

Mansfield District Council

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Appendix 1 Land North of Old Mill Lane Level 2 Strategic Flood Risk Assessment



Mansfield District Council

Land North of Old Mill Lane

Level 2 Strategic Flood Risk Assessment

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For and on behalf of Wallingford HydroSolutions Ltd.

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Land North of Old Mill Lane Level 2 SFRA

Flood Risk Overview

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

Flood Risk

Pluvial flood risk represents the greatest risk of flooding to the site, however only 2.9% of the site is affected in the extreme 0.1% + Climate Change extreme event. Therefore, the risk of flooding from surface water is considered to be low.

The risk of fluvial flooding is also considered to be low, as only 1.0% of the site is inundated in the extreme 0.1% + Climate Change extreme event.

The risk from other sources of flooding is considered to be moderate due to the potential for groundwater and reservoir flooding.

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 surface water flood risk. Provided no infrastructure is located in flood risk areas the national scale modelling will remain suitable for planning purposes.

Conclusions and Recommendations

The development proposed is residential and categorised as *More Vulnerable Development*. It should be possible to locate all infrastructure in Flood Zone 1 and outside the surface water flood extents at this site to avoid flood risk to people and property. There are no constraints in terms of site access.

However, a sequential approach will need to be followed, to ensure that all residential buildings are outside of the areas at flood risk.

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1 Introduction

1.1 Background

Wallingford HydroSolutions Ltd has been commissioned by Mansfield District Council (MDC) to undertake a Level 2 Strategic Flood Risk Assessment (SFRA) at Land North of Old Mill Lane in accordance with the National Planning Policy Framework (NPPF)¹, Planning Practice Guidance (PPG)² and associated guidance from the Environment Agency (EA)³.

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 site is 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 the 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 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 assessment also includes guidance for the preparation of FRAs, including information about the use of SuDS.

¹ Ministry of Housing Communities & Local government (2024) National Planning Policy Framework https://assets.publishing.service.gov.uk/media/67aafe8f3b41f783cca46251/NPPF_December_2024.pdf

² UK Government (2025) Planning practice guidance- Flood risk and coastal change <https://www.gov.uk/guidance/flood-risk-and-coastal-change>

³ Environment Agency (2026) <https://www.gov.uk/guidance/how-to-prepare-a-strategic-flood-risk-assessment>

1.3 Report Structure

This FRA follows the structure summarised below:

- 1 - Introduction (this section)
- 2 - Site Description
- 3 - Flood Risk
- 4 - Development Viability and FRA Recommendations

2 Site Description

2.1 General Location Plan

The Land North of Old Mill Lane site is 13.6ha in area. It is located in the north east of Mansfield, see Figure 1. The site is located on agricultural fields with a small woodland along the northwestern boundary. Land use surrounding the site is mixed, with residential developments to the south and east, a caravan park to the west and agricultural fields to the north.

The site is a proposed allocation for residential development in the emerging Local Plan review, with a capacity for 250 dwellings.

2.2 Topography

Based on 1m LiDAR data the site generally slopes in a westerly direction towards the River Maun, which runs along a section of the site's northwestern boundary. The ground levels across the site range from 71.0 m AOD to 109.2 m AOD, see Figure 2. The average ground level is 96.0 m AOD.

2.3 Nearby Watercourses

The River Maun runs from southwest to northeast along an approximately 370m stretch of the site's northwestern boundary. Additionally, there is a small pond within the northwest of the site, Figure 1.

