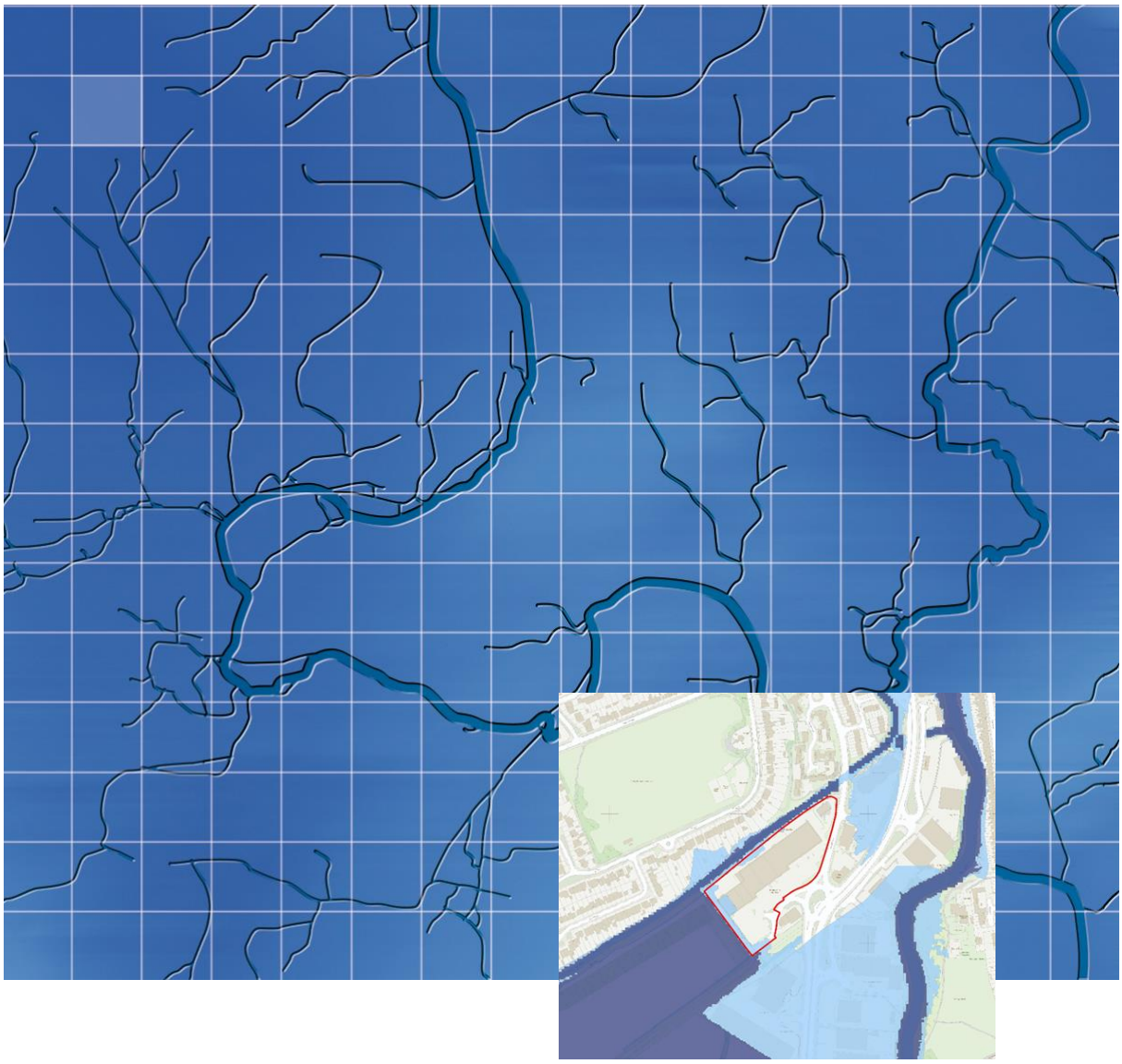
Reading Borough Council

May 2025

Reading Link Retail Park, Rose Kiln Lane (SR4g)

Level 2 Strategic Flood Risk Assessment



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Document issue details

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1.0	02/05/2025	Draft	Daniel Hamilton (*Principal 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.

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Reading Link Retail Park (SR4g) 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

Fluvial flood risk represents the greatest risk with a small proportion of the site lying in Flood Zone 2 based on the EA's fluvial flood map.

