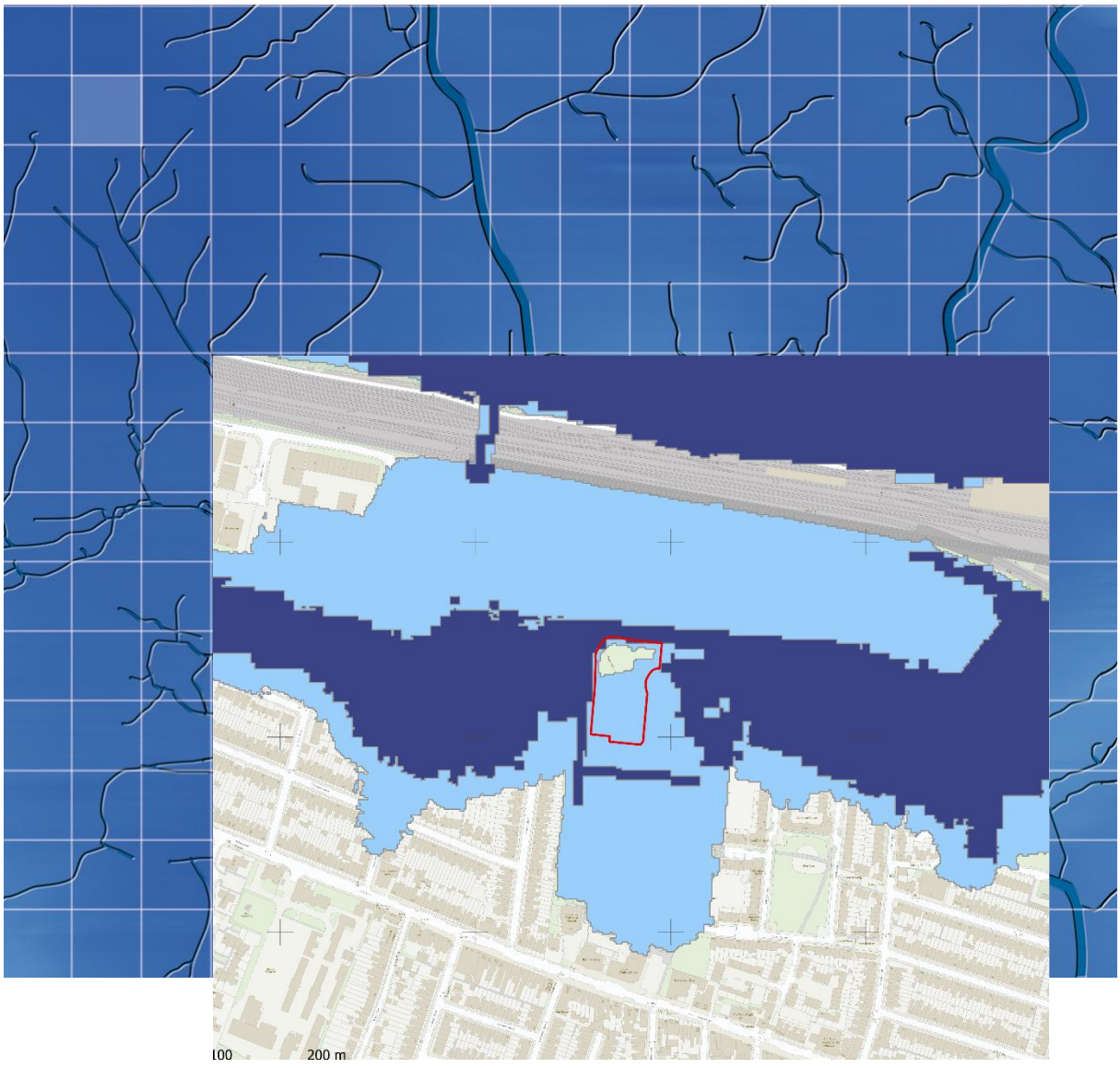
Reading Borough Council

May 2025

Part of Tesco Car Park, Portman Road (WR3w)

Level 2 Strategic Flood Risk Assessment



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Document issue details

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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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Part of Tesco Car Park, Portman Road (WR3w) 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

Fluvial flood risk represents the greatest risk with a 66% of the site lying in Flood Zone 2 based on the EA's fluvial 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 speed of onset to be very slow and depths of flooding for the 1.0% AEP plus central climate change allowance to be very low. In this respect fluvial flood risk is considered to be moderate.

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.

As none of the site is located in Flood Zone 3a and the majority of the site remains outside of the design 1.0% AEP plus climate change flood extent a residential development should be possible. Access routes to and from the site are located within Flood Zone 2 and the design flood extent however development is already established in the area and given the slow response time of the Thames it should not be a barrier to development.

