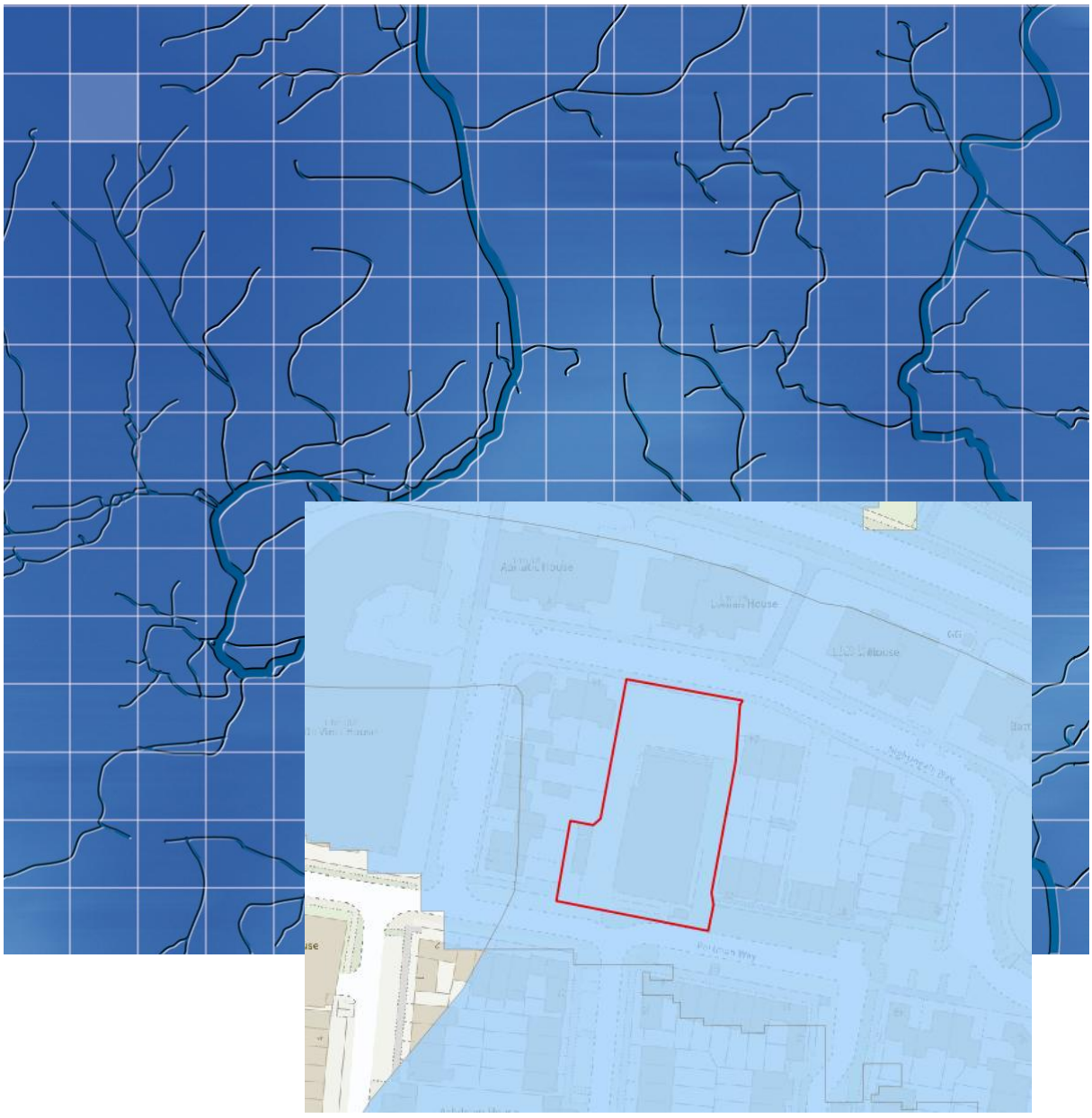
Reading Borough Council

May 2025

Land at Portman Way (WR3i)

Level 2 Strategic Flood Risk Assessment



Reading Borough Council

Land at Portman Way (Wr3i) Level 2 Strategic Flood Risk Assessment

Document issue details

WHS10135

Version	Issue date	Issue status	Prepared By	Approved By
1.0	13/05/2025	Draft	Jasmine Lucas (*Graduate Consultant*)	Paul Blackman (*Director*)

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.

Registered Office Maclean Building, Benson Lane, Wallingford OX10 8BB
www.hydrosolutions.co.uk

Land at Portman Way (WR3i) Level 2 SFRA
Flood Risk Overview

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

Flood Risk

Fluvial flood risk represents the greatest risk with the whole site lying within Flood Zone 2 in the EA Flood Map and Flood Zone 3 in the EA Climate Change Flood Map.

In this location the fluvial flood map is based on detailed modelling in the form of the River Thames model (Pangbourne to Sonning) (2021). The outputs of this model were further assessed and show significant flood depths in some locations.