Land North of Old Mill Lane Level 2 SFRA

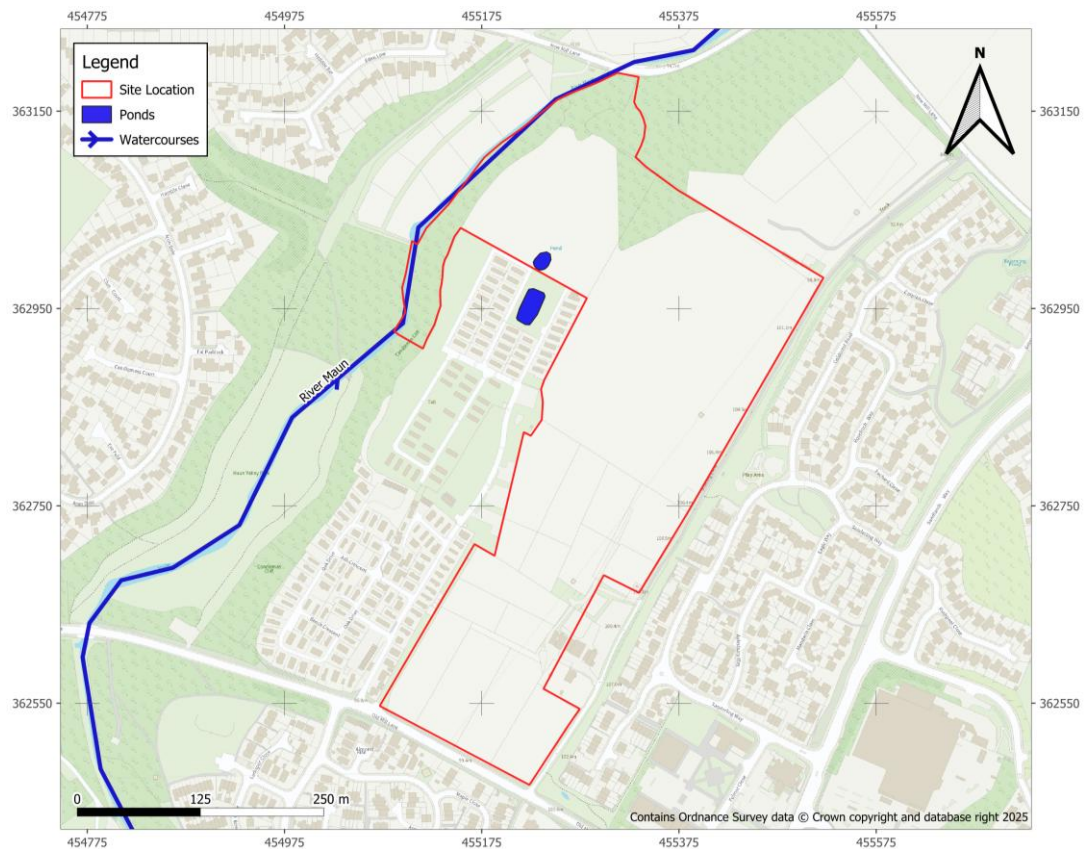


Figure 1 - Site Location

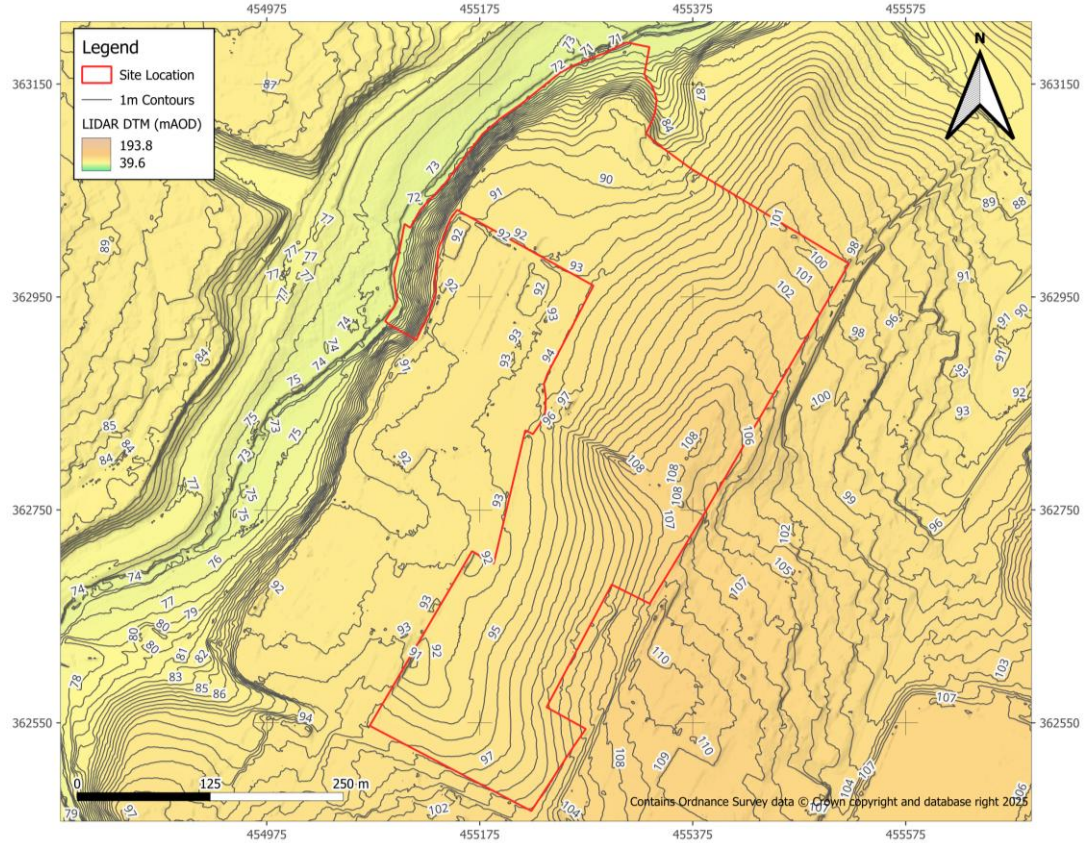


Figure 2 - Topography

3 Flood Risk

3.1 Historical Flooding

The EA has two records of historic flooding at the site. Both events were associated with the channel capacity of the River Maun being exceeded, these occurred in January 1947 and January 1977. Flooding was recorded along the northwestern boundary of the site, see Figure 3.

3.2 Fluvial Flood Risk

In the EA Flood Map for Planning (FMfP) dataset, 0.9% of the site is located in Flood Zone 2 (0.1% Annual Exceedance Probability (AEP)) and 0.7% is located in Flood Zone 3a (1.0% AEP). These Flood Zones consider the undefended scenario whereas Flood Zone 3b (3.3% AEP) considers the defended scenario. This extent shows 0.7% of the site is located within Flood Zone 3b. All flooding at this site is associated with the River Maun, see Figure 4.

The EA FMfP Climate Change dataset shows that a marginal increase in flood extents for the events assessed. For the 0.1% AEP and 1.0% AEP undefended events the proportions increase to 1.0% and 0.8% respectively. For the 3.3% AEP defended event, the proportion increases to 0.7%, see Figure 5.

Overall, fluvial flood risk is low and no further assessment is required.

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 0.6% of the site is inundated in the 3.3% AEP event, 0.9% is inundated in the 1.0% AEP event and 2.2% is inundated in the 0.1% AEP event, see Figure 6. When accounting for climate change the proportions moderately increase to 0.8% in the 3.3% AEP event, 1.2% in the 1.0% AEP event and 2.9% in the 0.1% AEP, see Figure 7. The majority of surface water flooding within the site is associated with pooling within areas of lower topography in the south of the site.

