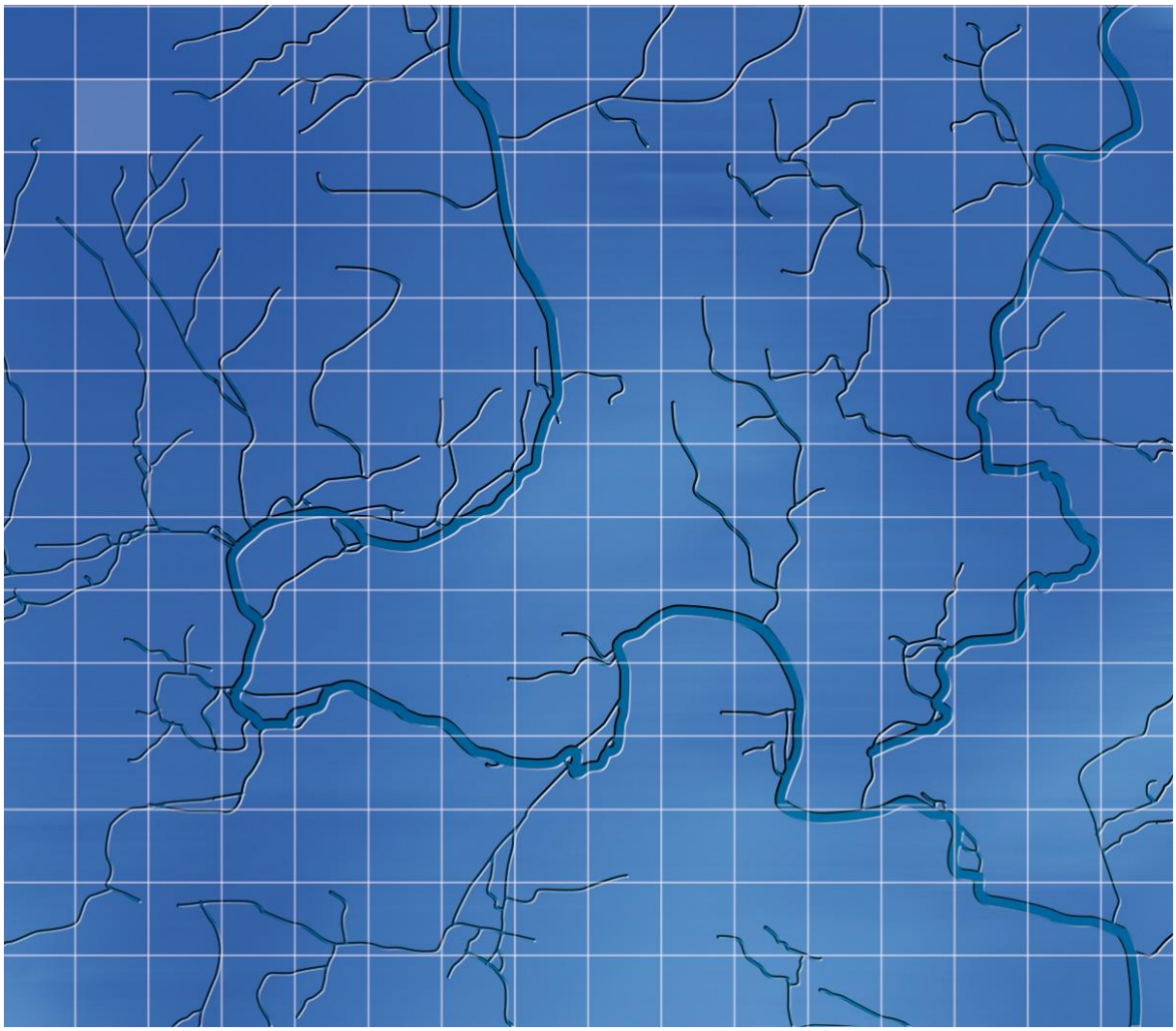
Oxford City Council

October 2025

Manor Place (31)

Level 2 Strategic Flood Risk Assessment



Oxford City Council

Manor Place (31) Level 2 Strategic Flood Risk Assessment

Document issue details

WHS10237

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1.0	09/10/2025	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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Manor Place (31) Level 2 SFRA
Flood Risk Overview

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

Flood Risk

The site is at risk from primarily from fluvial flooding.

The EA Flood Map for Planning shows 11.9% of the site is located within Flood Zone 2 (0.1% AEP), and 3.3% is located within Flood Zone 3a (1.0% AEP).

The River Thames Model (2018, re-run in 2023) 1.0% AEP + 26% CC design event extent covers 8.9% of the site area. Depths in the areas of inundation are generally between 0.1m to 0.2m. The design flood level at the site is 56.9 m AOD. Overall fluvial flood risk is considered to be moderate.

Pluvial flooding affects only small parts of the site and is considered to be low.

The risk from other sources of flooding is considered to be moderate.

The overall confidence in the assessment is High. This is based on the fact that the River Thames model has informed the assessment of the primary flood risk.

Conclusions and Recommendations

The development proposed is student halls of residence categorised as More 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. As only a small proportion of the site is located in Flood Zones 2 and 3a, it should be possible to locate the majority of infrastructure in Flood Zone 1 and outside of the design flood extent. Therefore, development should be possible.