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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 Part of Tesco Car Park, Portman Road (WR3w) 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 Part of Tesco Car Park, Portman Road (WR3w) site is 0.59ha and is located in west Reading, 150m south of the railway line, see Figure 1. Part of the site is currelty used as a car park. The surrounding land use is urban.

In the Replacement Local Development Plan (RLDP) it is proposed to be used for 46 to 68 residential dwellings.

2.2 Topography

Based on 1m LiDAR data, the site is for the most part relatively flat except for a mound of earth at the north end of the site separating the car park from Portman Road, see Figure 2. The ground levels within the site range from 38.8 to 41.1m AOD. The average ground level is 39.9m AOD.

2.3 Nearby Watercourses

The River Thames is approximately 1km north of the site. In this location it flows from west to east. Two small unnamed tributaries of the river are also nearby, approximately 0.75km north and east of the site. Figure 1 shows the location of these watercourses.

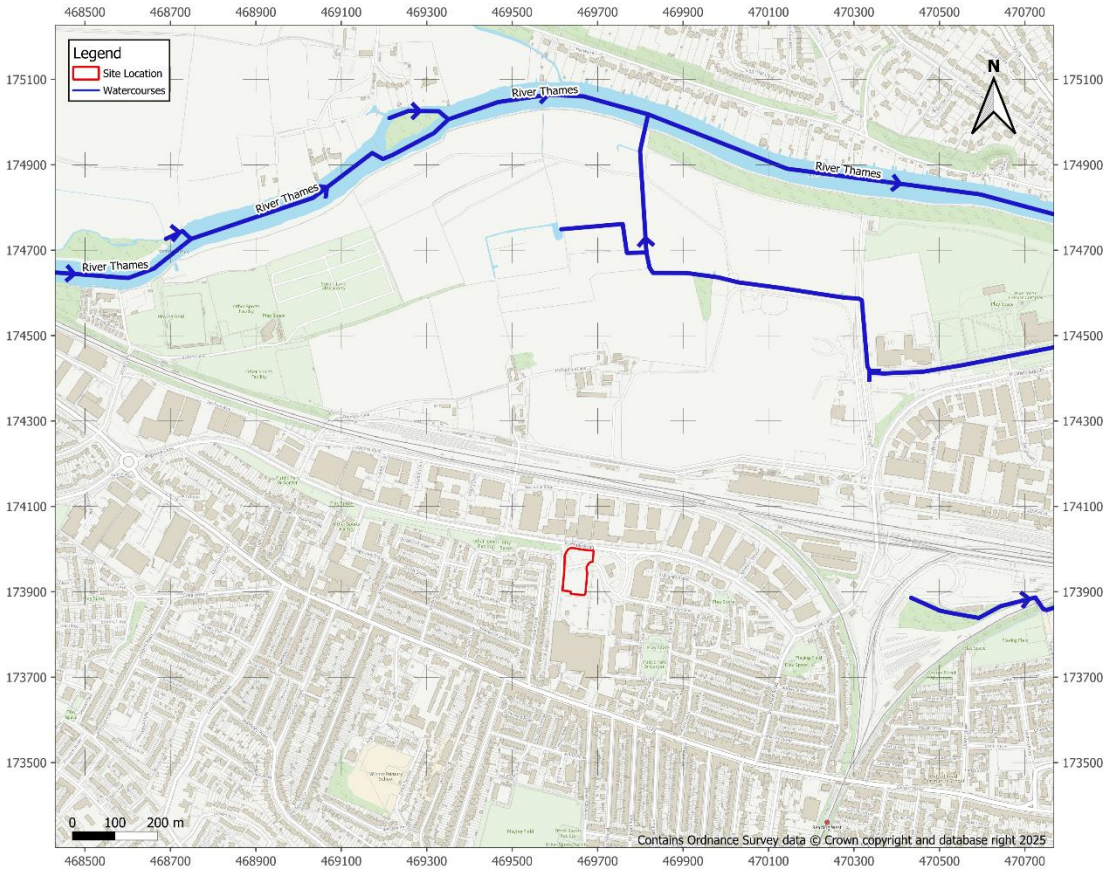

Figure 1 - Site Location

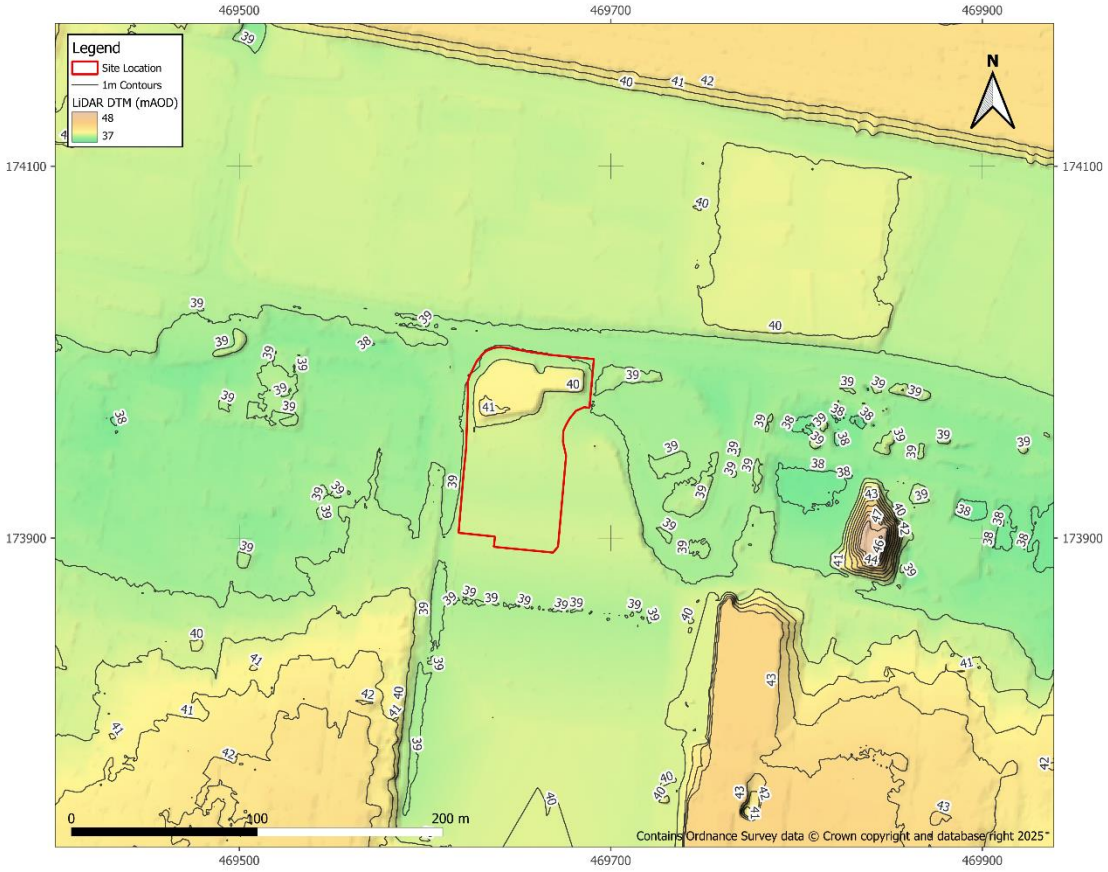

Figure 2 - Topography

3 Flood Risk

3.1 Historical Flooding

The EA hold one record of historic flooding at the site. This was in March 1947 and was associated with the River Thames.

3.2 Fluvial Flood Risk

In the existing Flood Map for Planning (FMfP), 66% the site is within Flood Zone 2, with no part of the site in Flood Zone 3a. Viewing the model results for the 3.3% AEP event, also confirms that none of the site is located in Flood Zone 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, 80% of the site is within Flood Zone 2, with 3% of the site located within Flood Zone 3a, 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

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 maps show none of the site to be at risk for the 3.3% AEP, 1.0% AEP and 0.1% AEP events, see Figure 5.

When accounting for climate change, 1% of the site is at risk during the 0.1% AEP event. This is associated with an isolated area in the cntre of the site, there is also some pooling of water along the access road to the superstore immediately west of the site. There remains no risk during the 3.3% AEP and 1.0% AEP events, see Figure 6. Overall, the risk of surface water flooding is considered to be low.

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 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.

