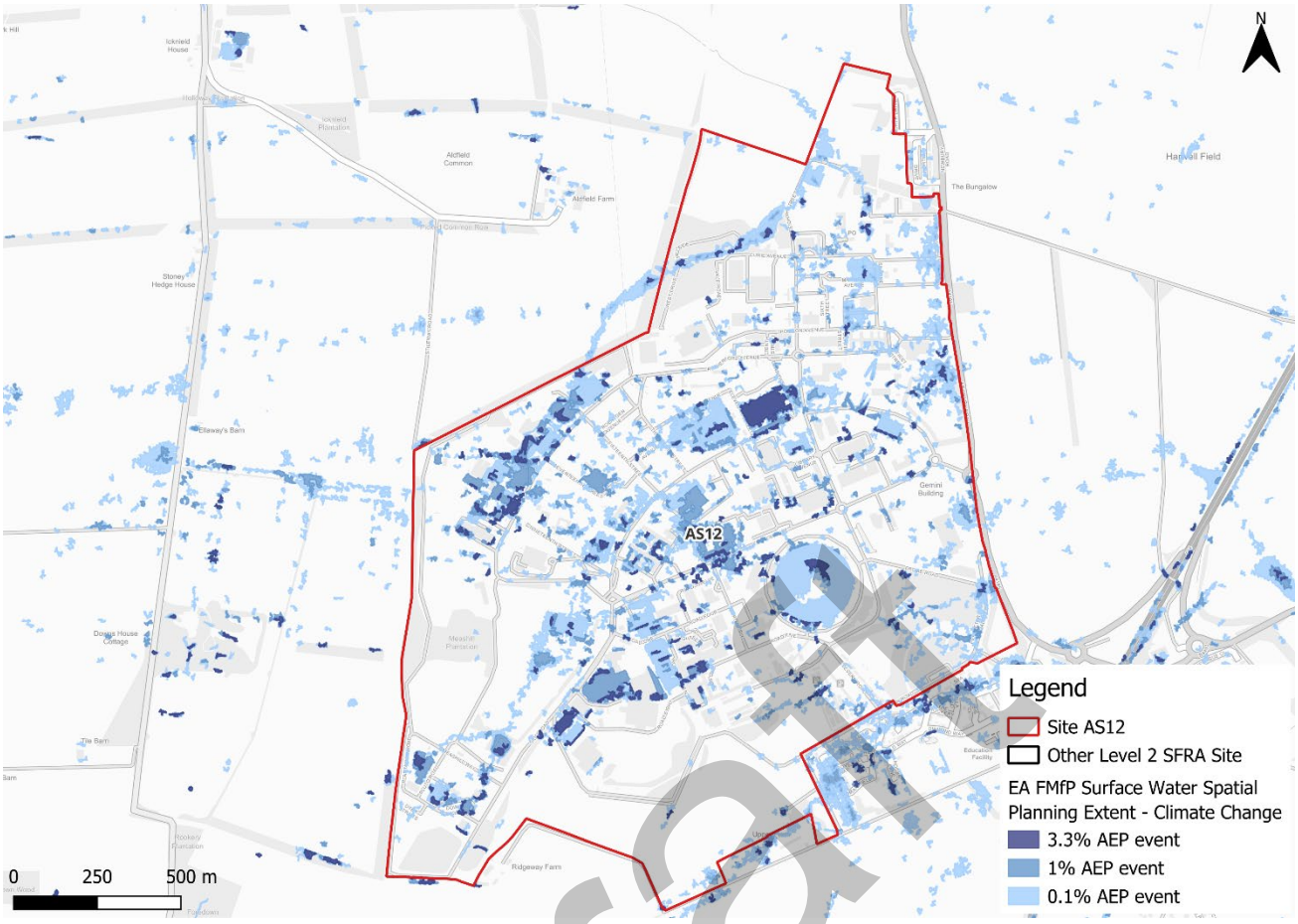

Figure 3-4: Flood Map for Planning - Surface Water Spatial Planning Extents Climate Change (2070s Upper End)

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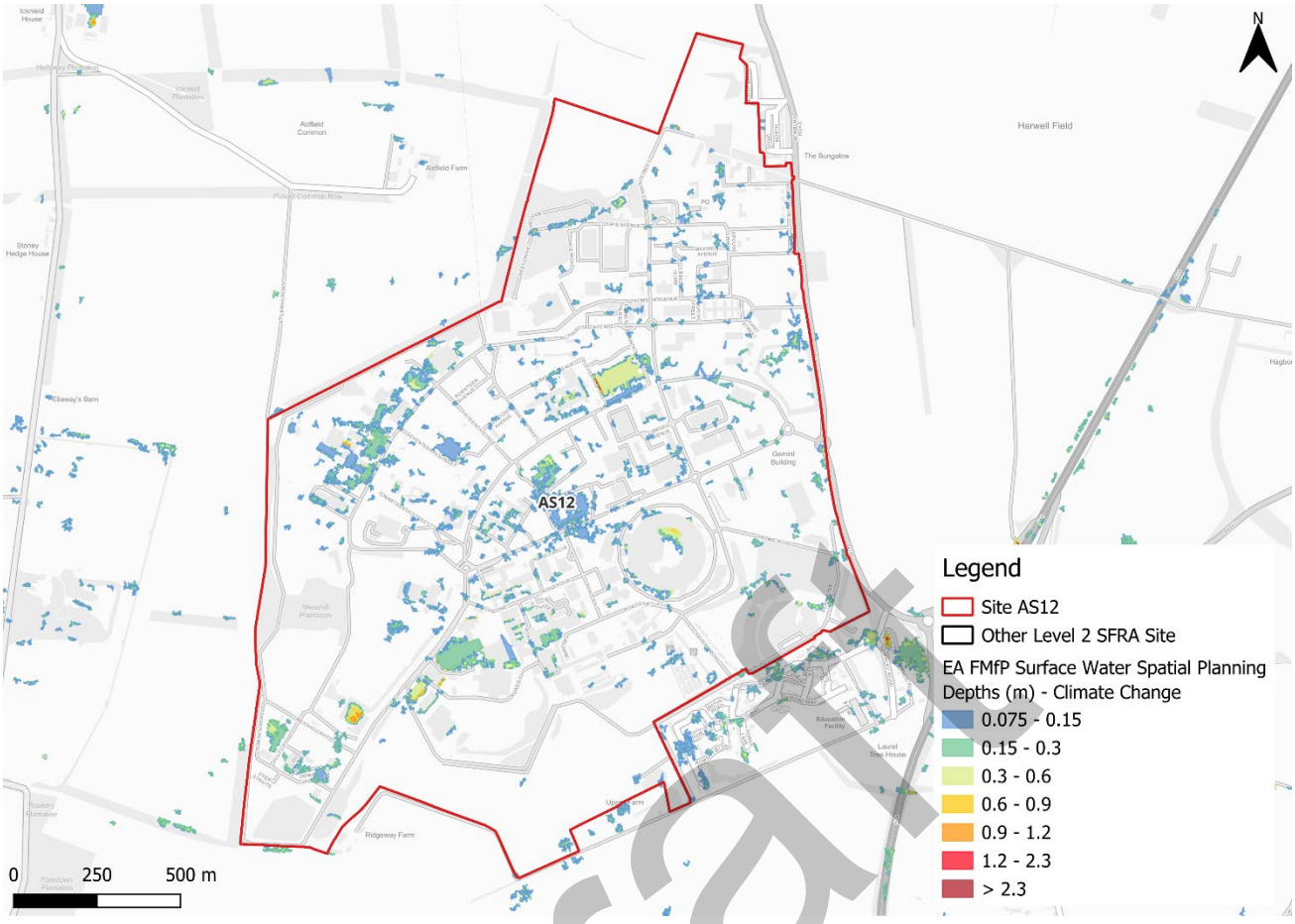

Figure 3-5: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Climate Change for the 1% AEP event (2070s Upper End)

3.2.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning climate change data does not include hazard information suitable for planning purposes. This Level 2 SFRA therefore considers the RoFSW low risk surface water event as a conservative proxy for the medium risk event plus climate change, as the best available information to assess surface water flood hazards. The impact of climate change on surface water flood hazards should be considered at the site-specific FRA stage.

Using the RoFSW low risk event as a proxy, future surface water flood hazard in the medium risk event is categorised as 'significant' in some areas of ponding in the centre of the site (Figure 3-6).

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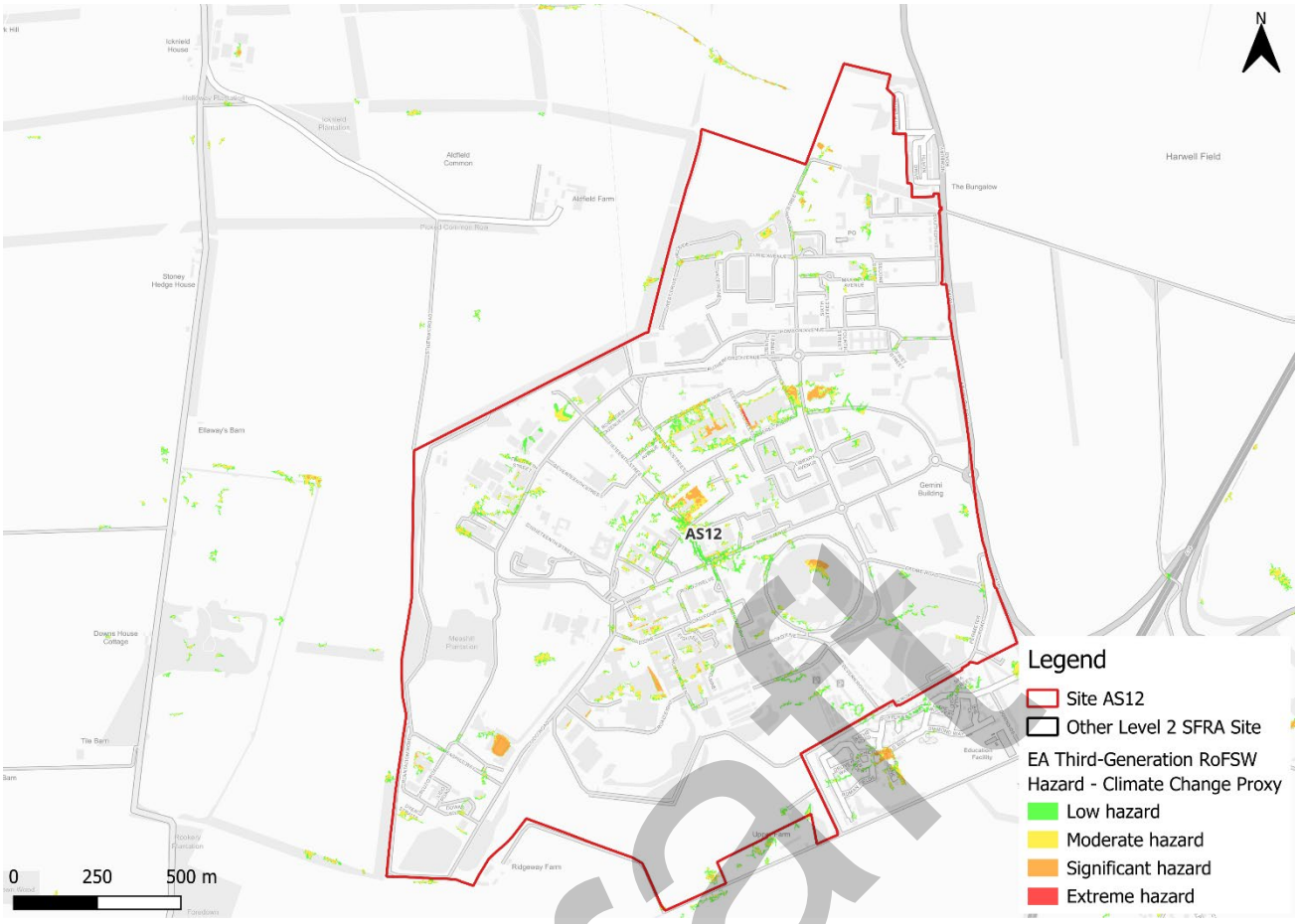

Figure 3-6: Low risk event surface water flood hazard[1], as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options, site suitability, sequential approach to development management - surface water

- Current risk to the site is predominantly very low, with 93% of the site being outside of the 0.1% AEP surface water flood extent. Surface water risk in the 1% AEP event is present as scattered areas of ponding within topographic low spots across the site and is constrained by the existing development.
- Topographic low spots should be considered and included in site design and ideally left in place to flood naturally when required.
- Risk to the site is shown to increase in extent when considering the impact of climate change. There are additional areas of ponding throughout the site.
- When a planning application is submitted, a full detailed drainage strategy would be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA. Any proposed surface water drainage scheme should look to mitigate existing surface water flood risk where feasible.
- Assessment of the current drainage system in place should be carried out to ascertain any current capacity issues and whether the current system could

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accommodate the proposed development or whether further capacity will be required.

- Safe access and escape routes should be achievable via Newbury Road (A415) in all events.

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4 Groundwater, geology and SuDS suitability

Risk of groundwater emergence is assessed in this SFRA using JBA's 5m Groundwater Emergence Map. Figure 4-1 show the map covering the site and the surrounding areas. Table 4-1 explains the risk classifications.

Risk of groundwater emergence varies across the site. The majority of the site is within an area where there groundwater emergence is unlikely. Within the east of the site, there is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely. Groundwater conditions may therefore be suited to infiltration SuDS in some locations.

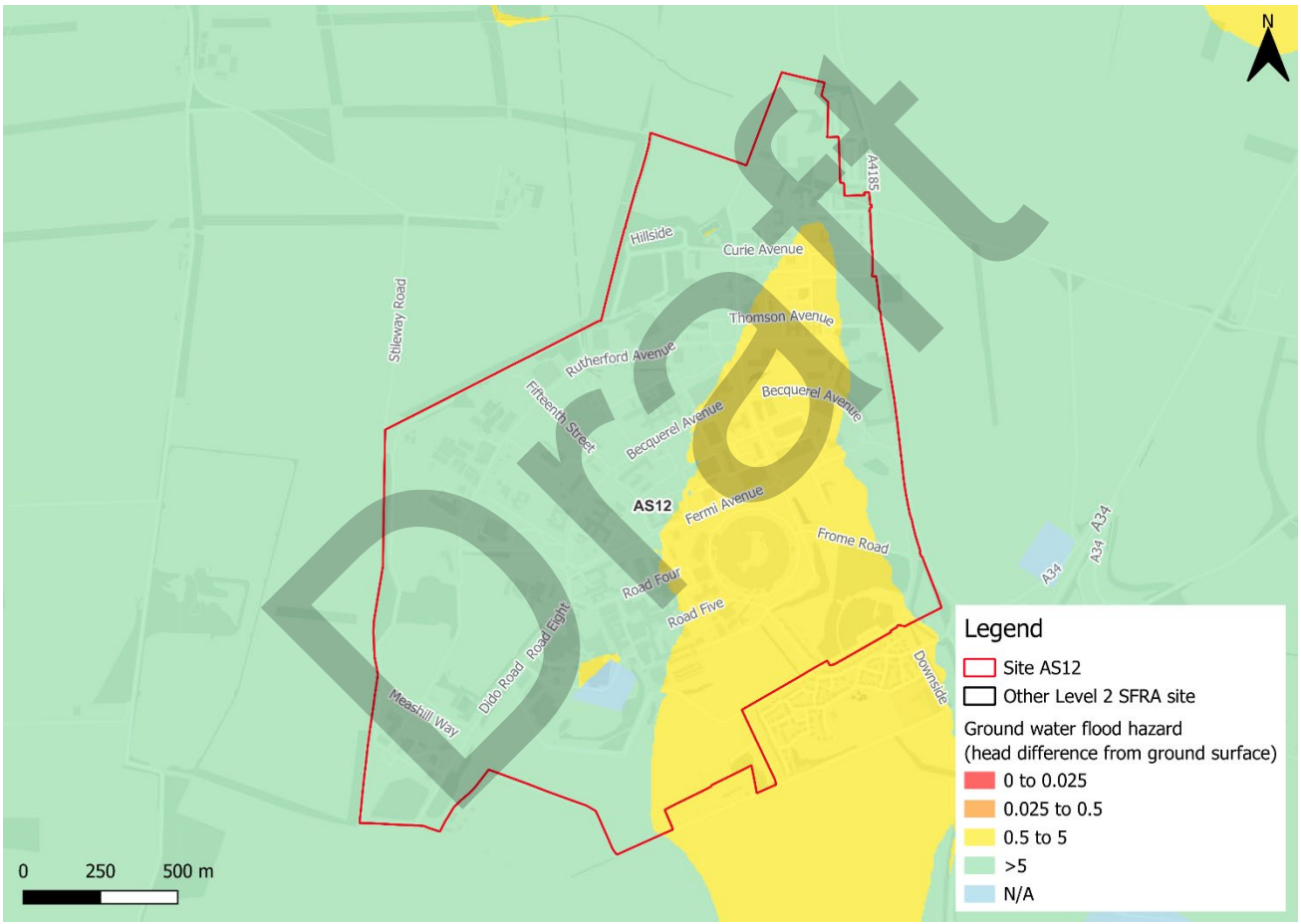

Figure 4-1: JBA 5m Groundwater Flood Map

Table 4-1: Groundwater Flood Hazard Classification

Groundwater head difference (m)*	Class label
0 to 0.025	Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater flooding to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
0.025 to 0.5	Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater flooding to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
0.5 to 5	Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event There is a risk of flooding to subsurface assets, but surface manifestation of groundwater is unlikely.
>5	Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event. Flooding from groundwater is not likely.
N/A	No risk. This zone is deemed as having a negligible risk from groundwater flooding due to the nature of the local geological deposits.
*Difference is defined as ground surface in mAOD minus modelled groundwater table in mAOD.	

The underlying bedrock within the site is chalk. Superficial deposits consist of sand and gravel in the central area of the site (Figure 4-2). Chalk has high levels of permeability. This could potentially contribute to higher water table levels. The drainage strategy for the site should investigate water table levels and ground conditions to inform on appropriate SuDS.

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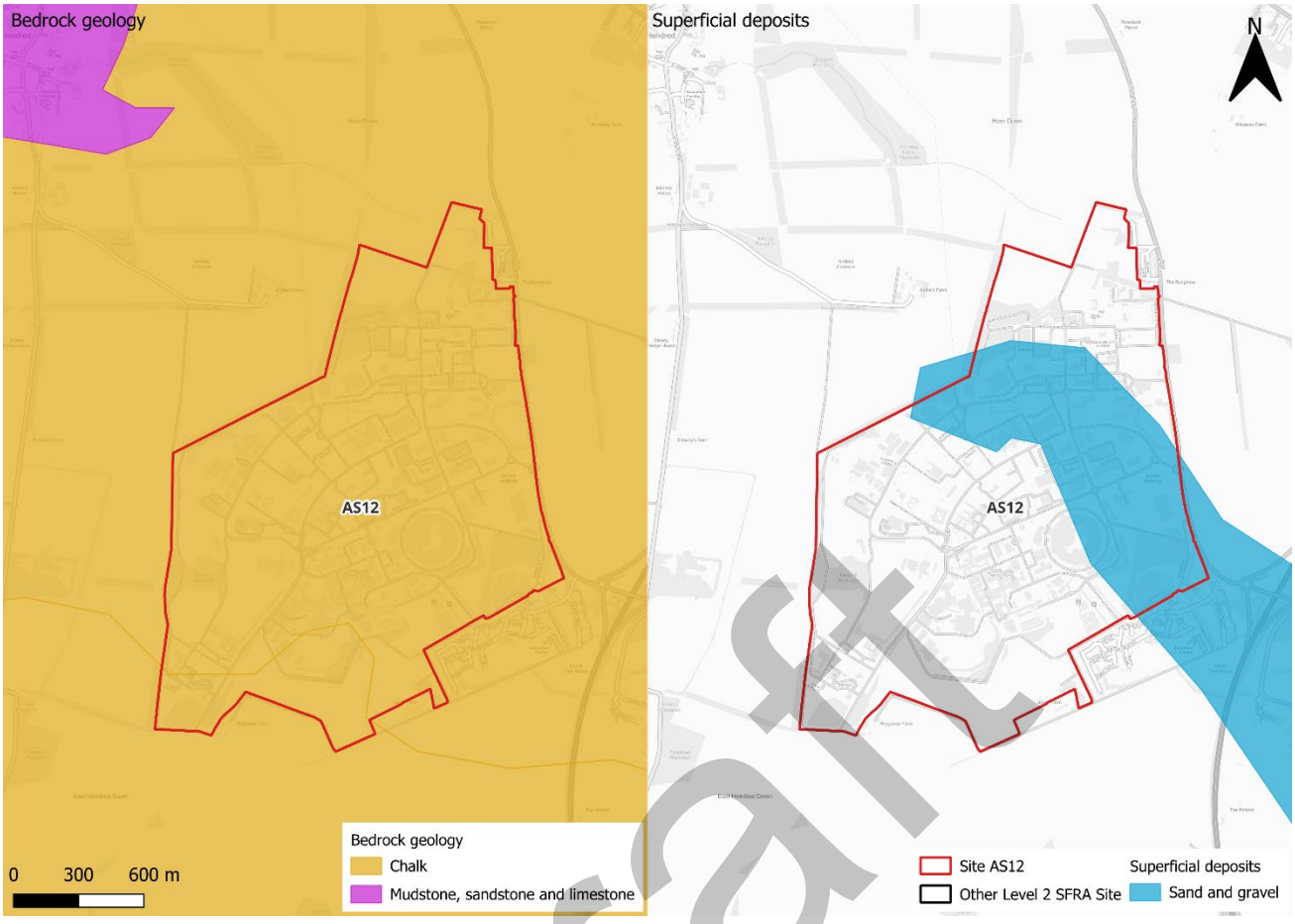

Figure 4-2: BGS Geology - Bedrock and superficial deposits

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5 Overall site assessment

5.1 Can part b) of the exception test be passed?

To pass part b) of the exception test[2], it must be proven that the development can be safe for its lifetime, which is 75 years for non-residential development, taking account of the vulnerability of its users, without increasing risk elsewhere, and, where possible, will reduce flood risk overall. The site is not required to pass the exception test as it is proposed for less vulnerable uses.

5.2 Recommendations and site-specific FRA requirements

Based on the evidence presented in the Level 1 SFRA (2024), Level 1 SFRA Addendum (2026) and this Level 2 SFRA:

- It should be appropriate for this site to be allocated, given the very low fluvial and largely low surface water flood risk to the site.
- A full detailed drainage strategy would be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA. Any proposed surface water drainage scheme should look to mitigate existing surface water flood risk where feasible.
- Any site-specific FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; South Oxfordshire and Vale of White Horse District Councils Joint Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the site-specific FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; TW; the highways authorities; and the emergency services.

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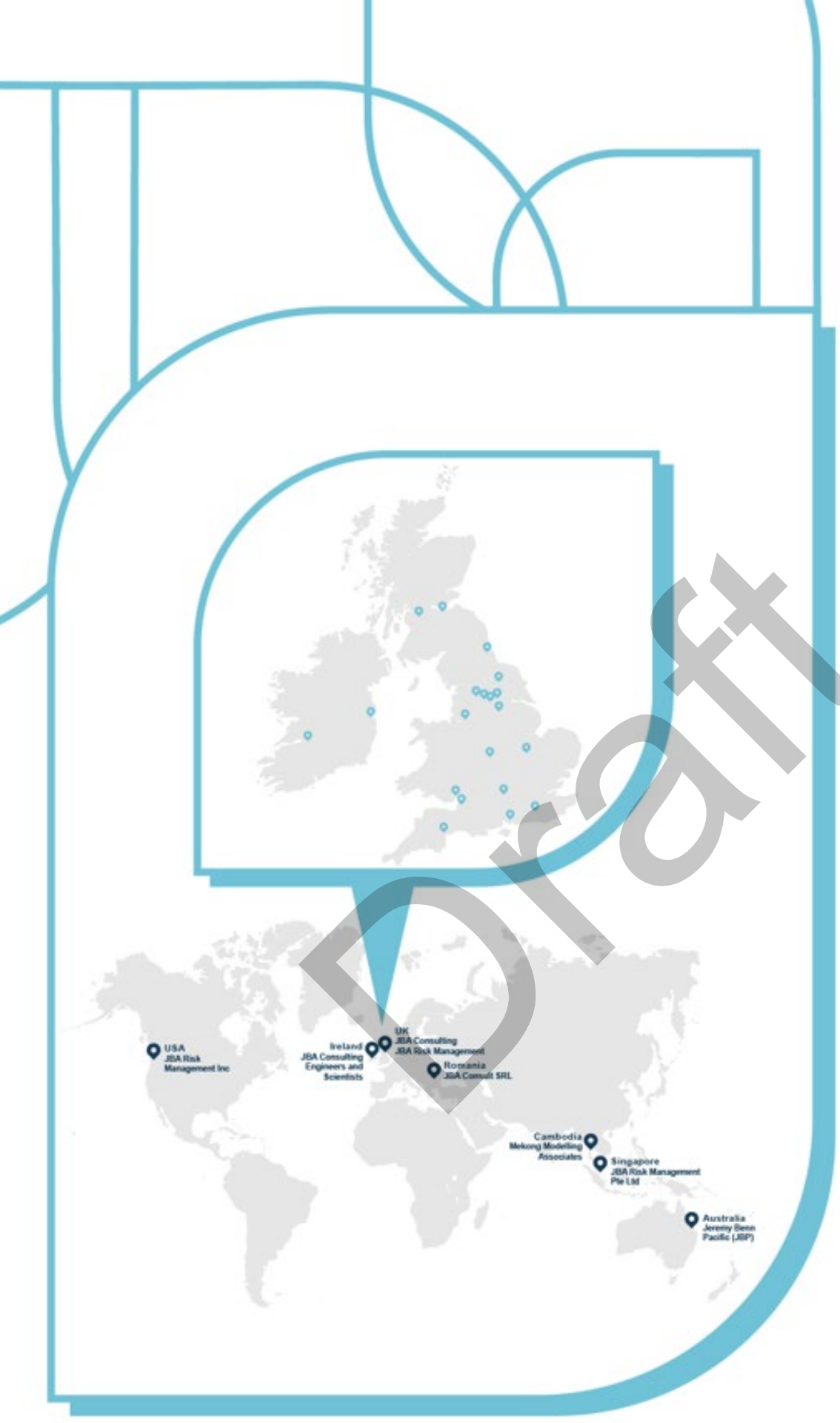

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Registered Office
1 Broughton Park
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Broughton
SKIPTON
North Yorkshire
BD23 3FD
United Kingdom

+44(0)1756 799919
info@jbaconsulting.com
www.jbaconsulting.com
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South Oxfordshire and Vale of White Horse Level 2 Strategic Flood Risk Assessment Update

Site AS15 - Harcourt Hill Campus

Draft Report

October 2026

Prepared for:

South Oxfordshire District Council and

Vale of White Horse District Council

www.jbaconsulting.com

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Prepared by	Boe Kilshaw BSc Assistant Analyst
Reviewed by	Laura Thompson-Jones BSc CGeog FRGS Senior Analyst
Authorised by	Mike Williamson BSc MSc CGeog FRGS EADA Project Director

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JBA Project Manager	Freya Nation
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2026s1132

This report describes work commissioned by South Oxfordshire and Vale of White Horse District Councils. The Client's representative for the contract was Rebekah Goodwill of South Oxfordshire and Vale of White Horse District Councils. Boe Kilshaw of JBA Consulting carried out this work.

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for South Oxfordshire and Vale of White Horse Joint Local Plan Site AS15 - Harcourt Hill Campus. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA' (2024) and the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum' (2026), and read the 'South Oxfordshire and Vale of White Horse District Councils Level 2 SFRA Main Report Update' (2026) and is therefore familiar with the terminology used in this report.

1.1 Site AS15 - Harcourt Hill Campus

- Location: Harcourt Hill Campus (Figure 1-1)
- Existing site use: Brownfield; educational and leisure
- Existing site use vulnerability: More vulnerable
- Proposed site use: Educational and leisure
- Proposed site use vulnerability: More vulnerable
- Site area: 22.7 ha
- Proposed development impermeable area: 19.3 ha (assumed 85% of site area)
- Watercourse: Unnamed watercourse
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for more detailed assessment through Level 2 SFRA (Strategic Recommendation B)
    - Assess present day and future surface water depths, hazards

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Figure 1-1: Site location

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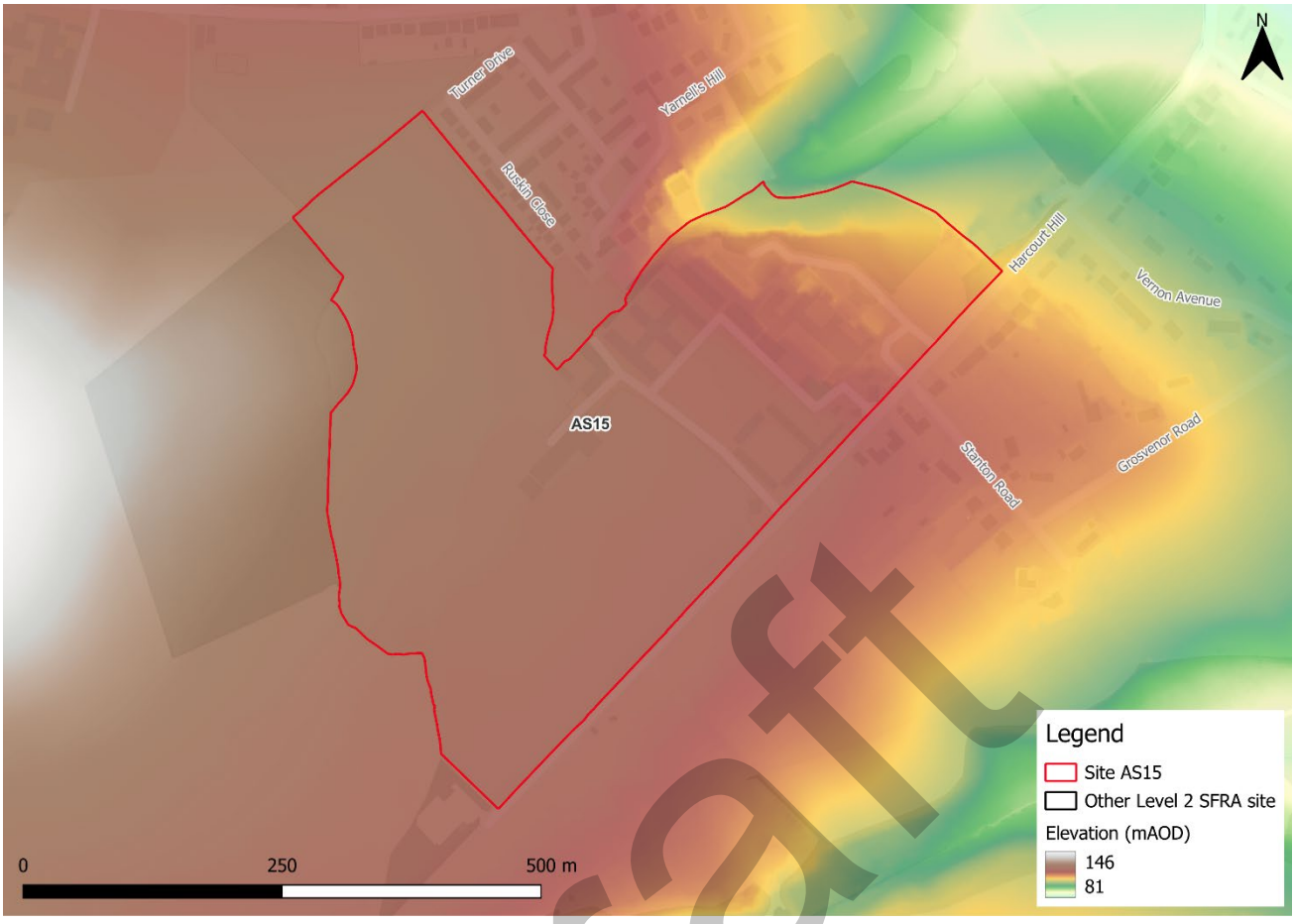

Figure 1-2: Topography

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2 Flood risk from rivers

2.1 Existing risk

2.1.1 Flood Map for Planning and functional floodplain

Based on the Environment Agency's (EA) Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum (2026), the percentage areas of the site within each flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.4).

The site is entirely within Flood Zone 1 and therefore at low risk of flooding from rivers.

Table 2-1: Existing flood risk based on percentage area of site at risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

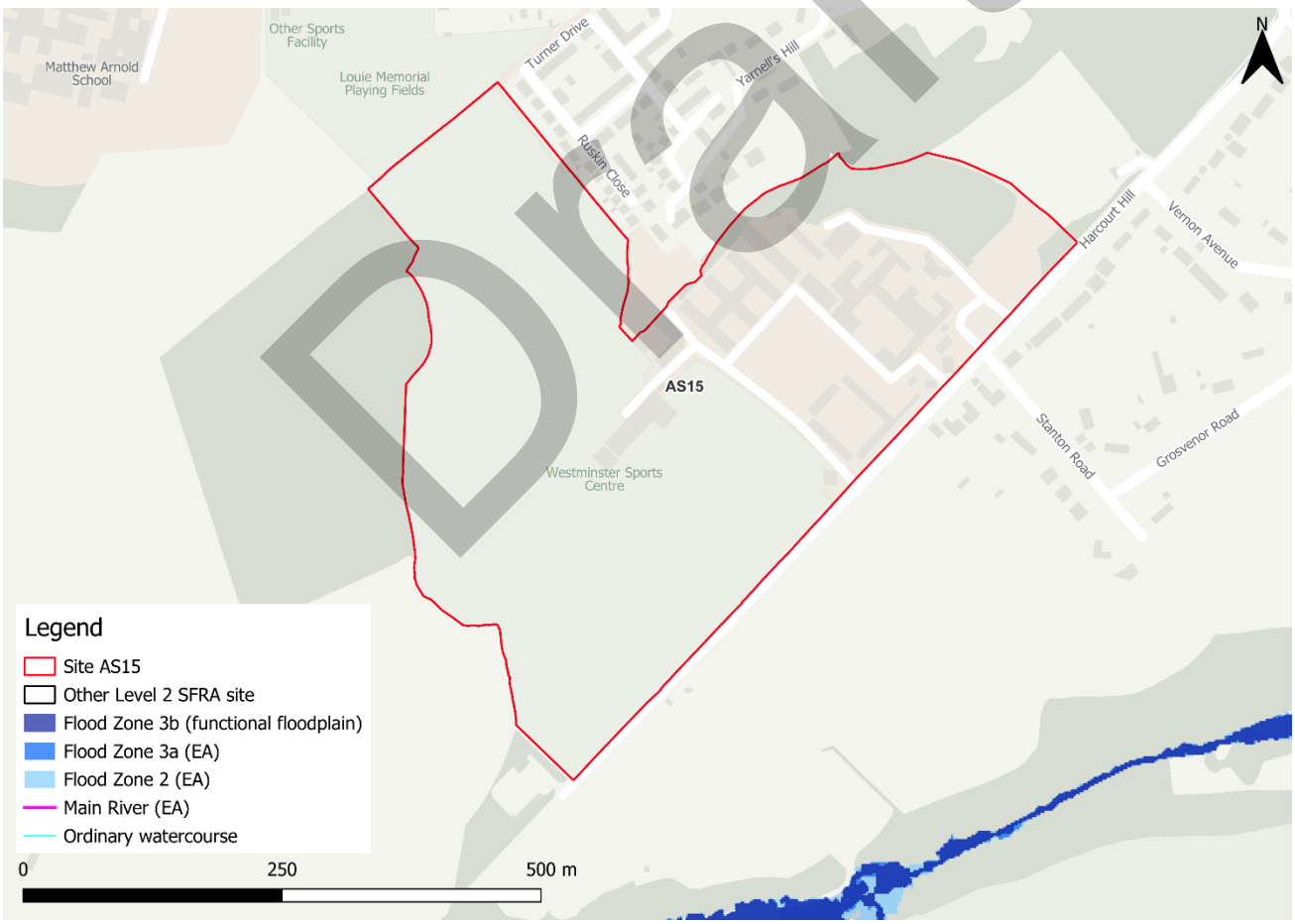

Figure 2-1: Existing risk from rivers to the site

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2.2 Impacts from climate change

2.2.1 Flood Map for Planning - Flood Zones plus Climate Change

The EA's Flood Map for Planning - Flood Zones plus Climate Change dataset does not show the site to be at future fluvial risk.

2.3 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

2.4 Flood risk management

The site doesn't benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

2.4.1 Cumulative impacts

A cumulative impact assessment was completed through the South Oxfordshire and Vale of White Horse Level 1 SFRA Addendum (2026), which aimed to identify catchments sensitive to the cumulative impact of development. Site AS15 (Harcourt Hill Campus) is located within one catchment, namely; Thames (Evenlode to Thame). The site is located within a higher sensitivity catchment. Planning considerations for sites at higher sensitivity to the cumulative impacts of development can be found in Appendix D of the Level 1 SFRA Addendum. Cumulative impacts of development should also be considered as part of a site-specific FRA.

2.4.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. Both within and upstream of the site, there is potential for runoff attenuation features to reduce the speed of flooding downstream. These areas are shown in Figure 2-2.

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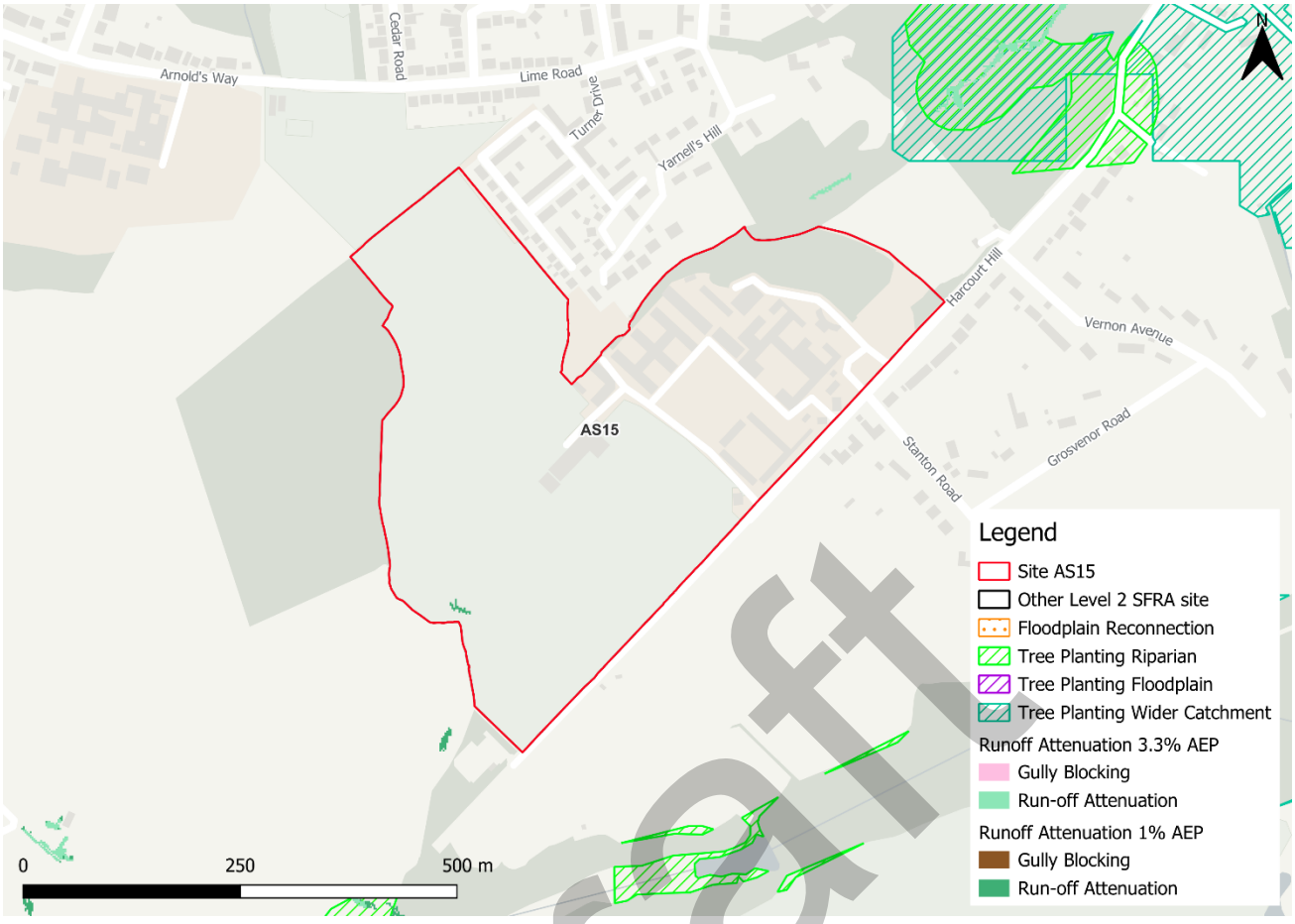

Figure 2-2: Natural Flood Management (NFM) potential mapping

2.5 Residual risk

Although a site may be afforded some protection from defences and / or drainage infrastructure, there is always a residual risk of flooding from asset failure i.e. defence breaches, or blockages of culverts or drainage assets.

There are no assets with the potential to pose a residual risk to the site

2.5.1 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. A "dry day" scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. A "wet day" scenario assumes a worst-case scenario where a reservoir releases water held on a "wet day" when local rivers have already overflowed their banks.

The site is not modelled to be at risk from reservoir flooding.

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2.6 Emergency Planning

2.6.1 Flood warnings and alerts

There are no Flood Warning Areas (FWA) or Flood Alert Areas (FAA) within the vicinity of the site.

2.6.2 Access and escape

Safe access and escape routes should be achievable via Harcourt Hill to the northeast of the site. This route is indicated by the yellow line in Figure 2-3.

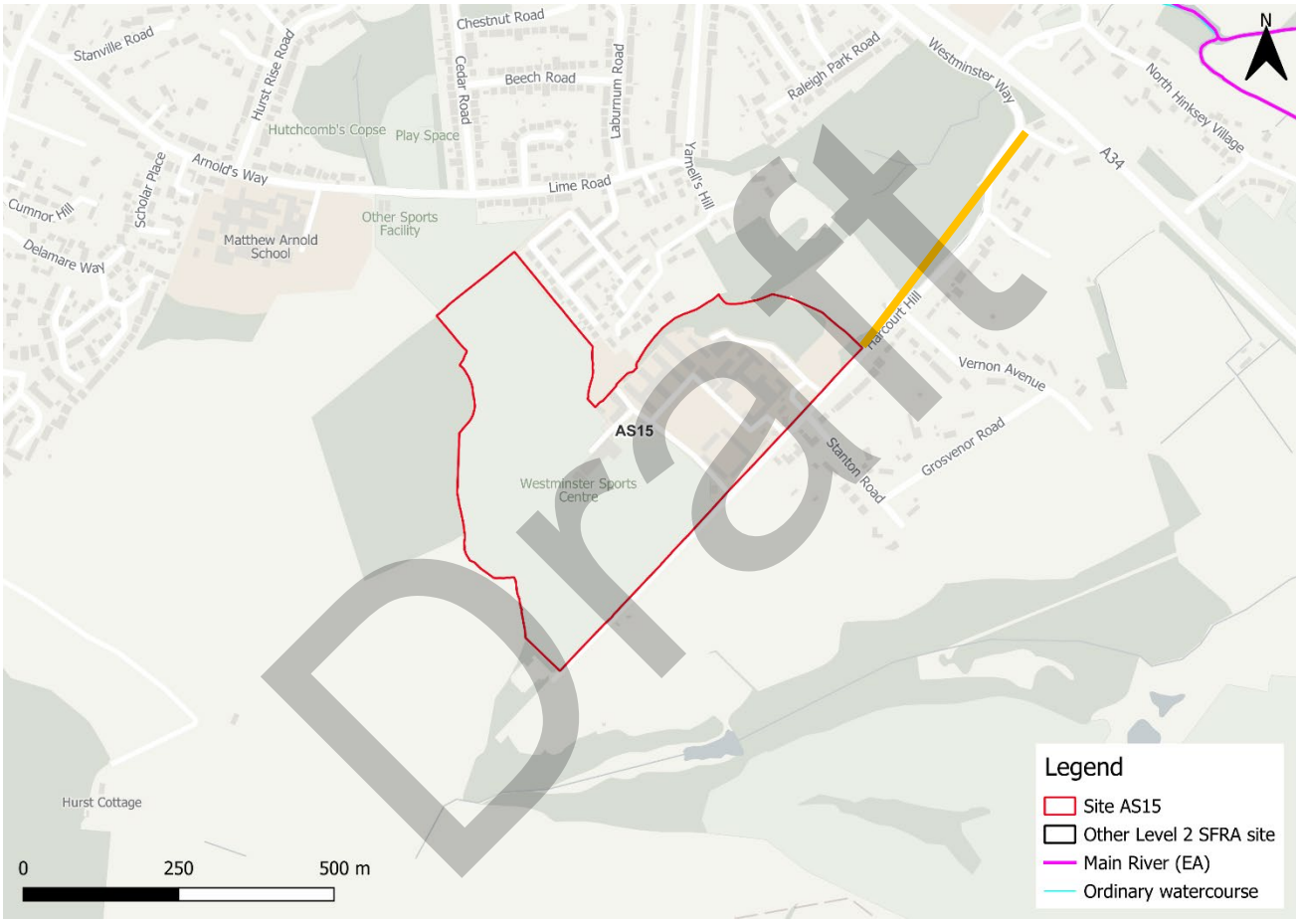

Figure 2-3: Potential access and escape routes

2.7 Observations, mitigation options, site suitability, sequential approach to development management - fluvial

- Observations:
  - The site is wholly within Flood Zone 1 and therefore at low risk of flooding from rivers.
  - The site is not shown to be at additional risk of fluvial flooding when considering climate change.
- Access and escape

- Safe access and escape routes should be achievable via Harcourt Hill to the northeast of the site.

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3 Flood risk from surface water

3.1 Existing risk

3.1.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths Present Day

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Extents Present Day map (September 2026), the majority of the site is at very low risk from surface water flooding, as shown in Table 3-1.

Surface water risk is largely confined to scattered areas of ponding across the site and is constrained by the existing development within the site (Figure 3-1). There are also some short flow paths through the site.

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Depths Present Day map, the greatest flood depths are between 0.3 and 0.6m, however are largely less than 0.3m across the majority of the site (Figure 3-2).

Safe access and escape routes would likely be achievable via Harcourt Hill to the northeast of the site.

Table 3-1: Existing surface water flood risk based on percentage area at risk using the Flood Map for Planning - Surface Water Spatial Planning Extent Present Day map

Less than 0.1% AEP event (% area)	0.1% AEP event (% area)	1% AEP event (% area)	3.3% AEP event (% area)
96	2	1	1

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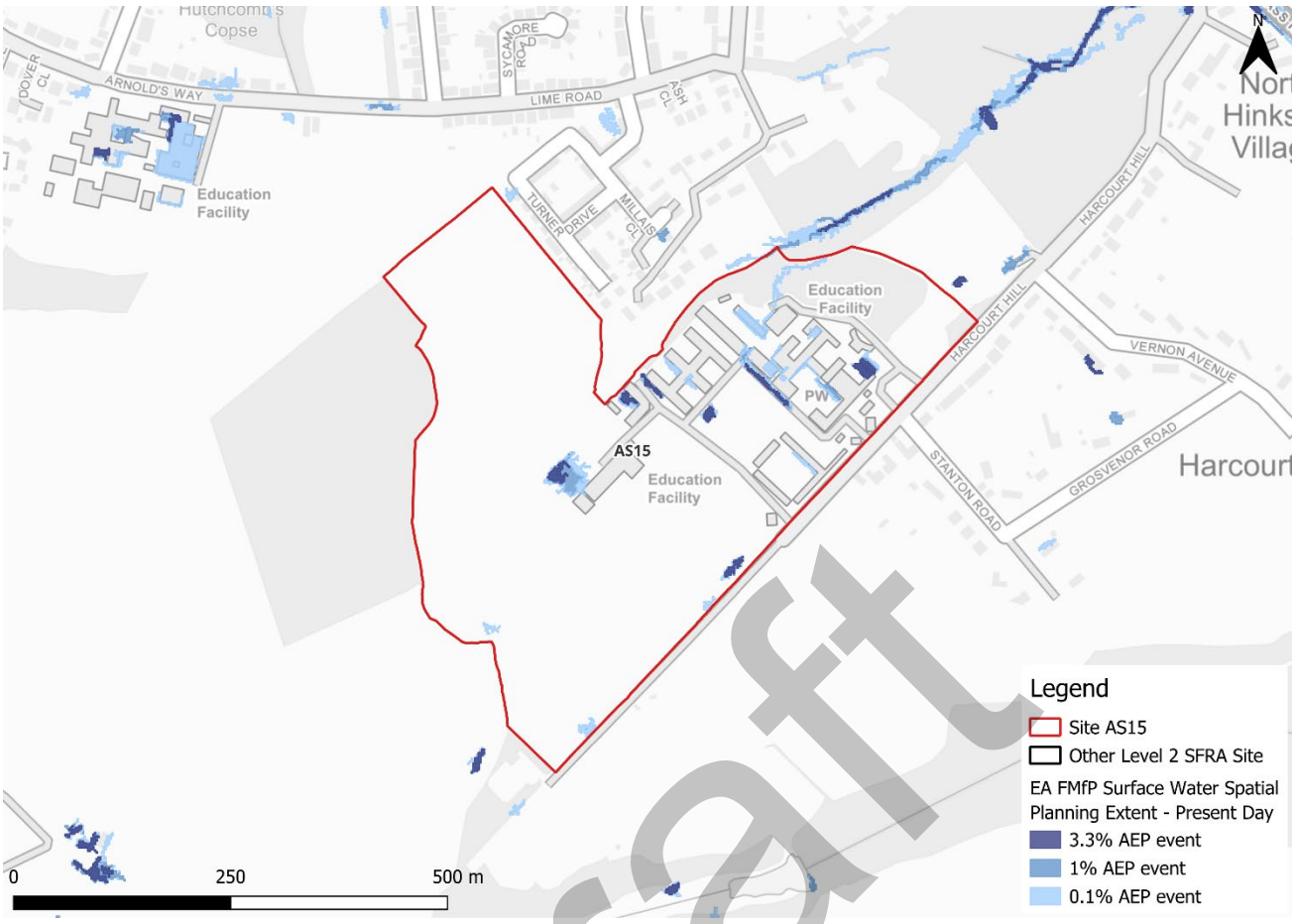

Figure 3-1: Flood Map for Planning - Surface Water Spatial Planning Extents Present Day

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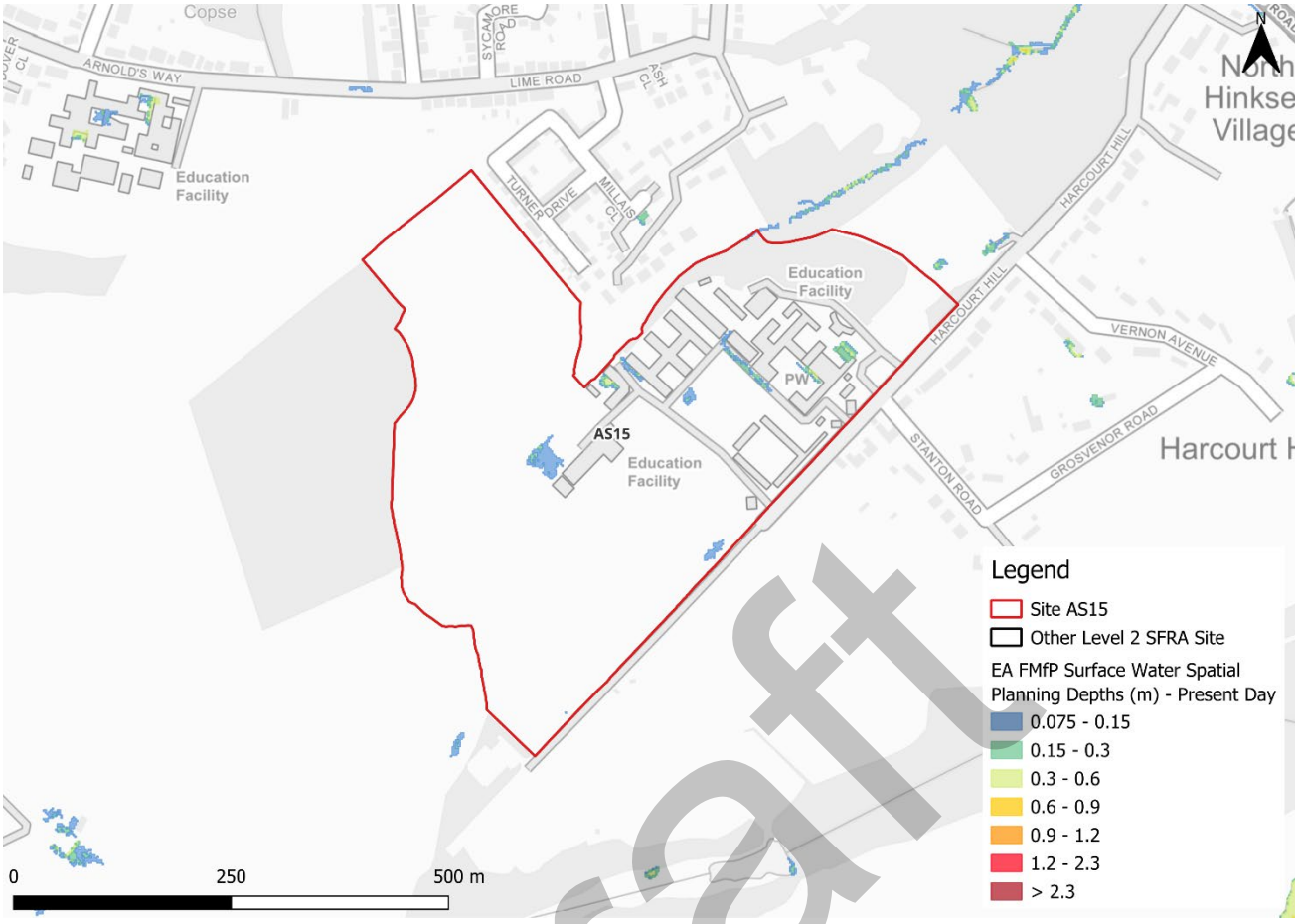

Figure 3-2: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Present Day for the 1% AEP event

3.1.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning data does not include hazard information suitable for planning purposes. Therefore, this Level 2 SFRA considers the third generation Risk of Flooding from Surface Water (RoFSW) hazard mapping in addition to the Flood Map for Planning - Surface Water Spatial Planning extents and depths, as the best available information. Updated surface water hazard information would need to be confirmed at the site-specific FRA stage.

Based on the EA's national scale third generation RoFSW map, the greatest flood hazard within the site in the medium risk event is categorised as 'significant', however is predominantly 'low' (Figure 3-3).

There are some differences between the Flood Map for Planning - Surface Water Spatial Planning map and the third generation RoFSW hazard mapping. The Flood Map for Planning - Surface Water Spatial Planning data does not map flooding less than 0.075m (7.5cm) in depth. Therefore, where the map may show no flooding, there may be shallow flooding up to a depth of 0.075m. In contrast, the third generation RoFSW does not map flooding with a hazard rating of less than 0.575. This could explain the differences observed between the Flood Map for Planning and third generation RoFSW maps.

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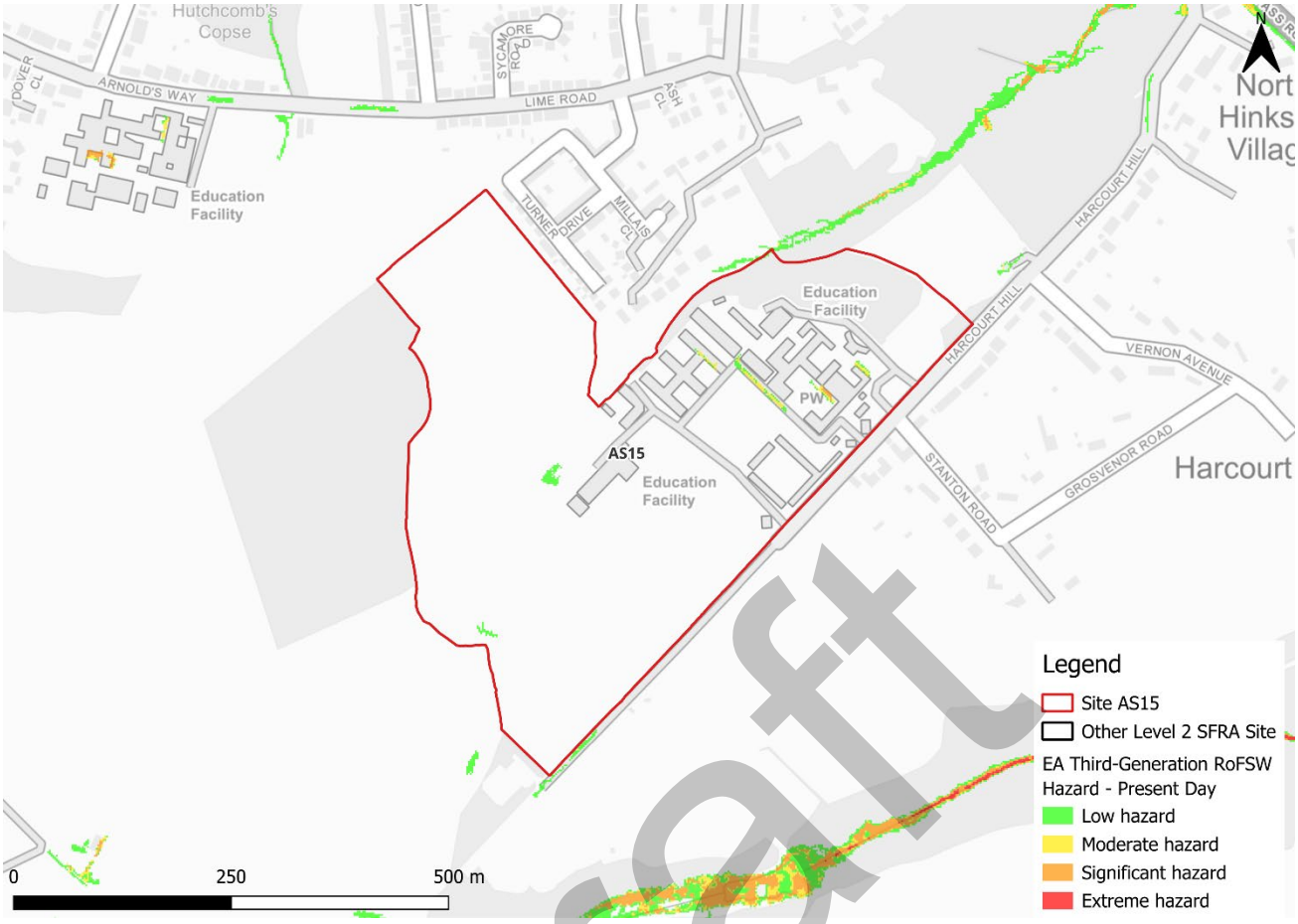

Figure 3-3: Third generation - Risk of Flooding from Surface Water map present day 1% AEP event surface water flood hazard[1]

3.2 Impacts from climate change

3.2.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths

The EA's climate change allowance guidance states that SFRA's should assess the upper end peak rainfall allowance for the 2070s epoch. This dataset is included in the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Climate Change dataset (September 2026). The peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment are shown in Table 3-2. The allowance for the 0.1% AEP event is not stated in the EA guidance.

1 Based on Section 7.5 Hazard rating. What is the Risk of Flooding from Surface Water map? Report version 2.0. April 2019. Environment Agency

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Table 3-2: Peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment

Return period	Central allowance 2070s (% increase)	Upper end allowance 2070s (% increase)
3.3% AEP	25	35
1% AEP	25	40

Figure 3-4 shows the surface water flood extents for the 2070s upper end climate change scenario. Surface water flood risk is shown to increase in extent with climate change, particularly within the area of ponding in the northeast of the site, constrained by the existing development present.

The greatest onsite flood depths are shown to increase to between 0.6 and 0.9m within the northeast of the site, however largely remain at less than 0.3m across the remaining area of the site (Figure 3-5).

Safe access and escape routes are likely to remain achievable via Harcourt Hill to the northeast of the site.

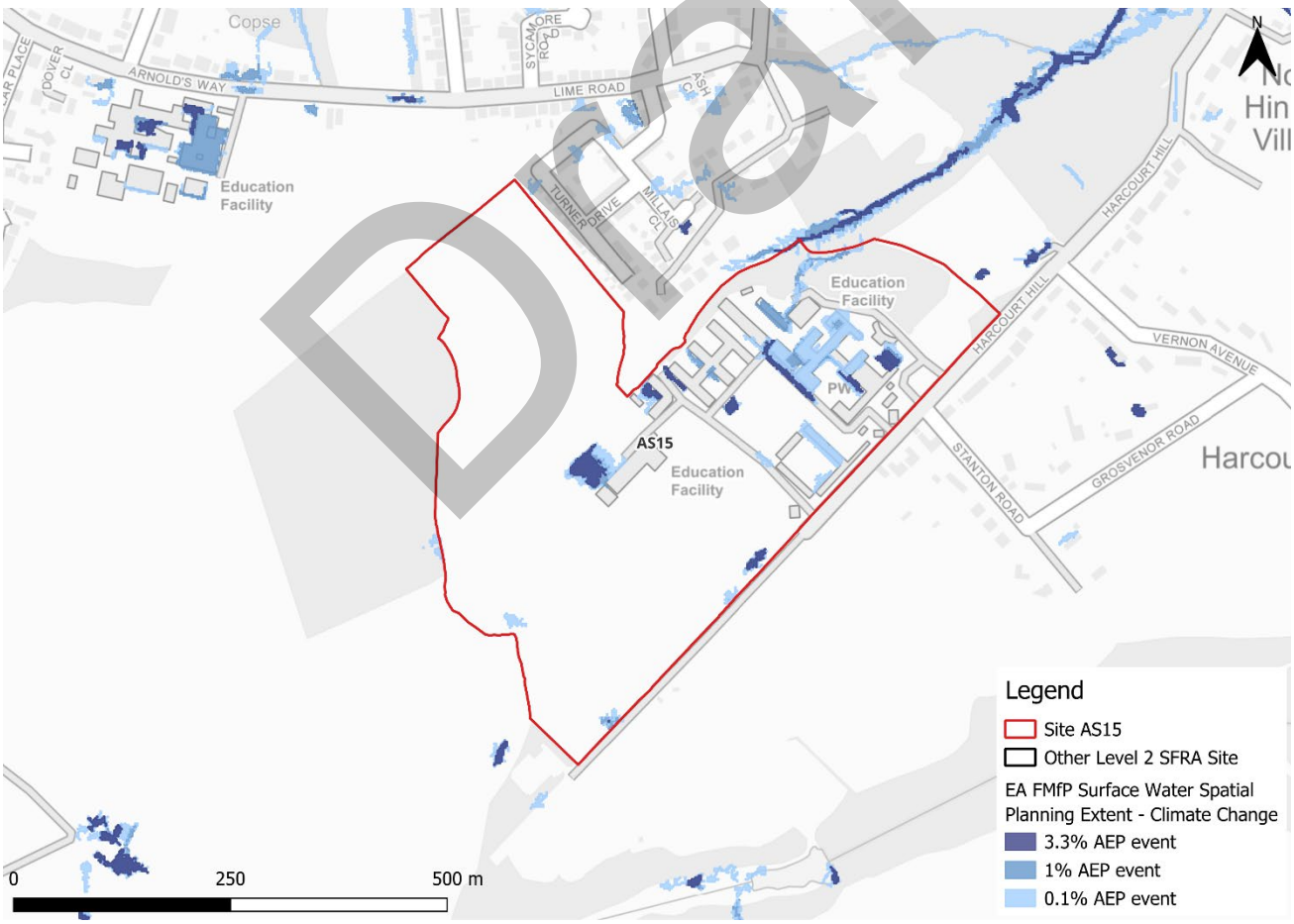

Figure 3-4: Flood Map for Planning - Surface Water Spatial Planning Extents Climate Change (2070s Upper End)

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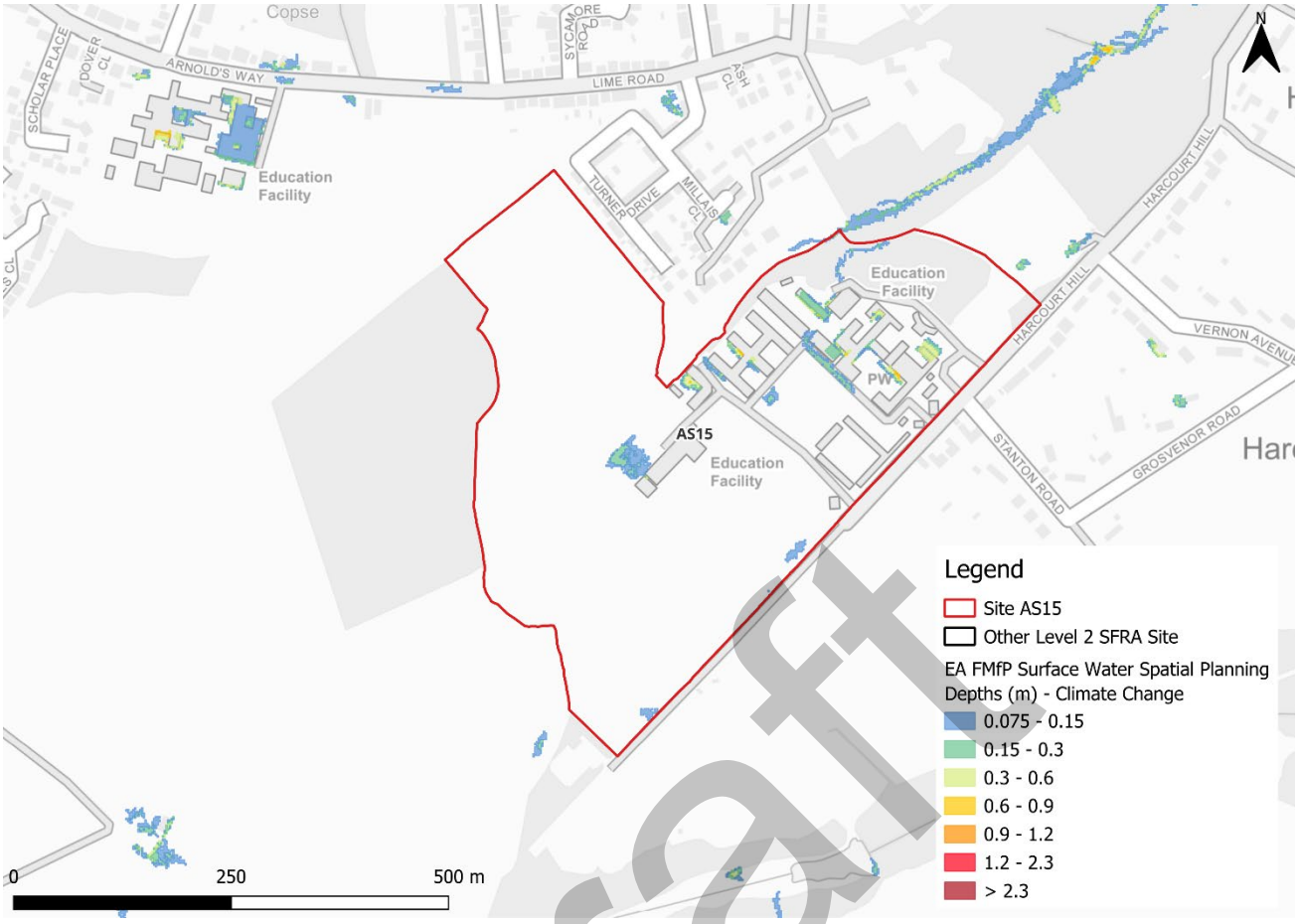

Figure 3-5: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Climate Change for the 1% AEP event (2070s Upper End)

3.2.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning climate change data does not include hazard information suitable for planning purposes. This Level 2 SFRA therefore considers the RoFSW low risk surface water event as a conservative proxy for the medium risk event plus climate change, as the best available information to assess surface water flood hazards. The impact of climate change on surface water flood hazards should be considered at the site-specific FRA stage.

