

BACKLOT FOR EXTERNAL FILMING AND TEMPORARY FILM SETS, LAND
SOUTH OF CUTBUSH LANE, SHINFIELD

FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY

SHINFIELD STUDIOS

21 NOVEMBER 2024



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1.0 Introduction

Context

- 1.1. This Flood Risk Assessment (FRA) has been prepared by Abley Letchford Partnership Ltd (ALP), on behalf of Shinfield Studios to support an application for Prior Approval for the construction of a backlot for external filming and set creating at Shinfield, Berkshire.

Development Proposals

- 1.2. The proposals are for the creation of a backlot suitable for external filming and the creation of temporary film sets with an area of 1.05 hectares located on land to the south-east of Oldhouse Farm which is located to the south of Cutbush Lane and Shinfield Studios.

Requirement for a Flood Risk Assessment

- 1.3. The requirement for a FRA is set out in Section 14 of the revised National Planning Policy Framework (NPPF) as revised in December 2023.
- 1.4. The footnote accompanying Paragraph 173 states:
- 1.5. *'A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.'*
- 1.6. The site is a greenfield site that comprises fields. The area of the site is approximately 1.05 hectares. As the site area extends greater than 1 hectare, a site-specific flood risk assessment is required. To comply with the requirements of the NPPF, matters related to flood risk and drainage are addressed within this report.

Report Aim and Formation

- 1.7. The principal aims of this report are to demonstrate that the proposed development complies with national and local planning policy in respect to flood risk and to demonstrate that a suitable drainage strategy can be provided as part of development.
- 1.8. This report will also summarise the impacts the development could have on flood risk to the surrounding area and outlines the mitigation strategies that will be implemented to minimise this risk.
- 1.9. The drainage design embraces the guiding principles of Sustainable Drainage Systems (SuDS) which are central to the design of the surface water drainage strategy for the proposed development.

Report Structure

- 1.10. This report addresses the requirements of revised NPPF and considers the following aspects:



- Section 2: Policy and Sources of Information – a review of policy relevant to the assessment and sources of information used to inform the assessment.
- Section 3: Site Setting – a description of the site location, topography, geology, and hydrology.
- Section 4: Overview of Flood Risk – a review of data for flooding from all sources to determine the baseline flood risk to the site and an assessment of the impacts of the development on flood risk.
- Section 5: Sequential Test and Exception Test – a description of the proposed development and a classification of the vulnerability in the context of the Sequential Test and Exception Test.
- Section 6: Flood Risk Mitigation – the mitigation measures implemented to manage the potential flood risk to the development.
- Sections 7: Surface Water Drainage Strategy – a summary of an appropriate strategy to manage the surface water from the site in the post development scenario.
- Section 8: Conclusion – a summary of the development proposals in the context of site vulnerability and the requirements of the NPPF.



2.0 Policy and Sources of Information

Introduction

- 2.1. This chapter provides a review of policy relevant to the assessment and the available information on all sources of flood risk.

National Planning Policy

- 2.2. National Planning Policy in relation to Flood Risk is set out in Section 14 of the National Planning Policy Framework (NPPF) and Planning Practice Guidance (PPG) ID: 7 for Flood Risk and Coastal Change. Flood Risk is discussed in Paragraphs 165-175 of the NPPF.
- 2.3. Paragraphs 165-168 discuss the sequential approach. Paragraph 166 refers to a Strategic Flood Risk Assessment (SFRA) that would form the basis of applying the Sequential Test for local authorities to allocate development, whilst Paragraphs 169-170 relate to the Exception Test.
- 2.4. Paragraph 173 discusses the determination of planning applications stating:
- ‘When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood risk assessment. Development should only be allowed in areas at risk of flooding where, in light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:*
- a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;*
 - b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;*
 - c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;*
 - d) any residual risk can be safely managed; and*
 - e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.’*
- 2.5. The proposed development comprising of a backlot for would be classed as a Major development with an area greater than 1 hectare. Paragraph 175 states:

‘Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate. The systems used should:

- a) Take account of advice from the lead local flood authority;*
- b) Have appropriate proposed minimum operational standards;*
- c) Have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and*



d) Where possible, provide multifunctional benefits.'

Environment Agency

- 2.6. The Flood and Water Management Act (2010) provides the Environment Agency (EA) a strategic overview role for all forms of flooding and coastal erosion. They also have direct responsibility for the prevention, mitigation, and remediation of flood damage for main rivers and coastal areas. The EA is a statutory consultee in relation to flood risk and planning dependent upon criteria.
- 2.7. The EA Standing Advice has been consulted and reviewed within this FRA.
- 2.8. The EA Flood Map for Planning, EA Long Term Flood Risk Mapping and the Catchment Data Explorer websites have been interrogated in respect to flood risk extents.

Local Authorities

- 2.9. The site lies within the administrative area of Wokingham Borough Council (WBC). WBC is the Local Planning Authority (LPA) and Lead Local Flood Authority (LLFA).
- 2.10. Planning guidance published by WBC regarding the flood risk was referred to in order to assess the methodology best suited to suit the local area. The following key documents were reviewed:
 - WBC Core Strategy, Core Policy CP1 'Sustainable Development' (adopted January 2010);
 - WBC Local Plan (dated February 2014);
 - WBC Local Flood Risk Management Strategy (dated April 2015);
 - WBC Preliminary Flood Risk Assessment (PFRA) (dated June 2011) and PFRA addendum (dated 2017);
 - WBC Level 1 Strategic Flood Risk Assessment (SFRA) (dated May 2023 and published May 2024); and
 - WBC Level 2 SFRA (dated August 2023 and published May 2024).
- 2.11. WBC became the LLFA under the Flood and Water Management Act 2010. WBC provide guidance to assess, manage and inform flood risk.
- 2.12. WBC has permissive rights over any Ordinary Watercourses including land drainage ditches. If any work is required within the watercourse (improvements or crossings) then approval from the LLFA is required under the Flood and Water Management Act 1991.