Overall, the risk of surface water flooding is low and no further assessment is required.

3.5 Groundwater Flooding

The site is underlain entirely by sandstone, which is expected to have moderate permeability. Superficial deposits are present close to the River Maun in the form of alluvium. The overlying soils are slightly acidic sandy soils; these are expected to be freely draining.

Based on the data available the risk of groundwater flooding is considered moderate, largely based on the freely draining nature of the overlying soils which permit a mobile water table. A geotechnical assessment is recommended at the planning stage to confirm the level of risk from groundwater flooding.

3.6 Reservoir Flood Risk

The FMfP shows that a small section in the west of the site is at risk from reservoir flooding during both a wet day and dry day scenario, see Figure 8. This flooding is primarily associated with a breach event of the King's Mill reservoir. 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 partially located within the River Maun at Mansfield flood warning area. The area covers the same extent as the recorded flood extent shown in Figure 3.

3.8 Access and Egress

Access and egress routes are available from the site. To avoid fluvial flood risk these should not head in a westerly direction toward the River Maun. In terms of surface water flooding, the depth maps for an extreme pluvial flood (0.1% AEP +CC) have been reviewed. Flood free access routes are available; these tend to converge on the Old Mill Lane to head south on Barringer Road (see Figure 9).

A site-specific FRA should assess the provisions for safe access and egress at the site in more detail once the final site layout and access points are known. It should assess nature of the flood risk to determine how quickly it occurs and the degree of hazard.