Using the RoFSW low risk event as a proxy, future surface water flood hazard in the medium risk event is categorised as 'significant' in the north east of the site (Figure 3-6)

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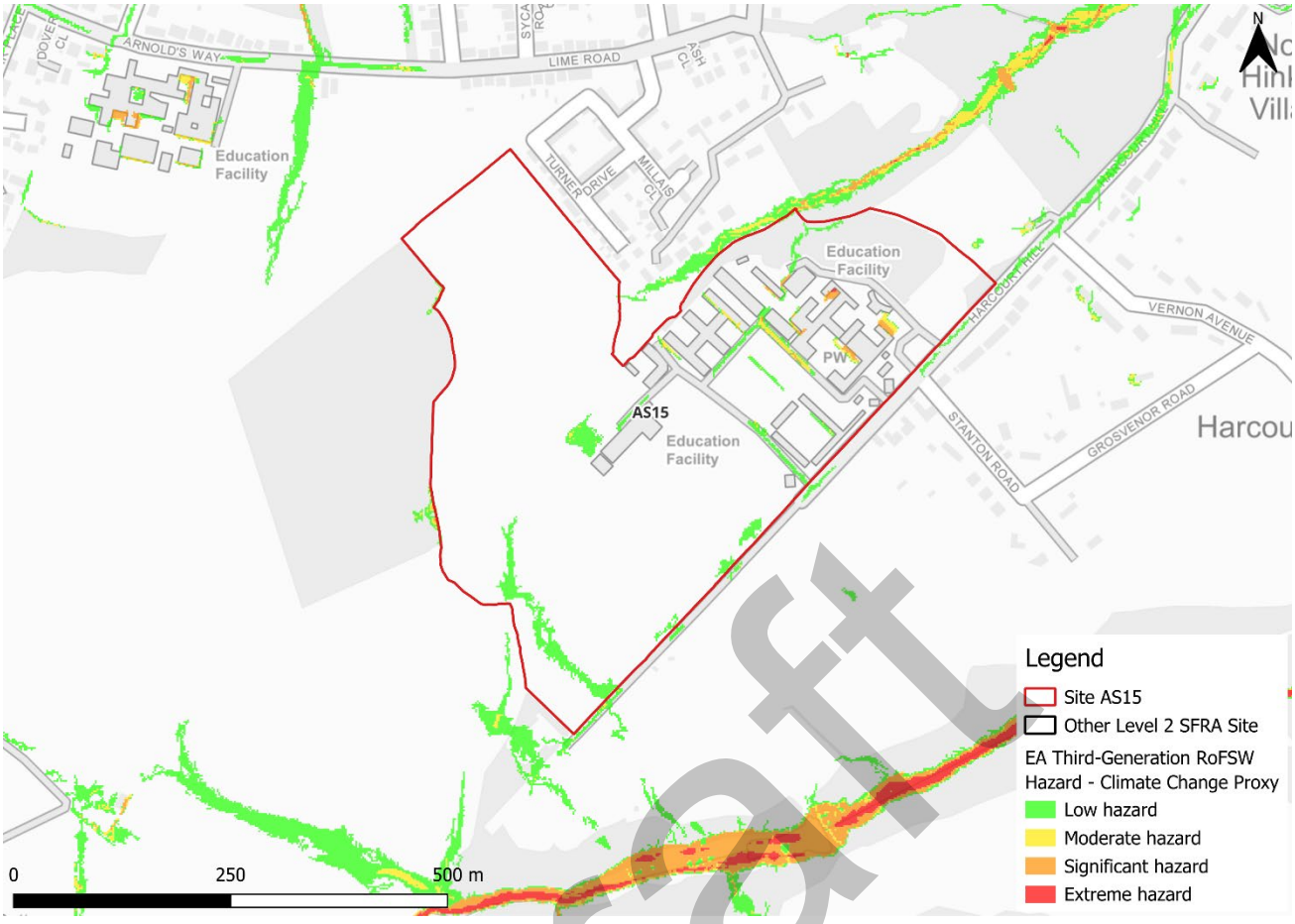

Figure 3-6: Low risk event surface water flood hazard[1], as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options, site suitability, sequential approach to development management - surface water

- Current risk to the site is predominantly very low, with 96% of the site being outside of the 0.1% AEP surface water flood extent. Surface water risk is largely present as scattered areas of ponding within topographic low spots across the site and is constrained by the existing development present.
- Risk to site is shown to increase in extent when considering the impact of climate change, particularly within the northeast of the site.
- Topographic low spots should be considered and included in site design and ideally left in place to flood naturally when required.
- If any structures are demolished for new development, a drainage strategy would therefore be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA. The developer should also follow the National SuDS guidance.
- Assessment of the current drainage system in place should be carried out to ascertain any current capacity issues and whether the current system could

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accommodate the proposed development or whether further capacity will be required.

- Safe access and escape routes would likely be achievable via Harcourt Hill to the northeast of the site in all events.

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4 Groundwater, geology and SuDS suitability

Risk of groundwater emergence is assessed in this SFRA using JBA's 5m Groundwater Emergence Map. Figure 4-1 shows the map covering the site and the surrounding areas. Table 4-1 explains the risk classifications.

Risk of groundwater emergence varies across the site. The majority of the site is within an area where there is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely. Within the north of the site, there is a risk of groundwater emergence to surface and subsurface assets. Ground investigations will be required through the site-specific FRA to ascertain groundwater levels and conditions in the north and investigate SuDS feasibility.

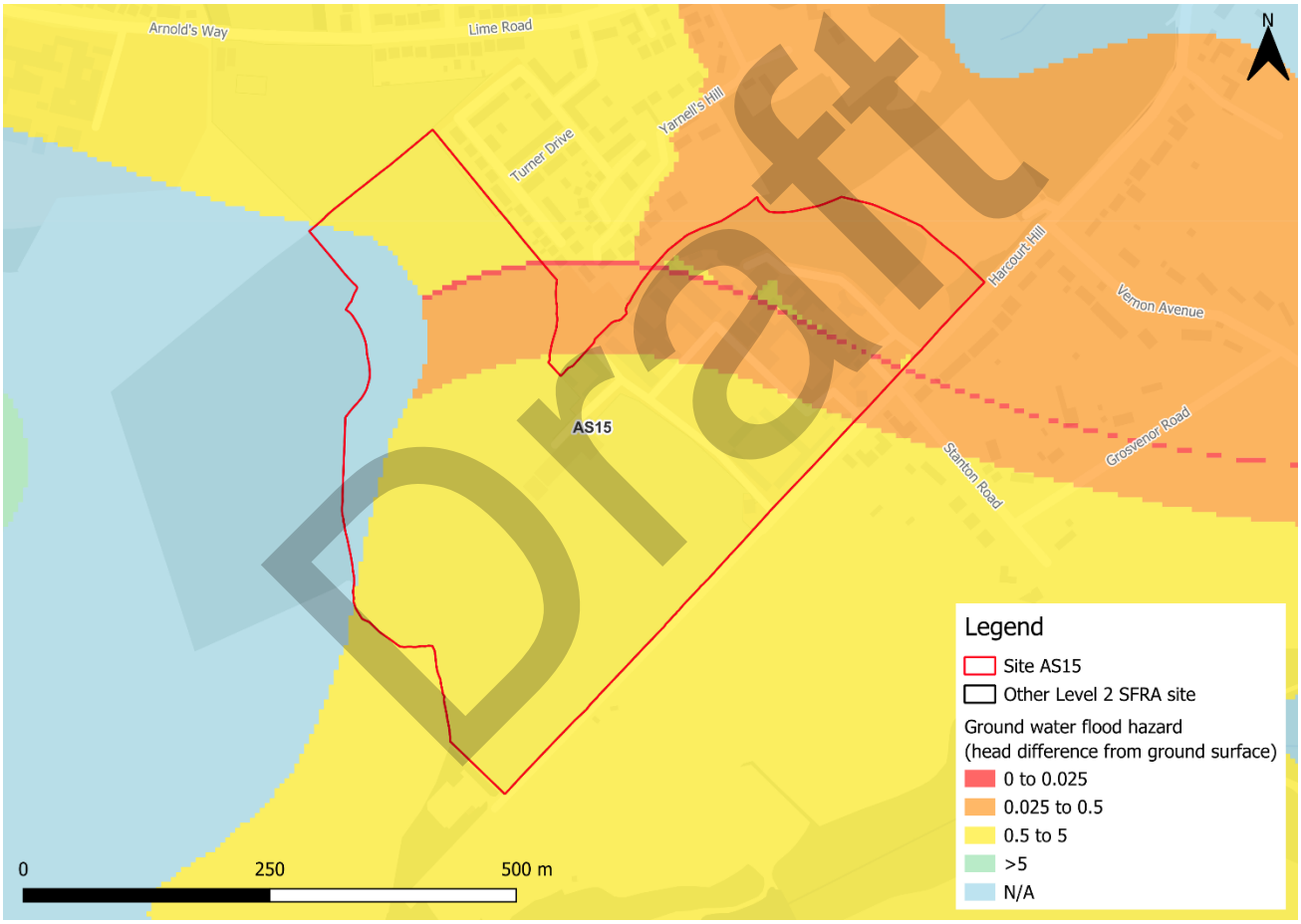

Figure 4-1: JBA 5m Groundwater Emergence Map

Table 4-1: Groundwater Emergence Hazard Classification

Groundwater head difference (m)*	Class label
0 to 0.025	Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
0.025 to 0.5	Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
0.5 to 5	Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event There is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely.
>5	Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event. Groundwater emergence is not likely.
N/A	No risk. This zone is deemed as having a negligible risk from groundwater emergence due to the nature of the local geological deposits.
*Difference is defined as ground surface in mAOD minus modelled groundwater table in mAOD.	

The underlying bedrock within the site is limestone, sandstone, siltstone and mudstone (Figure 4-2). Other than sandstone, all these rocks generally have low levels of permeability. This leads to less water infiltrating into the ground and could potentially contribute to lower water table levels. The drainage strategy for the site should investigate water table levels and ground conditions to inform on appropriate SuDS.

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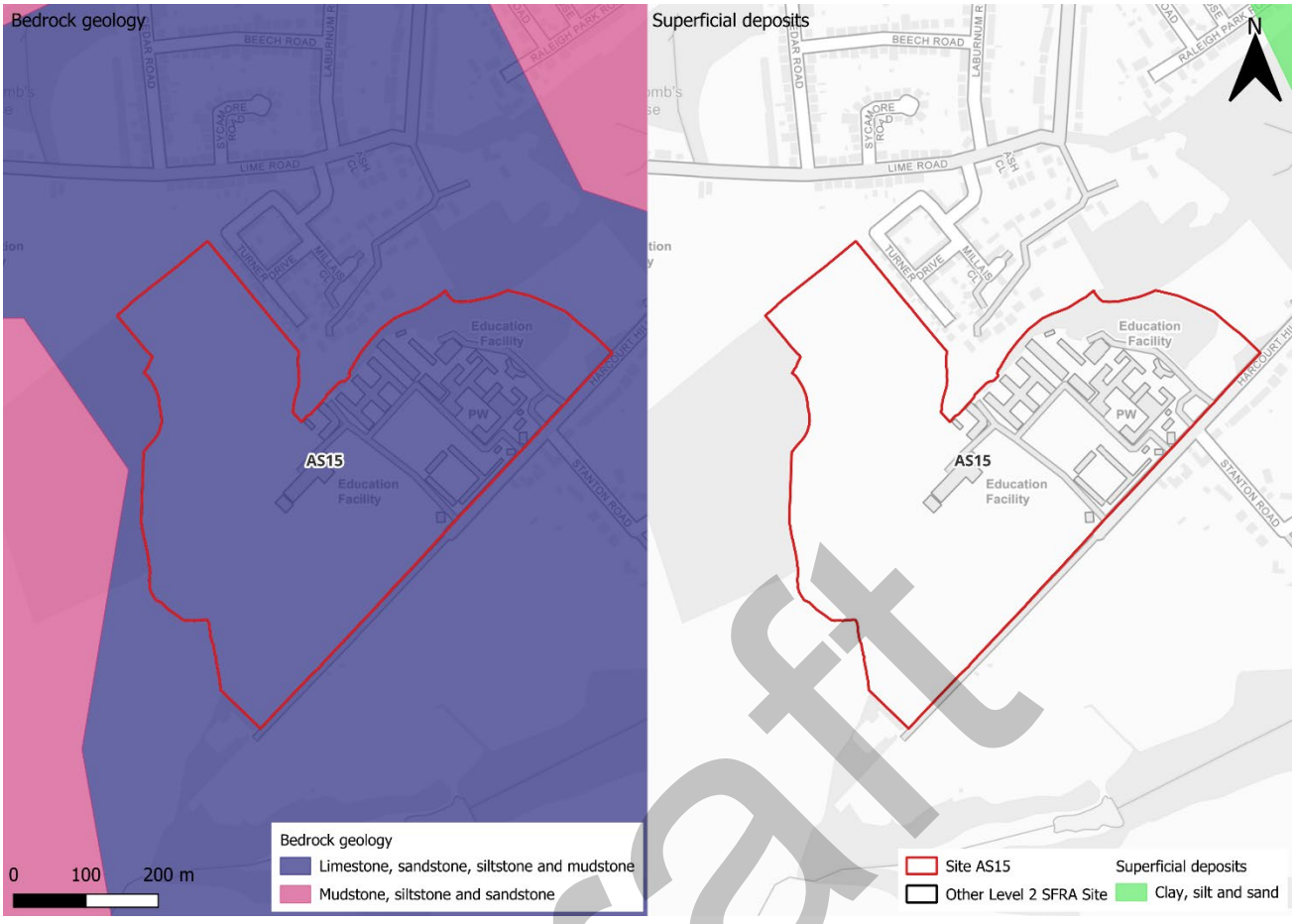

Figure 4-2: BGS Geology - Bedrock and superficial deposits

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5 Overall site assessment

5.1 Can part b) of the exception test be passed?

To pass part b) of the exception test[2], it must be proven that the development can be safe for its lifetime, which is 75 years for non-residential development, taking account of the vulnerability of its users, without increasing risk elsewhere, and, where possible, will reduce flood risk overall. The site is not required to pass the exception test as it is not located within Flood Zone 3a.

5.2 Recommendations and site-specific FRA guidance

Based on the evidence presented in the Level 1 SFRA (2024), Level 1 SFRA Addendum (2026) and this Level 2 SFRA:

- It should be appropriate for this site to be allocated, given the very low fluvial and surface water flood risk to the site.
- A detailed drainage strategy will be required for any new development, given the large area of the site.
- Groundwater conditions must be investigated further through the site-specific FRA.
- Opportunities for NFM features to reduce flood risk to the site and surrounding areas should be explored at the site-specific FRA stage.
- Any site-specific FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; South Oxfordshire and Vale of White Horse District Councils Joint Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the site-specific FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; TW; the highways authorities; and the emergency services.

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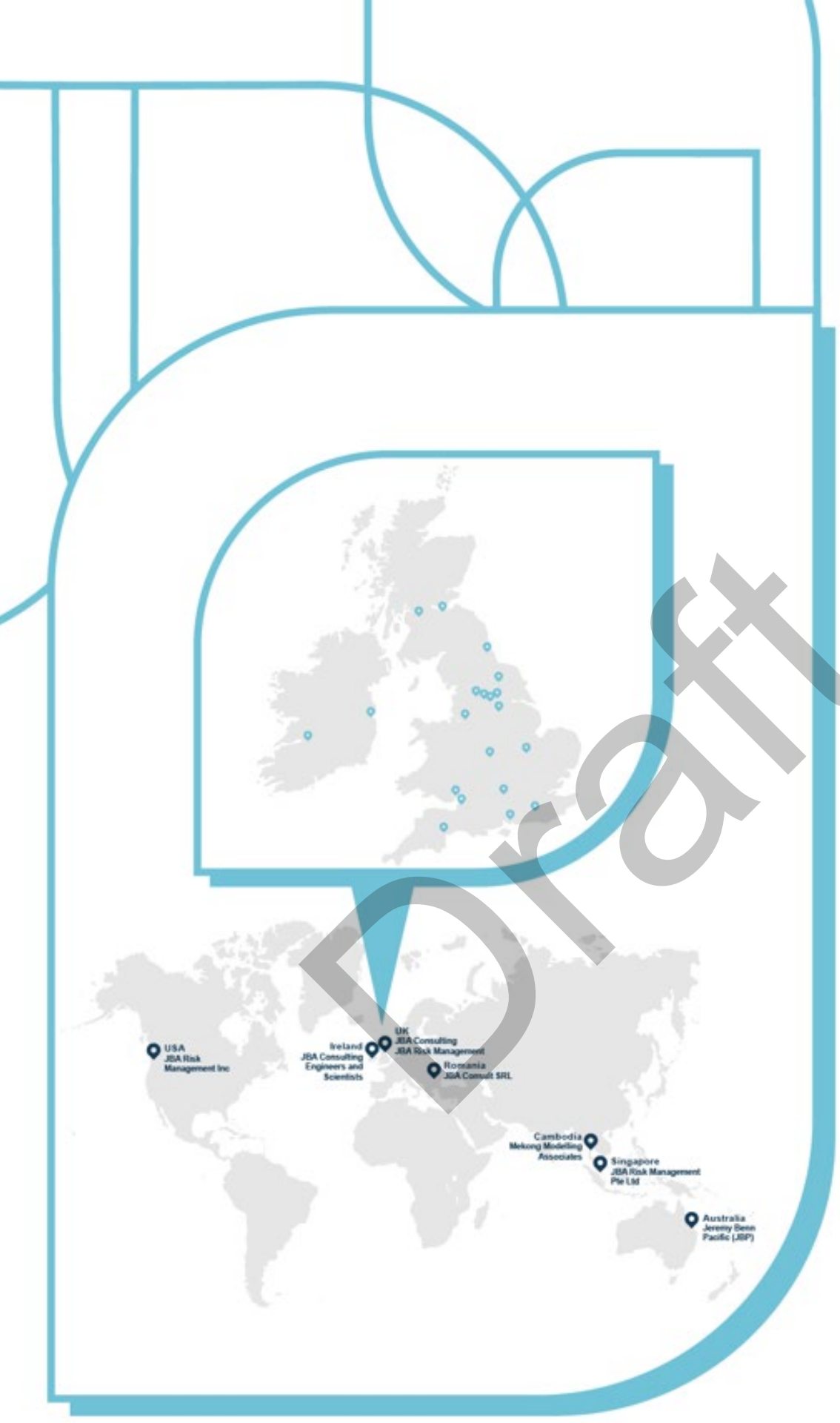

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Registered Office
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BD23 3FD
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South Oxfordshire and Vale of White Horse Level 2 Strategic Flood Risk Assessment Update

Site AS16 - Vauxhall Barracks, Didcot

Draft Report

October 2026

Prepared for:

South Oxfordshire District Council and

Vale of White Horse District Council

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Prepared by	Boe Kilshaw BSc Assistant Analyst
Reviewed by	Laura Thompson-Jones BSc CGeog FRGS Senior Analyst
Authorised by	Mike Williamson BSc MSc CGeog FRGS EADA Project Director

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JBA Project Manager	Freya Nation
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2026s1132

This report describes work commissioned by South Oxfordshire and Vale of White Horse District Councils. The Client's representative for the contract was Rebekah Goodwill of South Oxfordshire and Vale of White Horse District Councils. Boe Kilshaw of JBA Consulting carried out this work.

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The methodology adopted and the sources of information used by JBA in providing its services are outlined in this Report. The work described in this Report was undertaken between August and October 2026 and is based on the conditions encountered and the information available during the said period. The scope of this Report and the services are accordingly factually limited by these circumstances.

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for South Oxfordshire and Vale of White Horse Joint Local Plan Site AS16 - Vauxhall Barracks, Didcot. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA' (2024) and the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum' (2026), and read the 'South Oxfordshire and Vale of White Horse District Councils Level 2 SFRA Main Report Update' (2026) and is therefore familiar with the terminology used in this report.

1.1 Site AS16 - Vauxhall Barracks, Didcot

- Location: Vauxhall Barracks, Didcot (Figure 1-1)
- Existing site use: Brownfield; mixed use; recreation
- Existing site use vulnerability: More vulnerable
- Proposed site use: Mainly residential
- Proposed site use vulnerability: More vulnerable
- Site area: 9.87 ha
- Proposed development impermeable area: 8.4 ha (assumed 85% of site area)
- Watercourse: N/A
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for more detailed assessment through Level 2 SFRA (Strategic Recommendation B)
    - Assess present day and future surface water depths, hazards

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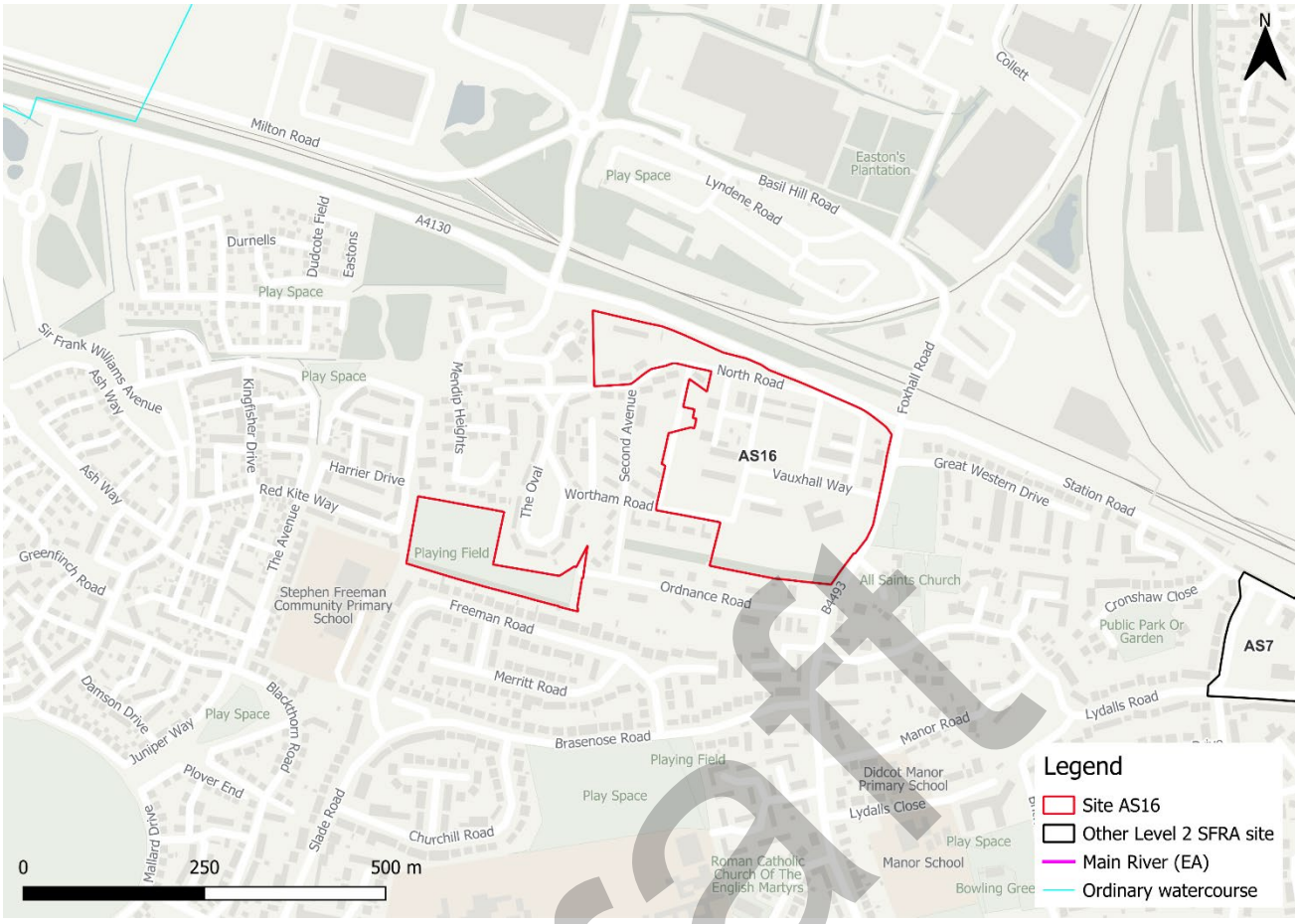

Figure 1-1: Site location

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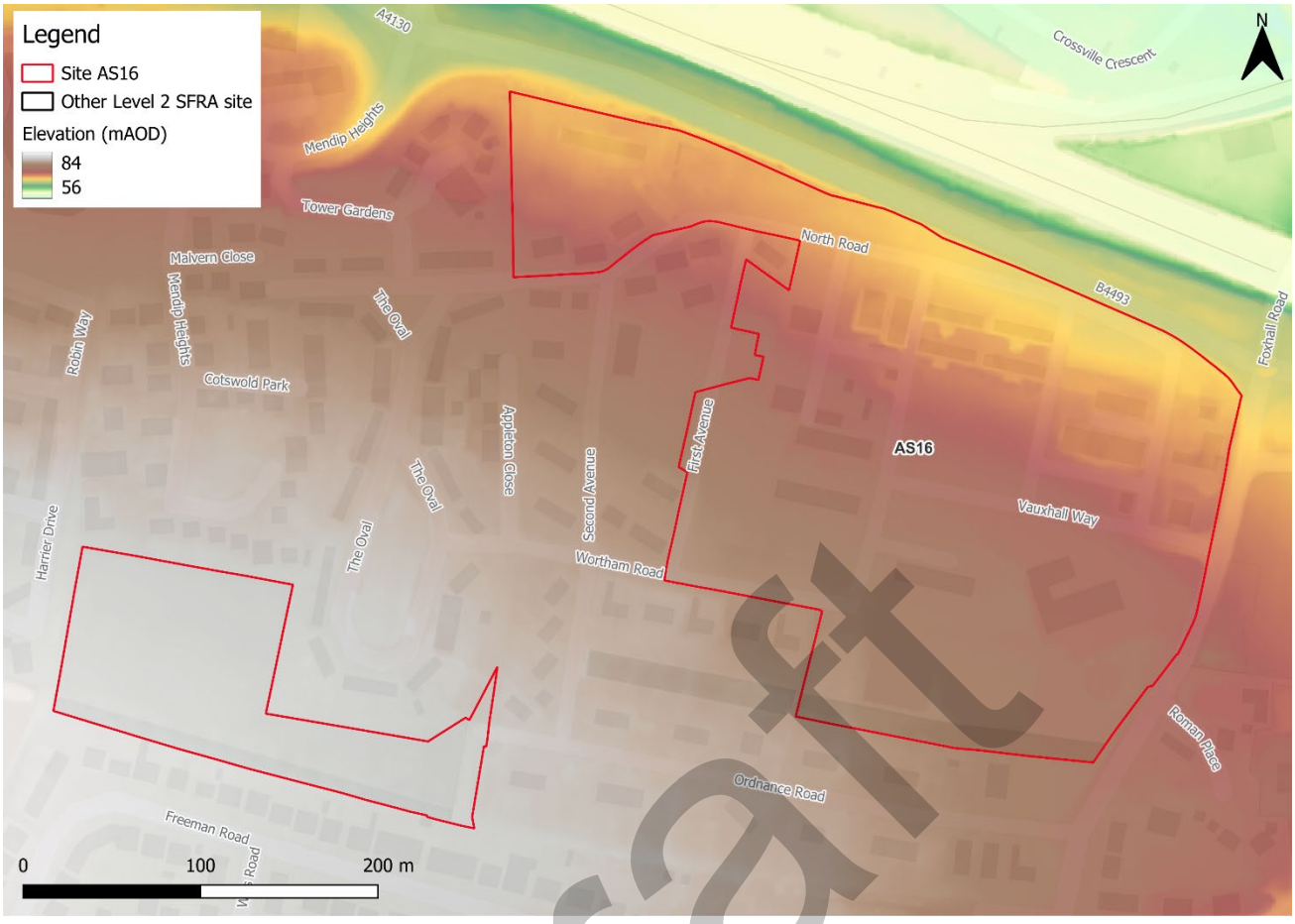

Figure 1-2: Topography

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2 Flood risk from rivers

2.1 Existing risk

2.1.1 Flood Map for Planning and functional floodplain

Based on the Environment Agency's (EA) Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum (2026), the percentage areas of the site within each flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.4).

The site is wholly located within Flood Zone 1 and therefore at low risk of flooding from rivers.

Table 2-1: Existing flood risk based on percentage area of site at risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

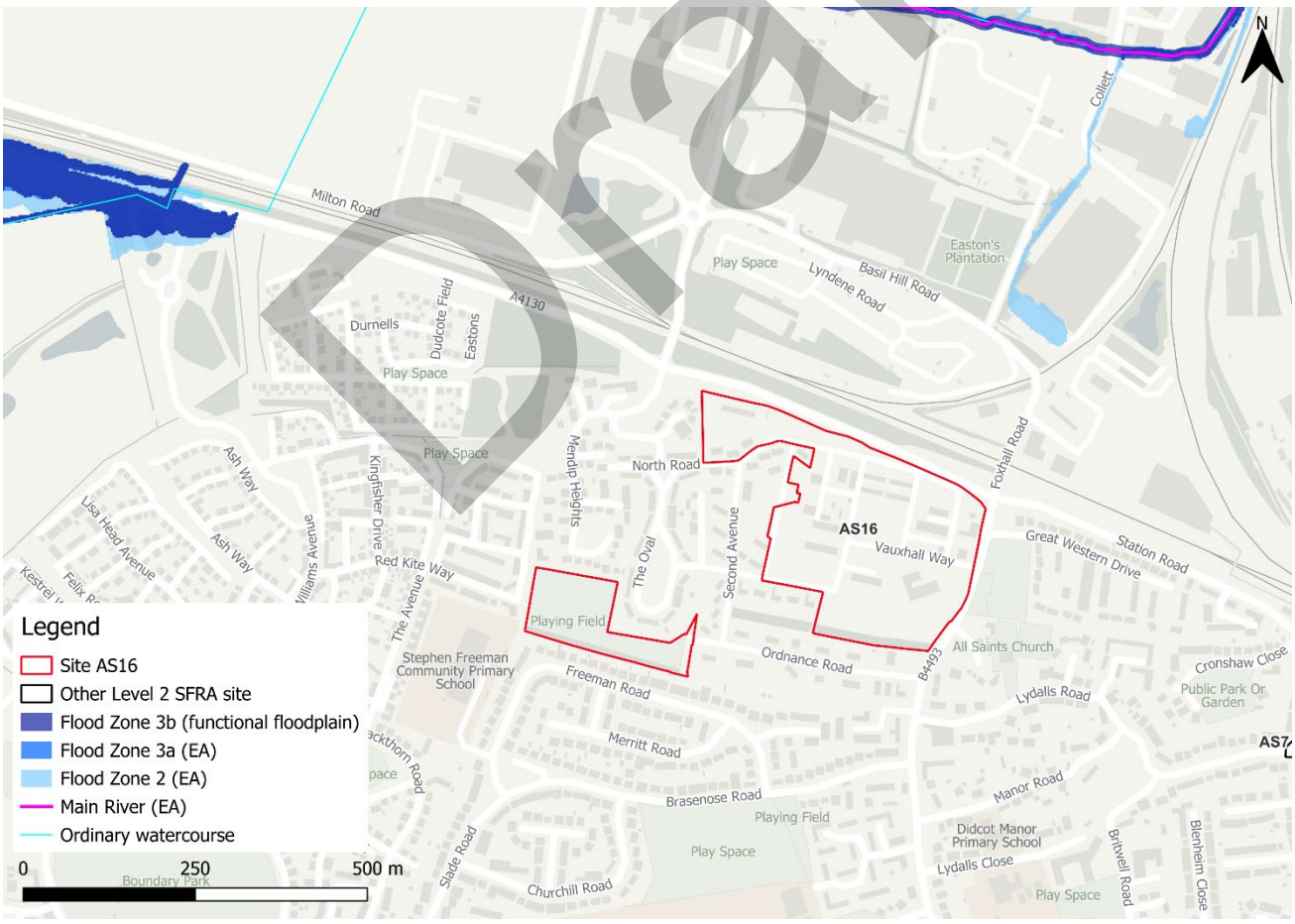

Figure 2-1: Existing risk from rivers to the site

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2.2 Impacts from climate change

2.2.1 Flood Map for Planning - Climate Change

The site is not shown to be at additional fluvial risk when considering climate change, based on the EA's Flood Map for Planning - Climate Change dataset.

2.3 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

2.4 Flood risk management

The site doesn't benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

2.4.1 Cumulative impacts

A cumulative impact assessment was completed through the South Oxfordshire and Vale of White Horse Level 1 SFRA Addendum (2026), which aimed to identify catchments sensitive to the cumulative impact of development. Site AS16 (Vauxhall Barracks, Didcot) is located within one catchment, namely; Moor Ditch and Ladygrove Ditch. This is ranked as a medium sensitivity catchment. Planning considerations for sites at medium sensitivity to the cumulative impacts of development can be found in Appendix D of the Level 1 SFRA Addendum. Cumulative impacts of development should also be considered as part of a site-specific FRA.

2.4.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. There are not any applicable areas that could benefit this site.

2.5 Residual risk

Although a site may be afforded some protection from defences and / or drainage infrastructure, there is always a residual risk of flooding from asset failure i.e. defence breaches, or blockages of culverts or drainage assets.

There are no assets with the potential to pose a residual risk to the site

2.5.1 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. A "dry day" scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. A

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"wet day" scenario assumes a worst-case scenario where a reservoir releases water held on a "wet day" when local rivers have already overflowed their banks.

The site is not modelled to be at risk from reservoir flooding.

2.6 Emergency Planning

2.6.1 Flood warnings and alerts

There are no Flood Warning Areas (FWA) or Flood Alert Areas (FAA) within the vicinity of the site.

2.6.2 Access and escape

Safe access and escape routes should be achievable via Foxhall Road to the east of the larger site parcel and Ordnance Road to the east of the smaller site parcel. These routes are indicated by the yellow lines in Figure 2-2.

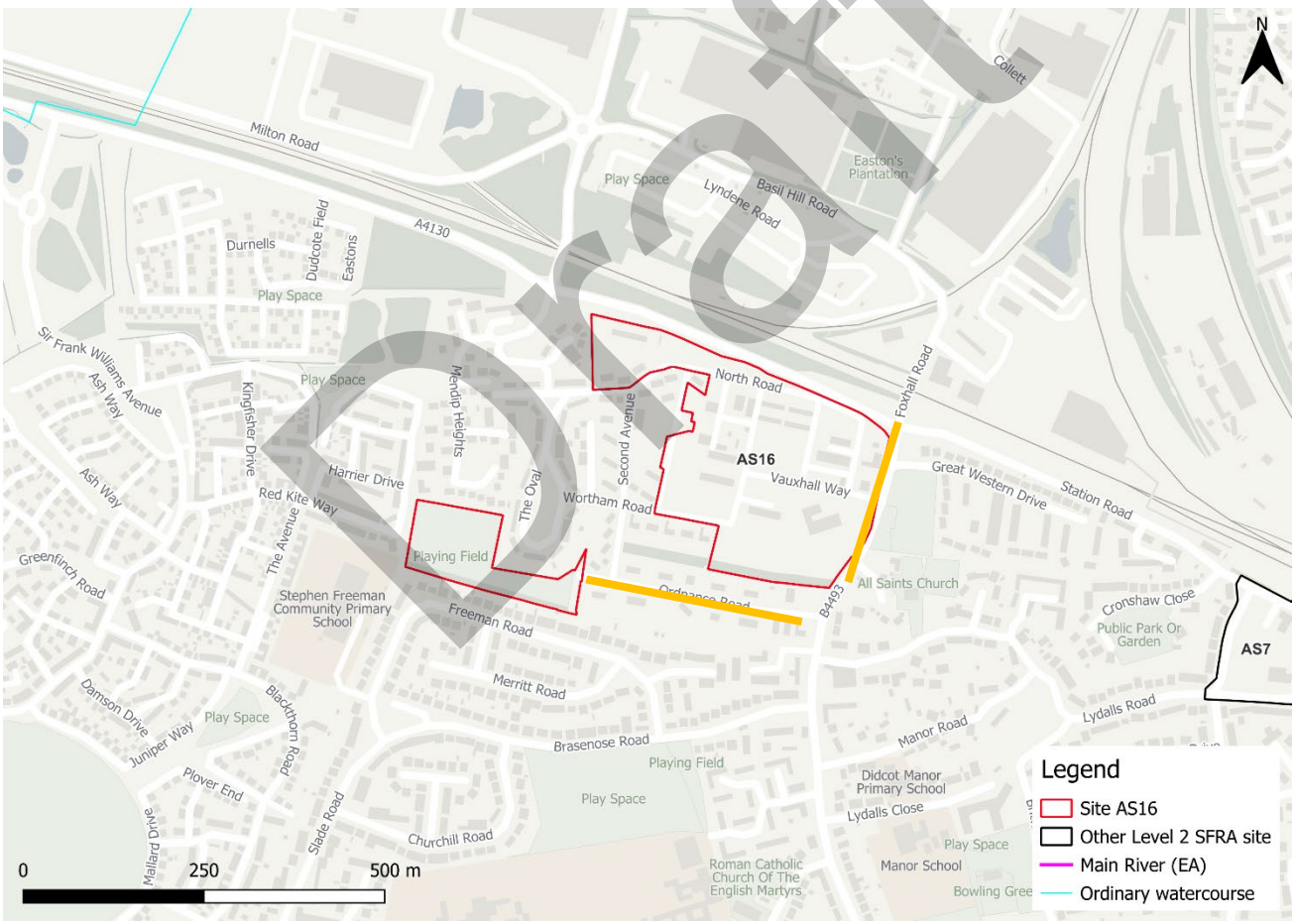

Figure 2-2: Potential access and escape routes

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2.7 Observations, mitigation options, site suitability, sequential approach to development management - fluvial

- Observations:
  - The site is wholly within Flood Zone 1 and therefore at low risk of flooding from rivers.
  - The site is not shown to be at additional risk from climate change.
- Access and escape:
  - Safe access and escape routes should be achievable via Foxhall Road to the east of the larger site parcel and Ordnance Road to the east of the smaller site parcel.

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3 Flood risk from surface water

3.1 Existing risk

3.1.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths Present Day

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Extents Present Day map (September 2026), the majority of the site is at very low risk from surface water flooding, as shown in Table 3-1.

Surface water risk is confined to the larger eastern site parcel in all events and is largely present in small, scattered areas of surface water ponding within topographic low spots (Figure 3-1). Surface water risk is constrained by the existing development within the site.

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Depths Present Day map, the greatest flood depths are modelled to be between 0.3 and 0.6 m (Figure 3-2).

Safe access and escape routes would likely be achievable via Foxhall Road and Ordnance Road.

Table 3-1: Existing surface water flood risk based on percentage area at risk using the Flood Map for Planning - Surface Water Spatial Planning Extent Present Day map

Less than 0.1% AEP event (% area)	0.1% AEP event (% area)	1% AEP event (% area)	3.3% AEP event (% area)
97	2	0	1

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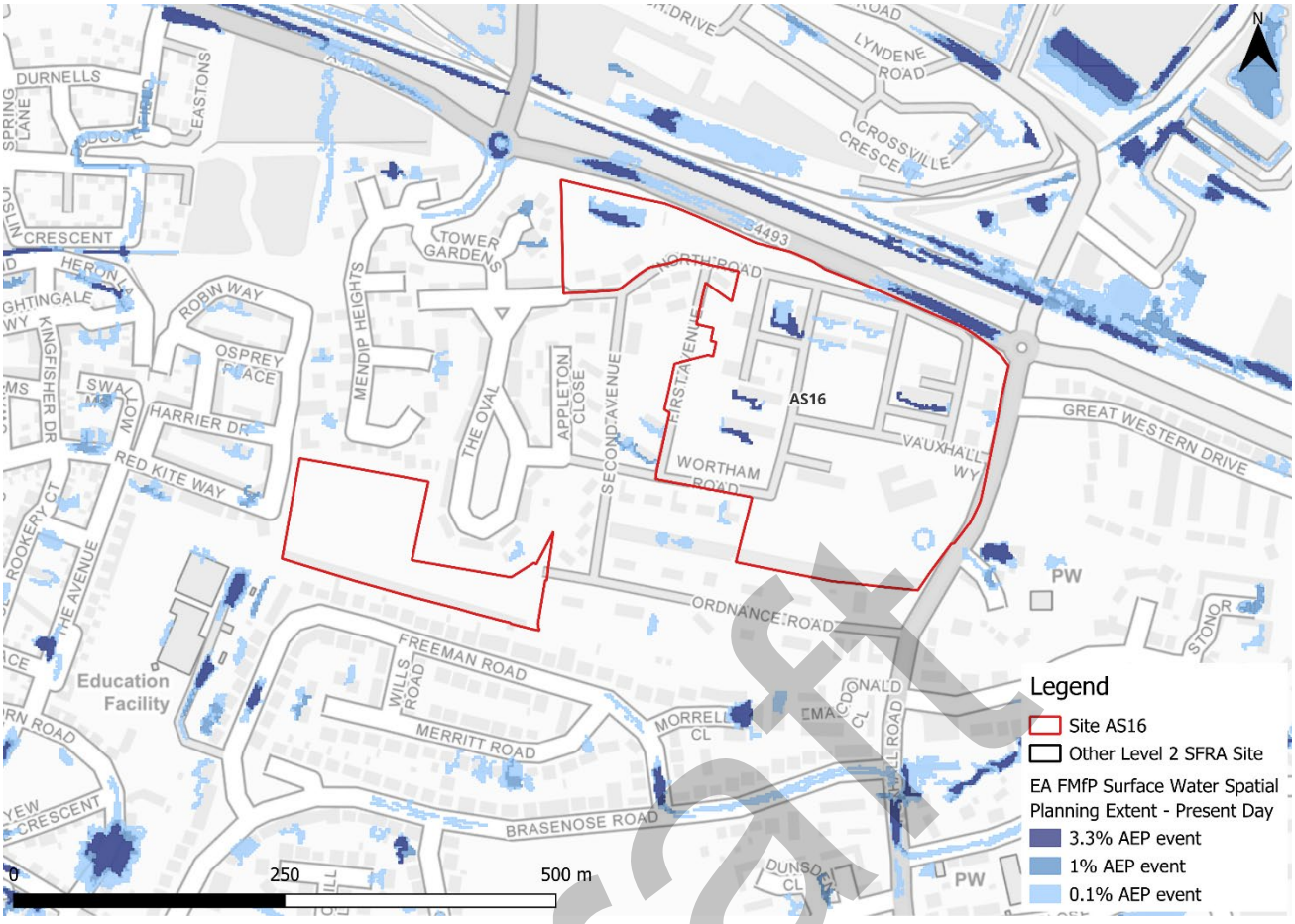

Figure 3-1: Flood Map for Planning - Surface Water Spatial Planning Extents Present Day

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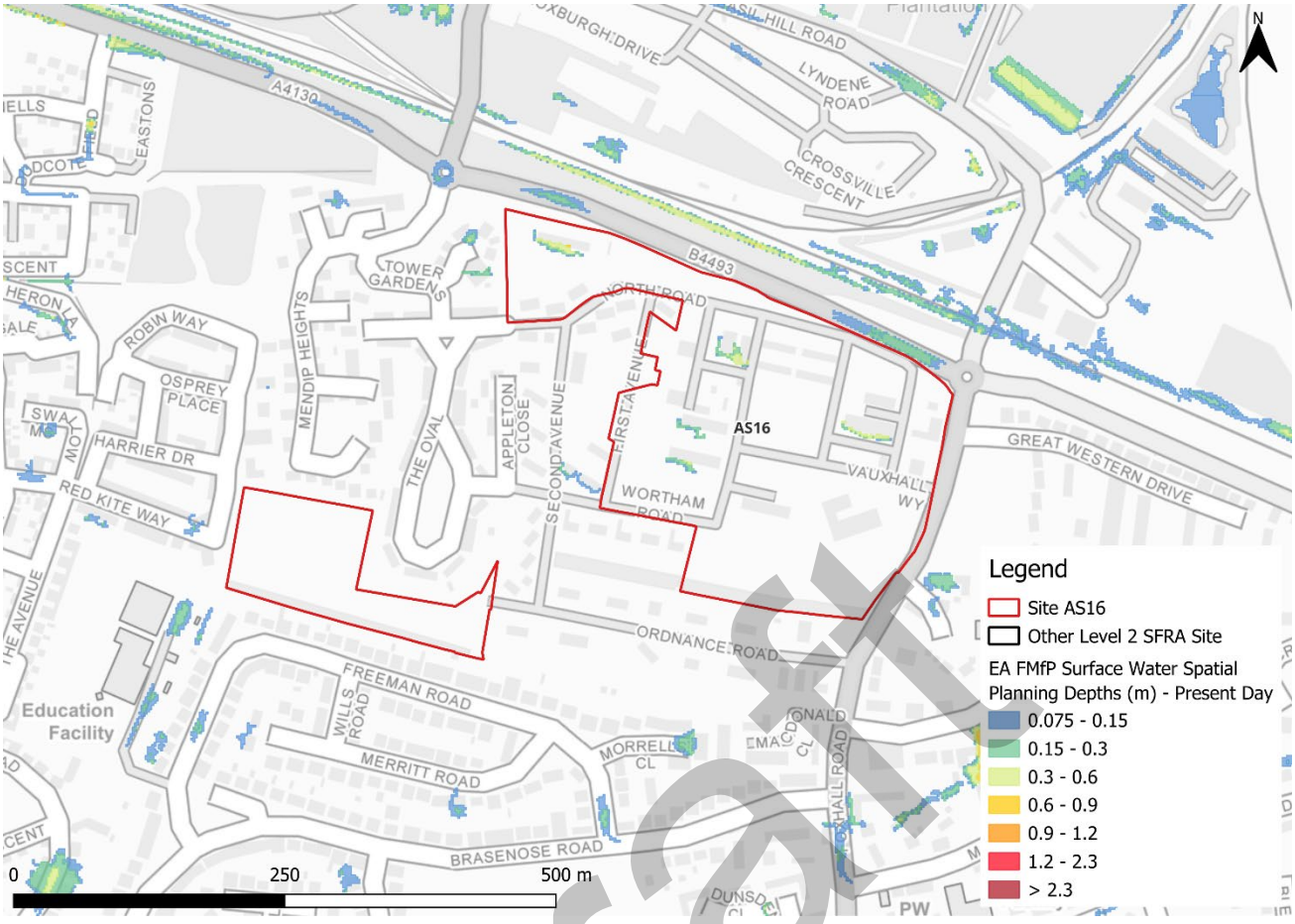

Figure 3-2: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Present Day for the 1% AEP event

3.1.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning data does not include hazard information suitable for planning purposes. Therefore, this Level 2 SFRA considers the third generation Risk of Flooding from Surface Water (RoFSW) hazard mapping in addition to the Flood Map for Planning - Surface Water Spatial Planning extents and depths, as the best available information. Updated surface water hazard information would need to be confirmed at the site-specific FRA stage.

Based on the EA's national scale third generation RoFSW map, the greatest flood hazard within the site in the medium risk event is categorised as 'moderate' (Figure 3-3).

There are some differences between the Flood Map for Planning - Surface Water Spatial Planning map and the third generation RoFSW hazard mapping. The Flood Map for Planning - Surface Water Spatial Planning data does not map flooding less than 0.075m (7.5cm) in depth. Therefore, where the map may show no flooding, there may be shallow flooding up to a depth of 0.075m. In contrast, the third generation RoFSW does not map flooding with a hazard rating of less than 0.575. This could explain the differences observed between the Flood Map for Planning and third generation RoFSW maps.

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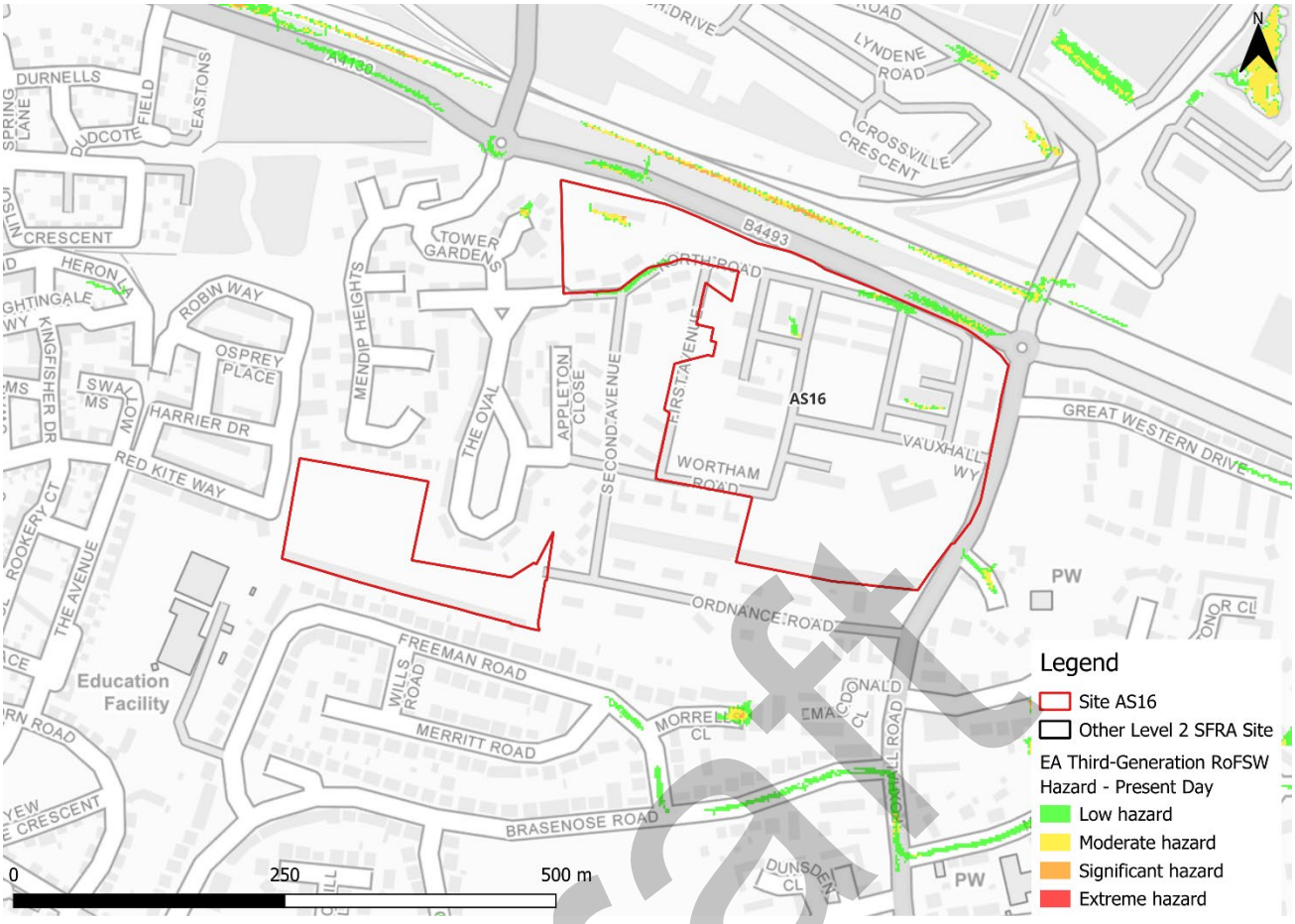

Figure 3-3: Third generation - Risk of Flooding from Surface Water map present day 1% AEP event surface water flood hazard[1]

3.2 Impacts from climate change

3.2.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths

The EA's climate change allowance guidance states that SFRA's should assess the upper end peak rainfall allowance for the 2070s epoch. This dataset is included in the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Climate Change dataset (September 2026). The peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment are shown in Table 3-2. The allowance for the 0.1% AEP event is not stated in the EA guidance.

1 Based on Section 7.5 Hazard rating. What is the Risk of Flooding from Surface Water map? Report version 2.0. April 2019. Environment Agency

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Table 3-2: Peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment

Return period	Central allowance 2070s (% increase)	Upper end allowance 2070s (% increase)
3.3% AEP	25	35
1% AEP	25	40

Figure 3-4 shows the surface water flood extents for the 2070s upper end climate change scenario. Surface water flood risk is modelled to increase slightly with climate change, however remains confined to the larger eastern site parcel. The areas of ponding across the site are shown to increase in extent in all events, with some additional areas of risk surrounding the existing buildings onsite (Figure 3-4). Surface water flood depths are shown to remain at between 0.3 and 0.6m (Figure 3-5).

Safe access and escape routes would likely remain achievable via Foxhall Road and Ordnance Road.

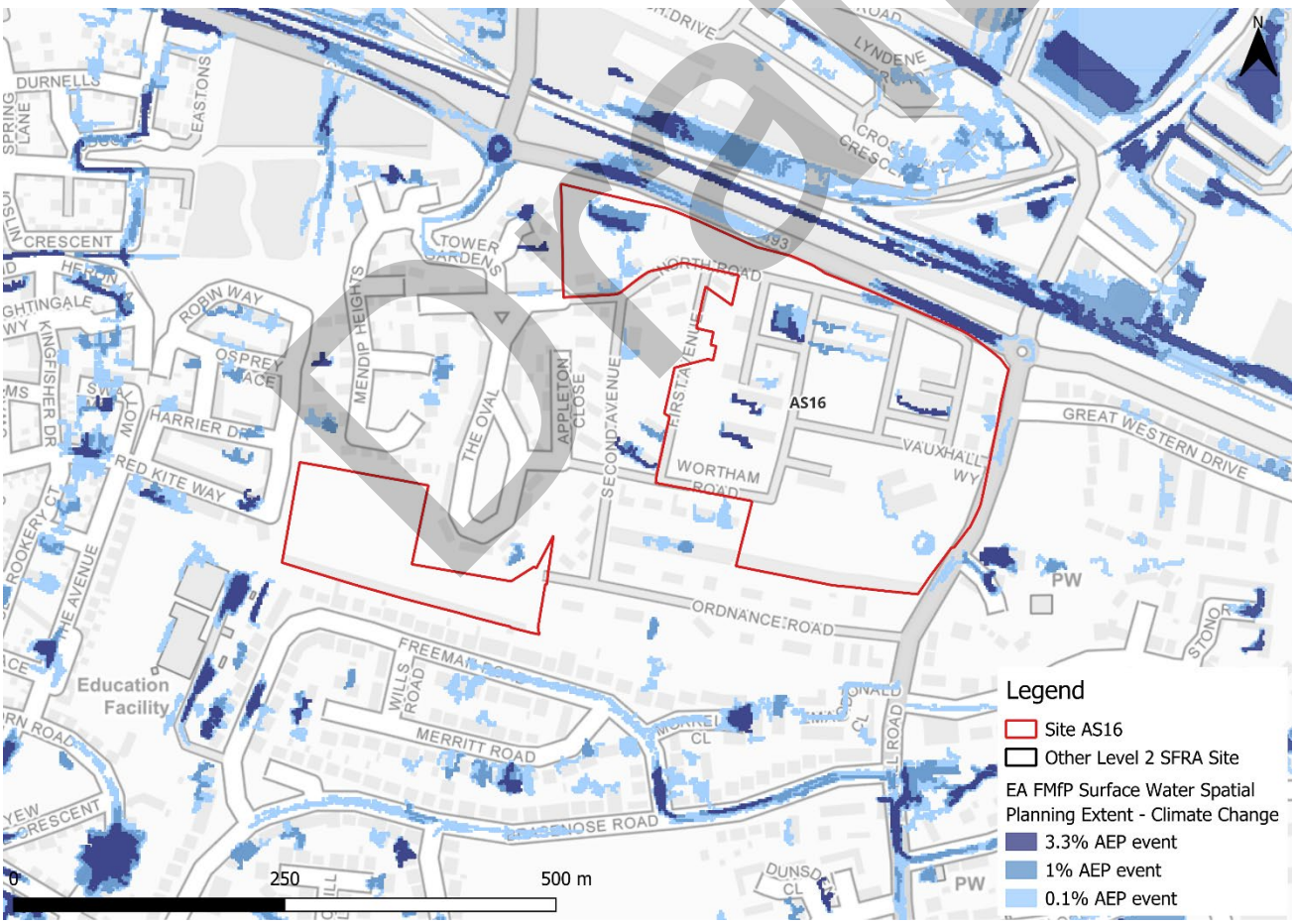

Figure 3-4: Flood Map for Planning - Surface Water Spatial Planning Extents Climate Change (2070s Upper End)

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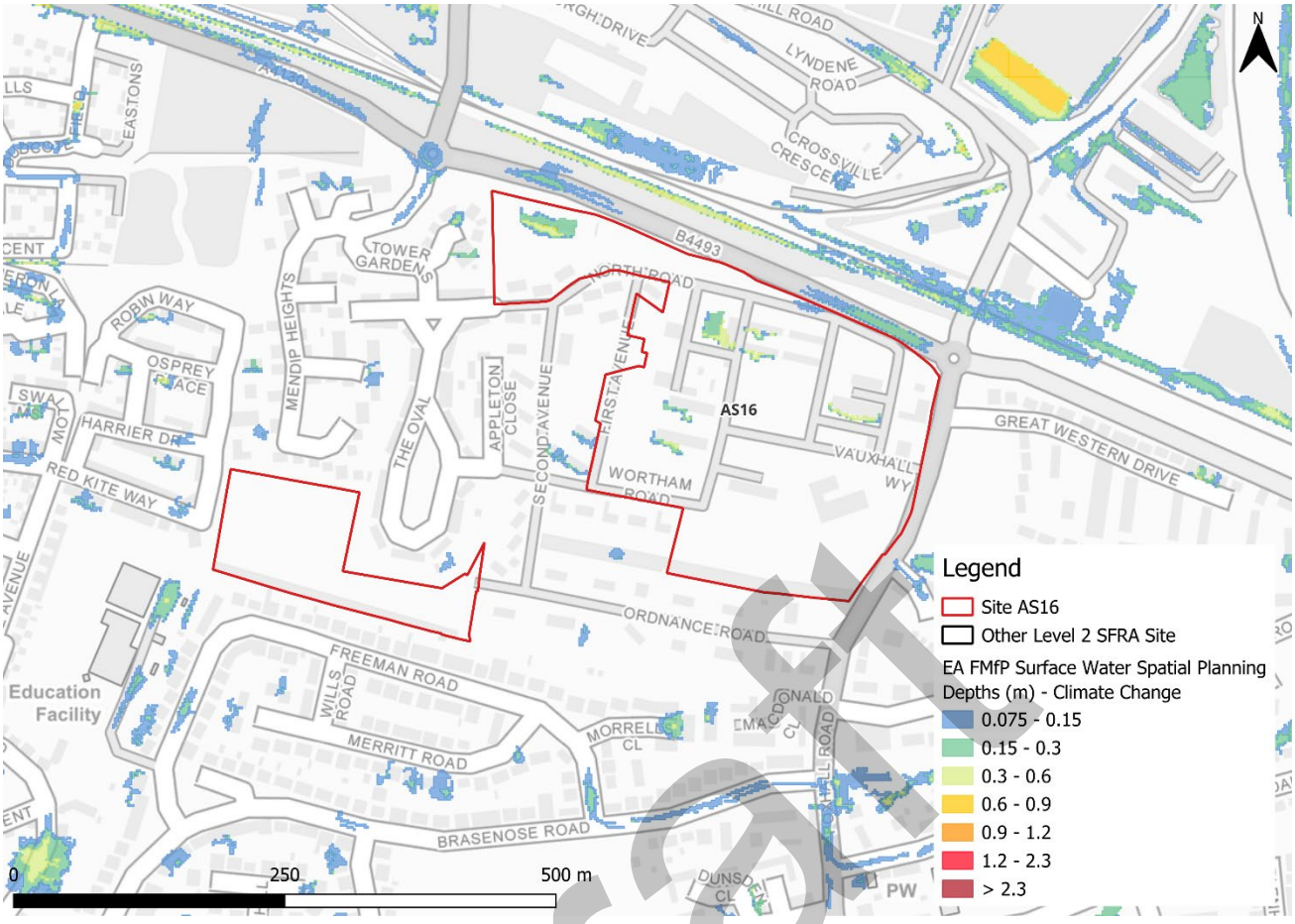

Figure 3-5: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Climate Change for the 1% AEP event (2070s Upper End)

3.2.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning climate change data does not include hazard information suitable for planning purposes. This Level 2 SFRA therefore considers the RoFSW low risk surface water event as a conservative proxy for the medium risk event plus climate change, as the best available information to assess surface water flood hazards. The impact of climate change on surface water flood hazards should be considered at the site-specific FRA stage.

Using the RoFSW low risk event as a proxy, future surface water flood hazard in the medium risk event is categorised as 'significant' within north of the site, with the majority of the site classified as 'moderate' (Figure 3-6).

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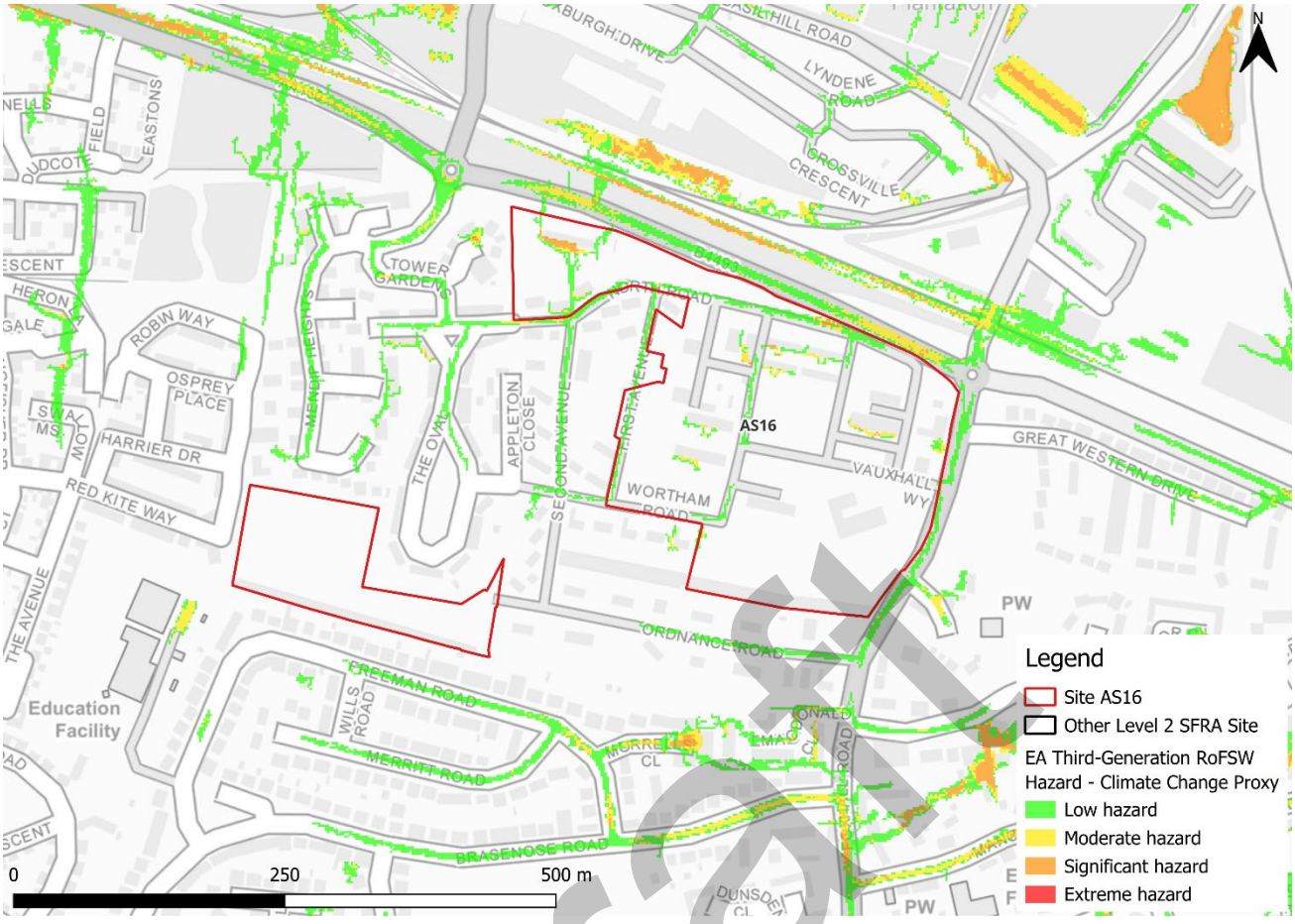

Figure 3-6: Low risk event surface water flood hazard[1], as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options, site suitability, sequential approach to development management - surface water

- Current risk to the site is predominantly very low, with 96% of the site being outside of the 0.1% AEP surface water flood extent. Risk is confined to the larger eastern site parcel. Surface water risk is present as scattered areas of ponding within topographic low spots and is constrained by the existing development onsite.
- Risk to site is shown to increase in extent when considering climate change. There is a greater extent of flooding within topographic low spots, with some additional areas of scattered ponding.
- Topographic low spots should be considered and included in site design and ideally left in place to flood naturally when required.
- If any structures are demolished for new development, a drainage strategy would therefore be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA. The developer should also follow the National SuDS guidance.

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- Assessment of the current drainage system in place should be carried out to ascertain any current capacity issues and whether the current system could accommodate the proposed development or whether further capacity will be required.
- The Council highways department should be consulted, along with Thames Water and the LLFA regarding existing highway drainage networks, surface water sewers and LLFA assets, and whether increased capacities may be required to enable sustainable development in the long term.
- Safe access and escape routes would likely be achievable via Foxhall Road and Ordnance Road.

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4 Groundwater, geology and SuDS suitability

Risk of groundwater emergence is assessed in this SFRA using JBA's 5m Groundwater Emergence Map. Figure 4-1 shows the map covering the site and the surrounding areas. Table 4-1 explains the risk classifications.

The entirety of the site is in an area where there is negligible groundwater emergence risk. Groundwater conditions may therefore be suited to infiltration SuDS.



Figure 4-1: JBA 5m Groundwater Emergence Map

Table 4-1: Groundwater Emergence Hazard Classification

Groundwater head difference (m)*	Class label
0 to 0.025	Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
0.025 to 0.5	Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
0.5 to 5	Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event There is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely.
>5	Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event. Groundwater emergence is not likely.
N/A	No risk. This zone is deemed as having a negligible risk from groundwater emergence due to the nature of the local geological deposits.
*Difference is defined as ground surface in mAOD minus modelled groundwater table in mAOD.	

The underlying bedrock within the site is mudstone, sandstone, and limestone (Figure 4-2). Other than sandstone, all these rocks generally have low levels of permeability. This leads to less water infiltrating into the ground and could potentially contribute to lower water table levels.

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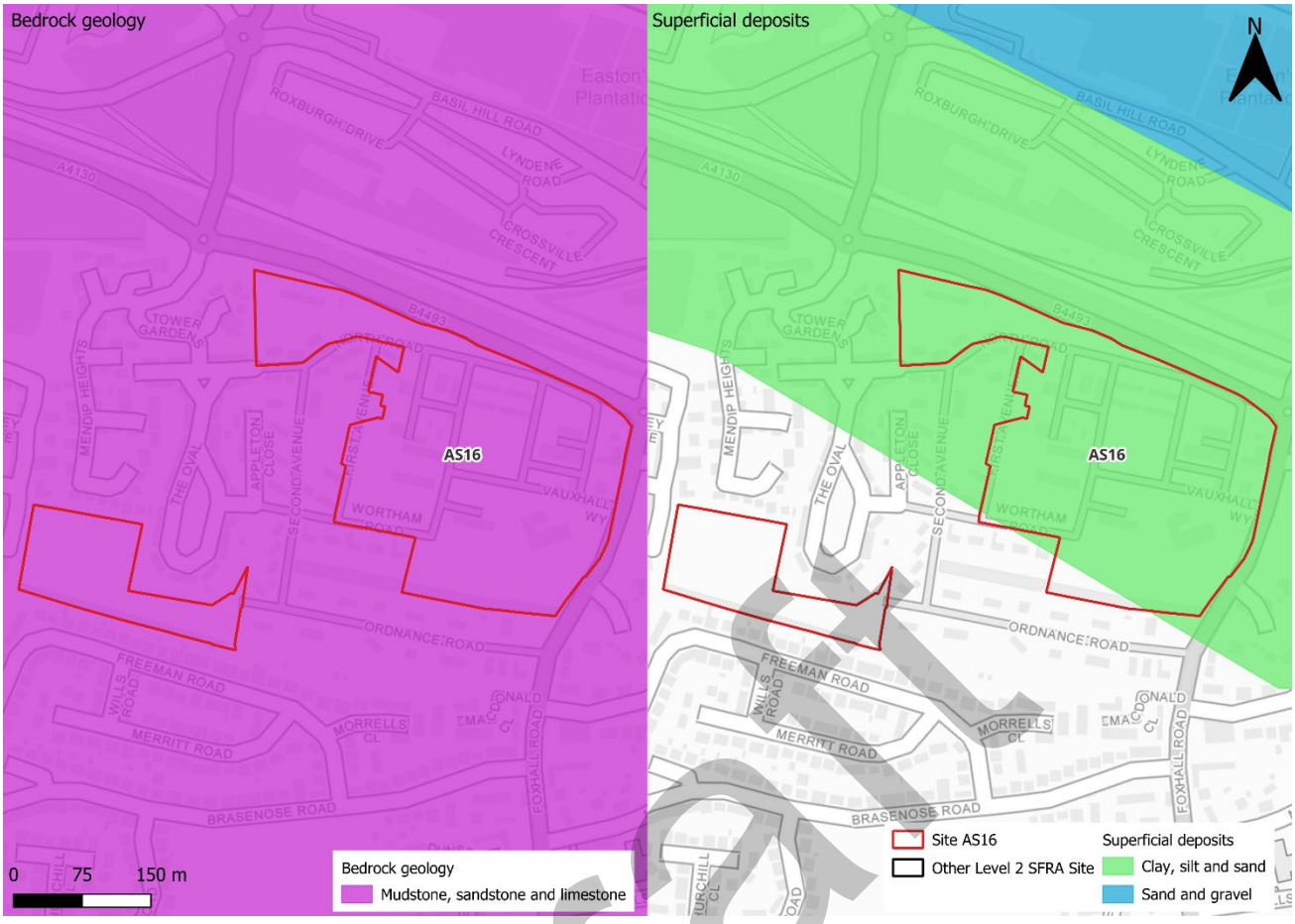

Figure 4-2: BGS Geology - Bedrock and superficial deposits

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5 Overall site assessment

5.1 Can part b) of the exception test be passed?

To pass part b) of the exception test[2], it must be proven that the development can be safe for its lifetime, which is 100 years for residential development, taking account of the vulnerability of its users, without increasing risk elsewhere, and, where possible, will reduce flood risk overall. The site is not required to pass the exception test as it is not located within Flood Zone 3a.

