

**FLOOD RISK ASSESSMENT**

**FOR**

**PROPOSED HOLIDAY LODGE DEVELOPMENT**

**AT**

**MALTON GRANGE COUNTRY PARK,  
AMOTHERBY LANE,  
AMOTHERBY, YO17 6TG**

**ON BEHALF OF**

**EDWARDSON**  

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**ASSOCIATES**

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*Report contains Environment Agency information © Environment Agency and database right Report contains material based upon records provided by British Geological Survey (NERC) Report contains images from google earth ©Google*

Document Revision Box			
Revision	Date	Description	Author
<b>01</b>	12 <sup>th</sup> Dec' '22	Draft Issue	DJC
<b>02</b>	26 <sup>th</sup> Jan' '23	Amended to Include EA Data	DJC

## **1.0 Introduction**

GGP Consult has been commissioned by Edwardson Associates to prepare a flood risk assessment for the proposed holiday lodge development at Malton Grange Country Park, Amotherby Lane, Amotherby, YO17 6TG.

The purpose of this assessment is to demonstrate compliance with local planning policy as outlined within the Ryedale District Council Strategic Flood Risk Assessment (SFRA) and the National Planning Policy Framework (NPPF).

This assessment will highlight flood risk to the site and detail appropriate measures to mitigate the risk.

## **2.0 Description of Proposed Development**

The existing site is currently entirely greenfield, with an area of approximately 0.4ha.

The site grid reference is SE 74838 74903.

Refer to Appendix I for the site location plan.

The development is located south of an established holiday park. It is proposed to develop 8 additional holiday lodges which will be operationally linked to the existing holiday park.

The Redbridge Sewer watercourse is located along the southern and eastern boundary which flows east into the River Rye.

The LLFA is North Yorkshire Council.

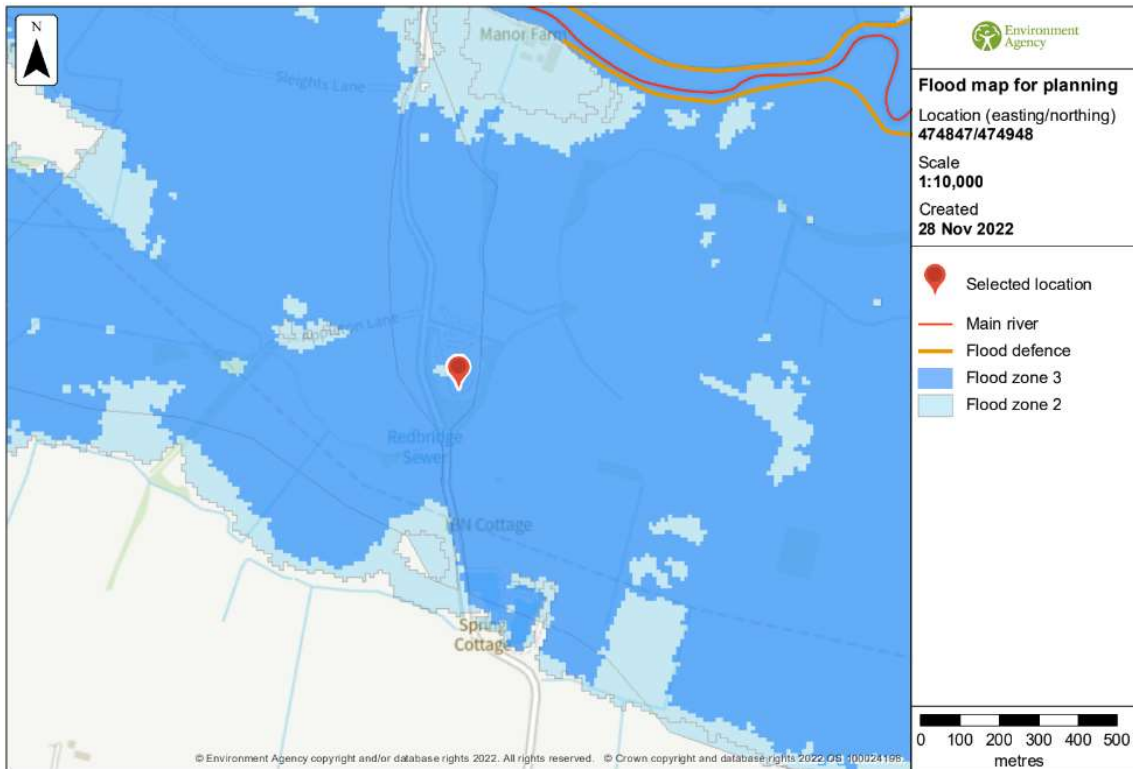
A topographical survey has been undertaken within the development, identifying an average site level of 21.65mAOD.

