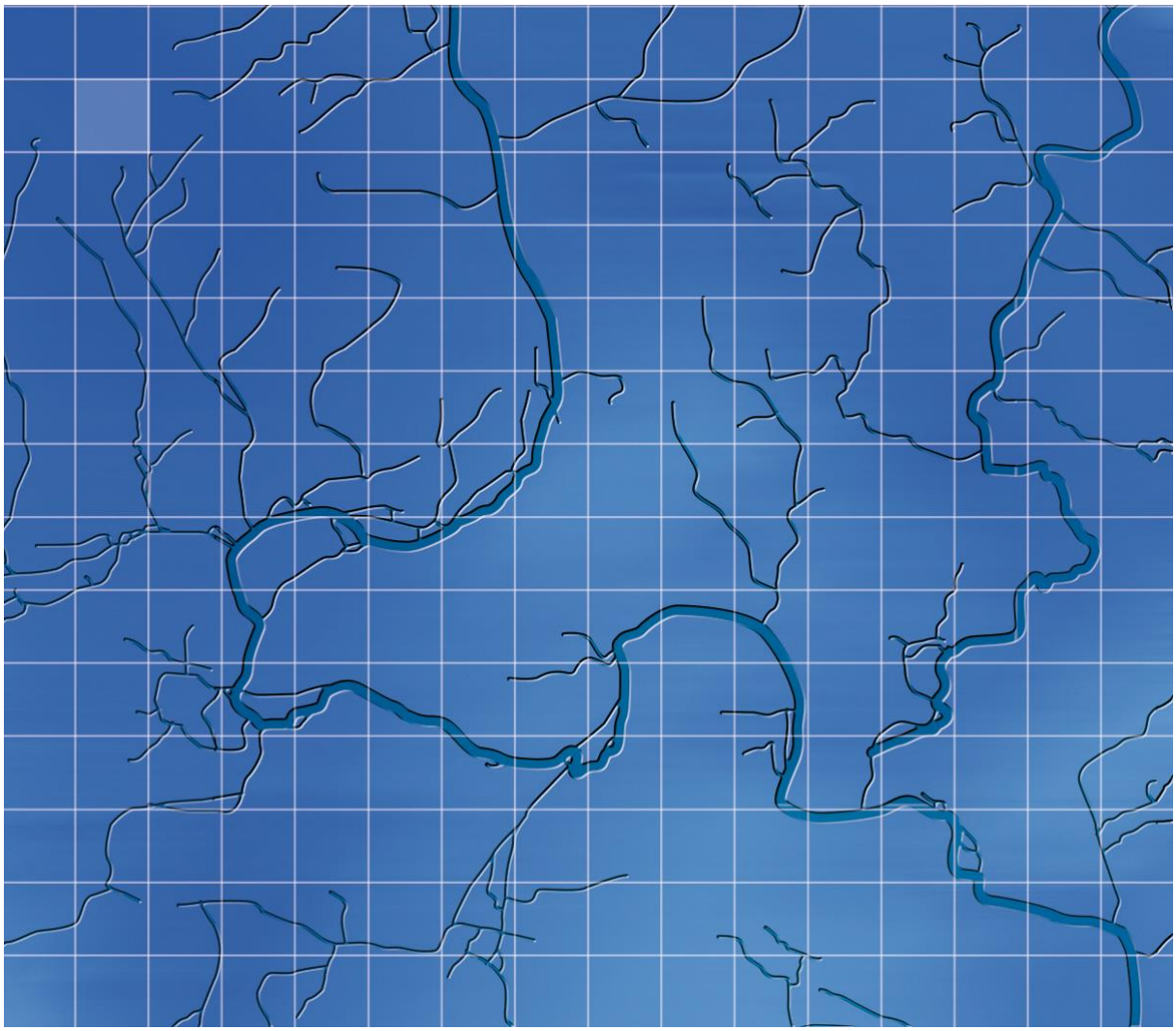
Oxford City Council

October 2025

Ozone Leisure Complex & Minchery Farmhouse (028c)

Level 2 Strategic Flood Risk Assessment



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Document issue details

WHS10237

Version	Issue date	Issue status	Prepared By	Approved By
1.0	24/10/2025	Draft	Tirion Lewis (*Graduate Consultant*)	Daniel Hamilton (*Principal Consultant*)

For and on behalf of Wallingford HydroSolutions Ltd.

The WHS Quality & Environmental Management system is certified as meeting the requirements of ISO 9001:2015 and ISO 14001:2015 providing environmental consultancy (including monitoring and surveying), the development of hydrological software and associated training.

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Ozone Leisure Complex & Minchery Farmhouse (028c) Level 2 SFRA

Flood Risk Overview

Fluvial Flood Risk	**M**
Pluvial Flood Risk	**L**
Other Sources of Flood Risk	**M**
Confidence in Assessment	**M**

Flood Risk

The site is at risk from primarily fluvial sources.

Overall, the risk from fluvial flooding is considered to be moderate. The EA Flood Map for Planning shows 12.7% of the site is located within Flood Zone 2, 5.0% of the site is located in Flood Zone 3a and 4.4% is located within Flood Zone 3b. The depth mapping for the 1.0% AEP + CC event, shows flooding is limited mostly to the north of the site near the Littlemore and Northfield Brooks. Inundations depths vary, they are highest close to the watercourses (>1.2m) and fall moving away (between 0.2-0.9 m). Depths most commonly are less than 0.2m.