In the location of the site the latest Flood Map for Planning is based on national scale modelling. However, the River Kennet model (Tyle Mill to Thames Confluence) (2018) which informed the previous flood map was assessed to attain further detail on fluvial flooding. It shows flooding to be limited to a small area in the southwest of the site, with limited flood depths and velocities at the site. Overall, 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 moderate. Whilst detailed modelling is available it does not inform the latest national scale mapping.

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.

None of the site lies in Flood Zone 3a and the Flood Zone 2 extent is limited to a small area in the southwest of the site. In this regard it will be possible to locate the majority of infrastructure in Flood Zone 1. Therefore, a new residential development at the site will be possible.

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 Reading Link Retail Park, Rose Kiln Lane (SR4g) site 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 Reading Link Retail Park, Rose Kiln Lane (SR4g) site is 2.12ha in area and is located on the south bank of the Holy Brook. It is located in Coley, approximately 1.0 km to the southwest of the centre of Reading. The surrounding land use is a mixture suburban land use and open space, see Figure 1.

In the Replacement Local Development Plan (RLDP) it is proposed to be used for residential development in the form of 150-220 dwellings.

2.2 Topography

Based on 1m LiDAR data, the site is relatively flat, with minor variations in level across the majority of the site, see Figure 2. The ground levels within the site boundary range from 38.9 to 40.50m AOD. The average ground level is 39.4m AOD.

2.3 Nearby Watercourses

The Holy Brook runs adjacent to the site's northwest boundary. In this location it predominantly runs from west to east. The River Kennet is located 170m to the east of the site. It runs from south to north is this location. The two watercourses are linked by a sluice approximately 140m northeast of the site. Figure 1 shows the location of these watercourses.

Figure 1 - Site Location

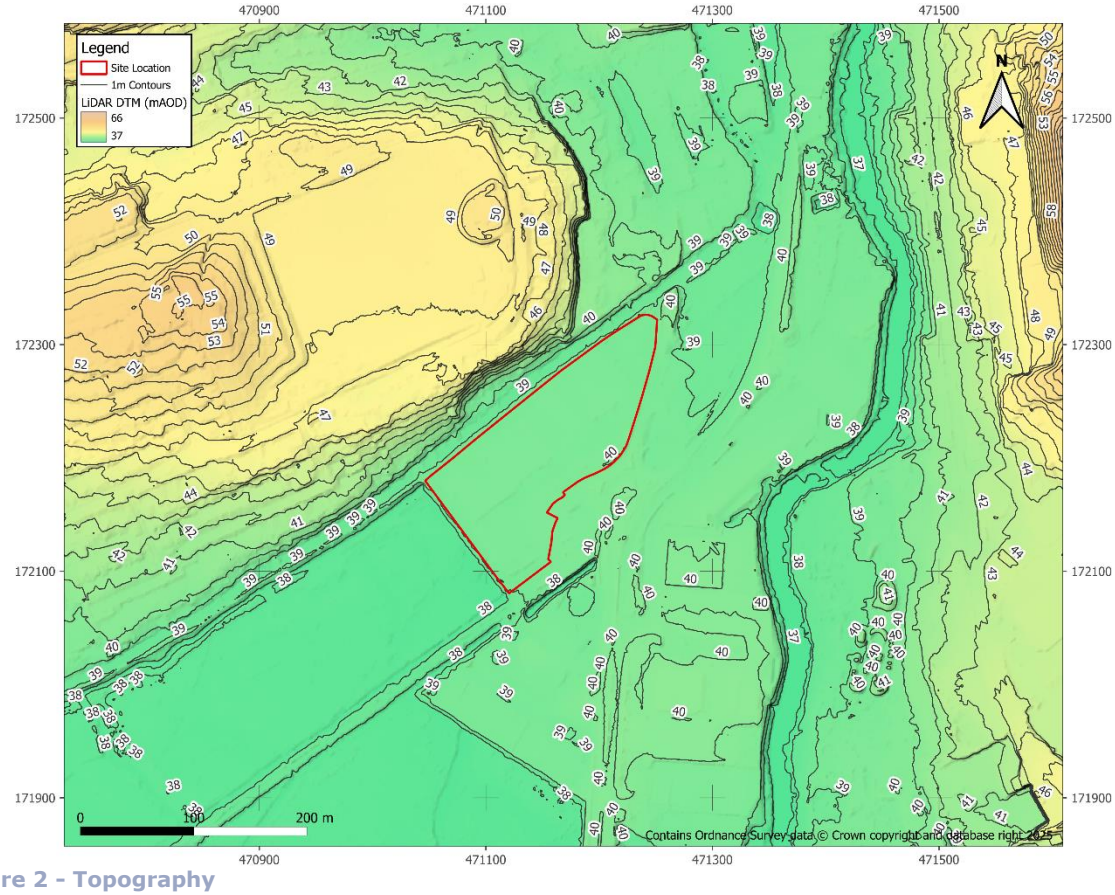

Figure 2 - Topography

3 Flood Risk

3.1 Historical Flooding

The EA has records of historic flooding at the site. In total, there is one event recorded in the EA database at this location. This event occurred in June 1971. It was attributable to flooding of the River Kennet and its associated tributaries.