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 Manor Place (reference: 31) 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

Manor Place (31) is a 1.24 ha site located on a largely disused expanse of land to the east of Holywell Cemetery. The River Cherwell runs adjacent to the site's eastern boundary. On the opposite bank lies St. Catherine's College. Parkland and existing residential development are located to the south and north of the site respectively, see Figure 1.

Proposed development at the site is housing (student) with a capacity of 43 dwellings.

2.2 Topography

Based on 1m LiDAR data, the site gently slopes from west to east towards the River Cherwell, see Figure 2. The ground levels within the site boundary range from 56.5 to 59.4 m AOD. The average ground level is approximately 57.1 m AOD.

2.3 Nearby Watercourses

The River Cherwell bifurcates upstream of the site and a branch of the Cherwell runs the length of the site's eastern boundary. It flows in a north to south direction. A backwater of the River Cherwell joins it approximately 70m from the south eastern corner of the site, see Figure 1.

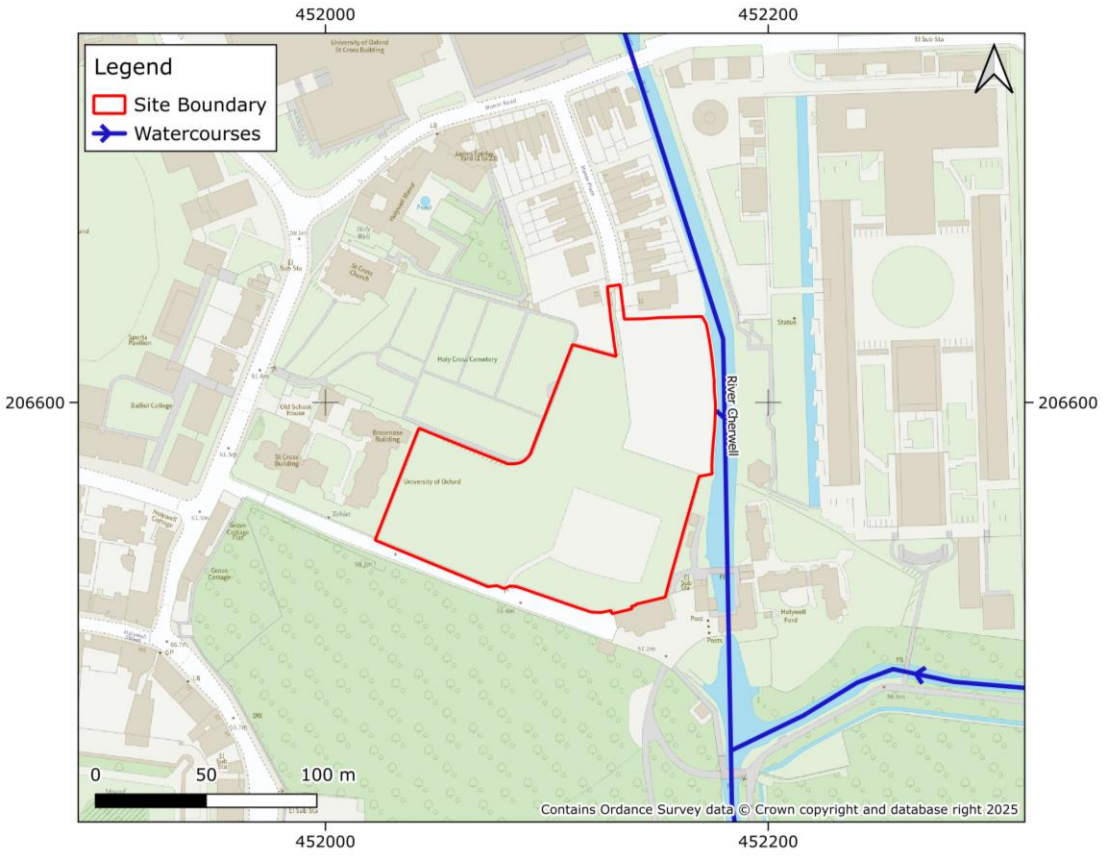

Figure 1 - Site Location

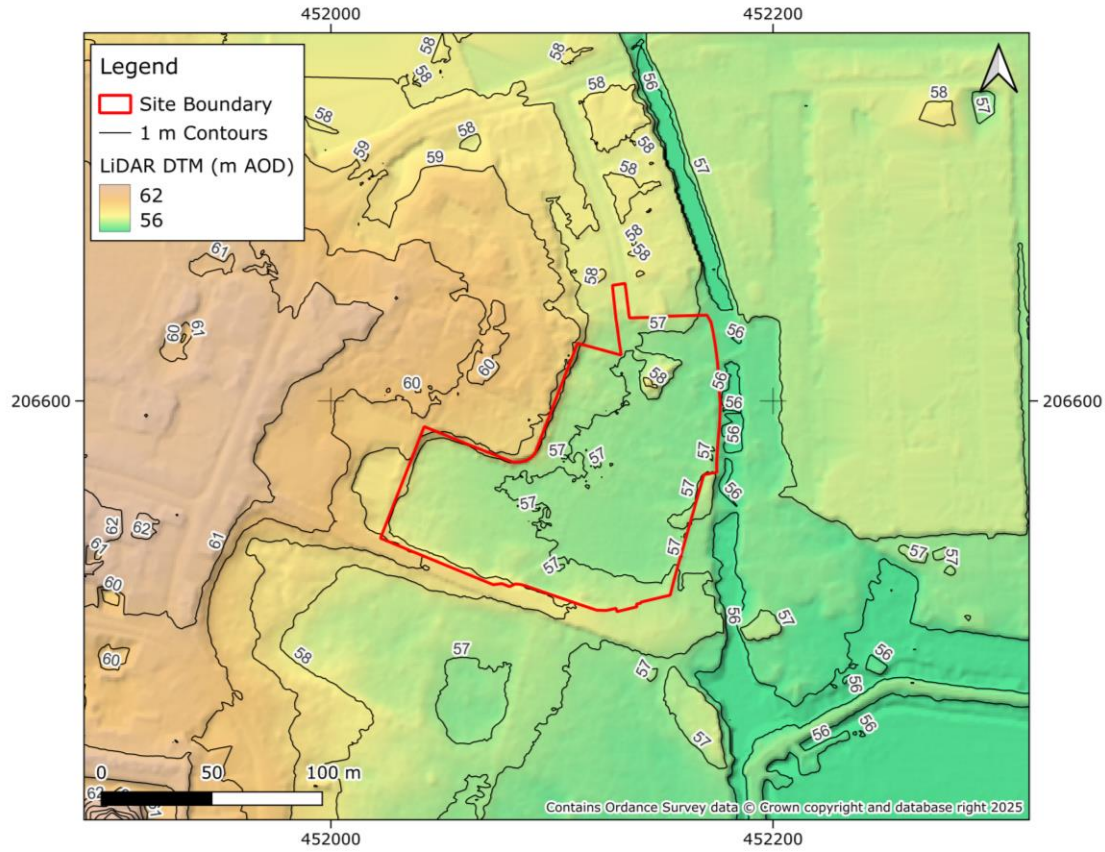

Figure 2 – Topography

3 Flood Risk

3.1 Historical Flooding

The EA has two records of historical flooding at the site. The first occurred in March 1947 and the second occurred in February 1979. Both inundated a small area in the east of the site and were associated with the River Cherwell, see Figure 3.

3.2 Fluvial Flood Risk

In the existing Flood Map for Planning (FMfP), 11.9% of the site is located within Flood Zone 2 (0.1% AEP), and 3.3% is located within Flood Zone 3a (1% AEP). Viewing the River Thames 2018 model results for the undefended 3.3% AEP event, none of the site is located within Flood Zone 3b. The areas at risk are located in the east of the site adjacent to the River Cherwell, see Figure 4.

The FMfP climate change outputs have also been assessed, 61.7% of the site is within Flood Zone 2 (0.1% AEP) and 8.9% of the site inundated by Flood Zone 3 (1.0% AEP), see Figure 5. The River Thames (2018) undefended 3.3% AEP +26% Climate Change extent equivalent to Flood Zone 3b with climate change, indicates that none of the site is expected to be inundated.