5.2 Recommendations and site-specific FRA requirements

Based on the evidence presented in the Level 1 SFRA (2024), Level 1 SFRA Addendum (2026) and this Level 2 SFRA:

- It should be appropriate for this site to be allocated, given the low fluvial and surface water flood risk to the site.
- It is assumed the current structures will be demolished for new housing units. A drainage strategy would therefore be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. Runoff rates should return to greenfield rates, to reduce flood risk downstream. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA. The use of infiltration SuDS should be investigated.
- Any site-specific FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; South Oxfordshire and Vale of White Horse District Councils Joint Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the site-specific FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; TW; the highways authorities; and the emergency services.

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[2] Policy F6 National Planning Policy Framework 2026

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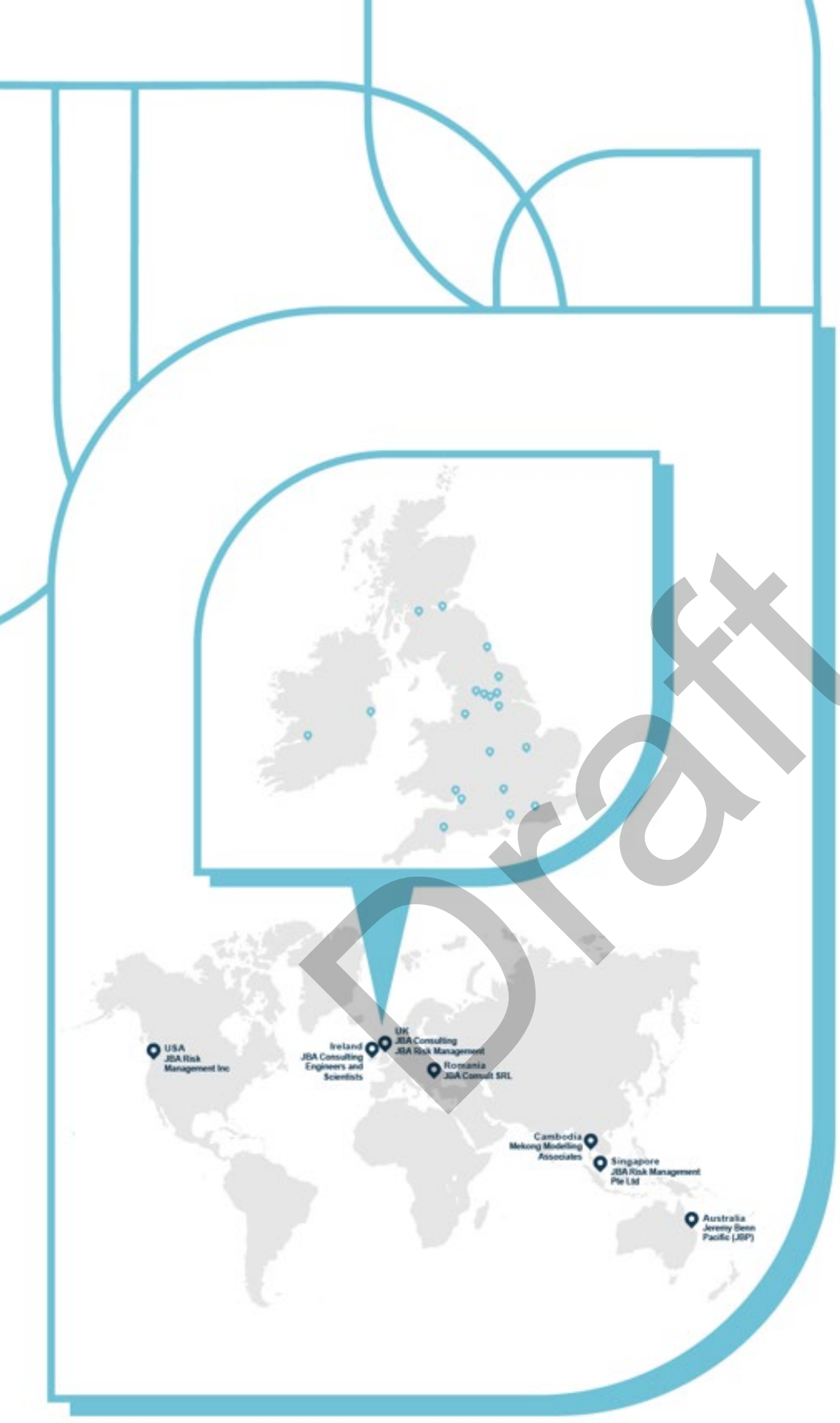

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Warrington

Registered Office
1 Broughton Park
Old Lane North
Broughton
SKIPTON
North Yorkshire
BD23 3FD
United Kingdom

+44(0)1756 799919
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Site JT1a - Southmead Industrial Estate, Didcot

Draft Report

October 2026

Prepared for:

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Reviewed by	Laura Thompson-Jones BSc CGeog FRGS Senior Analyst
Authorised by	Mike Williamson BSc MSc CGeog FRGS EADA Project Director

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JBA Project Manager	Freya Nation
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2025s1132

This report describes work commissioned by South Oxfordshire and Vale of White Horse District Councils. The Client's representative for the contract was Rebekah Goodwill of South Oxfordshire and Vale of White Horse District Councils. Boe Kilshaw of JBA Consulting carried out this work.

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for South Oxfordshire and Vale of White Horse Joint Local Plan Site JT1a - Southmead Industrial Estate, Didcot. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA' (2024) and the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum' (2026), and read the 'South Oxfordshire and Vale of White Horse District Councils Level 2 SFRA Main Report Update' (2026) and is therefore familiar with the terminology used in this report.

1.1 Site JT1a - Southmead Industrial Estate, Didcot

- Location: Southmead Industrial Estate, Didcot (Figure 1-1)
- Existing site use: Brownfield; industrial
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Mainly employment
- Proposed site use vulnerability: Less vulnerable
- Site area: 2.64 ha
- Proposed development impermeable area: 2.2 ha (assumed 85% of site area)
- EA model: Moor Ditch (Didcot to Thames Confluence) 2007
- Watercourse: Moor Ditch
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for more detailed assessment through Level 2 SFRA (Strategic Recommendation A)
    - Assess present day and future modelled fluvial depths, hazards
    - Assess present day and future modelled surface water depths, hazards

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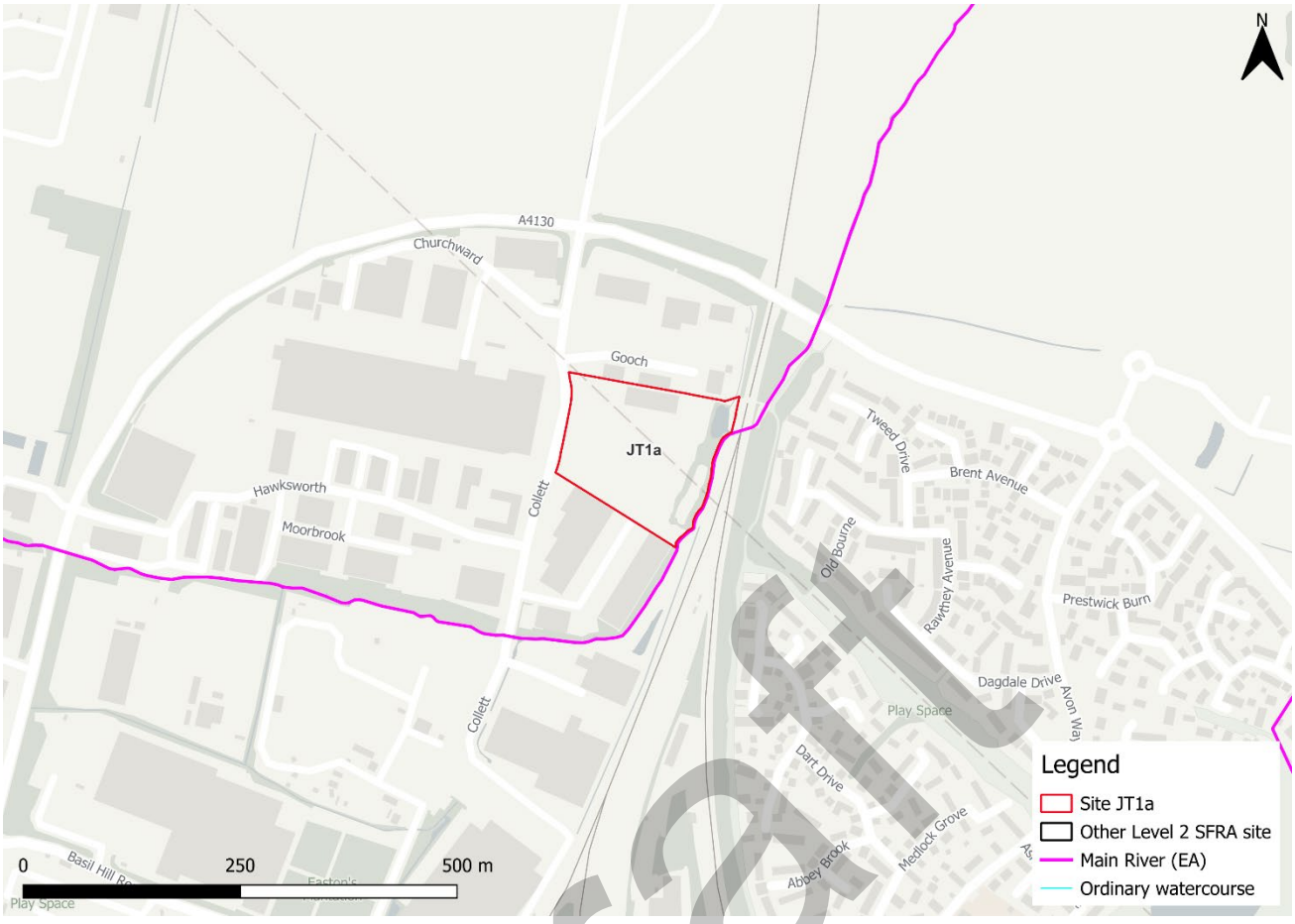

Figure 1-1: Site location

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Figure 1-2: Topography

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2 Flood risk from rivers

2.1 Existing risk

2.1.1 Flood Map for Planning and functional floodplain

Based on the Environment Agency's (EA) Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum (2026), the percentage areas of the site within each flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.4).

The area along the eastern boundary of the site is located within Flood Zone 3b. The area of functional floodplain onsite should be left free of vulnerable development. The functional floodplain in this location is based on the 1% AEP event from both the Moor Ditch (Didcot to Thames Confluence) 2007 model and the 8m buffered main river channel representing Moor Ditch. The remaining area of the site is within Flood Zone 1 and therefore at low risk of flooding from rivers.

Table 2-1: Existing flood risk based on percentage area of site at risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
96	0	0	4

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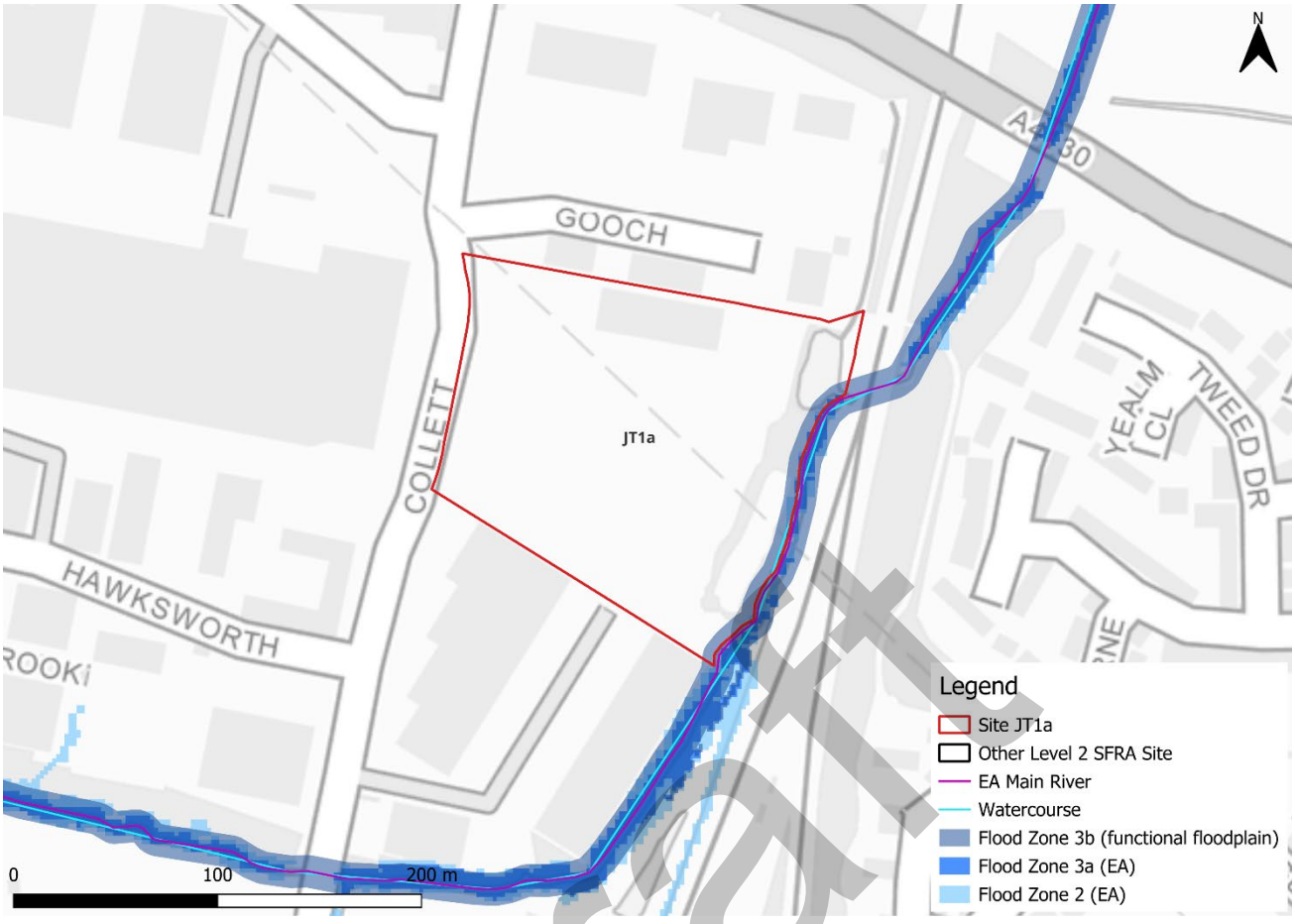

Figure 2-1: Existing risk from rivers to the site

2.1.2 Moor Ditch (Didcot to Thames Confluence) 2007 model outputs

The Moor Ditch (Didcot to Thames Confluence) 2007 model cannot be used to fully inform this SFRA, due to required results files not being provided for consideration. The fluvial risk information to inform the suitability for allocation of this site, and all other sites in the floodplain of the Moor Ditch model domain, is therefore limited. The information required for the SFRA that is not available includes:

- Flood hazard information

Flood depth information is available for present day flood events, derived through a 1D mapping process. However, this information was modelled in 2007 thus is likely to be based on outdated hydrology, terrain data and channel and structure survey.

Figure 2-2 shows the modelled flood depths for the 1% AEP undefended event which is the event Flood Zone 3 of the Flood Map for Planning is based on. Modelled risk to the site is similar to Flood Zone 3 in the vicinity of the site, with the area along the eastern boundary of the site modelled to be at risk. Maximum flood depths within the site are modelled to be < 0.15 m. There is no modelled flood risk to the rest of the site in the 1% AEP undefended event.

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Figure 2-2: Flood depths for 1% AEP undefended flood event

2.2 Impacts from climate change

2.2.1 Moor Ditch (Didcot to Thames Confluence) 2007 model outputs

The EA's SFRA guidance states that SFRAs should assess the 2080s central allowance for less vulnerable, more vulnerable, highly vulnerable and water compatible development (Table 2-2). The impacts of climate change on flood risk from Moor Ditch has not been modelled for this SFRA. The impacts of climate change must be modelled using the EA's latest allowances for peak river flows to inform whether the site can be safe for its lifetime and to assess modelled flood depths and hazards. Therefore, any updates to this Level 2 SFRA and/or any site-specific FRA should include for the most up to date climate change allowances.

Table 2-2: Climate change allowances for peak river flows for the Gloucestershire and the Vale management catchment

Epoch	Central	Higher Central	Upper End
2020s	11%	17%	33%
2050s	11%	19%	43%
2080s	26%	41%	84%

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2.2.2 Flood Map for Planning- Flood Zones plus Climate Change

Figure 2-3 shows the EA's Flood Map for Planning - Flood Zones plus Climate Change dataset. Based on this dataset, almost the entire eastern half of the site is shown to be at additional risk from climate change.

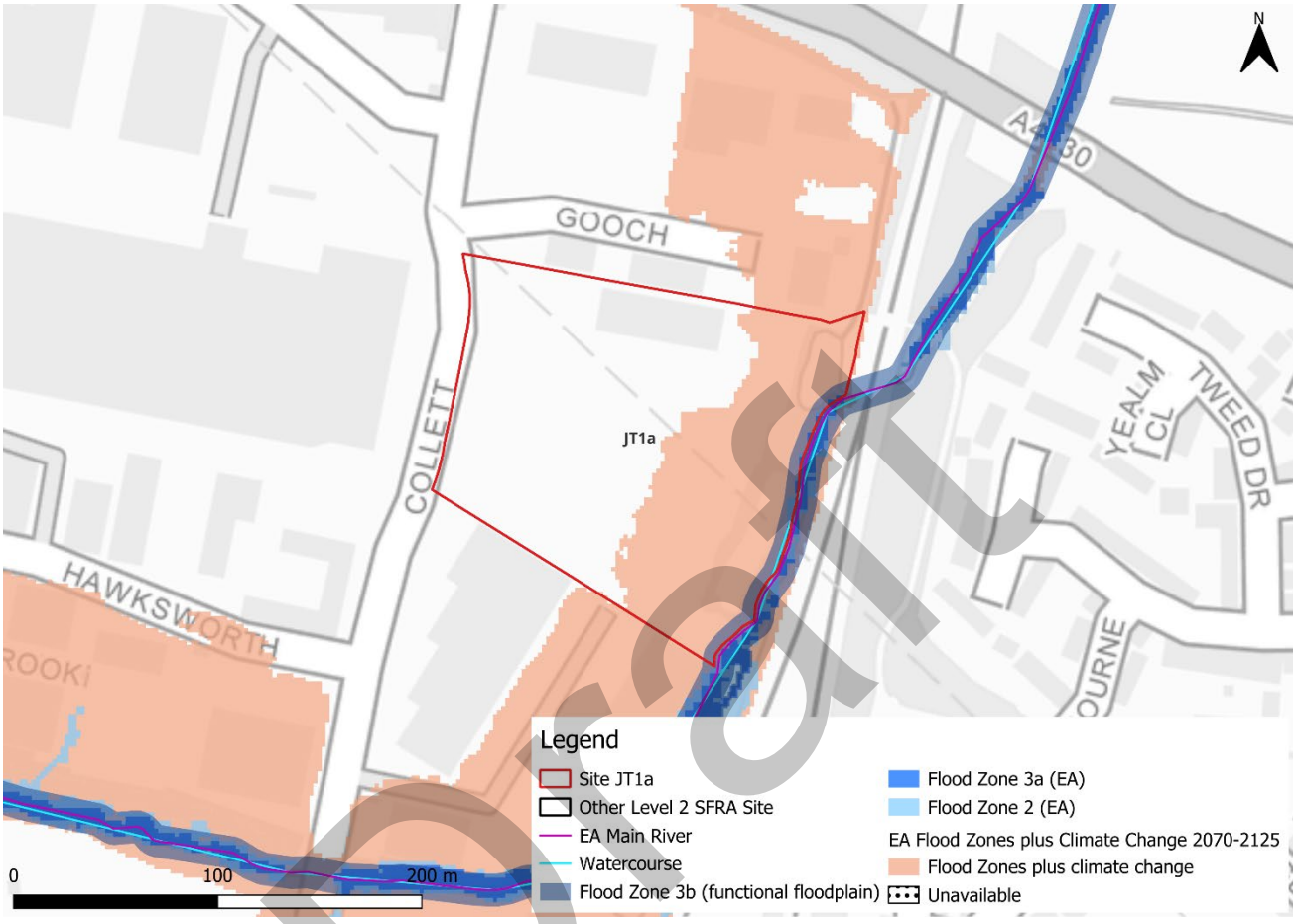

Figure 2-3: Flood Zones plus Climate Change Dataset

2.3 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

The LPA historic flooding records indicate that the units upstream of the site have experienced flooding in the past. The drainage network in this location drains into Moor Ditch, a S19 flood investigation report is available for Harriers Park. We are aware that historic flood events cover a greater area than the modelled flood data suggests.

2.4 Flood risk management

The site doesn't benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset. There are however areas of natural high ground along the banks of Moor Ditch to the east of the site boundary.

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2.4.1 Cumulative impacts

A cumulative impact assessment was completed through the South Oxfordshire and Vale of White Horse Level 1 SFRA Addendum (2026), which aimed to identify catchments sensitive to the cumulative impact of development. Site JT1a (Southmead Industrial Estate, Didcot) is located within one catchment, namely; Moor Ditch and Ladygrove Ditch. This is ranked as a medium sensitivity catchment. Planning considerations for sites at medium sensitivity to the cumulative impacts of development can be found in Appendix D of the Level 1 SFRA Addendum. Cumulative impacts of development should also be considered as part of a site-specific FRA.

2.4.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. Upstream of the site, there are opportunities to reconnect the channel to the floodplain, allowing flood water to be stored. This area is shown in Figure 2-4.

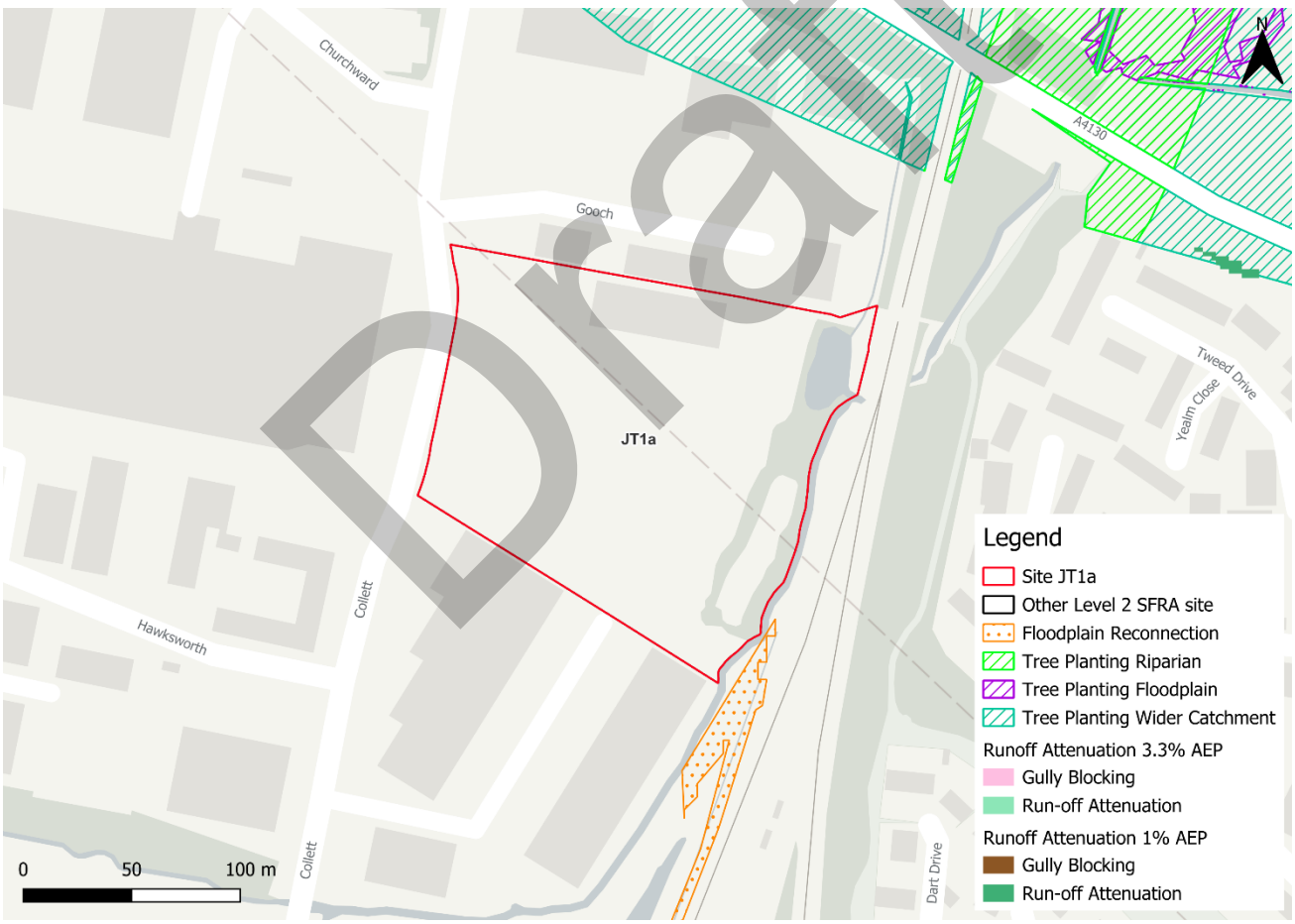

Figure 2-4: Natural Flood Management (NFM) potential mapping

2.5 Residual risk

Although a site may be afforded some protection from defences and / or drainage infrastructure, there is always a residual risk of flooding from asset failure i.e. defence

breaches, or blockages of culverts or drainage assets. Residual risk at this site comes from the potential blockage or structural failure of Moor Ditch which is culverted beneath the railway.

2.5.1 Potential blockage

There is potential residual risk to the site from a possible blockage of Moor Ditch which is culverted beneath the railway to the east of the site (Figure 2-5). The impact of a blockage of this structure has not been modelled as part of this Level 2 SFRA. It is recommended that the site-specific FRA should consider the impact of a blockage of this culvert on residual flood risk to the site.



Figure 2-5: Potential culvert blockage location

2.5.2 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. A "dry day" scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. A "wet day" scenario assumes a worst-case scenario where a reservoir releases water held on a "wet day" when local rivers have already overflowed their banks.

The site is not modelled to be at risk from reservoir flooding.

2.6 Emergency Planning

2.6.1 Flood warnings and alerts

The EA operates a Flood Warning Service for properties located within a Flood Warning Area (FWA) for when a flood event is expected to occur. Site JT1a (Southmead Industrial Estate, Didcot) is not located within a FWA.

Flood alerts may be issued before a flood warning for properties located within a Flood Alert Area (FAA) to provide advance notice of the possibility of flooding. A flood alert may be issued when there is less confidence that flooding will occur in a FWA. The site is located within one FAA, along the eastern boundary of the site, namely 061WAF23Ginge - Ginge Brook (Figure 2-6).



Figure 2-6: EA Flood Warning and Alert Areas

2.6.2 Access and escape routes

Safe access and escape routes could likely be achieved during a flood event via Collett to the west of the site. This route is indicated by the yellow line in Figure 2-7.

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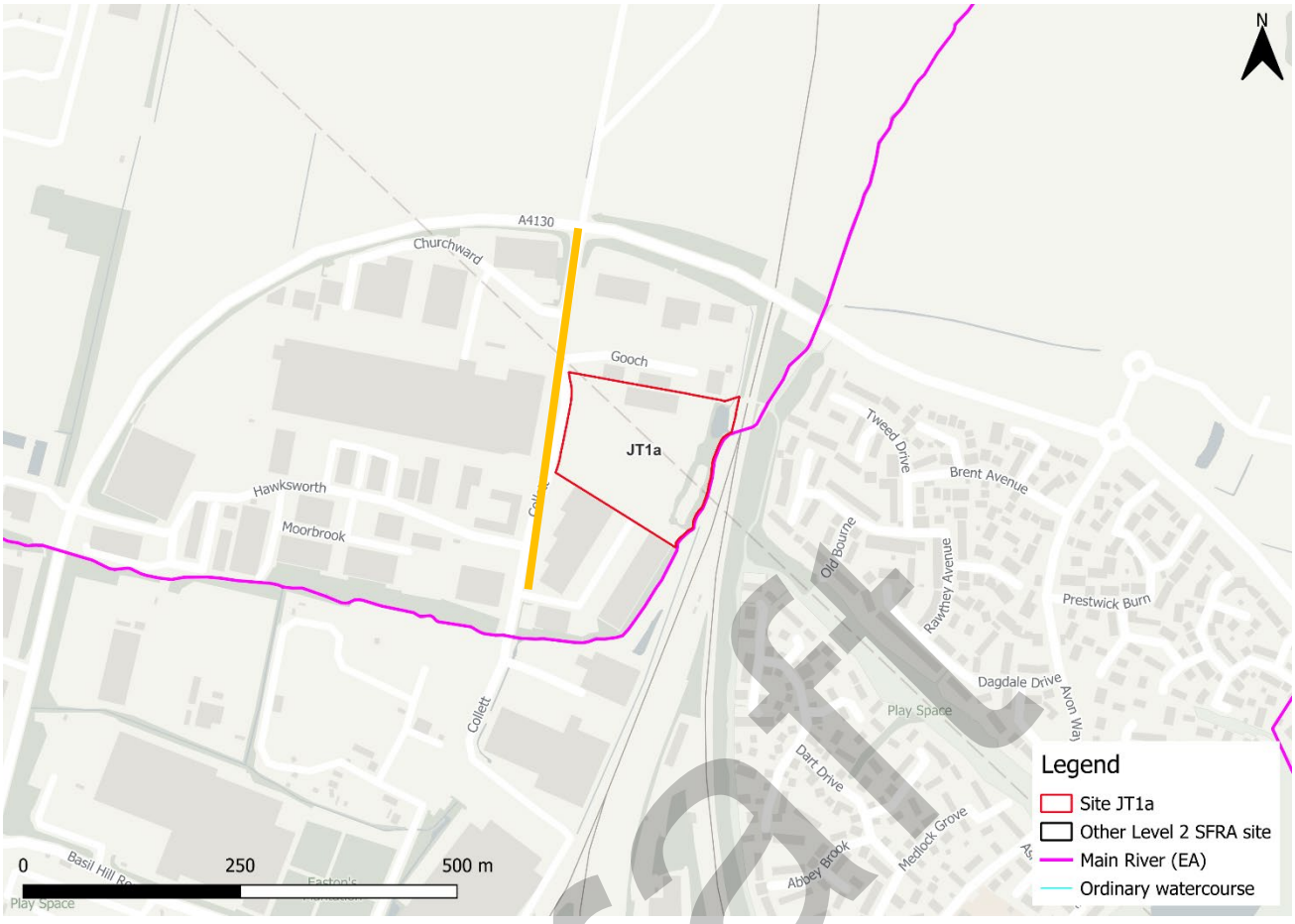

Figure 2-7: Potential access and escape routes

2.7 Observations, mitigation options, site suitability, sequential approach to development management - fluvial

- Observations:
  - The site is modelled to be within the functional floodplain along the eastern boundary of the site, adjacent to Moor Ditch. Vulnerable development is not permitted within the functional floodplain. However, the functional floodplain in this area is largely based on the 8m main river buffer.
  - There should be no development within 8m of Moor Ditch apart from permitted access. The EA recommend an 8m no development buffer for all main rivers to enable access for maintenance activities. If feasible, this area would be used as a green / blue corridor which can provide ecological, social and amenity value.
  - A flood risk activity permit may be required if development is planned within 8m of the riverbank. The EA can advise on whether a permit will be required. If feasible, this area would be used as a green / blue corridor which can provide ecological, social and amenity value.
  - The site is partially located in Flood Zone 3, as indicated by the Moor Ditch (Didcot to Thames Confluence) 1% AEP undefended event outputs. Greatest depths within the site boundary are modelled to be < 0.15 m. More vulnerable

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development should be directed away from the area of the site within Flood Zone 3.
    - Modelled hazard information was not available for the Moor Ditch model. This should be considered as part of a site-specific FRA, as well as/instead of a Level 2 SFRA update.
    - The EA Flood Zones plus Climate Change dataset shows almost the entire eastern half of the site is at additional risk from climate change. However, as discussed, there is no detailed modelling available to understand the impact of climate change on fluvial flood depths, velocities and hazards. Climate change must be modelled at the site-specific FRA stage.
    - Given the historic flooding upstream of the site, the capacity of the receiving watercourse for discharge from the development will need to be assessed. A condition survey of the watercourse along the eastern boundary of the site should also be assessed as part of a site-specific FRA to ensure flows can be conveyed.
- Mitigation:
    - The area of functional floodplain should be maintained and included in site design as a green / blue corridor offering multifunctional benefits alongside flood risk mitigation including Biodiversity Net Gain (BNG) contributions, and social and amenity benefits.
    - The area of the site shown to be at future fluvial risk should also be considered as open greenspace within site design. However, this should be supported by detailed climate change modelling.
    - The EA flood alert area should continue to be in place to ensure early evacuation of site users before an extreme flood event occurs.
- Residual risk:
    - The site is at potential residual risk from a blockage of Moor Ditch which is culverted beneath the railway. The site-specific FRA should consider modelling a blockage scenario to understand whether there would be any additional risk to the site.
    - Areas adjacent to culverts and bridges are at particular risk from the rapid onset of fast flowing and deep flooding, with little or no warning if structures become blocked.
    - Emergency plans must be in place for such areas and safe access and escape routes must be in place for the lifetime of development. Resistance and resilience measures may also need to be put in place to manage residual flood risk when avoidance measures have been exhausted.
    - The LPA should use the information on residual risk in this Level 2 SFRA to state in the local plan strategic policies a preferred mitigation strategy for ensuring development will be safe throughout its lifetime in relation to urban form, risk management and where flood mitigation measures are likely to have wider sustainable design implications (para 042, FRCC-PPG).
- Access and escape:

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- Safe access and escape routes are available from Collett based on available information on fluvial flood risk.

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3 Flood risk from surface water

3.1 Existing risk

3.1.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths Present Day

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Extents Present Day map (September 2026), the majority of the site is at very low risk from surface water flooding, as shown in Table 3-1.

Surface water risk is confined to areas of ponding in topographic low spots within the north and east of the site (Figure 3-1). Surface water risk is constrained by the existing development onsite.

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Depths Present Day map, the greatest flood depths are between 0.3 and 0.6m within the east of the site (Figure 3-2).

Safe access and escape routes would likely be achievable via Collett to the west of the site.

Table 3-1: Existing surface water flood risk based on percentage area at risk using the Flood Map for Planning - Surface Water Spatial Planning Extent Present Day map

Less than 0.1% AEP event (% area)	0.1% AEP event (% area)	1% AEP event (% area)	3.3% AEP event (% area)
93	2	2	3

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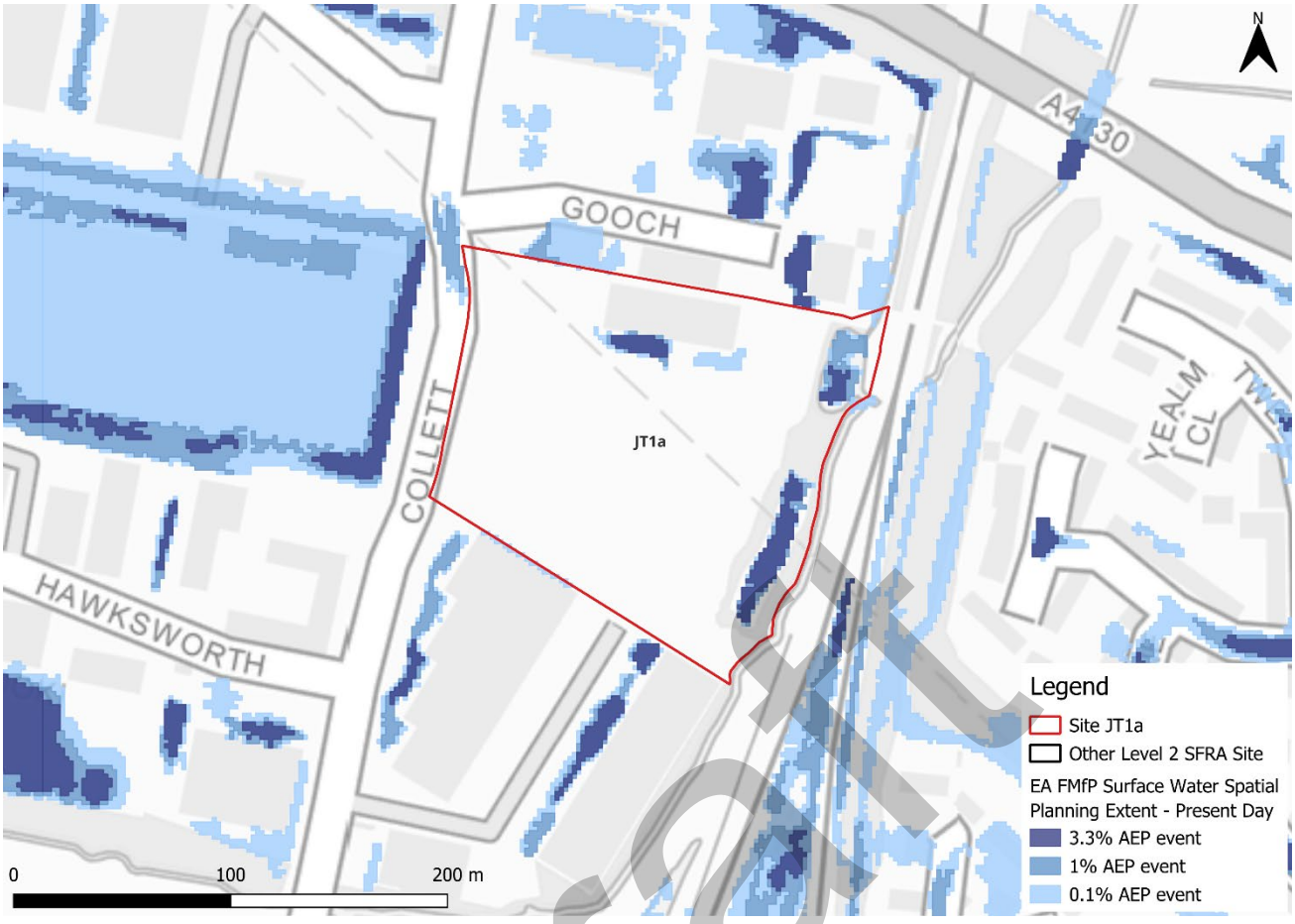

Figure 3-1: Flood Map for Planning - Surface Water Spatial Planning Extents Present Day

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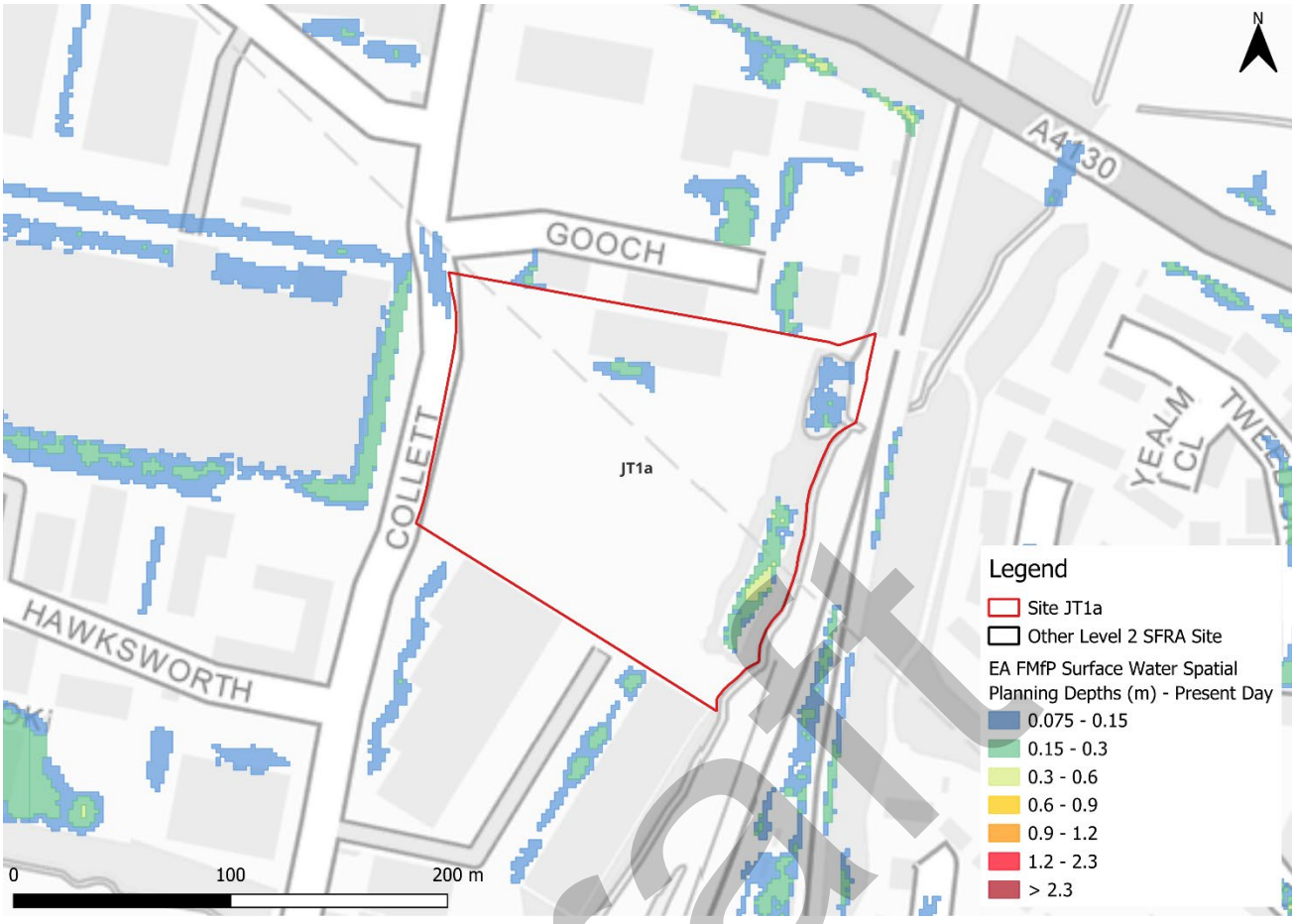

Figure 3-2: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Present Day for the 1% AEP event

3.1.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning data does not include hazard information suitable for planning purposes. Therefore, this Level 2 SFRA considers the third generation Risk of Flooding from Surface Water (RoFSW) hazard mapping in addition to the Flood Map for Planning - Surface Water Spatial Planning extents and depths, as the best available information. Updated surface water hazard information would need to be confirmed at the site-specific FRA stage.

Based on the EA's national scale third generation RoFSW map, the greatest flood hazard within the site in the medium risk event is categorised as 'significant' (Figure 3-3).

There are some differences between the Flood Map for Planning - Surface Water Spatial Planning map and the third generation RoFSW hazard mapping. The Flood Map for Planning - Surface Water Spatial Planning data does not map flooding less than 0.075m (7.5cm) in depth. Therefore, where the map may show no flooding, there may be shallow flooding up to a depth of 0.075m. In contrast, the third generation RoFSW does not map flooding with a hazard rating of less than 0.575. This could explain the differences observed between the Flood Map for Planning and third generation RoFSW maps.

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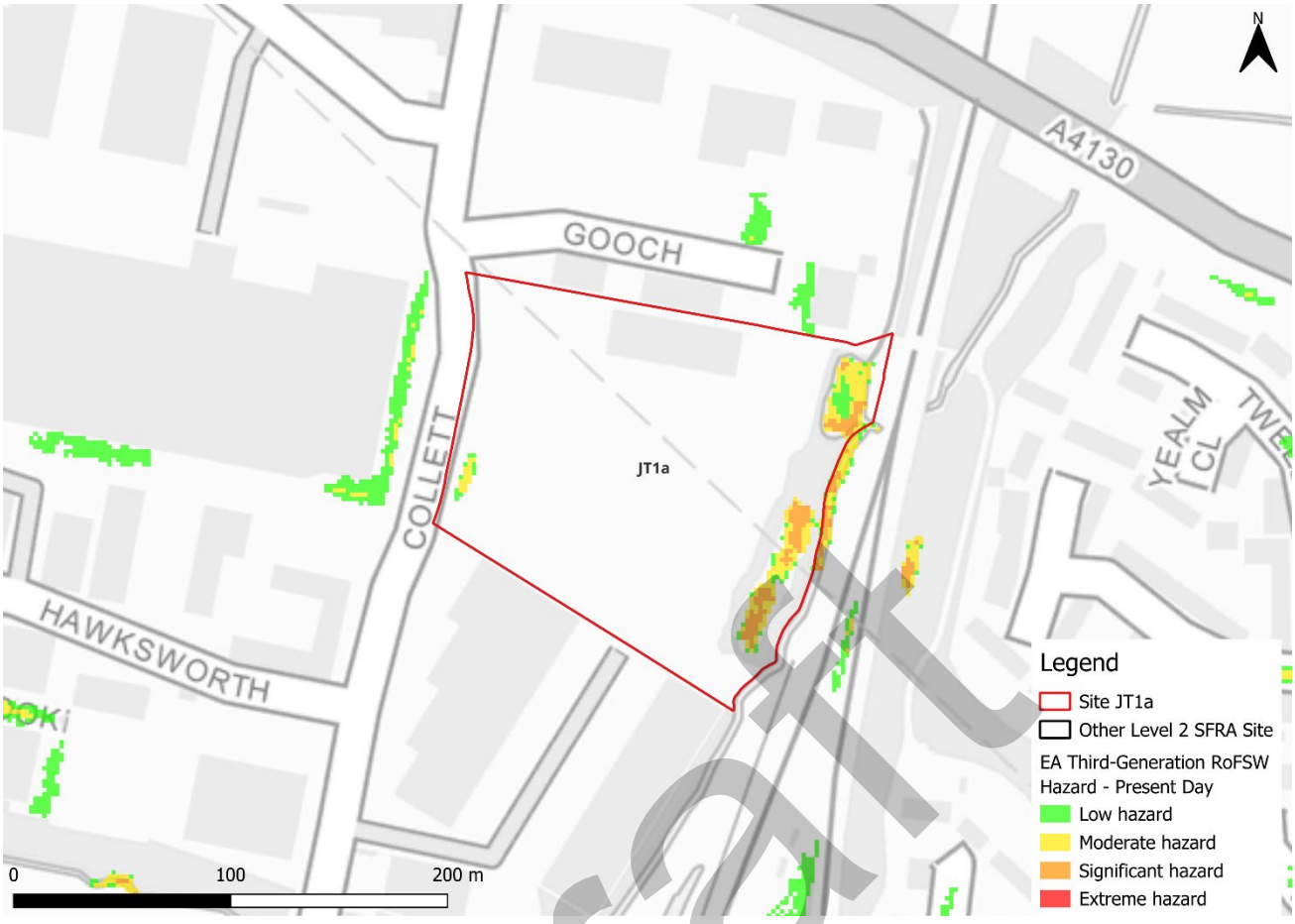

Figure 3-3: Third generation - Risk of Flooding from Surface Water map present day 1% AEP event surface water flood hazard[1]

3.2 Impacts from climate change

3.2.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths

The EA's climate change allowance guidance states that SFRA's should assess the upper end peak rainfall allowance for the 2070s epoch. This dataset is included in the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Climate Change dataset (September 2026). The peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment are shown in Table 3-2. The allowance for the 0.1% AEP event is not stated in the EA guidance.

1 Based on Section 7.5 Hazard rating. What is the Risk of Flooding from Surface Water map? Report version 2.0. April 2019. Environment Agency

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Table 3-2: Peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment

Return period	Central allowance 2070s (% increase)	Upper end allowance 2070s (% increase)
3.3% AEP	25	35
1% AEP	25	40

Figure 3-4 shows the surface water flood extents for the 2070s upper end climate change scenario. Surface water flood risk may increase with climate change. The areas of ponding across the site are shown to increase in extent in the 0.1% AEP event (Figure 3-4).

Flood depths are modelled to remain at between 0.3 and 0.6m in the existing areas of ponding along the eastern site boundary (Figure 3-5).

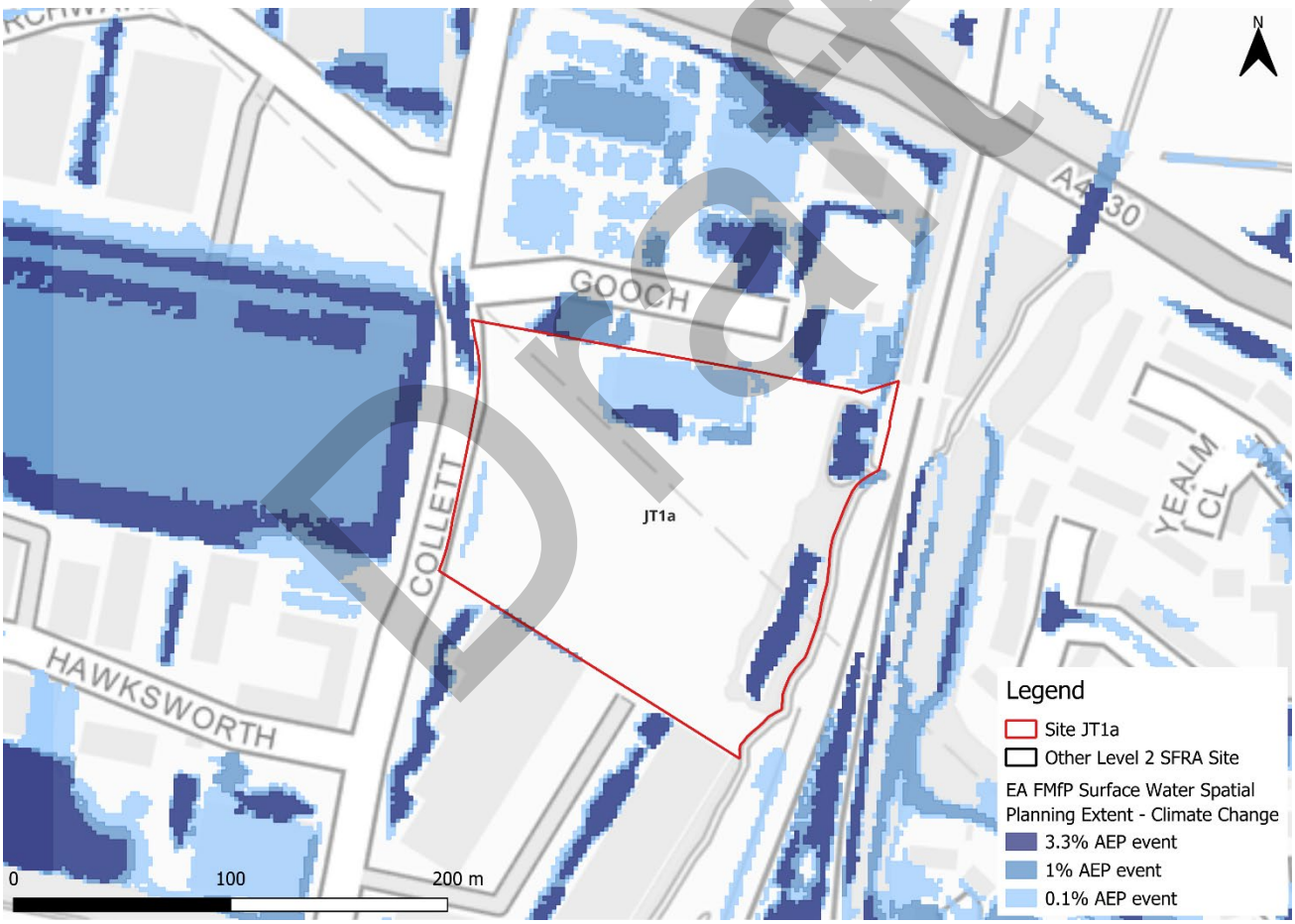

Figure 3-4: Flood Map for Planning - Surface Water Spatial Planning Extents Climate Change (2070s Upper End)

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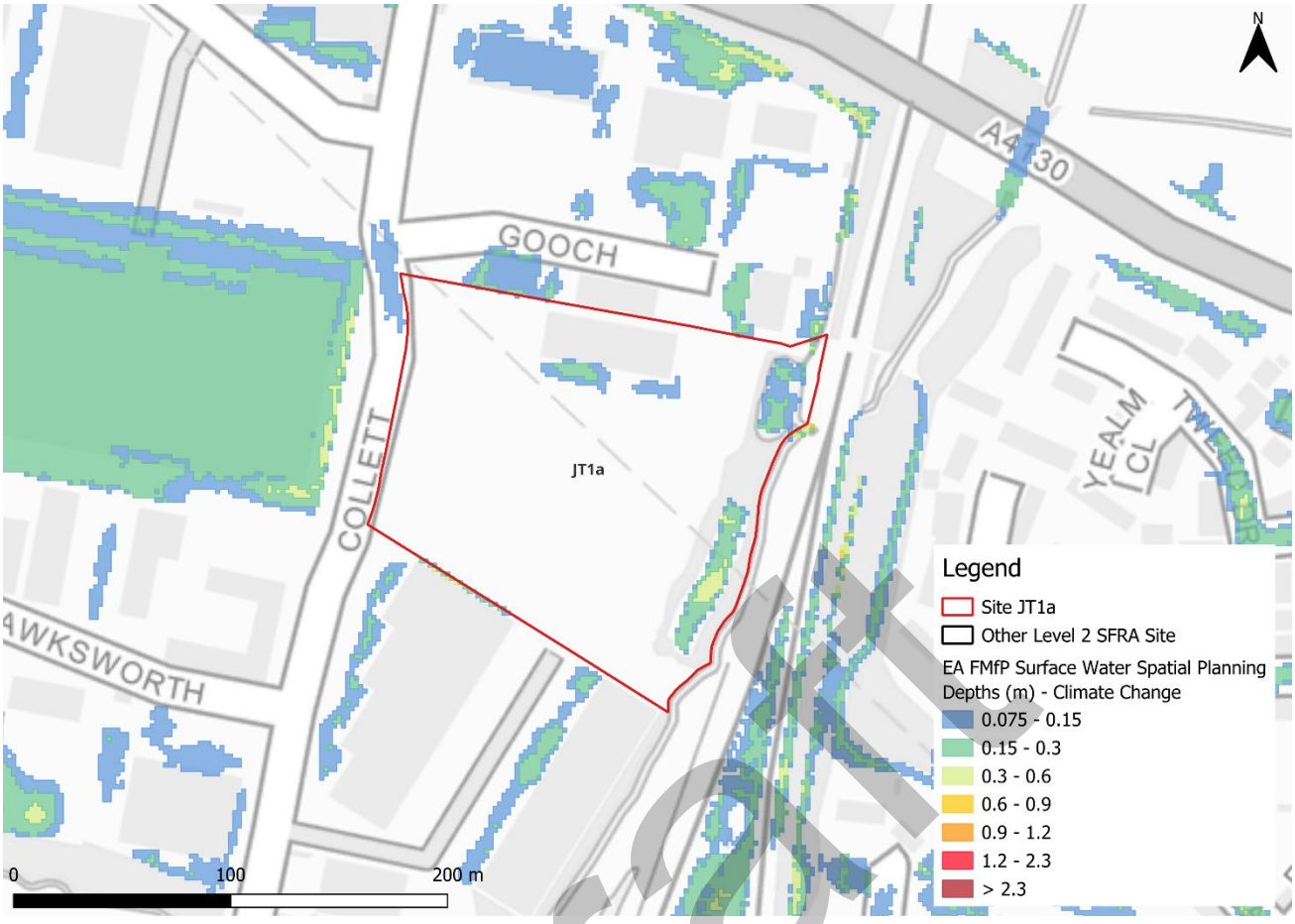

Figure 3-5: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Climate Change for the 1% AEP event (2070s Upper End)

3.2.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning climate change data does not include hazard information suitable for planning purposes. This Level 2 SFRA therefore considers the RoFSW low risk surface water event as a conservative proxy for the medium risk event plus climate change, as the best available information to assess surface water flood hazards. The impact of climate change on surface water flood hazards should be considered at the site-specific FRA stage.

Using the RoFSW low risk event as a proxy, future surface water flood hazard in the medium risk event is categorised as 'significant' (Figure 3-6).

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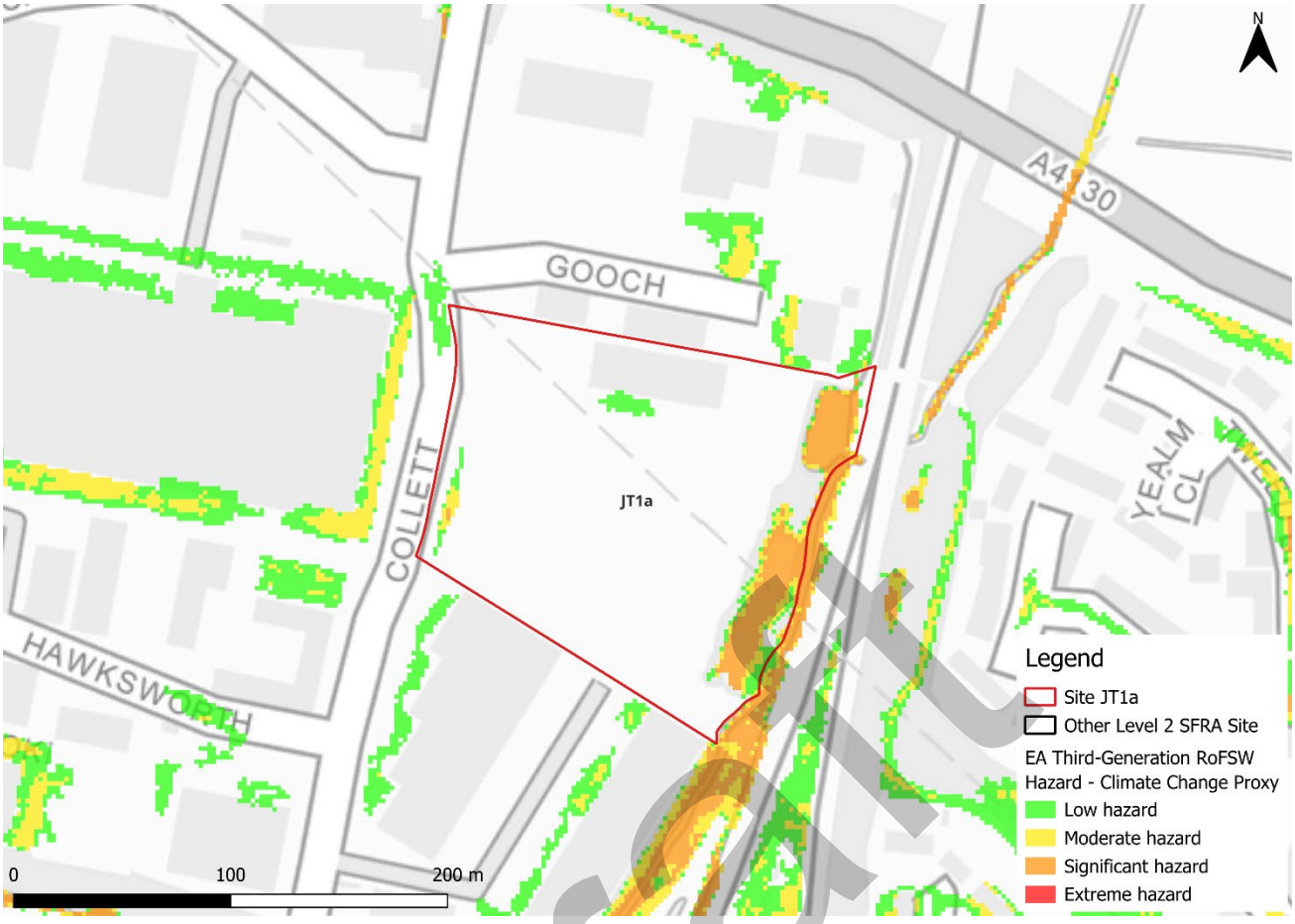

Figure 3-6: Low risk event surface water flood hazard[1], as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options, site suitability, sequential approach to development management - surface water

- Current risk to the site is predominantly very low, with 93% of the site outside of the 0.1% AEP surface water flood event. Surface water risk is confined to areas of ponding across the site, particularly within the existing ponds along the eastern boundary. These ponds should be considered within site design.
- Risk to site is modelled to be slightly greater when considering the impact of climate change, with the areas of ponding across the site are shown to increase in extent in the 0.1% AEP event.
- Topographic low spots should be considered and included in site design and ideally left in place to flood naturally when required.
- Surface water flood hazards, including for the impact of climate change, should be considered further through the site-specific FRA and drainage strategy.
- The drainage strategy must ensure there is no increase in surface water flood risk elsewhere as a result of new development. The developer should aim to achieve betterment of existing runoff rates. The developer should also follow the National SuDS guidance.

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- Safe access and escape routes would likely be achievable via Collett to the west of the site in all events.

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4 Groundwater, geology and SuDS suitability

Risk of groundwater emergence is assessed in this SFRA using JBA's 5m Groundwater Emergence Map. Figure 4-1 shows the map covering the site and the surrounding areas. Table 4-1 explains the risk classifications.

Risk of groundwater emergence varies across the site. Across the western area of the site, there is a risk of groundwater emergence to both surface and subsurface assets. Within the east of the site there is a negligible risk from groundwater emergence. Ground investigations will be required through the site-specific FRA to ascertain groundwater levels and conditions and instigate SuDS suitability in the eastern area of the site.

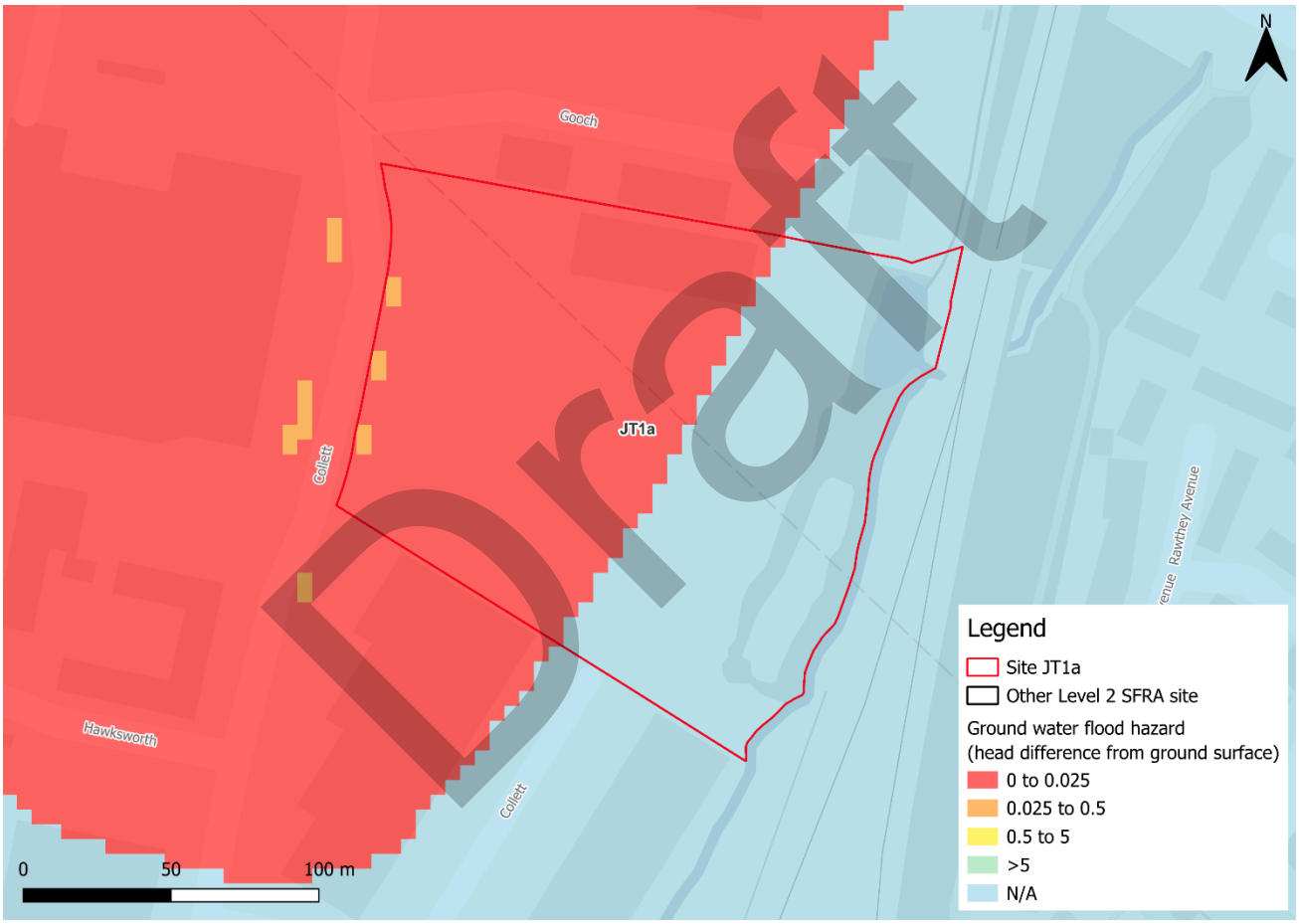

Figure 4-1: JBA 5m Groundwater Emergence Map

Table 4-1: Groundwater Emergence Hazard Classification

Groundwater head difference (m)*	Class label
0 to 0.025	Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
0.025 to 0.5	Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
0.5 to 5	Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event There is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely.
>5	Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event. Groundwater emergence is not likely.
N/A	No risk. This zone is deemed as having a negligible risk from groundwater emergence due to the nature of the local geological deposits.
*Difference is defined as ground surface in mAOD minus modelled groundwater table in mAOD.	

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The underlying bedrock within the site is mudstone, sandstone and limestone. Superficial deposits consist of sand and gravel in the central area of the site (Figure 4-2). Other than sandstone, these rocks generally have low levels of permeability. This leads to less water infiltrating into the ground and could potentially contribute to lower water table levels. The drainage strategy for the site should investigate water table levels and ground conditions to inform on appropriate SuDS.



Figure 4-2: BGS Geology - Bedrock and superficial deposits

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5 Overall site assessment

5.1 Can part b) of the exception test be passed?

To pass part b) of the exception test[2], it must be proven that the development can be safe for its lifetime, which is 75 years for non-residential development, taking account of the vulnerability of its users, without increasing risk elsewhere, and, where possible, will reduce flood risk overall. The site is not required to pass the exception test as it is proposed for less vulnerable uses.

5.2 Recommendations and site-specific FRA requirements

Based on the evidence presented in the Level 1 SFRA (2024), Level 1 SFRA Addendum (2026) and this Level 2 SFRA:

- There should be no vulnerable development within the area of the site within the functional floodplain.
- There should also be no development within 8m of Moor Ditch apart from permitted access. The EA recommend an 8m no development buffer for all main rivers to enable access for maintenance activities.
- The area of functional floodplain should be maintained and included in site design as a green / blue corridor offering multifunctional benefits alongside flood risk mitigation including BNG contributions, and social and amenity benefits. The area of the site shown to be at future fluvial risk should also be considered as open greenspace within site design. However, this should be supported by detailed climate change modelling.
- Present day hazard information and updated climate change modelling along Moor Ditch should be used to update this Level 2 SFRA at the earliest opportunity to provide an up-to-date strategic assessment of flood risk to this site and the surrounding areas. It would be acceptable to use updated modelling to suitably assess risk through a site-specific FRA, as well as/instead of a Level 2 SFRA update.
- The existing ponds within the east of the site should be considered in site design.
- Based on current information, this site could be allocated if development avoids the area at modelled fluvial risk along the eastern boundary of the site.
- Were this site to be allocated based on current information, the LPA must make it clear that this site cannot be developed until the required information detailed in this SFRA on future flood risk from Moor Ditch is fully ascertained.
- Groundwater conditions must be investigated further.
- Opportunities for NFM features to reduce flood risk to the site and surrounding areas should be explored at the site-specific FRA stage.

[2] Policy F6 National Planning Policy Framework 2026

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- Any site-specific FRA should undertake a condition survey of the watercourse along the eastern boundary of the site to ensure flows can be conveyed.
- Any site-specific FRA should undertake a condition assessment of the culvert beneath the railway and investigate the impact of a potential blockage of this structure.
- Any site-specific FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; South Oxfordshire and Vale of White Horse District Councils Joint Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the site-specific FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; TW; the highways authorities; and the emergency services.