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 availability of recent detailed modelling in the vicinity of the site.

Conclusions and Recommendations

The development proposed is categorised as *More Vulnerable Development* which is permissible in Flood Zone 2 but needs to pass the Exception Test to justify development in Flood Zone 3a. More vulnerable development is not permissible in Flood Zone 3b.

Given that no part of the site is located within Flood Zones 3a or 3b, residential development may be possible, however there are significant barriers. The whole site is inundated during the design event which takes account of climate change; therefore, infrastructure may need to be raised to ensure it is safe for the development's lifetime. This could in turn compromise floodplain storage which will need to be offset by compensatory storage. Access routes to and from the site are located within Flood Zone 2 and the design flood extent however given the slow response time of the Thames this should be manageable.

Contents

1 Introduction

1.1 Background

Wallingford HydroSolutions Ltd has been commissioned by Reading Borough Council (RBC) to undertake a Level 2 Strategic Flood Risk Assessment (SFRA) at Land at Portman Way (WR3i) 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

The Land at Portman Way (WR3i) site is a 0.21 ha and is located in the west of Reading, see Figure 1. The surrounding land uses are suburban.

In the Replacement Local Development Plan (RLDP) it is proposed to be used for a residential development of between 18 to 26 dwellings.

2.2 Topography

Based on 1m LiDAR data, the site is relatively flat with a small topographic depression in the north, see Figure 2. The ground levels within the site boundary range from 37.7 to 38.9 m AOD. The average ground level is 38.5 m AOD.

LiDAR data also shows a steep mound (maximum ground level of 48.3 m AOD) close to the west of the site. However, when viewing the area using street view imagery, this steep mound is not present.

2.3 Nearby Watercourses

The site is located approximately 1 km south of the River Thames and 650 m southwest of one of its tributaries. Another tributary of the Thames, the Vastern Ditch, is located approximately 530 m east of the site. Figure 1 shows the location of these watercourses.

Figure 1 - Site Location

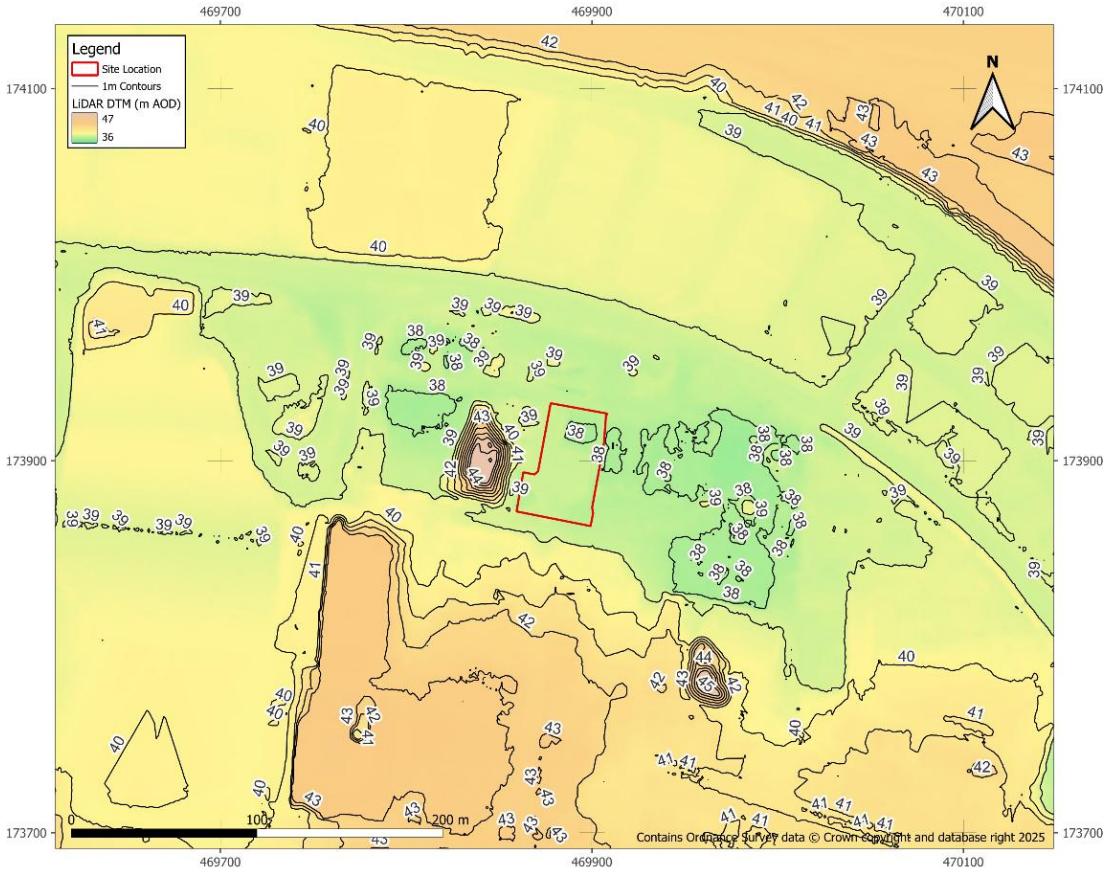


Figure 2 - Topography

3 Flood Risk

3.1 Historical Flooding

The EA has one record of flooding at the location of the site. This was associated with the River Thames exceeding its channel capacity during March 1947.