Pluvial flood risk at the site is considered to be low and is limited to a small area in the centre of the site.

The risk from other sources of flooding is considered to be moderate due to potential groundwater flood risk.

The overall confidence in the assessment is moderate. This is based on the fact that the EA's latest national scale modelling has informed the assessment of flood risk.

Conclusions and Recommendations

The development proposed is mixed, including retail, residential, community and commercial uses. Residential development is categorised as *More Vulnerable Development*, while the other uses are categorised as *Less Vulnerable Development*. A sequential approach to the siting of the development should be used, with development prioritised first within Flood Zone 1 prior to consideration of any siting within Flood Zone 2 or 3a. The design must ensure that areas of the site that may be located within Flood Zone 3b in the future are avoided altogether.

In terms of fluvial flood risk it should be possible to locate all infrastructure in Flood Zone 1. Pluvial flooding is present at the site, but it is limited to isolated areas and comes partly as a result of the existing infrastructure at the site (i.e. Ozone leisure complex). A sequential approach should still be followed with development sited to avoid high risk areas.

Contents

1 Introduction

1.1 Background

Wallingford HydroSolutions Ltd has been commissioned by Oxford City Council (OCC) to undertake a Level 2 Strategic Flood Risk Assessment (SFRA) at Ozone Leisure Complex & Minchery Farmhouse (reference: 028c) in accordance with the National Planning Policy Framework (NPPF), Planning Practice Guidance (PPG) and associated guidance from the Environment Agency (EA).

Where there is a risk of flooding at the site, this risk has been quantified with the latest available datasets and any associated limitations with the assessment have been identified.

Where applicable, recommendations for improving our understanding of flood risk and/or mitigating the risk has also been included in this report.

1.2 Assessment of Flood Risk

For the site, a detailed assessment of the nature of flood hazard was undertaken. This included using the relevant fluvial modelling data to assess:

- The proportion of the site inundated for a range of return periods
- The speed of onset
- Flood depth
- Flood velocity
- Flood Hazard

The sites were assessed against a range of return periods, however the design event, the 100-year (plus central climate change) event, was considered most important for planning purposes.

In addition to the analysis of modelling data, the location, standard and condition of existing flood defences was assessed. Other sources of flooding were also reviewed at each site. This included an assessment of surface water flooding and an assessment of groundwater flooding based on available hydrogeological information from BGS and Soilscapes. Potential access/egress routes were identified with respect to the risk posed from all sources of flooding.

Following a review of flood risk, flood defences and the identification of access/egress routes, an assessment was made on whether a future site-specific FRA would be able to show that the site can be allocated for development. The assessment takes into account the flood risk vulnerability of the development, the scale of development proposed along with any requirements for the Exception Test. In this context, any mitigative actions in the form of ground raising and compensatory storage are identified.

The site assessments also include guidance for the preparation of FRAs, including information about the use of SuDS.

1.3 Report Structure

This FRA follows the structure summarised below:

1 - Introduction (this section)

2 - Site Description

3 - Flood Risk

4 – Detailed Review of Primary Flood Risk

5 – Development Viability and FRA Recommendations

2 Site Description

2.1 General Location Plan

Ozone Leisure Complex & Minchery Farmhouse (028c) is a 3.0 ha site located in the south of Blackbird Leys, see Figure 1. Current land use at the site is mixed and includes recreational buildings, a hotel and car parking.

Proposed development at the site is mixed including, retail, residential, community and commercial uses.

2.2 Topography

Based on 1m LiDAR data, the site slopes from south to north towards the Littlemore and Northfield Brooks, see Figure 2. The ground levels within the site boundary range from 56.9m to 61.7m AOD. The average ground level is approximately 60.0m AOD.

2.3 Nearby Watercourses

The Littlemore Brook, a small tributary of the River Thames, flows from northeast to southwest along a small section of the site's northern boundary. It is joined by the Northfield Brook which flows along the site's northern eastern boundary from east to northwest, see Figure 1.