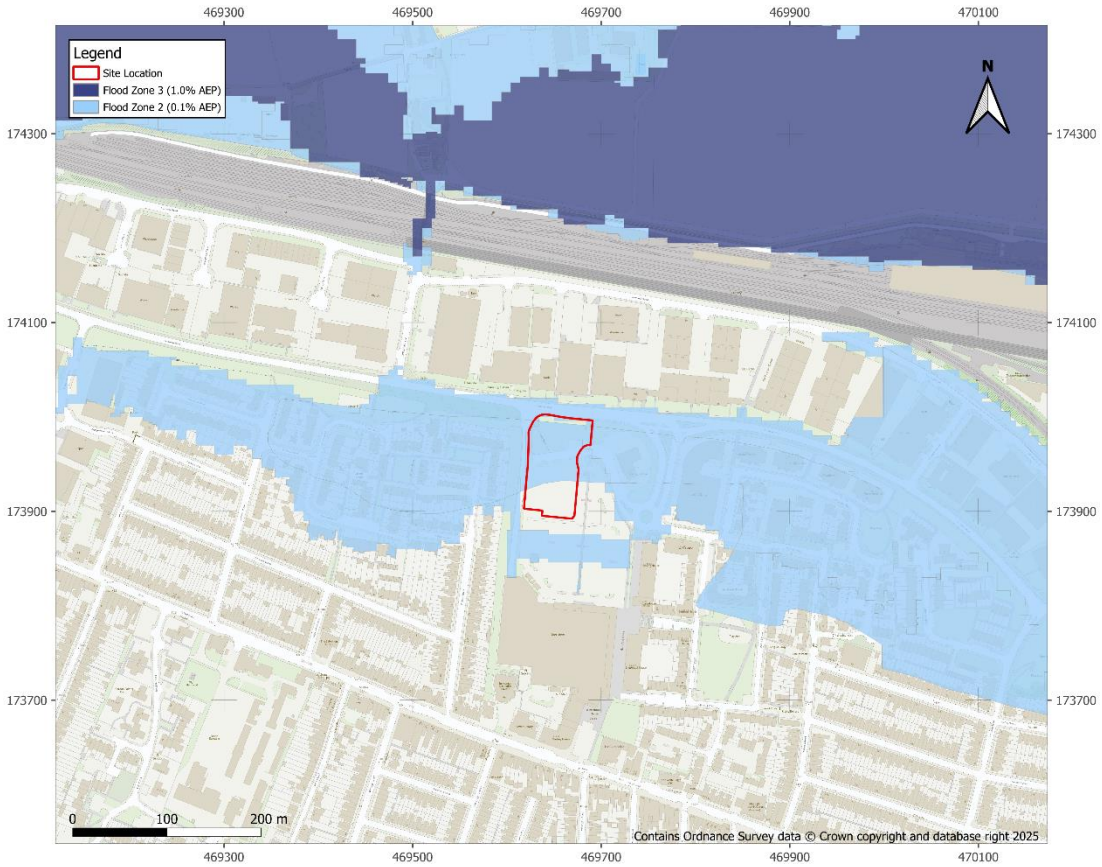

Figure 3 - Fluvial Flood Map

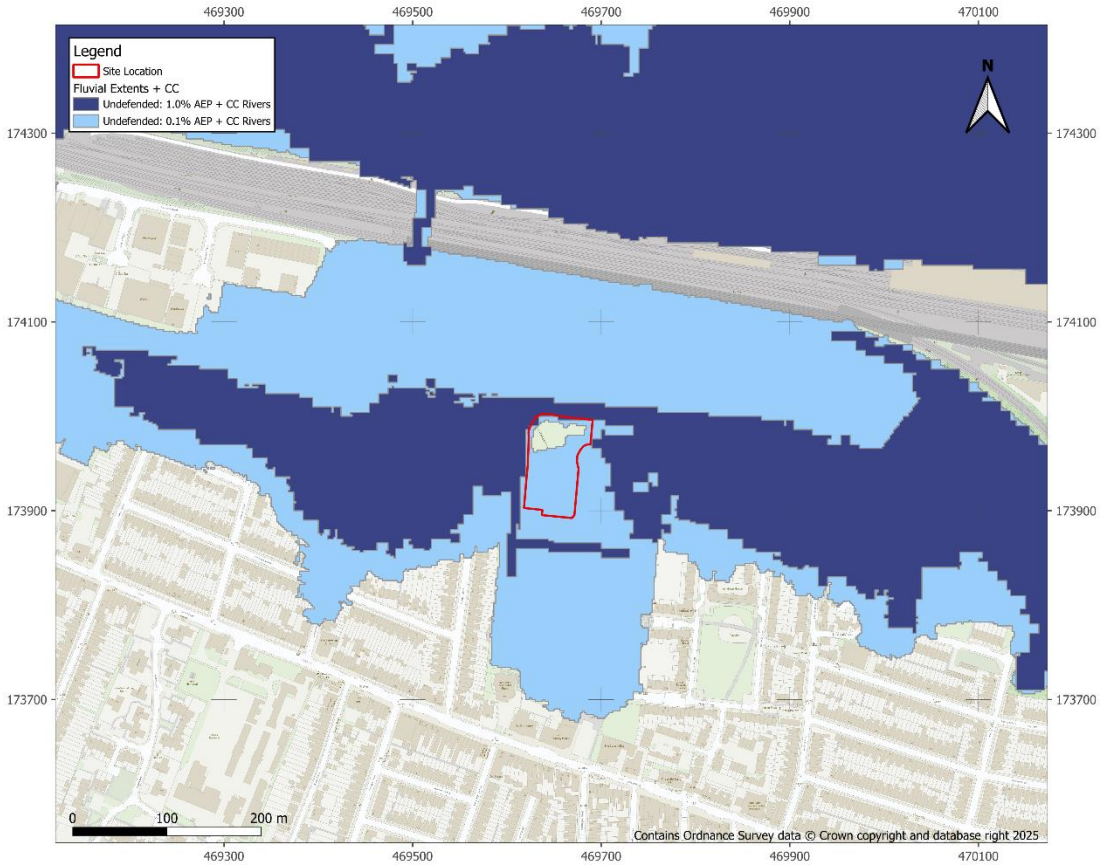

Figure 4 – Fluvial Climate Change Flood Map

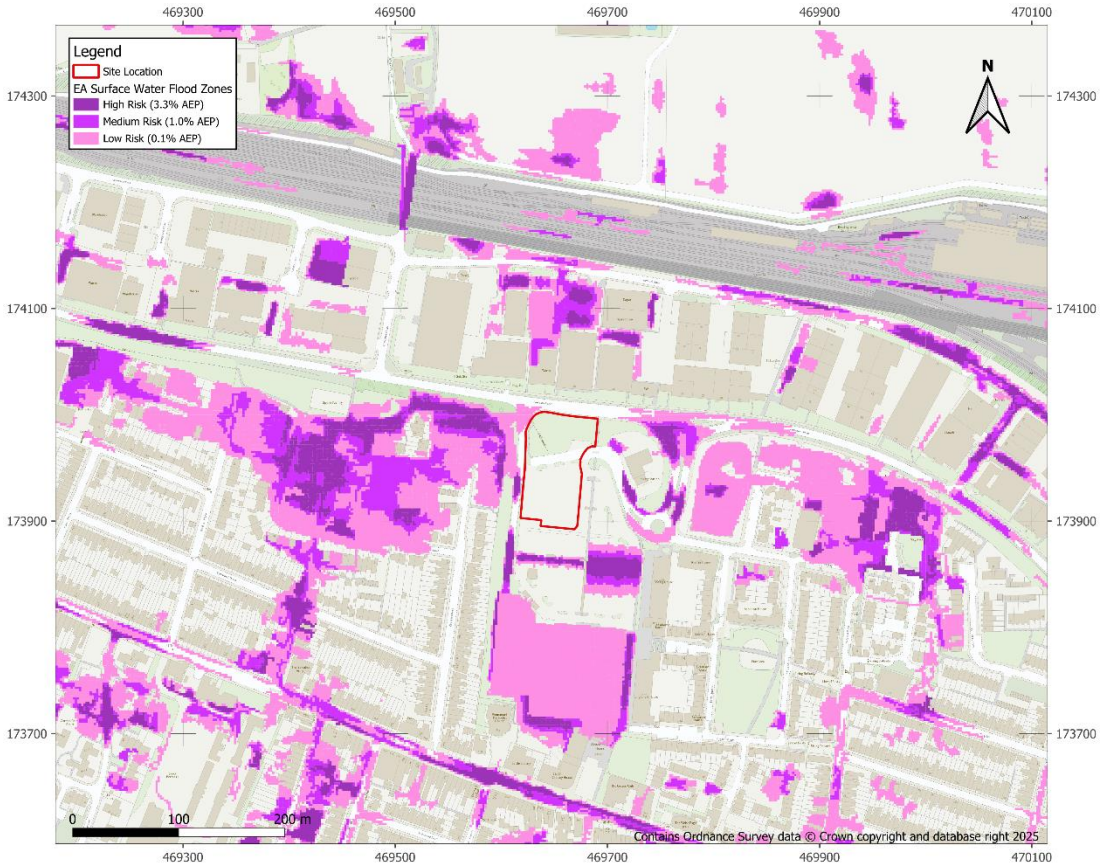