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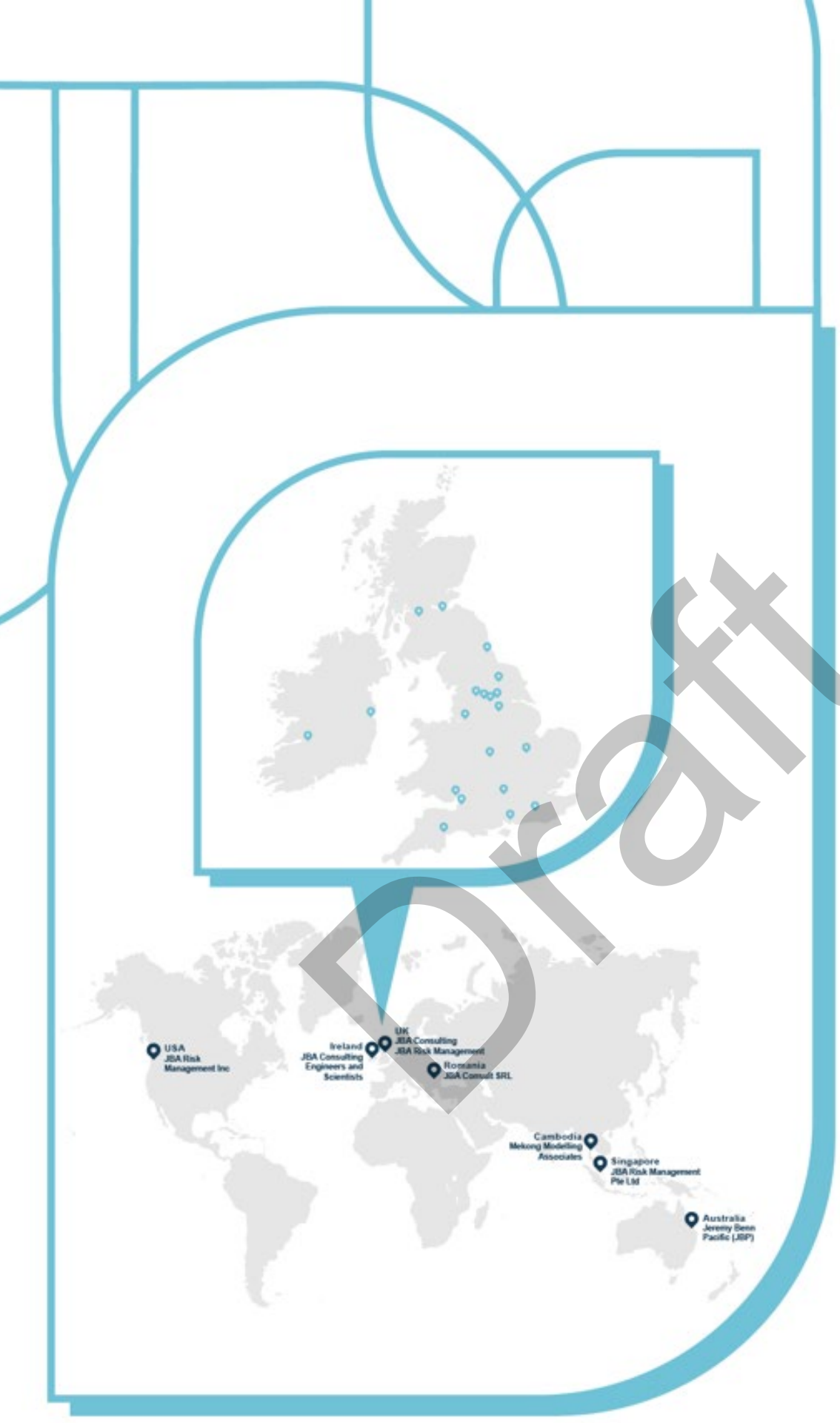

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Wallingford
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Registered Office
1 Broughton Park
Old Lane North
Broughton
SKIPTON
North Yorkshire
BD23 3FD
United Kingdom

+44(0)1756 799919
info@jbaconsulting.com
www.jbaconsulting.com
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South Oxfordshire and Vale of White Horse Level 2 Strategic Flood Risk Assessment Update

Site JT1b - Grove Technology Park

Draft Report

October 2026

Prepared for:

South Oxfordshire District Council and

Vale of White Horse District Council

www.jbaconsulting.com

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Reviewed by	Laura Thompson-Jones BSc CGeog FRGS Senior Analyst
Authorised by	Mike Williamson BSc MSc CGeog FRGS EADA Project Director

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Contract

JBA Project Manager	Freya Nation
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2026s1132

This report describes work commissioned by South Oxfordshire and Vale of White Horse District Councils. The Client's representative for the contract was Rebekah Goodwill of South Oxfordshire and Vale of White Horse District Councils. Boe Kilshaw of JBA Consulting carried out this work.

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for South Oxfordshire and Vale of White Horse Joint Local Plan Site JT1b - Grove Technology Park. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA' (2024) and the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum' (2026), and read the 'South Oxfordshire and Vale of White Horse District Councils Level 2 SFRA Main Report Update' (2026) and is therefore familiar with the terminology used in this report.

1.1 Site JT1b - Grove Technology Park

- Location: Grove Technology Park (Figure 1-1)
- Existing site use: Brownfield; commercial
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Employment
- Proposed site use vulnerability: Less vulnerable
- Site area: 13.2 ha
- Proposed development impermeable area: 11.2 ha (assumed 85% of site area)
- Watercourse: Unnamed watercourse
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for more detailed assessment through Level 2 SFRA (Strategic Recommendation B)
    - Assess present day and future surface water depths, hazards

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Figure 1-1: Site location

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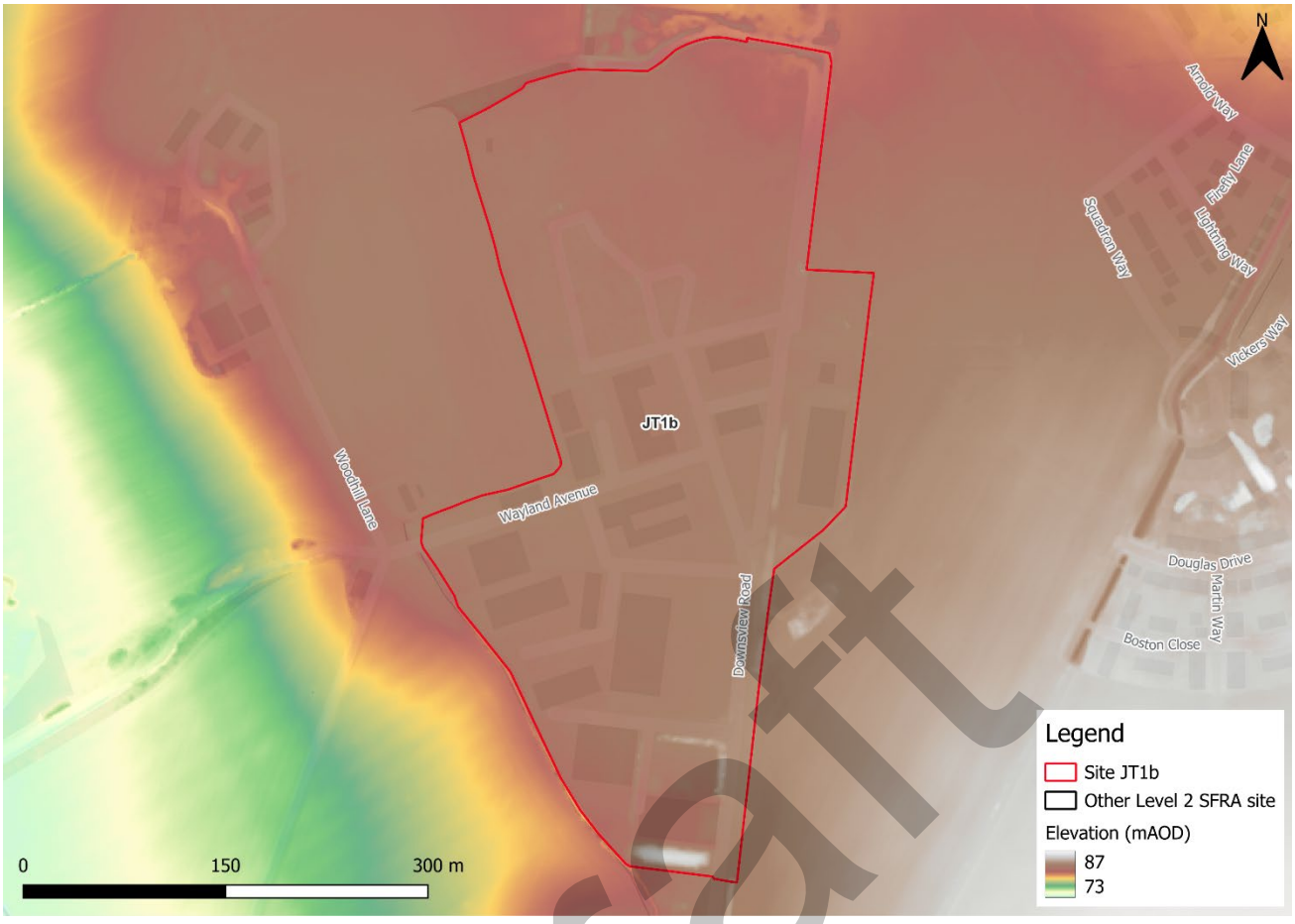

Figure 1-2: Topography

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2 Flood risk from rivers

2.1 Existing risk

2.1.1 Flood Map for Planning and functional floodplain

Based on the Environment Agency's (EA) Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum (2026), the percentage areas of the site within each flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.4).

The site is entirely within Flood Zone 1 and therefore at low risk of flooding from rivers.

Table 2-1: Existing flood risk based on percentage area of site at risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

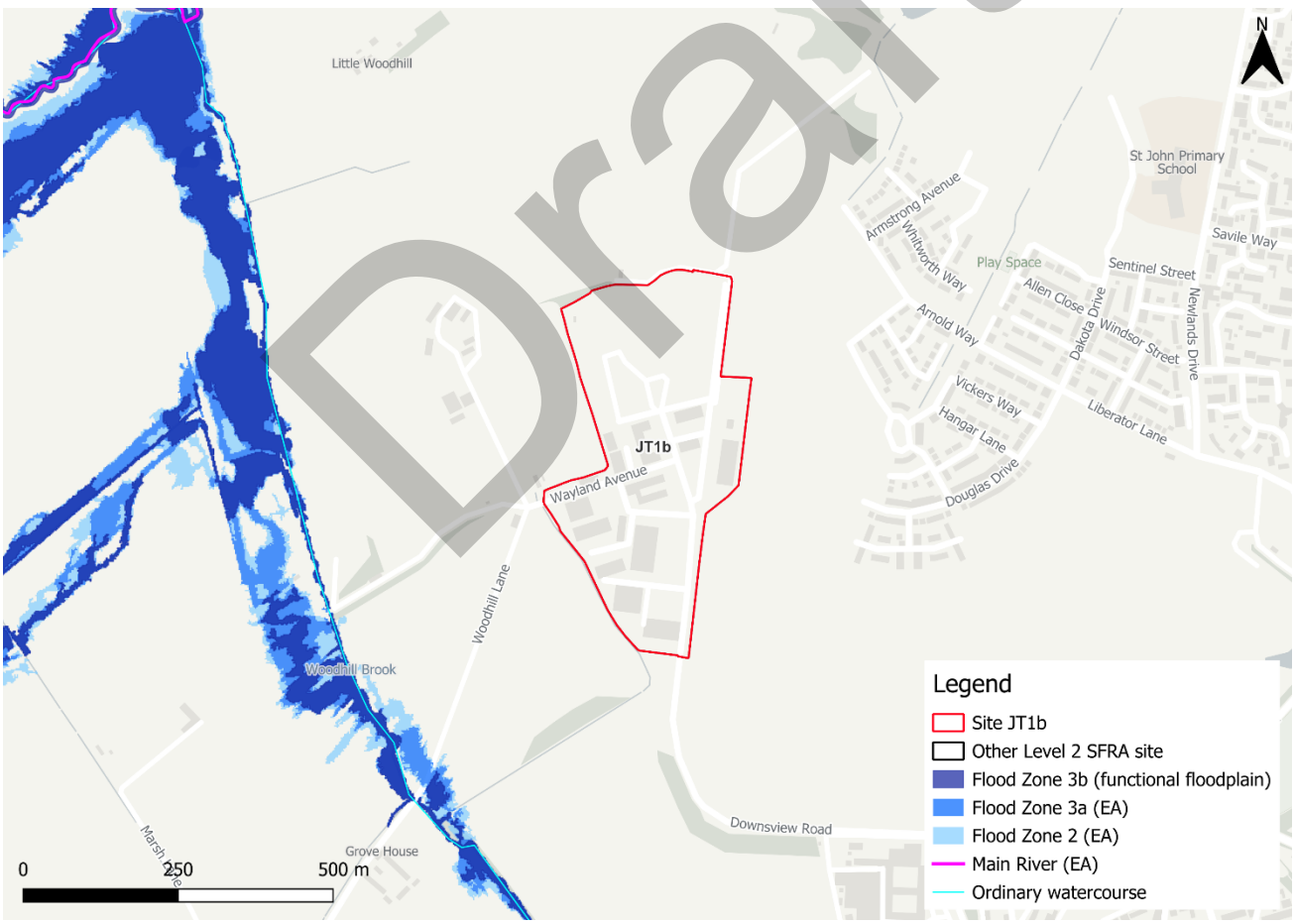

Figure 2-1: Existing risk from rivers to the site

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2.2 Impacts from climate change

2.2.1 Flood Map for Planning - Flood Zones plus Climate Change

The EA's Flood Map for Planning - Flood Zones plus Climate Change dataset does not show the site to be at future fluvial risk.

2.3 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

2.4 Flood risk management

The site doesn't benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

2.4.1 Cumulative impacts

A cumulative impact assessment was completed through the South Oxfordshire and Vale of White Horse Level 1 SFRA Addendum (2026), which aimed to identify catchments sensitive to the cumulative impact of development. Site JT1b (Grove Technology Park) is located within one catchment, namely; Childrey Brook and tributaries. The site is located within a high sensitivity catchment. Planning considerations for sites at high sensitivity to the cumulative impacts of development can be found in Appendix D of the Level 1 SFRA Addendum. Cumulative impacts of development should also be considered as part of a site-specific FRA.

2.4.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. Both within and upstream of the site, there is potential for wider catchment woodland planting to increase infiltration and hydrological losses. Adjacent to the unnamed watercourse along the southwestern boundary, there is potential for riparian woodland planting to attenuate flooding. These areas are shown in Figure 2-2.

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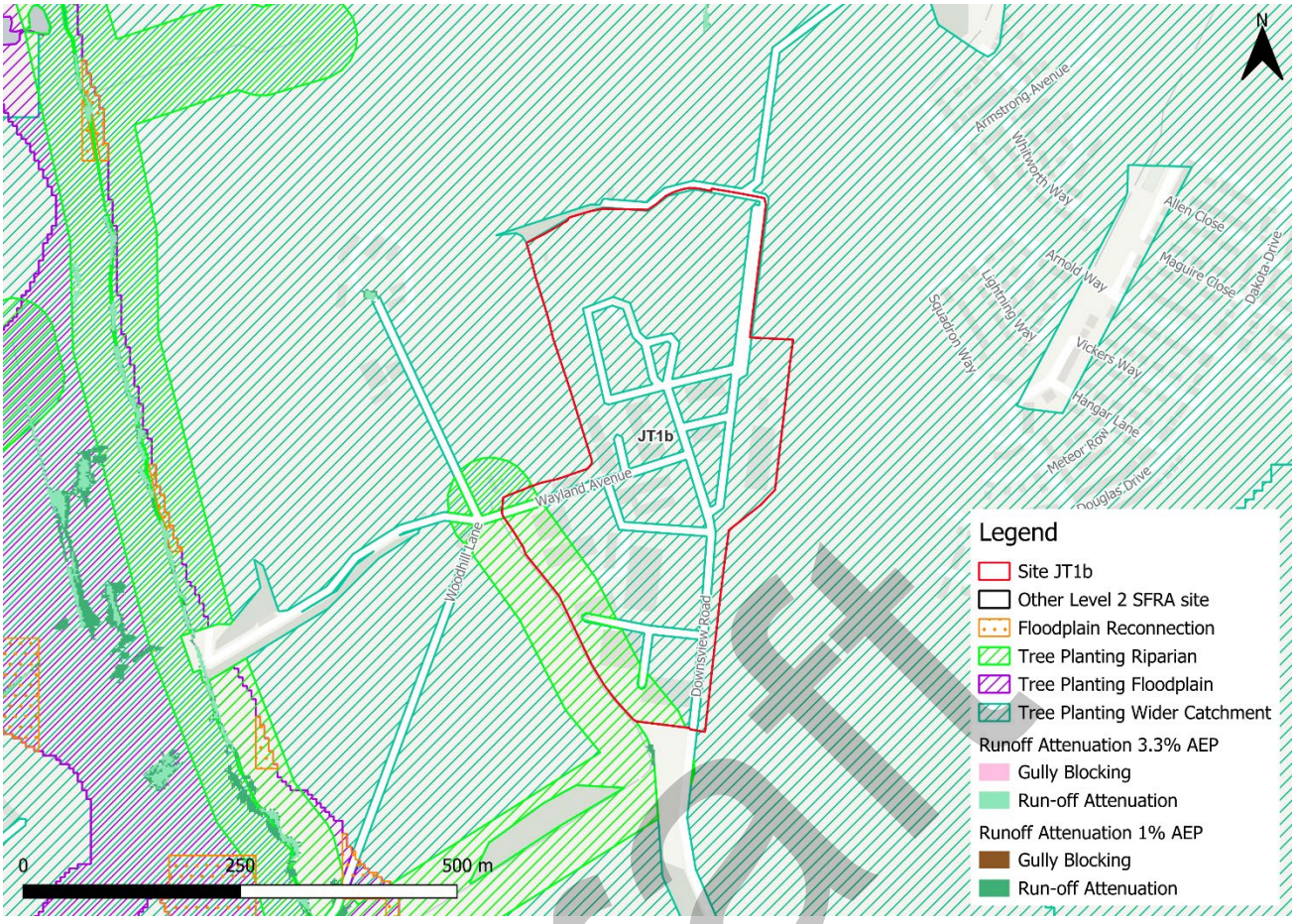

Figure 2-2: Natural Flood Management (NFM) potential mapping

2.5 Residual risk

Although a site may be afforded some protection from defences and / or drainage infrastructure, there is always a residual risk of flooding from asset failure i.e. defence breaches, or blockages of culverts or drainage assets.

There are no assets with the potential to pose a residual risk to the site

2.5.1 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. A "dry day" scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. A "wet day" scenario assumes a worst-case scenario where a reservoir releases water held on a "wet day" when local rivers have already overflowed their banks.

The site is not modelled to be at risk from reservoir flooding.

2.6 Emergency Planning

2.6.1 Flood warnings and alerts

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There are no Flood Warning Areas (FWA) or Flood Alert Areas (FAA) within the vicinity of the site.

2.6.2 Access and escape routes

Safe access and escape routes would likely be achievable via Downsview Road to the south of the site. This route is indicated by the yellow lines in Figure 2-3.



Figure 2-3: Potential access and escape routes

2.7 Observations, mitigation options, site suitability, sequential approach to development management - fluvial

- Observations:
  - The site is wholly within Flood Zone 1 and therefore at low risk of flooding from rivers.
  - The site is not shown to be at additional risk of fluvial flooding when considering climate change.
- Access and escape:
  - Safe access and escape routes would likely be achievable via Downsview Road to the south of the site.

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3 Flood risk from surface water

3.1 Existing risk

3.1.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths Present Day

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Extents Present Day map (September 2026), the majority of the site is at very low risk from surface water flooding, as shown in Table 3-1.

Surface water risk is confined to scattered areas of ponding across the site and is constrained by the existing development within the south of the site (Figure 3-1).

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Depths Present Day map, the greatest flood depths are between 0.3 and 0.6m within the south of the site, however are largely less than 0.3m across the majority of the site (Figure 3-2).

Safe access and escape routes would likely be achievable via Downsview Road to the south of the site.

Table 3-1: Existing surface water flood risk based on percentage area at risk using the Flood Map for Planning - Surface Water Spatial Planning Extent Present Day map

Less than 0.1% AEP event (% area)	0.1% AEP event (% area)	1% AEP event (% area)	3.3% AEP event (% area)
86	8	2	4

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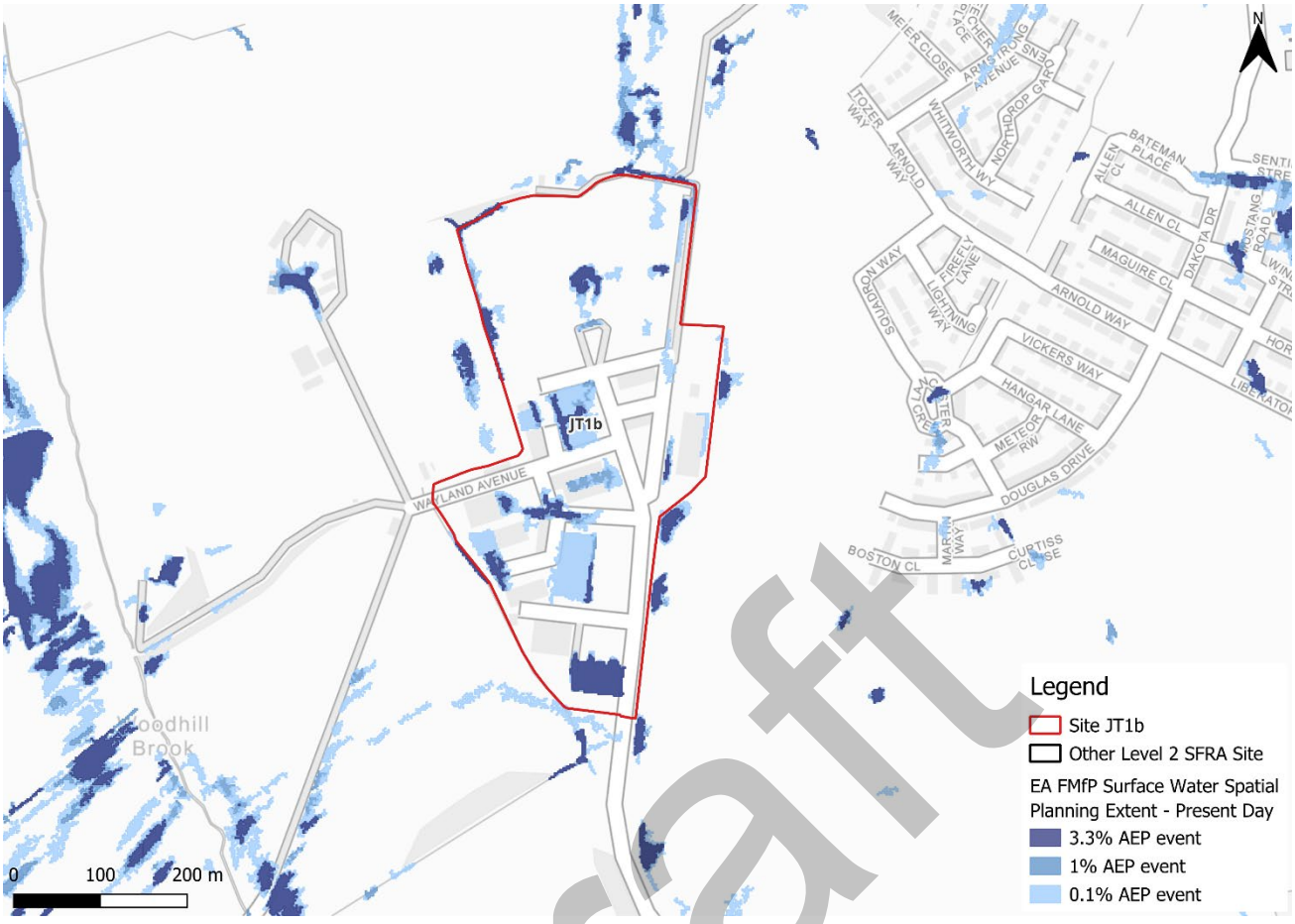

Figure 3-1: Flood Map for Planning - Surface Water Spatial Planning Extents Present Day

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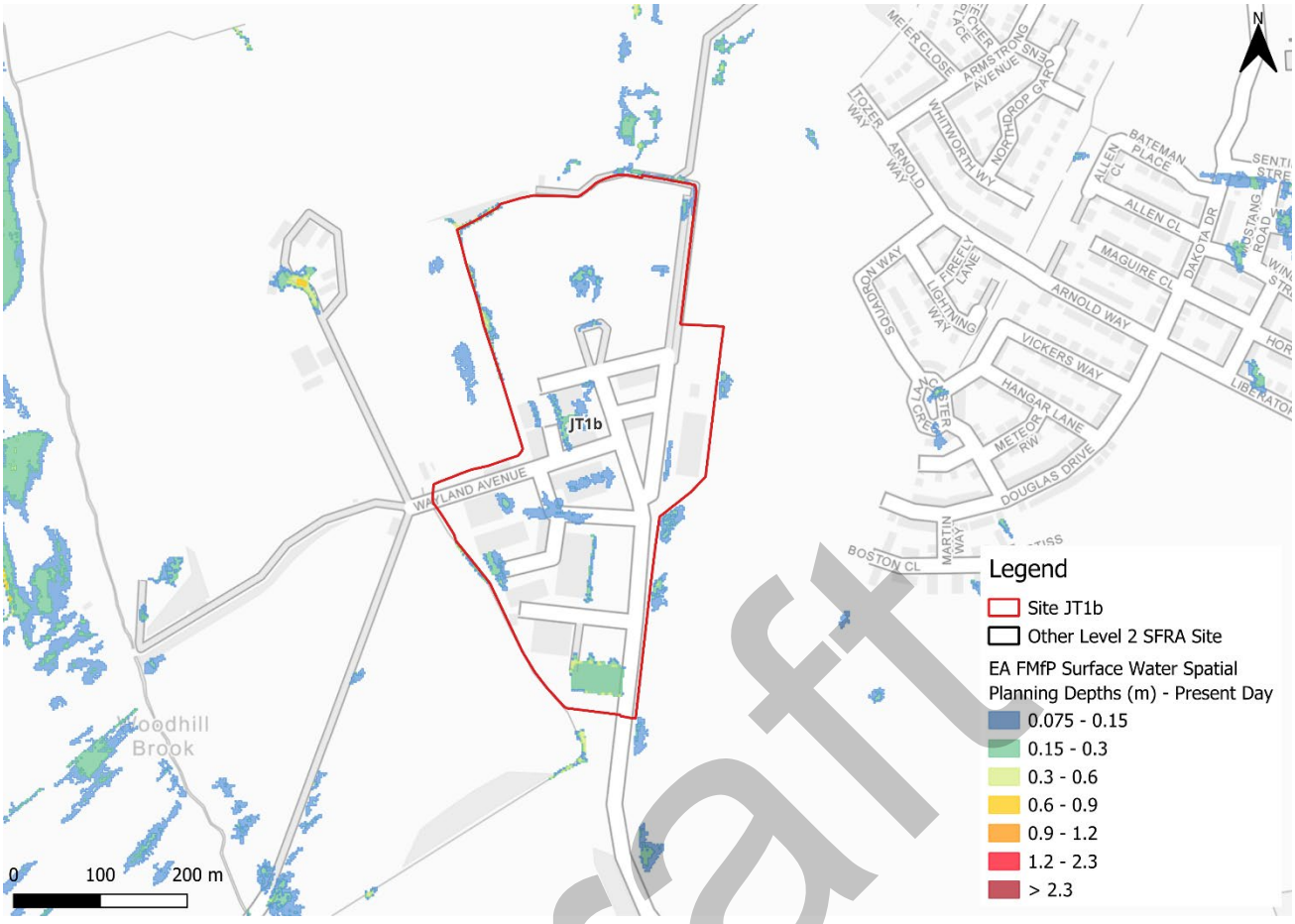

Figure 3-2: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Present Day for the 1% AEP event

3.1.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning data does not include hazard information suitable for planning purposes. Therefore, this Level 2 SFRA considers the third generation Risk of Flooding from Surface Water (RoFSW) hazard mapping in addition to the Flood Map for Planning - Surface Water Spatial Planning extents and depths, as the best available information. Updated surface water hazard information would need to be confirmed at the site-specific FRA stage.

Based on the EA's national scale third generation RoFSW map, the medium risk event is not modelled to inundate the site (Figure 3-3).

There are clear differences between the Flood Map for Planning - Surface Water Spatial Planning map and the third generation RoFSW hazard mapping. The Flood Map for Planning - Surface Water Spatial Planning data does not map flooding less than 0.075m (7.5cm) in depth. Therefore, where the map may show no flooding, there may be shallow flooding up to a depth of 0.075m. In contrast, the third generation RoFSW does not map flooding with a hazard rating of less than 0.575. This could explain the differences observed between the Flood Map for Planning and third generation RoFSW maps.

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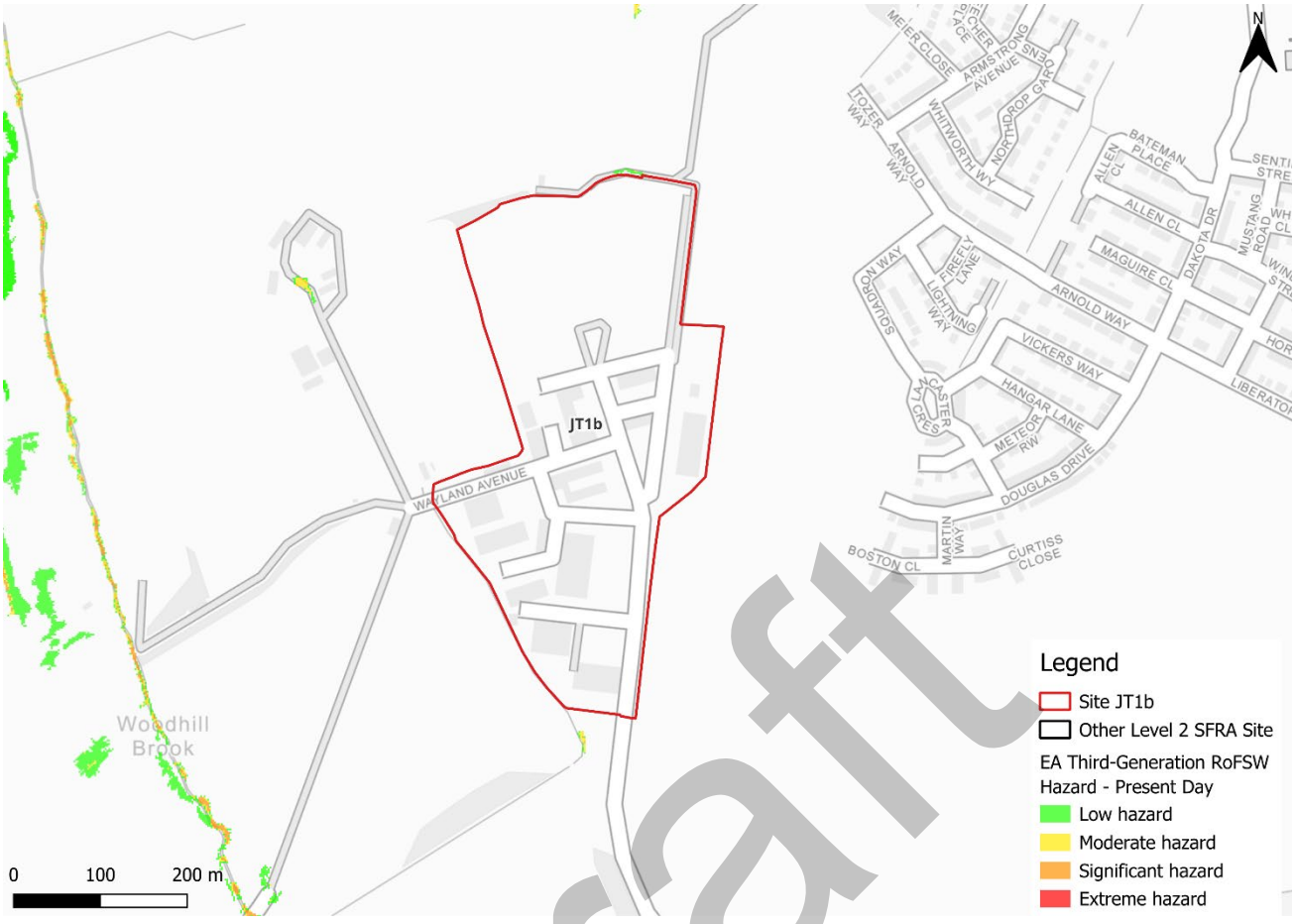

Figure 3-3: Third generation - Risk of Flooding from Surface Water map present day 1% AEP event surface water flood hazard[1]

3.2 Impacts from climate change

3.2.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths

The EA's climate change allowance guidance states that SFRA's should assess the upper end peak rainfall allowance for the 2070s epoch. This dataset is included in the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Climate Change dataset (September 2026). The peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment are shown in Table 3-2. The allowance for the 0.1% AEP event is not stated in the EA guidance.

1 Based on Section 7.5 Hazard rating. What is the Risk of Flooding from Surface Water map? Report version 2.0. April 2019. Environment Agency

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Table 3-2: Peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment

Return period	Central allowance 2070s (% increase)	Upper end allowance 2070s (% increase)
3.3% AEP	25	35
1% AEP	25	40

Figure 3-4 shows the surface water flood extents for the 2070s upper end climate change scenario. Surface water risk is shown to increase in extent with climate change. The areas of ponding across the site are shown to expand in extent in all events, with some additional areas of ponding emerging within the north.

Greatest flood depths are shown to increase to remain at between 0.3 and 0.6m within the south and west of the site, with the majority of the area at risk being less than 0.3m in depth (Figure 3-5).

Safe access and escape routes would likely remain achievable via Downsview Road to the south of the site.

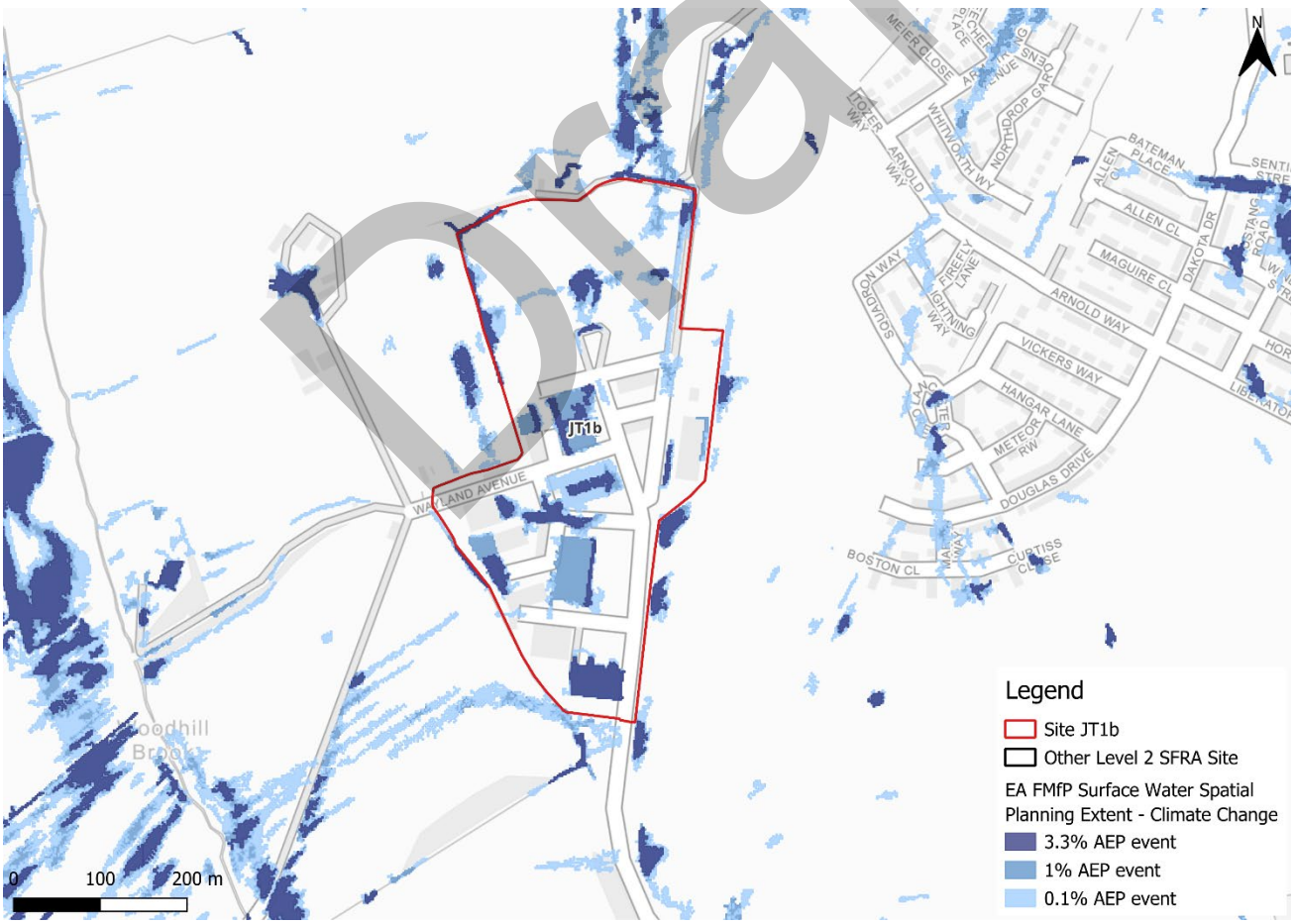

Figure 3-4: Flood Map for Planning - Surface Water Spatial Planning Extents Climate Change (2070s Upper End)

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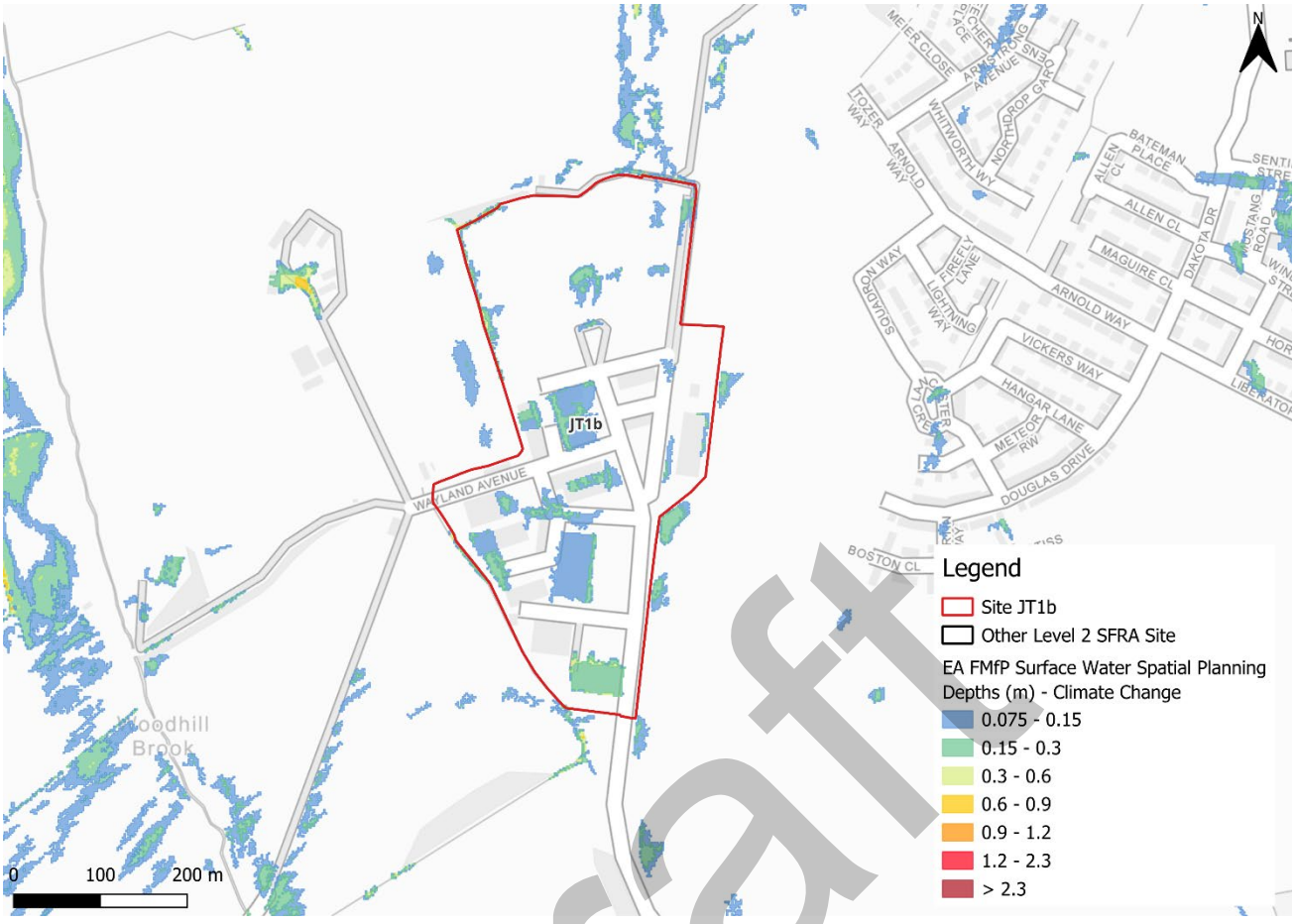

Figure 3-5: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Climate Change for the 1% AEP event (2070s Upper End)

3.2.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning climate change data does not include hazard information suitable for planning purposes. This Level 2 SFRA therefore considers the RoFSW low risk surface water event as a conservative proxy for the medium risk event plus climate change, as the best available information to assess surface water flood hazards. The impact of climate change on surface water flood hazards should be considered at the site-specific FRA stage.

Using the RoFSW low risk event as a proxy, future surface water flood hazard in the medium risk event is categorised as 'moderate', however is mostly 'low' (Figure 3-6)

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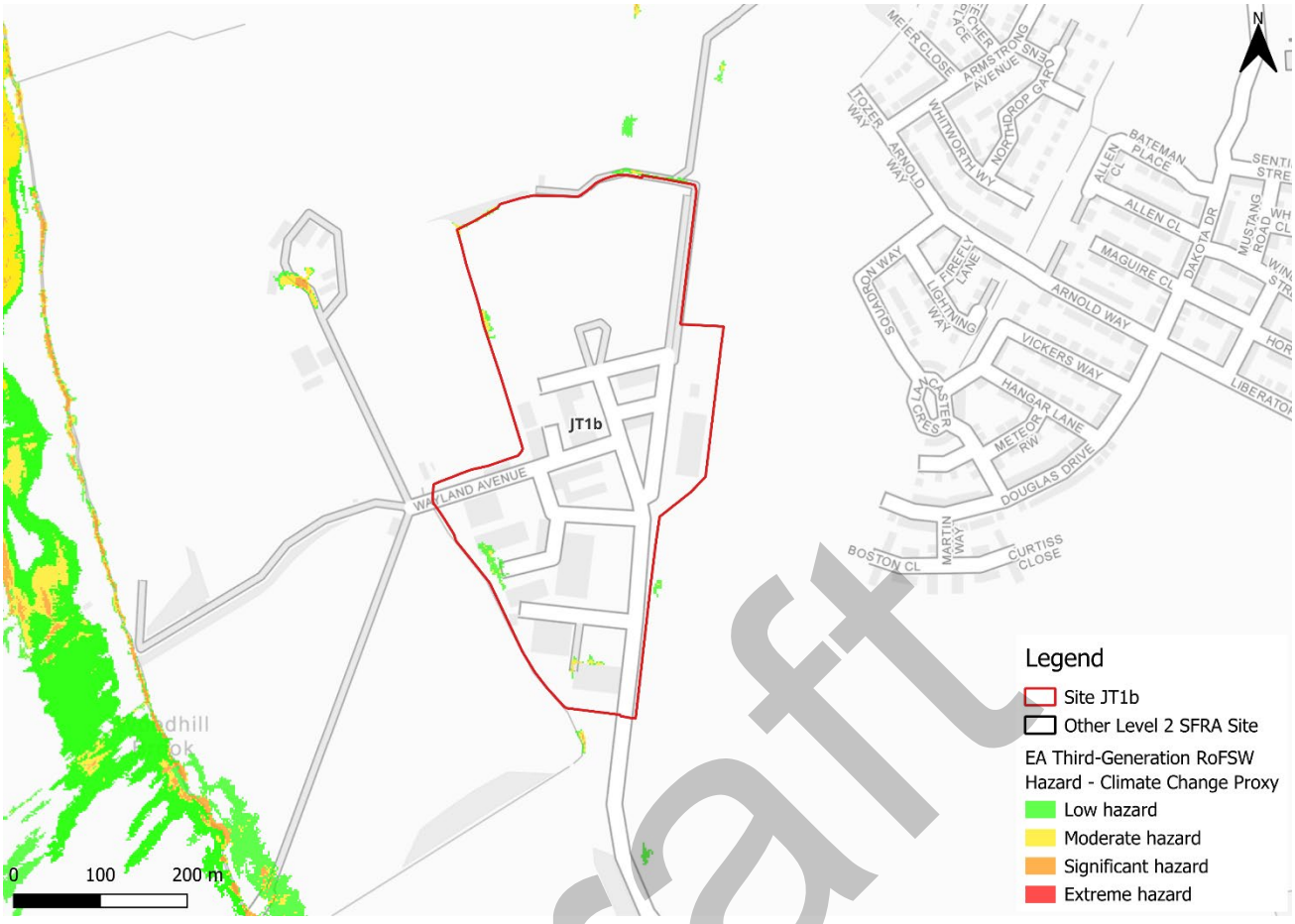

Figure 3-6: Low risk event surface water flood hazard[1], as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options, site suitability, sequential approach to development management - surface water

- Current risk to the site is predominantly very low, with 86% of the site being outside of the 0.1% AEP surface water flood extent. Surface water risk is largely present as scattered locations of ponding within topographic low spots across the site and is constrained by the existing development present onsite.
- Risk is shown to increase in extent within the site when considering the impact of climate change. There are additional areas of ponding within the south of the site.
- Topographic low spots should be considered and included in site design and ideally left in place to flood naturally when required.
- If any structures are demolished for new development, a drainage strategy would therefore be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA. The developer should also follow the National SuDS guidance.
- Assessment of the current drainage system in place should be carried out to ascertain any current capacity issues and whether the current system could

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accommodate the proposed development or whether further capacity will be required.

- Safe access and escape routes would likely be achievable via Downsview Road.

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4 Groundwater, geology and SuDS suitability

Risk of groundwater emergence is assessed in this SFRA using JBA's 5m Groundwater Emergence Map. Figure 4-1 shows the map covering the site the surrounding areas. Table 4-1 explains the risk classifications.

The majority of the site is within an area where there is a risk of groundwater emergence to surface and subsurface assets. Ground investigations will be required through the site-specific FRA to ascertain groundwater levels and conditions.



Figure 4-1: JBA 5m Groundwater Emergence Map

Table 4-1: Groundwater Emergence Hazard Classification

Groundwater head difference (m)*	Class label
0 to 0.025	Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
0.025 to 0.5	Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
0.5 to 5	Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event There is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely.
>5	Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event. Groundwater emergence is not likely.
N/A	No risk. This zone is deemed as having a negligible risk from groundwater emergence due to the nature of the local geological deposits.
*Difference is defined as ground surface in mAOD minus modelled groundwater table in mAOD.	

The underlying bedrock within the site is mudstone, sandstone, and limestone. Superficial deposits consist of sand and gravel (Figure 4-2). Other than sandstone, all these rocks generally have low levels of permeability. This leads to less water infiltrating into the ground and could potentially contribute to lower water table levels. The drainage strategy for the site should investigate water table levels and ground conditions to inform on appropriate SuDS.

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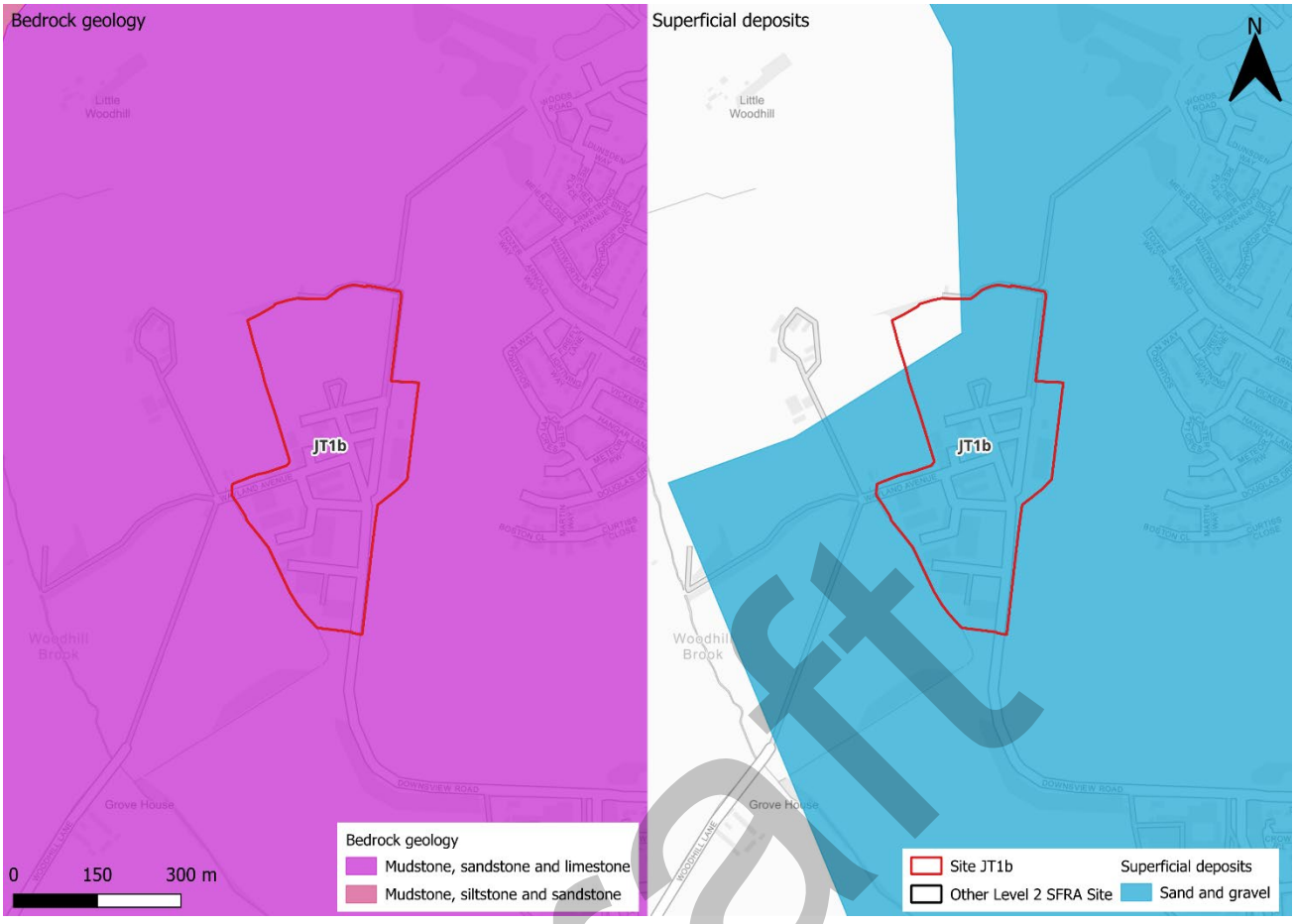

Figure 4-2: BGS Geology - Bedrock and superficial deposits

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5 Overall site assessment

5.1 Can part b) of the exception test be passed?

To pass part b) of the exception test[2], it must be proven that the development can be safe for its lifetime, which is 75 years for non-residential development, taking account of the vulnerability of its users, without increasing risk elsewhere, and, where possible, will reduce flood risk overall. The site is not required to pass the exception test as it is proposed for less vulnerable uses.

5.2 Recommendation summary

Based on the evidence presented in the Level 1 SFRA (2024), Level 1 SFRA Addendum (2026) and this Level 2 SFRA:

- It should be appropriate for this site to be allocated, given the low fluvial and surface water flood risk to the site.
- A detailed drainage strategy will be required for any new development, given the large area of the site.
- Groundwater conditions must be investigated further through the site-specific FRA.
- Opportunities for NFM features to reduce flood risk to the site and surrounding areas should be explored at the site-specific FRA stage.
- Any site-specific FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; South Oxfordshire and Vale of White Horse District Councils Joint Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the site-specific FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; TW; the highways authorities; and the emergency services.

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[2] Policy F6 National Planning Policy Framework 2026

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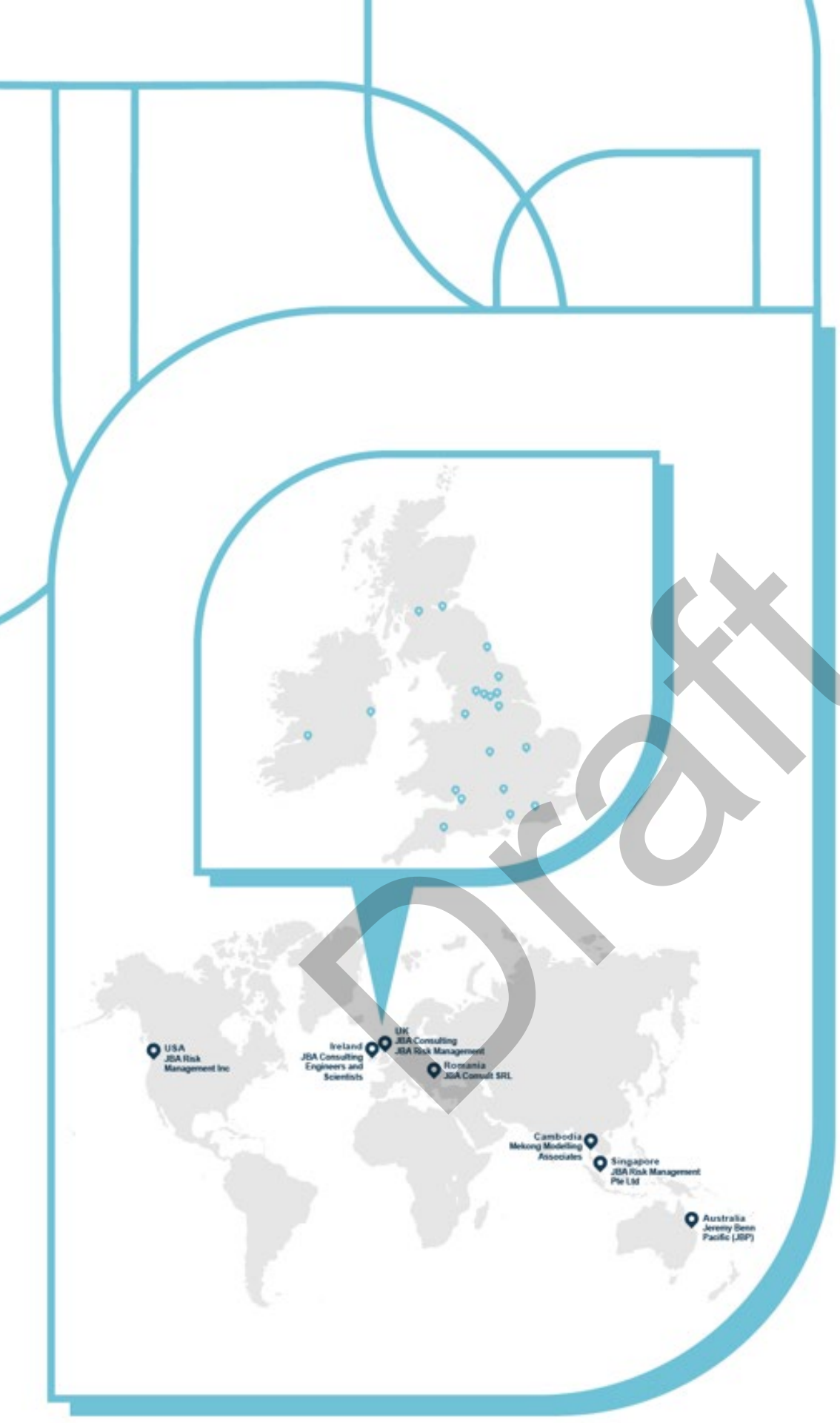

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Warrington

Registered Office
1 Broughton Park
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Broughton
SKIPTON
North Yorkshire
BD23 3FD
United Kingdom

+44(0)1756 799919
info@jbaconsulting.com
www.jbaconsulting.com
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South Oxfordshire and Vale of White Horse Level 2 Strategic Flood Risk Assessment Update

Site JT1d - Hithercroft Industrial Estate, Wallingford

Draft Report

October 2026

Prepared for:

South Oxfordshire District Council and

Vale of White Horse District Council

www.jbaconsulting.com

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Prepared by	Boe Kilshaw BSc Assistant Analyst
Reviewed by	Laura Thompson-Jones BSc CGeog FRGS Senior Analyst
Authorised by	Mike Williamson BSc MSc CGeog FRGS EADA Project Director

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JBA Project Manager	Freya Nation
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2026s1132

This report describes work commissioned by South Oxfordshire and Vale of White Horse District Councils. The Client's representative for the contract was Rebekah Goodwill of South Oxfordshire and Vale of White Horse District Councils. Boe Kilshaw of JBA Consulting carried out this work.

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for South Oxfordshire and Vale of White Horse Joint Local Plan Site JT1d - Hithercroft Industrial Estate, Wallingford. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA' (2024) and the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum' (2026), and read the 'South Oxfordshire and Vale of White Horse District Councils Level 2 SFRA Main Report Update' (2026) and is therefore familiar with the terminology used in this report.

1.1 Site JT1d - Hithercroft Industrial Estate, Wallingford

- Location: Hithercroft Industrial Estate, Wallingford (Figure 1-1)
- Existing site use: Brownfield; industrial
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Employment
- Proposed site use vulnerability: Less vulnerable
- Site area: 0.6 ha
- Proposed development impermeable area: 0.5 ha (assumed 85% of site area)
- Watercourse: Bradford's Brook
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for more detailed assessment through Level 2 SFRA (Strategic Recommendation B)
    - Assess present day and future surface water depths, hazards

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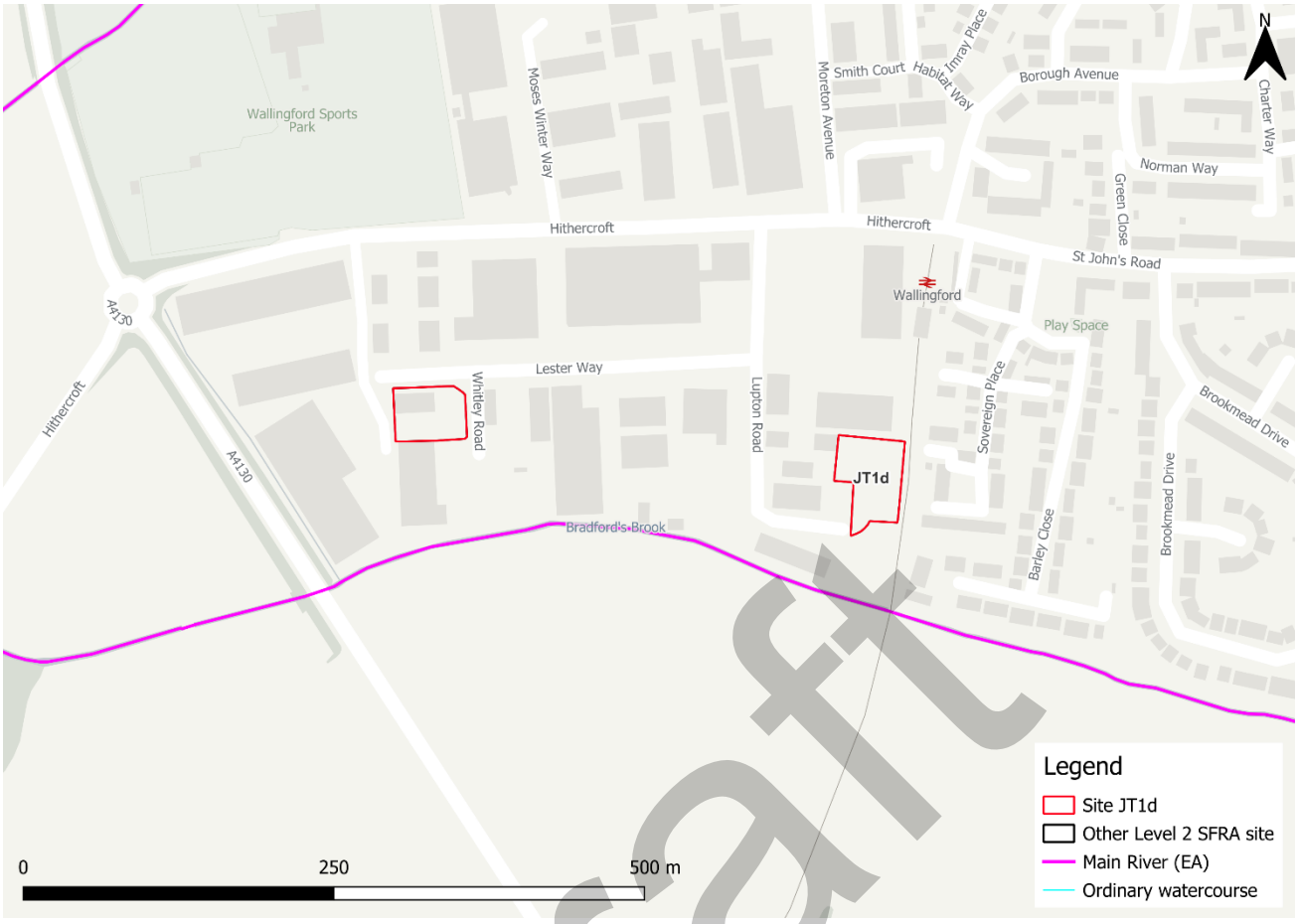

Figure 1-1: Site location

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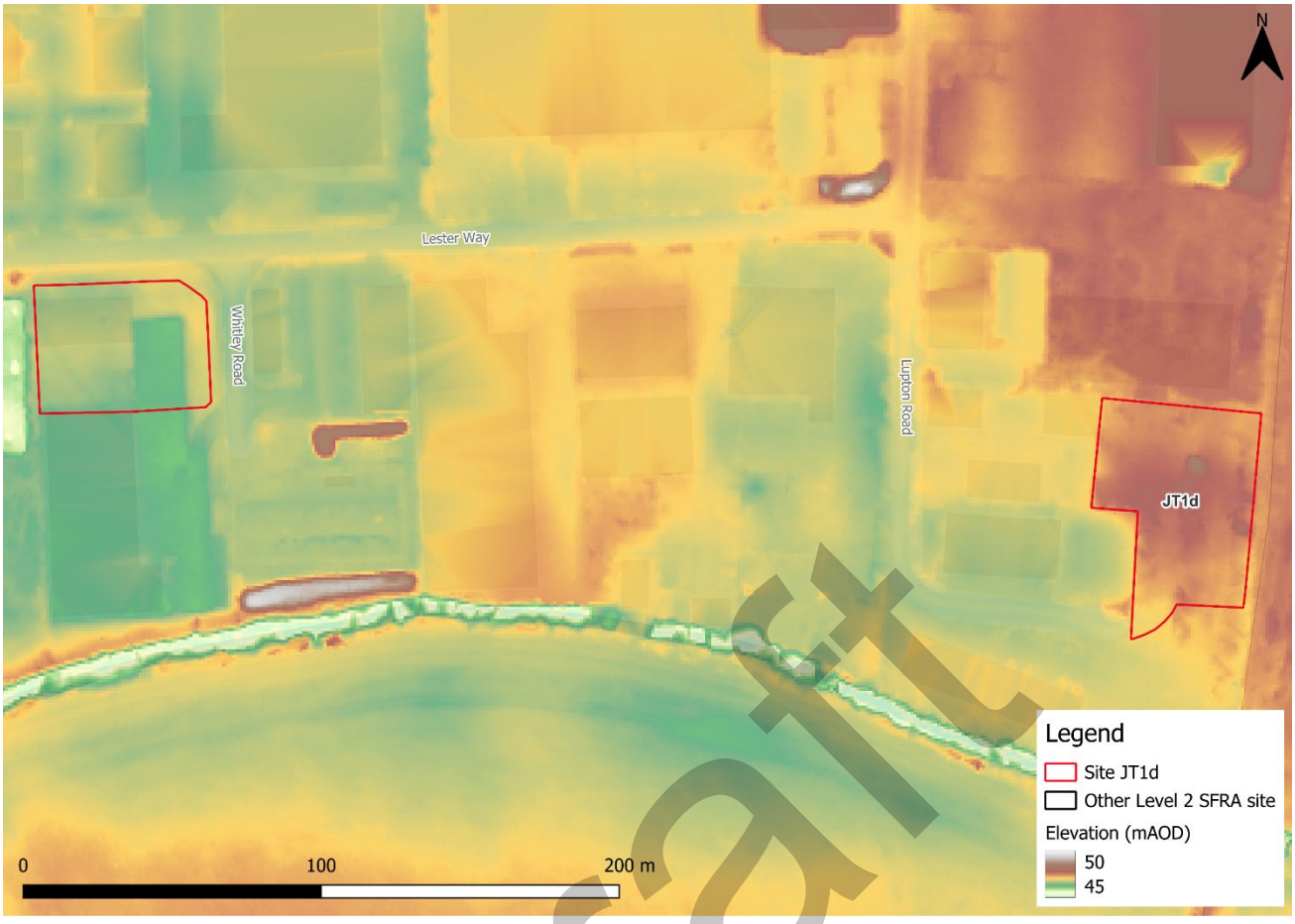

Figure 1-2: Topography

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2 Flood risk from rivers

2.1 Existing risk

2.1.1 Flood Map for Planning and functional floodplain

Based on the Environment Agency's (EA) Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum (2026), the percentage areas of the site within each flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.4).

The site is entirely within Flood Zone 1 and therefore at low risk of flooding from rivers.

Table 2-1: Existing flood risk based on percentage area of site at risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

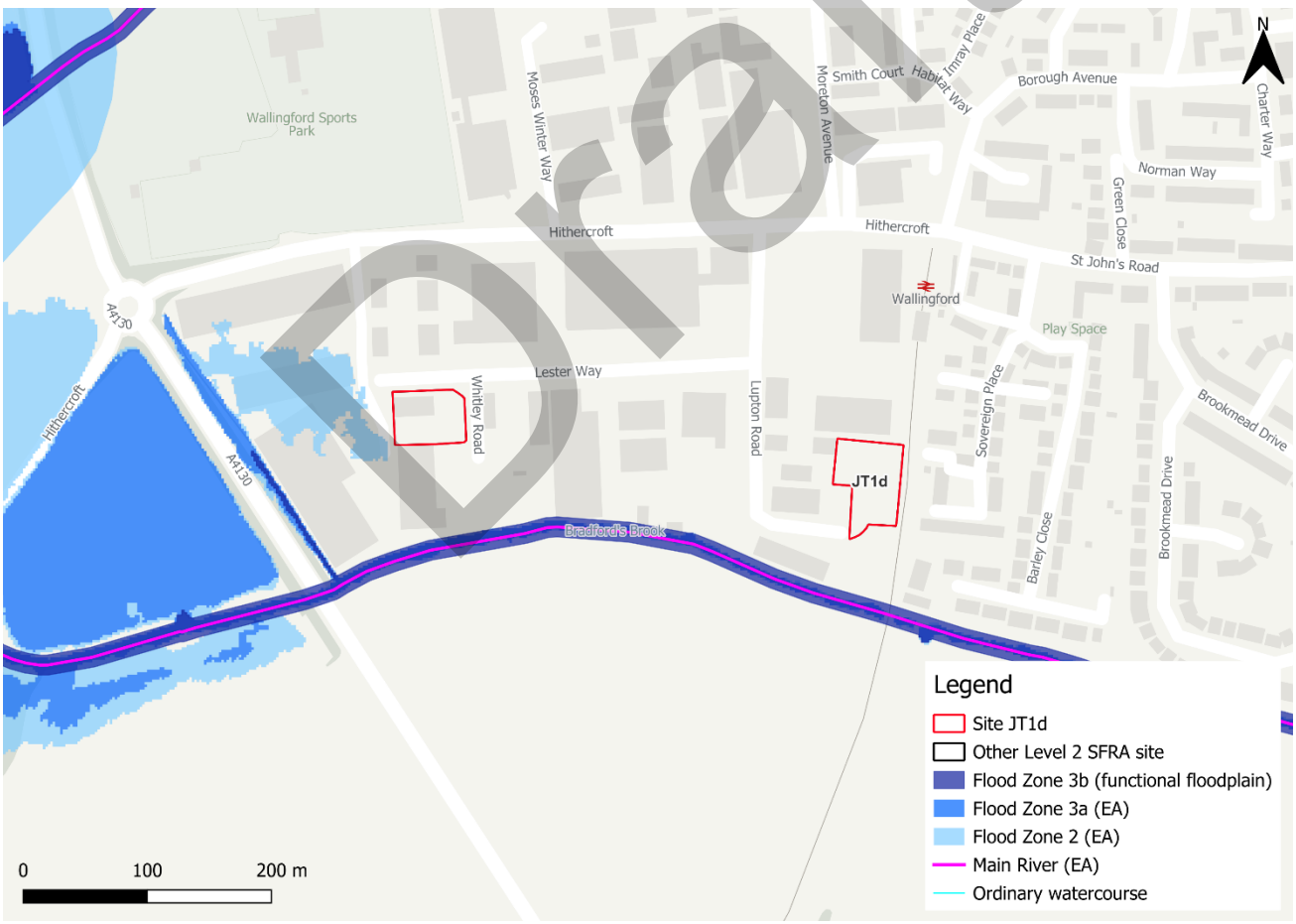

Figure 2-1: Existing risk from rivers to the site

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2.2 Impacts from climate change

2.2.1 Detailed model outputs - climate change

The EA's SFRA guidance states that SFRAs should assess the 2080s central allowance for less vulnerable, more vulnerable, highly vulnerable and water compatible development (Table 2-2). The impacts of climate change on flood risk from Bradford's Brook has not been modelled for this SFRA, as a model covering Bradford's Brook was not made available for consideration. The impacts of climate change must be modelled using the EA's latest allowances for peak river flows to inform whether the site can be safe for its lifetime and to assess modelled flood depths and hazards. Therefore, any updates to this Level 2 SFRA and/or any site-specific FRA should include for the most up to date climate change allowances.