Refer to Appendix II for the site topographical survey.

Refer to Appendix III for the proposed site plan.

### 3.0 Flood Risk Vulnerability of the Proposed Development

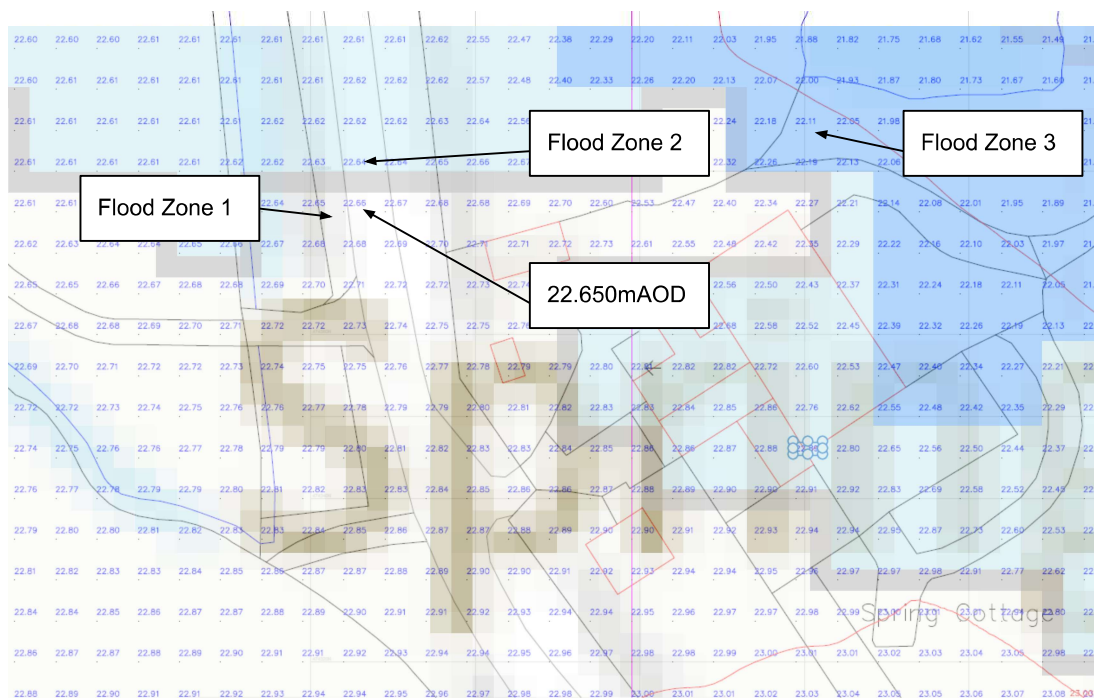
The development is located within Flood Zone 3 as shown with the below Environment Agency map.



**Environment Agency Flood Risk Map for Planning**

This means the site is at greater probability of flooding, with 1% or greater annual probability of river flooding, or over 0.5% or greater annual probability of sea flooding in any year.

Flood zone 1 is located approximately 430m to the south of the development adjacent to Brickyard Lakes Country Park. A topographical survey of Brickyard Lakes Country Park, available through the planning portal, identifies flood zone 1 starting at a level of 22.650m AOD.



In accordance with Table 2 of the National Planning Policy Framework technical guidance, the proposed development of a holiday lodge classifies as 'More Vulnerable'.

With reference to Table 3 of the technical guidance, developments with 'More Vulnerable' classifications within flood zone 3 are acceptable with an accompanying exception test.

**Table 3: Flood risk vulnerability and flood zone 'compatibility'**

Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	✗	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	✗	✗	✗

**Key:** ✓ Development is appropriate.  
✗ Development should not be permitted.

Therefore, the proposal is acceptable on the basis of an accompanying exception test.

#### 4.0 **Sequential Test**

The purpose of the sequential test is to steer development towards areas of low flood risk, this would normally require development in Flood Zone 1 where possible.

The proposal is to expand the existing holiday park and to maintain functional operation between the existing and proposed development. No undeveloped land within the holiday park is located within a lower flood zone.

Inherently, the caravans will be raised a minimum of 600mm above ground level. A further 300mm of flood resilience measures will be incorporated. With the incorporation of appropriate mitigation measures, the proposal is acceptable.

Additionally, a flood evacuation plan will be provided to detail a safe route of escape in the event of a flood.

Therefore, the development has adequately passed the sequential test on the provision of appropriate mitigation.

#### **4.1 Exception Test**

NPPF Technical Guidance states that, on provision that the sequential test is past, more vulnerable developments within flood zone 3a require an exemption test.