Figure 5 – Surface Water Flood Map

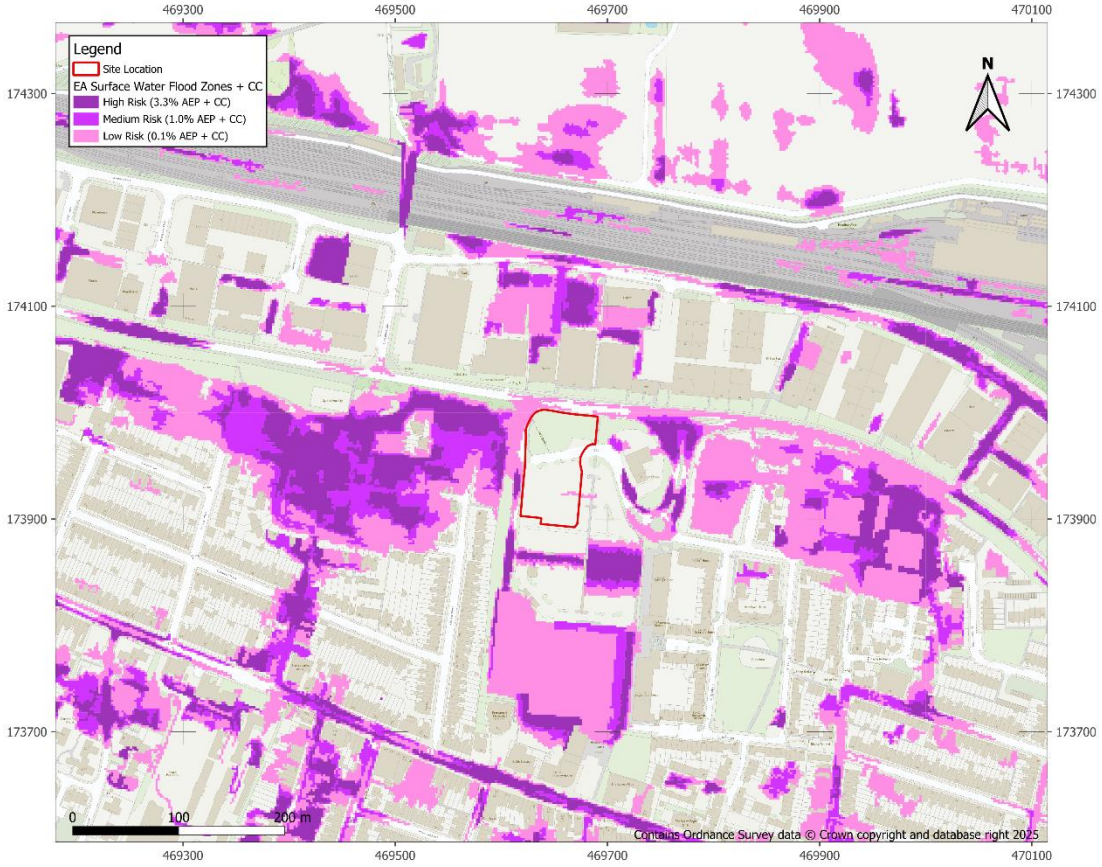

Figure 6 -Surface Water Climate Change Flood Map

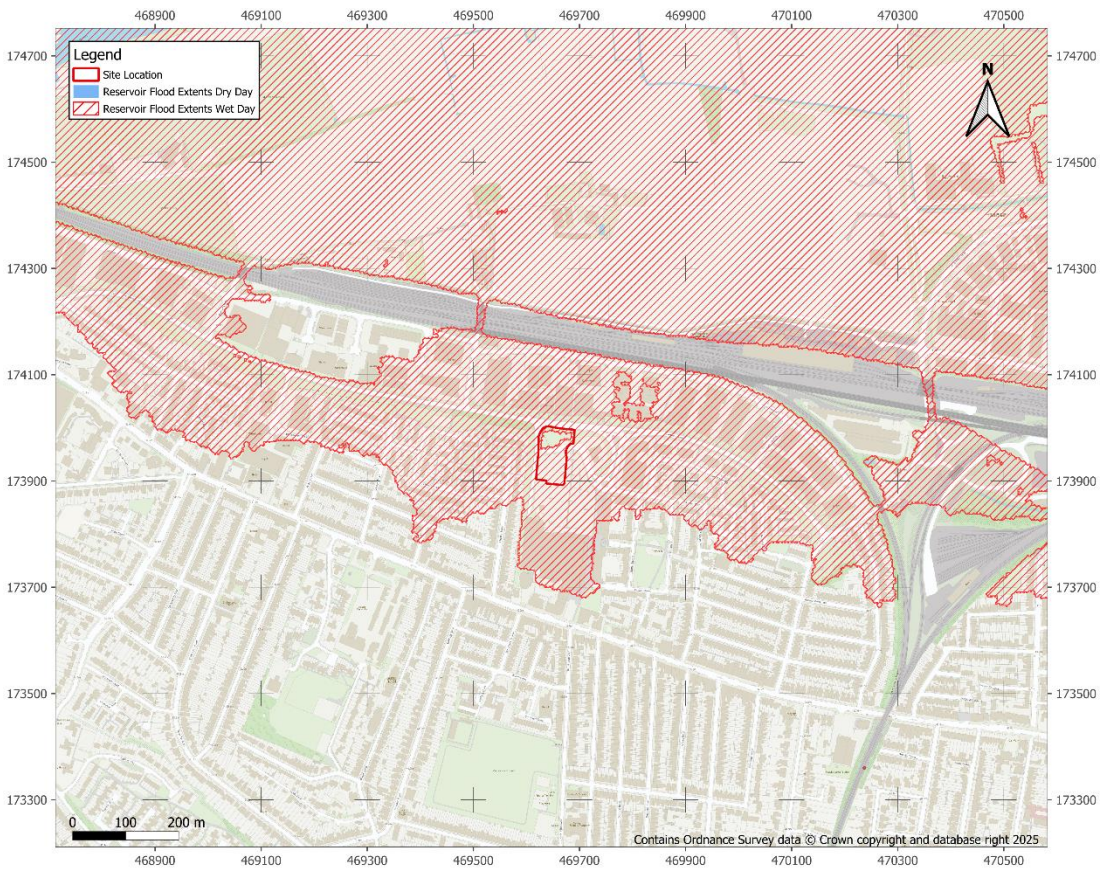

Figure 7 - Reservoir Failure Flood Map

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) which informs the latest FMfP was assessed to attain further detail on fluvial flooding.