Table 2-2: Climate change allowances for peak river flows for the Thames and South Chilterns management catchment

Epoch	Central	Higher Central	Upper End
2020s	12%	17%	30%
2050s	14%	22%	42%
2080s	31%	43%	76%

2.2.2 Flood Map for Planning - Flood Zones plus Climate Change

Figure 2-2 shows the EA's Flood Map for Planning - Flood Zones plus Climate Change dataset. Based on this dataset, the site is not shown to be at additional risk from climate change.

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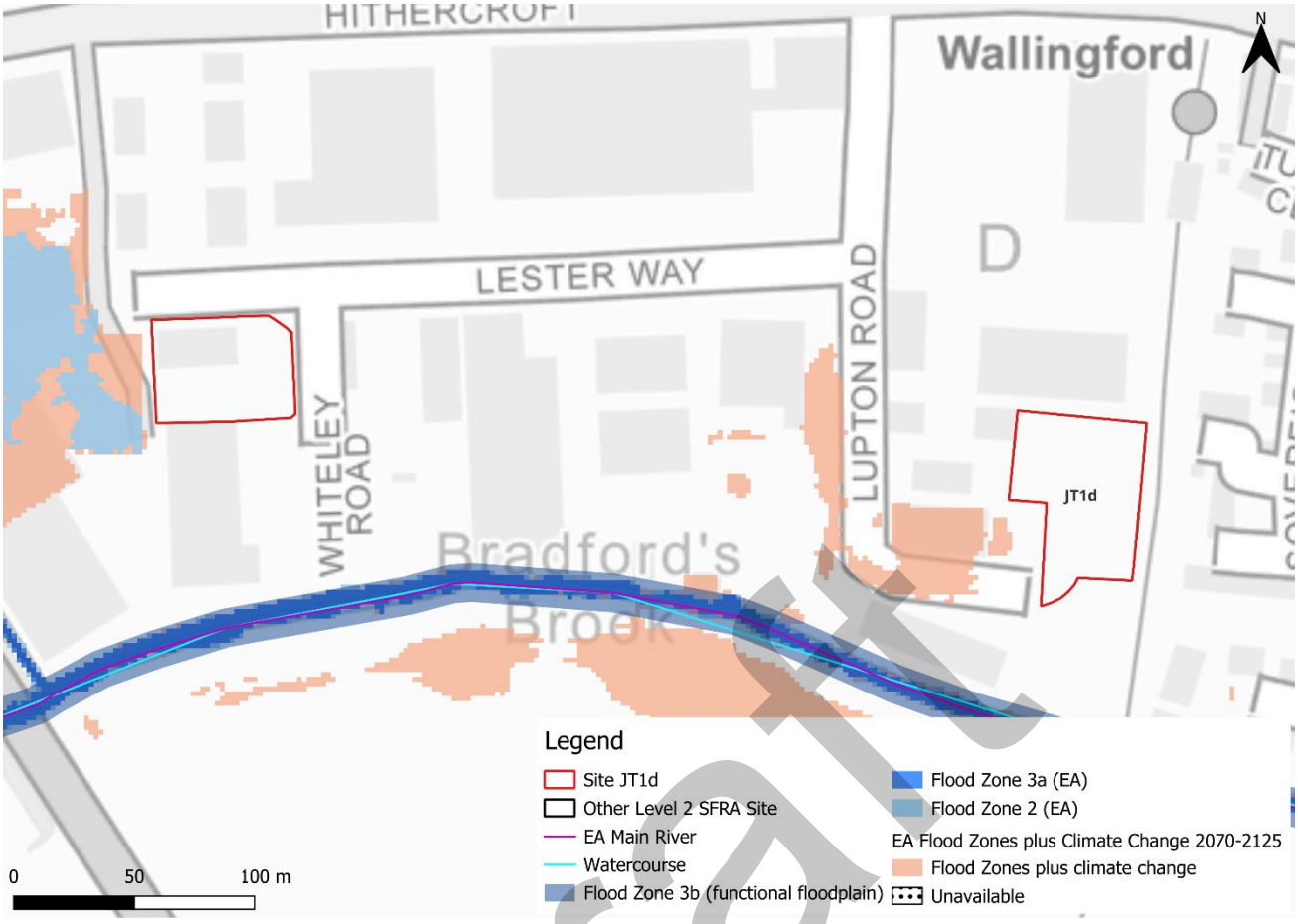

Figure 2-2: EA Flood Map for Planning - Flood Zones plus Climate Change

2.3 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

2.4 Flood risk management

The site doesn't benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

2.4.1 Cumulative impacts

A cumulative impact assessment was completed through the South Oxfordshire and Vale of White Horse Level 1 SFRA Addendum (2026), which aimed to identify catchments sensitive to the cumulative impact of development. Site JT1d (Hithercroft Industrial Estate, Wallingford) is located within one catchment, namely; Mill Brook and Bradfords Brook system, Wallingford. This is ranked as a low sensitivity catchment. Planning considerations all sites can be found in Appendix D of the Level 1 SFRA Addendum. Cumulative impacts of development should also be considered as part of a site-specific FRA.

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2.4.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. Along the unnamed watercourse adjacent to the western site parcel, there is potential for riparian woodland planting to attenuate flooding. These areas are shown in Figure 2-3.



Figure 2-3: Natural Flood Management (NFM) potential mapping

2.5 Residual risk

Although a site may be afforded some protection from defences and / or drainage infrastructure, there is always a residual risk of flooding from asset failure i.e. defence breaches, or blockages of culverts or drainage assets.

There are no assets with the potential to pose a residual risk to the site.

2.5.1 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. A "dry day" scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. A

"wet day" scenario assumes a worst-case scenario where a reservoir releases water held on a "wet day" when local rivers have already overflowed their banks.

The site is not modelled to be at risk from reservoir flooding.

2.6 Emergency Planning

2.6.1 Flood warnings and alerts

There are no Flood Warning Areas (FWA) or Flood Alert Areas (FAA) within the vicinity of the site.

2.6.2 Access and escape

Safe access and escape routes should be achievable via Lupton Road to the west of the eastern site parcel, and Lester Way to the north of the western site parcel. These routes are indicated by the yellow lines on Figure 2-4.

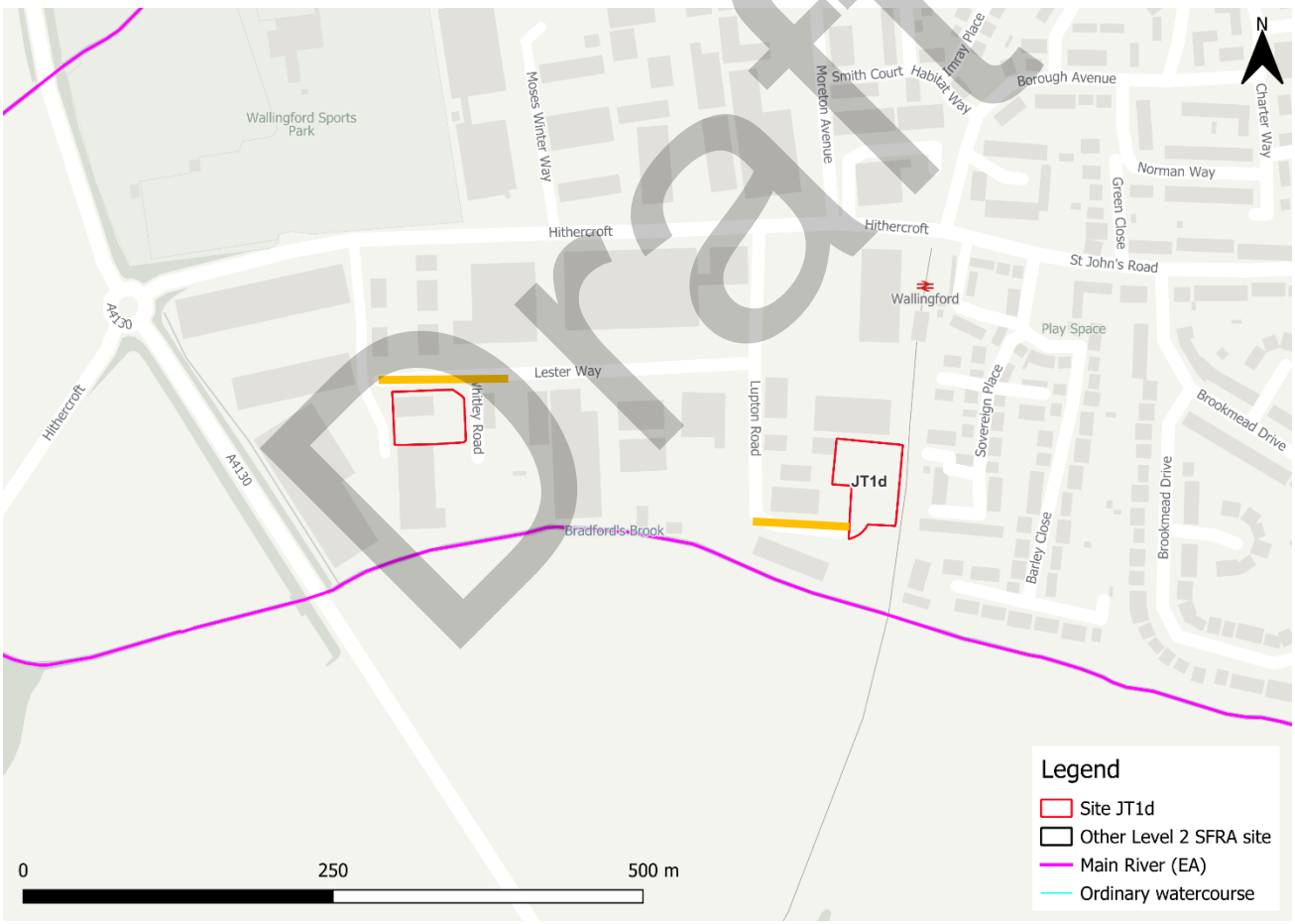

Figure 2-4: Potential access and escape routes

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2.7 Observations, mitigation options, site suitability, sequential approach to development management - fluvial

- Observations:
  - The site is wholly within Flood Zone 1 and therefore at low risk of flooding from rivers.
  - The site is not shown to be at additional risk of fluvial flooding when considering climate change.
- Access and escape:
  - Safe access and escape routes are likely achievable via Lupton Road to the west of the eastern site parcel, and Lester Way to the north of the western site parcel.

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3 Flood risk from surface water

3.1 Existing risk

3.1.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths Present Day

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Extents Present Day map (September 2026), the majority of the site is at very low risk from surface water flooding, as shown in Table 3-1.

Surface water risk is confined to scattered areas of ponding within topographic low sports across the site (Figure 3-1). There is no modelled surface water flood risk to the western site parcel in the 3.3% AEP and 1% AEP events.

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Depths Present Day map, depths onsite are predominantly below 0.15m, however section of the north west corner of the eastern site parcel has depths of between 0.15 and 0.3m (Figure 3-2).

Lupton Road is modelled to become inundated in all events, however depths are modelled to remain largely less than 0.15m in the 1% AEP event. Further hazard information may be required in a site-specific assessment to understand whether Lupton Road is a viable access and escape route from the eastern site parcel. Lester Way is modelled to remain as a safe access and escape route from the western site parcel.

Table 3-1: Existing surface water flood risk based on percentage area at risk using the Flood Map for Planning - Surface Water Spatial Planning Extent Present Day map

Less than 0.1% AEP event (% area)	0.1% AEP event (% area)	1% AEP event (% area)	3.3% AEP event (% area)
85	12	1	2

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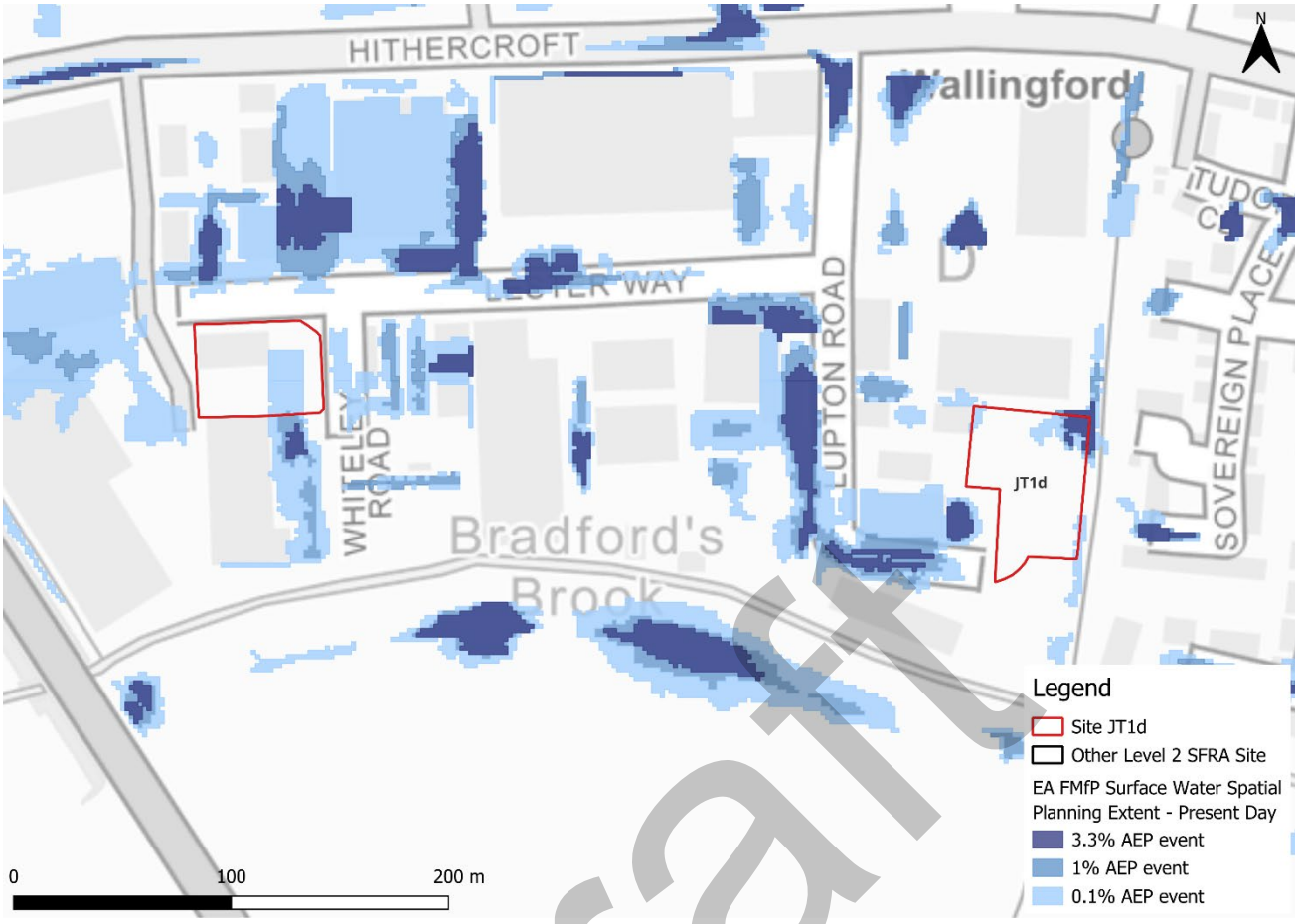

Figure 3-1: Flood Map for Planning - Surface Water Spatial Planning Extents Present Day

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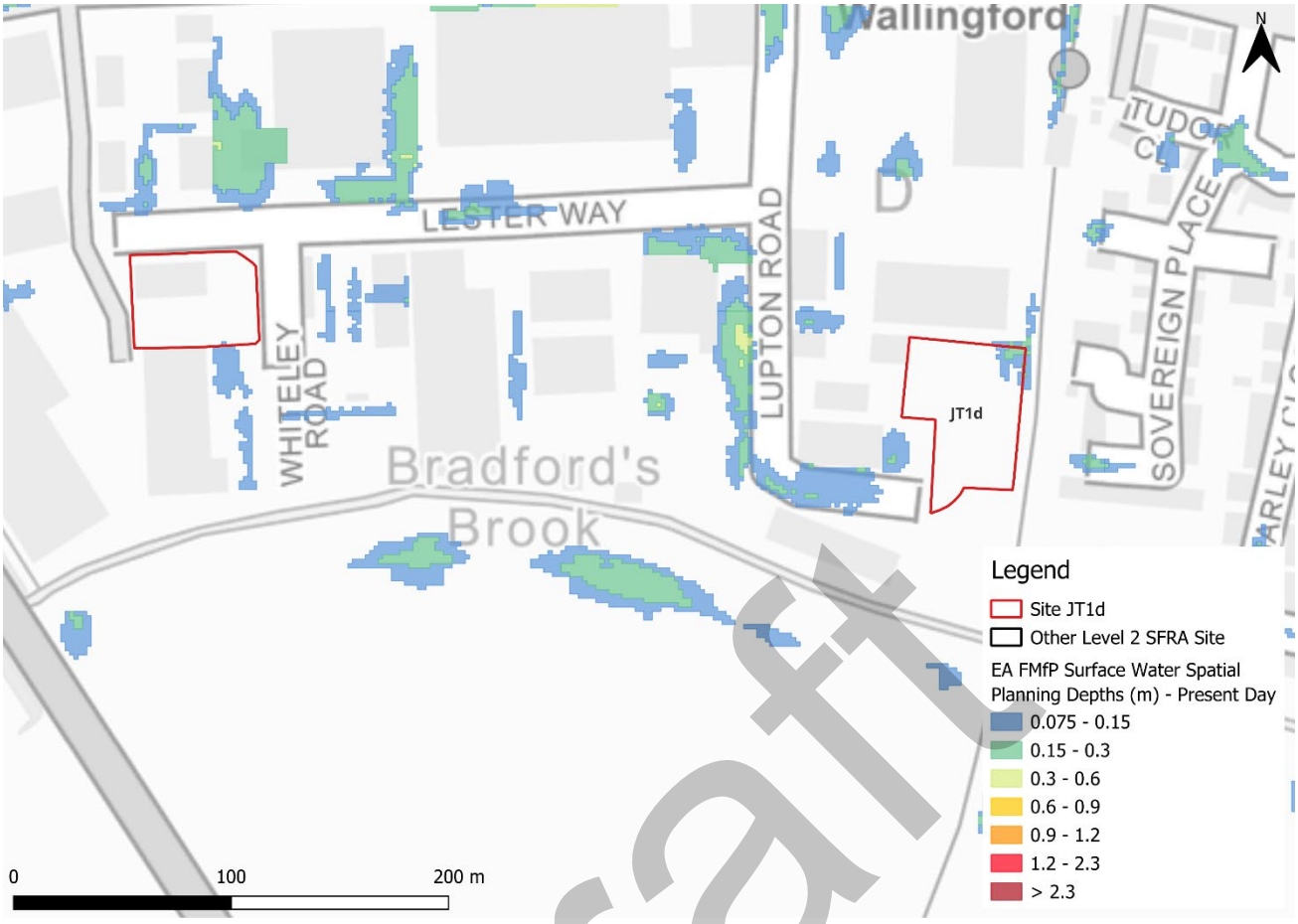

Figure 3-2: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Present Day for the 1% AEP event

3.1.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning data does not include hazard information suitable for planning purposes. Therefore, this Level 2 SFRA considers the third generation Risk of Flooding from Surface Water (RoFSW) hazard mapping in addition to the Flood Map for Planning - Surface Water Spatial Planning extents and depths, as the best available information. Updated surface water hazard information would need to be confirmed at the site-specific FRA stage.

Based on the EA's national scale third generation RoFSW map, the medium risk event is not modelled to impact the site (Figure 3-3).

There are clear differences between the Flood Map for Planning - Surface Water Spatial Planning map and the third generation RoFSW hazard mapping. The Flood Map for Planning - Surface Water Spatial Planning data does not map flooding less than 0.075m (7.5cm) in depth. Therefore, where the map may show no flooding, there may be shallow flooding up to a depth of 0.075m. In contrast, the third generation RoFSW does not map flooding with a hazard rating of less than 0.575. This could explain the differences observed between the Flood Map for Planning and third generation RoFSW maps.

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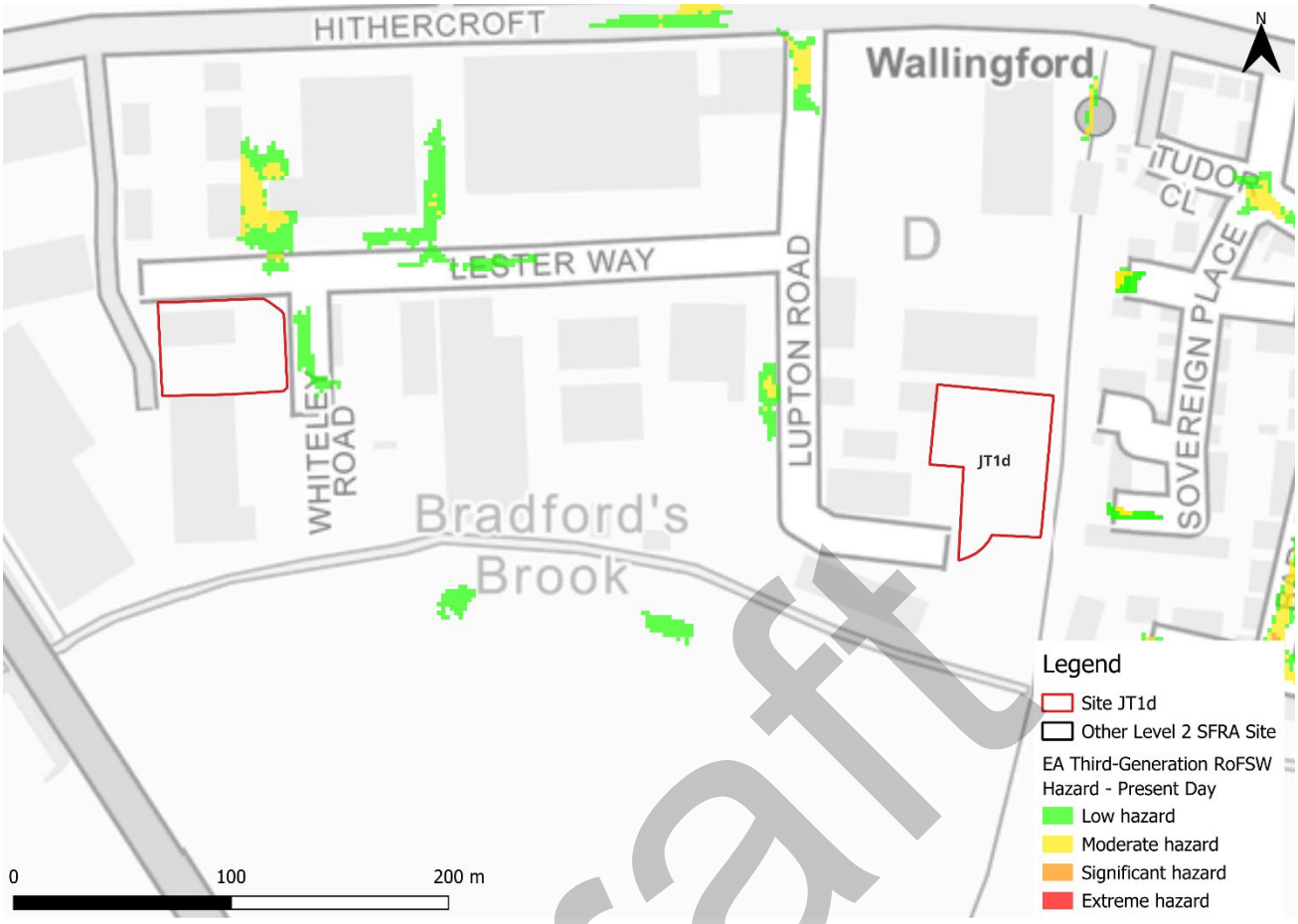

Figure 3-3: Third generation - Risk of Flooding from Surface Water map present day 1% AEP event surface water flood hazard[1]

3.2 Impacts from climate change

3.2.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths

The EA's climate change allowance guidance states that SFRA's should assess the upper end peak rainfall allowance for the 2070s epoch. This dataset is included in the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Climate Change dataset (September 2026). The peak rainfall intensity allowances for the Thames and South Chilterns management catchment are shown in Table 3-2. The allowance for the 0.1% AEP event is not stated in the EA guidance.

1 Based on Section 7.5 Hazard rating. What is the Risk of Flooding from Surface Water map? Report version 2.0. April 2019. Environment Agency

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Table 3-2: Peak rainfall intensity allowances for the Thames and South Chilterns management catchment

Return period	Central allowance 2070s (% increase)	Upper end allowance 2070s (% increase)
3.3% AEP	25	35
1% AEP	25	40

Figure 3-4 shows the surface water flood extents for the 2070s upper end climate change scenario. Surface water risk is modelled to increase slightly in extent with climate change, predominantly in the 0.1% AEP event.

Flood depths are modelled to remain at between 0.15 and 0.3m, however these depths cover a greater area of the site in comparison to the present day event (Figure 3-5).

Further hazard information may be required in a site-specific assessment to understand whether Lupton Road is a viable access and escape route from the eastern site parcel. However, depths are modelled to be less than 0.3m along this route. Access and escape routes should be achievable via Lester Way to the north of the western site parcel.

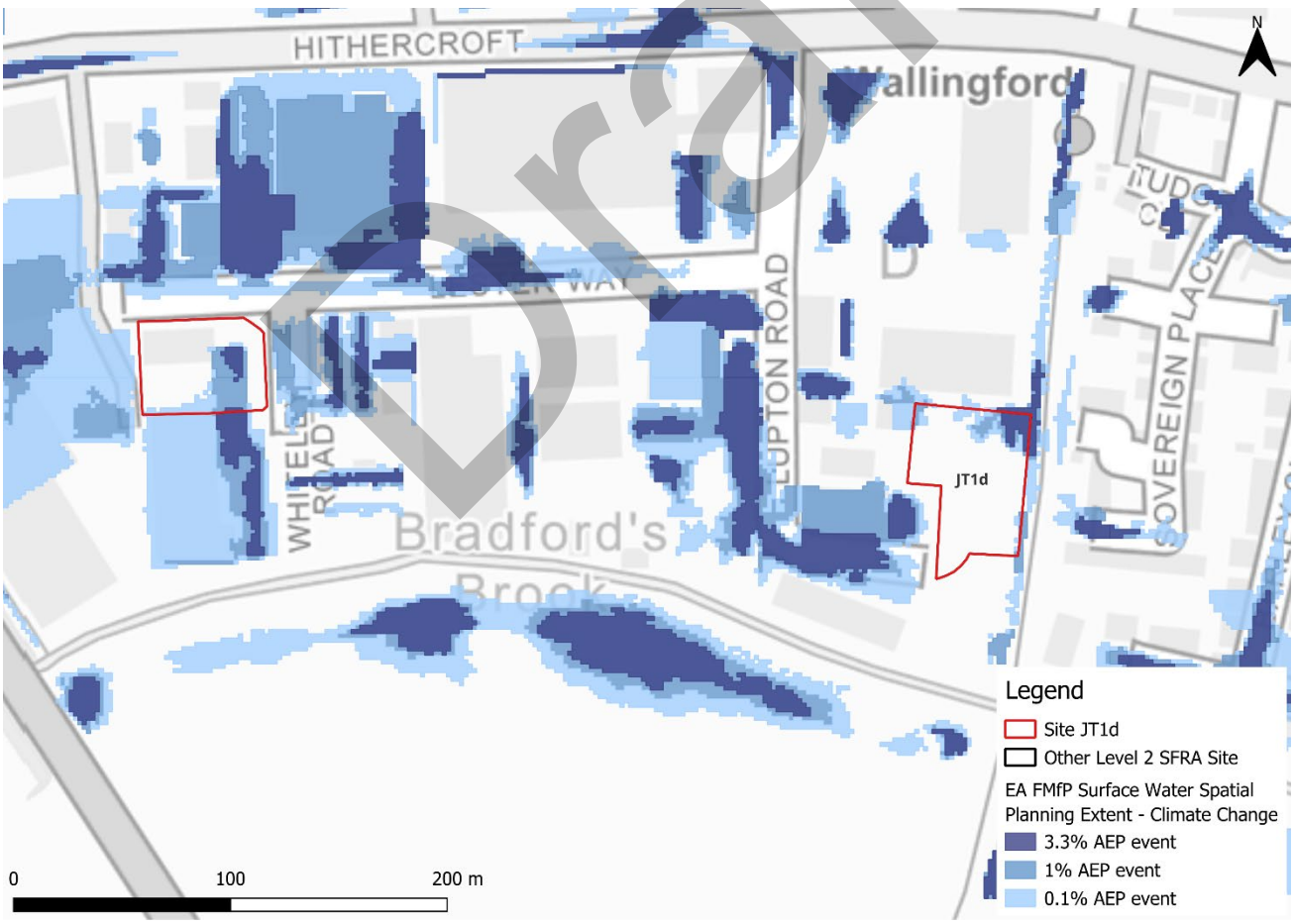

Figure 3-4: Flood Map for Planning - Surface Water Spatial Planning Extents Climate Change (2070s Upper End)

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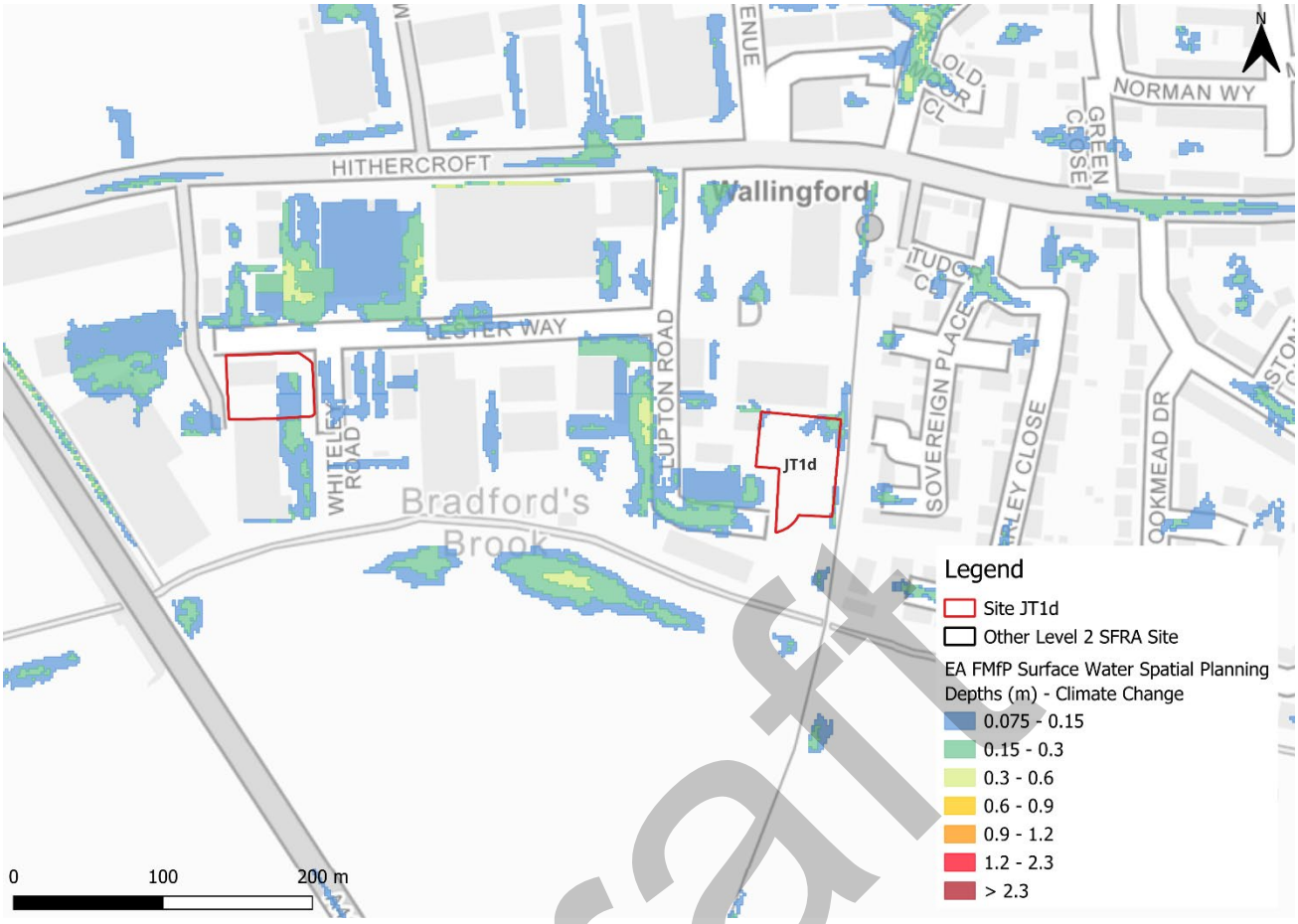

Figure 3-5: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Climate Change for the 1% AEP event (2070s Upper End)

3.2.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning climate change data does not include hazard information suitable for planning purposes. This Level 2 SFRA therefore considers the RoFSW low risk surface water event as a conservative proxy for the medium risk event plus climate change, as the best available information to assess surface water flood hazards. The impact of climate change on surface water flood hazards should be considered at the site-specific FRA stage.

Using the RoFSW low risk event as a proxy, future surface water flood hazard in the medium risk event is categorised as 'moderate' (Figure 3-6).

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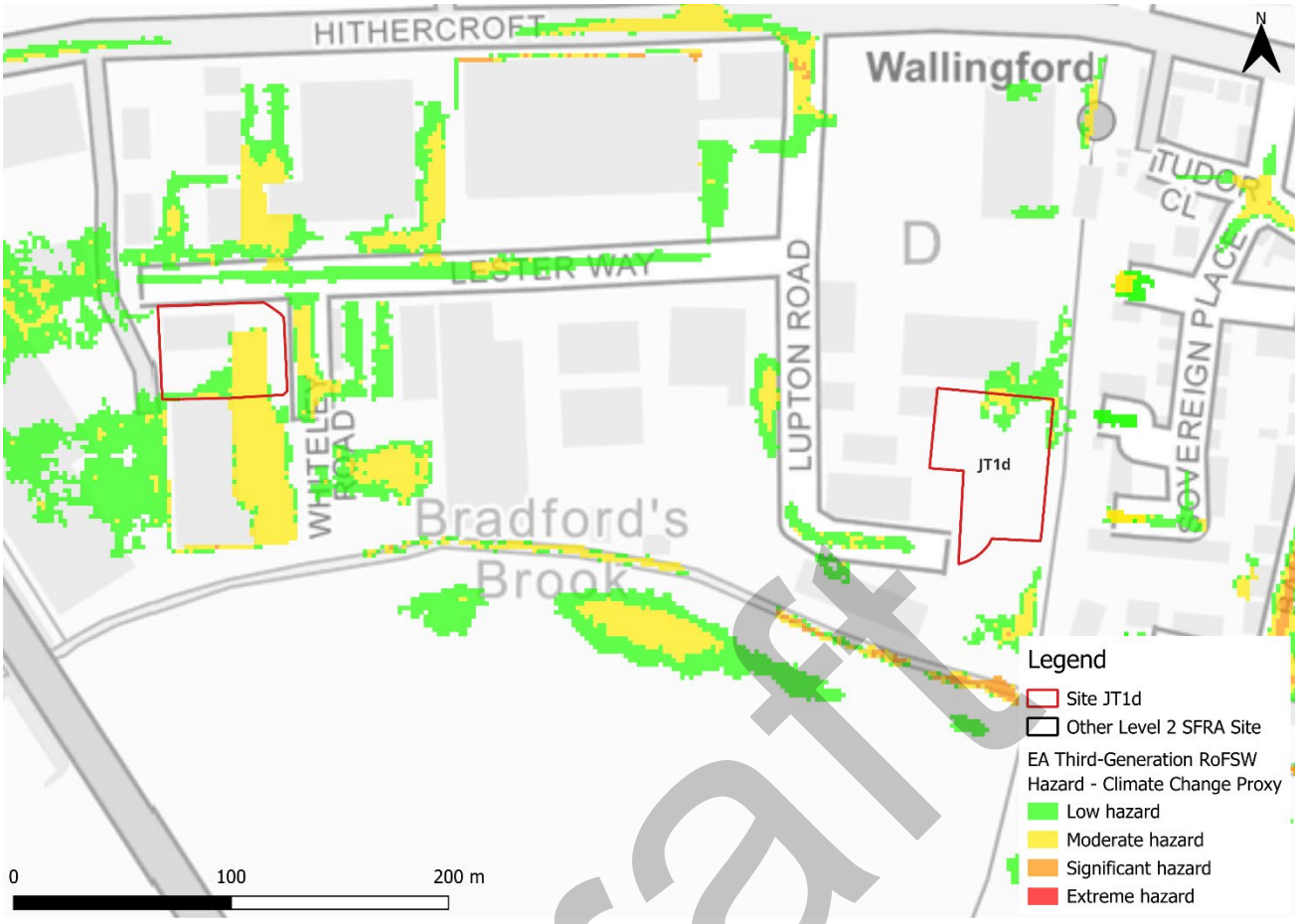

Figure 3-6: Low risk event surface water flood hazard[1], as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options, site suitability, sequential approach to development management - surface water

- Current risk to the site is predominantly very low, with 86% of the site being outside of the 0,1% AEP surface water flood extent. Surface water risk is present as areas of scattered ponding within topographic low spots.
- Risk to the site is shown to increase in extent when considering the impact of climate change with larger extents of the site effected.
- Topographic low spots should be considered and included in site design and ideally left in place to flood naturally when required.
- The drainage strategy must ensure there is no increase in surface water flood risk elsewhere as a result of new development. The developer should aim to achieve betterment of existing runoff rates. The developer should also follow the National SuDS guidance.
- If any structures are demolished for new development, a drainage strategy would therefore be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA. The developer should also follow the National SuDS guidance.

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- Assessment of the current drainage system in place should be carried out to ascertain any current capacity issues and whether the current system could accommodate the proposed development or whether further capacity will be required.
- Updated hazard information is required to understand whether Lupton Road is a viable access and escape route from the eastern site parcel, however depths along this route are low. Lester Way should remain as a safe access and escape route from the western site parcel.

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4 Groundwater, geology and SuDS suitability

Risk of groundwater emergence is assessed in this SFRA using JBA's 5m Groundwater Emergence Map. Figure 4-1 show the map covering the site and the surrounding areas. Table 4-1 explains the risk classifications.

The entirety of the site is within an area where there is a risk of groundwater emergence to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots. Ground investigations will be required through the site-specific FRA to ascertain groundwater levels and conditions. SuDS will not be suitable for this site.



Figure 4-1: JBA 5m Groundwater Emergence Map

Table 4-1: Groundwater Emergence Hazard Classification

Groundwater head difference (m)*	Class label
0 to 0.025	Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
0.025 to 0.5	Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
0.5 to 5	Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event There is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely.
>5	Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event. Groundwater emergence is not likely.
N/A	No risk. This zone is deemed as having a negligible risk from groundwater emergence due to the nature of the local geological deposits.
*Difference is defined as ground surface in mAOD minus modelled groundwater table in mAOD.	

The underlying bedrock within the site is chalk. Superficial deposits consist of sand and gravel (Figure 4-2). Chalk has high permeability. This leads to more water infiltrating into the ground and could potentially contribute to high water table levels. The drainage strategy for the site should investigate water table levels and ground conditions to inform on appropriate SuDS.

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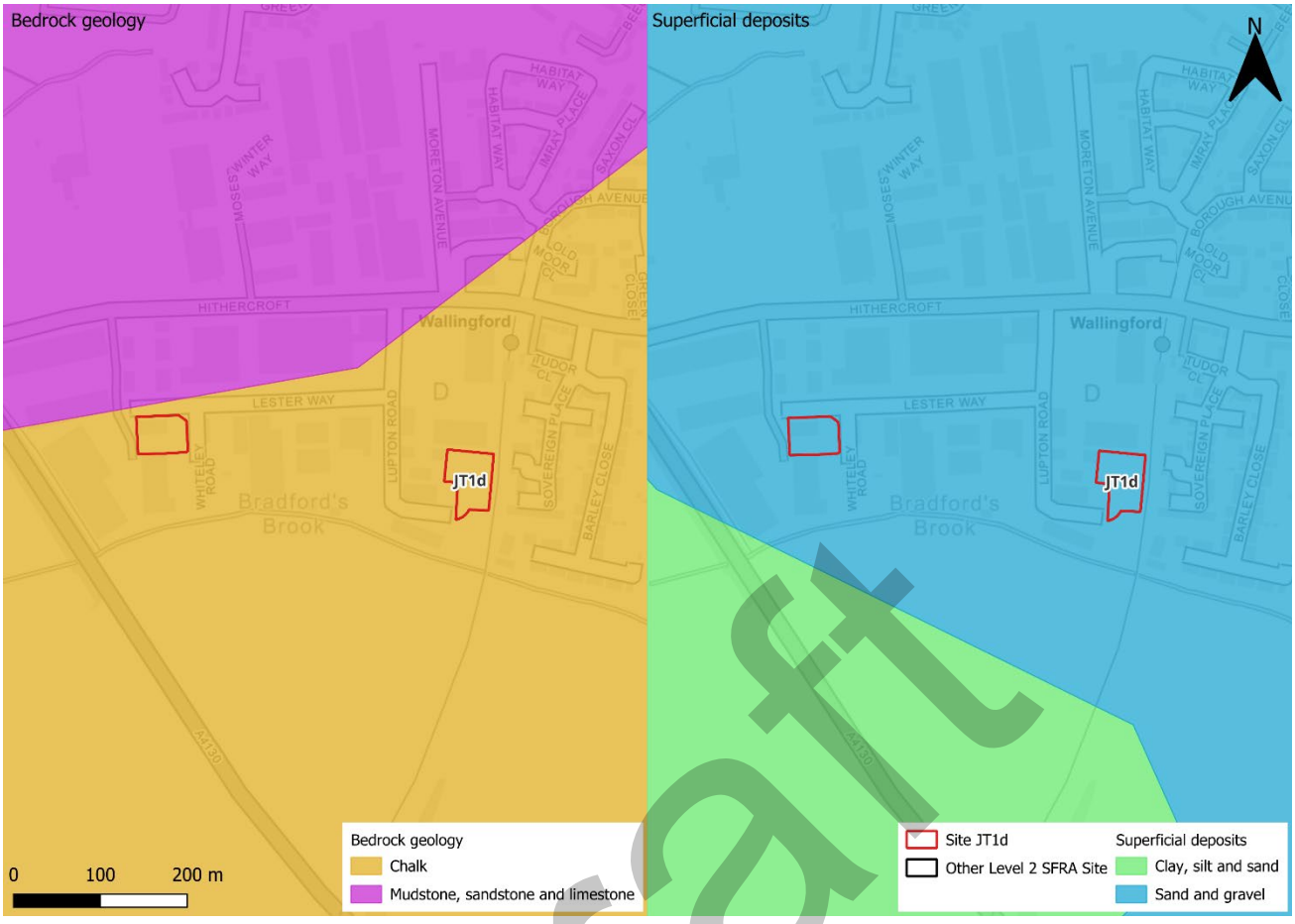

Figure 4-2: BGS Geology - Bedrock and superficial deposits

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Overall site assessment

4.1 Can part b) of the exception test be passed?

To pass part b) of the exception test[2], it must be proven that the development can be safe for its lifetime, which is 75 years for non-residential development, taking account of the vulnerability of its users, without increasing risk elsewhere, and, where possible, will reduce flood risk overall. The site is not required to pass the exception test as it is proposed for less vulnerable uses.

4.2 Recommendations and site-specific FRA requirements

Based on the evidence presented in the Level 1 SFRA (2024), Level 1 SFRA Addendum (2026) and this Level 2 SFRA:

- Updated climate change modelling of Bradford's Brook its tributaries should be used to update this Level 2 SFRA at the earliest opportunity to provide an up-to-date strategic assessment of fluvial flood risk to the site. It would be acceptable to use updated modelling to suitably assess surface water risk through a site-specific FRA, as well as/instead of a Level 2 SFRA update.
- It should be appropriate for this site to be allocated, given the low fluvial and surface water flood risk to the site. However, were this site to be allocated based on current information, the LPA must make it clear that this site cannot be developed until the required information detailed in this SFRA on future flood risk from fluvial sources is fully ascertained.
- Updated hazard information is required to understand whether Lupton Road is a viable access and escape route from the eastern site parcel, however depths along this route are low. Lester Way should remain as a safe access and escape route from the western site parcel.
- It is assumed the current structures will be demolished for new development. A drainage strategy would therefore be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. Runoff rates should return to greenfield rates, to reduce flood risk downstream. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA
- Groundwater conditions must be investigated further through the site-specific FRA.
- Opportunities for NFM features to reduce flood risk to the site and surrounding areas should be explored at the site-specific FRA stage.
- Any site-specific FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; South Oxfordshire and Vale of White Horse District Councils Joint Local Plan and LLFA policies; and national and local SuDS policy and guidelines.

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- Throughout the site-specific FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; TW; the highways authorities; and the emergency services.

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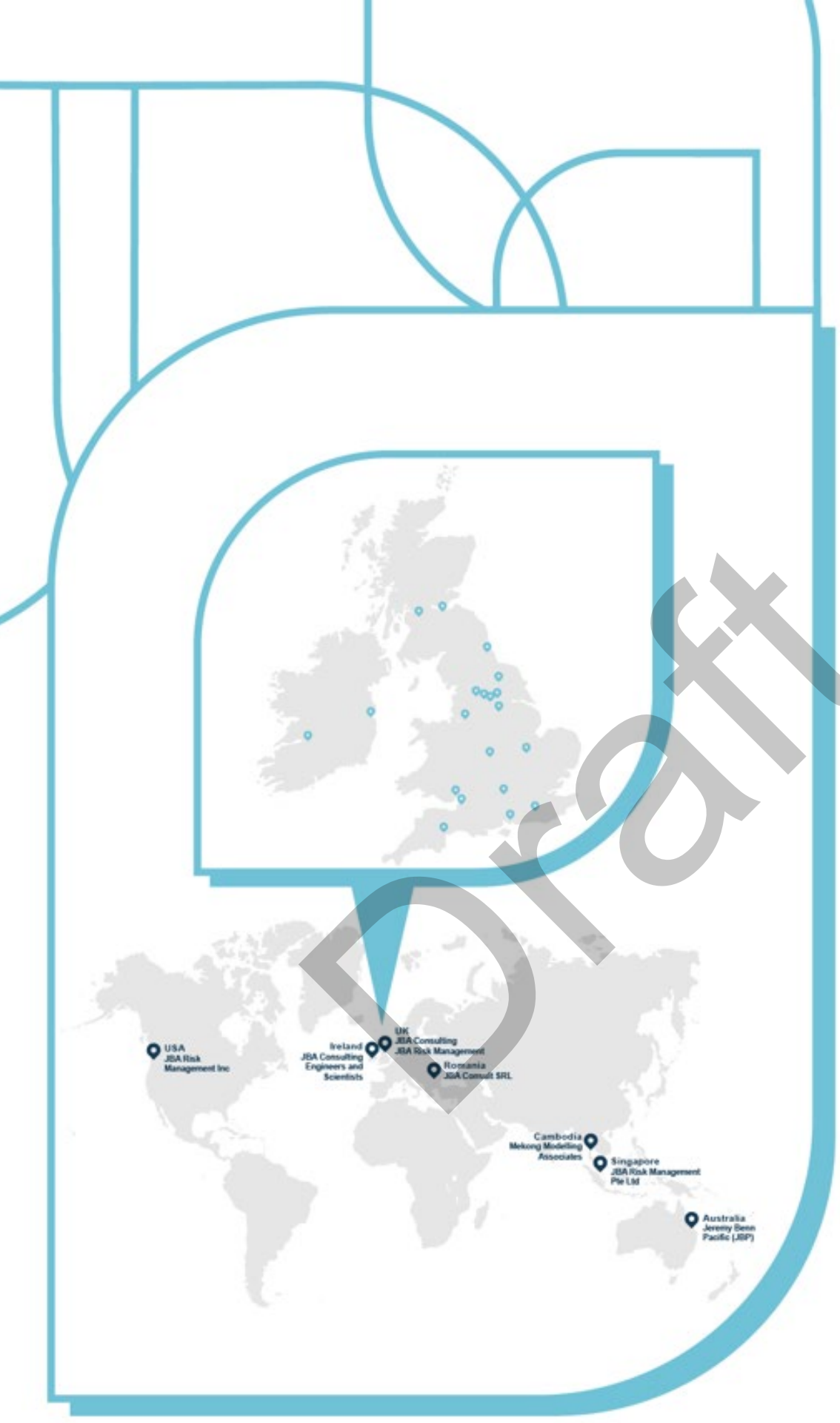

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BD23 3FD
United Kingdom

+44(0)1756 799919
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South Oxfordshire and Vale of White Horse Level 2 Strategic Flood Risk Assessment Update

Site JT1e - Monument Business Park, Chalgrove

Draft Report

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October 2026

Prepared for:

South Oxfordshire District Council and

Vale of White Horse District Council

www.jbaconsulting.com

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Reviewed by	Laura Thompson-Jones BSc CGeog FRGS Senior Analyst
Authorised by	Mike Williamson BSc MSc CGeog FRGS EADA Project Director

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JBA Project Manager	Freya Nation
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2026s1132

This report describes work commissioned by South Oxfordshire and Vale of White Horse District Councils. The Client's representative for the contract was Rebekah Goodwill of South Oxfordshire and Vale of White Horse District Councils. Boe Kilshaw of JBA Consulting carried out this work.

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for South Oxfordshire and Vale of White Horse Joint Local Plan Site JT1e - Monument Business Park, Chalgrove. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA' (2024) and the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum' (2026), and read the 'South Oxfordshire and Vale of White Horse District Councils Level 2 SFRA Main Report Update' (2026) and is therefore familiar with the terminology used in this report.

1.1 Site JT1e - Monument Business Park, Chalgrove

- Location: Monument Business Park, Chalgrove (Figure 1-1)
- Existing site use: Greenfield and brownfield; employment
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Mainly employment
- Proposed site use vulnerability: Less vulnerable
- Site area: 2.25 ha
- Proposed development impermeable area: 1.9 ha (assumed 85% of site area)
- Watercourse: N/A
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for more detailed assessment through Level 2 SFRA (Strategic Recommendation B)
    - Assess present day and future modelled surface water depths, hazards

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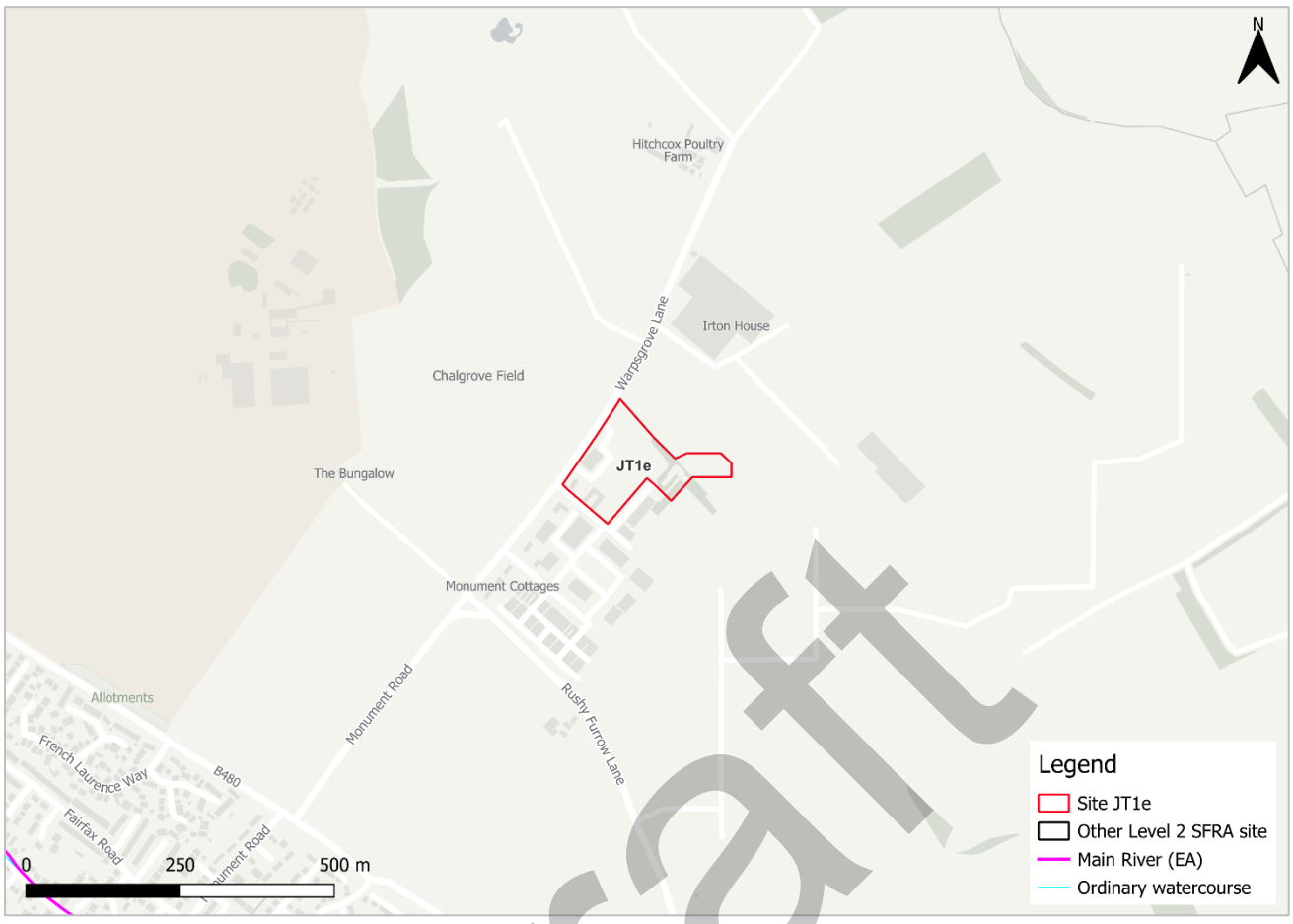

Figure 1-1: Site location

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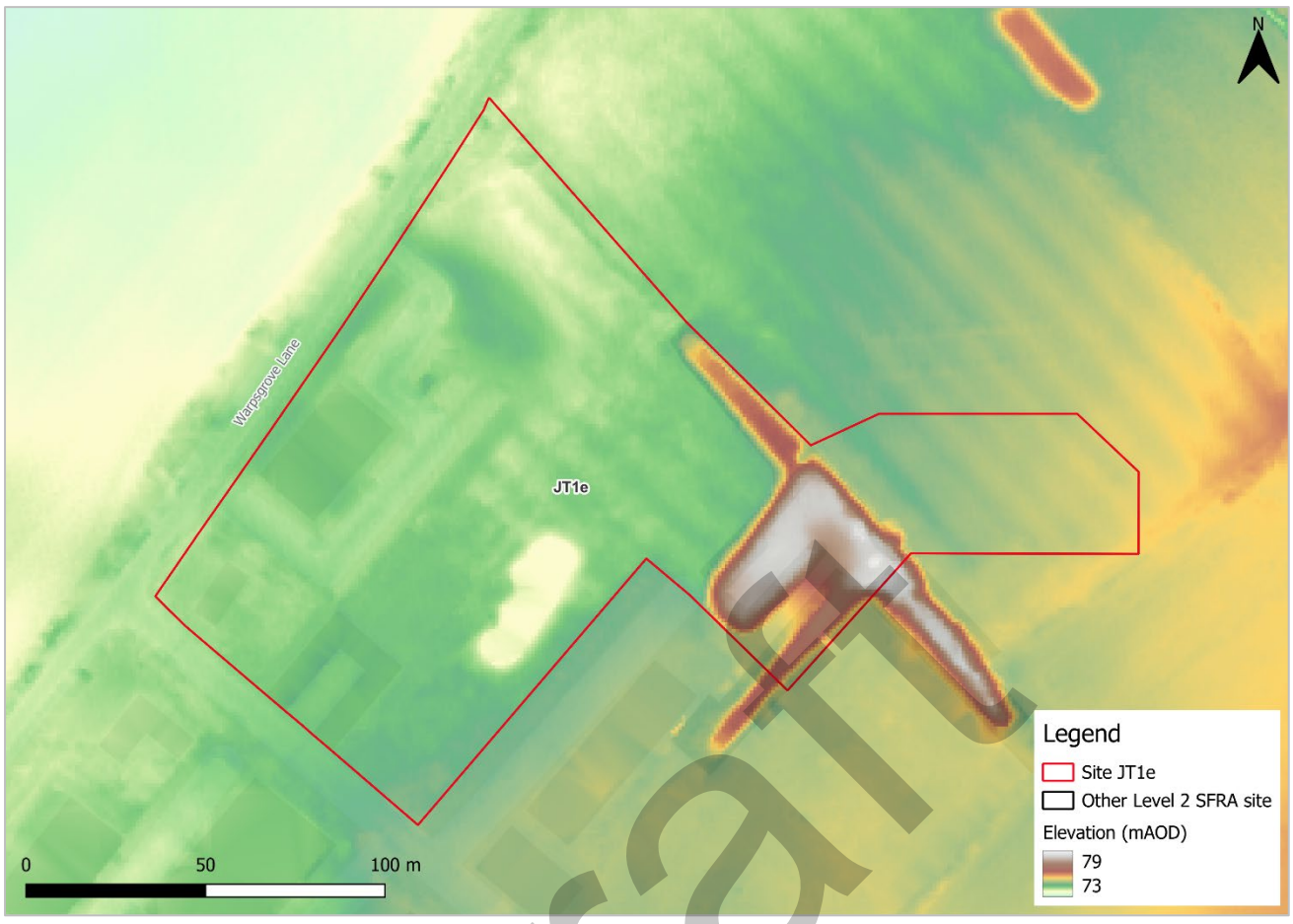

Figure 1-2: Topography

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2 Flood risk from rivers

2.1 Existing risk

2.1.1 Flood Map for Planning and functional floodplain

Based on the Environment Agency's (EA) Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum (2026), the percentage areas of the site within each flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.4).

The site is entirely within Flood Zone 1 and therefore at low risk of flooding from rivers.

Table 2-1: Existing flood risk based on percentage area of site at risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

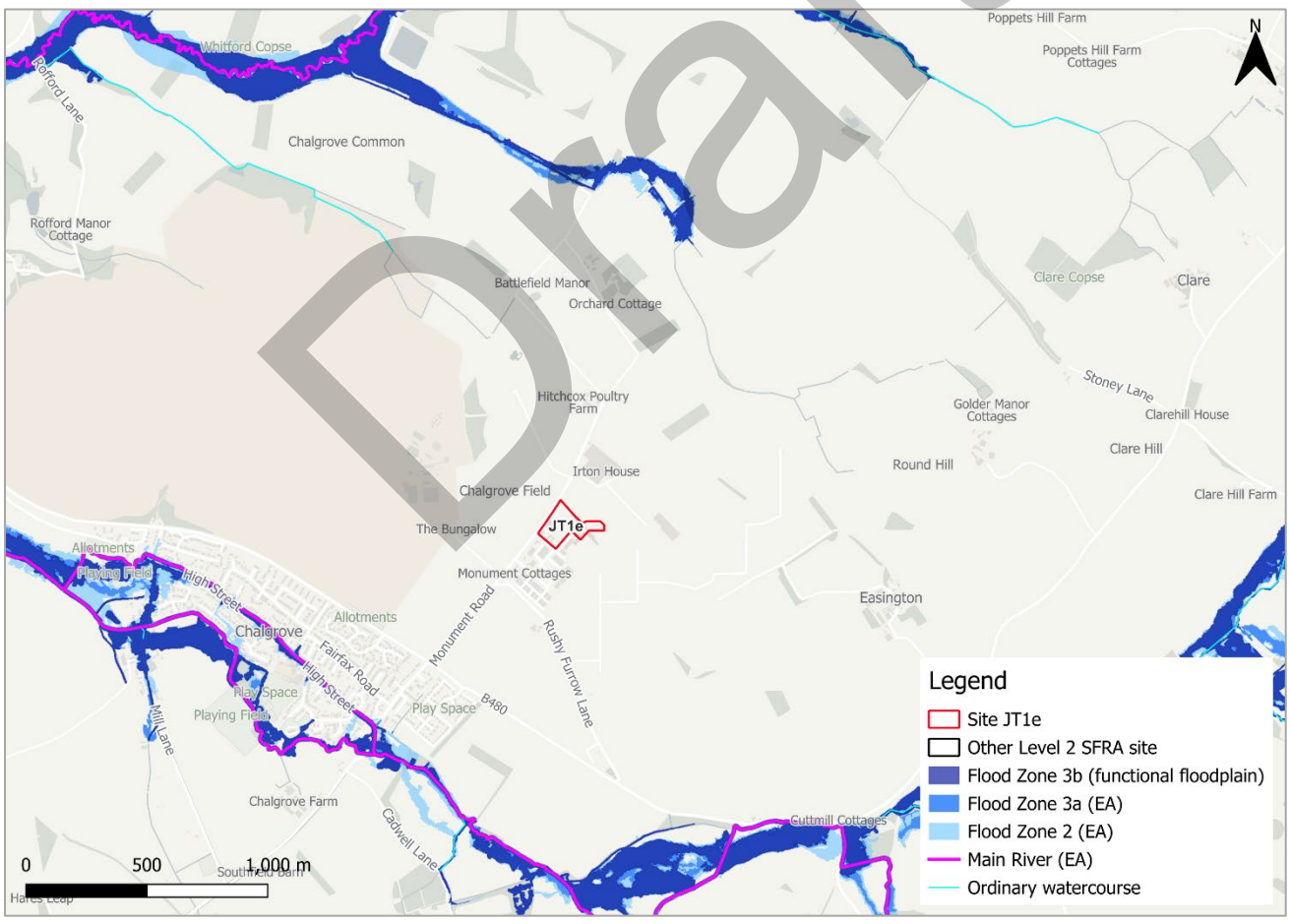

Figure 2-1: Existing risk from rivers to the site

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2.2 Impacts from climate change

2.2.1 Flood Map for Planning - Flood Zones plus Climate Change

The EA's Flood Map for Planning - Flood Zones plus Climate Change dataset does not show the site to be at future fluvial risk.

2.3 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

2.4 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

2.4.1 Cumulative impacts

A cumulative impact assessment was completed through the South Oxfordshire and Vale of White Horse Level 1 SFRA Addendum (2026), which aimed to identify catchments sensitive to the cumulative impact of development. Site JT1e (Monument Business Park, Chalgrove) is located within one catchment, namely; Haseley Brook (Latchford Brook to Thame). This is ranked as a medium sensitivity catchment. Planning considerations that apply to sites at medium sensitivity to the cumulative impacts of development can be found in Appendix D of the Level 1 SFRA Addendum. Cumulative impacts of development should also be considered as part of a site-specific FRA.

2.4.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. Within the site, there is significant potential for tree planting to slow floodwaters, reduce flood peak height and reduce sediment delivery to the watercourse. There is also potential for runoff attenuation features to reduce the speed of flooding downstream. These areas are shown on Figure 2-2.

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Figure 2-2: Natural Flood Management (NFM) potential mapping

2.5 Residual risk

Although a site may be afforded some protection from defences and / or drainage infrastructure, there is always a residual risk of flooding from asset failure i.e. defence breaches, or blockages of culverts or drainage assets.

There are no assets with the potential to pose a residual risk to the site

2.5.1 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. A "dry day" scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. A "wet day" scenario assumes a worst-case scenario where a reservoir releases water held on a "wet day" when local rivers have already overflowed their banks.

This site is not modelled to be at risk of flooding from reservoirs.

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2.6 Emergency Planning

2.6.1 Flood warnings and alerts

There are no Flood Warning Areas (FWA) or Flood Alert Areas (FAA) within the vicinity of the site.

2.6.2 Access and escape routes

Safe access and escape routes would likely be achievable via Warpsgrove Lane to the west of the site. This route is indicated by the yellow line in Figure 2-3.



Figure 2-3: Potential access and escape routes

2.7 Observations, mitigation options, site suitability, sequential approach to development management - fluvial

- Observations:
  - The site is wholly within Flood Zone 1 and therefore at low risk of flooding from rivers.
  - The site is not shown to be at additional risk of fluvial flooding when considering climate change.
- Access and escape:

- Safe access and escape routes would likely be achievable via Warpsgrove Lane to the west of the site.

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3 Flood risk from surface water

3.1 Existing risk

3.1.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths Present Day

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Extents Present Day map (September 2026), the site is at significant risk of surface water flooding, as shown in Table 3-1.

Surface water flooding is present as a distinct, large flow path through the centre of the site (Figure 3-1). This develops into a large area of ponding within the north of the site. Surface water risk is constrained by the existing development present onsite.

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Depths Present Day map, the greatest flood depths are between 0.6 and 0.9m. However, the majority of the site floods to depths of below 0.3m (Figure 3-2).

Safe access and escape routes would possibly be achievable by Warpsgrove Lane to the west of the site.

Table 3-1: Existing surface water flood risk based on percentage area at risk using the Flood Map for Planning - Surface Water Spatial Planning Extent Present Day map

Less than 0.1% AEP event (% area)	0.1% AEP event (% area)	1% AEP event (% area)	3.3% AEP event (% area)
56	16	7	21

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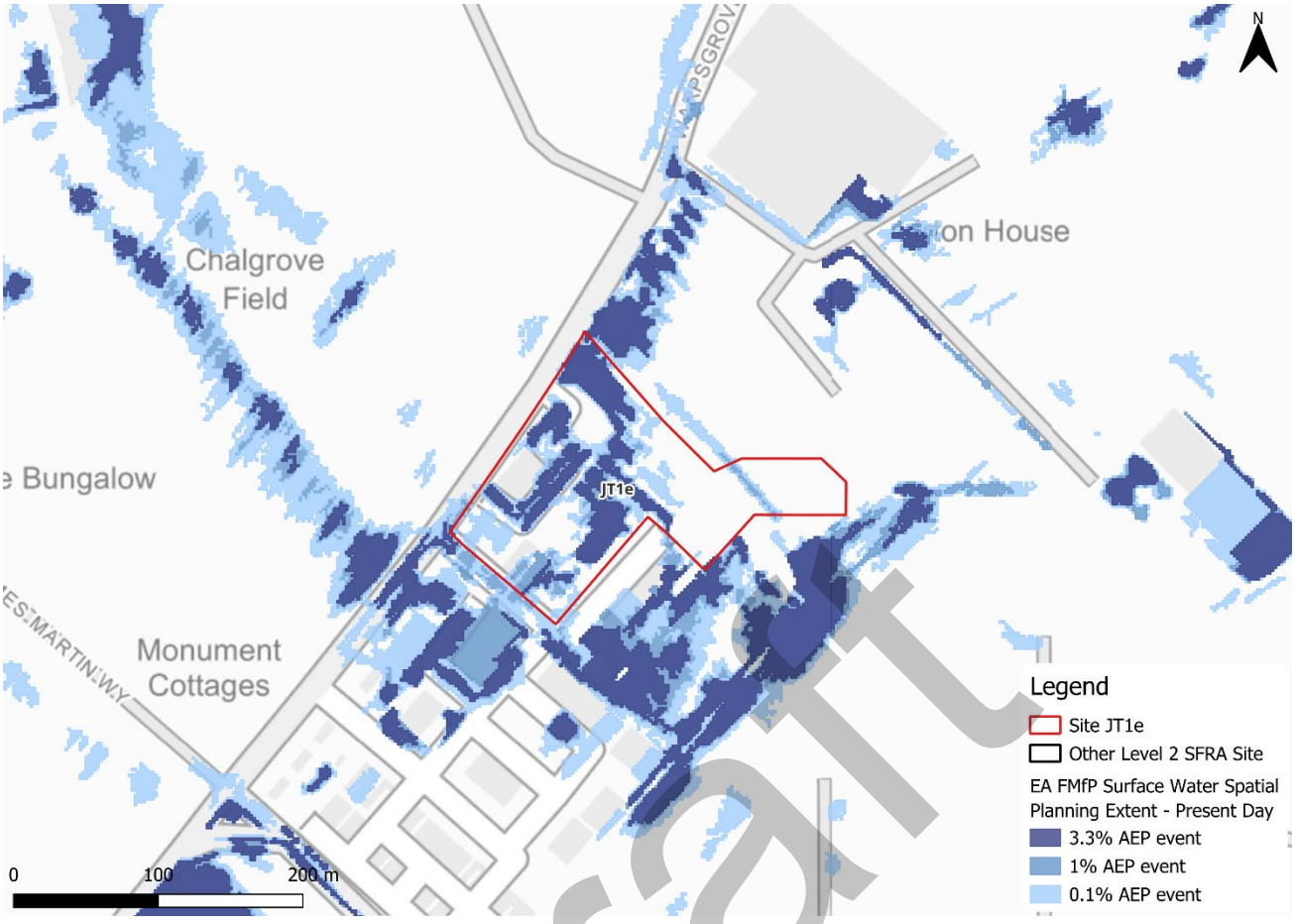

Figure 3-1: Flood Map for Planning - Surface Water Spatial Planning Extents Present Day

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Figure 3-2: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Present Day for the 1% AEP event

3.1.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning data does not include hazard information suitable for planning purposes. Therefore, this Level 2 SFRA considers the third generation Risk of Flooding from Surface Water (RoFSW) hazard mapping in addition to the Flood Map for Planning - Surface Water Spatial Planning extents and depths, as the best available information. Updated surface water hazard information would need to be confirmed at the site-specific FRA stage.

Based on the EA's national scale third generation RoFSW map, the greatest flood hazard within the site in the medium risk event is categorised as 'significant', however is predominantly 'moderate' to 'low' (Figure 3-3).