3.2 Fluvial Flood Risk

In the existing Flood Map for Planning (FMfP), 12% of the site is inundated by Flood Zone 2, with none of the site located in Flood Zone 3a. The Flood Zone 2 proportion is thought to be based on a combination of the recorded flood outline from June 1971 and the latest national scale modelling. This is in place of the River Kennet (Tyle Mill to Thames Confluence) (2018) model which informed the previous iteration of the FMfP and the level 1 SFRA for Reading Borough completed in November 2024. Viewing the 2018 model results when compared to the latest national scale modelling, similar extents were generated. Flooding at this site is mainly associated with the Holy Brook, see Figure 3.

The EA climate change fluvial outputs for Flood Zone 2 and 3 have also been assessed. These show a significant increase in the Flood Zone 2 extent to 94%. Flood Zone 3a inundates 6% of the site, see Figure 4.

Overall, fluvial flood risk is considered to be moderate and is assessed in more detail in section 4.

3.3 Flood Defence Infrastructure

A flood embankment runs along the entire northwest boundary. This has a standard of protection (SOP) of 5-years (20% Annual Exceedance Probability (AEP)) and does not have an impact on the flood events assessed for planning purposes. None of the site is 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 isolated areas of surface water flooding in parts of the site. In total, 1% of the site is inundated in the 3.3% AEP event, 5% is inundated in the 1.0% AEP event and 11% is inundated in the 0.1% AEP event, for the latter this includes a small area in the north of the site, see Figure 5. When accounting for climate change the proportions moderately increase to 4% in the 3.3% AEP event, 8% in the 1.0% AEP event and 14% in the 0.1% AEP, 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 loamy and clayey floodplain soils with naturally high groundwater, these are expected to have impeded drainage.

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. However, given the site's location near a river, groundwater flooding is likely to be heavily correlated with fluvial flooding.

3.6 Reservoir Flood Risk

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

3.7 Flood Warning Service

A small area in the west of the site is located within the River Kennet from Theale down to Reading EA Flood Warning Area.