Local Water Authority

- 2.13. South East Water is responsible for the supply of clean water in the South Wokingham area. Thames Water is responsible for the disposal of wastewater for the South Wokingham area.
- 2.14. Information with regards to sewer and water main flooding contained within the SFRA has been reviewed as part of this FRA. All water companies have a statutory obligation to maintain a register of properties and areas which are at risk of flooding from the public sewerage system and is shown on the DG5 Flood Register.



Other Sources of Information

- 2.15. A desktop study of the site was carried out using the following websites to gather data relating to local features, hydrology and soil characteristics:
- DEFRA's Magic Map portal;
 - British Geological Survey (BGS) 'Geology of Britain' online viewer; and
 - Cranfield University 'Soilscapes' portal.
- 2.16. Guidance with respect to Sustainable Drainage Systems (SuDS) is contained within DEFRA document Sustainable Drainage Systems, Non-statutory technical standards for sustainable drainage systems March 2015, CIRIA C753 The SuDS Manual and within the NPPF Planning Practice Guidance (PPG) – 'Flood Risk and Coastal Change'.
- 2.17. Additional guidance on development and flood risk is contained within CIRIA C624 Development and Flood Risk – Guidance for the Construction Industry which identifies several key aims for a development to ensure it is sustainable in flood risk terms.

3.0 Site Setting

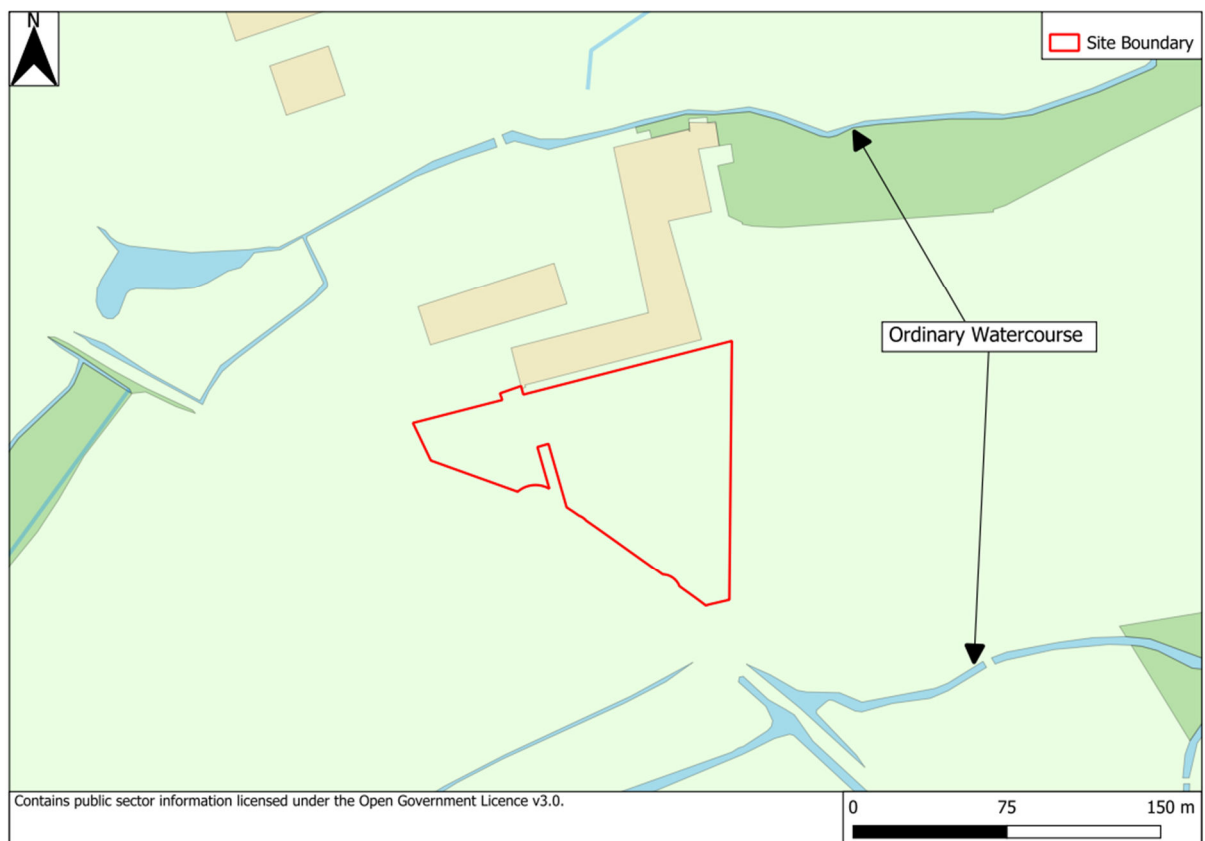
Introduction

- 3.1. This chapter provides a description of the site location, its topography, hydrological context, geology, and hydrogeology.

Site Location

- 3.2. The site is located at land to the south-east of Oldhouse Farm which is located to the south of Cutbush Lane. The nearest postcode is RG2 9AF. The site centre grid reference is 474537E, 168659N. The site location is shown in **Figure 1**.