There are some differences between the Flood Map for Planning - Surface Water Spatial Planning map and the third generation RoFSW hazard mapping. The Flood Map for Planning - Surface Water Spatial Planning data does not map flooding less than 0.075m (7.5cm) in depth. Therefore, where the map may show no flooding, there may be shallow flooding up to a depth of 0.075m. In contrast, the third generation RoFSW does not map flooding with a hazard rating of less than 0.575. This could explain the differences observed between the Flood Map for Planning and third generation RoFSW maps.

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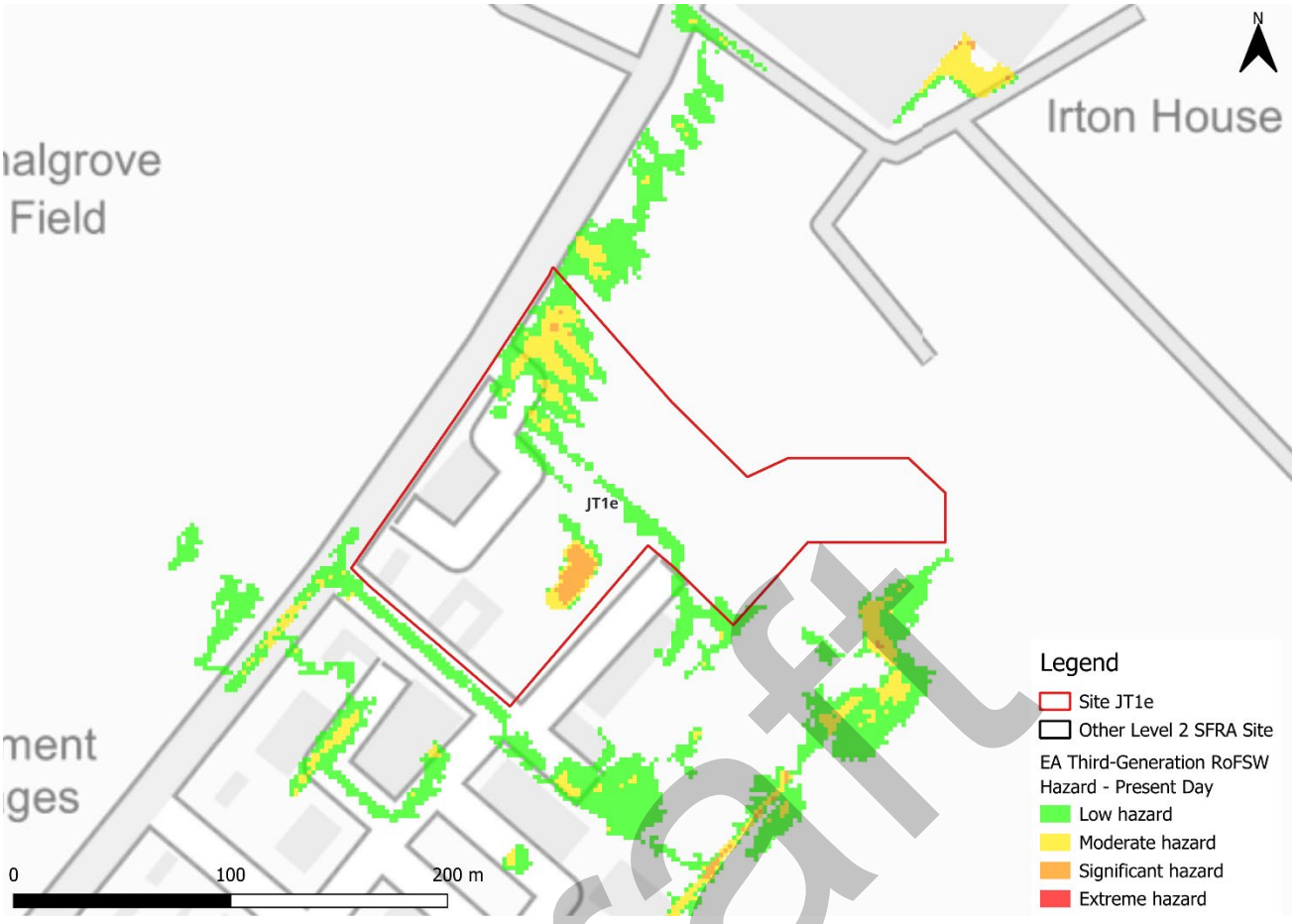

Figure 3-3: Third generation - Risk of Flooding from Surface Water map present day 1% AEP event surface water flood hazard[1]

3.2 Impacts from climate change

3.2.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths

The EA's climate change allowance guidance states that SFRA's should assess the upper end peak rainfall allowance for the 2070s epoch. This dataset is included in the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Climate Change dataset (September 2026). The peak rainfall intensity allowances for the Thames and South Chilterns management catchment are shown in Table 3-2. The allowance for the 0.1% AEP event is not stated in the EA guidance.

1 Based on Section 7.5 Hazard rating. What is the Risk of Flooding from Surface Water map? Report version 2.0. April 2019. Environment Agency

Table 3-2: Peak rainfall intensity allowances for the Thames and South Chilterns management catchment

Return period	Central allowance 2070s (% increase)	Upper end allowance 2070s (% increase)
3.3% AEP	25	35
1% AEP	25	40

Figure 3-4 shows the surface water flood extents for the 2070s upper end climate change scenario. Surface water flood risk is shown to increase in extent with climate change, covering the majority of the site.

Flood depths are modelled to remain at between 0.6 and 0.9m, however the majority of the site is shown to flood to less than 0.3m (Figure 3-5).

Safe access and escape routes would possibly be achievable by Warpsgrove Lane to the west of the site.

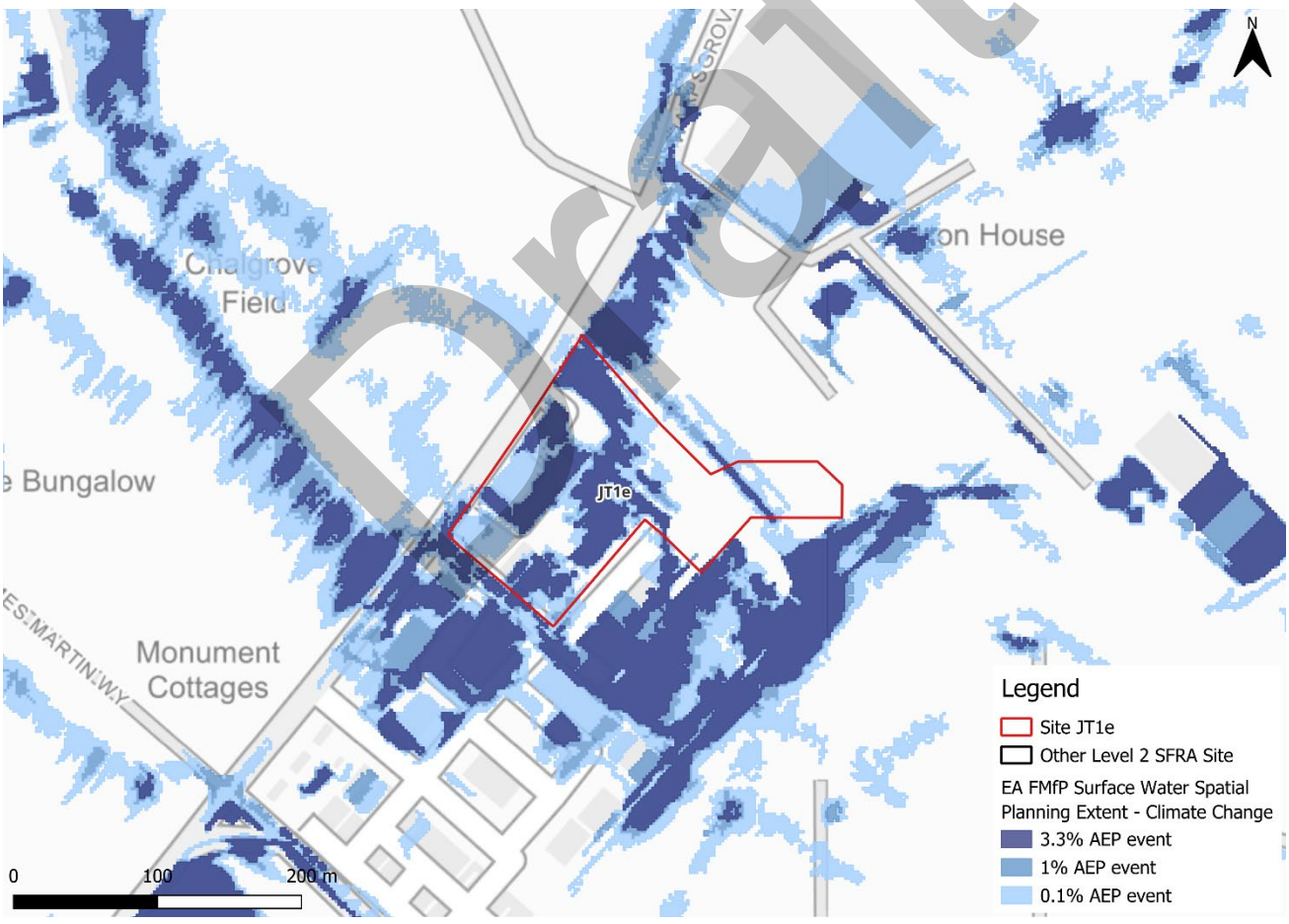

Figure 3-4: Flood Map for Planning - Surface Water Spatial Planning Extents Climate Change (2070s Upper End)

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Figure 3-5: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Climate Change for the 1% AEP event (2070s Upper End)

3.2.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning climate change data does not include hazard information suitable for planning purposes. This Level 2 SFRA therefore considers the RoFSW low risk surface water event as a conservative proxy for the medium risk event plus climate change, as the best available information to assess surface water flood hazards. The impact of climate change on surface water flood hazards should be considered at the site-specific FRA stage.

Using the RoFSW low risk event as a proxy, future surface water flood hazard in the medium risk event is categorised as 'significant', however is predominantly 'moderate' to 'low' (Figure 3-6).

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Figure 3-6: Low risk event surface water flood hazard[1], as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options, site suitability, sequential approach to development management - surface water

- Current surface water risk to the site significant. Surface water risk present along a distinct flow path through the centre of the site, with an area of larger ponding within the north of the site. Any existing flow paths should be maintained in site design.
- Risk is modelled to increase in extent across the site in all events, covering the majority of the site.
- Any development should avoid the surface water flow path through the centre of the site in the high and medium risk events, subject to detailed modelling through a drainage strategy. These areas should be maintained and included in site design as open greenspace offering multifunctional benefits alongside flood risk mitigation including Biodiversity Net Gain (BNG) contributions, and social and amenity benefits.
- If any structures are demolished for new development, a drainage strategy would therefore be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water

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modelling based on layout plans and detailed design and full consultation with the LLFA. The developer should also follow the National SuDS guidance.

- Assessment of the current drainage system in place should be carried out to ascertain any current capacity issues and whether the current system could accommodate the proposed development or whether further capacity will be required.
- Safe access and escape routes would possibly be achievable by Warpsgrove Lane to the west of the site.

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4 Groundwater, geology and SuDS suitability

Risk of groundwater emergence is assessed in this SFRA using JBA's 5m Groundwater Emergence Map. Figure 4-1 shows the map covering the site and the surrounding areas. Table 4-1 explains the risk classifications.

The entirety of the site is in an area where there is a risk of groundwater emergence to both surface and subsurface assets. Ground investigations will be required through the site-specific FRA to ascertain groundwater levels and conditions. SuDS are unlikely to be suitable for this site.

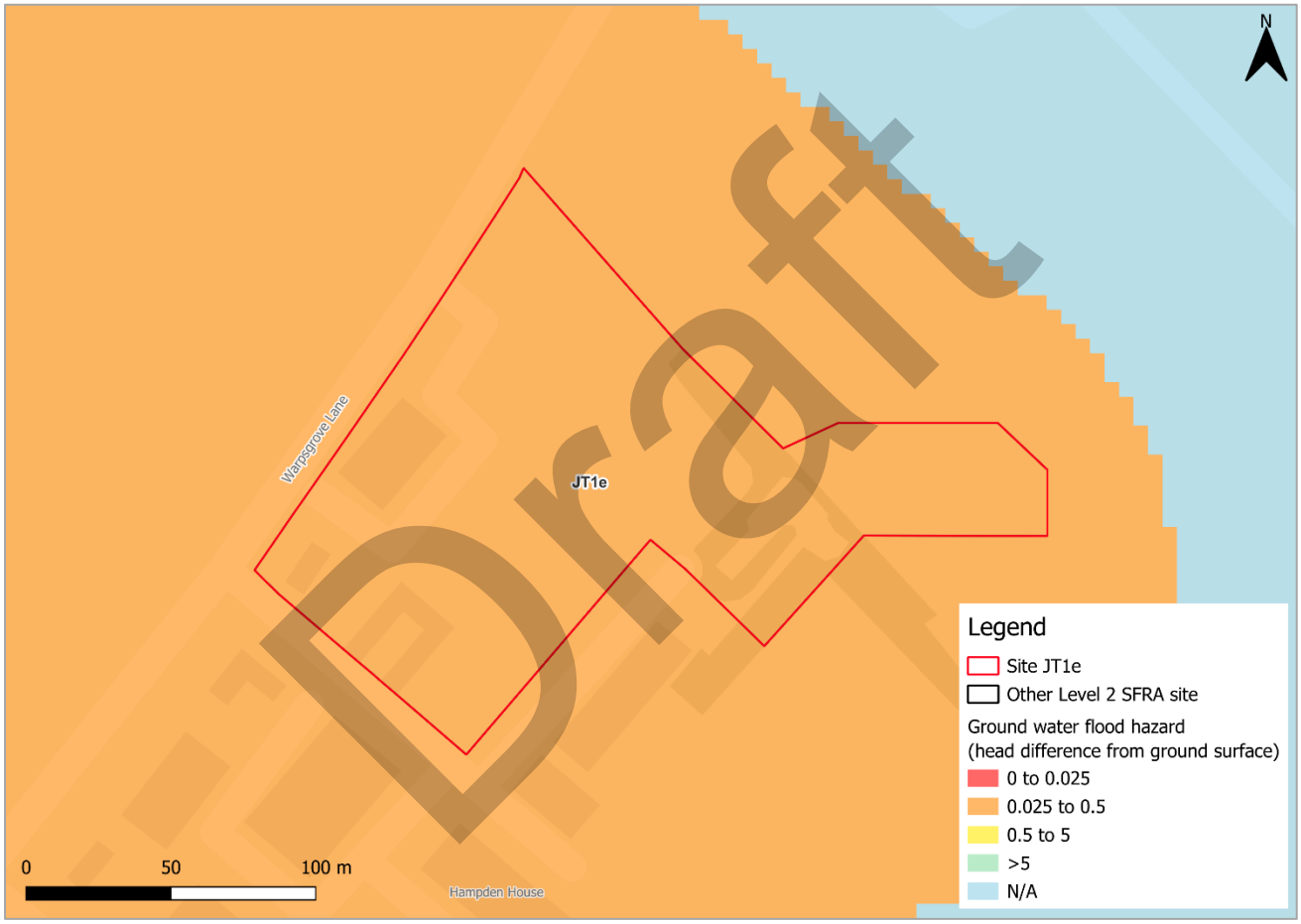

Figure 4-1: JBA 5m Groundwater Emergence Map

Table 4-1: Groundwater Emergence Hazard Classification

Groundwater head difference (m)*	Class label
0 to 0.025	Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
0.025 to 0.5	Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
0.5 to 5	Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event There is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely.
>5	Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event. Groundwater emergence is not likely.
N/A	No risk. This zone is deemed as having a negligible risk from groundwater emergence due to the nature of the local geological deposits.
*Difference is defined as ground surface in mAOD minus modelled groundwater table in mAOD.	

The underlying bedrock within the site is mudstone, sandstone, and limestone. Superficial deposits consist of sand and gravel in southern area of the site (Figure 4-2). Other than sandstone, all these rocks generally have low levels of permeability. This leads to less water infiltrating into the ground and could potentially contribute to lower water table levels. The drainage strategy for the site should investigate water table levels and ground conditions to inform on appropriate SuDS.

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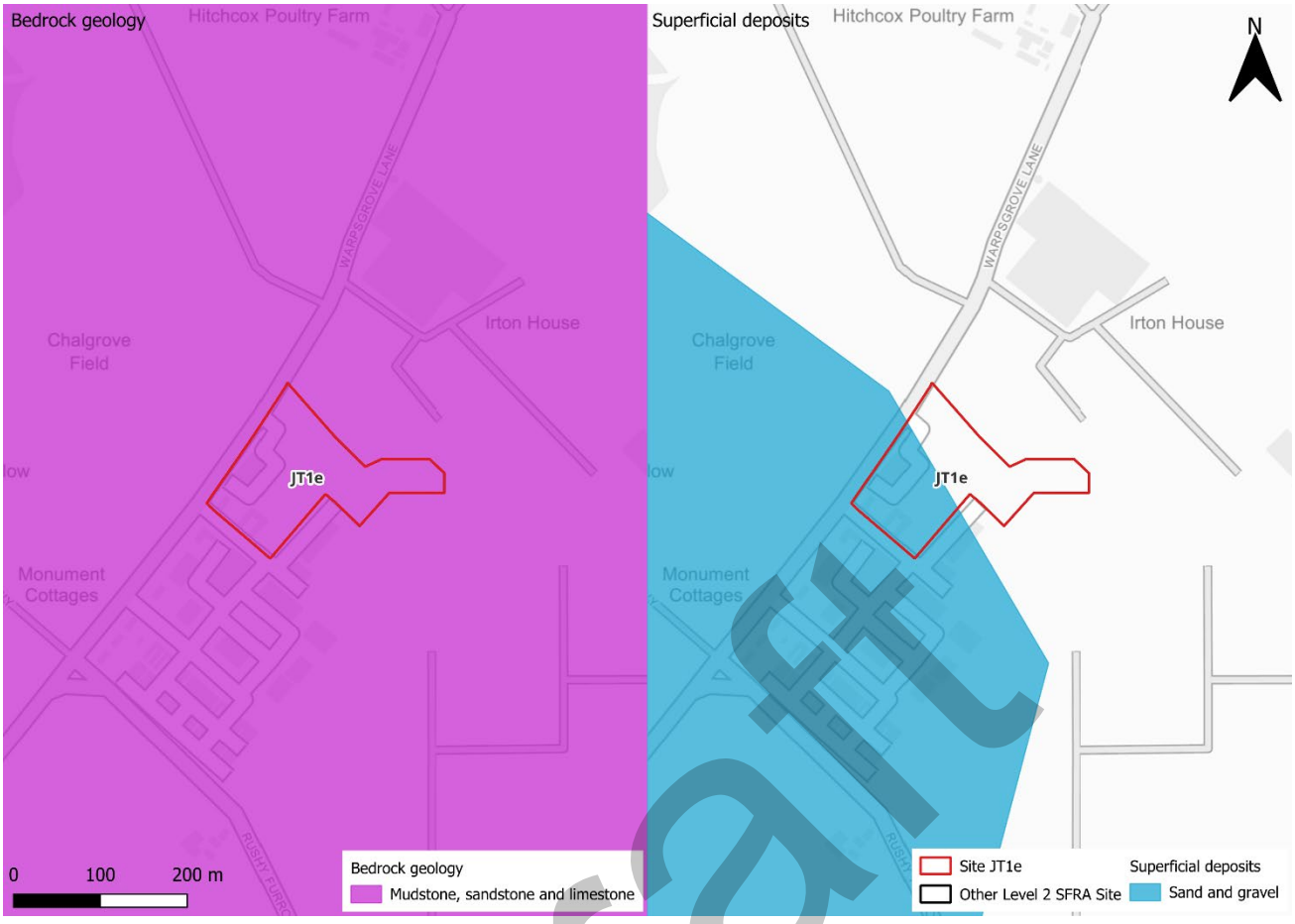

Figure 4-2: BGS Geology - Bedrock and superficial deposits

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5 Overall site assessment

5.1 Can part b) of the exception test be passed?

To pass part b) of the exception test[2], it must be proven that the development can be safe for its lifetime, which is 75 years for non-residential development, taking account of the vulnerability of its users, without increasing risk elsewhere, and, where possible, will reduce flood risk overall. The site is not required to pass the exception test as it is proposed for less vulnerable uses.

5.2 Recommendations and site-specific FRA requirements

Based on the evidence presented in the Level 1 SFRA (2024), Level 1 SFRA Addendum (2026) and this Level 2 SFRA:

- Based on current information, this site could be allocated if development can avoid the area at modelled surface water flood risk in the high and medium risk events. These areas should be maintained and included in site design as open greenspace offering multifunctional benefits alongside flood risk mitigation including BNG contributions, and social and amenity benefits.
- A detailed drainage strategy will be required for any new development, given the large proportion of the site at surface water risk.
- Groundwater conditions must be investigated further.
- Opportunities for NFM features to reduce flood risk to the site and surrounding areas should be explored at the site-specific FRA stage.
- Any site-specific FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; South Oxfordshire and Vale of White Horse District Councils Joint Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the site-specific FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; TW; the highways authorities; and the emergency services.

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[2] Policy F6 National Planning Policy Framework 2026

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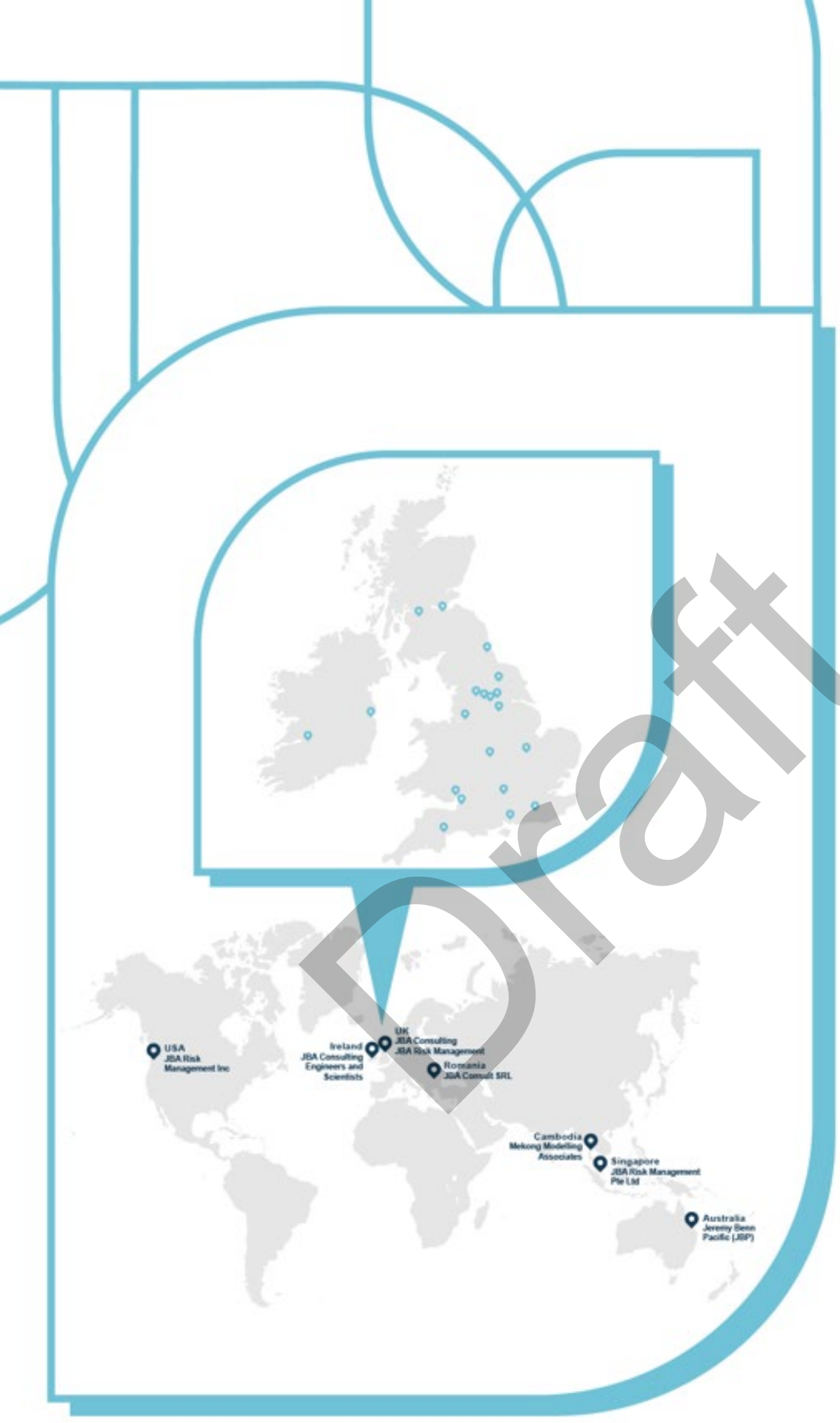

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Warrington

Registered Office
1 Broughton Park
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Broughton
SKIPTON
North Yorkshire
BD23 3FD
United Kingdom

+44(0)1756 799919
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South Oxfordshire and Vale of White Horse Level 2 Strategic Flood Risk Assessment Update

Site JT1f - Abingdon Science Park

Draft Report

October 2026

Prepared for:

South Oxfordshire District Council and

Vale of White Horse District Council

www.jbaconsulting.com

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Prepared by	Boe Kilshaw BSc Assistant Analyst
Reviewed by	Laura Thompson-Jones BSc CGeog FRGS Senior Analyst
Authorised by	Mike Williamson BSc MSc CGeog FRGS EADA Project Director

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JBA Project Manager	Freya Nation
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2026s1132

This report describes work commissioned by South Oxfordshire and Vale of White Horse District Councils. The Client's representative for the contract was Rebekah Goodwill of South Oxfordshire and Vale of White Horse District Councils. Boe Kilshaw of JBA Consulting carried out this work.

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for South Oxfordshire and Vale of White Horse Joint Local Plan Site JT1f - Abingdon Science Park. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA' (2024) and the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum' (2026), and read the 'South Oxfordshire and Vale of White Horse District Councils Level 2 SFRA Main Report Update' (2026) and is therefore familiar with the terminology used in this report.

1.1 Site JT1f - Abingdon Science Park

- Location: Abingdon Science Park (Figure 1-1)
- Existing site use: Brownfield; employment
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Mainly employment
- Proposed site use vulnerability: Less vulnerable
- Site area: 16.7 ha. Allocation for the JLP is 0.7 ha of the total site area.
- Proposed development impermeable area: 14.2 ha / 0.6 ha JLP allocation area (assumed 85% of site area)
- EA model: Thames (Sandford to Pangbourne) 2018
- Watercourse: River Thames / Radley Park Ditch. An unnamed drain flows out of the south of the site.
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for more detailed assessment through Level 2 SFRA (Strategic Recommendation A)
    - Assess present day and future modelled fluvial depths, hazards
    - Assess present day and future modelled surface water depths, hazards

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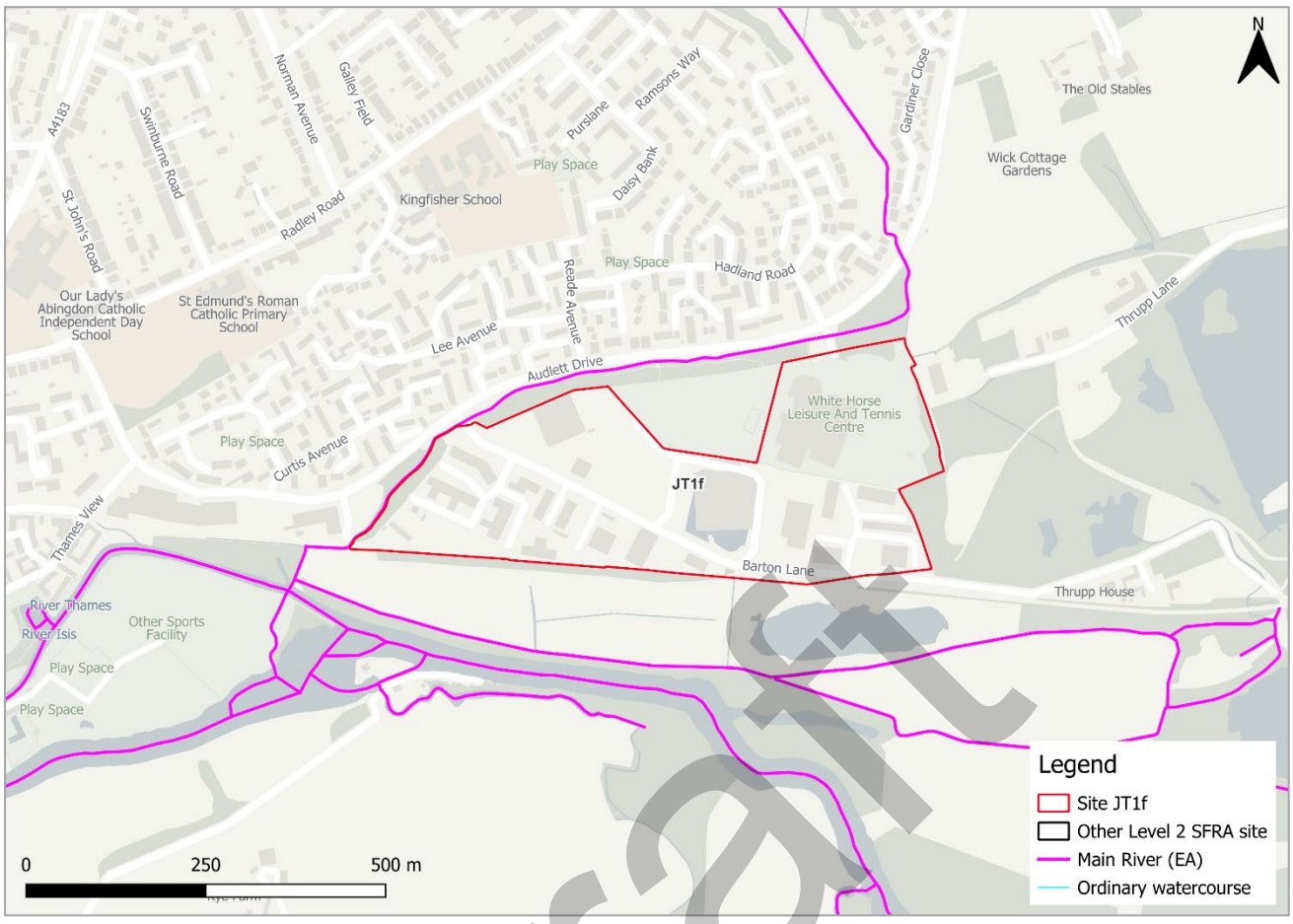

Figure 1-1: Site location

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Figure 1-2: Topography

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2 Flood risk from rivers

2.1 Existing risk

2.1.1 Flood Map for Planning and functional floodplain

Based on the Environment Agency's (EA) Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum (2026), the percentage areas of the site within each flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.4).

The areas along the western and southern boundaries of the site are located within Flood Zone 3b. The area of functional floodplain onsite should be left free of vulnerable development. The functional floodplain in this location is based on 3.3% AEP defended event from the Thames (Sandford to Pangbourne) 2018 model. There are some additional areas of fluvial risk to the west and south of the site within Flood Zone 3a, and therefore at high risk of flooding from rivers, and Flood Zone 2, and therefore at medium risk of flooding from rivers.

The remaining area of the site is within Flood Zone 1 and therefore at low risk of flooding from rivers.

Note that modelled flood depths and hazards along Radley Park Ditch were not available for consideration within this Level 2 SFRA. Any site-specific FRA should include detailed flood modelling of this watercourse.

Table 2-1: Existing flood risk based on percentage area of site at risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
86	11	1	2

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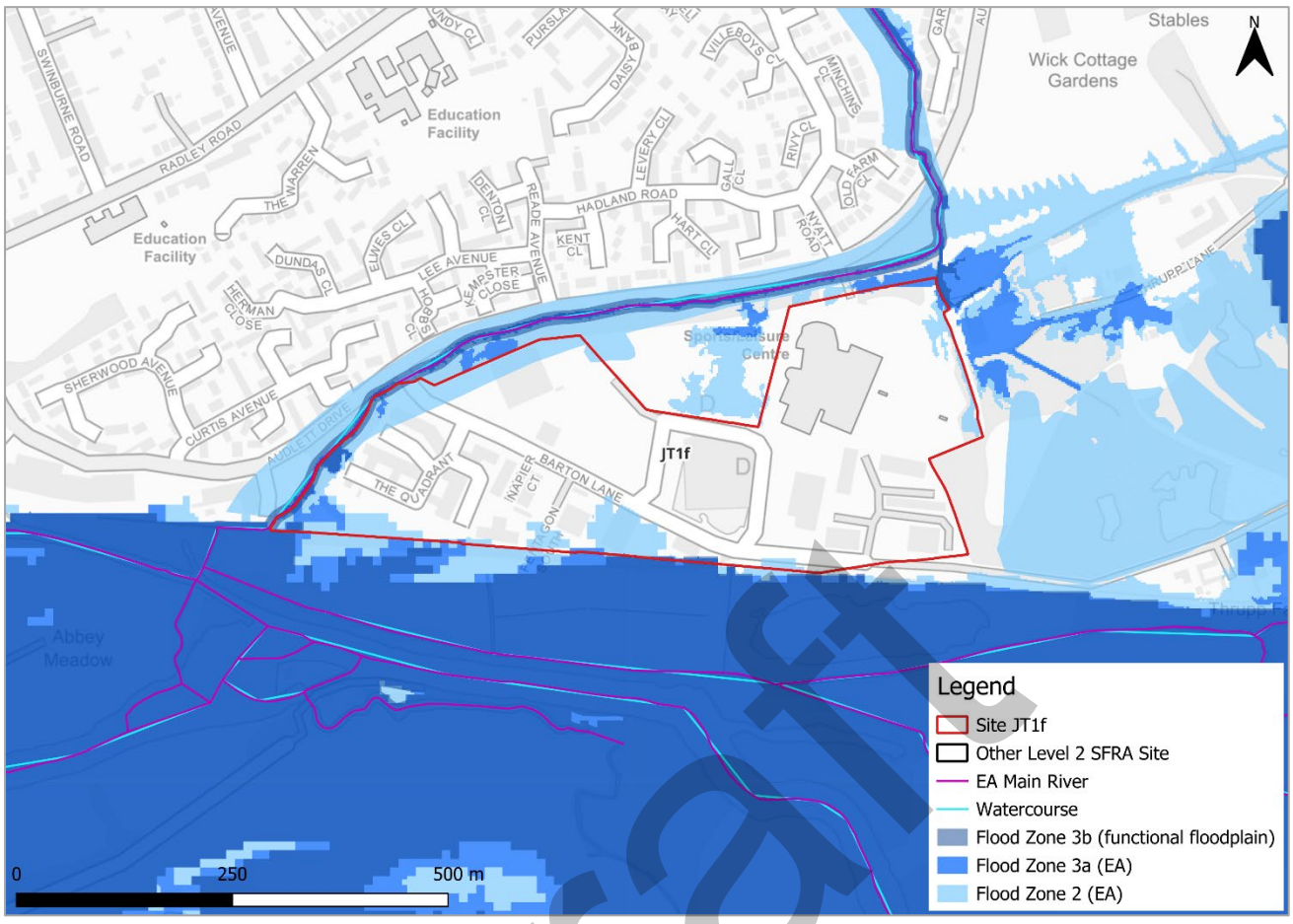

Figure 2-1: Existing risk from rivers to the site

2.1.2 Thames (Sandford to Pangbourne) 2018 model outputs

Figure 2-2 shows the modelled flood depths for the 1% AEP undefended event which is the event Flood Zone 3 of the Flood Map for Planning is based on. Modelled risk to the site is similar to Flood Zone 3 in the vicinity of the site, with the area along the southern boundary of the site modelled to be at risk. Maximum flood depths within the site are modelled to be between 0.3 and 0.6m. Figure 2-3 shows the modelled flood hazard ratings for the 1% AEP undefended event. Modelled flood hazard in the area of the site at fluvial flood risk is largely categorised as 'Very low'. There is no modelled flood risk to the rest of the site in the 1% AEP undefended event.

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Figure 2-2: Flood depths for 1% AEP undefended flood event

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Figure 2-3: Flood hazard[1] for 1% AEP undefended flood event

2.2 Impacts from climate change

2.2.1 Thames (Sandford to Pangbourne) 2018 model outputs

The EA's SFRA guidance states that SFRAs should assess the 2080s central allowance for less vulnerable, more vulnerable, highly vulnerable and water compatible development (Table 2-2). The impacts of climate change on flood risk from the River Thames has not been modelled for this SFRA. The impacts of climate change must be modelled using the EA's latest allowances for peak river flows to inform whether the site can be safe for its lifetime and to assess modelled flood depths and hazards. Therefore, any updates to this Level 2 SFRA and/or any site-specific FRA should include for the most up to date climate change allowances.

[1] Fluvial hazard ratings based on Table 4 of the Supplementary Note on Flood Hazard Ratings and Thresholds for Development Planning and Control Purpose – Clarification of the Table 13.1 of FD2320/TR2 and Figure 3.2 of FD2321/TR1. May 2008. Environment Agency.

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Table 2-2: Climate change allowances for peak river flows for the Gloucestershire and the Vale management catchment

Epoch	Central	Higher Central	Upper End
2020s	11%	17%	33%
2050s	11%	19%	43%
2080s	26%	41%	84%

2.2.2 Flood Map for Planning - Flood Zones plus Climate Change

Figure 2-4 shows the EA's Flood Map for Planning - Flood Zones plus Climate Change dataset. Based on this dataset, a large area within the east of the site is shown to be at additional risk from climate change. This dataset shows how the combined extent of Flood Zones 2 and 3 could increase with climate change. The impacts of climate change must be modelled using the EA's latest allowances for peak river flows to inform whether the site can be safe for its lifetime and to assess modelled flood depths and hazards.

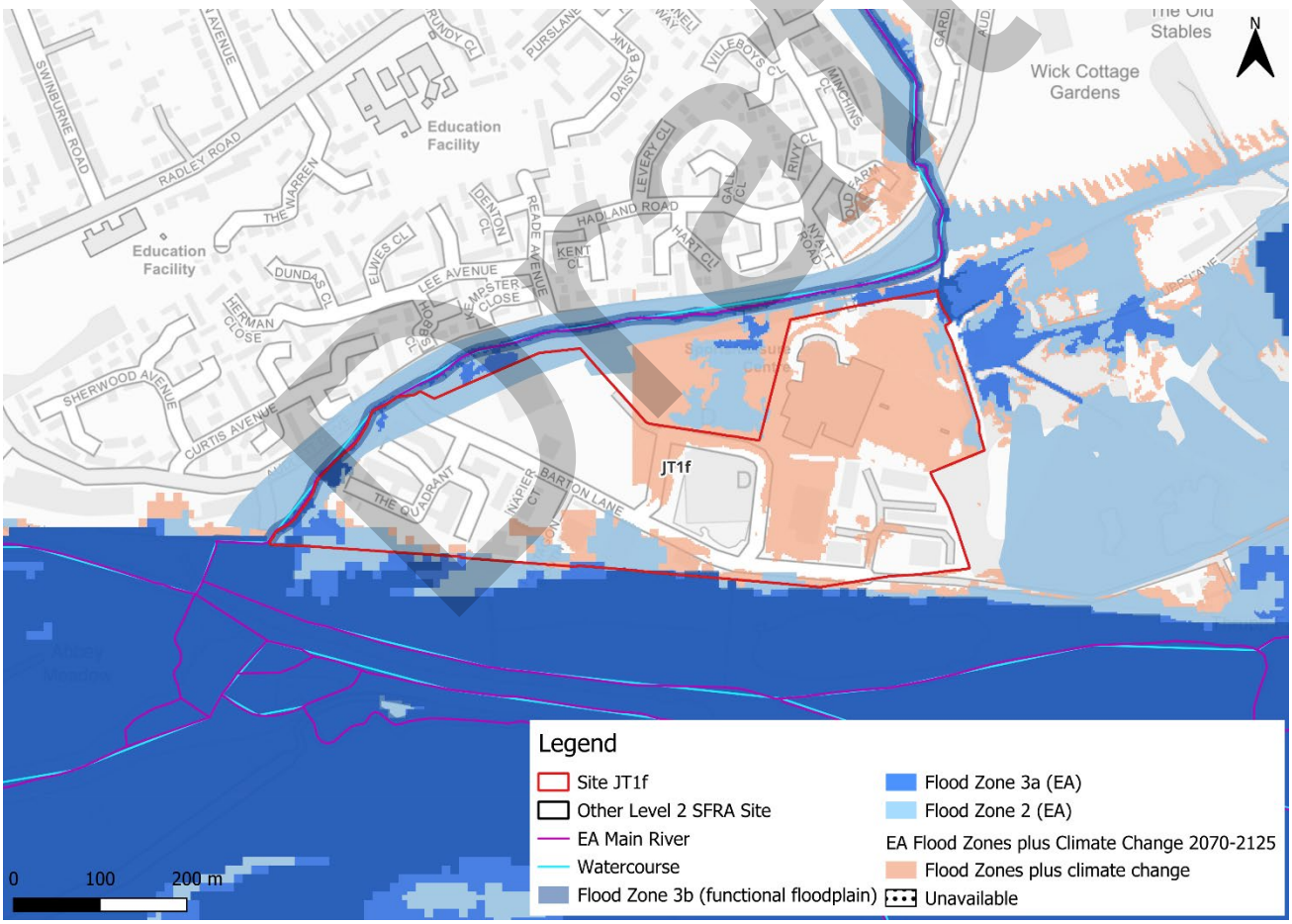

Figure 2-4: Flood Zones plus Climate Change Dataset

2.3 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. Historic risk to the site is shown in Figure 2-5 which shows that the area

along the north western boundary of the site has been subject to flooding in the past. The RFO dataset references that this area was subject to flooding in Autumn 1992 due to fluvial flooding from the Radley Park Ditch.

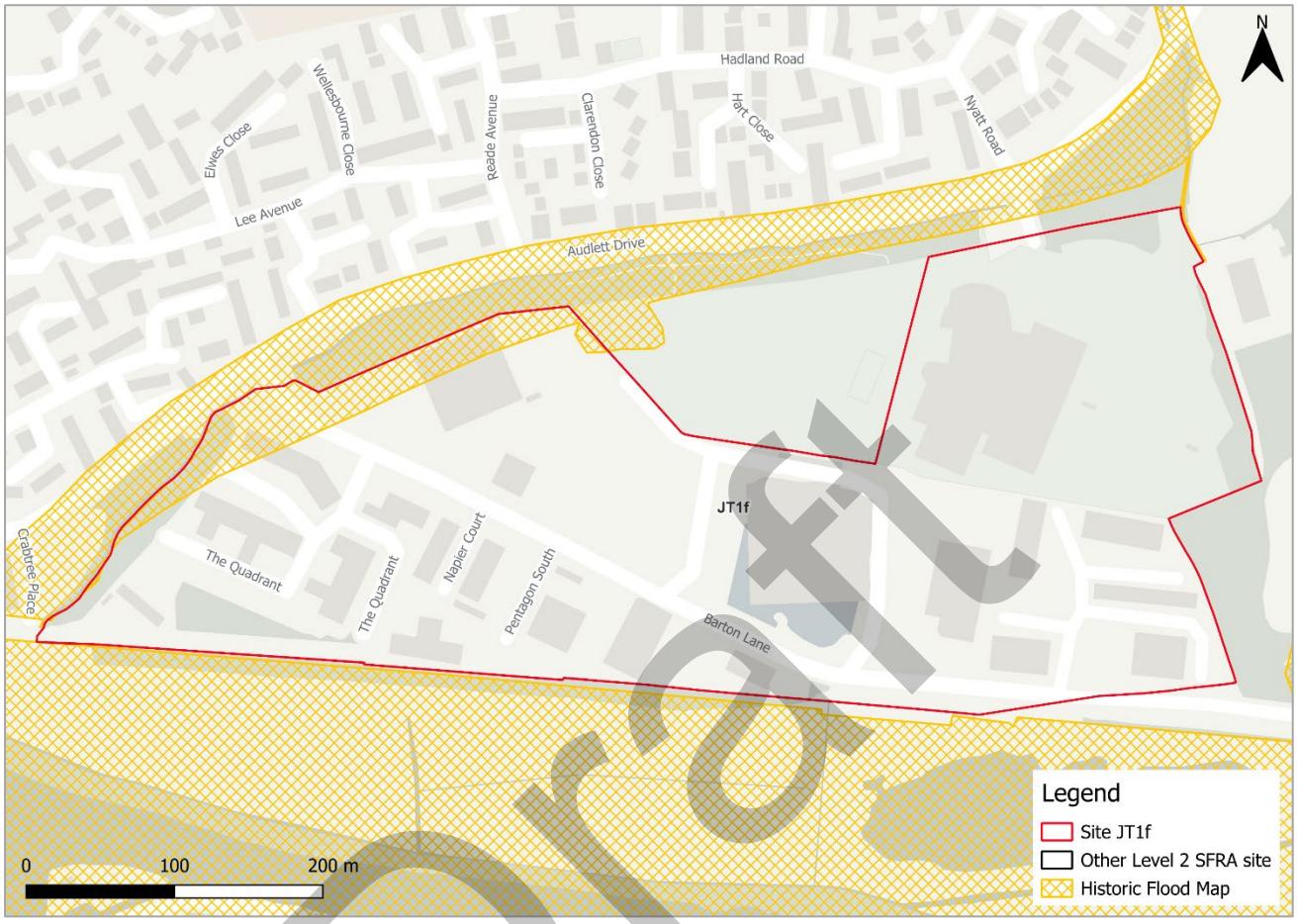

Figure 2-5: Recorded historic flood events onsite and around the site

2.4 Flood risk management

Flood defences are in place along the left bank of Radley Park Ditch, as shown in Figure 2-6. Information provided in the EA's 'Spatial Flood Defences' dataset states that this defence is a raised embankment with a design Standard of Protection (SoP) of 5 years. Actual SoP is unknown. Current condition is also unknown. The dataset states that a private individual, company or charity owns and maintains the defence.

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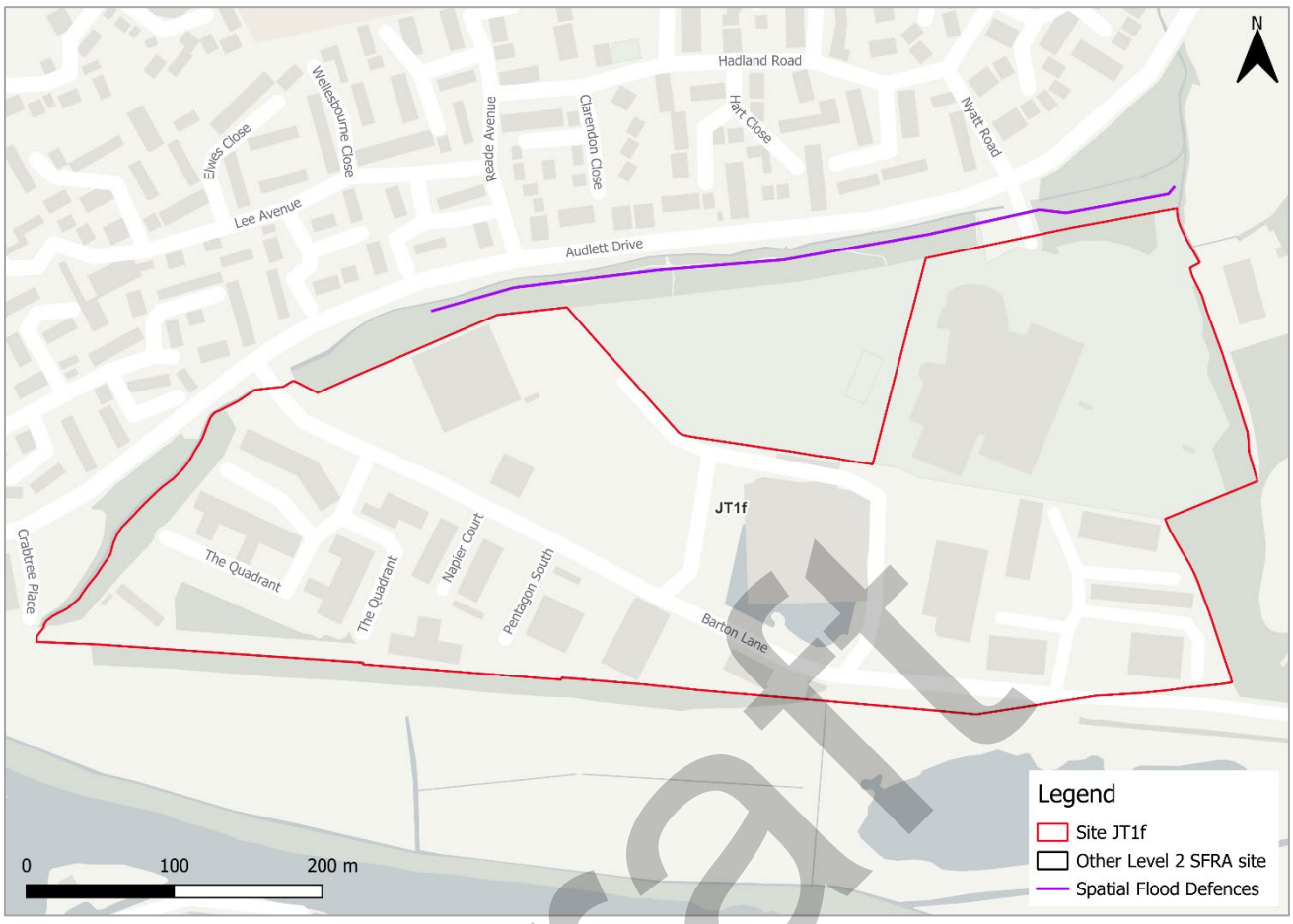

Figure 2-6: EA Spatial Flood Defences dataset

2.4.1 Cumulative impacts

A cumulative impact assessment was completed through the South Oxfordshire and Vale of White Horse Level 1 SFRA Addendum (2026), which aimed to identify catchments sensitive to the cumulative impact of development. Site JT1f (Abingdon Science Park) is located within one catchment, namely; Thames (Evenlode to Thame). This is ranked as a higher sensitivity catchment. Planning considerations for sites at higher sensitivity to the cumulative impacts of development can be found in Appendix D of the Level 1 SFRA Addendum. Cumulative impacts of development should also be considered as part of a site-specific FRA.

2.4.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. Upstream of the site, there is potential to reconnect the channel to the floodplain, allowing flood water to be stored. Within the site, there are opportunities for runoff attenuation features to slow the rate of flood waters downstream. Within the Thames floodplain, there is significant potential for tree planting to slow floodwaters, reduce flood

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peak height and reduce sediment delivery to the watercourse. These areas are shown in Figure 2-7.

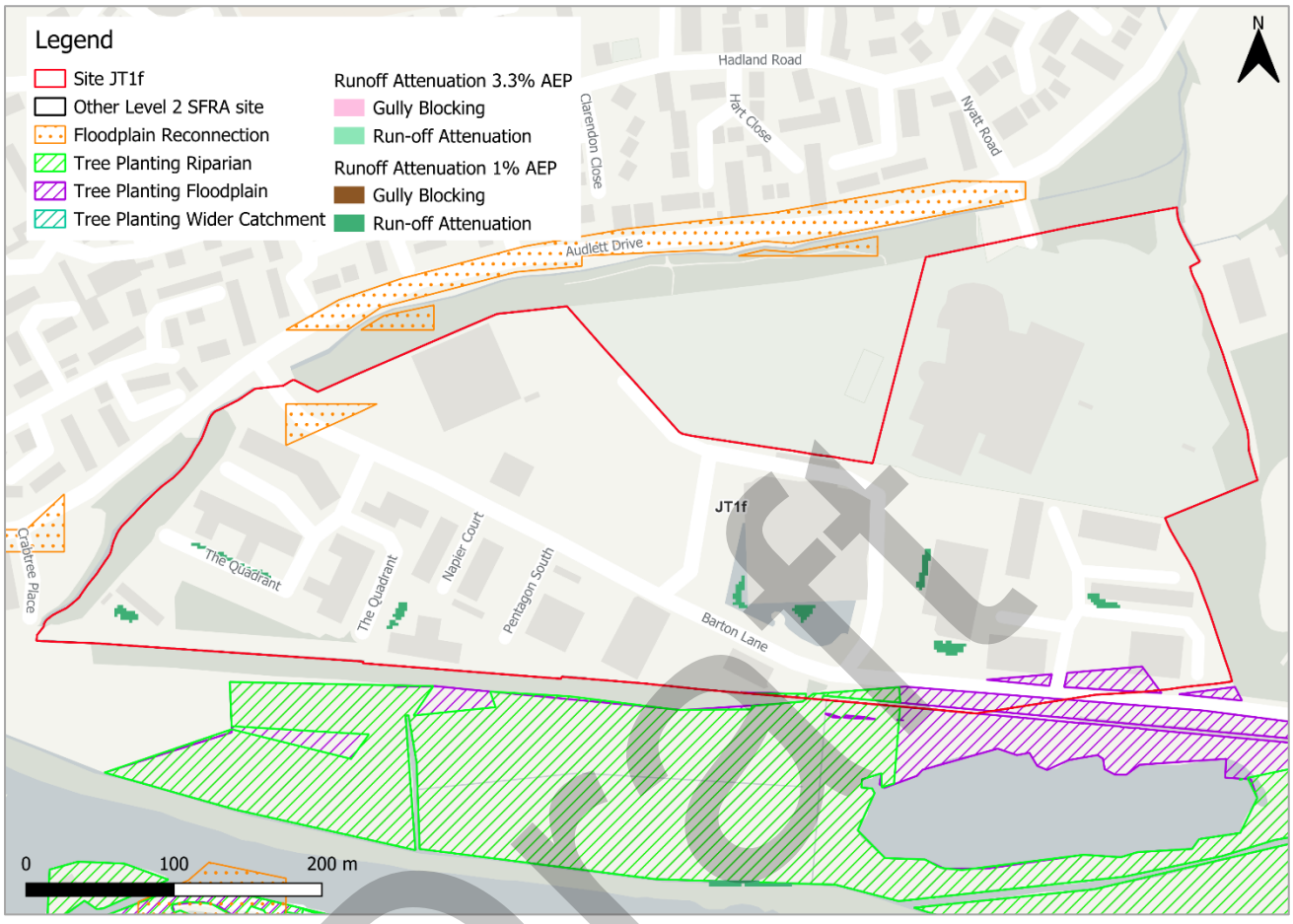

Figure 2-7: Natural Flood Management (NFM) potential mapping

2.5 Residual risk

Although a site may be afforded some protection from defences and / or drainage infrastructure, there is always a residual risk of flooding from asset failure i.e. defence breaches, or blockages of culverts or drainage assets. Residual risk at this site comes from the potential blockage or structural failure of Radley Park Ditch along the northern boundary of the site.

2.5.1 Potential blockage

There is potential residual risk to the site from a possible blockage of Radley Park Ditch along the northern boundary of the site (Figure 2-8). The impact of a blockage of this structure has not been modelled as part of this Level 2 SFRA, as there is no existing flood model for the watercourse. There is also potential residual risk to the site from a possible breach of the defence along the left bank of Radley Park Ditch.

It is recommended that the site-specific FRA should consider the impact of the potential blockage and breach locations on residual flood risk to the site.

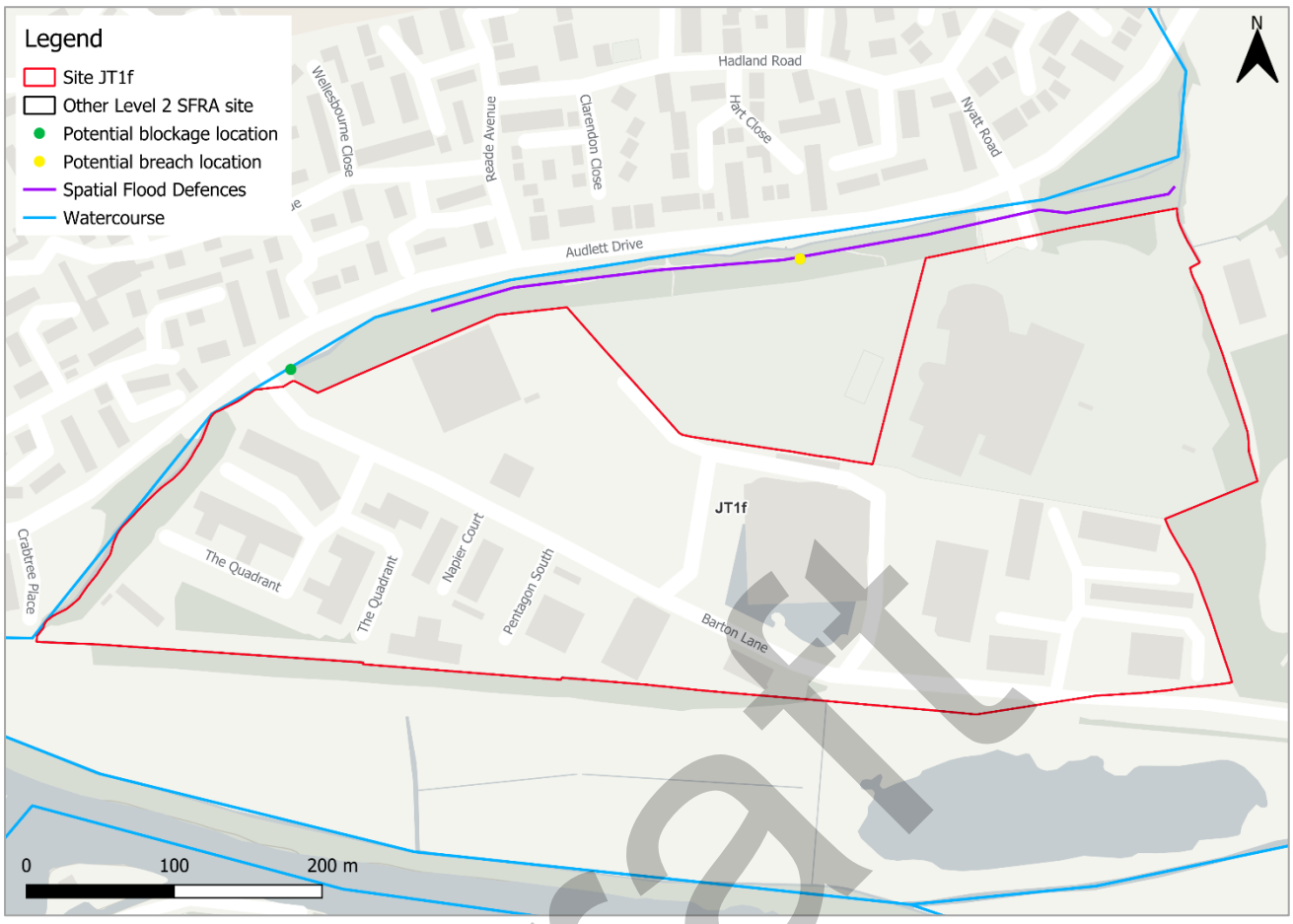

Figure 2-8: Potential culvert blockage location

2.5.2 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. Figure 2-9 shows the RFM in a "dry day" and "wet day" scenario. A "dry day" scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. A "wet day" scenario assumes a worst-case scenario where a reservoir releases water held on a "wet day" when local rivers have already overflowed their banks.

The site is potentially at risk from two reservoirs which are located in Oxfordshire, namely Farmoor No.1 and Farmoor No.2. The site is also potential at risk from one reservoir located within West Northamptonshire, namely Banbury FAS.

The EA's SFRA guidance states that where a proposed development site is at flood risk from a reservoir, then an assessment into whether the reservoir design or maintenance schedule needs improving should be carried out. Expert advice may be required.

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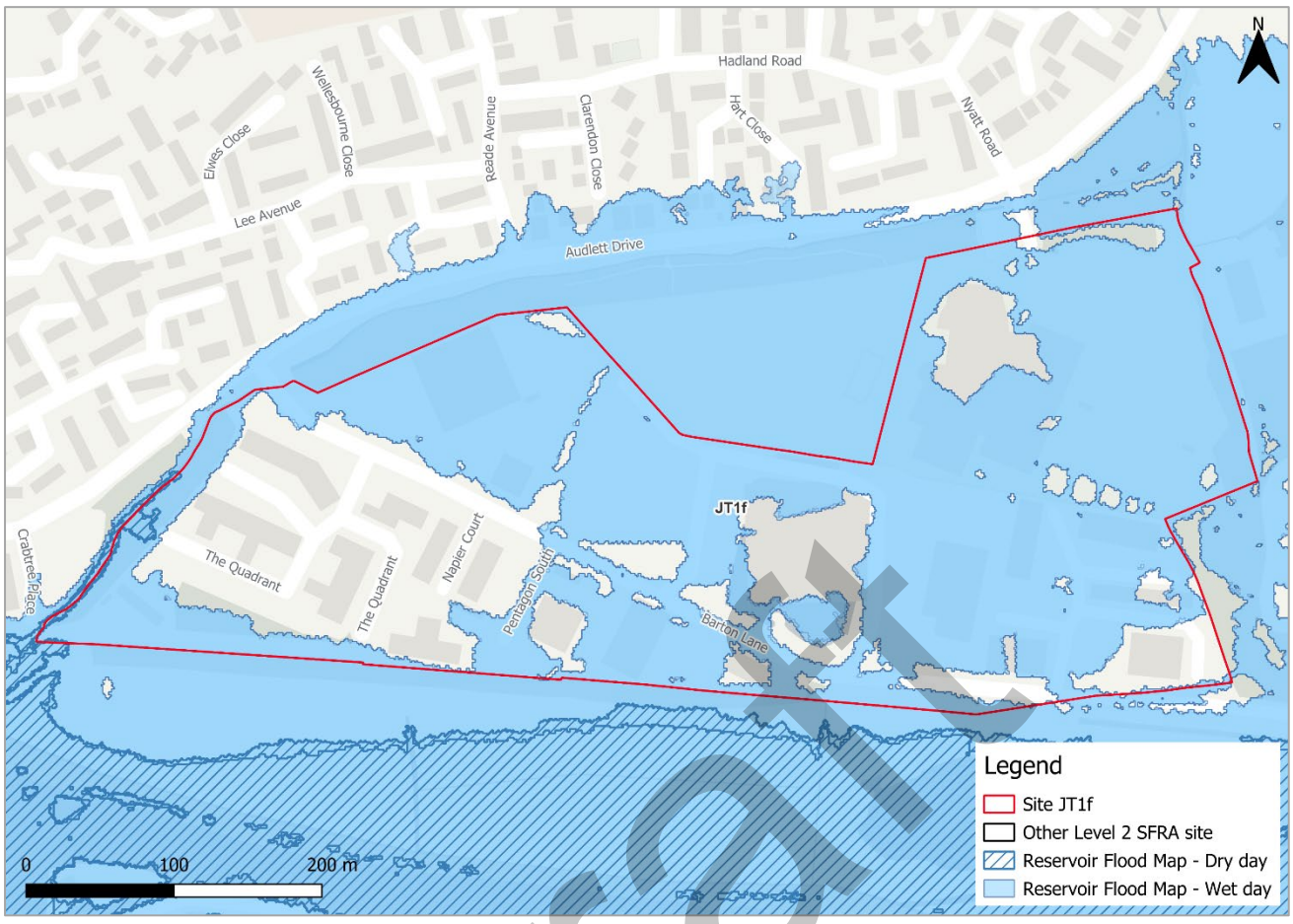

Figure 2-9: Flood risk from reservoirs

2.6 Emergency Planning

2.6.1 Flood warnings and alerts

The EA operates a Flood Warning Service for properties located within a Flood Warning Area (FWA) for when a flood event is expected to occur. Site JT1f (Abingdon Science Park) is partially located within one FWA; 061FWF23Abingdon - River Thames in Abingdon, as shown on Figure 2-10.

Flood alerts may be issued before a flood warning for properties located within a Flood Alert Area (FAA) to provide advance notice of the possibility of flooding. A flood alert may be issued when there is less confidence that flooding will occur in a FWA. The site is also located within a FAA, namely 061WAF23Abingdon - River Thames for the Abingdon area, as shown on Figure 2-10.

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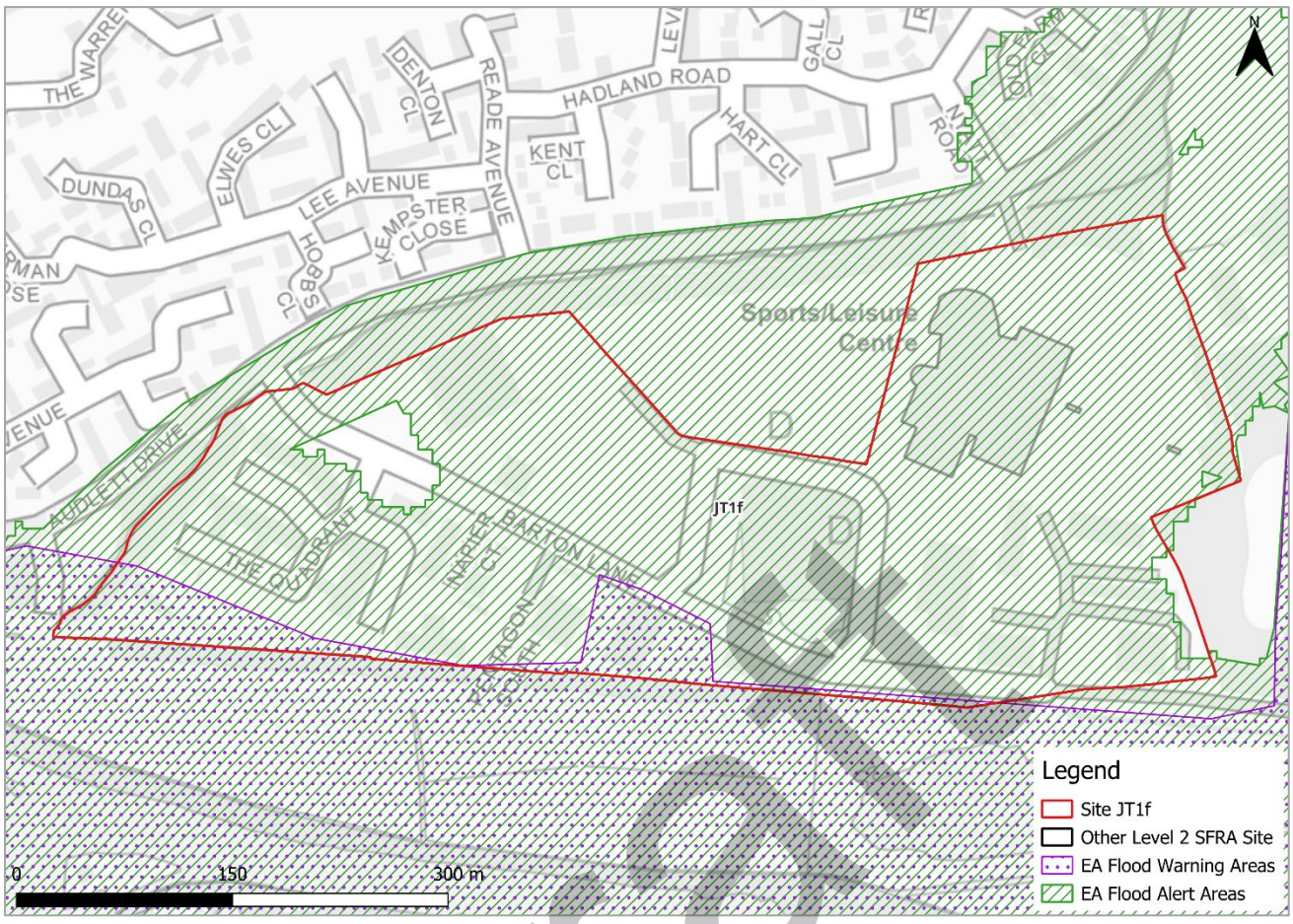

Figure 2-10: EA Flood Warning and Alert Areas

2.6.2 Access and escape

Safe access and escape routes may be challenging to achieve via existing road infrastructure. Routes via the east of the site should be explored.

2.7 Observations, mitigation options, site suitability, sequential approach to development management - fluvial

- Observations:
  - The site is modelled to be within the functional floodplain along the western and southern boundaries of the site. Vulnerable development is not permitted within the functional floodplain.
  - There should be no development within 8m of the Radley Park Ditch apart from permitted access. The EA recommend for an 8m no development buffer for all main rivers to enable access for maintenance activities.
  - A flood risk activity permit may be required if development is planned within 8m of the riverbank. The EA can advise on whether a permit will be required.
  - The site is partially located in Flood Zone 3, as indicated by the EA's Flood Map for Planning and the Thames (Sandford to Pangbourne) 1% AEP

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undefended event outputs. Greatest depths within the site boundary are modelled to be between 0.3 and 0.6m.

- The EA Flood Zones plus Climate Change dataset shows the site is at significant additional risk from climate change. However, as discussed, there is no detailed climate change modelling available for the reach of the River Thames to the south of the site to understand the impact of climate change on fluvial flood depths, velocities and hazards. Climate change must be modelled at the site-specific FRA stage.
- It would be acceptable to use updated climate change modelling to suitably assess risk through a site-specific FRA, as well as/instead of a Level 2 SFRA update.
- Any site-specific FRA should also include for detailed flood modelling of Radley Park Ditch to inform flood depths and hazards along the western boundary of the site.