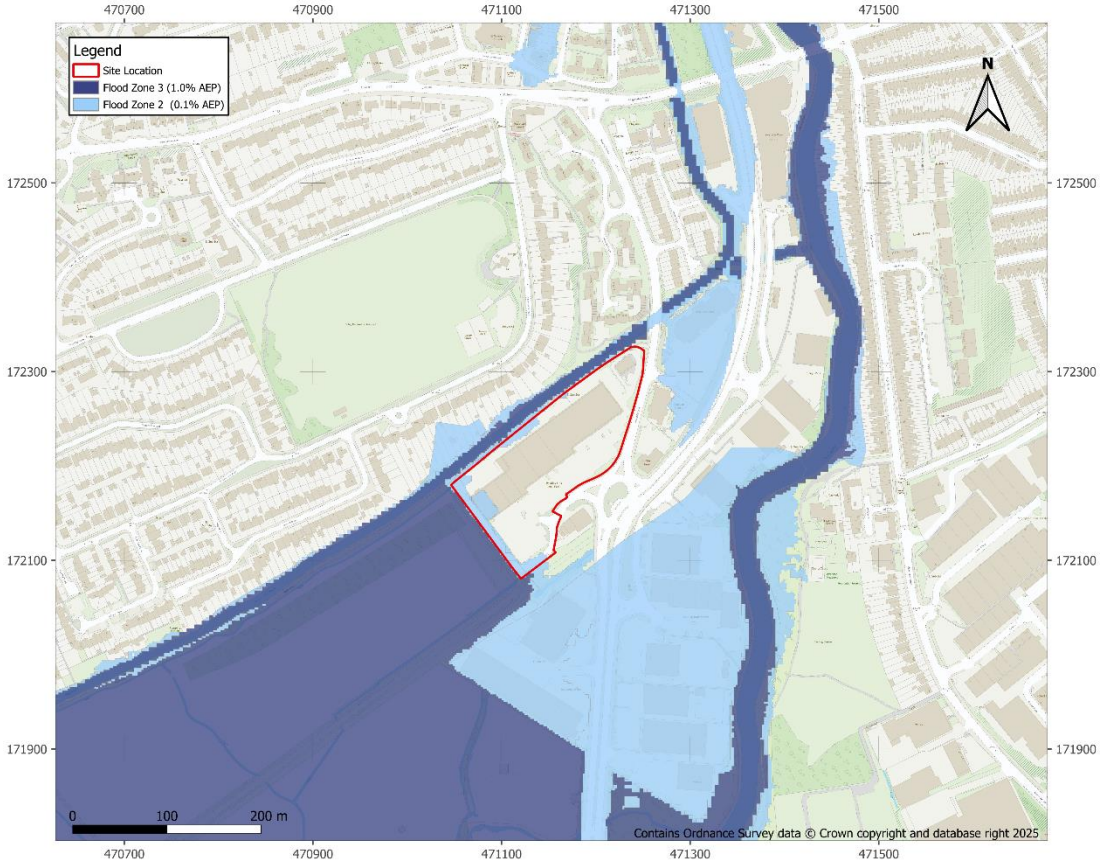

Figure 3 - Fluvial Flood Map

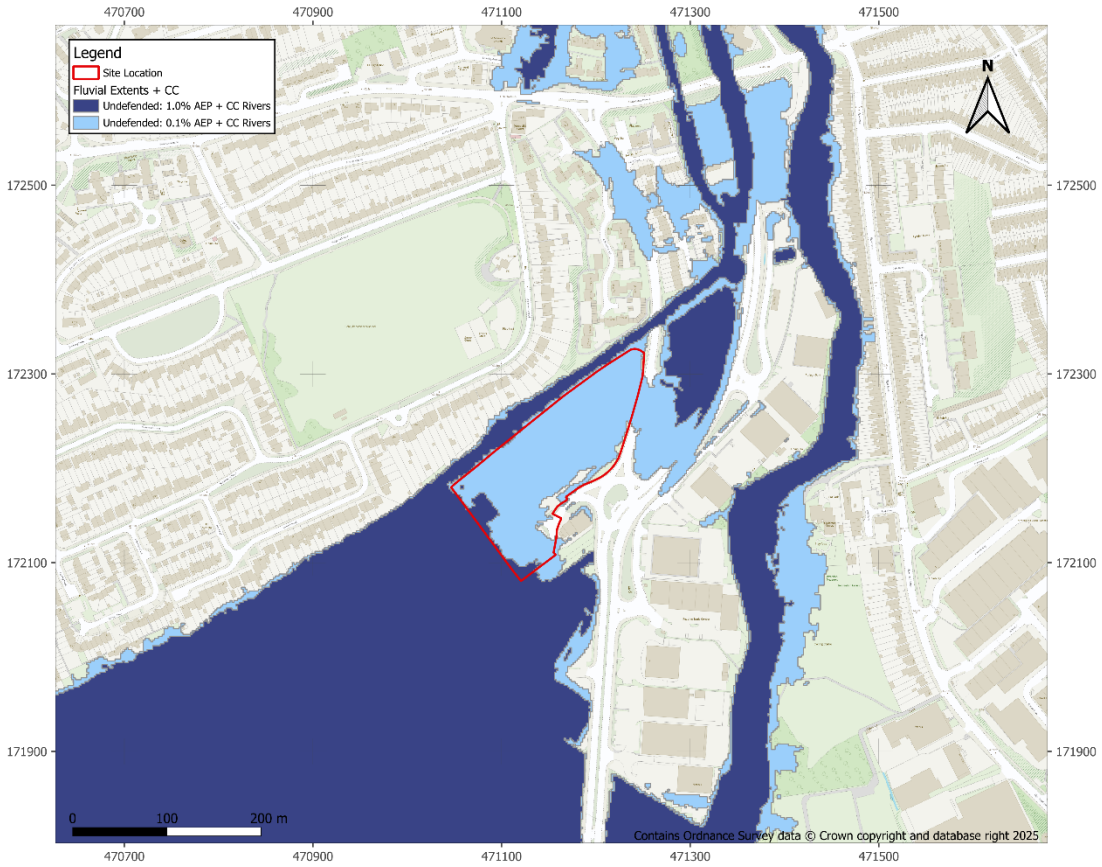

Figure 4 – Fluvial Climate Change Flood Map

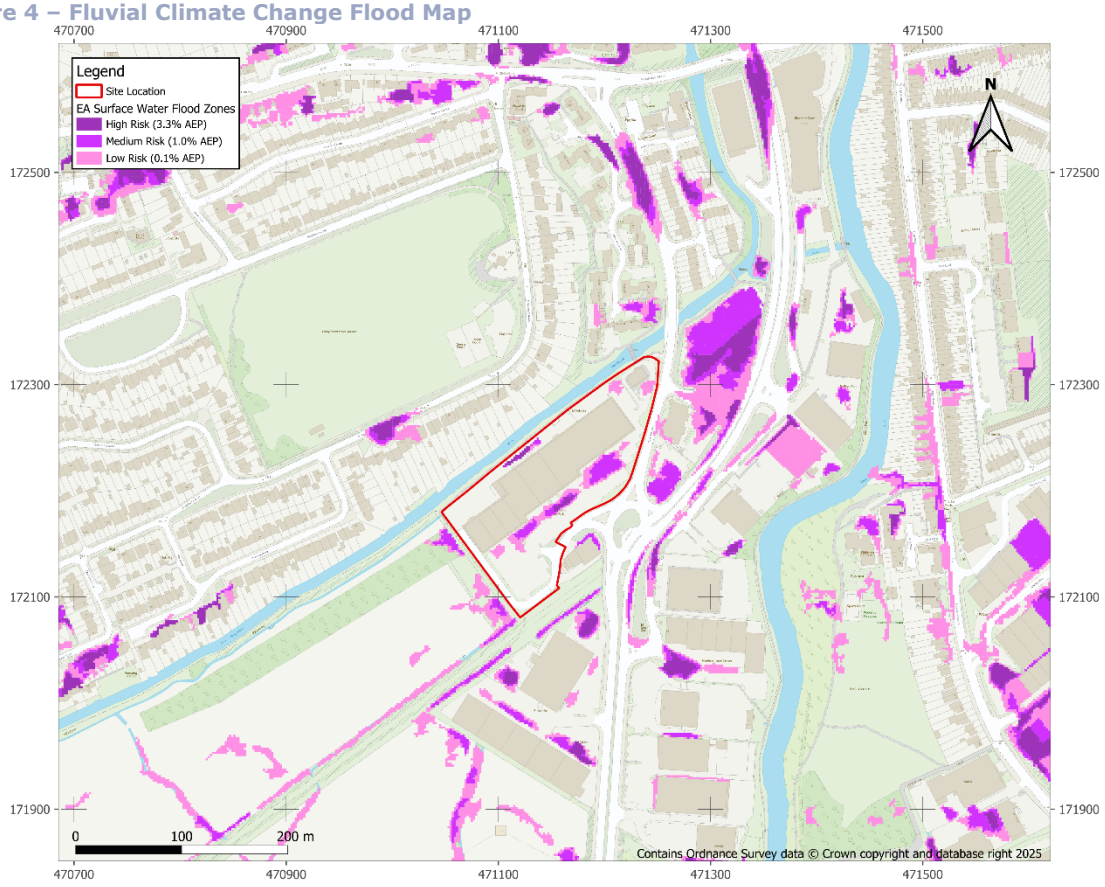

Figure 5 – Surface Water Flood Map