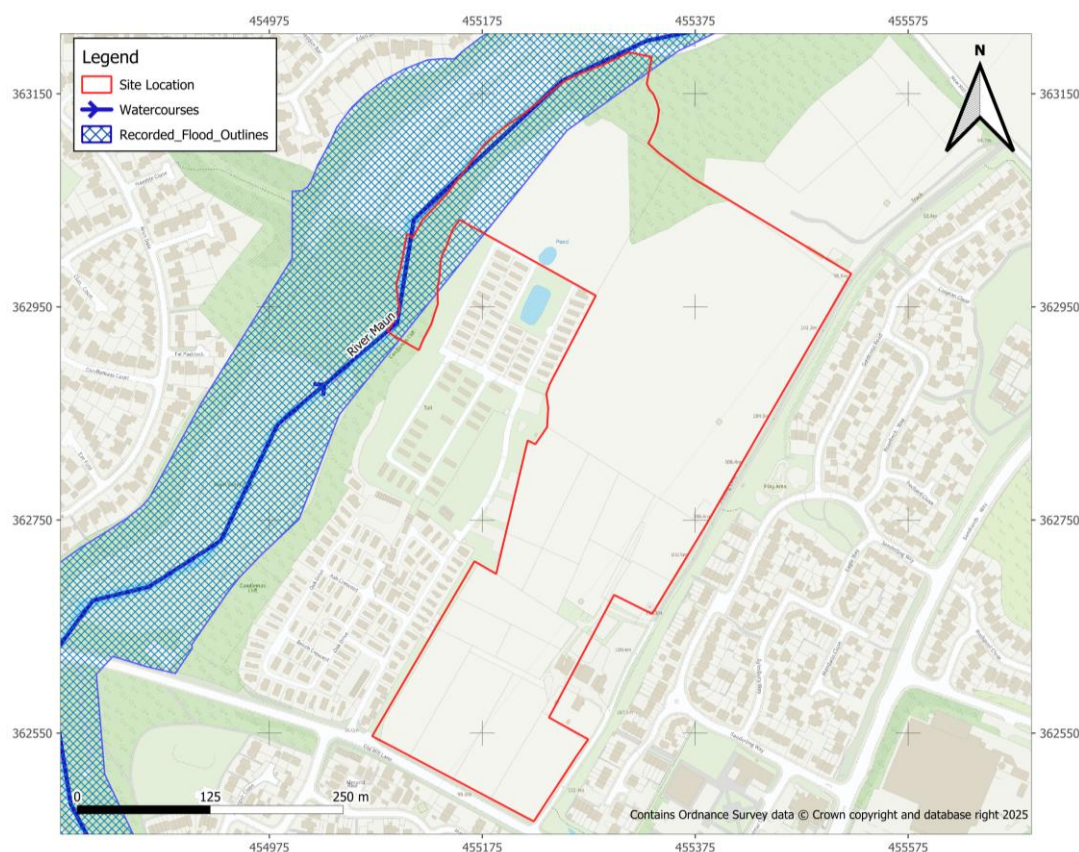


Figure 3 - Recorded Flood Events

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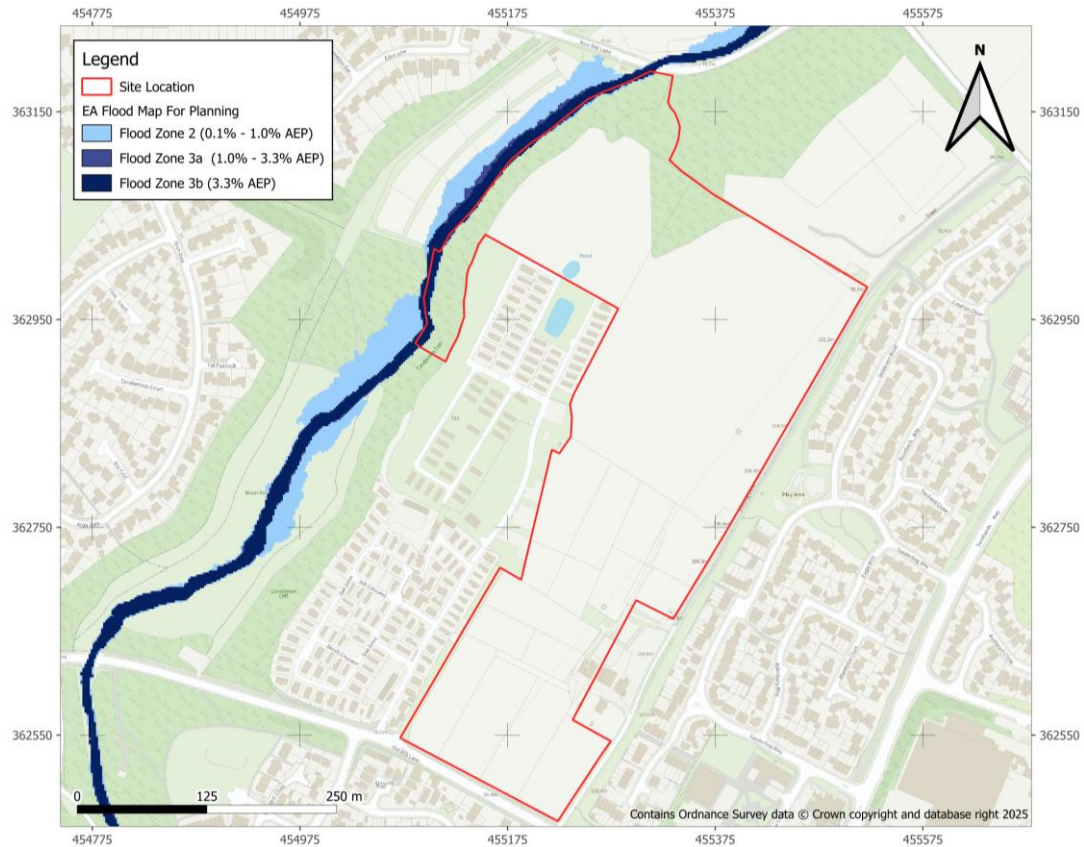