Figure 1 – Site Location

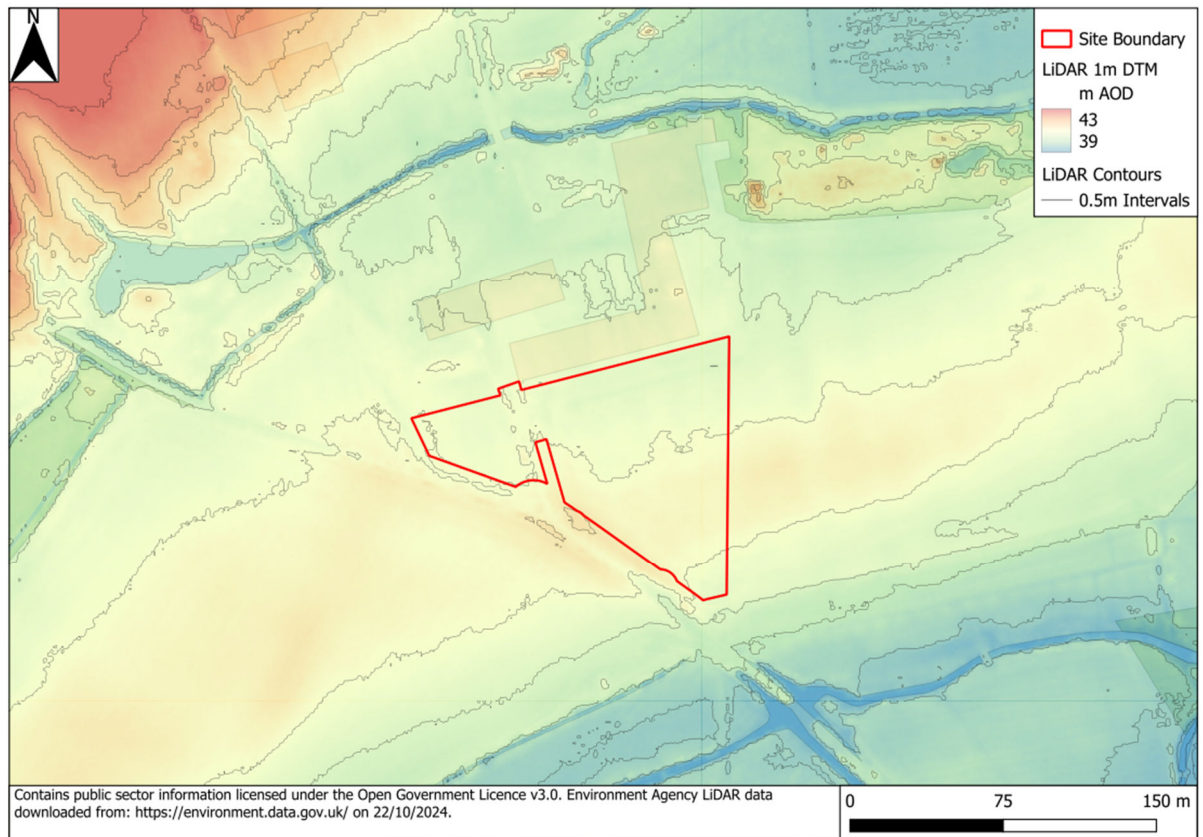


- 3.3. To the west and south, the site is surrounded by fields; to the east is the temporary backlot area and to the north is Oldhouse Farm. Further north lies the recently constructed Creative Media Hub workshops and the British Museum.
- 3.4. The site covers an area of approximately 1.05 hectares.

Topography

- 3.5. The ground levels across the site are shown by LiDAR in **Figure 2**.

Figure 2 – Site Topography



- 3.6. Ground levels across the site are between 40.4m AOD and 41.5m AOD. Ground levels are highest in the centre of the site and slope down to the northeast corner of the site and to the south.

Watercourses and Ditches

- 3.7. There are no watercourses within the site boundary. The nearest watercourses are Ordinary Watercourses are located approximately 30m to the south of the site and 110m to the north of the site.
- 3.8. The River Loddon is the nearest Main River. The River Loddon is located approximately 550m to the southeast of the site.

Surface and Foul Water Sewers

- 3.9. There are no sewers within the site boundary.

Geology and Hydrogeology

- 3.10. The British Geological Survey (BGS) 'Geology of Britain' online viewer indicates that the geology bedrock underlying the site is London Clay Formation. The superficial deposits of Brickearth – clay, silt, and sand.



- 3.11. The Cranfield University 'Soilscapes' online viewer indicates that the soil is loamy and clayey floodplain soils with naturally high groundwater. The DEFRA Magic Map online viewer indicates that the site is located within the Groundwater Source Protection Zone – Outer Protection Zone. The site is not underlain by a bedrock aquifer. The site is underlain by a Secondary B superficial drift aquifer which are mainly lower permeability layers that may store and yield limited amounts of groundwater through thick cracks.