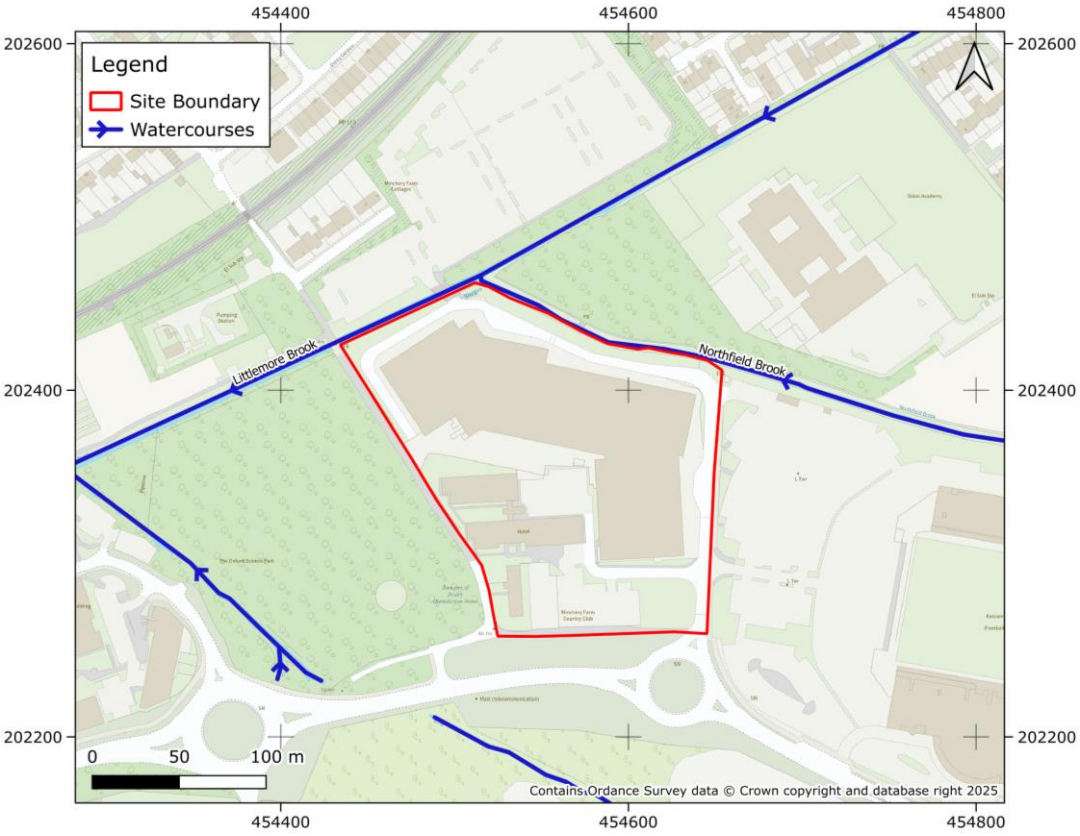

Figure 1 - Site Location

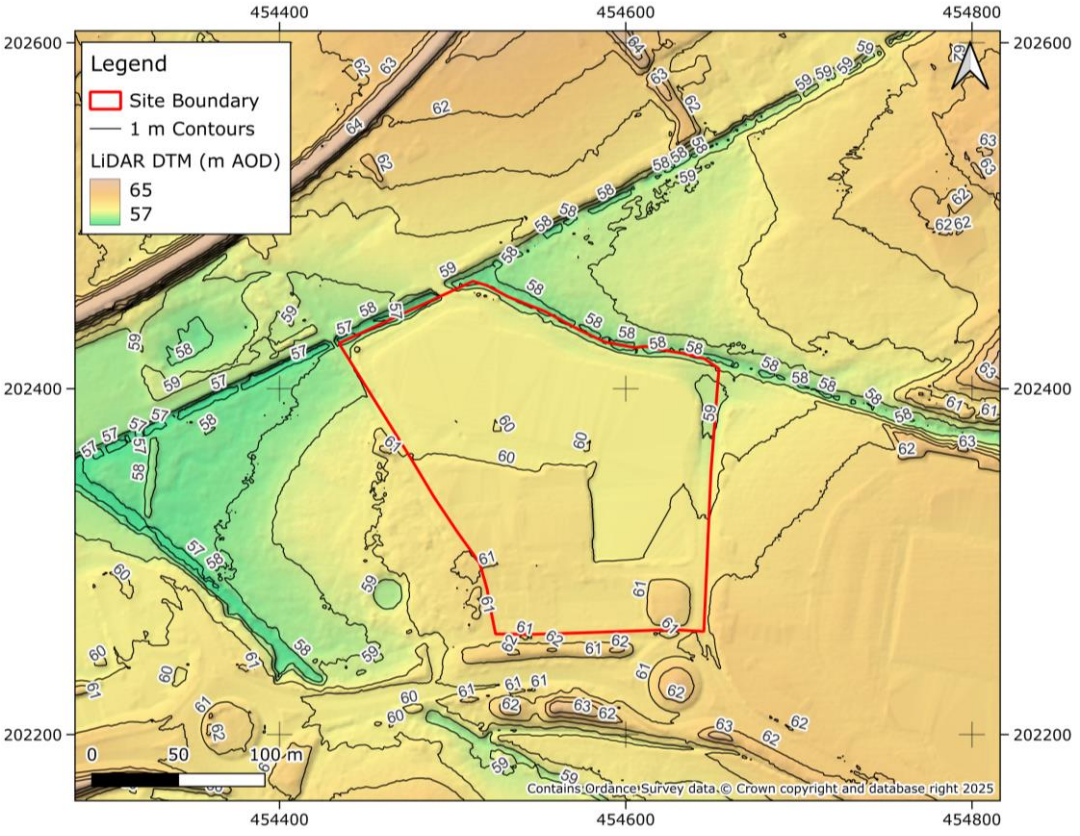

Figure 2 – Topography

3 Flood Risk

3.1 Historical Flooding

The EA has no records of historical flood events on the site.

3.2 Fluvial Flood Risk

In the existing Flood Map for Planning (FMfP), 12.7% of the site is located within Flood Zone 2 (0.1% AEP), and 5.0% is located within Flood Zone 3a (1% AEP), see Figure 3. These Flood Zones consider the undefended scenario whereas Flood Zone 3b (3.3% AEP) considers the defended scenario. This extent shows 4.4% of the site to be located within Flood Zone 3b.