For the 1.0% AEP plus central climate change (31%) design event, the maximum flood level at the site is 39.0 m AOD, 0.9m below the average ground level on the site. This flood risk is just within the site at the northern boundary and covers 4% of the site. The hazard map for this event (see Figure 8) shows that it has a *low* hazard rating within the site with a very small area showing *danger for some*. Given the distance from the River Thames and the need for floodwater to travel under the railway, the speed of onset is very slow. 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 (%)	4%
Average Flood Depth (m)	0.07m (Max - 0.18m)
Average Velocity (m/s)	0.04m/s (Max - 0.11m/s)
Speed of Onset (hrs)	239hrs

4.3 Access and egress

Access to the site is via Portman Road which is flooded during the 1.0% AEP plus central climate change design event, with areas with a hazard rating up to *danger for most*. Given the long speed of onset, sufficient time to evacuate can be provided if there is adequate flood warning to site users, particularly as the site is on the perimeter of the modelled flood extent. Figure 9 shows the lowest hazard access/egress route, along Portman Road turning off at Bridgewater Close.

It is also important to note that the surrounding roads are also at risk of surface water flooding, this risk is covered in the other site-specific considerations section. 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.

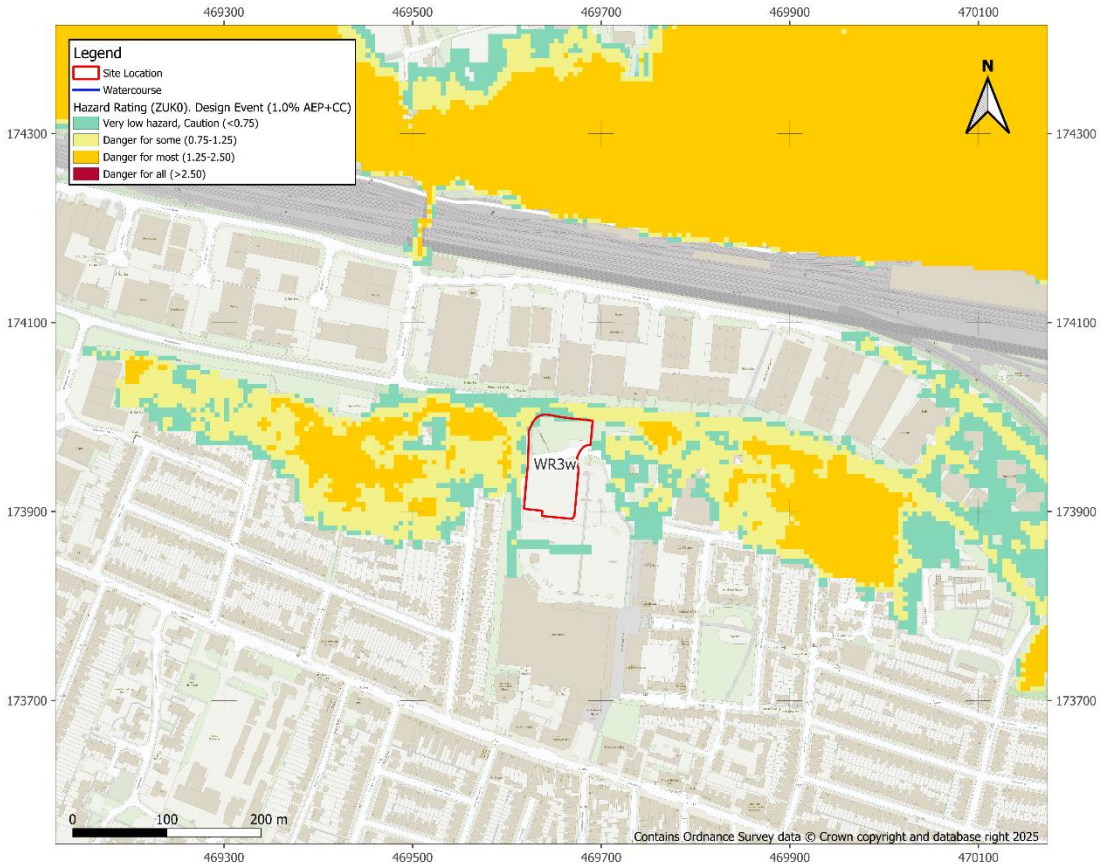

Figure 8 – Flood Hazard Map for the Design Event

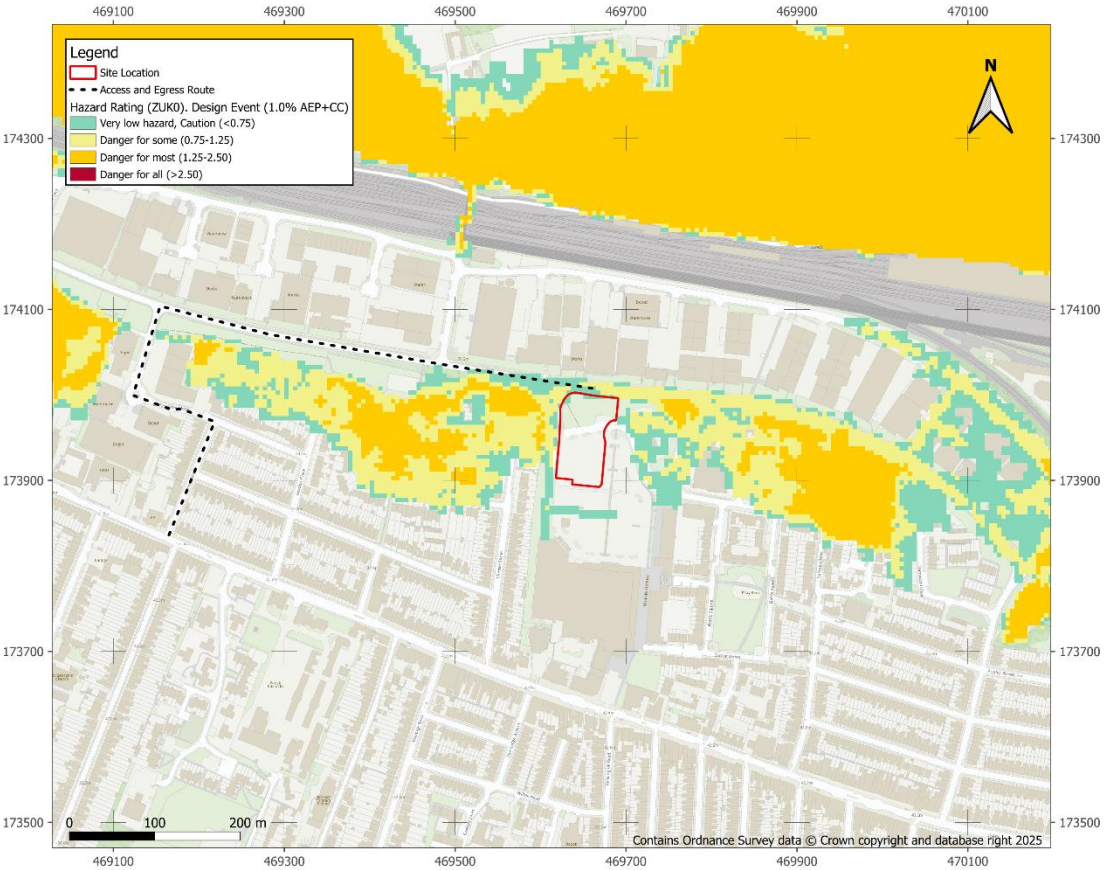

Figure 9 – Access/Egress Routes

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.