4.0 Overview of Flood Risk

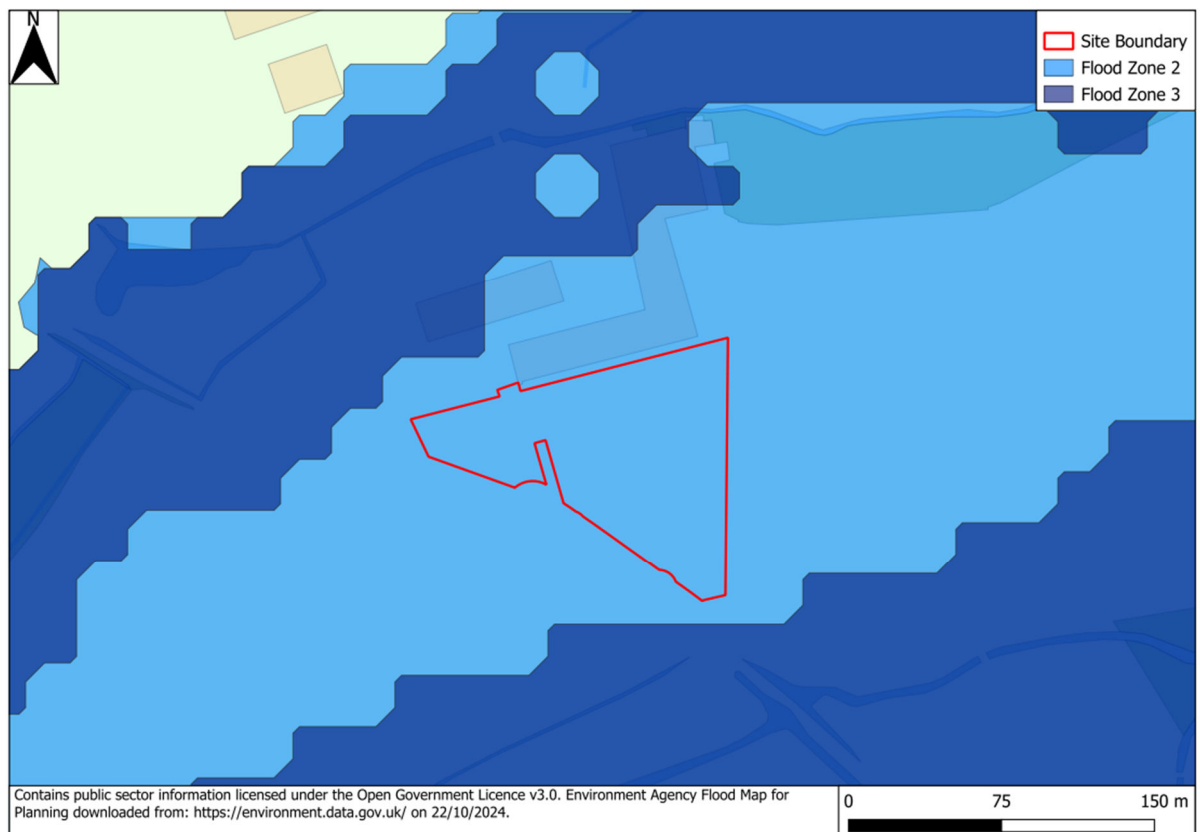
EA Flood Zone Map

4.1. The EA Flood Map for Planning provides an initial indication of the extent of Flood Zones. In the NPPF, Flood Zones are defined as follows:

- Flood Zone 1 'Low Probability' – Land less than 1 in 1,000 (0.1%) annual probability of river or sea flooding.
- Flood Zone 2 'Medium Probability' – Land between 1 in 100 (1%) and 1 in 1,000 (0.1%) annual probability of river flooding, or between 1 in 200 (0.5%) and 1 in 1,000 (0.1%) annual probability of sea flooding.
- Flood Zone 3 'High Probability' – Land at 1 in 100 (1%) or greater annual probability of river flooding, or 1 in 200 (0.5%) or greater annual probability of sea flooding.

4.2. **Figure 3** shows the EA Flood Zone mapping.

Figure 3 – EA Flood Zone Map

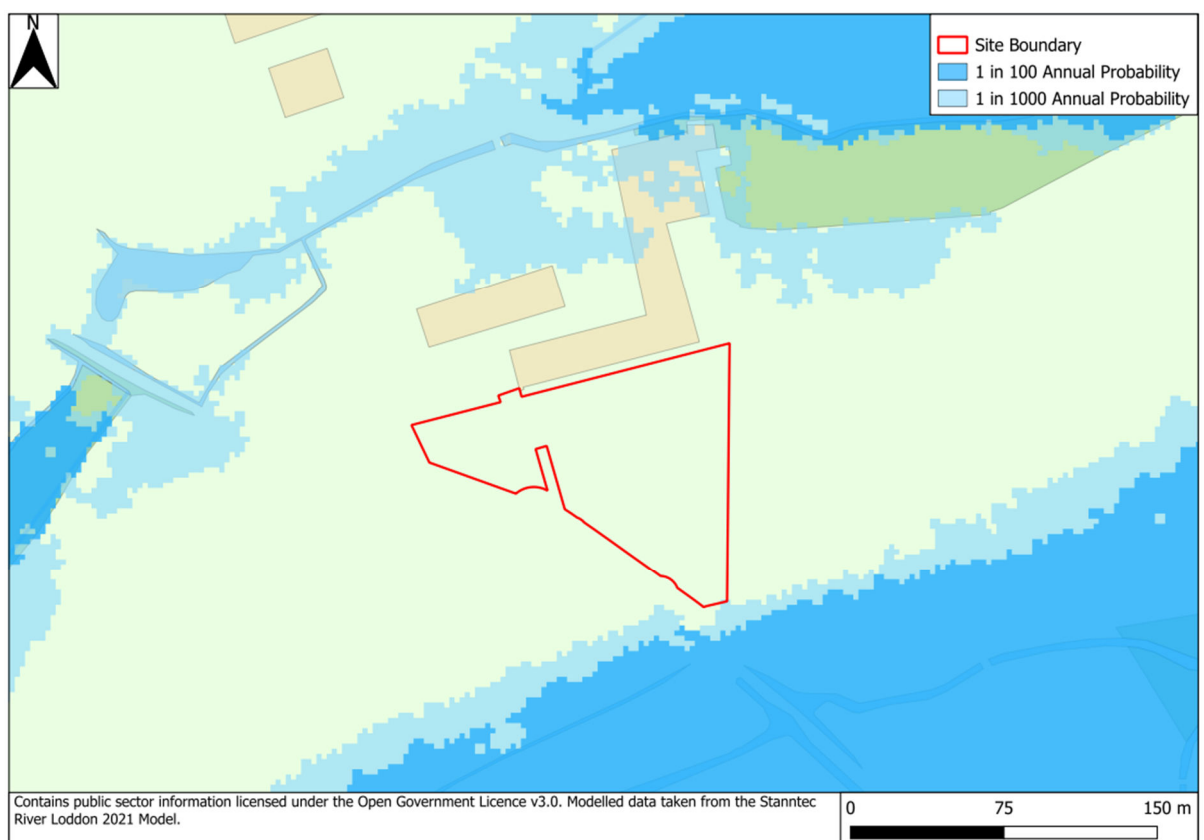


4.3. **Figure 3** shows that, according to the EA maps the entire site is located within Flood Zone 2. However, these are strategic maps which provide an initial indication of flood risk and a more detailed review of the potential for fluvial flooding is completed in the following section.