- Mitigation:
  - The areas of the site shown to be at fluvial risk, including for the impacts of climate change, should be maintained and included in site design as a green / blue corridor offering multifunctional benefits alongside flood risk mitigation including Biodiversity Net Gain (BNG) contributions, and social and amenity benefits. This should be supported by detailed climate change modelling.
  - The EA flood warnings and alerts should continue to be in place to ensure early evacuation of site users before an extreme flood event occurs.
- Residual risk:
  - The site is at potential residual risk from a blockage of Radley Park Ditch along the northern boundary of the site. The site-specific FRA should consider modelling a blockage scenario to understand whether there would be any additional risk to the site.
  - Areas adjacent to culverts and bridges are at particular risk from the rapid onset of fast flowing and deep flooding, with little or no warning if structures become blocked.
  - Emergency plans must be in place for such areas and safe access and escape routes must be in place for the lifetime of development. Resistance and resilience measures may also need to be put in place to manage residual flood risk when avoidance measures have been exhausted.
  - The LPA should use the information on residual risk in this Level 2 SFRA to state in the local plan strategic policies a preferred mitigation strategy for ensuring development will be safe throughout its lifetime in relation to urban form, risk management and where flood mitigation measures are likely to have wider sustainable design implications (para 042, FRCC-PPG).
  - The site is also at potential residual risk from a breach of two reservoirs. Given the potential reservoir risk to the site, developers should consider:
    - Consulting with the local resilience forum for advice on emergency planning,

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- Consulting with relevant reservoir owners to understand the impact development may have on their reservoirs, and
- Using this Level 2 SFRA to understand whether any proposed development will be safe throughout its lifetime.

- Access and escape:
  - Safe access and escape routes may be challenging to achieve based on present day and future fluvial risk to the site and surrounding areas.

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3 Flood risk from surface water

3.1 Existing risk

3.1.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths Present Day

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Extents Present Day map (September 2026), the majority of the site is at very low risk from surface water flooding, as shown in Table 3-1.

Surface water risk is largely confined to areas of ponding in topographic low spots scattered across the site. Surface water risk is constrained by the existing development within the site (Figure 3-1).

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Depths Present Day map, the greatest flood depths are between 0.9 and 1.2m within the east of the site, however depths are predominantly below 0.3m across the remaining area at risk (Figure 3-2).

Audlett Drive is modelled to be a possible safe access and escape route, based on surface water risk only.

Table 3-1: Existing surface water flood risk based on percentage area at risk using the Flood Map for Planning - Surface Water Spatial Planning Extent Present Day map

Less than 0.1% AEP event (% area)	0.1% AEP event (% area)	1% AEP event (% area)	3.3% AEP event (% area)
86	8	4	2

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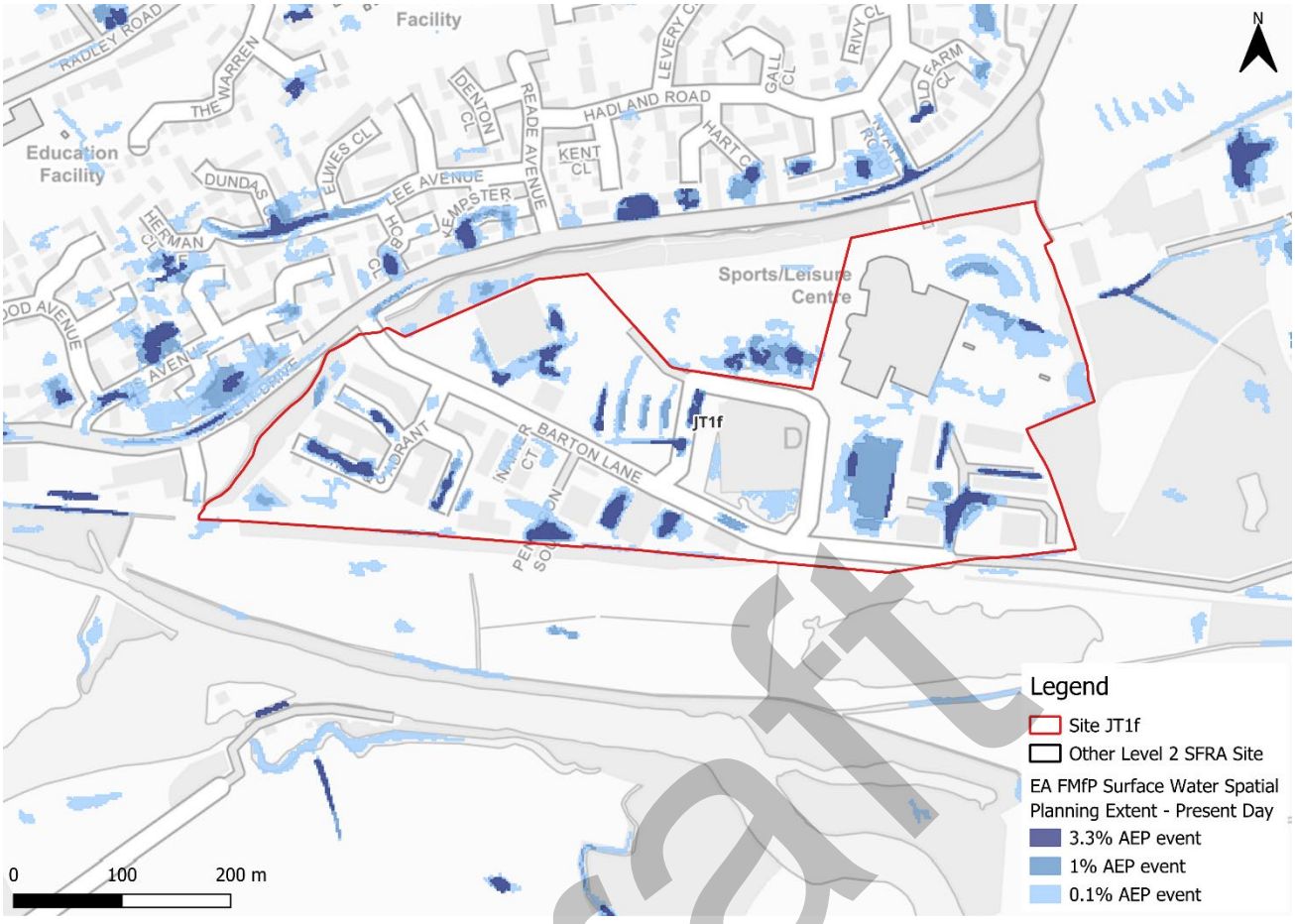

Figure 3-1: Flood Map for Planning - Surface Water Spatial Planning Extents Present Day

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Figure 3-2: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Present Day for the 1% AEP event

3.1.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning data does not include hazard information suitable for planning purposes. Therefore, this Level 2 SFRA considers the third generation Risk of Flooding from Surface Water (RoFSW) hazard mapping in addition to the Flood Map for Planning - Surface Water Spatial Planning extents and depths, as the best available information. Updated surface water hazard information would need to be confirmed at the site-specific FRA stage.

Based on the EA's national scale third generation RoFSW map, the greatest flood hazard within the site in the medium risk event is categorised as 'significant', however is predominantly 'moderate' to 'low' (Figure 3-3).

There are differences between the Flood Map for Planning - Surface Water Spatial Planning map and the third generation RoFSW hazard mapping. The Flood Map for Planning - Surface Water Spatial Planning data does not map flooding less than 0.075m (7.5cm) in depth. Therefore, where the map may show no flooding, there may be shallow flooding up to a depth of 0.075m. In contrast, the third generation RoFSW does not map flooding with a hazard rating of less than 0.575. This could explain the differences observed between the Flood Map for Planning and third generation RoFSW maps.

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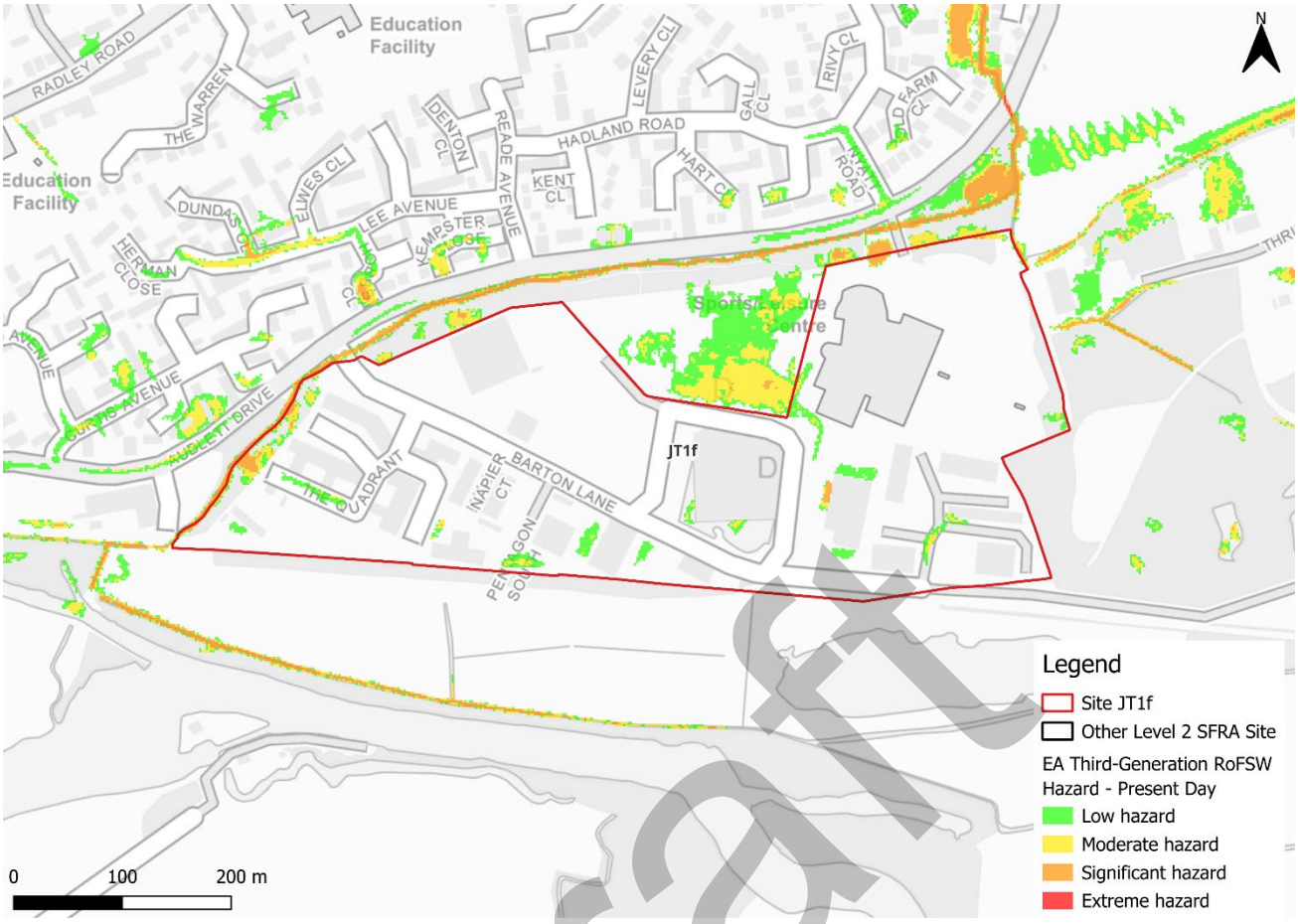

Figure 3-3: Third generation - Risk of Flooding from Surface Water map present day 1% AEP event surface water flood hazard[2]

3.2 Impacts from climate change

3.2.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths

The EA's climate change allowance guidance states that SFRA's should assess the upper end peak rainfall allowance for the 2070s epoch. This dataset is included in the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Climate Change dataset (September 2026). The peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment are shown in Table 3-2. The allowance for the 0.1% AEP event is not stated in the EA guidance.

2 Based on Section 7.5 Hazard rating. What is the Risk of Flooding from Surface Water map? Report version 2.0. April 2019. Environment Agency

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Table 3-2: Peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment

Return period	Central allowance 2070s (% increase)	Upper end allowance 2070s (% increase)
3.3% AEP	25	35
1% AEP	25	40

Figure 3-4 shows the surface water flood extents for the 2070s upper end climate change scenario. Surface water flood risk is shown to increase in extent with climate change. There are a number of additional areas of surface water ponding across the site in all events.

Flood depths are modelled to remain at between 0.9 and 1.2m, however the majority of the area at risk is shown to flood to depths of less than 0.3m (Figure 3-5).

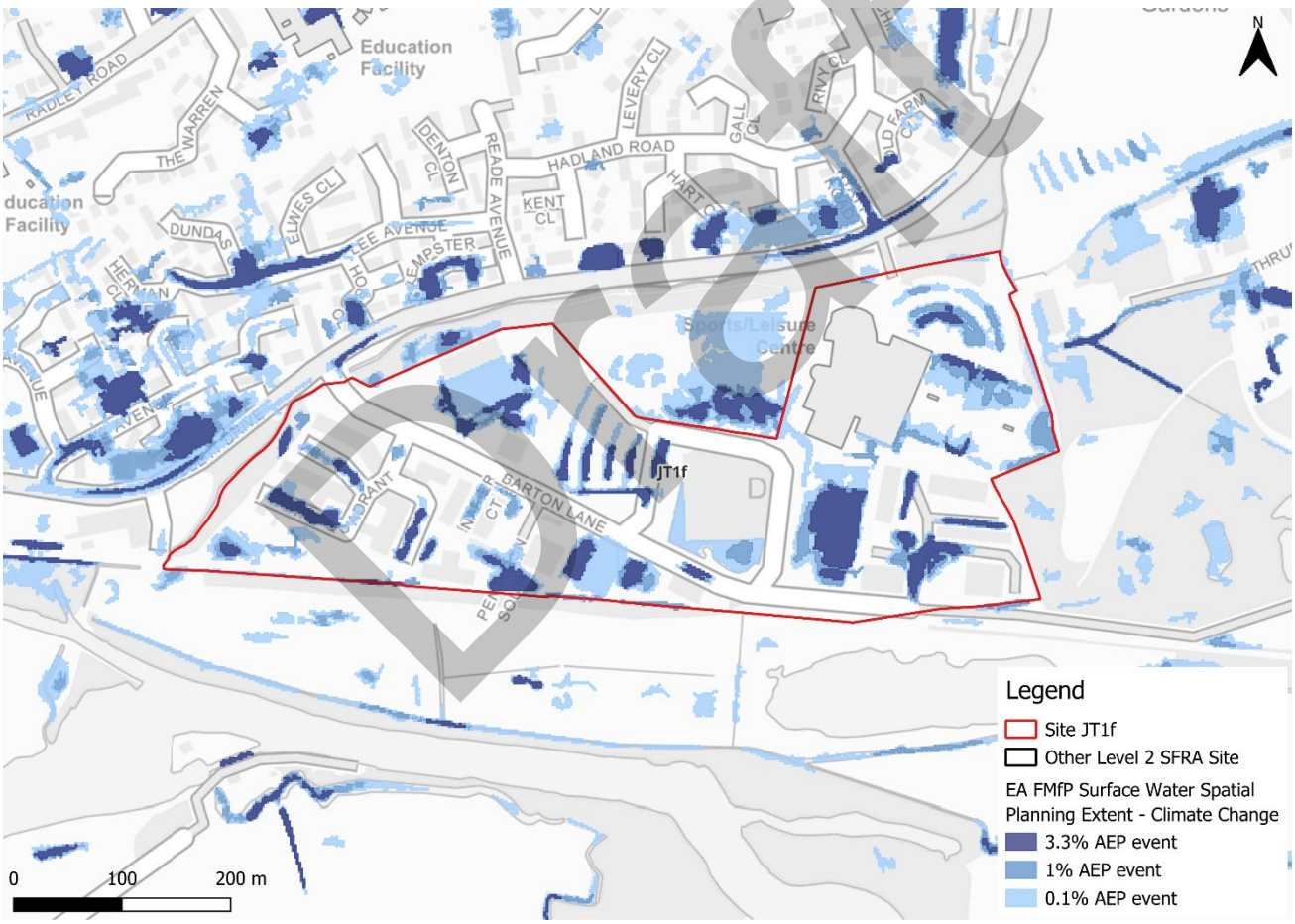

Figure 3-4: Flood Map for Planning - Surface Water Spatial Planning Extents Climate Change (2070s Upper End)

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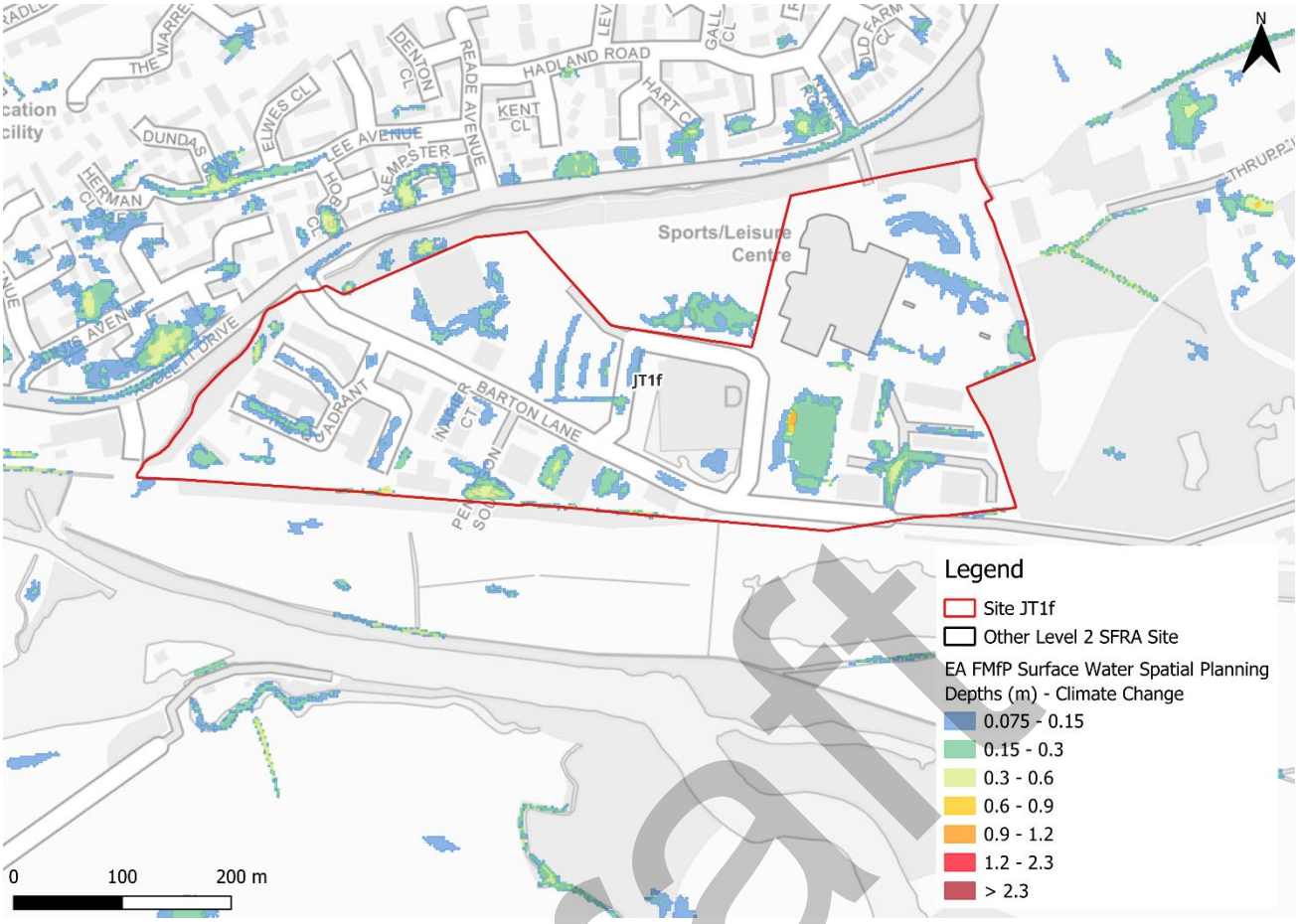

Figure 3-5: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Climate Change for the 1% AEP event (2070s Upper End)

3.2.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning climate change data does not include hazard information suitable for planning purposes. This Level 2 SFRA therefore considers the RoFSW low risk surface water event as a conservative proxy for the medium risk event plus climate change, as the best available information to assess surface water flood hazards. The impact of climate change on surface water flood hazards should be considered at the site-specific FRA stage.

Using the RoFSW low risk event as a proxy, future surface water flood hazard in the medium risk event is categorised as 'significant' (Figure 3-6).

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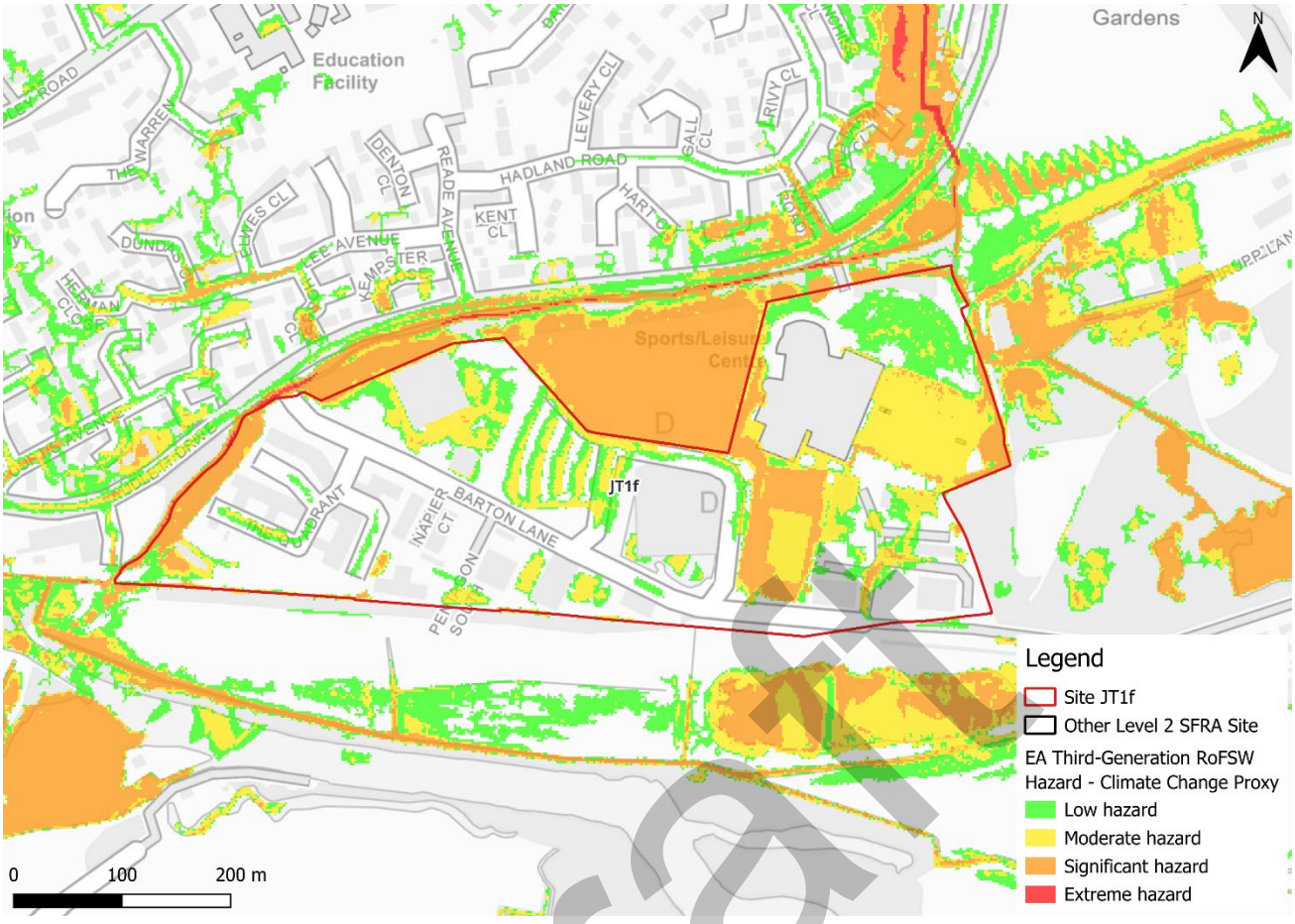

Figure 3-6: Low risk event surface water flood hazard[2], as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options, site suitability, sequential approach to development management - surface water

- Current risk to the site is predominantly very low, with 86% of the site being outside of the 0.1% AEP surface water flood extent. Surface water risk is confined to areas of ponding within topographic low spots scattered across the site. Surface water risk is constrained by the existing development within the site.
- Risk to the site is shown to increase in extent when considering the impact of climate change, with greater areas of ponding particularly in the northeast of the site.
- Topographic low spots should be considered and included in site design and ideally left in place to flood naturally when required.
- If any structures are demolished for new development, a drainage strategy would therefore be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA. The developer should also follow the National SuDS guidance.
- Assessment of the current drainage system in place should be carried out to ascertain any current capacity issues and whether the current system could

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accommodate the proposed development or whether further capacity will be required.

- Safe access and escape should remain achievable via Audlett Drive to the west of the site, based on surface water risk only.

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4 Groundwater, geology and SuDS suitability

Risk of groundwater emergence is assessed in this SFRA using JBA's 5m Groundwater Emergence Map. Figure 4-1 shows the map covering the site and the surrounding areas. Table 4-1 explains the risk classifications.

Across the majority of the site there is a negligible risk of groundwater emergence. Within the south and west of the site, there is a risk of emergence to both surface and subsurface assets. Ground investigations will be required through the site-specific FRA to ascertain groundwater levels and conditions. SuDS are unlikely to be suitable within the centre of the site, however SuDS may be suitable for the majority of the site following investigations into groundwater.



Figure 4-1: JBA 5m Groundwater Emergence Map

Table 4-1: Groundwater Emergence Hazard Classification

Groundwater head difference (m)*	Class label
0 to 0.025	Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
0.025 to 0.5	Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
0.5 to 5	Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event There is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely.
>5	Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event. Groundwater emergence is not likely.
N/A	No risk. This zone is deemed as having a negligible risk from groundwater emergence due to the nature of the local geological deposits.
*Difference is defined as ground surface in mAOD minus modelled groundwater table in mAOD.	

The underlying bedrock within the site is mudstone, sandstone, and limestone. Superficial deposits consist of sand and gravel (Figure 4-2). Other than sandstone, all these rocks generally have low levels of permeability. This leads to less water infiltrating into the ground and could potentially contribute to lower water table levels. The drainage strategy for the site should investigate water table levels and ground conditions to inform on appropriate SuDS.

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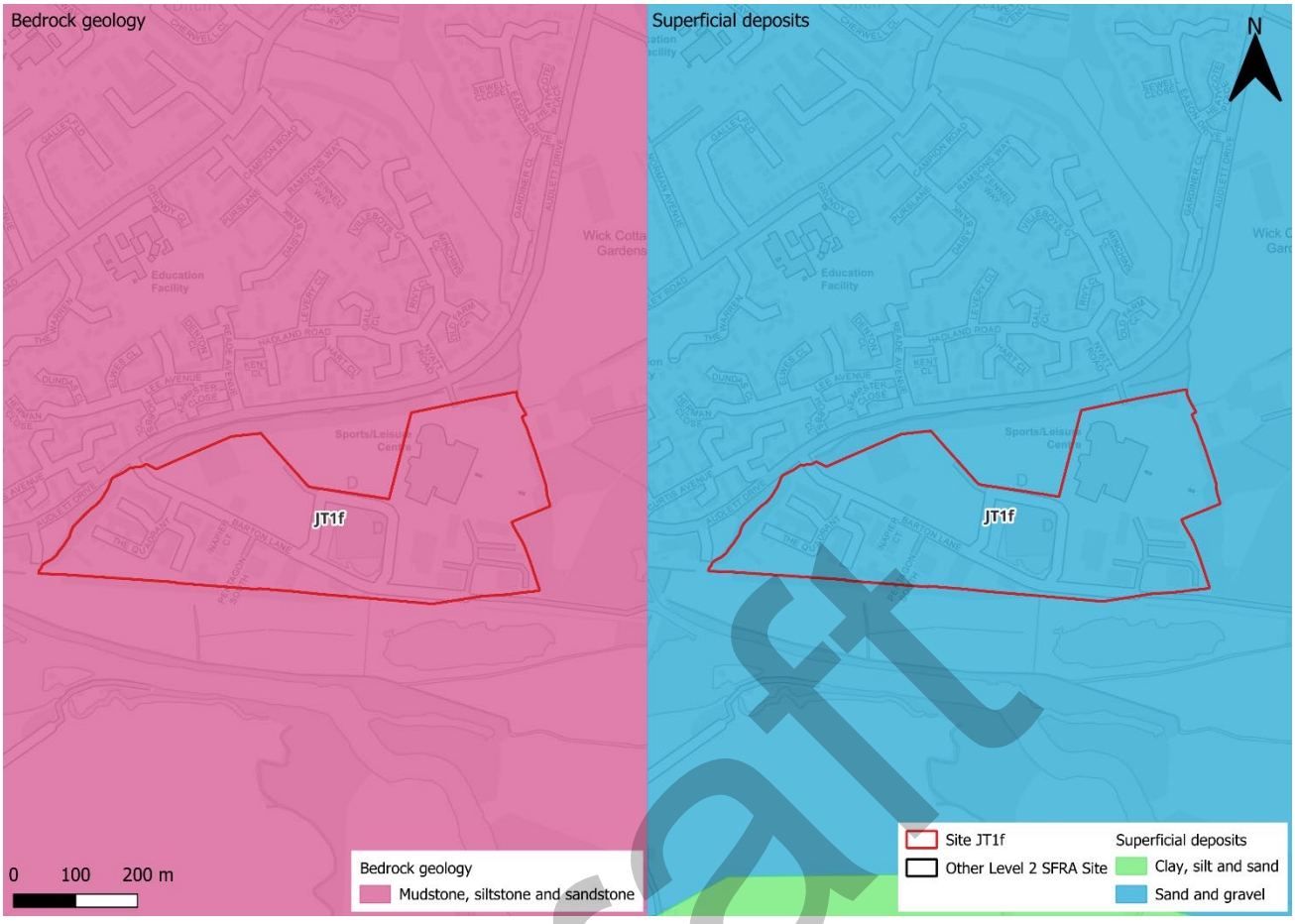

Figure 4-2: BGS Geology - Bedrock and superficial deposits

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5 Overall site assessment

5.1 Can part b) of the exception test be passed?

To pass part b) of the exception test[3], it must be proven that the development can be safe for its lifetime, which is 75 years for non-residential development, taking account of the vulnerability of its users, without increasing risk elsewhere, and, where possible, will reduce flood risk overall. The site is not required to pass the exception test as it is proposed for less vulnerable uses.

5.2 Recommendations and site-specific FRA requirements

Based on the evidence presented in the Level 1 SFRA (2024), Level 1 SFRA Addendum (2026) and this Level 2 SFRA:

- There should be no development within 8m of Radley Park Ditch apart from permitted access. The EA recommend for an 8m no development buffer for all main rivers to enable access for maintenance activities. This should be used as a blue / green corridor to provide ecological, amenity and social value.
- Updated climate change modelling of the River Thames and Radley Park Ditch should be used to update this Level 2 SFRA at the earliest opportunity to provide an up-to-date strategic assessment of flood risk to this site and the surrounding areas. It would be acceptable to use updated modelling to suitably assess risk through a site-specific FRA, as well as/instead of a Level 2 SFRA update.
- Based on current information, this site could be allocated in the Joint Local Plan if development avoids the area at modelled future fluvial risk, as shown by the EA Flood Zones plus Climate Change dataset. This should be supported by detailed climate change modelling of the 1% AEP event. However, safe access and escape routes must be shown to be achievable in this event.
- Were this site to be allocated based on current information, the LPA must make it clear that this site cannot be developed until the required information detailed in this SFRA on future flood risk from the River Thames and Radley Park Ditch is fully ascertained.
- Safe access and escape routes, considering both fluvial and surface water flood risk, should be confirmed through the site-specific FRA.
- A detailed drainage strategy will be required for any new development, given the large area of the site.
- Groundwater conditions must be investigated further through the site-specific FRA.
- Opportunities for NFM features to reduce flood risk to the site and surrounding areas should be explored at the site-specific FRA stage.

[3] Policy F6 National Planning Policy Framework 2026

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- The site-specific FRA should undertake a capacity and condition assessment of the Radley Park Ditch culvert along the northern boundary of the site. Blockage modelling should also be considered.
- Any site-specific FRA should be carried out in line with the NPPF, FRCC-PPG, EA guidance, South Oxfordshire and Vale of White Horse District Councils Joint Local Plan and LLFA policies, and national and local SuDS policy and guidelines.
- Throughout the site-specific FRA process, consultation should be carried out with the following, where applicable: the LPA; LLFA; emergency planning officers; EA; TW; the highways authorities; and the emergency services.

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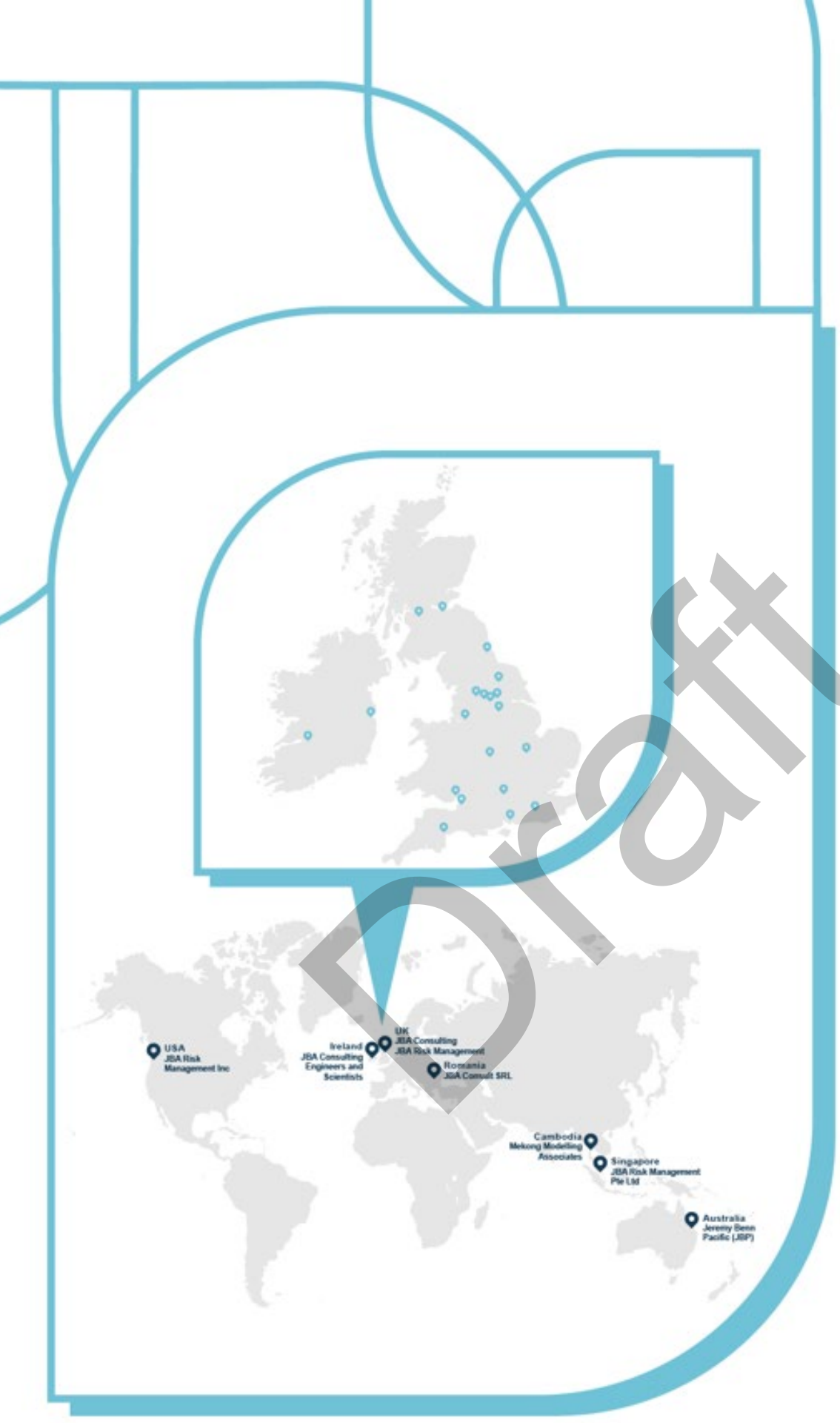

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Thirsk
Wallingford
Warrington

Registered Office
1 Broughton Park
Old Lane North
Broughton
SKIPTON
North Yorkshire
BD23 3FD
United Kingdom

+44(0)1756 799919
info@jbaconsulting.com
www.jbaconsulting.com
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South Oxfordshire and Vale of White Horse Level 2 Strategic Flood Risk Assessment Update

Site JT1i - Former Esso Research Centre

Draft Report

October 2026

Prepared for:

South Oxfordshire District Council and

Vale of White Horse District Council

www.jbaconsulting.com

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Reviewed by	Laura Thompson-Jones BSc CGeog FRGS Senior Analyst
Authorised by	Mike Williamson BSc MSc CGeog FRGS EADA Project Director

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JBA Project Manager	Freya Nation
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2026s1132

This report describes work commissioned by South Oxfordshire and Vale of White Horse District Councils. The Client's representative for the contract was Rebekah Goodwill of South Oxfordshire and Vale of White Horse District Councils. Boe Kilshaw of JBA Consulting carried out this work.

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for South Oxfordshire and Vale of White Horse Joint Local Plan Site JT1i - Former Esso Research Centre. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA' (2024) and the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum' (2026), and read the 'South Oxfordshire and Vale of White Horse District Councils Level 2 SFRA Main Report Update' (2026) and is therefore familiar with the terminology used in this report.

1.1 Site JT1i - Former Esso Research Centre

- Location: Former Esso Research Centre (Figure 1-1)
- Existing site use: Brownfield
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Mainly employment
- Proposed site use vulnerability: Less vulnerable
- Site area: 11.01 ha
- Proposed development impermeable area: 9.4 ha (assumed 85% of site area)
- Watercourse: N/A
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for more detailed assessment through Level 2 SFRA (Strategic Recommendation B)
    - Assess present day and future modelled surface water depths, hazards

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Figure 1-1: Site location

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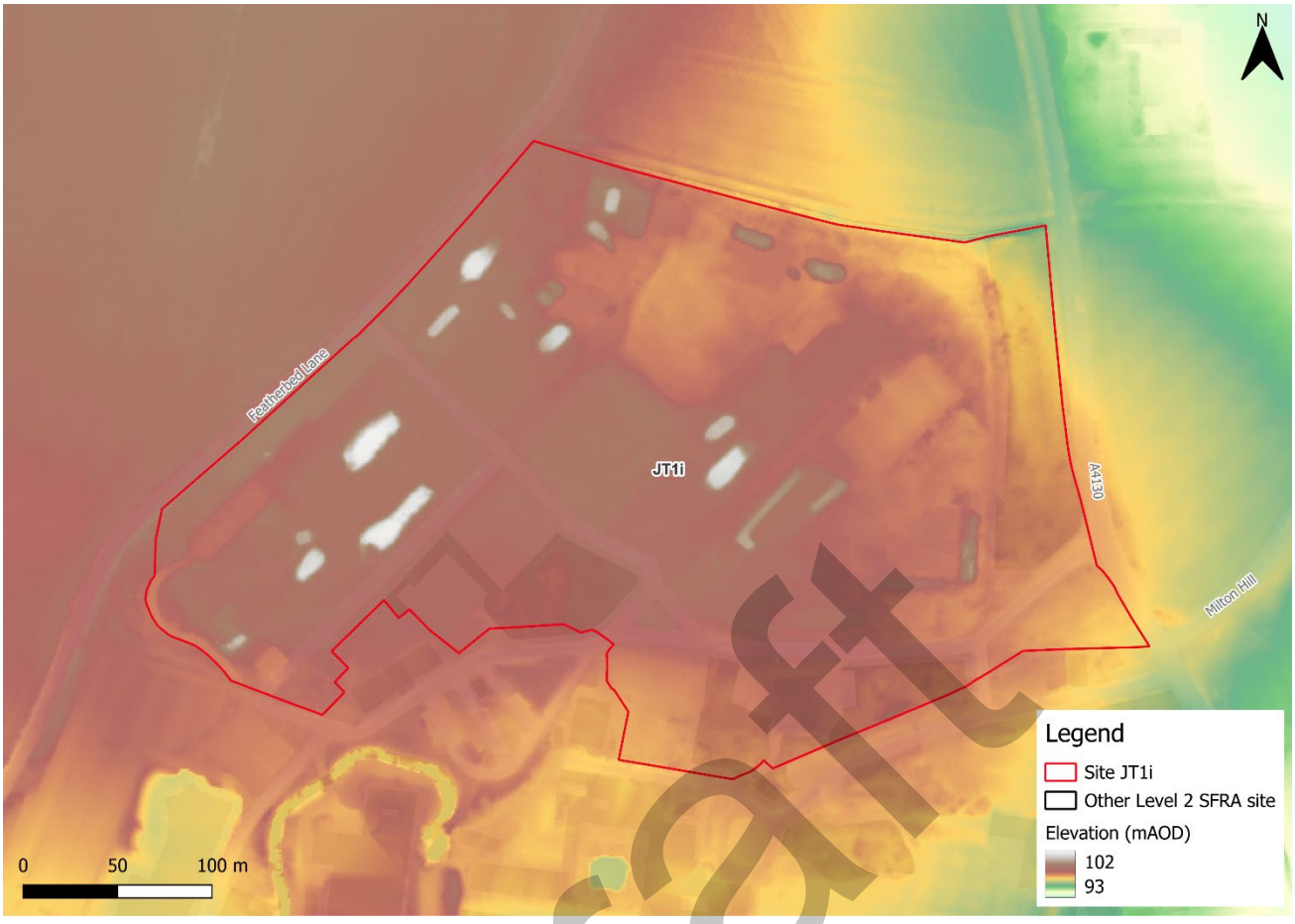

Figure 1-2: Topography

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2 Flood risk from rivers

2.1 Existing risk

2.1.1 Flood Map for Planning and functional floodplain

Based on the Environment Agency's (EA) Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum (2026), the percentage areas of the site within each flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.4).

The site is entirely within Flood Zone 1 and therefore at low risk of flooding from rivers.

Table 2-1: Existing flood risk based on percentage area of site at risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

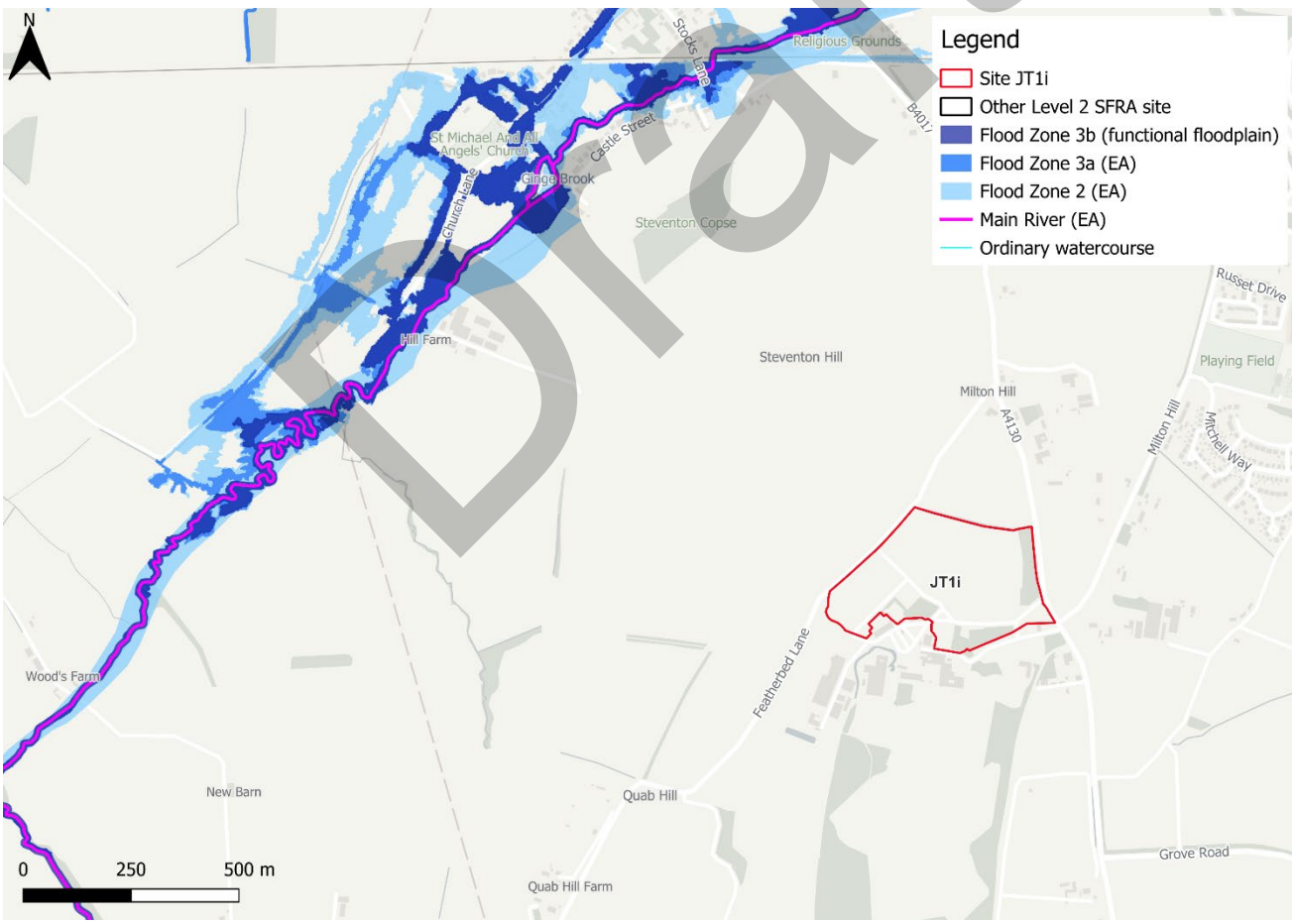

Figure 2-1: Existing risk from rivers to the site

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2.2 Impacts from climate change

2.2.1 Flood Map for Planning - Flood Zones plus Climate Change

The EA's Flood Map for Planning - Flood Zones plus Climate Change dataset does not show the site to be at future fluvial risk.

2.3 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

2.4 Flood risk management

The site doesn't benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

2.4.1 Cumulative impacts

A cumulative impact assessment was completed through the South Oxfordshire and Vale of White Horse Level 1 SFRA Addendum (2026), which aimed to identify catchments sensitive to the cumulative impact of development. Site JT1i (Former Esso Research Centre) is located within two catchments, namely; Moor Ditch and Ladygrove Ditch and Ginge Brook and Mill Brook. The majority of the site is located within a medium sensitivity catchment, with the remaining area of the site located within a higher sensitivity catchment. Planning considerations for sites at medium sensitivity to the cumulative impacts of development can be found in Appendix D of the Level 1 SFRA Addendum. Cumulative impacts of development should also be considered as part of a site-specific FRA.

2.4.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. Within the site, there are opportunities for tree planting to reduce runoff. This area is shown in Figure 2-2.

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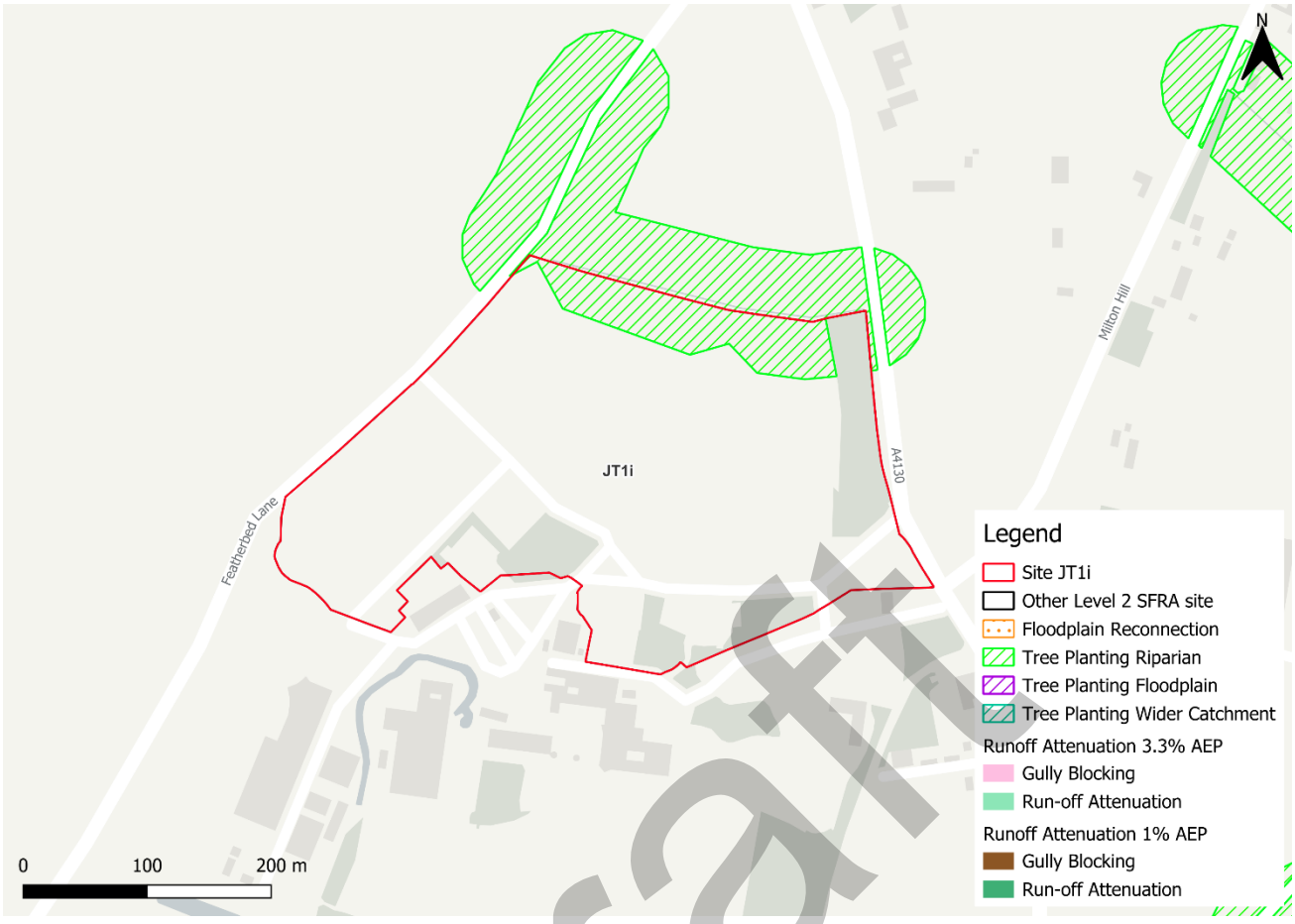

Figure 2-2: Natural Flood Management (NFM) potential mapping

2.5 Residual risk

Although a site may be afforded some protection from defences and / or drainage infrastructure, there is always a residual risk of flooding from asset failure i.e. defence breaches, or blockages of culverts or drainage assets.

There are no assets with the potential to pose a residual risk to the site

2.5.1 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. A "dry day" scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. A "wet day" scenario assumes a worst-case scenario where a reservoir releases water held on a "wet day" when local rivers have already overflowed their banks.

The site is not modelled to be at risk from reservoir flooding.

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2.6 Emergency Planning

2.6.1 Flood warnings and alerts

There are no Flood Warning Areas (FWA) or Flood Alert Areas (FAA) within the vicinity of the site.

2.6.2 Access and escape

Safe access and escape routes should be achievable via Featherbed Lane to the west of the site or Abingdon Road to the east of the site. This route is indicated by the yellow lines on Figure 2-3.



Figure 2-3: Potential access and escape routes

2.7 Observations, mitigation options, site suitability, sequential approach to development management - fluvial

- Observations:
  - The site is wholly within Flood Zone 1 and therefore at low risk of flooding from rivers.
  - The site is not shown to be at additional risk of fluvial flooding when considering climate change.
- Access and escape:

- Safe access and escape routes should be achievable via Featherbed Lane to the west of the site or Abingdon Road to the east of the site.

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3 Flood risk from surface water

3.1 Existing risk

3.1.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths Present Day

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Extents Present Day map (September 2026), the majority of the site is at very low risk from surface water flooding, as shown in Table 3-1.

Surface water risk is largely confined to scattered areas of ponding within topographic low spots across the site (Figure 3-1).

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Depths Present Day map, the greatest flood depths are between 0.15 and 0.3m (Figure 3-2).

Safe access and escape routes would likely be achievable via Featherbed Lane and Abingdon Road.

Table 3-1: Existing surface water flood risk based on percentage area at risk using the Flood Map for Planning - Surface Water Spatial Planning Extent Present Day map

Less than 0.1% AEP event (% area)	0.1% AEP event (% area)	1% AEP event (% area)	3.3% AEP event (% area)
94	3	1	2

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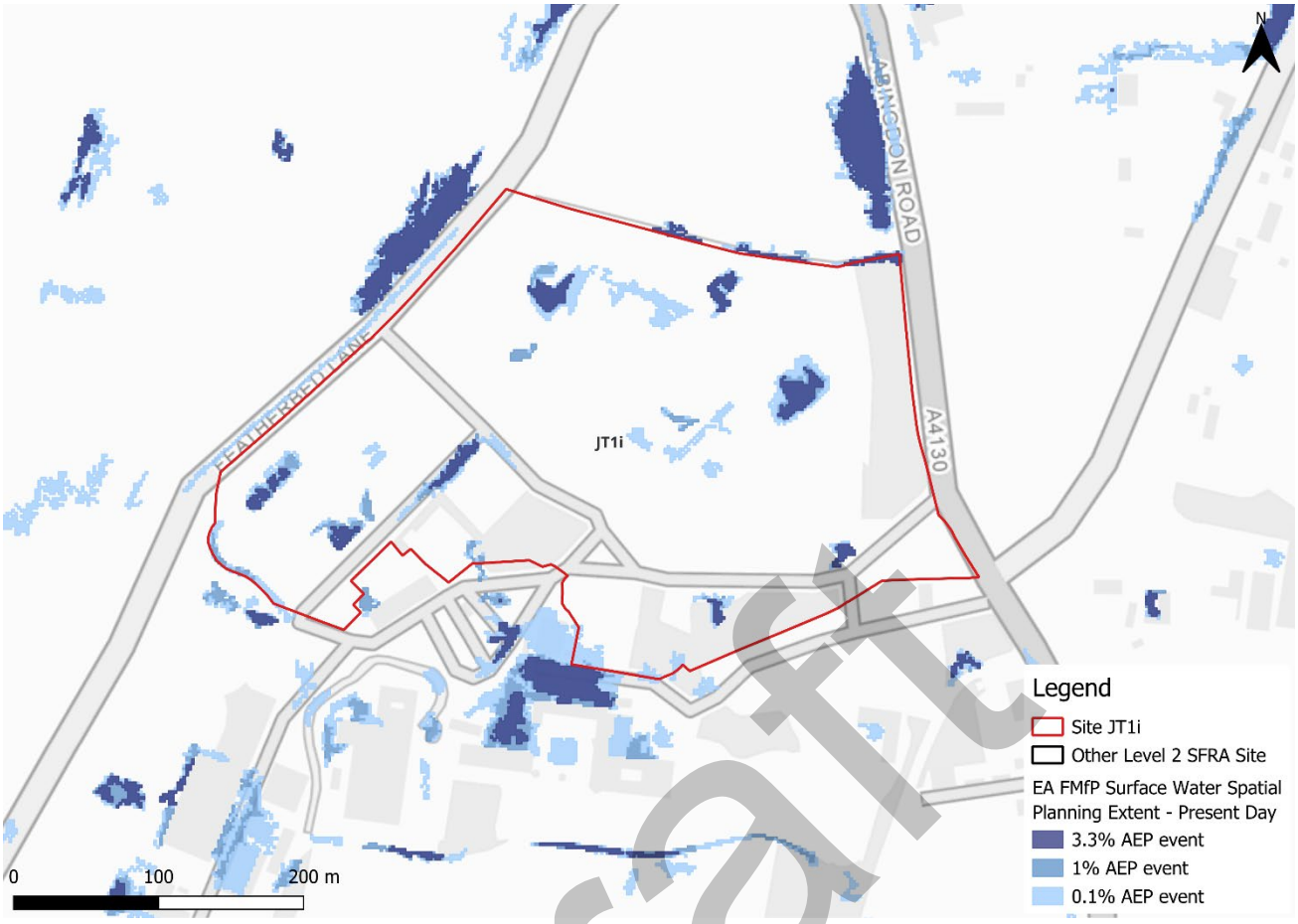

Figure 3-1: Flood Map for Planning - Surface Water Spatial Planning Extents Present Day

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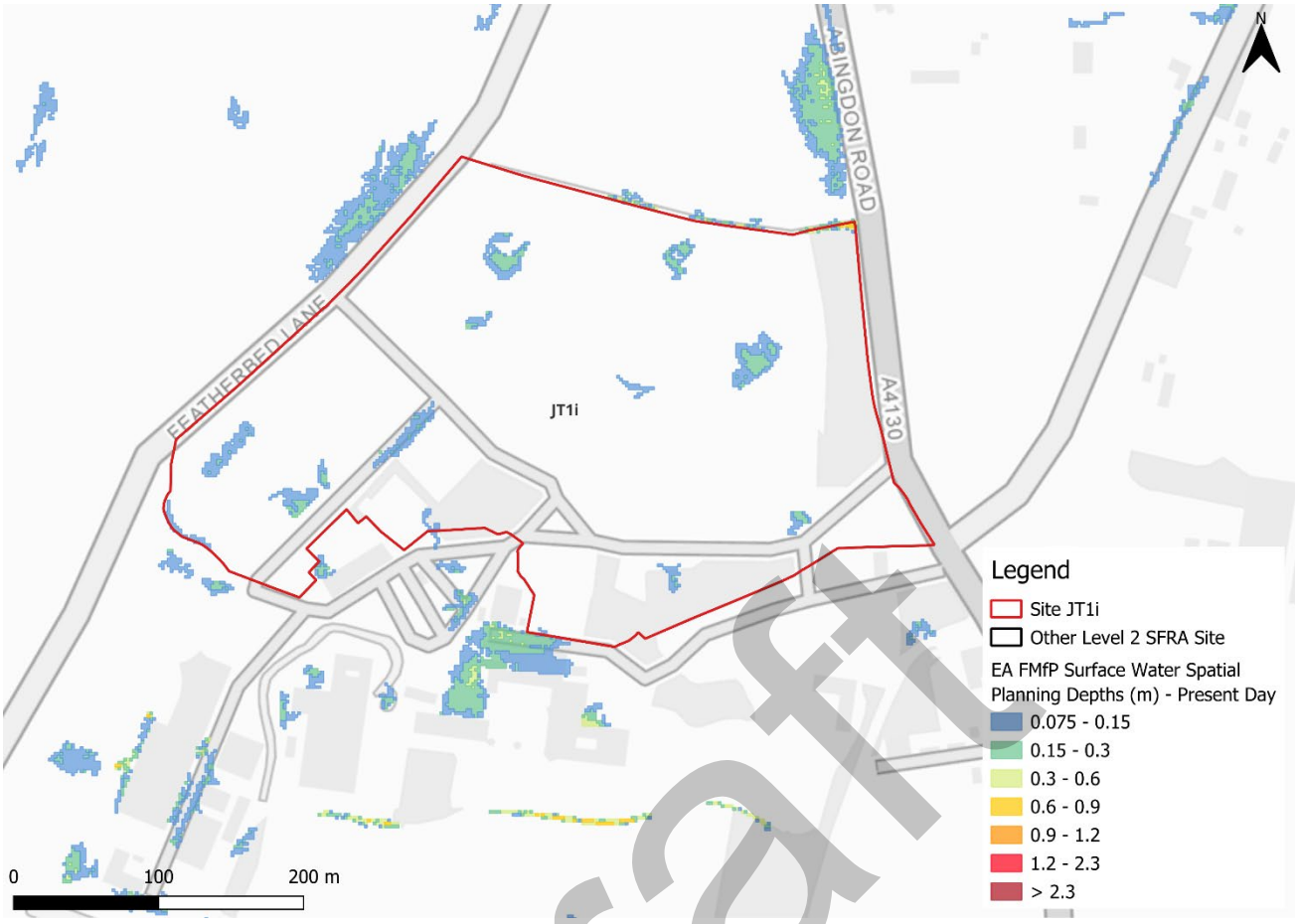

Figure 3-2: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Present Day for the 1% AEP event

3.1.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning data does not include hazard information suitable for planning purposes. Therefore, this Level 2 SFRA considers the third generation Risk of Flooding from Surface Water (RoFSW) hazard mapping in addition to the Flood Map for Planning - Surface Water Spatial Planning extents and depths, as the best available information. Updated surface water hazard information would need to be confirmed at the site-specific FRA stage.

Based on the EA's national scale third generation RoFSW map, the greatest flood hazard within the site in the medium risk event is categorised as 'low' (Figure 3-3).

There are some differences between the Flood Map for Planning - Surface Water Spatial Planning map and the third generation RoFSW hazard mapping. The Flood Map for Planning - Surface Water Spatial Planning data does not map flooding less than 0.075m (7.5cm) in depth. Therefore, where the map may show no flooding, there may be shallow flooding up to a depth of 0.075m. In contrast, the third generation RoFSW does not map flooding with a hazard rating of less than 0.575. This could explain the differences observed between the Flood Map for Planning and third generation RoFSW maps.

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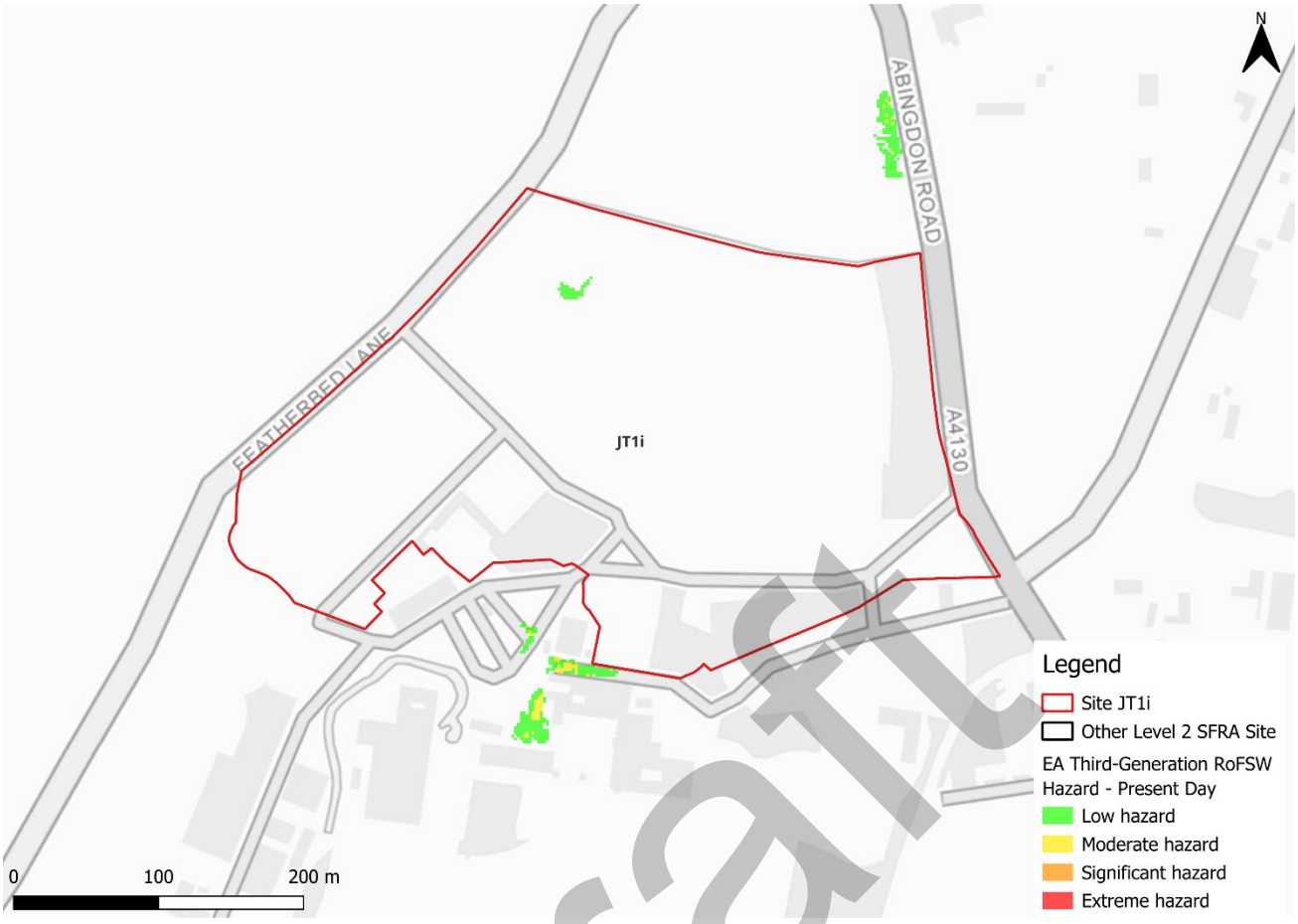

Figure 3-3: Third generation - Risk of Flooding from Surface Water map present day 1% AEP event surface water flood hazard[1]

3.2 Impacts from climate change

3.2.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths

The EA's climate change allowance guidance states that SFRA's should assess the upper end peak rainfall allowance for the 2070s epoch. This dataset is included in the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Climate Change dataset (September 2026). The peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment are shown in Table 3-2. The allowance for the 0.1% AEP event is not stated in the EA guidance.

1 Based on Section 7.5 Hazard rating. What is the Risk of Flooding from Surface Water map? Report version 2.0. April 2019. Environment Agency

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Table 3-2: Peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment

Return period	Central allowance 2070s (% increase)	Upper end allowance 2070s (% increase)
3.3% AEP	25	35
1% AEP	25	40

Figure 3-4 shows the surface water flood extents for the 2070s upper end climate change scenario. Surface water flood risk is modelled to increase slightly in extent with climate change. There are a number of additional areas of ponding across the site.

Flood depths are predominantly modelled to remain at between 0.15 and 0.3m, however there is a small area within the centre of the site with depths of between 1.2 and 2.3m (Figure 3-5).

Safe access and escape routes would likely remain achievable via Abingdon Road to the east of the site.