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 none of the site to fall within the 3.3% AEP extents, 1.2% is inundated during a 1.0% AEP event, and 14.0% is inundated during a 0.1% AEP event, see Figure 6. The main area of the site at risk of surface water flooding is a small area of tarmac located in the south east of the site.

When considering the effects of climate change, the proportion of the site at risk for each event increases to 1.1%, 6.3%, and 29.2% respectively, see Figure 7.

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

3.5 Groundwater Flooding

The site is underlain by a bedrock comprised of clay and mudstone in the form of the Oxford Clay Formation and West Walton Formation. The bedrock is expected to permit low amounts of infiltration. In terms of superficial deposits, sand and gravel are found across most of the site with alluvium associated with the River Cherwell's floodplain along the eastern boundary; these deposits are expected to have variable permeabilities. The underlying soils vary across the site with freely draining lime-rich loamy soils covering the majority of the site. On the eastern boundary, near the River Cherwell, the soils are loamy and clayey and have naturally high groundwater.

Based on the data available the water table in the soils underlying the site is expected to be mobile presenting a moderate risk of groundwater flooding, however more data is required at the planning stage to confirm this.

3.6 Reservoir Flood Risk

The FMfP shows that the majority of the site it at risk from reservoir flooding during a wet day scenario however, only a very small section in the east of the site would be affected during a dry day scenario, see Figure 8. Whilst the site is shown to be at risk, it should be noted that reservoir failure is a rare event with a very low probability of occurrence. Current reservoir regulations aim to make sure that all reservoirs are properly maintained and

monitored to detect and repair any problem. If required, the local planning authority (LPA) can consult the local resilience forum for emergency planning advice in relation to reservoir failure.

3.7 Flood Warning Service

The site is located partially within the River Cherwell at Oxford Flood warning area.