Flood Risk from Fluvial Sources

- 4.4. Detailed modelling of the River Loddon has been undertaken by WBC in 2022 in support of the SFRA dated 2023. This modelling uses the EA's original model from 2009 but includes updated hydrology data. The physical features within the catchment are the same as those for the 2009 model and this means that significant elements such as the Eastern Relief Road at Shinfield are not included in the model.
- 4.5. The modelled 1 in 100 and 1 in 1,000 annual probability flood extents which define the extents of Flood Zones 3 and 2 respectively are shown in the figure in Appendix 1.
- 4.6. As noted above the 2022 model comprises current hydrological data but an outdated physical ground model. WBC completed modelling in 2021 to support the 2021 SFRA which uses a model with a more up to date ground model and which includes those physical features within the catchment such as the Eastern Relief Road. For the purposes of this site specific FRA it is the 2021 SFRA model which is deemed to be most representative of the current catchment and which is therefore used to inform the FRA. It is noted that the 2021 SFRA and model is part of the Local Plan Update informing strategic site allocations.
- 4.7. **Figure 4** shows the modelled flood extents from this 2021 model.

Figure 4 – River Loddon 2021 Modelled Flood Extents





4.8. **Figure 5** shows that the site is not affected in the 1 in 100 or 1 in 1,000 annual probability events which represent the extents of Flood Zones 3 and 2 respectively.

4.9. This confirms that the site is at a low risk of fluvial flooding.

Flood Risk from Surface Water

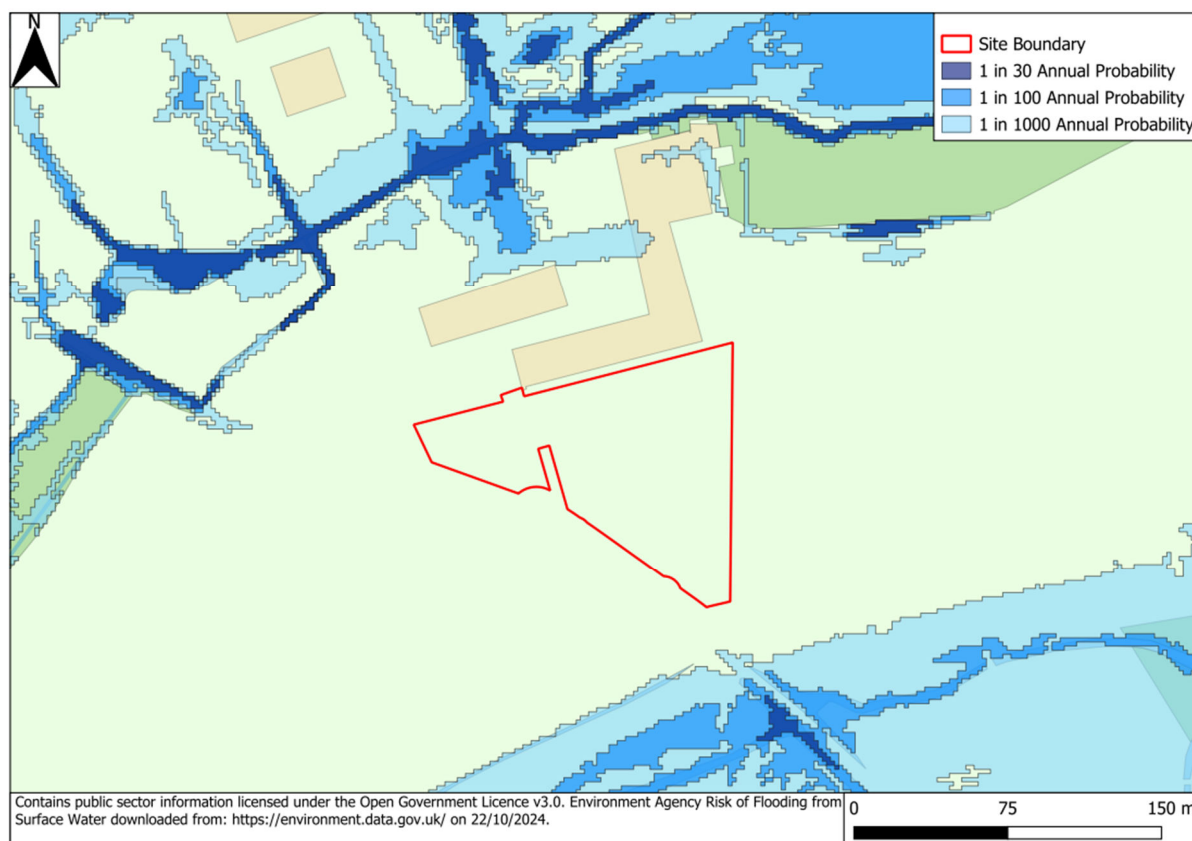
4.10. The EA's Risk of Flooding from Surface Water mapping indicates areas that could be susceptible to surface water flooding during extreme rainfall events. The EA surface water mapping defines rainfall events based on the following:

- 1 in 30 (3.3%) annual probability 'High Risk'
- 1 in 100 (1%) annual probability 'Medium Risk'
- 1 in 1000 (0.1%) annual probability 'Low Risk'
- Lower than 1 in 1000 (0.1%) annual probability 'Very Low Risk'.

4.11. The NPPF PPG – 'Flood Risk and Coastal Change' includes the 1 in 100 annual probability of surface water flood (including climate change) within the definition of the design flood event to be used to inform a FRA.

4.12. **Figure 5** shows the potential flood risk from surface water.

Figure 5 - EA Flood Risk from Surface Water



- 4.13. The EA Flood Risk from Surface Water mapping shows that the entire site is located within an area of 'Very Low' risk of surface water flooding.

Flood Risk from Groundwater

- 4.14. Groundwater flooding has the potential to occur after prolonged periods of unusually high rainfall. During such periods, more water than usual infiltrates through the ground, raising the water table above its normal depth below the surface. Where the water table is at a shallow depth in any case, the water table can reach the surface. This can cause groundwater to merge with rainfall and cause localised flooding.
- 4.15. The WBC Level 1 SFRA assesses the area for susceptibility to groundwater flooding. The interactive mapping for the site is included within Appendix A, Map D3 of the WBC Level 1 SFRA. A copy of this is included with **Appendix 1** of this FRA.
- 4.16. The mapping shows that the entire site is located within a 1km² grid square of which 50% to 75% of the grid square is susceptible to groundwater flooding.
- 4.17. Therefore the site is deemed to be potentially at risk of groundwater flooding. It is likely that the greatest risk of groundwater flooding is in the low lying areas of the grid square, adjacent to the River Loddon.