The EA climate change fluvial outputs for the 0.1% AEP and 1.0% AEP undefended extents have also been assessed, these show 14.4% of the site inundated during the 0.1% AEP event and 12.7% of the site inundated during the 1.0% AEP event. The climate change extent for the 3.3% AEP defended event was also assessed, the proportion of the site inundated increases to 4.8%, see Figure 4.

Fluvial flood risk is considered to be moderate and is assessed in more detail in section 4.

3.3 Flood Defence Infrastructure

No flood defence infrastructure is located on or near the site.

3.4 Surface Water Flood Risk

The EA's surface water flood maps show 2.7% of the site to be inundated during a 3.3% AEP event, 5.6% is inundated during a 1.0% AEP event, and 9.0% is inundated during a 0.1% AEP event, see Figure 5. The areas at risk are isolated to a small area in the centre of the site which follows the boundary of an existing building (i.e. Ozone leisure complex).

When considering the effects of climate change, the proportion of the site at risk for each event increases to 4.3%, 7.0%, and 9.8% respectively, see Figure 6.

Overall, the surface water flood risk to the site is low.

3.5 Groundwater Flooding

The site is underlain by a bedrock of sandstone in the form of the Beckley Sand Member. It is expected to permit moderate amounts of infiltration. Superficial deposits of peat and alluvium consisting of clay, silt, sand and gravel are present in the north of the site, these are expected to have variable permeabilities. The underlying soils are permeable freely draining slightly acidic loamy soils.

Based on the data available the water table is expected to be mobile meaning that there may be a moderate risk of groundwater flooding, however more data is required at the planning stage to confirm this.

3.6 Reservoir Flood Risk

The site is not located in or near an area of reservoir flood risk.