Figure 4 - Fluvial Flood Map

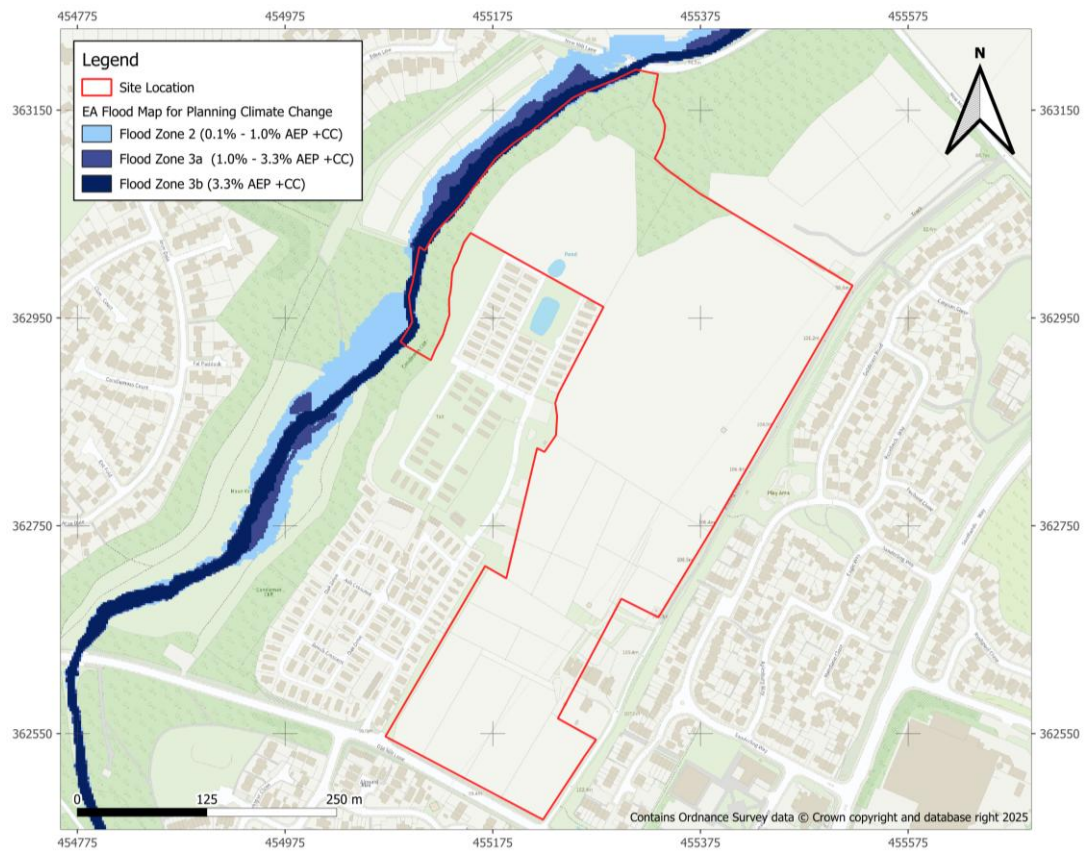


Figure 5 - Fluvial Climate Change Flood Map