This exception test will detail how flood risk will be managed and show how the sustainable benefits of the development to the community outweigh the flood risk.

The proposed development will increase income for the park and ensure the financial viability of the Malton Grange Lodges throughout the future. This will also ensure that park employment is secure and provides the possibility of employment growth.

Additionally, increased tourism will provide a much needed benefit to the local economy.

The flood risk to the proposal will be mitigated, preventing flood risk to life and property. Detail of proposed mitigation is noted within section 5.0. Additionally, the development will not increase flood risk.

Therefore, the exception test is deemed satisfied.

#### **5.0 Flood Risk**

The following section will highlight flooding risk from the following areas;

1. Pluvial (Surface Water)
2. Fluvial (Rivers)
3. Historic
4. Groundwater
5. Reservoir
6. Sewer

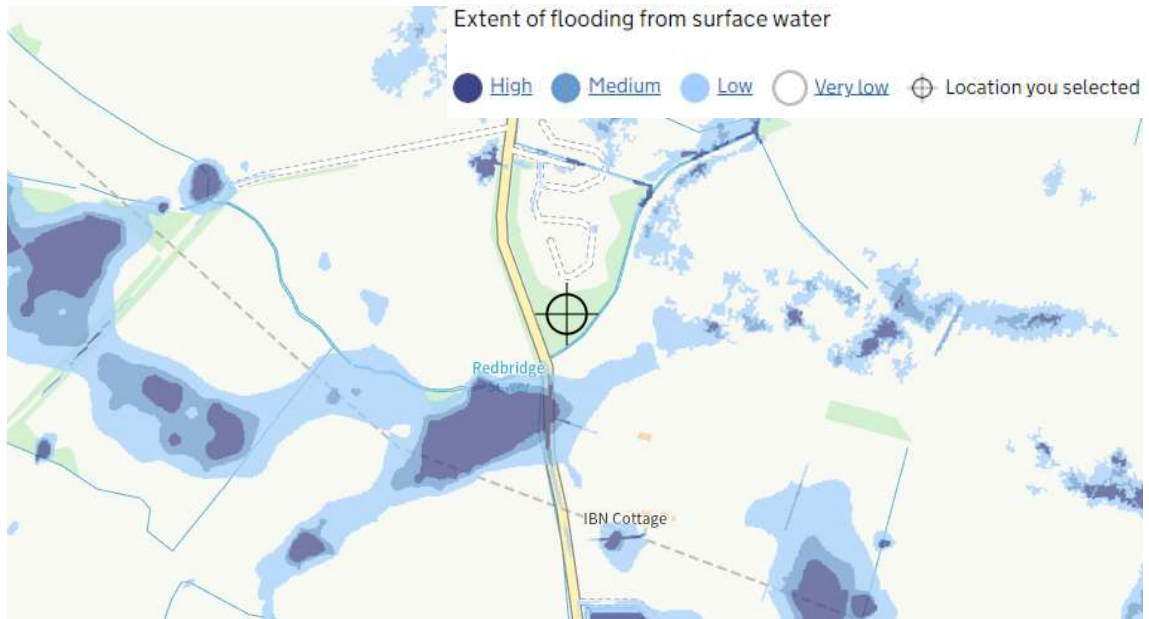
The following section will follow the structure of the headings above.

## 5.1 Pluvial Flooding

Surface water flood risk has been assessed on a national level by The Environment Agency. Maps were released in December 2013, which are some of the most comprehensive surface water flood risk maps in the world.

'The Surface Water mapping involves cutting edge technology, with flood experts using models to observe how rainwater flows and ponds. Then producing maps that take local topography, weather patterns and historical data into account.'

The extract below identifies surface water flooding risk to the site.