As none of the site is located in Flood Zone 3a and the majority of the site remains outside of the design 1.0% AEP plus climate change flood extent a residential development should be possible. Access routes to and from the site are located within Flood Zone 2 and the design flood extent however development is already established in the area and given the slow response time of the Thames it should not be a barrier to development.

5.2 Scale of Development

The total site area is currently 0.59ha; allocated for 46 to 68 residential dwellings. Given the scale of the development it is likely to cover the majority of the site area, however to reduce the impact on floodplain storage, building footprints and infrastructure should be sited outside of the small area lying within the modelled design flood extent.

5.3 Sequential Approach

It is important that a sequential approach is implemented at the site. Placement of more vulnerable development within Flood Zone 2 is permissible, however development should be prioritised within Flood Zone 1 wherever possible. An option is to place more vulnerable residential development in lower flood risk areas with ancillary infrastructure such as car parks and green spaces located in higher flood risk areas if possible. This is under the assumption that it does not increase flood risk elsewhere and is designed to be appropriately resistant and resilient to flooding.

5.4 Other Site-Specific Considerations

The pluvial flood risk at the site is considered to be low. It should not be a significant barrier to development as a large majority of the site is not at risk. However, parts of the access route are shown to be at surface water risk. 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. If new infrastructure is proposed, 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 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.