3.2 Fluvial Flood Risk

In the existing Flood Map for Planning (FMfP), the entire site is inundated by Flood Zone 2, however no part of the site is located within Flood Zone 3a or 3b. All flooding at this site is associated with the River Thames, see Figure 3.

The EA climate change fluvial outputs for Flood Zone 2 and 3 have also been assessed. The entire site is inundated by Flood Zone 2 and Flood Zone 3a, see Figure 4.

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

3.3 Flood Defence Infrastructure

There is no formal flood defence infrastructure in the vicinity of the site. The site is not located within an area associated with a reduction in risk of flooding from rivers and sea due to defences nor is it located within a flood storage area.

3.4 Surface Water Flood Risk

The EA's surface water flood map shows parts of the site at surface water flood risk. In total, 9% of the site is inundated during the 3.3% AEP event, 17% is inundated during the 1.0% AEP event, and 40% is inundated during the 0.1% AEP event, see Figure 5. When accounting for climate change these proportions increase to 15%, 30%, and 100% respectively, see Figure 6.

Overall, the risk of surface water flooding is considered to be moderate, given the small percentage of the site at high risk (3.3% AEP).

3.5 Groundwater Flooding

The site is underlain by a bedrock of chalk in the form of the Seaford Chalk formation. It is expected to permit high amounts of infiltration. Superficial deposits of alluvium and gravel are also present at this site, these are also expected to be freely draining. The underlying soils are acid loamy soils which are also expected to be freely draining.

Based on the data available the water table at the site could be mobile, translating to a moderate risk of groundwater flooding. More data is required at the planning stage to confirm this.

3.6 Reservoir Flood Risk

The FMfP shows that the entire site is at risk from reservoir flooding during the wet day scenario, however the site is not at risk during the dry day scenario, see Figure 7. 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.

3.7 Flood Warning Service

The site is located within the River Thames at Reading and Caversham EA Flood Warning Area.