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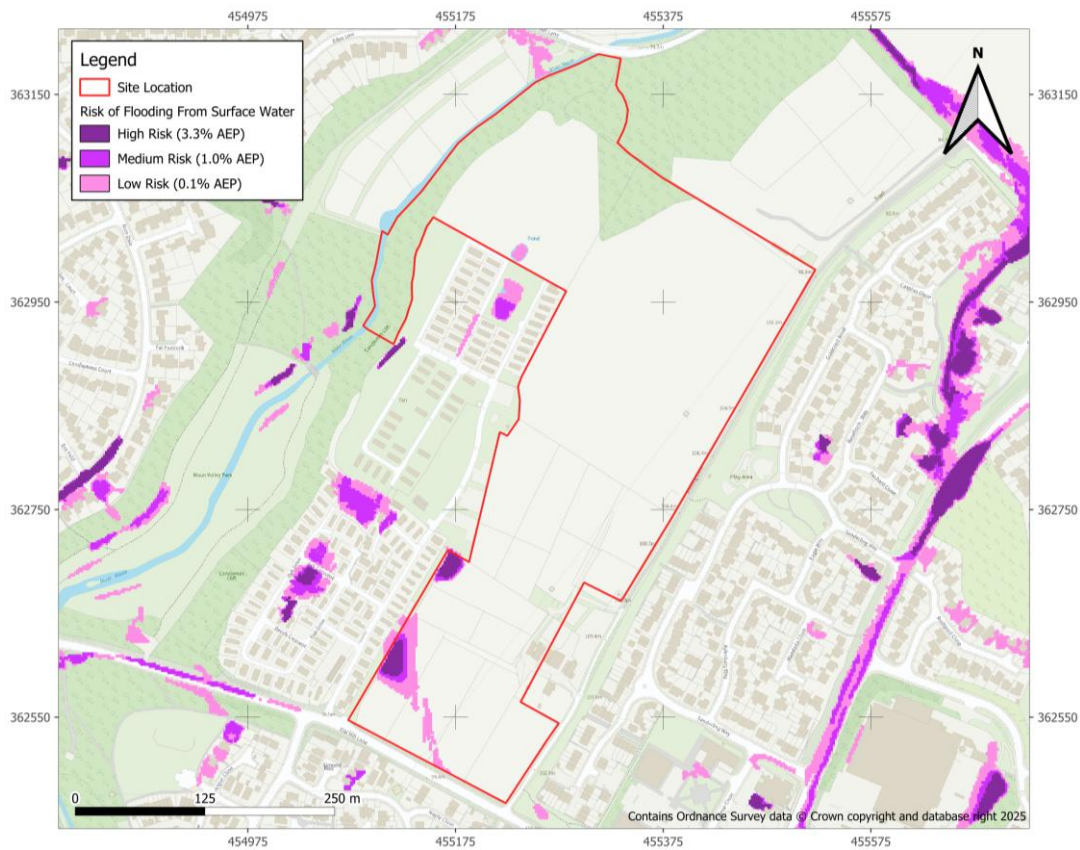