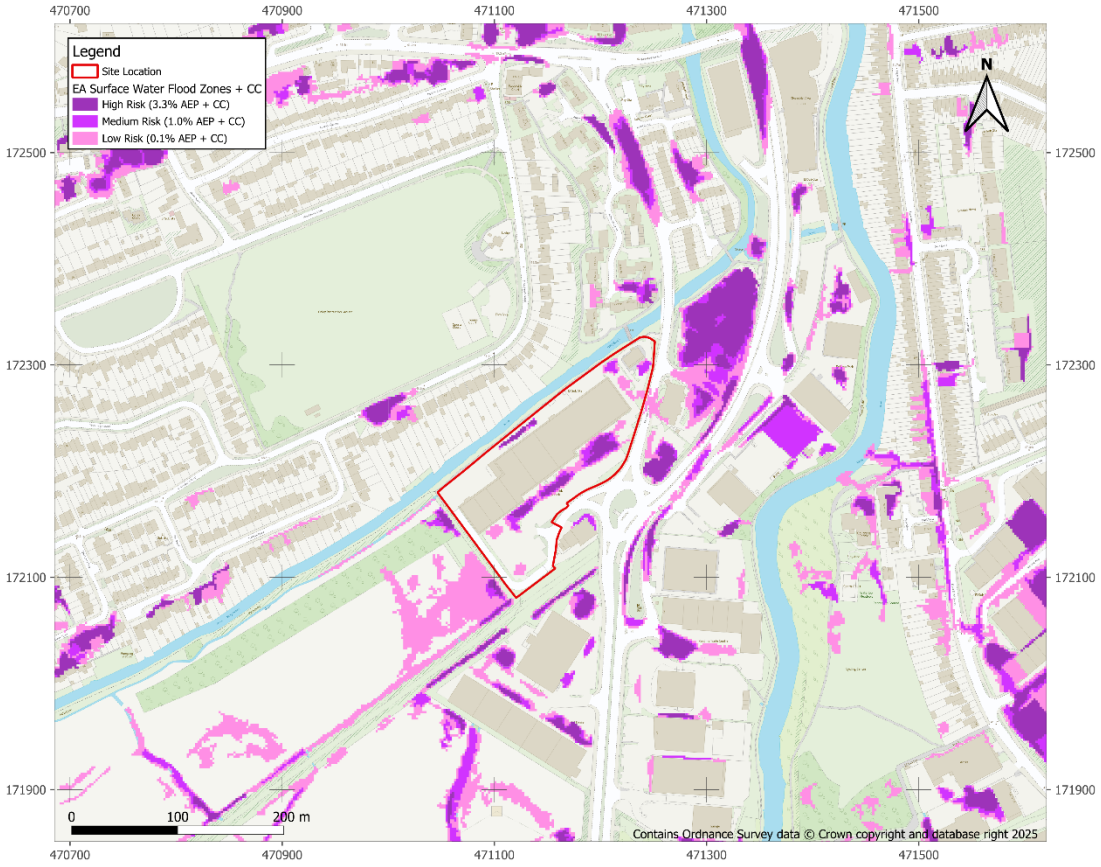

Figure 6 -Surface Water Climate Change Flood Map

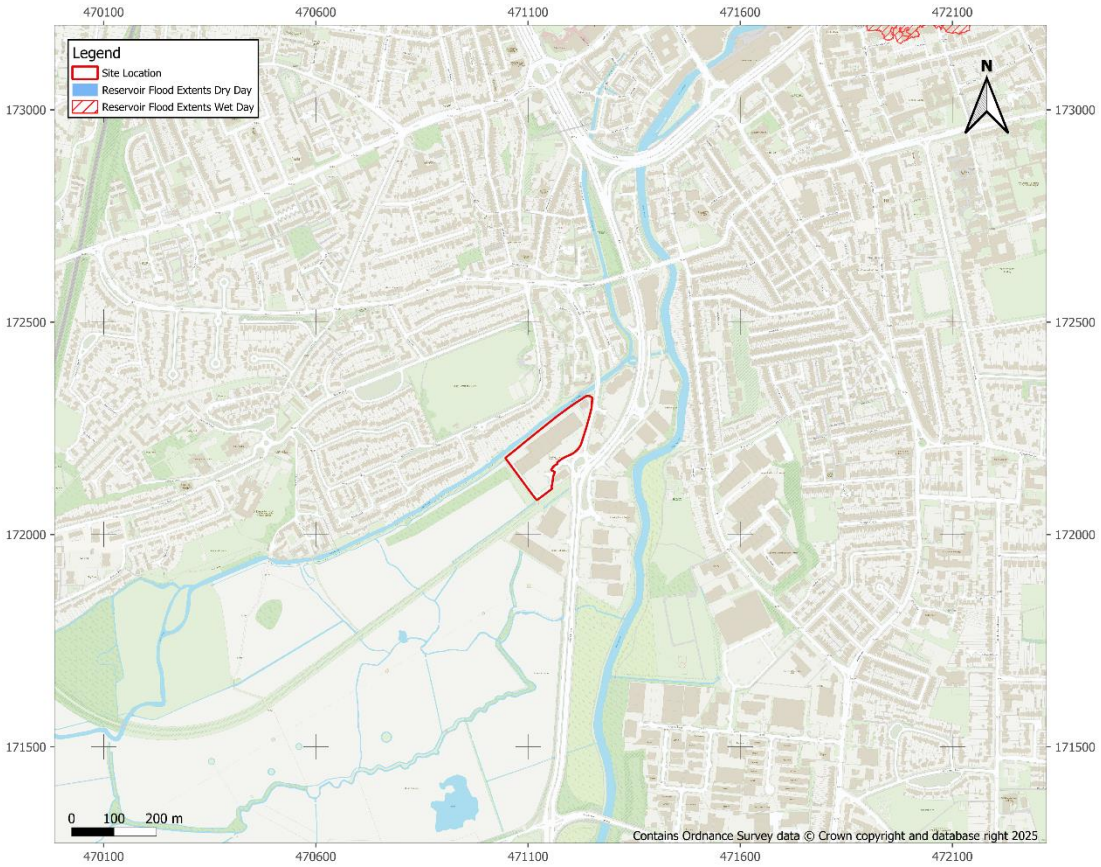

Figure 7 - Reservoir Failure Flood Map

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 national scale modelling does not provide details on flood depths, velocities, hazard or speed of onset. Therefore, the River Kennet model (Tyle Mill to Thames Confluence) (2018) was assessed to attain further detail on fluvial flooding.