3.7 Flood Warning Service

The site is not located within an EA Flood Warning Area

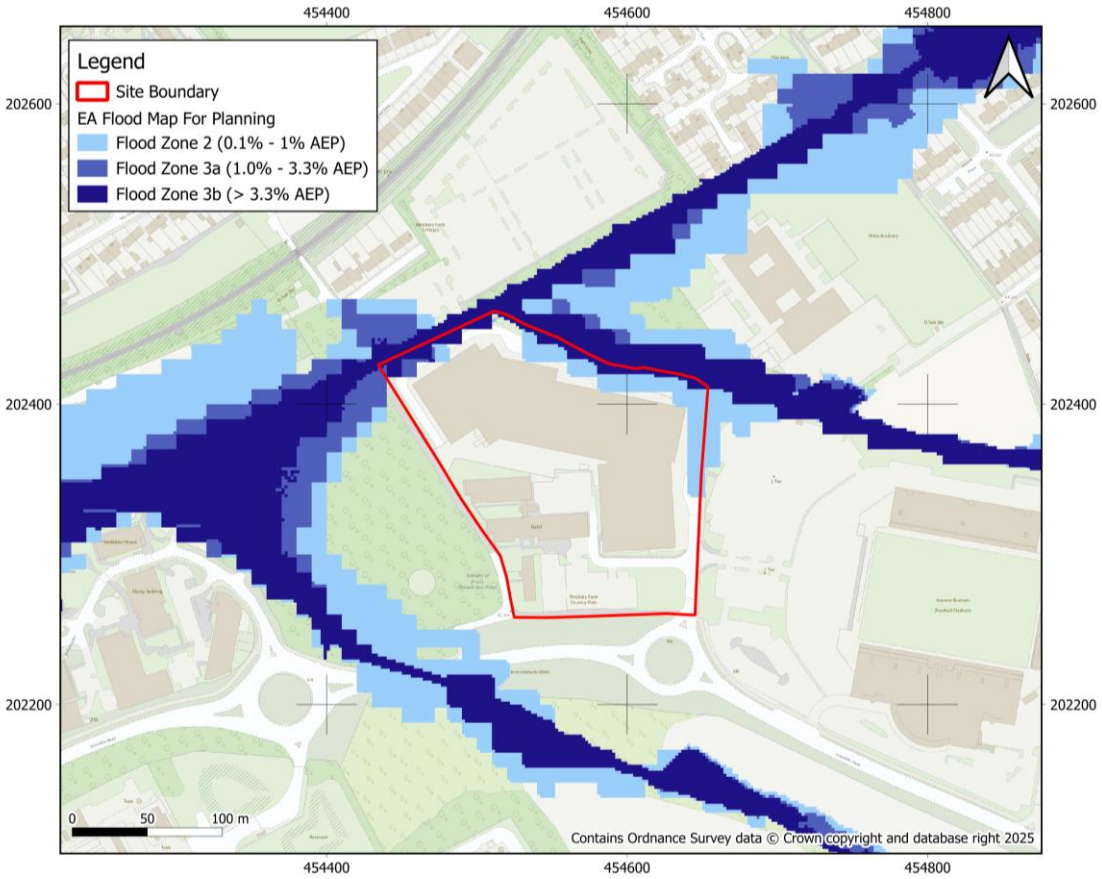

Figure 3 - Fluvial Flood Map

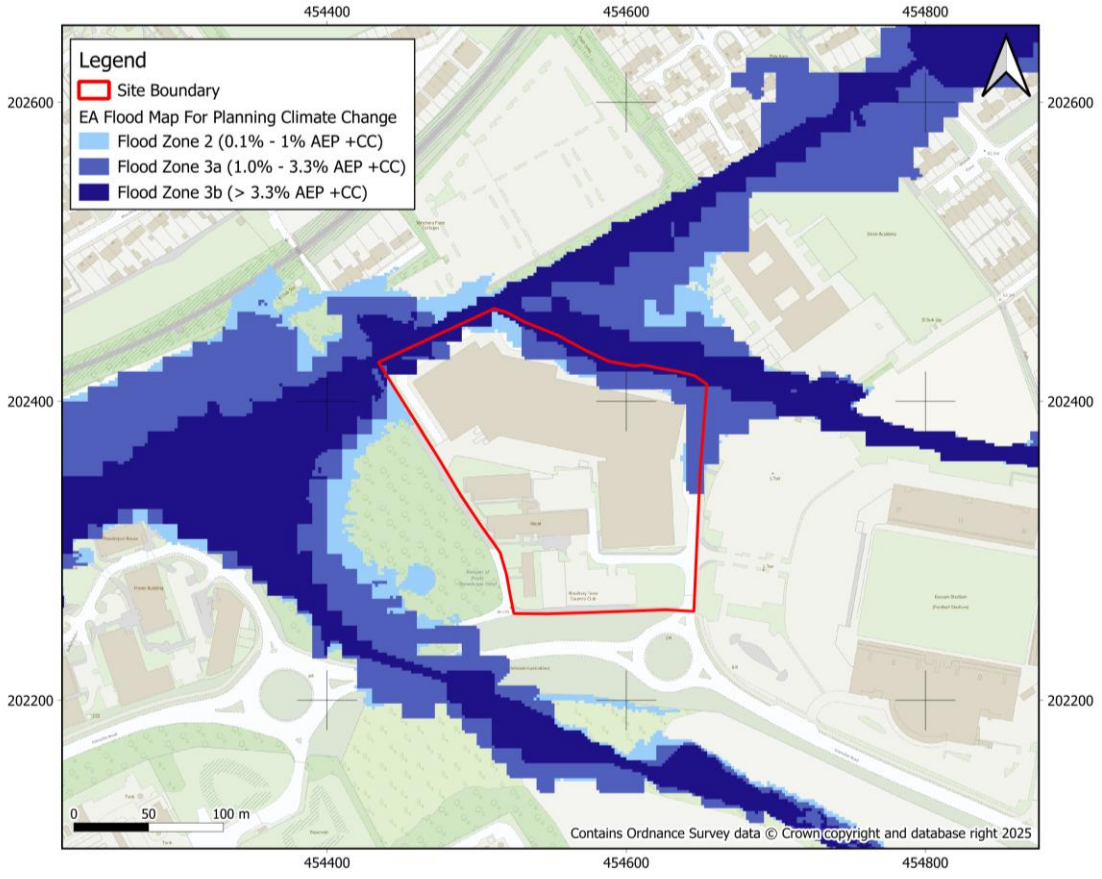

Figure 4 – Fluvial Climate Change Flood Map

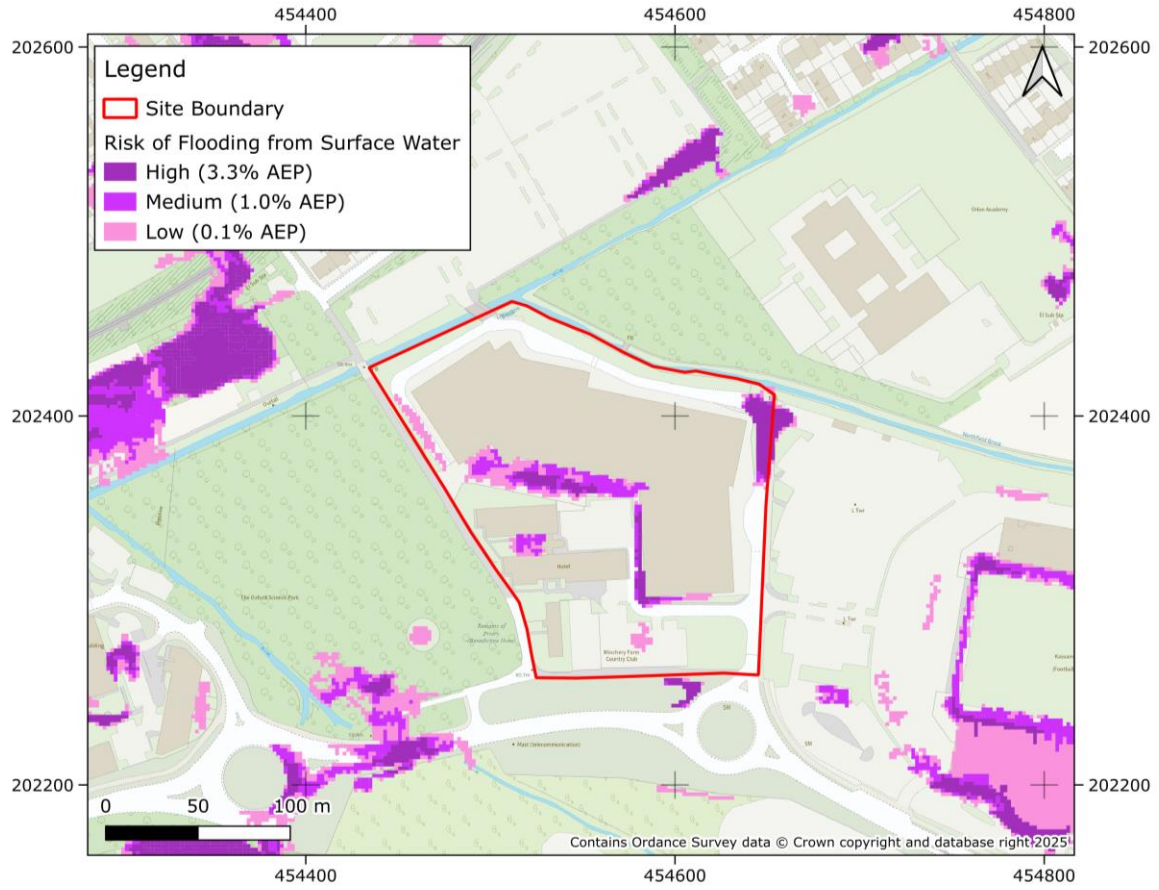

Figure 5 – Surface Water Flood Map

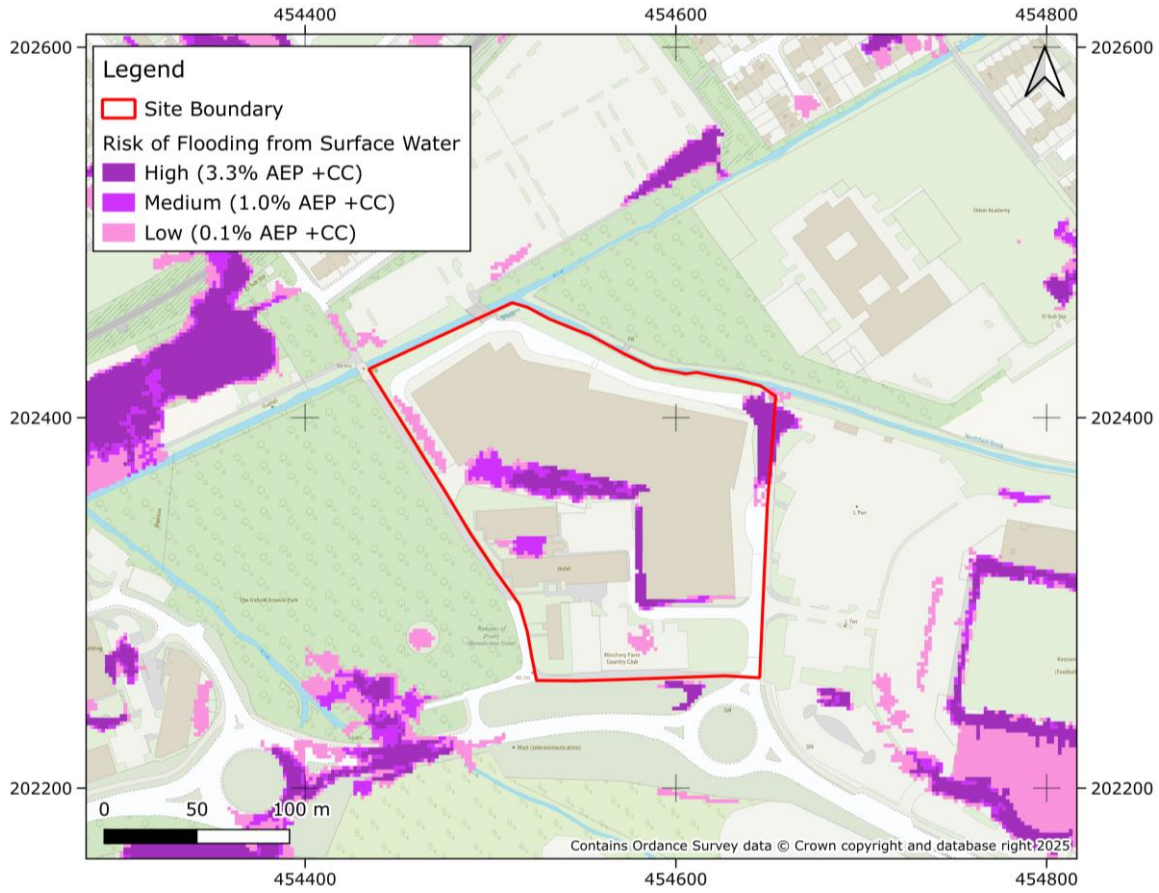

Figure 6 -Surface Water Climate Change Flood Map

4 Detailed Review of Primary Flood Risk

4.1 Primary Flood Risk

Fluvial is the primary flood risk to the site and will be quantitively assessed in more detail below.

4.2 Flood Risk Metrics

The Northfield Brook and Littlemore Brook Model (2011) was re-run as part of the previous SFRA for Oxford City in 2023. This was to obtain results applying the latest climate change allowances. These extents have been reviewed and are significantly reduced relative to the climate change extents shown in the latest national mapping (see Figure 3). Therefore, to ensure a precautionary approach the national mapping outputs have been assessed in more detail.