Figure 6 – Surface Water Flood Map

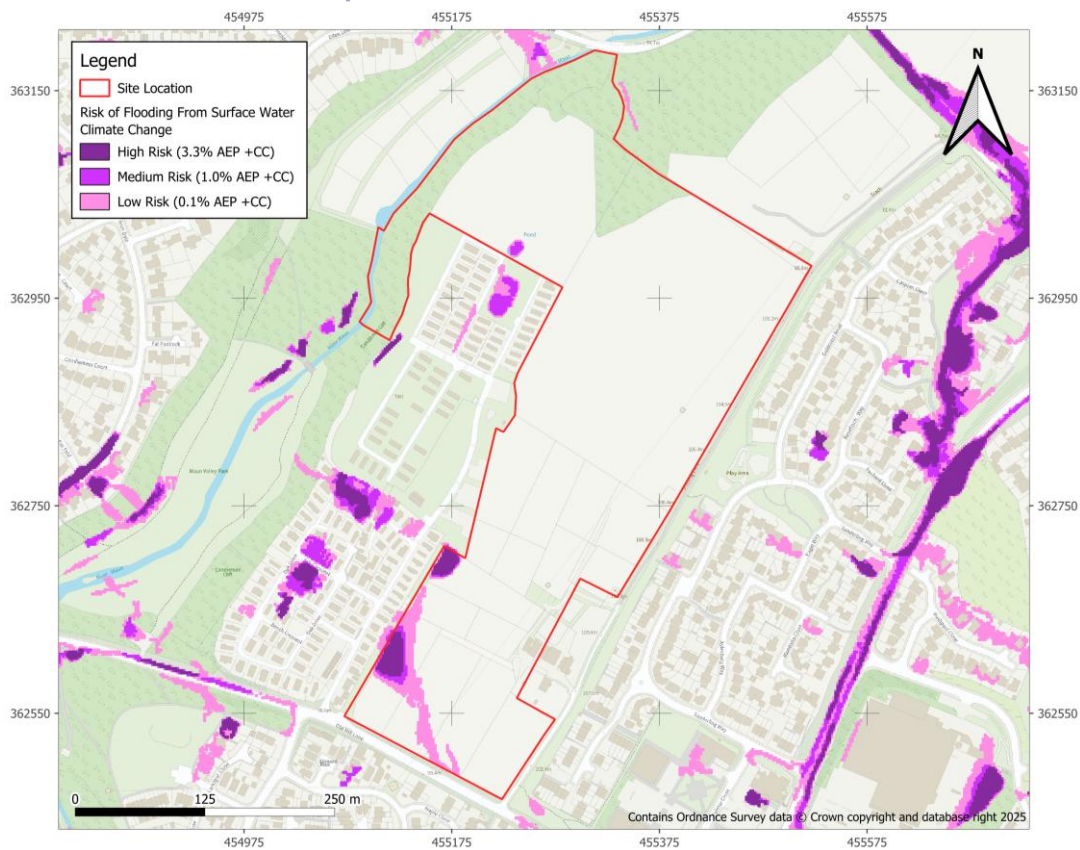


Figure 7 -Surface Water Climate Change Flood Map

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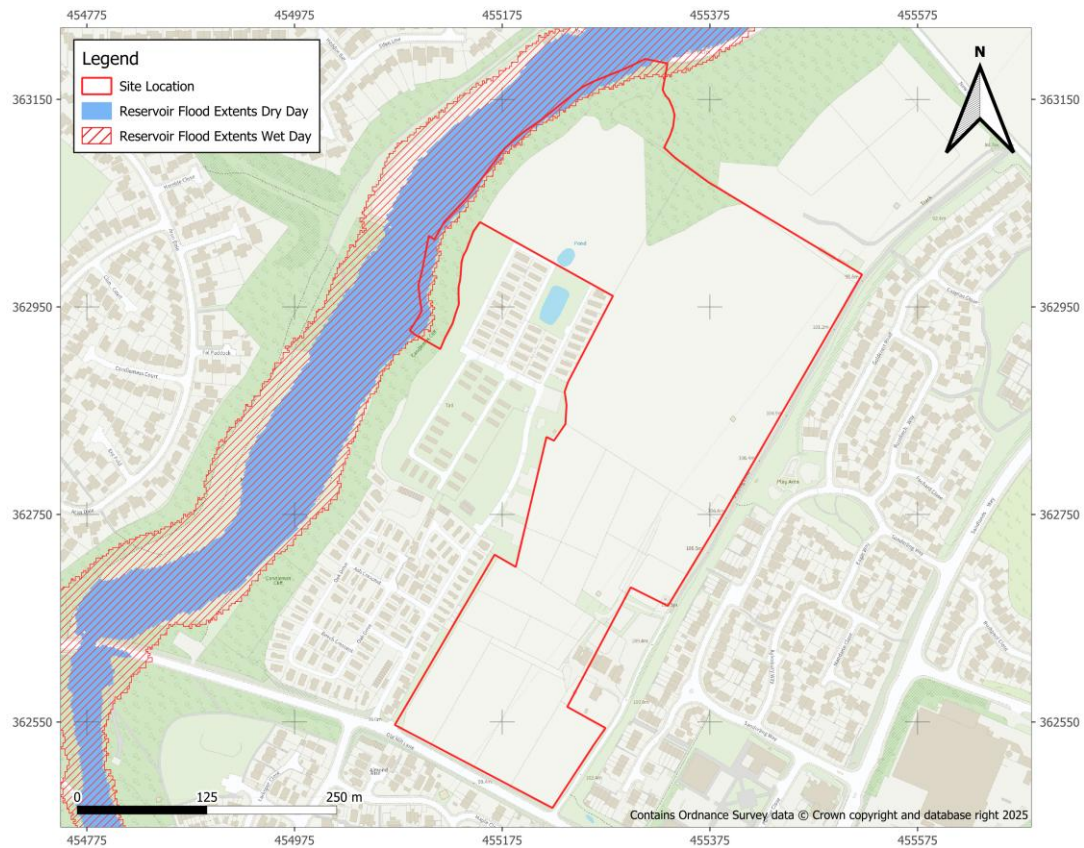