For the 100-yr plus central climate change (21%) design event, the maximum flood level at the site is 39.4 m AOD, similar to the average ground level at the site. The hazard map for this event (see Figure 8) shows that in the limited areas where flooding occurs flood hazard is *low* indicating low flood depths and velocities. Speed of onset values are relatively moderate considering the location of the Holy Brook relative to the site. Table 1 shows the flood risk metrics associated with the design event.

Table 1- Flood Risk Metrics

	Design Event 1.0% AEP (+21%)
Percentage Inundated (%)	6%
Average Flood Depth (m)	0.25m (Max- 0.36m)
Average Velocity (m/s)	0.03m/s (Max – 0.05m/s)
Speed of Onset (hrs)	13.0 hrs

4.3 Access and egress

Vehicular access to and from the site would be south westerly along the Rose Kiln Lane. In the location of the site Rose Kiln Lane is in Flood Zone 1. Subsequent travel would likely be along the A33, which is elevated and in Flood Zone 1. Pluvial flood risk is also limited along the identified route. Note Figure 9 shows the modelled 0.1% AEP flood hazard from the Kennet model rather than the Flood Zone 2 extent which is based on a combination of the recorded flood outline from the June 1971 event and national scale modelling.

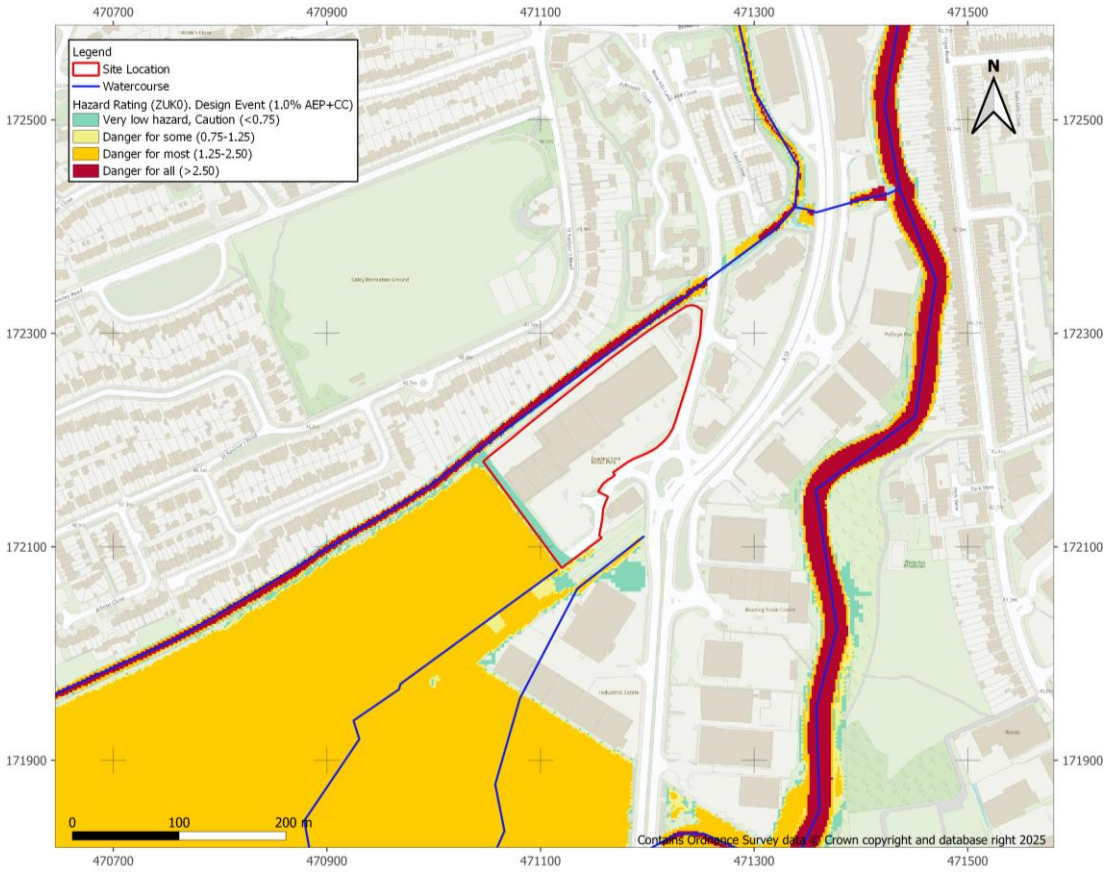

Figure 8 – Flood Hazard Map for the Design Event

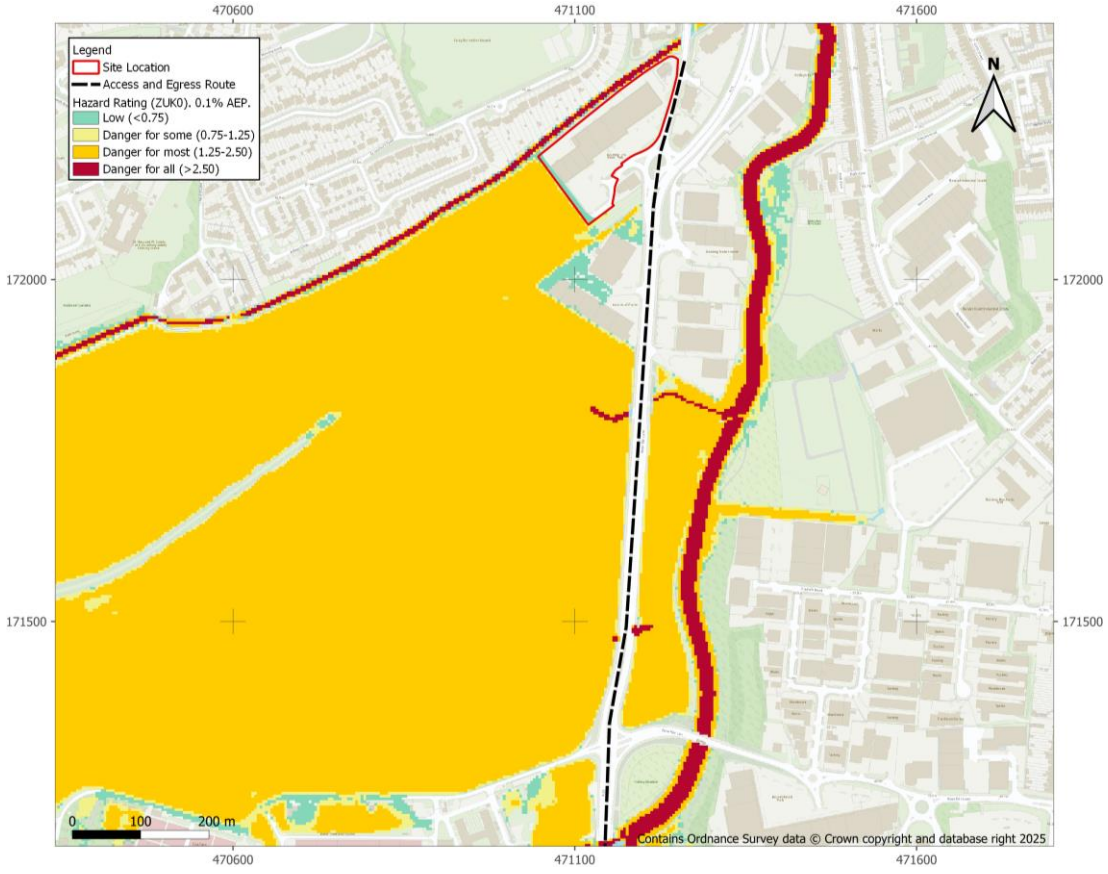

Figure 9 – Access/Egress Routes

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.

None of the site lies in Flood Zone 3a and the Flood Zone 2 extent is limited to a small area in the southwest of the site. In this regard it should be possible to locate the majority of infrastructure in Flood Zone 1. Therefore, a new residential development at the site should be possible.

5.2 Scale of Development

The total site area is 2.12ha; allocated for between 150-220 dwellings. Given the size of the site, it is assumed that the development will either be high density housing or utilise multistorey flats. It should be possible to locate the majority of infrastructure in Flood Zone 1, with a small amount of infrastructure potentially located in Flood Zone 2. The scale of development should therefore not be an issue on flood risk grounds.

5.3 Sequential Approach

Whilst it should be possible to locate the majority of infrastructure in Flood Zone 1 it is important that a sequential approach is implemented at the site, prioritising 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 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. 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.

5.4 Other Site-Specific Considerations

There is limited surface water flood risk within the site, therefore it should not be a barrier to development. However, 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 and at the same level as the river, 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.