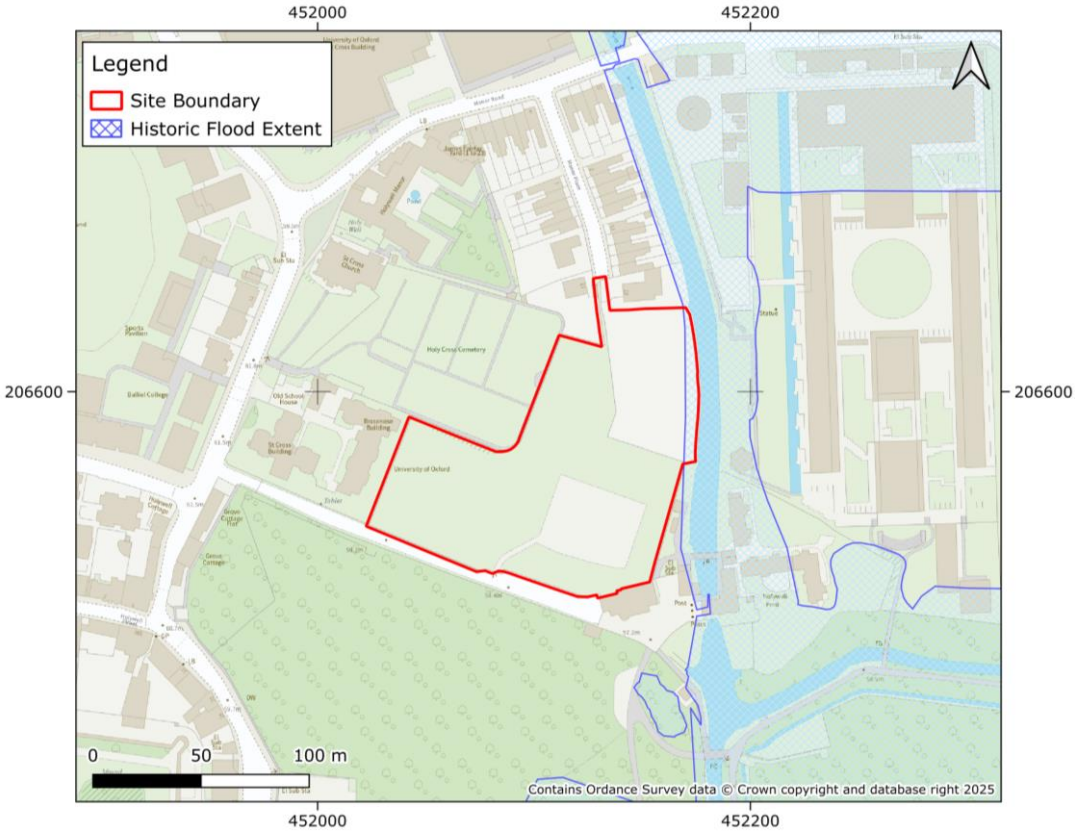

Figure 3 - Recorded Flood Outlines

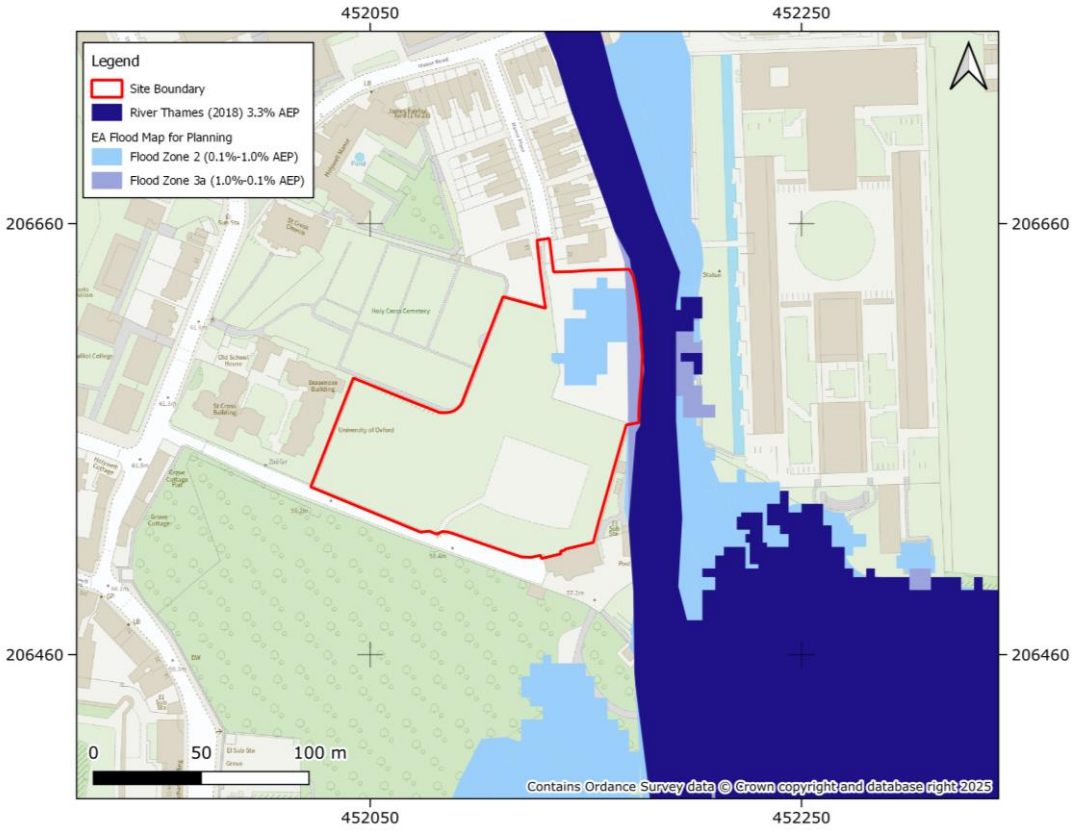

Figure 4 - Fluvial Flood Map

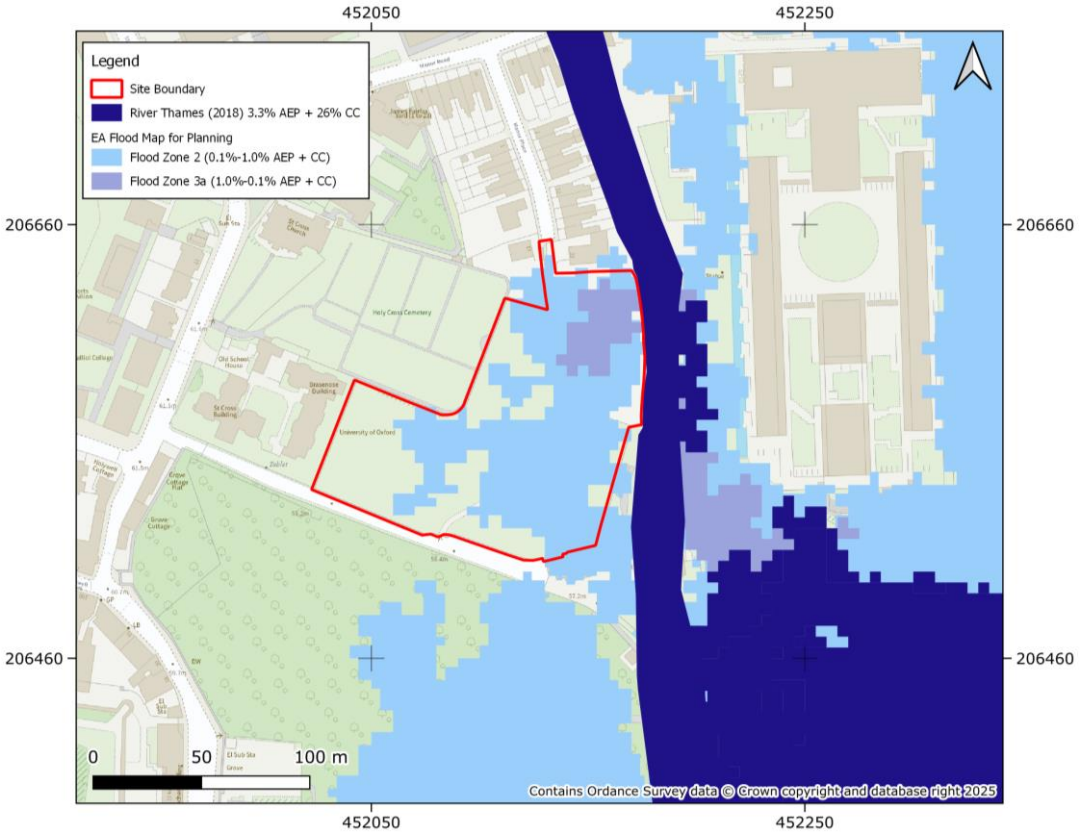

Figure 5 – Fluvial Climate Change Flood Map

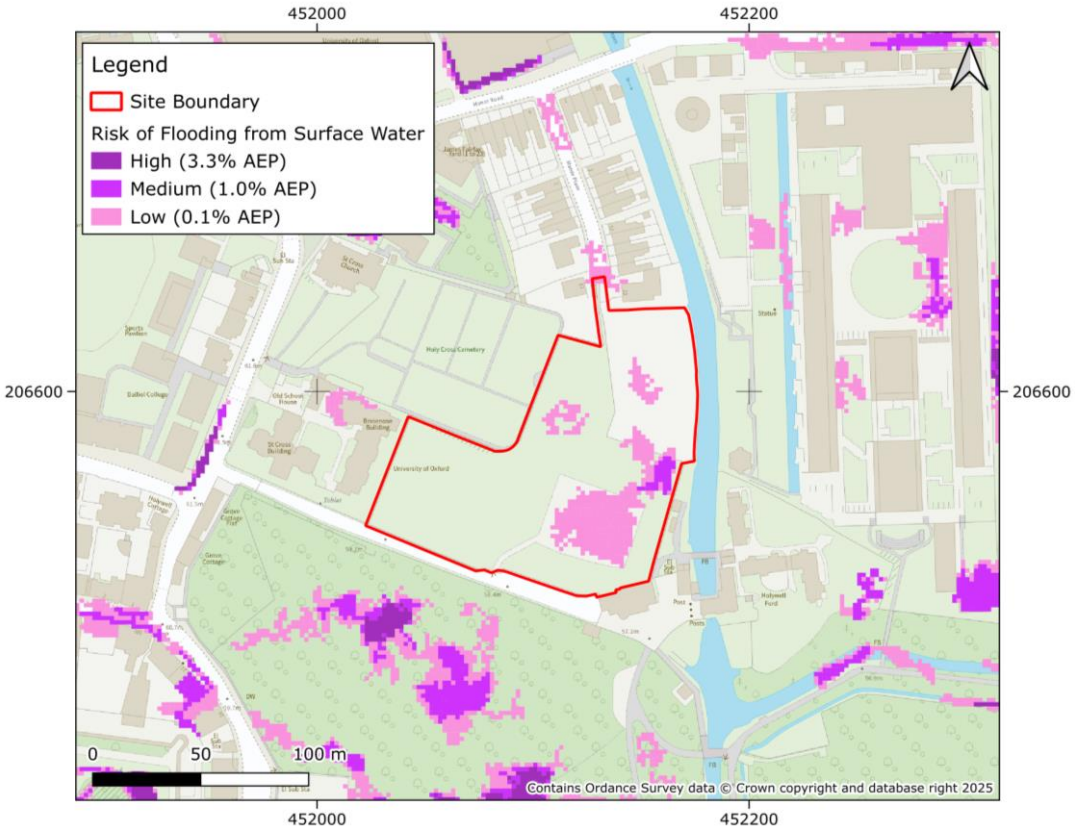

Figure 6 – Surface Water Flood Map

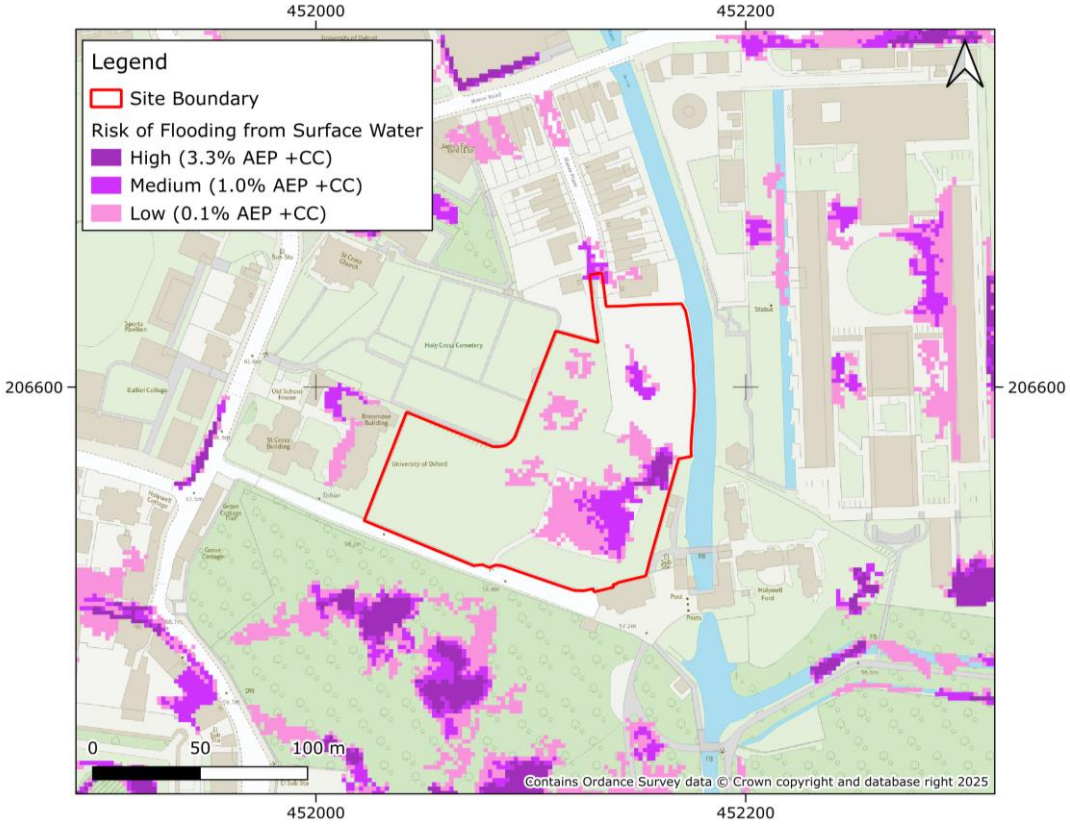

Figure 7 -Surface Water Climate Change Flood Map

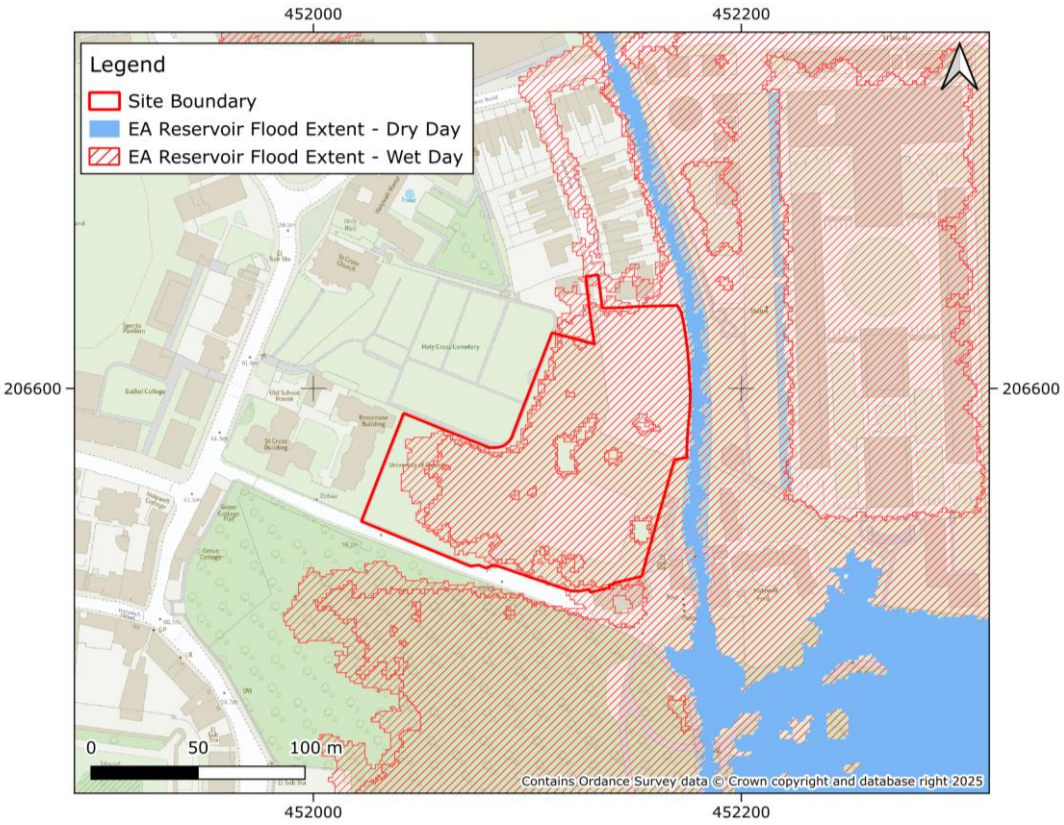

Figure 8 - Reservoir Failure Flood Map

4 Detailed Review of Primary Flood Risk

4.1 Primary Flood Risk

Fluvial flooding is the primary flood risk mechanism at the site and is assessed in more detail below.

4.2 Flood Risk Metrics

The River Thames Model (2018) 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.