Figure 8 - Reservoir Failure Flood Map

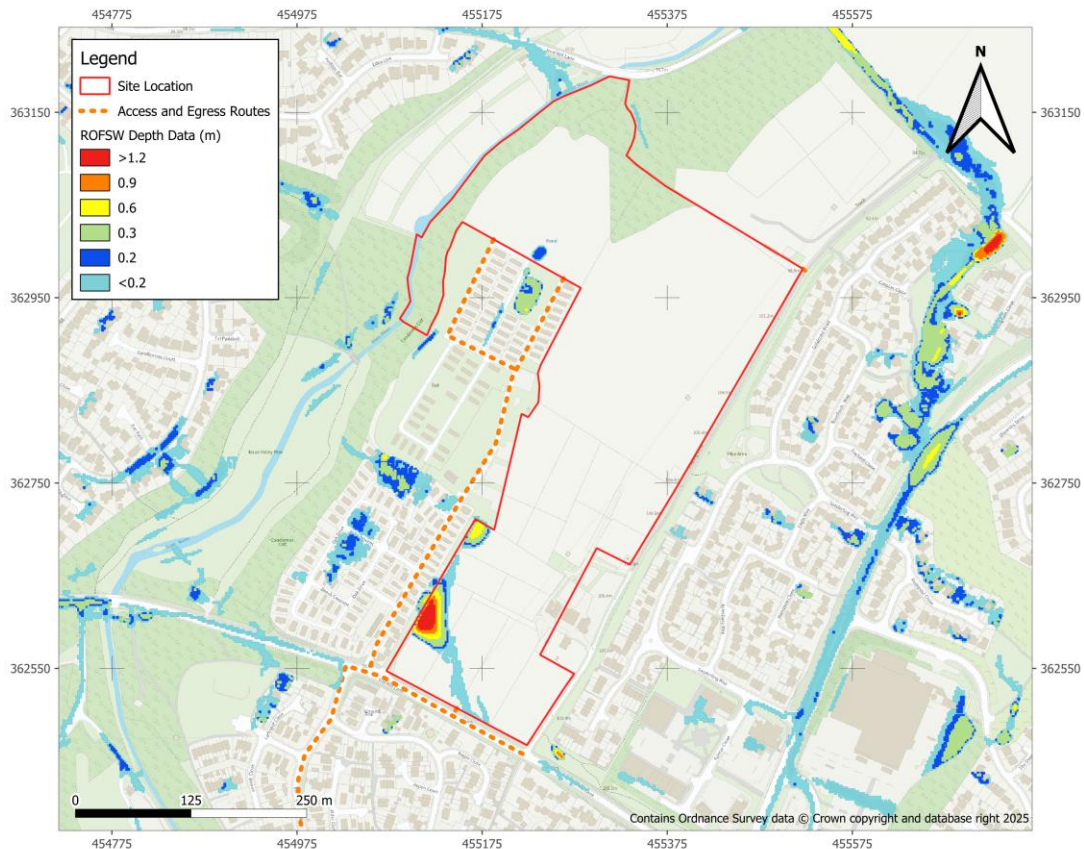


Figure 9 - Access and Egress Routes with depth data for 0.1% + Climate Change Surface Water Map

4 Development Viability and FRA recommendations

4.1 Development Categorisation

The development proposed is residential and categorised as *More Vulnerable Development*. It should be possible to locate all infrastructure in Flood Zone 1 and outside the surface water flood extents at this site to avoid flood risk to people and property. There are no constraints in terms of site access.

However, a sequential approach will need to be followed, to ensure that all residential buildings are outside of the areas at flood risk.

4.2 Scale of Development

The total site area is currently 13.58 ha, allocated for 250 residential dwellings. In total only 3.9% of the site (0.53 ha) lies within the combined fluvial and pluvial flood zones when accounting for climate change. Assuming medium density housing (35 dwellings per hectare) 250 dwellings would require 7.14 ha of land. Given 13.05 ha of the site remains flood free during the design event, it should be possible to locate all development outside of flood free areas. This is provided there are no constraints (non-flood related) which require development to be located in at-risk areas.

4.3 Sequential Approach

Given the majority of the site is located within Flood Zone 1 (99.0%), no infrastructure should be located within an area of fluvial flood risk. Therefore, the areas of surface water flood risk should be used to inform the sequential locating of infrastructure at the site, avoiding the small areas at risk.

If required ancillary infrastructure such as SuDS features, car parks and green spaces could be located in higher flood risk areas to allow residential properties to be sited in lower risk areas. This is under the assumption that it does not increase flood risk elsewhere and is designed to be appropriately resistant and resilient to flooding.

4.4 Other Site-Specific Considerations

Overall, the site is developable. It should be possible to locate all more vulnerable infrastructure in Flood Zone 1 and outside of the design pluvial flood extent. However, this will require a sequential approach to be implemented. There are no constraints in terms of site access.

At the planning stage, it is recommended that a site-specific FRA consider in more detail how quickly surface water flooding 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 a 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. It will also confirm whether groundwater flooding could be an issue at the site. Attenuated discharge to a watercourse or a sewer will also need to be considered as part of a site-specific FRA.

In addition, as aligned with the draft policy for the site there may be opportunities for development to be set back from the River Maun to provide green buffers for green and blue infrastructure. This will support biodiversity net gain and safeguard local wildlife sites.