**Environment Agency Surface Water Flood Risk Map**

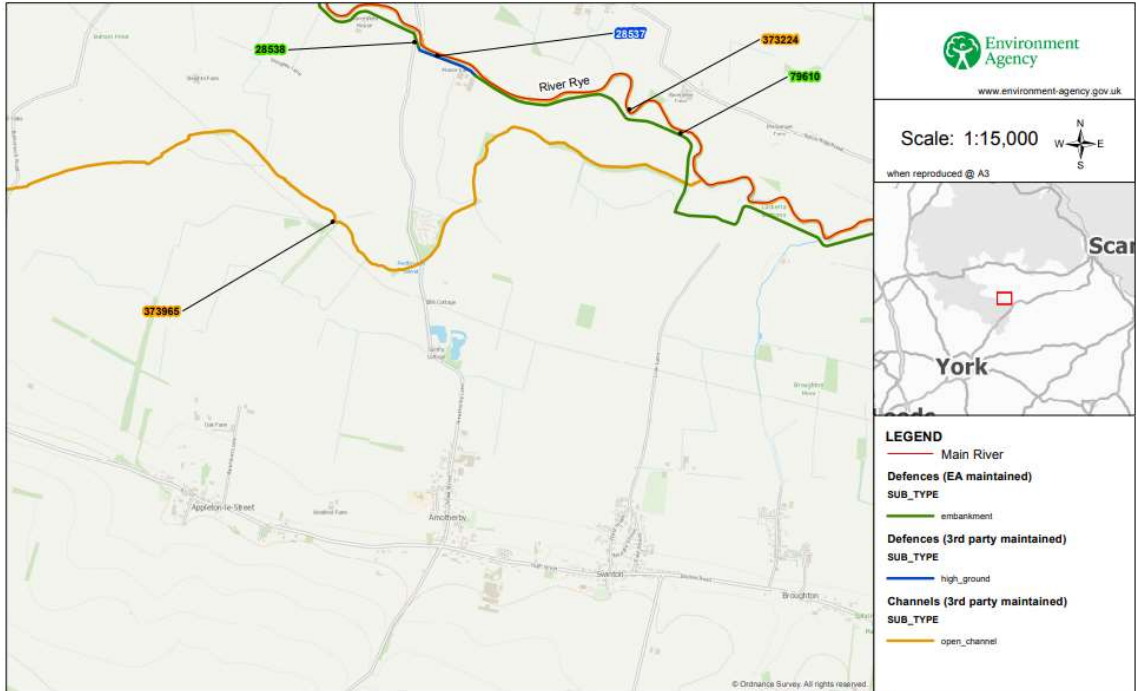
As shown above, the site is at 'very low' risk of surface water flooding. This means the site has less than a 0.1% chance of surface water flooding each year.

**Therefore, the risk posed by surface water flooding is considered negligible.**

**5.2 Fluvial Flooding**

Potential sources of fluvial flooding include the Redbridge Sewer located along the southern boundary of the development and the River Rye located approximately 0.95km to the northeast.

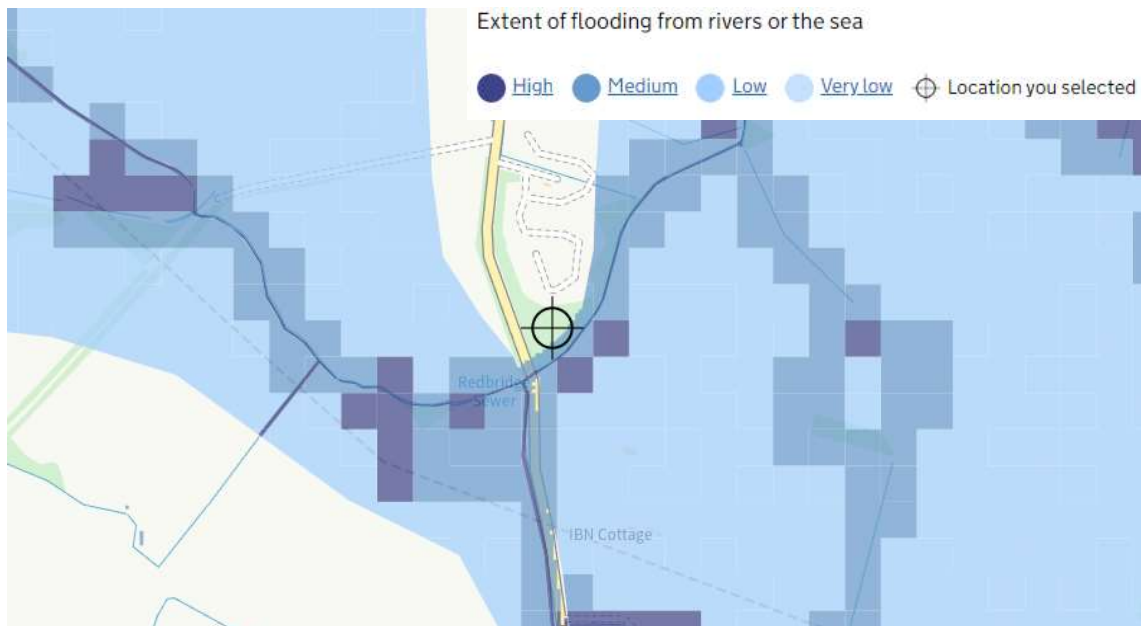
The Environment Agency asset map identifies the Redbridge Sewer and River Rye as being an open channel under 3rd party maintenance. An Environment Agency embankment is located along the south of the River Rye. An extract of the asset map is shown below.