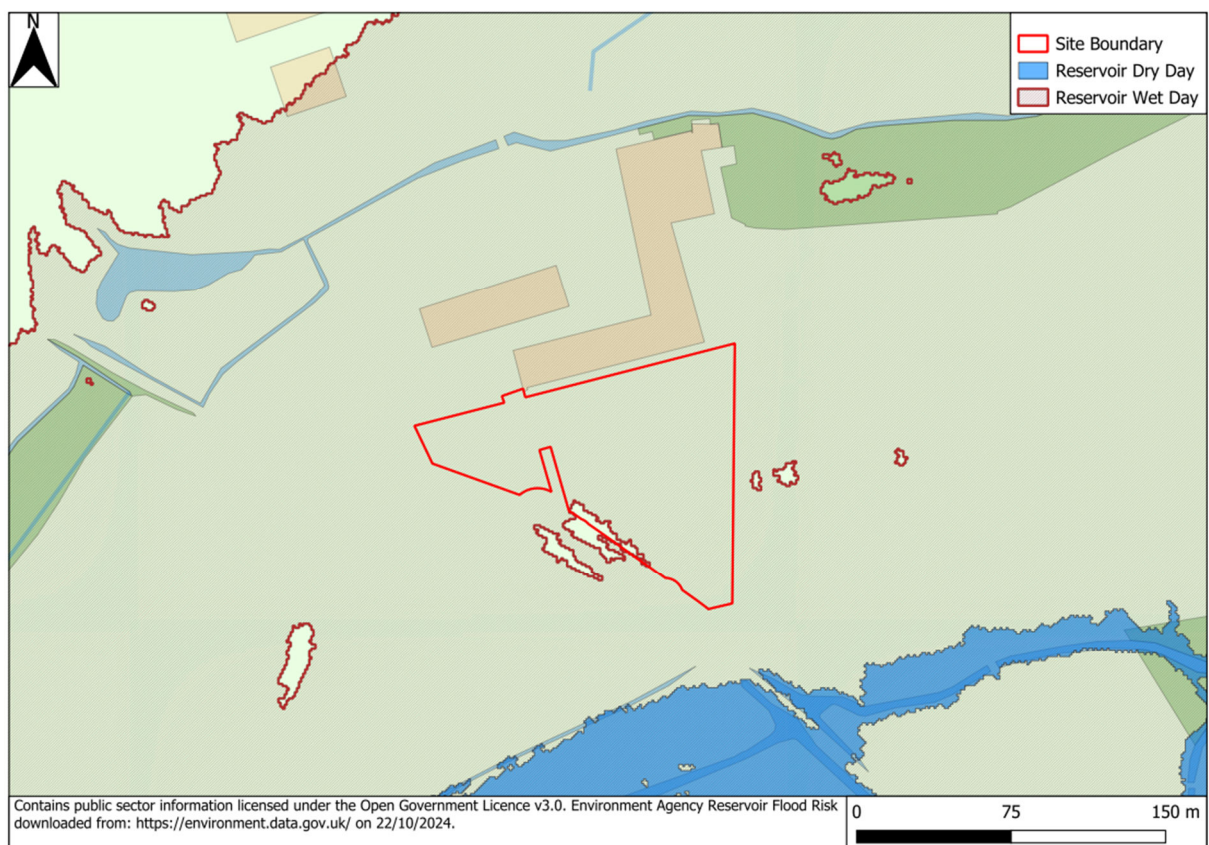
Flood Risk from Sewers

- 4.18. When exceeded, surcharged sewer networks can lead to flooding from backed up manholes and gully connections.
- 4.19. There are no sewers within the site boundary or nearby. The risk of flooding from sewers is therefore considered to be low.

Flood Risk from Reservoirs

- 4.20. The EA flood risk from reservoirs mapping indicates areas that would be at risk of flooding in the event of a reservoir breach.
- 4.21. **Figure 6** shows the flood risk from reservoirs. This indicates that the site may be affected during a reservoir breach in the 'wet day' scenario.

Figure 6 – EA Flood Risk from Reservoirs



- 4.22. The reservoir flooding potential comes from Bearwood Lane, located approximately 2.6km to the southeast of the site. It is understood that Bearwood Lake is a Category A Reservoir under the 1975 Reservoir Act and as such is highly regulated. It has been subject to recent upgrades and is deemed to have the capacity to withstand a 1 in 10,000-year event. Uncontrolled breaches of regulated reservoirs are very rare and as such the probability of the reservoir breached outline being reached is very low. This would be considered a residual risk, as set out in Paragraph 041 of the NPPG.