Depth data is not available for the climate change extents reviewed in section 3.2, these extents consider the 2080s epoch (2070-2125). However, depth data is available from the national mapping from the Risk of Flooding from Rivers and Sea (RoFRS) dataset. The climate change allowances used in RoFRS are based on the 2050's epoch (2041-2069) and reflect the median estimate of flow increases. The RoFRS extents are very similar to the extents applying the 2080s allowances, therefore are considered suitable for the purposes of this SFRA.

The depth mapping across the site (see Figure 8) shows flooding is limited mostly to the north of the site near the Littlemore and Northfield Brooks, with approximately 12.9% of the total site area being inundated. Inundations depths vary, they are highest close to the watercourses (>1.2m) and fall moving away (between 0.2-0.9 m). Depths most commonly are less than 0.2m.

4.3 Access and egress

Given the pre-existing road network within and near the site, access and egress to the majority of the site should be possible along Grenoble Road to the south of the site, preferably heading east to avoid fluvial flooding, see Figure 9.

This route lies entirely outside of the design flood extents, and Flood Zones 2 and 3. Whilst the route lies outside of the design fluvial extent, there is some pluvial flood risk along the route. Whilst this risk is generally considered manageable, a site-specific FRA should consider in more detail the nature of the flood risk to determine how quickly it occurs and the degree of hazard.

It should be noted that the site is not currently located within an EA Flood Warning Area. However, other areas of Oxford are covered by flood warning areas and so these Flood Warnings should be considered when assessing the need for evacuation from the site.

Once the development layout is known, a site-specific FRA should consider onsite routes across the site and any infrastructure required to reach the proposed access route. The proposed route should also be reassessed in a site-specific FRA when all access points to the site are known, to ensure the route with the lowest hazard remains the same.