Depth data for the 100-yr plus central (26%) climate change design event is assessed to attain further detail on fluvial flooding. The modelled scenario considers the presence of flood defences unlike the FMfP data, although the impact at this site is minimal.

The depth mapping for the design event (see Figure 9) shows flooding in the north east with floodwater overtopping the right bank of the River Cherwell in a location where bank levels are slightly lower. In total 8.9% of the site is inundated during the design event. Flood depths in this location are generally between 0.1-0.2m with a maximum flood depth within the site of 0.22 m. The design flood level for the 1.0% AEP +26% CC event is 56.88 m AOD, just below the average ground level at the site based on LIDAR (57.1 m AOD).

4.3 Access and egress

Vehicular access to the site should be available to the north via Manor Place. A pedestrian route is also available to the south of the site. Both of these routes would eventually join St Cross Rd with onward travel likely westwards away from the River Cherwell.

Figure 10 shows both routes to lie outside of the design flood extent, they are also entirely within Flood Zone 1.

Despite the low hazard along the route early flood warning will be vital site to ensure that the access route can be utilised before floodwater inundates the northeastern part of the site, especially given the site's proximity to the River Cherwell. The River Cherwell's response to rainfall is generally a flashy, due to the predominantly impervious clay soils in its catchment. The site does benefit from being located within an EA Flood Warning Area and is also in the downstream reaches of the Cherwell giving potentially more time for evacuation.

Surface water flood risk along the route is generally low, with some isolated areas at low hazard. However, a site-specific FRA should consider in more detail the nature of the surface water flood risk to determine how quickly it occurs and the degree of hazard on site and to access.

Once the development layout is known, a site-specific FRA should also 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.

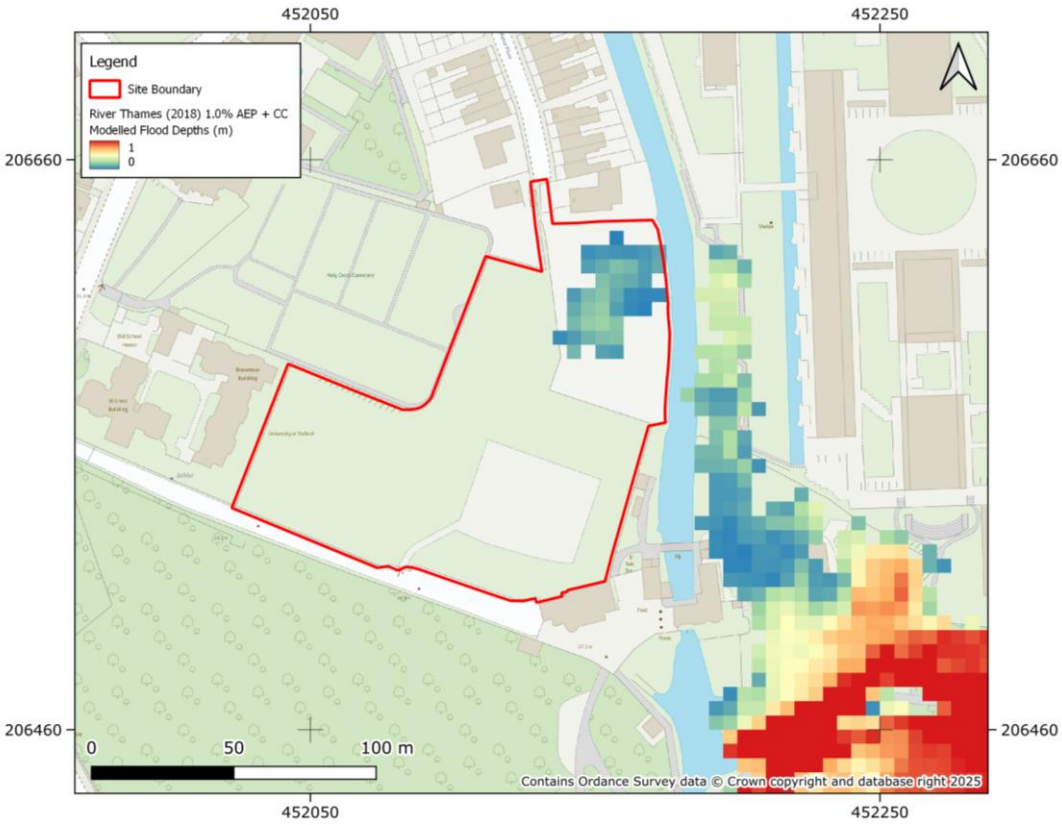

Figure 9 – River Thames (2018) 1.0% AEP +26% CC Modelled Flood Depths (m)