**Environment Agency Asset Map**

The lowest crest level along the Environment Agency embankment is identified as being 23.45mAOD. Therefore, as our proposed development has an approximate level of 22.65mAOD, the development is at theoretical risk of flooding from the overtopping of the embankment.

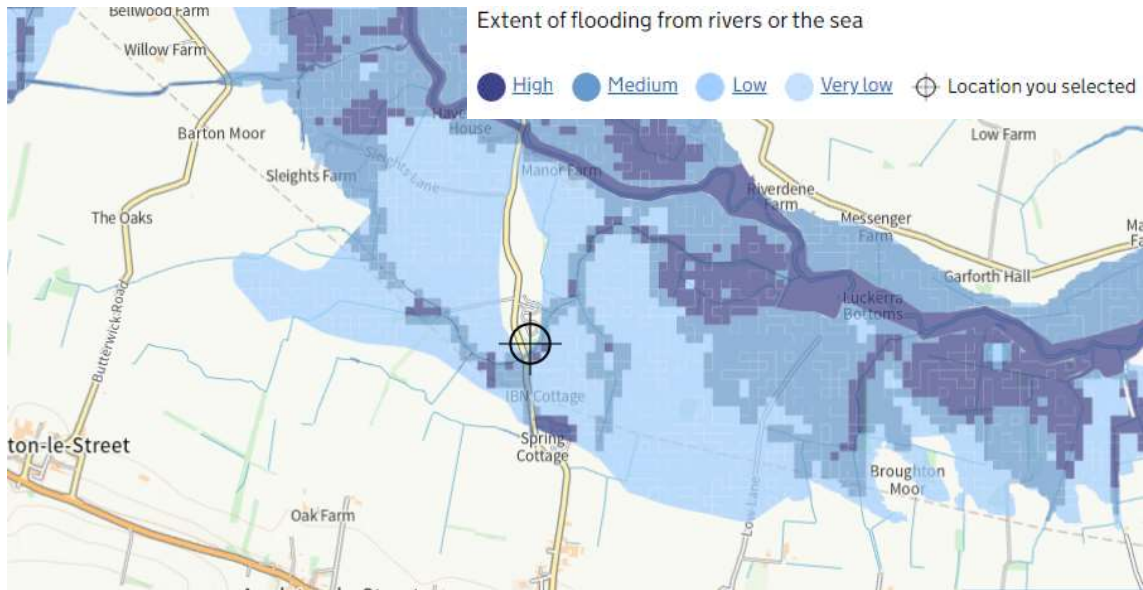
As shown within the Environment Agency river and sea flood risk map below, the proposed development is at 'very low' risk of flooding, resulting in a chance of flooding of less than 0.1% each year. This takes into account the effect of local flood defences.