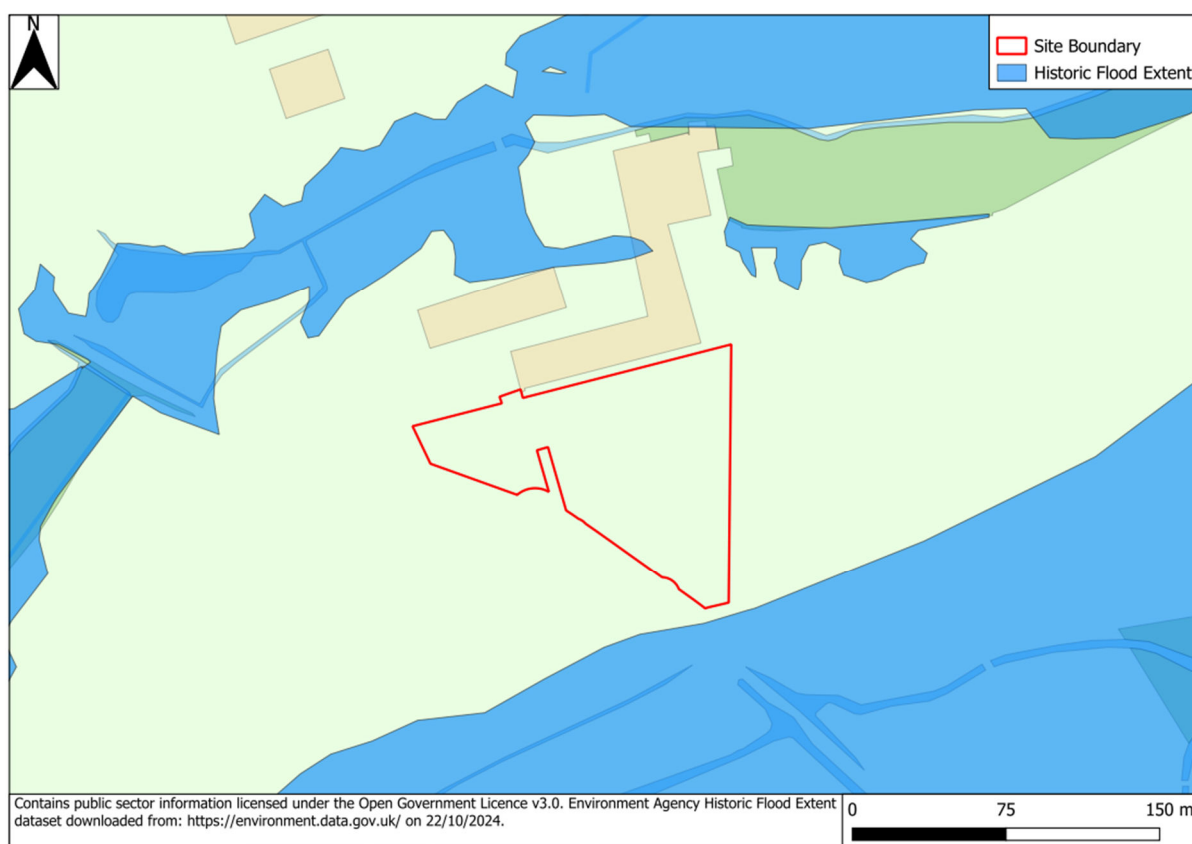
Flood Risk from Other Sources

- 4.23. The EA flood risk maps, WBC PFRA and WBC Level 1 and Level 2 SFRA indicate that the site is not at risk from other sources of flood risk.

Historic Flooding

- 4.24. **Figure 7** shows the historic flood extent records held by the EA. The EA Historic Flood Map shows the maximum extent of recorded flood events.

Figure 7 – Historic Flood Extents



- 4.25. **Figure 7** shows that there are no records of flooding impacting the site which is consistent with the assessments of flood risk in earlier sections.

Flood Risk Summary

- 4.26. A summary of flooding from all sources is provided in **Table 1**.



Table 1 – Summary of Flood Risk

Source of Flooding	High	Medium	Low	Comments
Fluvial			✓	The WBC detailed River Loddon 2021 modelling confirms that the site is located within Flood Zone 1.
Pluvial			✓	The EA Risk of Flooding from Surface Water mapping shows that the entire site is at a 'Very Low' risk of surface water flooding.
Groundwater		✓		The areas susceptible to groundwater flooding mapping contained within the WBC Level 1 SFRA shows that the entire site is located within a 1km ² grid square of which 50% to 75% of the grid square is susceptible to groundwater flooding.
Sewers			✓	There are no sewers within the site boundary. The risk of sewer flooding is therefore considered to be low.
Reservoirs			✓	The EA reservoir flood mapping shows that the entire site is located within an area at risk of flooding in the event of a breach at Bearwood Lake in the wet day scenario only. The risk of reservoir flooding occurring is low.
Canals and other artificial sources			✓	The WBC Level 1 and Level 2 SFRA indicate that the site is not at risk from other sources of flood risk.



5.0 Sequential Test

NPPF Sequential Test

- 5.1. NPPF states that Local Planning Authorities allocating land for development should apply the Sequential Test to demonstrate that there are no reasonably available sites in areas with a lower probability of flooding that would be appropriate to the type of development or land use proposed.
- 5.2. The site is shown in the 2021 SFRA River Loddon modelling to be within Flood Zone 1.
- 5.3. The Sequential and Exception Tests are therefore not required.



6.0 Flood Mitigation Strategy

Floodplain Storage and Flow Routing

- 6.1. The site is not affected by fluvial or surface water flooding and the proposed development will not impact floodplain storage and flow routes..

Residual Risk

- 6.2. The NPPF PPG – ‘Flood Risk and Coastal Change’ defined residual risk as coming from ‘flood risk management infrastructure’ and the ‘residual risk to a development once any site-specific flood mitigation measures are taken into account.’
- 6.3. Residual risk to the site includes a breach in the raised flood defences, the failure of a reservoir and a flood event greater than the designed standards.
- 6.4. The residual risk to the site is low. The EA mapping for reservoir breaches indicates that the site could be impacted by flooding in the event of a reservoir breach occurring at the same time as fluvial flooding.

Safe Access

- 6.5. The site potentially forms a ‘dry island’ within the River Loddon fluvial flood extents. The site is located within the EA River Loddon Flood Warning Area. The EA issue flood warnings when flooding is predicted. The site users should sign up to these warnings and ensure that the site is evacuated well in advance of the site becoming at risk of being cutoff.
- 6.6. The site is for a backlot to the film studios. Due to the nature of the development, site users will be readily able to evacuate the site when it is in use.



7.0 Surface Water Drainage Strategy

Introduction

- 7.1. This chapter provides an overview of the surface water drainage strategy and associated measures to drain the development.

Surface Water Strategy

- 7.2. The underlying soils are mainly clay and therefore have a poor infiltrating capacity in their natural state.
- 7.3. The proposals involve removing a layer of topsoil and replacing with a layer of gravel/ scalping. Since this is considered to be less impermeable than the existing soils, there would be no need to attenuate the surface water runoff.
- 7.4. Therefore no formal drainage strategy is required. The site will continue to drain as it currently does.