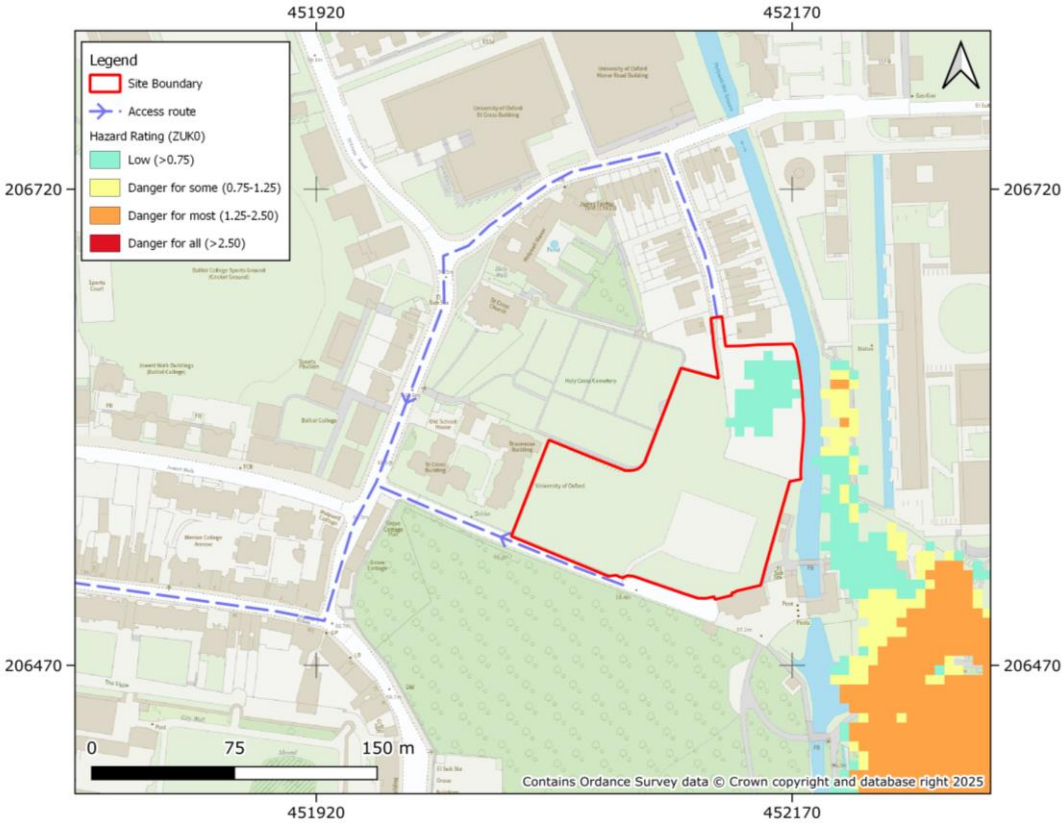

Figure 10 – Access/Egress Routes showing Flood Hazard (ZUK0) for the 1.0% AEP +26% CC Event

5 Development Viability and FRA recommendations

5.1 Development Categorisation

The development proposed is student halls of residence categorised as *More 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. As only a small proportion of the site is located in Flood Zones 2 and 3a, it should be possible to locate the majority of infrastructure in Flood Zone 1 and outside of the design flood extent. Therefore development should be possible.

5.2 Scale of Development

The total site area is currently 1.24 ha; allocated for 43 dwellings. Assuming medium density housing (60 dwellings per hectare), 43 dwellings would require 0.72 ha of land translating to 66% of the site area. This assumes each dwelling is a separate building, student accommodation would most likely be flats which would potentially take up less of the site area.

The design flood extent takes up only 8.9% of the site area and Flood Zone 2 11.9% of the site area. It therefore should be possible to locate all infrastructure within Flood Zone 1.

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.

At this site, it should be possible to locate all development outside of the design flood extents and within Flood Zone 1. However, it is recommended that more vulnerable housing development be located further from the flood risk areas in the north east of the site, with less vulnerable infrastructure (i.e. car parks and open spaces) located closer to these areas if required.

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

5.4 Other Site-Specific Considerations

Areas of surface water flood risk are present within the site and along the Manor Place access route. Whilst risk and hazard are generally expected to be low, a site-specific FRA should consider in more detail the nature of the surface water flood risk to determine how quickly it occurs and the degree of hazard on site and to access.

The geology at the site has variable permeability with high groundwater expected, therefore the significant use of infiltration SuDS solutions may be challenging. 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. Any activity near to the River Cherwell at this site may require Flood Risk Activity Permits, due to its designation as a main river.

Due to some parts of the site being in the wet day reservoir failure inundation extent, any development in this area could affect the reservoirs risk designation, design category and how it is operated with potential cost implications for developers. However, it is noted that the quantum of development is very small in comparison to the existing development in Oxford already lying within the reservoir flood extents so any change in designation is assumed to be unlikely.