**Environment Agency River & Sea Flood Risk Map**

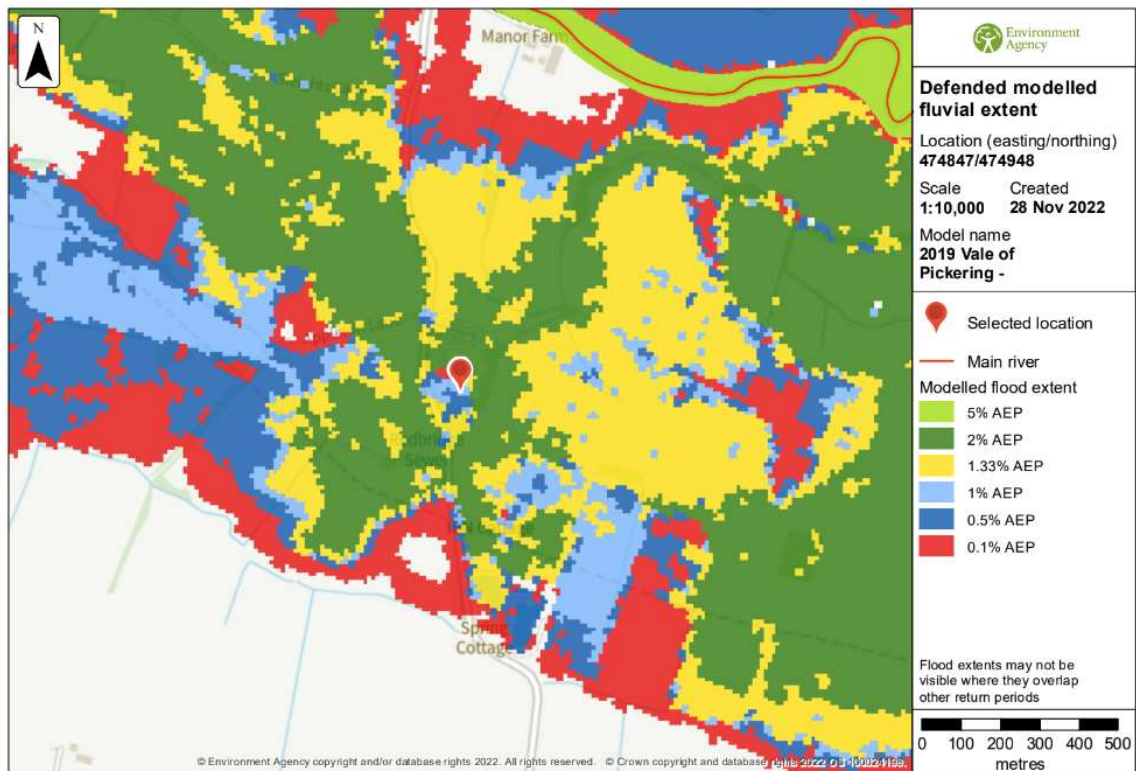


The river and sea flood risk map shows the development site and areas to the north are located within a local highspot. This is clearly shown within the below map extract.



**Environment Agency River & Sea Flood Risk Map**

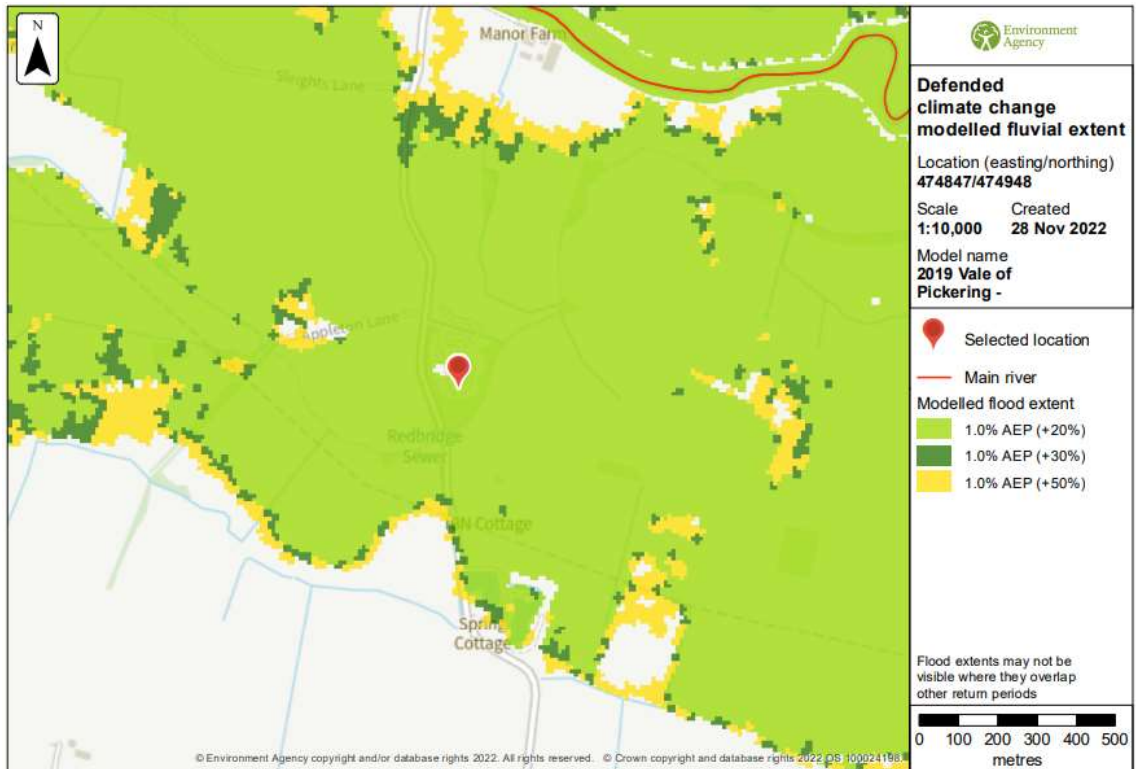
Fluvial flooding models of the River Rye have been undertaken for a variety of possible flooding events. The below Environment Agency flood risk map identifies the flooding extent of a defended fluvial model.



**Environment Agency Defended Fluvial Map**

The development is at risk of flooding in a 1:100 year flood event (annual exceedance probability of 1%).