8.0 Conclusion

Flood Risk

- 8.1. The Environment Agency (EA) Flood Risk mapping has been reviewed alongside the Wokingham Borough Council (WBC) Preliminary Flood Risk Assessment (PFRA) and Level 1 and Level 2 Strategic Flood Risk Assessment (SFRA).
- 8.2. This Flood Risk Assessment (FRA) concludes that:
- The EA Flood Map for Planning shows that the site is located with Flood Zone 2. However detailed modelling completed by WBC for the 2021 SFRA confirms that the site is entirely within Flood Zone 1
 - The EA Risk of Flooding from Surface Water mapping shows that the entire site is located within an area with a 'Very Low' risk of surface water flooding.
 - The areas susceptible to groundwater flooding mapping contained within the WBC Level 1 SFRA shows that the entire site is located within a 1km² grid square of which 50% to 75% of the grid square is susceptible to groundwater flooding.
 - There are no sewers within the site boundary. The risk of sewer flooding is therefore considered to be low.
 - The EA reservoir flood mapping shows that the entire site is located within an area at risk of flooding in the event of a breach at Bearwood Lake. The risk of reservoir flooding occurring is low.
 - The site is located within the River Loddon Flood Warning Area. Site users should sign up to the flood warnings and evacuate the site ahead of flooding cutting off the site.
- 8.3. In summary the site is at a low risk of flooding from all other sources of flooding.

Sequential Test and Exception Test

- 8.4. The site is within Flood Zone 1, therefore the Sequential Test and Exception Test are not applicable.

Summary

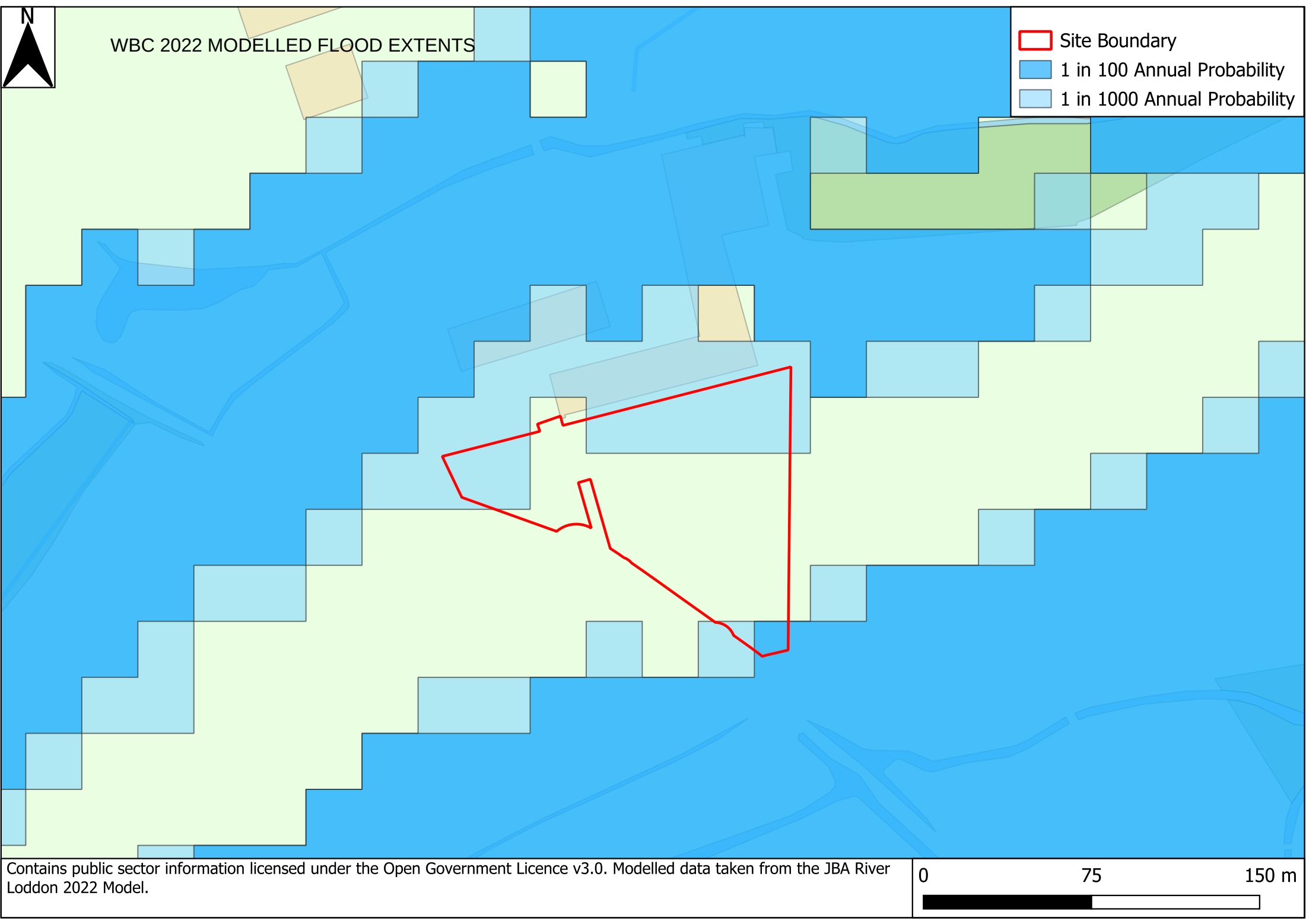
- 8.5. This FRA demonstrates that the proposed development complies with national and local planning policy with respect to flood risk and drainage. The risk of flooding is adequately managed, and the offsite flood risk is not increased.



APPENDIX 1

WBC 2022 MODELLED FLOOD EXTENTS

SFRA GROUNDWATER FLOOD RISK MAP



WBC 2022 MODELLED FLOOD EXTENTS

- Site Boundary
- 1 in 100 Annual Probability
- 1 in 1000 Annual Probability

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