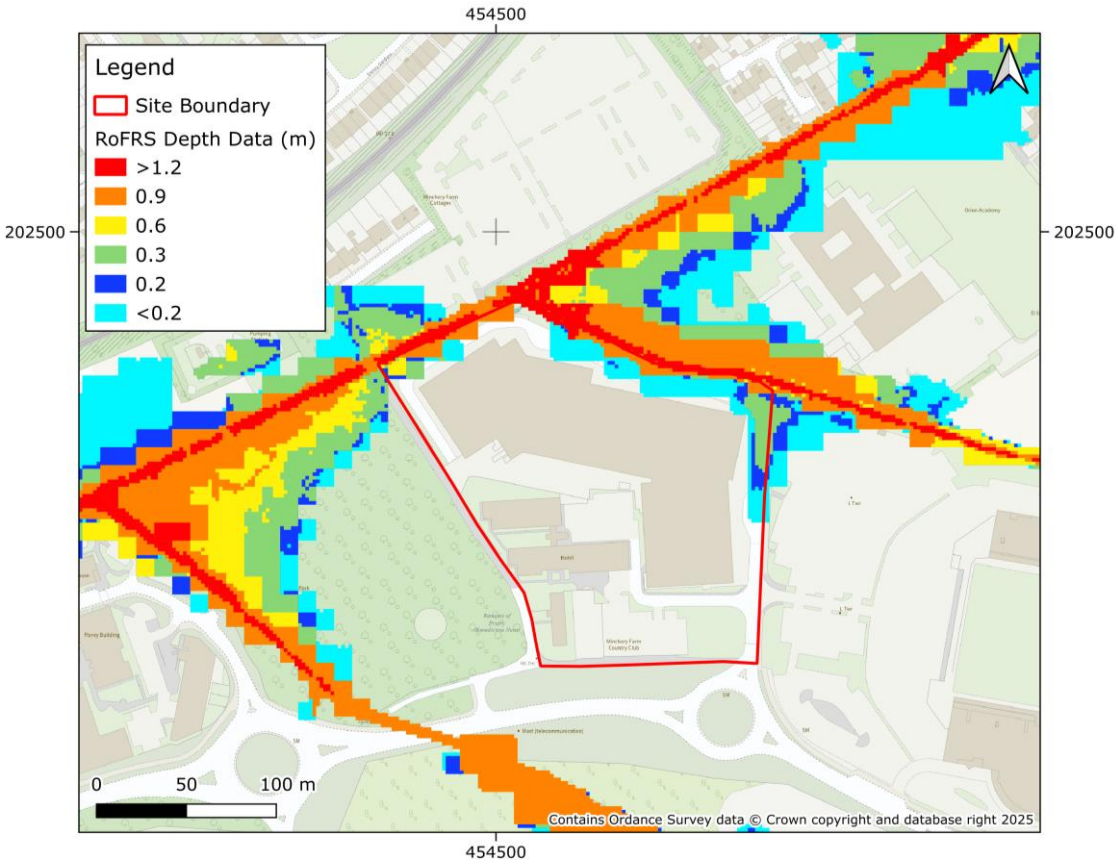

Figure 8 – RoFRS Depth Data for 1.0% AEP + Climate Change Event

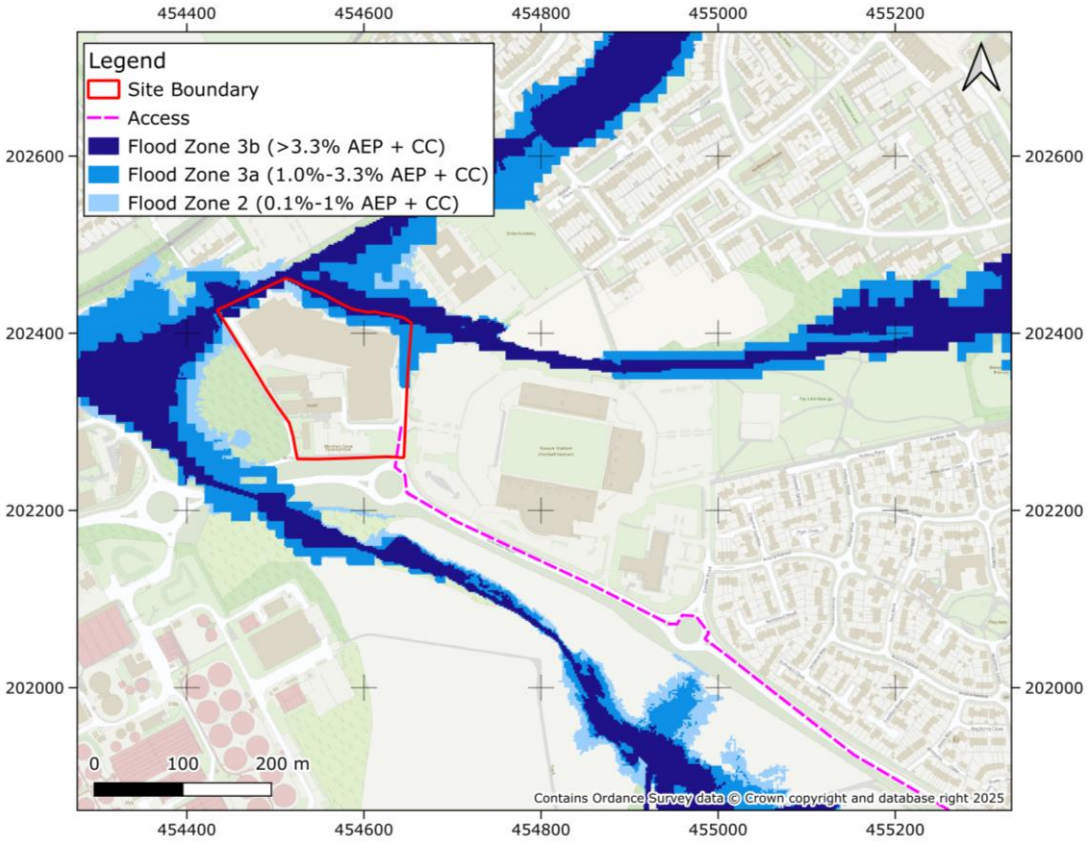

Figure 9 – Access/Egress Routes

5 Development Viability and FRA recommendations

5.1 Development Categorisation

The development proposed is mixed, including retail, residential, community and commercial uses. Residential development is categorised as *More Vulnerable Development*, while the other uses are categorised as *Less Vulnerable Development*. A sequential approach to the siting of the development should be used, with development prioritised first within Flood Zone 1 prior to consideration of any siting within Flood Zone 2 or 3a. The design must ensure that areas of the site that may be located within Flood Zone 3b in the future are avoided altogether.

In terms of fluvial flood risk it should be possible to locate all infrastructure in Flood Zone 1. Pluvial flooding is present at the site but it is limited to isolated areas and comes partly as a result of the existing infrastructure at the site (i.e. Ozone leisure complex). A sequential approach should still be followed with development sited to avoid high risk areas.

5.2 Scale of Development

The total site area is currently 3.0 ha and has not yet been allocated capacity numbers for dwellings or area for other uses.

In total 14% of the site or 0.42 ha of land lies within the fluvial flood zones when accounting for climate change. Therefore, it should be possible to locate more vulnerable residential development outside of this area. As pluvial flooding is isolated to a small area and is associated with existing buildings it should manageable allowing development to be accommodated on the site.

5.3 Sequential Approach

It is important that a sequential approach is implemented at the site, prioritising development in Flood Zone 1 wherever possible, followed by Flood Zone 2 and then Flood Zone 3a. As already stated, no development should be located in Flood Zone 3b. If required more vulnerable housing development should be prioritised in lower flood risk areas with less vulnerable uses located in higher flood risk areas if required. This is on the assumption that it does not increase flood risk elsewhere and is designed to be appropriately resistant and resilient to flooding.

Note, surface water flood risk is also present in smaller areas across the centre of the site. Therefore, it should be used to inform the development layout with development located outside of high-risk areas if possible.

5.4 Other Site-Specific Considerations

Whilst this SFRA report has reviewed surface water flood risk a site-specific FRA should consider in more detail how quickly it occurs and the degree of hazard to the site and its access. The drainage strategy for the proposed development should be suitably designed to manage additional runoff arising from the development and ensure that surface water flood risk at the site and to third party land is not increased.

In assessing and demonstrating the viability of any drainage solution for the site, a site-specific FRA should follow the national standards for SuDS and any relevant Local Authority Local Plan policies. The geology at the site has moderate permeability, therefore the use of infiltration SuDS solutions may be possible. It is recommended that a geotechnical investigation is undertaken at this site to obtain further information relating to infiltration rates, this will confirm whether infiltration could be viable in some areas. Attenuated discharge to a watercourse or a sewer will also need to be considered as part of a site-specific FRA.