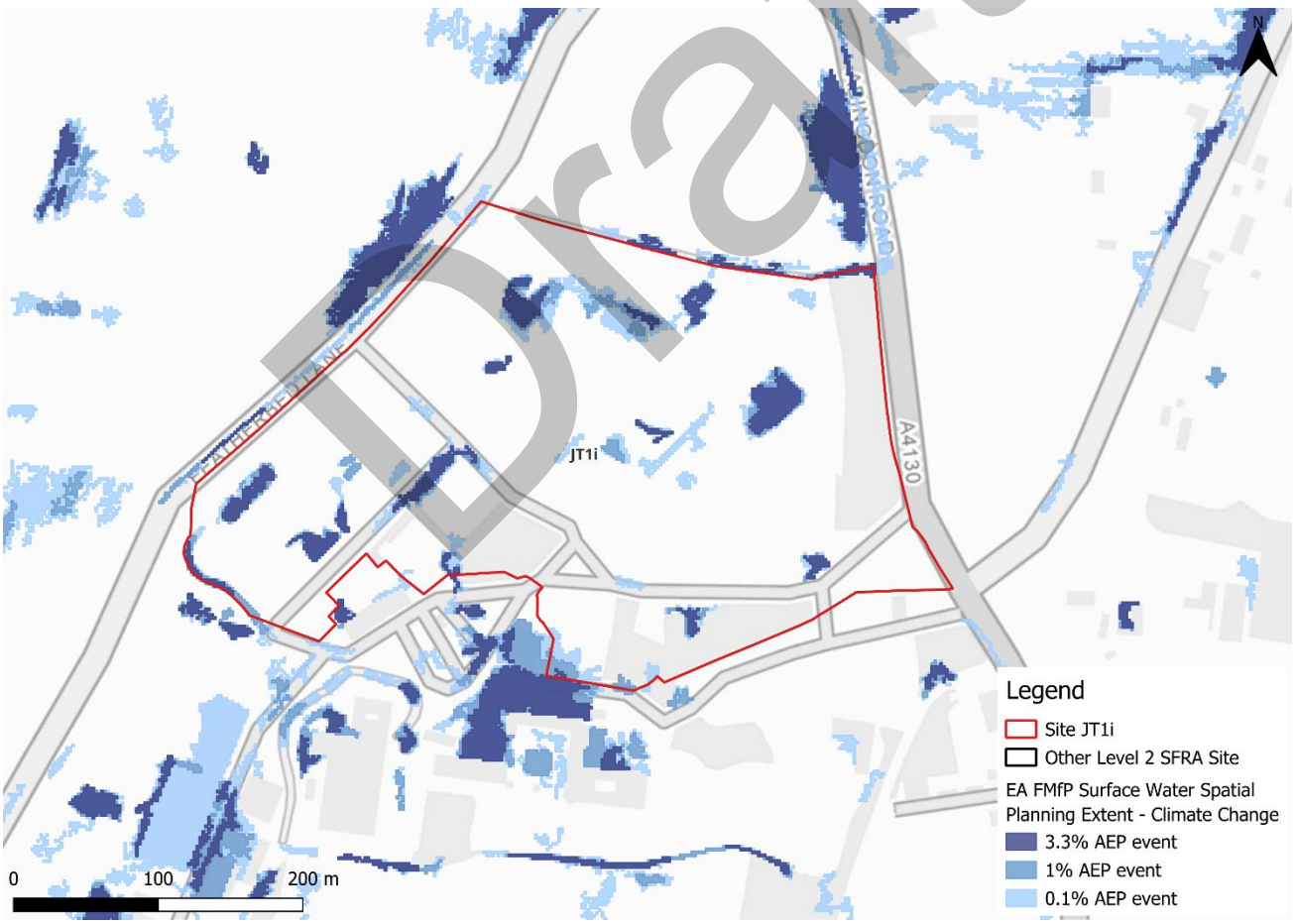

Figure 3-4: Flood Map for Planning - Surface Water Spatial Planning Extents Climate Change (2070s Upper End)

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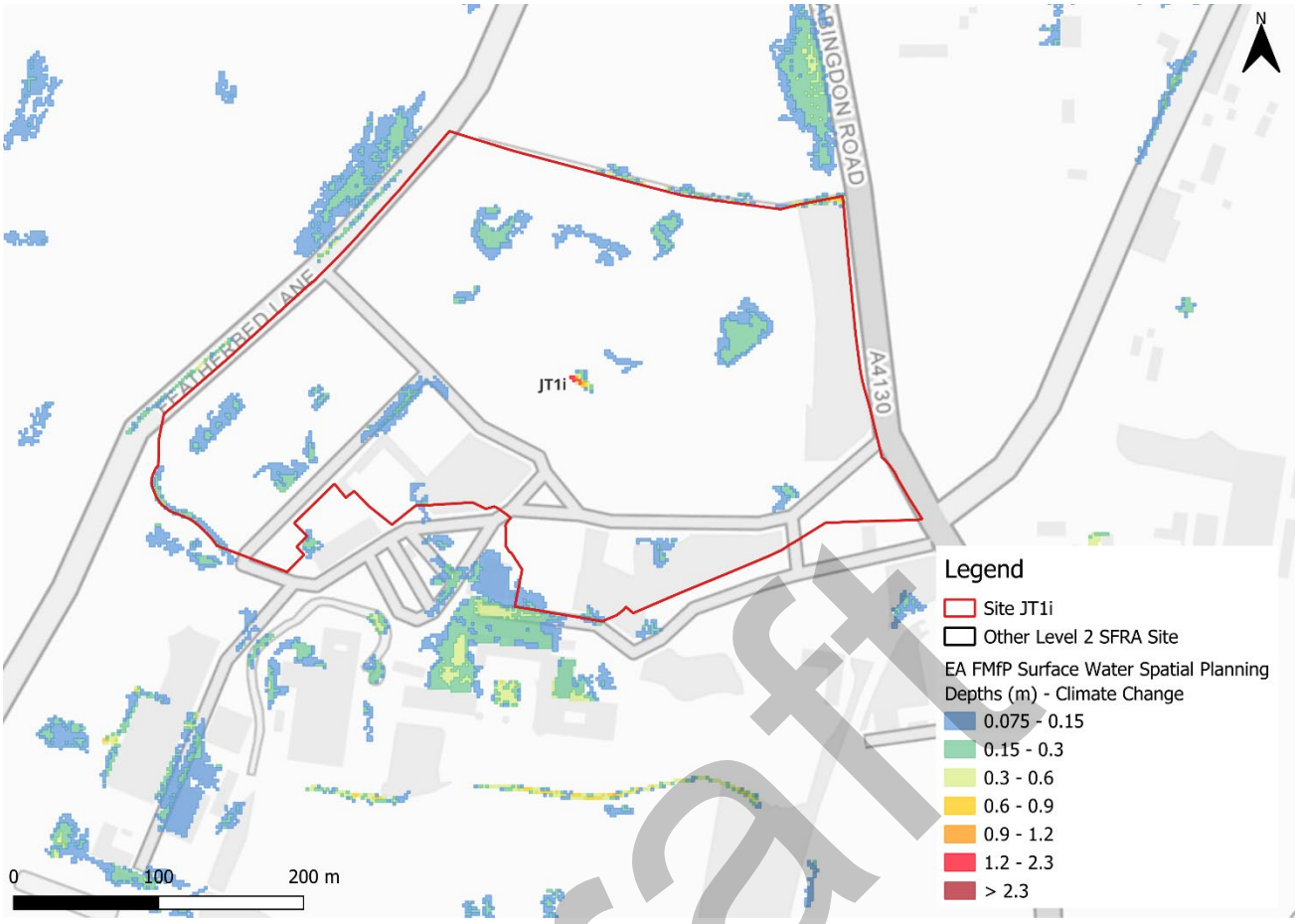

Figure 3-5: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Climate Change for the 1% AEP event (2070s Upper End)

3.2.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning climate change data does not include hazard information suitable for planning purposes. This Level 2 SFRA therefore considers the RoFSW low risk surface water event as a conservative proxy for the medium risk event plus climate change, as the best available information to assess surface water flood hazards. The impact of climate change on surface water flood hazards should be considered at the site-specific FRA stage.

Using the RoFSW low risk event as a proxy, future surface water flood hazard in the medium risk event is categorised as 'moderate', however is predominantly 'low' (Figure 3-6).

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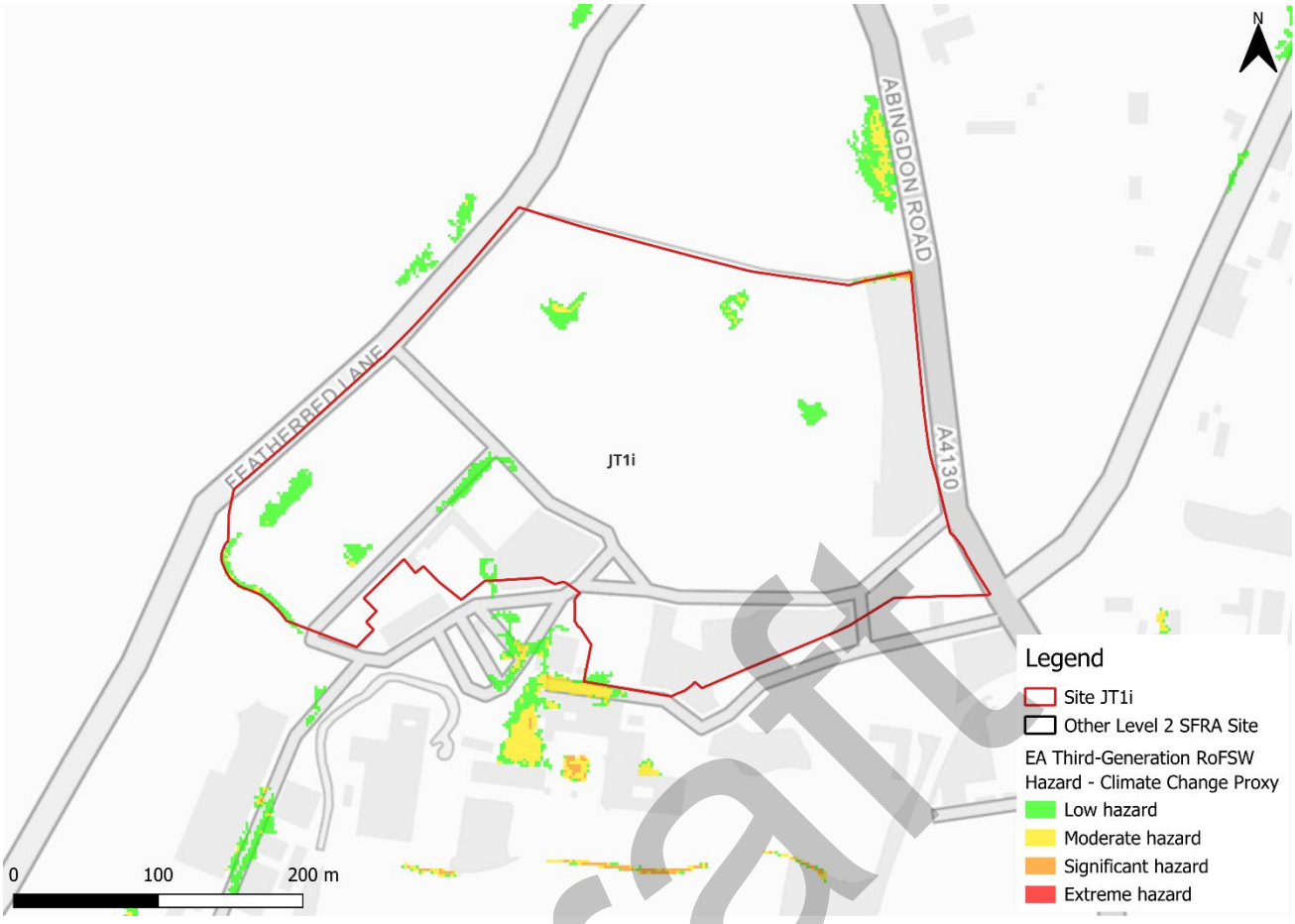

Figure 3-6: Low risk event surface water flood hazard[1], as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options, site suitability, sequential approach to development management - surface water

- Current risk to the site is predominantly very low, with 94% of the site being outside of the 0.1% AEP surface water flood event. Surface water risk is confined to areas of ponding within topographic low spots across the site.
- Risk to the site is shown to increase in extent when considering the impact of climate change. There are some additional areas of surface water ponding, however these are likely to remain shallow.
- Topographic low spots should be considered and included in site design and ideally left in place to flood naturally when required.
- If any structures are demolished for new development, a drainage strategy would therefore be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA. The developer should also follow the National SuDS guidance.
- Assessment of the current drainage system in place should be carried out to ascertain any current capacity issues and whether the current system could

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accommodate the proposed development or whether further capacity will be required.

- Safe access and escape routes would likely be achievable via Abingdon Road to the east of the site.

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4 Groundwater, geology and SuDS suitability

Risk of groundwater emergence is assessed in this SFRA using JBA's 5m Groundwater Emergence Map. Figure 4-1 shows the map covering the site and the surrounding areas and Table 4-1 explains the risk classifications.

The entirety of the site is in an area where there is negligible groundwater emergence risk. Groundwater conditions may therefore be suited to infiltration SuDS.



Figure 4-1: JBA 5m Groundwater Emergence Map

Table 4-1: Groundwater Emergence Hazard Classification

Groundwater head difference (m)*	Class label
0 to 0.025	Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
0.025 to 0.5	Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
0.5 to 5	Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event There is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely.
>5	Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event. Groundwater emergence is not likely.
N/A	No risk. This zone is deemed as having a negligible risk from groundwater emergence due to the nature of the local geological deposits.
*Difference is defined as ground surface in mAOD minus modelled groundwater table in mAOD.	

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The underlying bedrock within the site is mudstone, sandstone, and limestone (Figure 4-2). Other than sandstone, all these rocks generally have low levels of permeability. This leads to less water infiltrating into the ground and could potentially contribute to lower water table levels.



Figure 4-2: BGS Geology - Bedrock and superficial deposits

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5 Overall site assessment

5.1 Can part b) of the exception test be passed?

To pass part b) of the exception test[2], it must be proven that the development can be safe for its lifetime, which is 75 years for non-residential development, taking account of the vulnerability of its users, without increasing risk elsewhere, and, where possible, will reduce flood risk overall. The site is not required to pass the exception test as it is proposed for less vulnerable uses.

5.2 Recommendations and site-specific FRA requirements

Based on the evidence presented in the Level 1 SFRA (2024), Level 1 SFRA Addendum (2026) and this Level 2 SFRA:

- It should be appropriate for this site to be allocated, given the low fluvial and surface water flood risk to the site..
- It is assumed the current structures will be demolished for new development. A drainage strategy would therefore be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. Runoff rates should return to greenfield rates, to reduce flood risk downstream. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA. The use of infiltration SuDS should be investigated.
- Opportunities for NFM features to reduce flood risk to the site and surrounding areas should be explored at the site-specific FRA stage.
- Any site-specific FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; South Oxfordshire and Vale of White Horse District Councils Joint Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the site-specific FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; TW; the highways authorities; and the emergency services.

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[2] Policy F6 National Planning Policy Framework 2026

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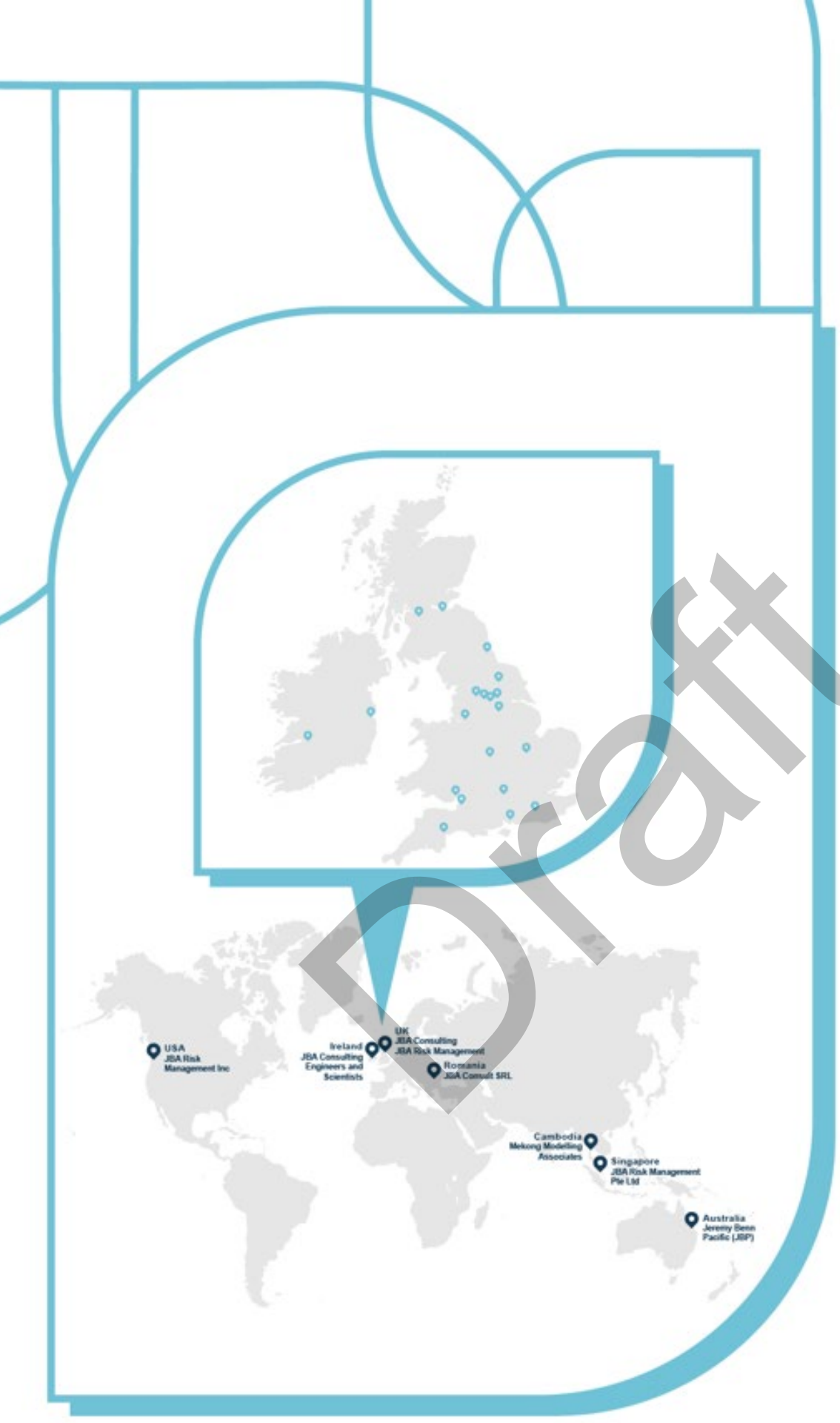

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Registered Office
1 Broughton Park
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North Yorkshire
BD23 3FD
United Kingdom

+44(0)1756 799919
info@jbaconsulting.com
www.jbaconsulting.com
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South Oxfordshire and Vale of White Horse Level 2 Strategic Flood Risk Assessment Update

Site JT1k - South of Park Road, Faringdon

Draft Report

October 2026

Prepared for:

South Oxfordshire District Council and

Vale of White Horse District Council

www.jbaconsulting.com

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Reviewed by	Laura Thompson-Jones BSc CGeog FRGS Senior Analyst
Authorised by	Mike Williamson BSc MSc CGeog FRGS EADA Project Director

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Contract

JBA Project Manager	Freya Nation
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2026s1132

This report describes work commissioned by South Oxfordshire and Vale of White Horse District Councils. The Client's representative for the contract was Rebekah Goodwill of South Oxfordshire and Vale of White Horse District Councils. Boe Kilshaw of JBA Consulting carried out this work.

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for South Oxfordshire and Vale of White Horse Joint Local Plan Site JT1k - South of Park Road, Faringdon. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA' (2024) and the 'South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum' (2026), and read the 'South Oxfordshire and Vale of White Horse District Councils Level 2 SFRA Main Report Update' (2026) and is therefore familiar with the terminology used in this report.

1.1 Site JT1k - South of Park Road, Faringdon

- Location: South of Park Road, Faringdon (Figure 1-1)
- Existing site use: Greenfield. North western area of the site currently developed for residential uses.
- Existing site use vulnerability: Water compatible
- Proposed site use: Employment
- Proposed site use vulnerability: Less vulnerable
- Site area: 3 ha
- Proposed development impermeable area: 2.6 ha (assumed 85% of site area)
- Watercourse: N/A
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for more detailed assessment through Level 2 SFRA (Strategic Recommendation B)
    - Assess present day and future modelled surface water depths, hazards

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Figure 1-1: Site location

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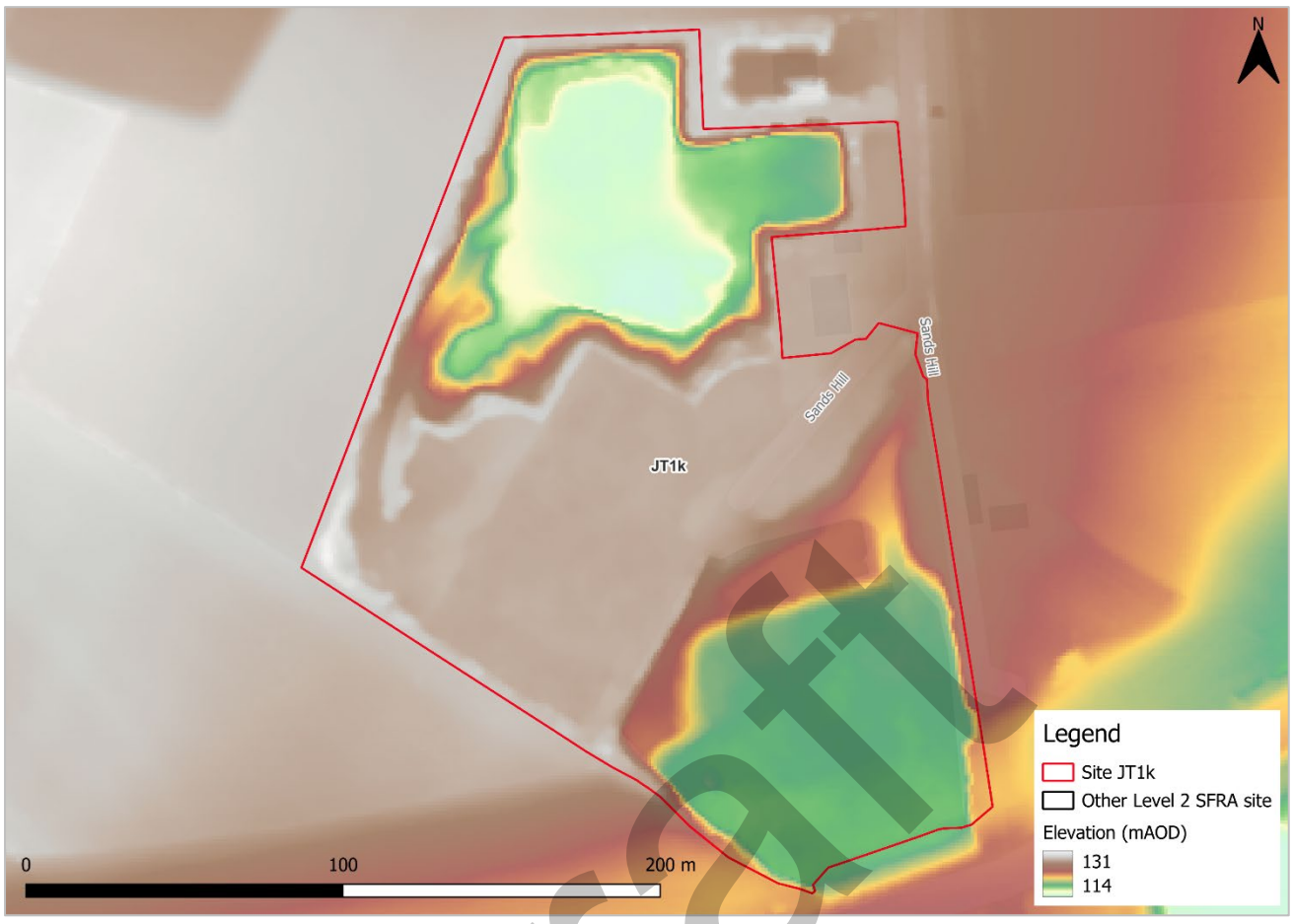

Figure 1-2: Topography

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2 Flood risk from rivers

2.1 Existing risk

2.1.1 Flood Map for Planning and functional floodplain

Based on the Environment Agency's (EA) Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the South Oxfordshire and Vale of White Horse District Councils Level 1 SFRA Addendum (2026), the percentage areas of the site within each flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.4).

The site is entirely within Flood Zone 1 and therefore at low risk of flooding from rivers.

Table 2-1: Existing flood risk based on percentage area of site at risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0



Figure 2-1: Existing risk from rivers to the site

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2.2 Impacts from climate change

2.2.1 Flood Map for Planning - Flood Zones plus Climate Change

The EA's Flood Map for Planning - Flood Zones plus Climate Change dataset does not show the site to be at future fluvial risk.

2.3 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There have been no recorded historic flood incidents within the vicinity of the site.

2.4 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

2.4.1 Cumulative impacts

A cumulative impact assessment was completed through the South Oxfordshire and Vale of White Horse Level 1 SFRA Addendum (2026), which aimed to identify catchments sensitive to the cumulative impact of development. Site JT1k (South of Park Road, Faringdon) is located within one catchment, namely; Ock (to Cherbury Brook). This is ranked as a low sensitivity catchment. Planning considerations for all sites can be found in Appendix D of the Level 1 SFRA Addendum. Cumulative impacts of development should also be considered as part of a site-specific FRA.

2.4.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. Within the site, there is potential for runoff attenuation features to reduce the speed of flooding downstream. This area is shown on Figure 2-2.

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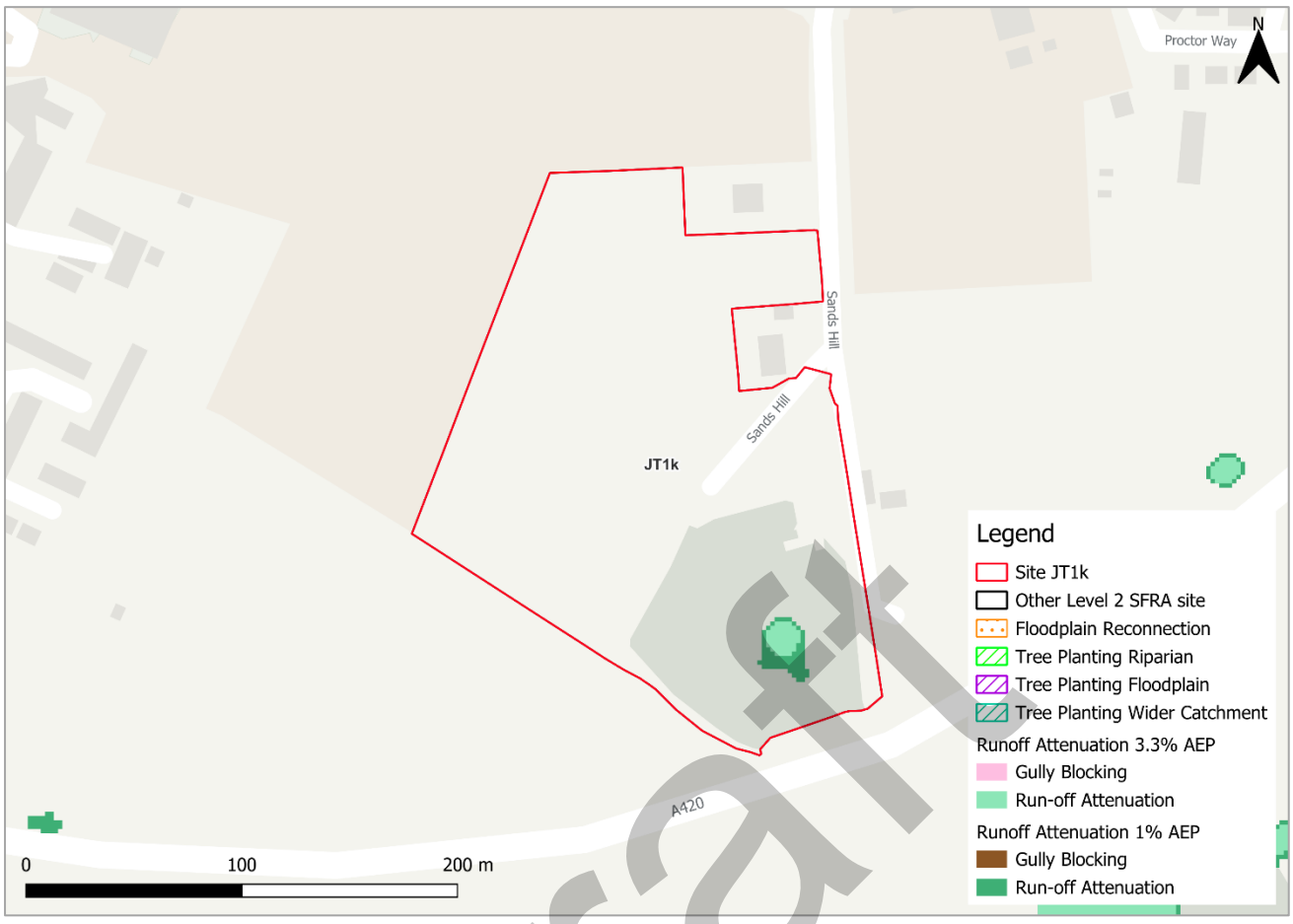

Figure 2-2: Natural Flood Management (NFM) potential mapping

2.5 Residual risk

Although a site may be afforded some protection from defences and / or drainage infrastructure, there is always a residual risk of flooding from asset failure i.e. defence breaches, or blockages of culverts or drainage assets.

There are no assets with the potential to pose a residual risk to the site

2.5.1 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. A "dry day" scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. A "wet day" scenario assumes a worst-case scenario where a reservoir releases water held on a "wet day" when local rivers have already overflowed their banks.

This site is not modelled to be at risk of flooding from reservoirs.

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2.6 Emergency Planning

2.6.1 Flood warnings and alerts

There are no Flood Warning Areas (FWA) or Flood Alert Areas (FAA) within the vicinity of the site.

2.6.2 Access and escape routes

Based on available information, safe access and escape routes should be achievable via Sands Hill to the northeast of the site. This route is indicated by the yellow line in Figure 2-3.

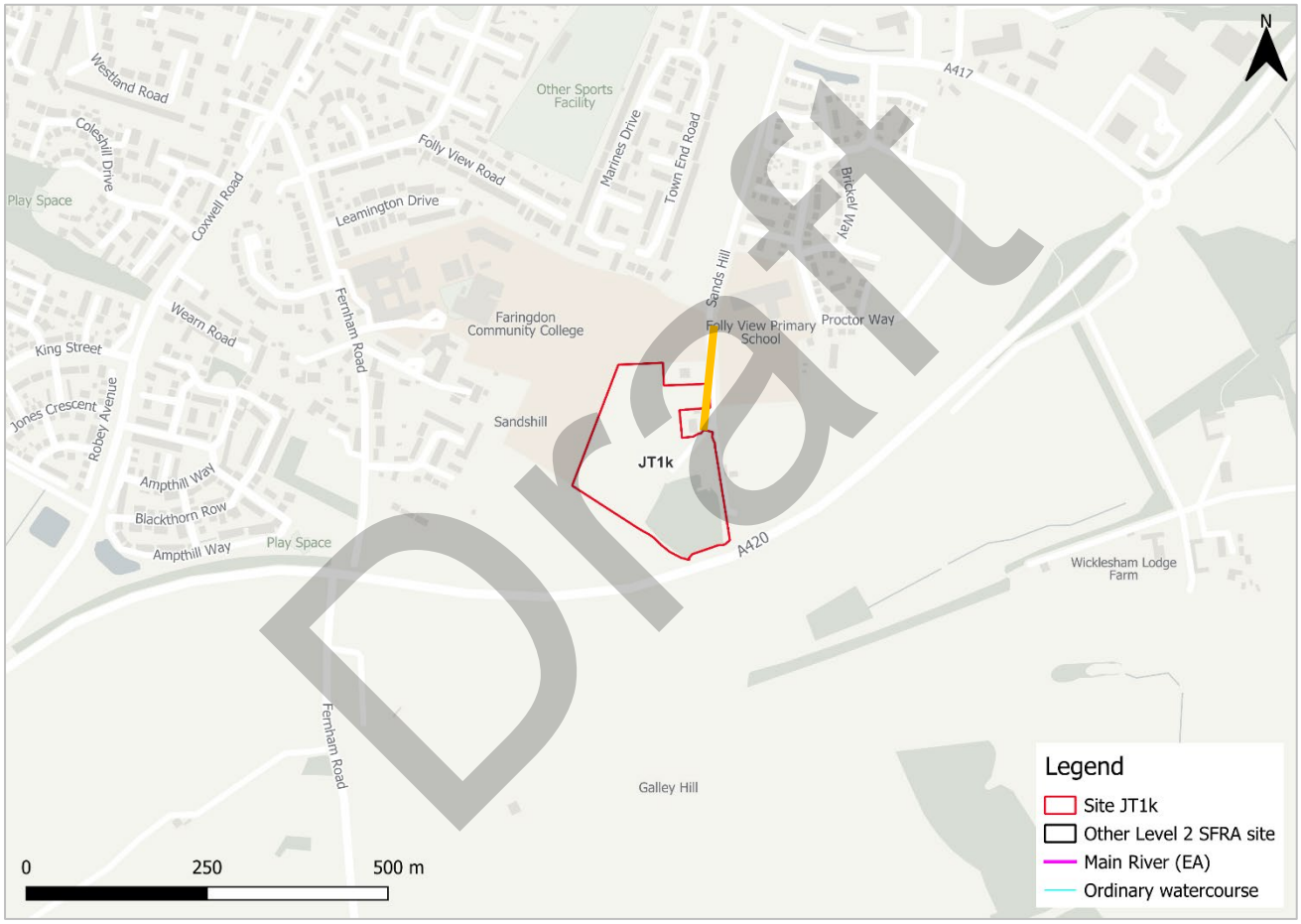

Figure 2-3: Potential access and escape routes

2.7 Observations, mitigation options, site suitability, sequential approach to development management - fluvial

- Observations:
  - The site is wholly within Flood Zone 1 and therefore at low risk of flooding from rivers.
  - The site is not shown to be at additional risk of fluvial flooding when considering climate change.

- Access and escape:
  - Safe access and escape routes should be achievable via Sands Hill to the northeast of the site.

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3 Flood risk from surface water

3.1 Existing risk

3.1.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths Present Day

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Extents Present Day map (September 2026), the majority of the site is at very low risk from surface water flooding, as shown in Table 3-1. Surface water risk is confined to areas of ponding within topographic low spots across the site (Figure 3-1). Updated surface water modelling should be completed to understand the extent of surface water risk within the site following the re-levelling of the ground.

Based on the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Depths Present Day map, the greatest flood depths on site are between 0.6 and 0.9m within the area of ponding in the south of the site (Figure 3-2).

Safe access and escape routes would likely be achievable via Sands Hill to the northeast of the site.

Table 3-1: Existing surface water flood risk based on percentage area at risk using the Flood Map for Planning - Surface Water Spatial Planning Extent Present Day map

Less than 0.1% AEP event (% area)	0.1% AEP event (% area)	1% AEP event (% area)	3.3% AEP event (% area)
85	7	3	5

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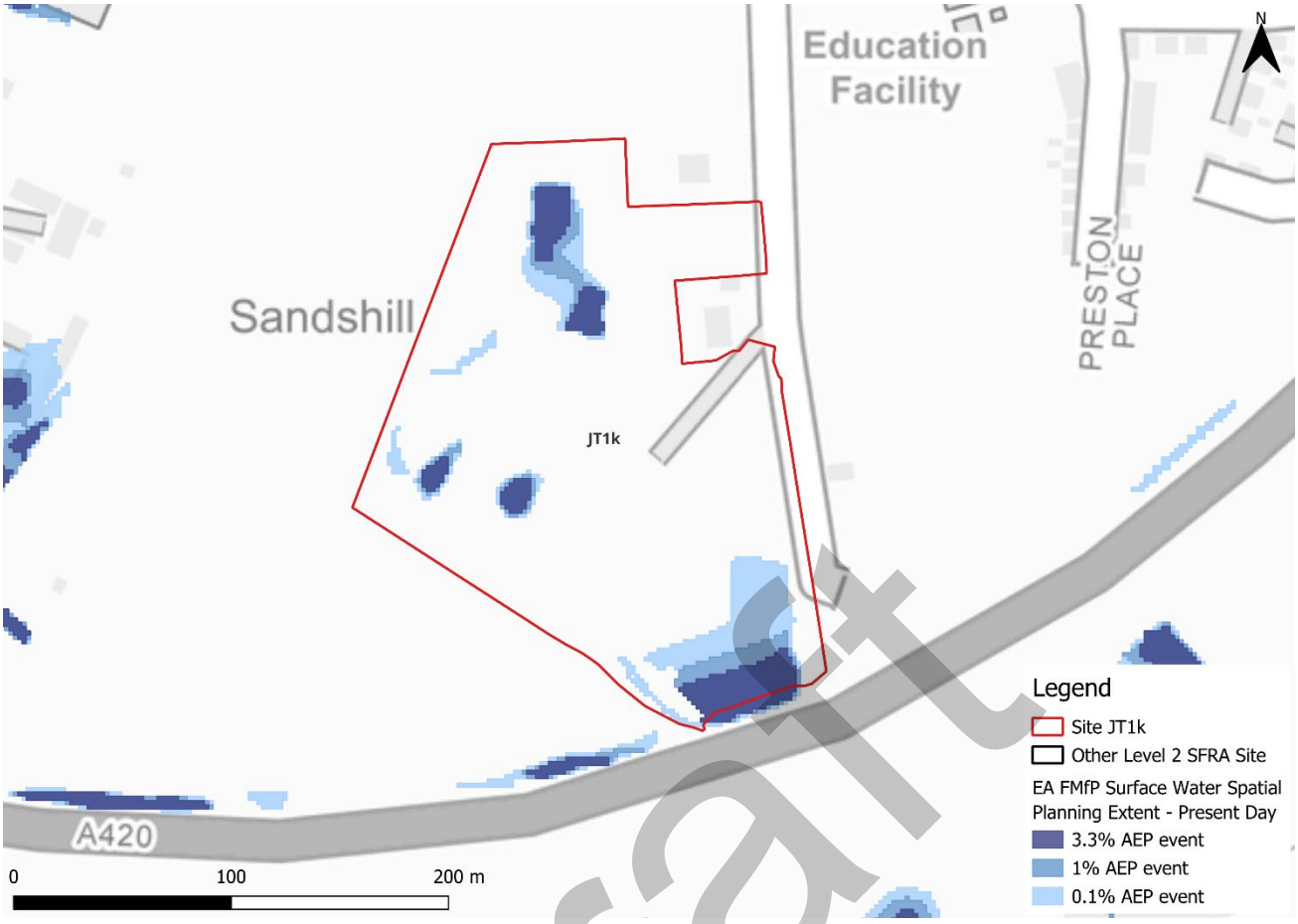

Figure 3-1: Flood Map for Planning - Surface Water Spatial Planning Extents Present Day

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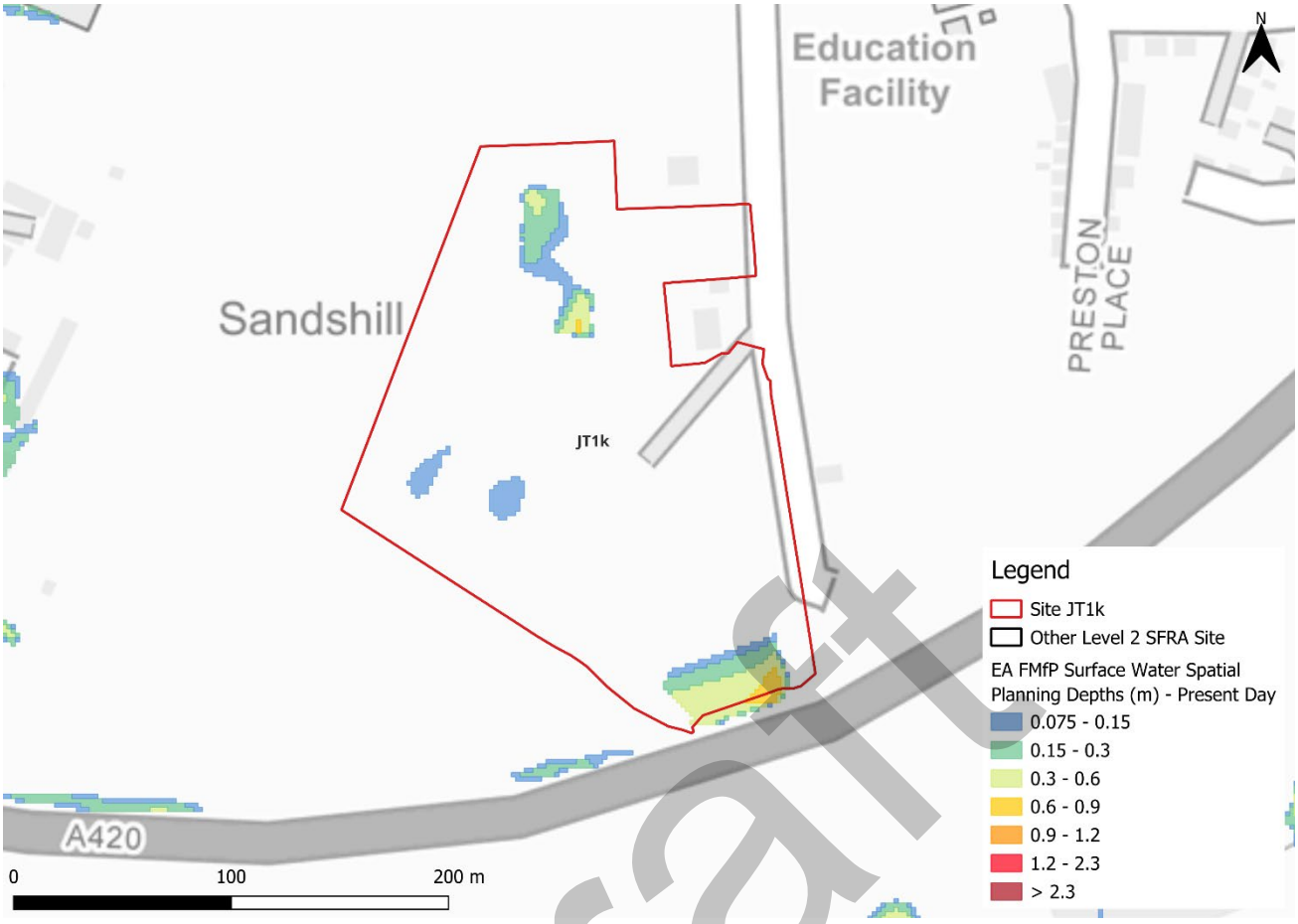

Figure 3-2: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Present Day for the 1% AEP event

3.1.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning data does not include hazard information suitable for planning purposes. Therefore, this Level 2 SFRA considers the third generation Risk of Flooding from Surface Water (RoFSW) hazard mapping in addition to the Flood Map for Planning - Surface Water Spatial Planning extents and depths, as the best available information. Updated surface water hazard information would need to be confirmed at the site-specific FRA stage.

Based on the EA's national scale third generation RoFSW map, the greatest flood hazard within the site in the medium risk event is categorised as 'significant' (Figure 3-3).

There are some differences between the Flood Map for Planning - Surface Water Spatial Planning map and the third generation RoFSW hazard mapping. The Flood Map for Planning - Surface Water Spatial Planning data does not map flooding less than 0.075m (7.5cm) in depth. Therefore, where the map may show no flooding, there may be shallow flooding up to a depth of 0.075m. In contrast, the third generation RoFSW does not map flooding with a hazard rating of less than 0.575. This could explain the differences observed between the Flood Map for Planning and third generation RoFSW maps.

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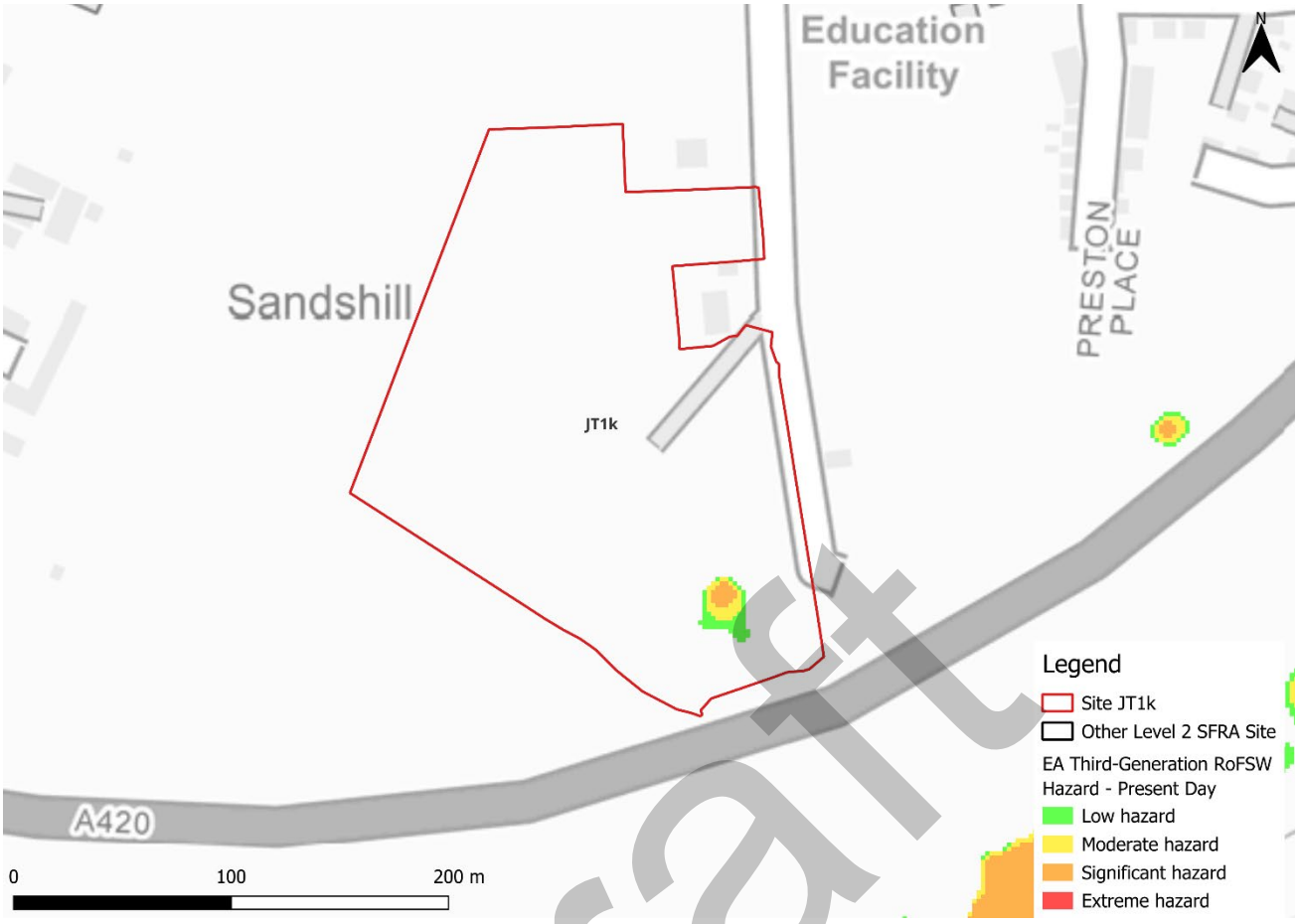

Figure 3-3: Third generation - Risk of Flooding from Surface Water map present day 1% AEP event surface water flood hazard[1]

3.2 Impacts from climate change

3.2.1 Flood Map for Planning - Surface Water Spatial Planning Extents and Depths

The EA's climate change allowance guidance states that SFRA's should assess the upper end peak rainfall allowance for the 2070s epoch. This dataset is included in the EA's national scale Flood Map for Planning - Surface Water Spatial Planning Climate Change dataset (September 2026). The peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment are shown in Table 3-2. The allowance for the 0.1% AEP event is not stated in the EA guidance.

1 Based on Section 7.5 Hazard rating. What is the Risk of Flooding from Surface Water map? Report version 2.0. April 2019. Environment Agency

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Table 3-2: Peak rainfall intensity allowances for the Gloucestershire and the Vale management catchment

Return period	Central allowance 2070s (% increase)	Upper end allowance 2070s (% increase)
3.3% AEP	25	35
1% AEP	25	40

Figure 3-4 shows the surface water flood extents for the 2070s upper end climate change scenario. Surface water flood risk is modelled to increase in extent with climate change during in all events. The areas of ponding across the site are shown to expand in extent in the 0.1% AEP event, with some additional scattered areas of ponding within the west in the 3.3% AEP event.

Flood depths are modelled to increase to between 0.9 and 1.2m in the topographic low spot in the south of the site (Figure 3-5).

Safe access and escape routes are likely to remain achievable via Sand Hills to the northeast of the site.

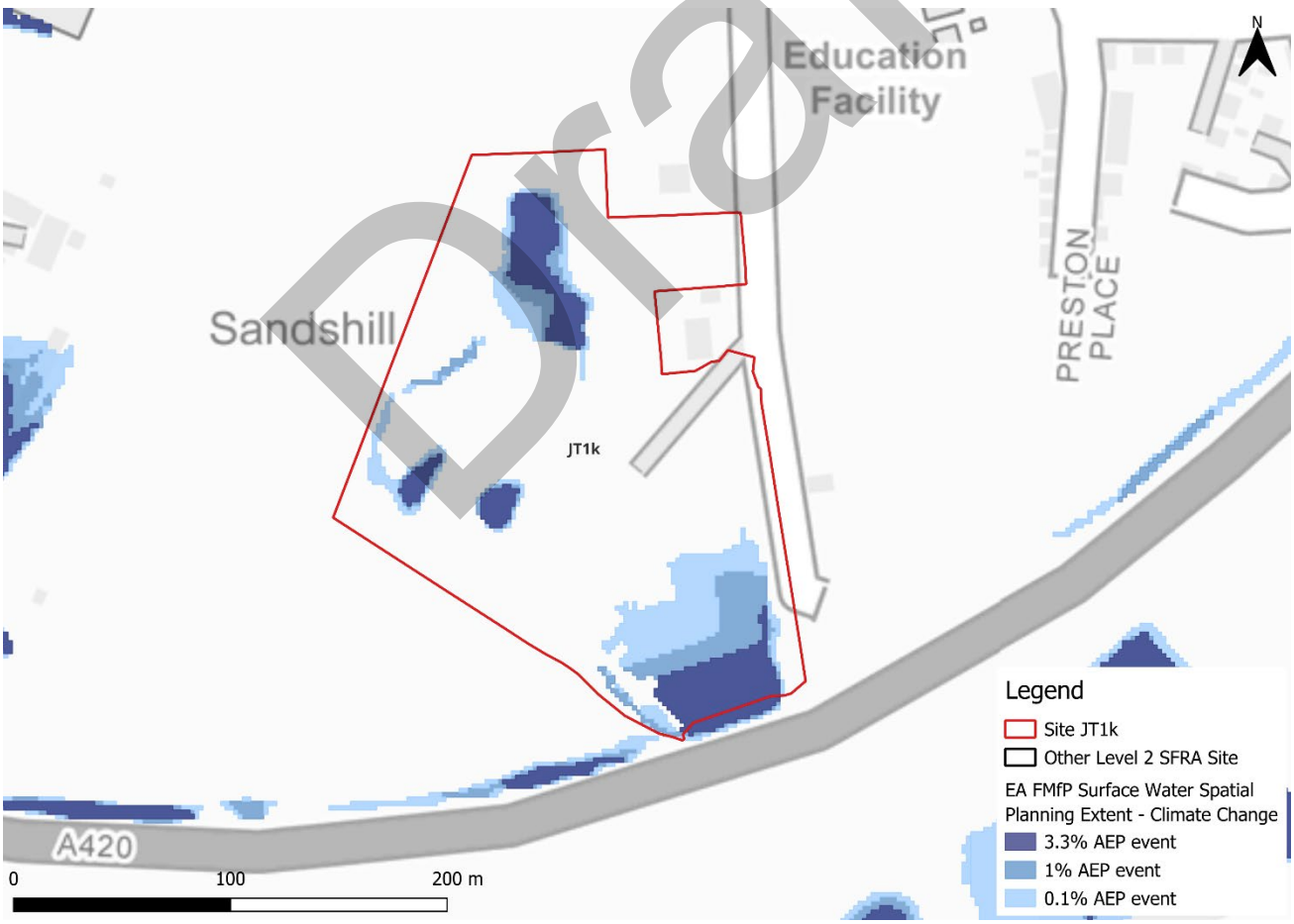

Figure 3-4: Flood Map for Planning - Surface Water Spatial Planning Extents Climate Change (2070s Upper End)

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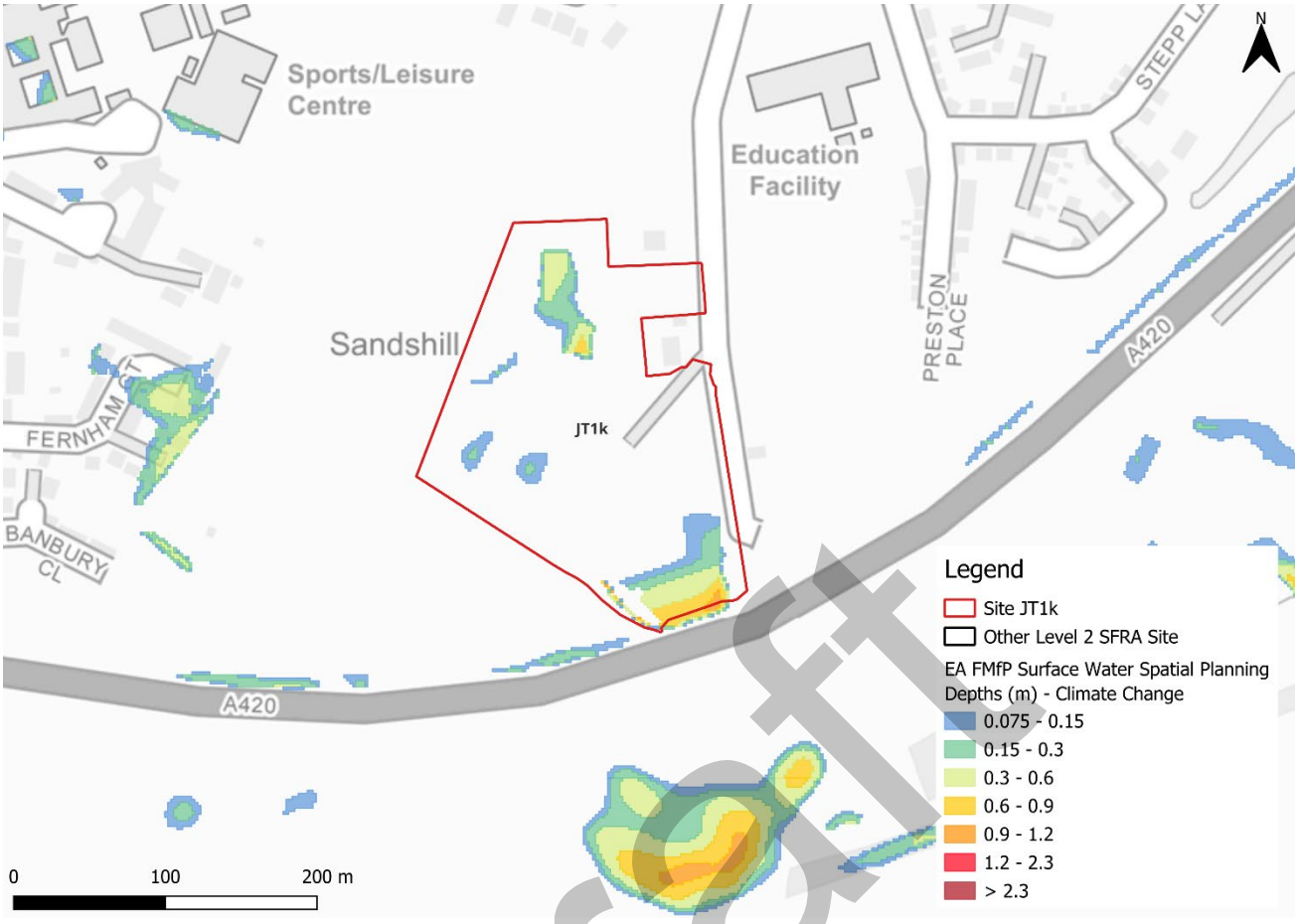

Figure 3-5: Flood Map for Planning - Surface Water Spatial Planning Depths (m) Climate Change for the 1% AEP event (2070s Upper End)

3.2.2 Risk of Flooding from Surface Water - Third Generation Hazard

At the time of writing, the EA's latest Flood Map for Planning - Surface Water Spatial Planning climate change data does not include hazard information suitable for planning purposes. This Level 2 SFRA therefore considers the RoFSW low risk surface water event as a conservative proxy for the medium risk event plus climate change, as the best available information to assess surface water flood hazards. The impact of climate change on surface water flood hazards should be considered at the site-specific FRA stage.

Using the RoFSW low risk event as a proxy, future surface water flood hazard in the medium risk event is categorised as 'significant' (Figure 3-6).

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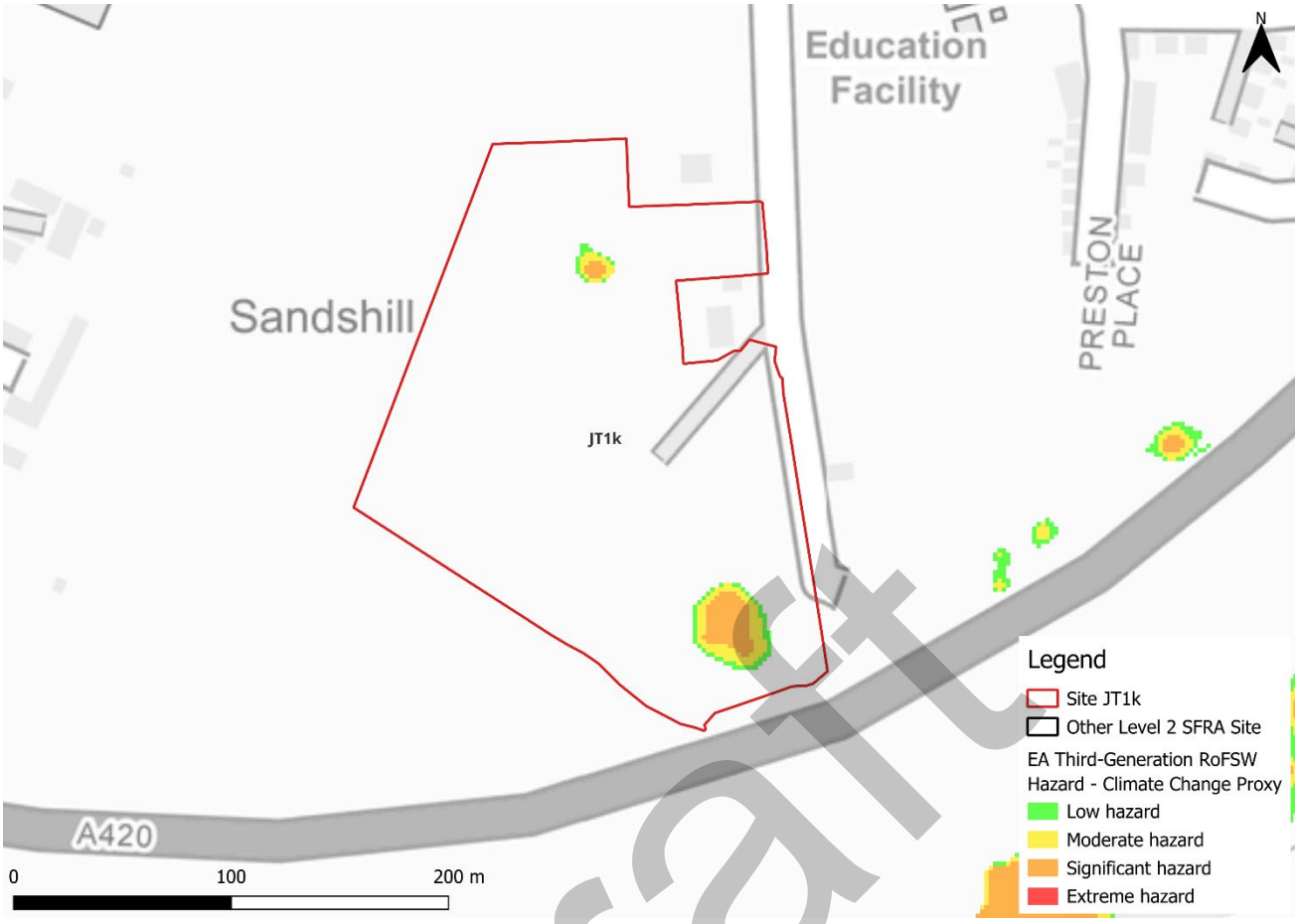

Figure 3-6: Low risk event surface water flood hazard[1], as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options, site suitability, sequential approach to development management - surface water

- Current risk to the site is predominantly very low, with approximately 86% of the site outside of the 0.1% AEP surface water flood event. Surface water risk is confined to areas of ponding within topographic low spots across the site.
- Risk to the site is shown increase in extent when considering the impact of climate change. There are additional areas of ponding in the west.
- Topographic low spots should be considered and included in site design and ideally left in place to flood naturally when required. Updated surface water modelling should be completed to understand the extent of surface water risk within the site following the re-levelling of the ground.
- The drainage strategy must ensure there is no increase in surface water flood risk elsewhere as a result of new development. The developer should aim to achieve betterment of existing runoff rates. The developer should also follow the National SuDS guidance.
- Safe access and escape would likely be achievable via Sands Hill to the northeast of the site in all events.

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4 Groundwater, geology and SUDS suitability

Risk of groundwater emergence is assessed in this SFRA using JBA's 5m Groundwater Emergence Map. Figure 4-1 shows the map covering the site and the surrounding areas. Table 4-1 explains the risk classifications.

The entirety of the site is in an area where there is a risk of groundwater emergence to both surface and subsurface assets. Ground investigations will be required through the site-specific FRA to ascertain groundwater levels and conditions. Infiltration SuDS are not likely to be suitable for this site.

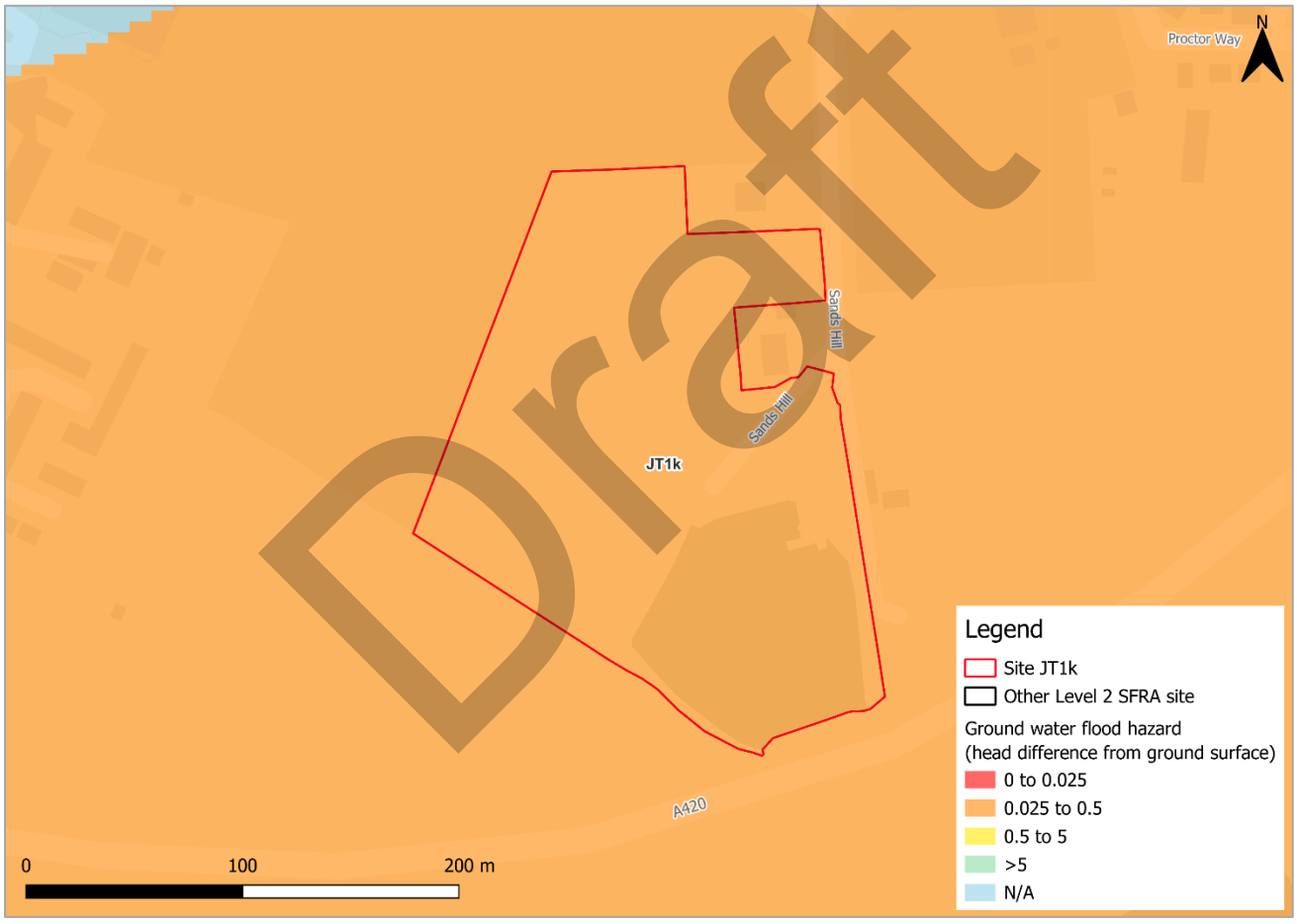

Figure 4-1: JBA 5m Groundwater Emergence Map

Table 4-1: Groundwater Emergence Hazard Classification

Groundwater head difference (m)*	Class label
0 to 0.025	Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
0.025 to 0.5	Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater emergence to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
0.5 to 5	Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event There is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely.
>5	Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event. Groundwater emergence is not likely.
N/A	No risk. This zone is deemed as having a negligible risk from groundwater emergence due to the nature of the local geological deposits.
*Difference is defined as ground surface in mAOD minus modelled groundwater table in mAOD.	

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The underlying bedrock within the site is sandstone and mudstone. (Figure 4-2). Sandstone has a high permeability, whereas mudstone has low levels of permeability. This leads to mixed levels of water infiltrating into the ground and could potentially alter water table levels. The drainage strategy for the site should investigate water table levels and ground conditions to inform on appropriate SuDS.



Figure 4-2: BGS Geology - Bedrock and superficial deposits

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5 Overall site assessment

5.1 Can part b) of the exception test be passed?

To pass part b) of the exception test[2], it must be proven that the development can be safe for its lifetime, which is 75 years for non-residential development, taking account of the vulnerability of its users, without increasing risk elsewhere, and, where possible, will reduce flood risk overall. The site is not required to pass the exception test as it is proposed for less vulnerable uses.

5.2 Recommendations and site-specific FRA requirements

Based on the evidence presented in the Level 1 SFRA (2024), Level 1 SFRA Addendum (2026) and this Level 2 SFRA:

- The proposed development of the site would see a change in the risk classification from water compatible to less vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the site-specific FRA must show that the development can be designed to be safe and that there is adequate emergency planning provision (para 006 FRCC-PPG).
- Based on current information, this site could be allocated given the low fluvial and surface water flood risk. However, were this site to be allocated based on current information, the LPA must make it clear that this site cannot be developed until the required information detailed in this SFRA on future flood risk from surface water is fully ascertained.
- Updated surface water modelling should be completed to understand the extent of surface water risk within the site following the re-levelling of the ground.
- Groundwater conditions must be investigated further.
- Opportunities for NFM features to reduce flood risk to the site and surrounding areas should be explored at the site-specific FRA stage.
- Any site-specific FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; South Oxfordshire and Vale of White Horse District Councils Joint Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the site-specific FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; TW; the highways authorities; and the emergency services.

[2] Policy F6 National Planning Policy Framework 2026

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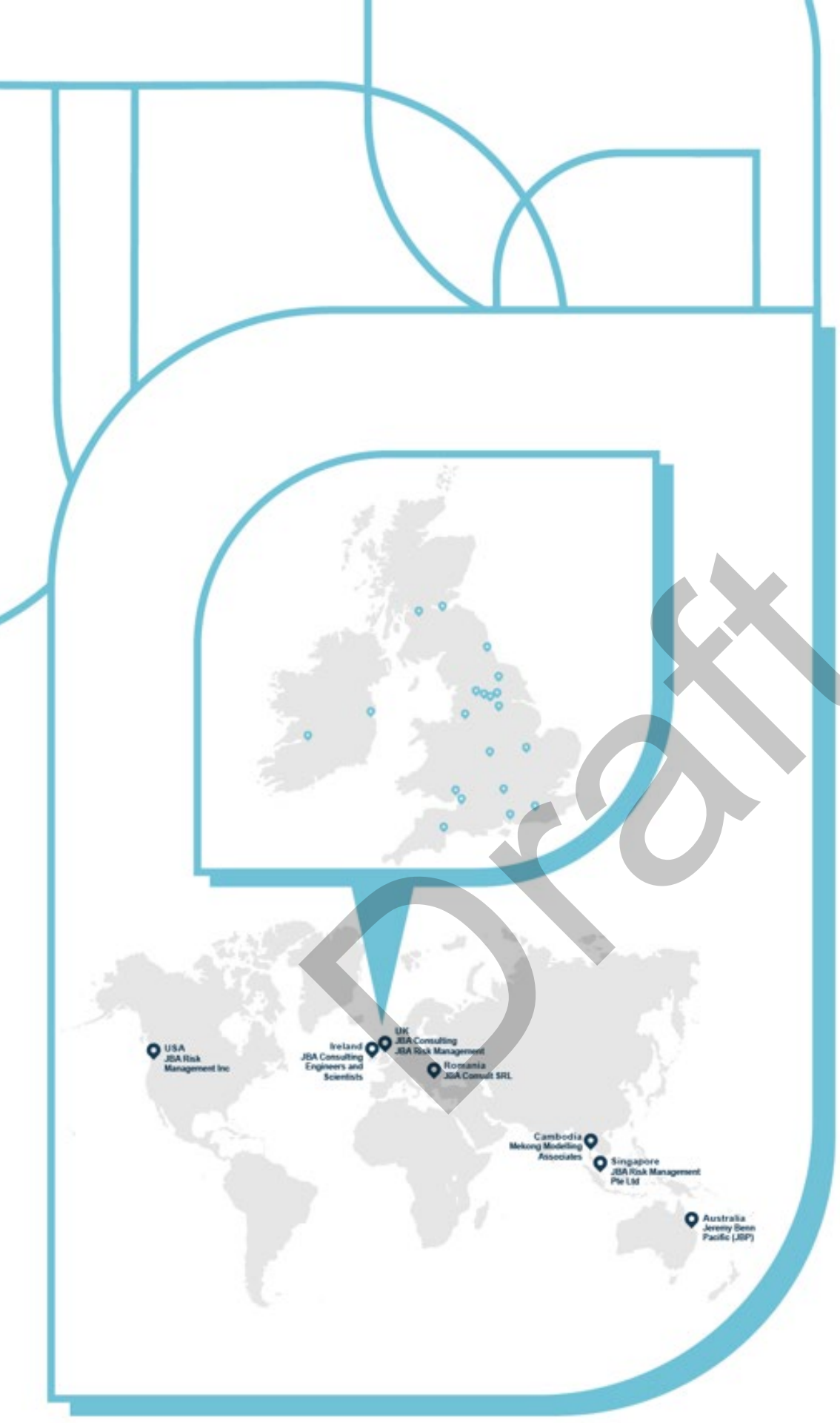

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JBA consulting

Offices at

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Thirsk
Wallingford
Warrington

Registered Office
1 Broughton Park
Old Lane North
Broughton
SKIPTON
North Yorkshire
BD23 3FD
United Kingdom

+44(0)1756 799919
info@jbaconsulting.com
www.jbaconsulting.com
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