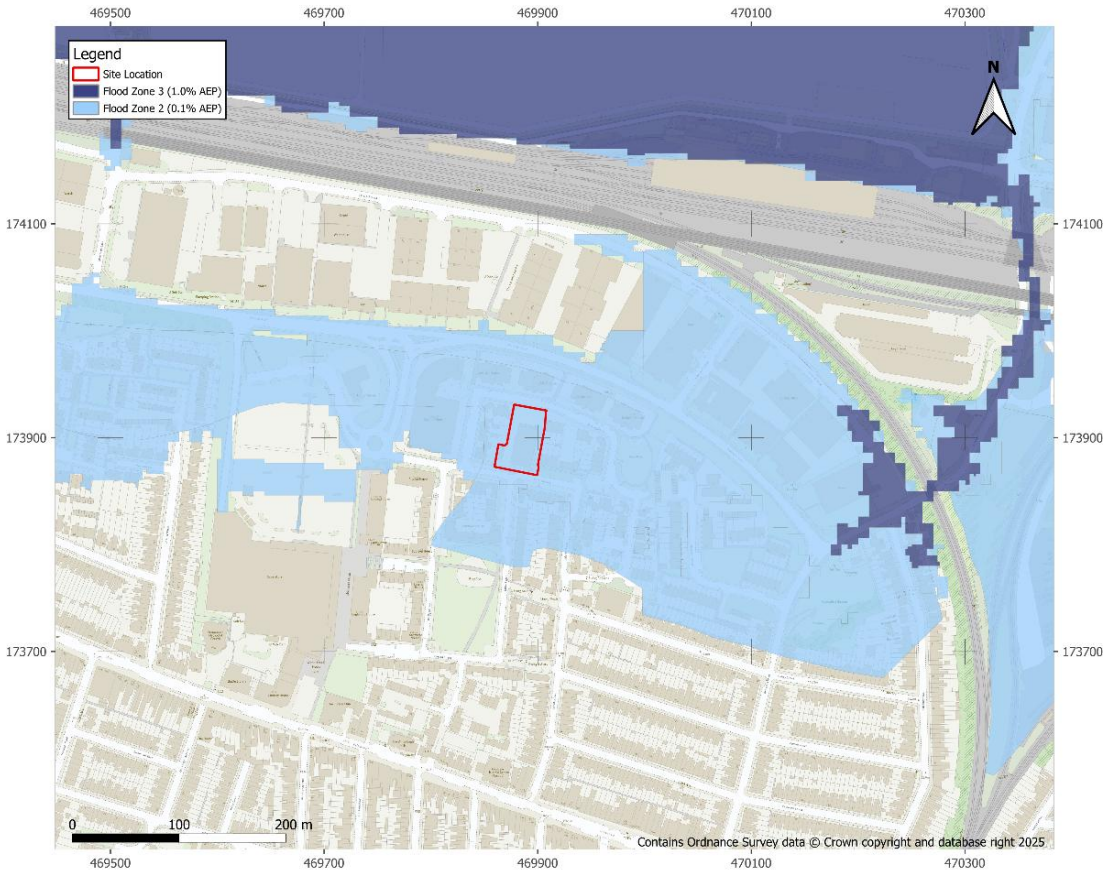


Figure 3 - Fluvial Flood Map

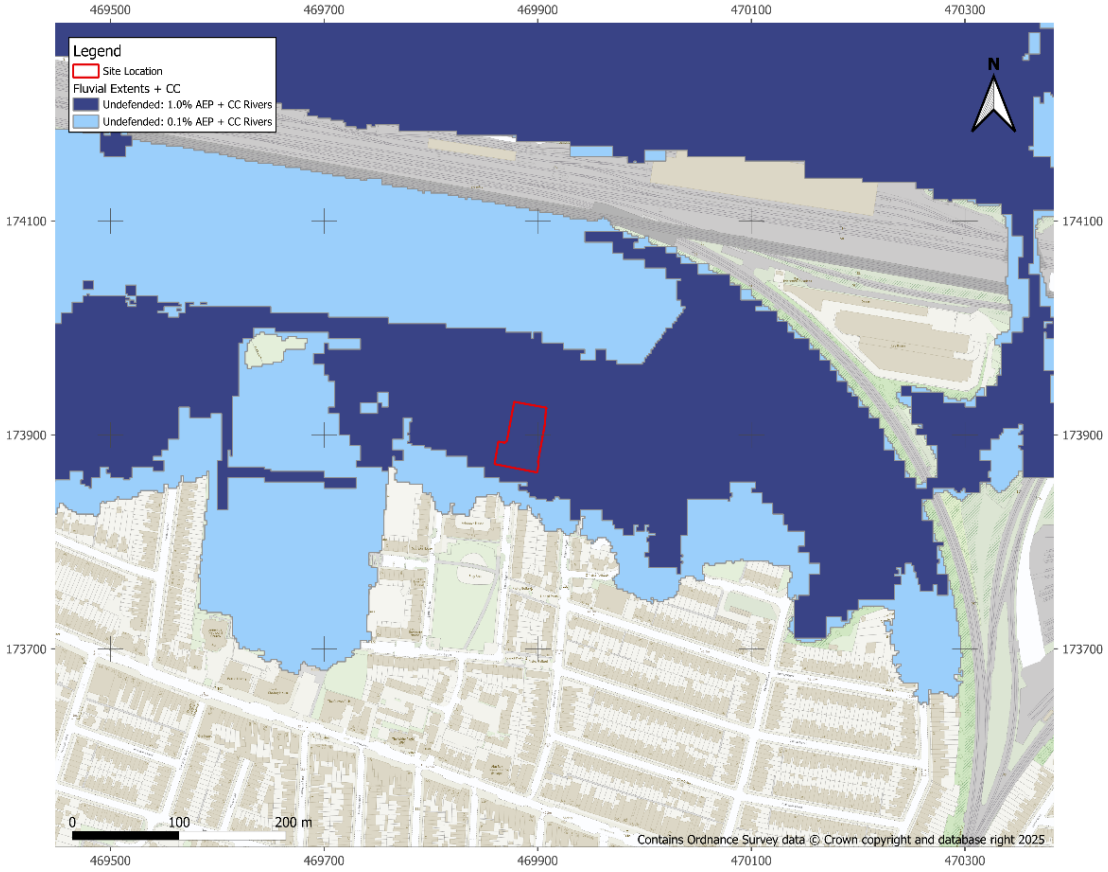


Figure 4 – Fluvial Climate Change Flood Map

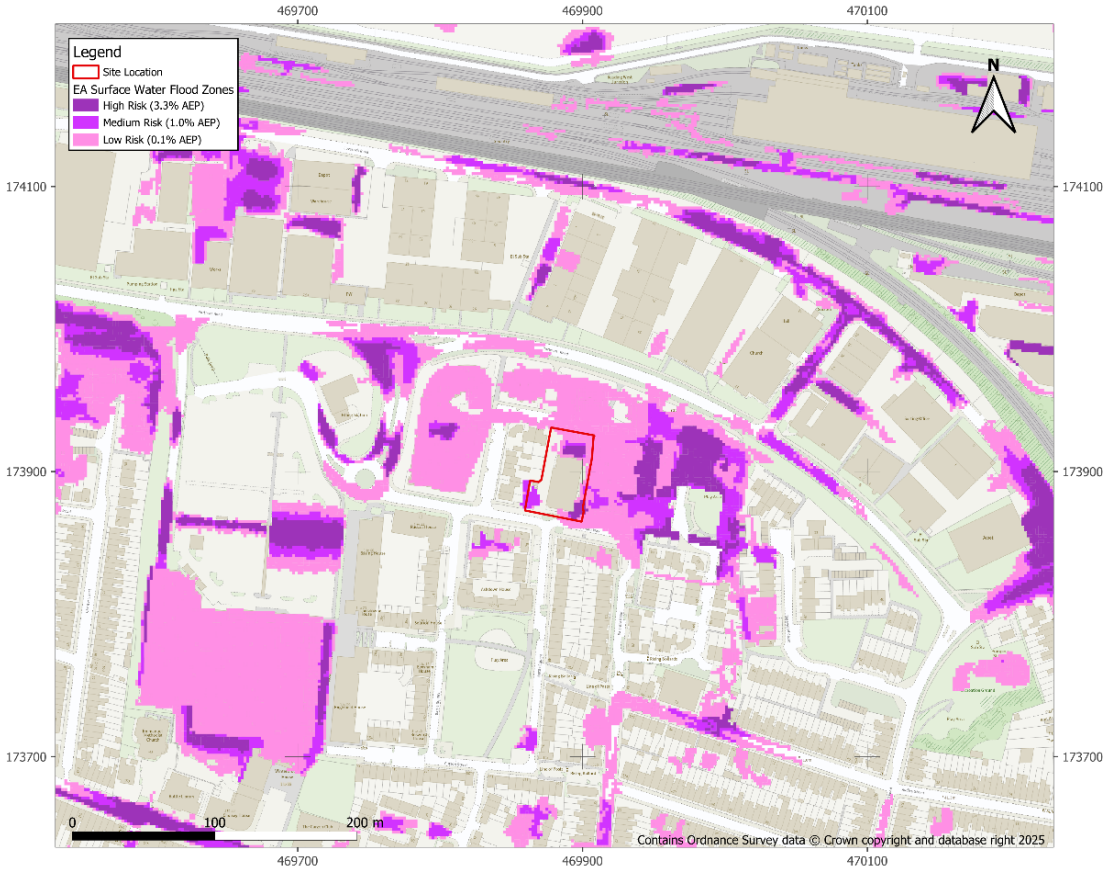


Figure 5 – Surface Water Flood Map

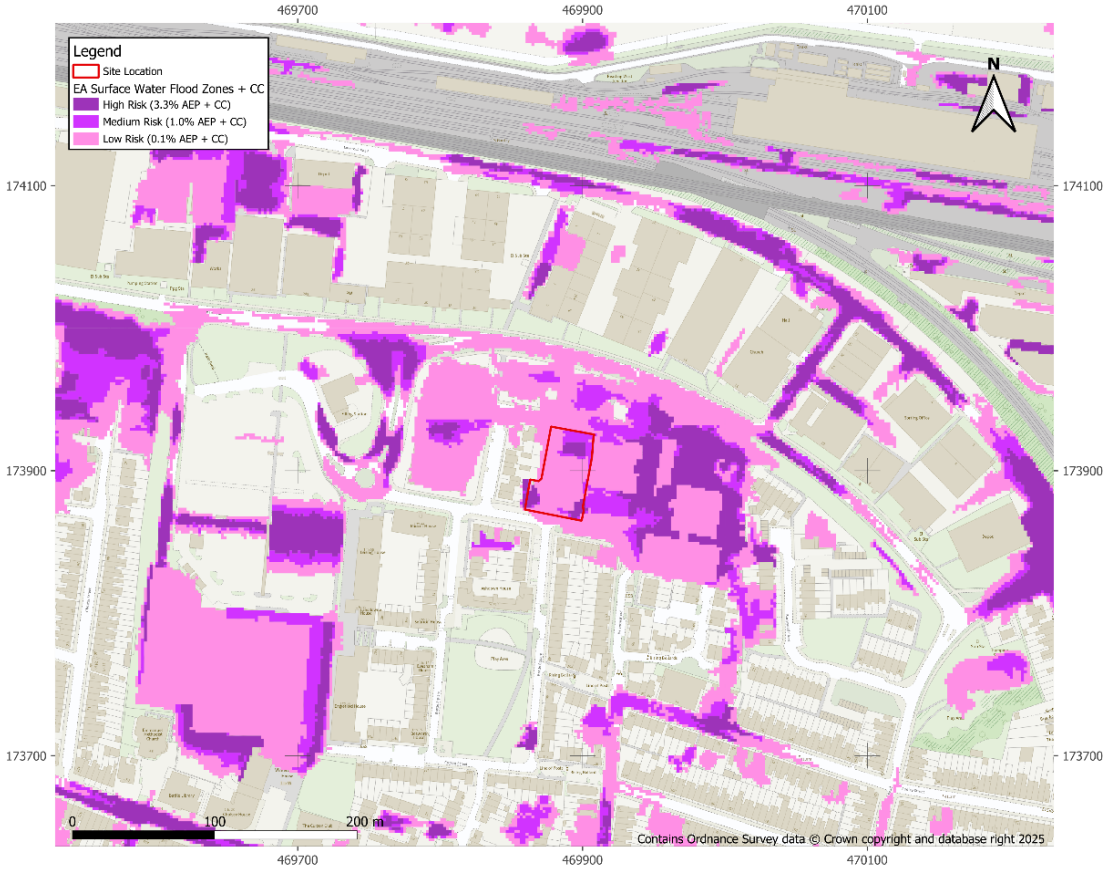


Figure 6 -Surface Water Climate Change Flood Map

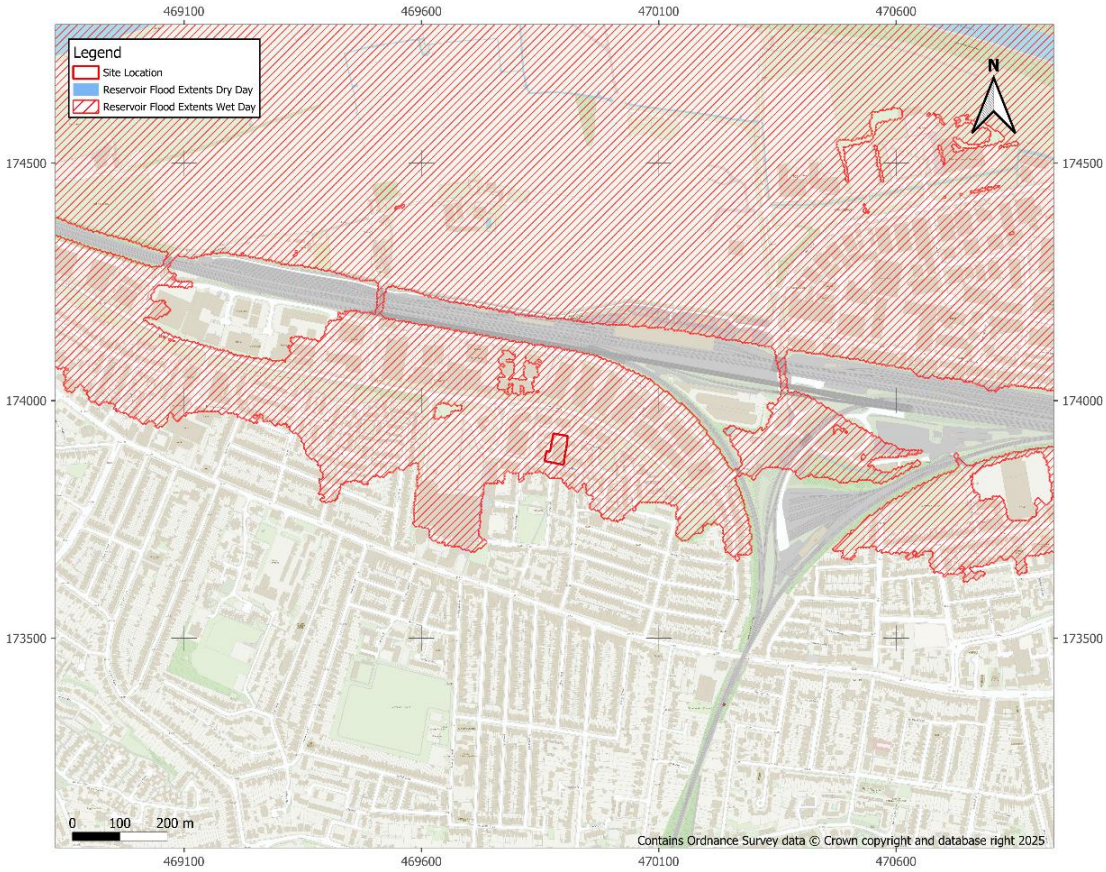


Figure 7 - Reservoir Failure Flood Map

4 Detailed Review of Primary Flood Risk

4.1 Primary Flood Risk

The primary flood risk mechanism at the site is fluvial in origin. The flood risk is quantitively assessed in more detail below.

4.2 Flood Risk Metrics

The River Thames model (Pangbourne to Sonning) (2021) was assessed to attain further detail on fluvial flooding.

For the 100-yr plus central climate change (31%) design event, the maximum flood level at the site is 39.0 m AOD, higher than the maximum ground level on the site. The hazard map for this event (see Figure 8) shows that the south of the site has a low hazard rating however the north of the site has a hazard rating of *danger for most*. Velocities are generally low across the site; however, average flood depths are greater than 0.5 m. Table 1 shows the flood risk metrics associated with the design event.

Table 1- Flood Risk Metrics

	Design Event 1.0% AEP (+31%)
Percentage Inundated (%)	100%
Average Flood Depth (m)	0.55 m (Max - 1.11 m)
Average Velocity (m/s)	0.03 m/s (Max – 0.17 m/s)
Speed of Onset (hrs)	237 hrs

4.3 Access and egress

Both vehicles and pedestrians can access the site via either Portman Way to the south or Nightingale Way to the north.