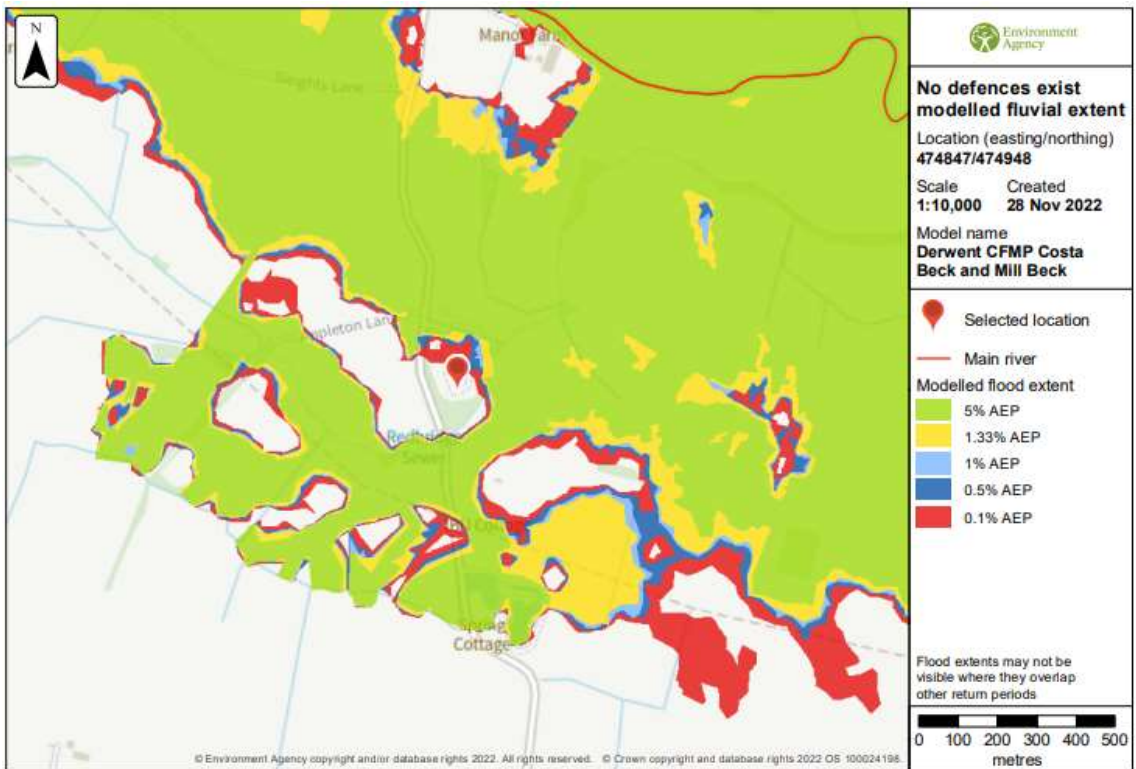
With the addition of climate change the flood model of a defended event is shown below.



**Environment Agency Defended Climate Change Fluvial Map**

The development is at risk of flooding in a 1:100 year flood event (annual exceedance probability of 1%).

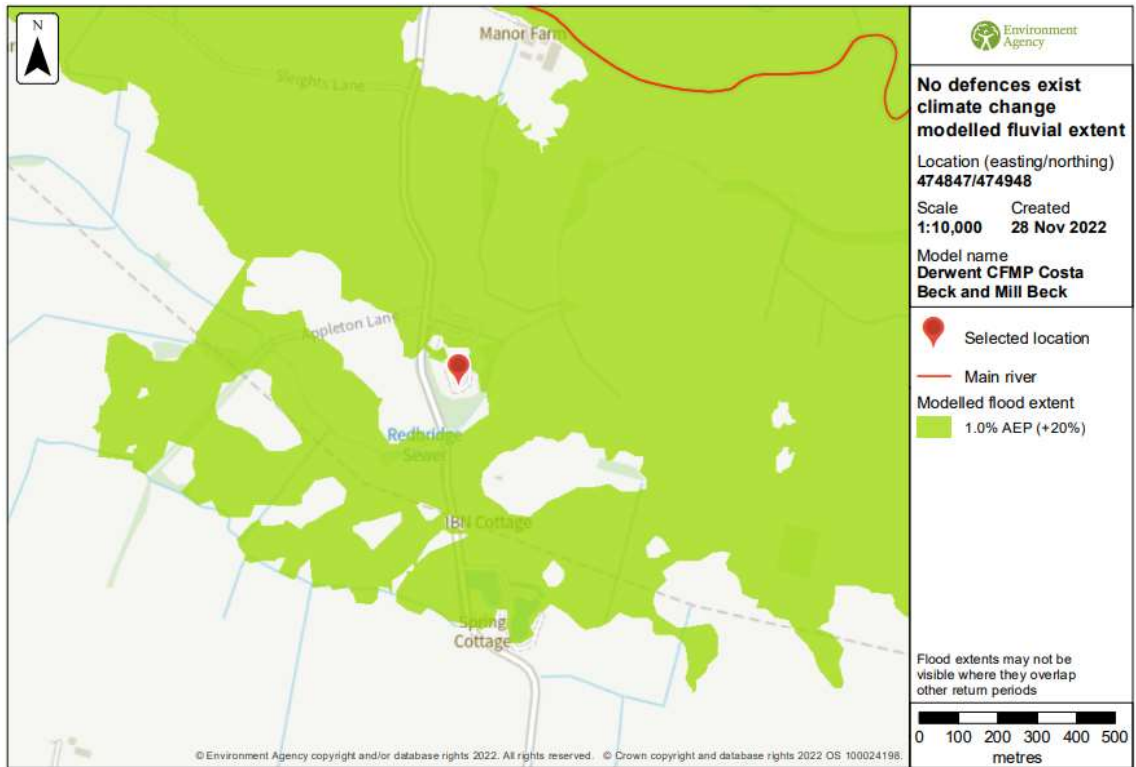
The Environment Agency flood risk model for rivers with no defences is shown below.