Pedestrians are able to exit the site via Portman Way to the south and continue south along Battle Square to continue onwards towards areas of low flood risk. However, due to bollards along this road, vehicles must travel west along Portman Way, turning right at two consecutive junctions to travel east along Portman Road. Vehicles should then turn right onto Beresford Road to continue south towards areas of low flood risk, see Figure 9.

At flood peak the initial part of this route for vehicles is inundated, with flood hazard in some locations indicating *danger for most*. Therefore, providing adequate flood warning to site users will be vital. In general, the River Thames in this location is slow responding and the site is located in a flood warning area so this should be possible. However, it is important to note that parts of the route are also at surface water flood risk. 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.

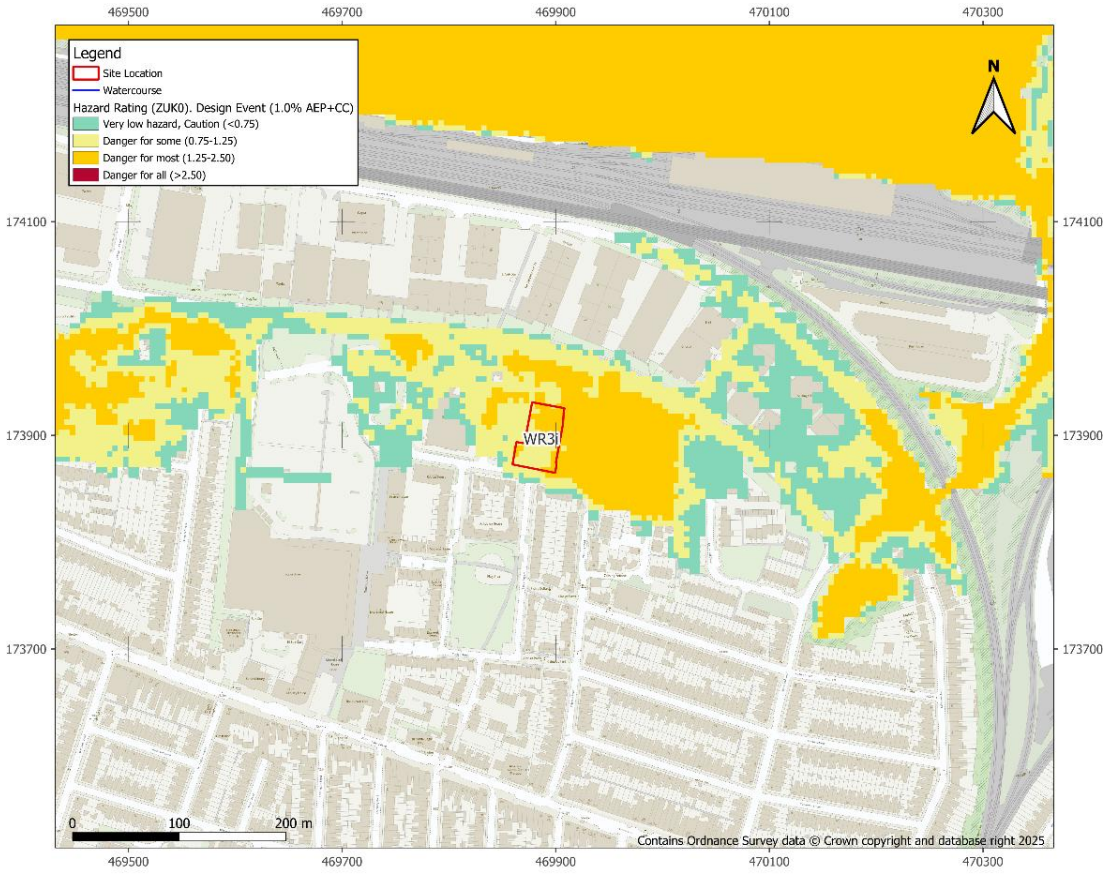


Figure 8 – Flood Hazard Map for the Design Event

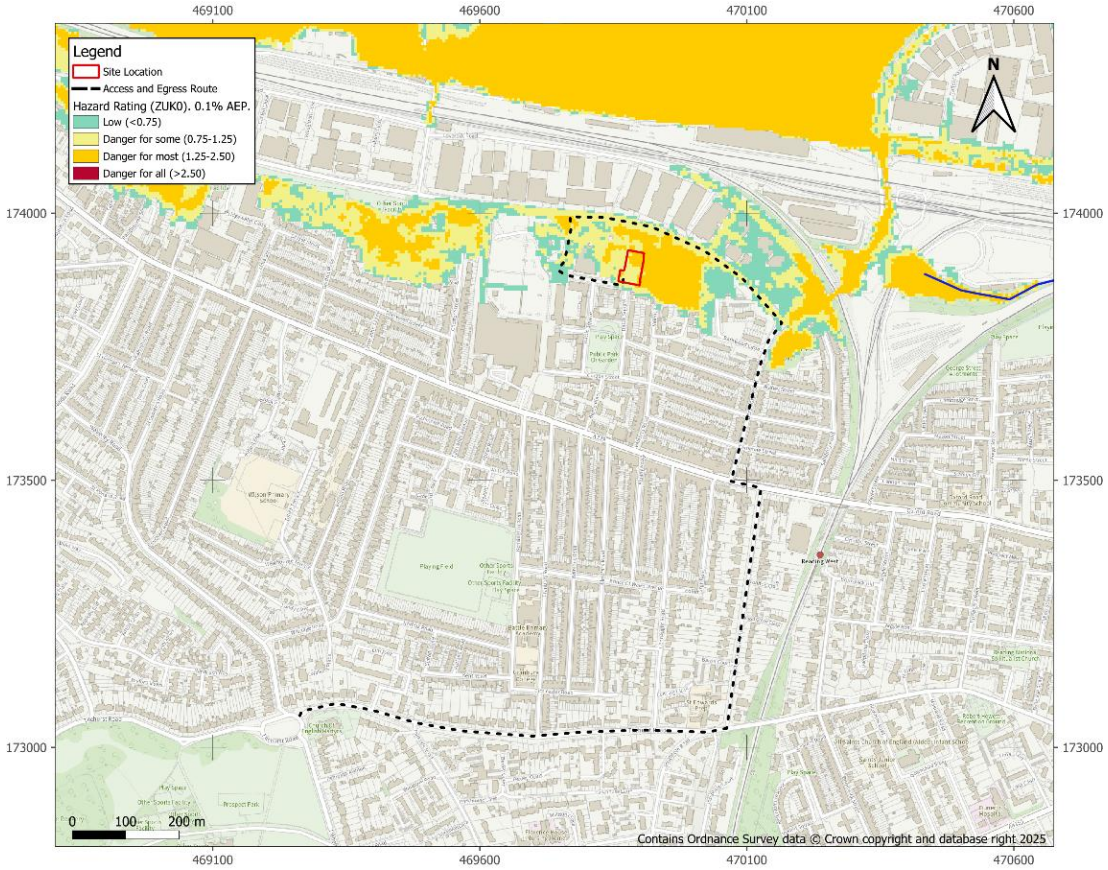


Figure 9 – Access/Egress Routes

5 Development Viability and FRA recommendations

5.1 Development Categorisation

The development proposed is categorised as *More Vulnerable Development* which is permissible in Flood Zone 2 but needs to pass the Exception Test to justify development in Flood Zone 3a. More vulnerable development is not permissible in Flood Zone 3b.

Given that no part of the site is located within Flood Zones 3a or 3b, residential development may be possible, however there are significant barriers. The whole site is inundated during the design event which takes account of climate change; therefore, infrastructure may need to be raised to ensure it is safe for the development's lifetime. This could in turn compromise floodplain storage which will need to be offset by compensatory storage. Access routes to and from the site are located within Flood Zone 2 and the design flood extent however given the slow response time of the Thames this should be manageable.

5.2 Scale of Development

The total site area is currently 0.21 ha; allocated for change in use for residential including 18-26 dwellings. Given the size of the site, it is assumed that the residential development onsite will either be high density housing or utilise multistorey flats. In any case it is assumed that given the scale of the development it is likely to cover the majority of the site area. As the whole site is inundated during the design event, infrastruture will need to be raised, which will in turn compromise floodplain storage requiring compensatory storage elsewhere on site. Given the size of the site, the provision of compensatory storage could be challenging and will further reduce the amount of developable land available.

It is recommended that only the lower dwelling amount is considered for development on flood risk grounds. A site-specific FRA would need to assess in more detail the requirements for compensatory storage.

5.3 Sequential Approach

A sequential approach should be applied when locating infrastructure on site, with more vulnerable residential infrastructure prioritised in areas of lower flood risk, and less vulnerable infrastructure like open space and car parks in areas of higher flood risk. This is under the assumption, that it does not increase flood risk elsewhere and is designed to be appropriately resistant and resilient to flooding. For this site it is recommended that the climate change extents are used, which more clearly show the graduation in flood risk across the site. The impacts of surface water flood risk should also be considered when siting infrastructure at the site.

5.4 Other Site-Specific Considerations

Surface water flood risk is present within the site. Therefore, development should be sited outside of this at-risk area where possible. Furthermore, parts of the egress route are at risk from surface water flooding. Therefore, 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. Given both the fluvial and surface water flood risk to the site access route, provision of a Flood Evacuation Plan (FEP) should be considered.

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 non-statutory technical standards for SuDS and any relevant

Local Authority Local Plan policies. The geology at the site is freely draining. However, the water table is likely to be high, 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.

As mentioned, new infrastructure may compromise flood plain storage. Hydraulic modelling may need to be undertaken to assess 3rd party impacts and compensatory storage requirements. Storage and modelling requirements should be confirmed with the EA for a site-specific FRA.