**Environment Agency No Defences Flood Risk Map**

As shown above, the development is not at risk of flooding from rivers with no defences.

With the addition of climate change, the development still is not at risk of flooding from a undefended event.



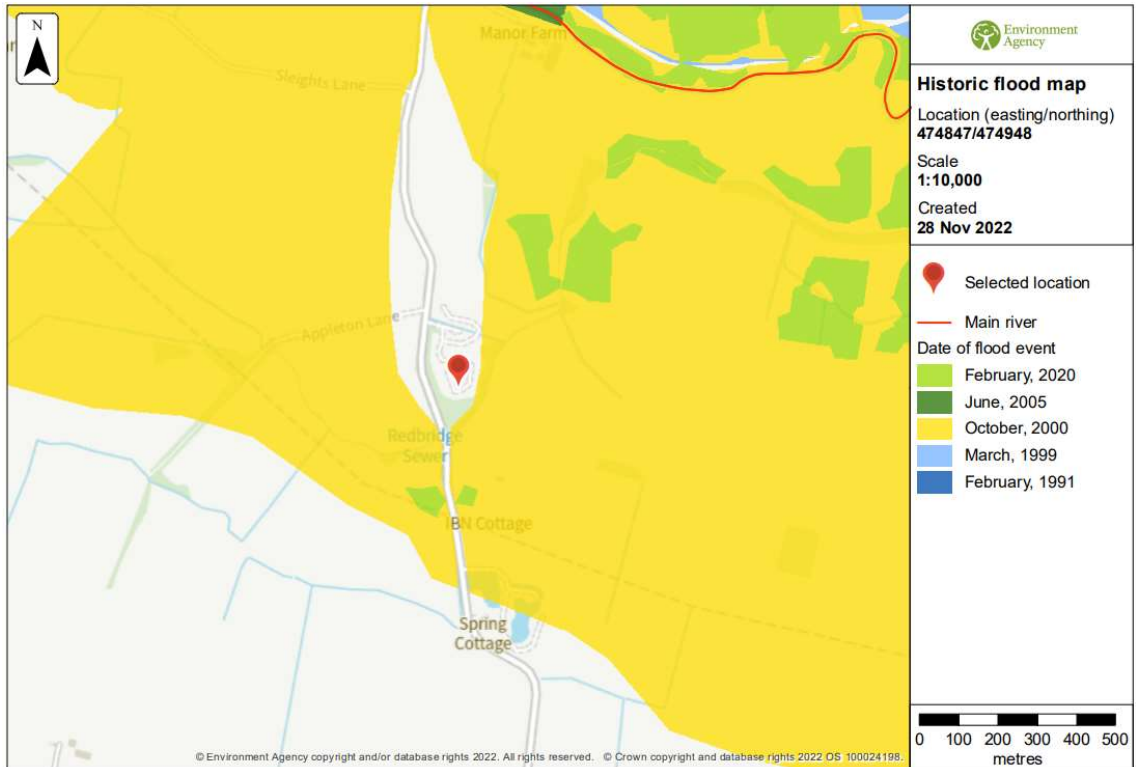
**Environment Agency No Defences Climate Change Flood Risk Map**

As shown, above the development is at risk from fluvial flooding for a 1:100 year event. As the proposed holiday lodges will be raised 600mm above ground level with the incorporation of 300mm of flood resilience measures, sufficient mitigation has been provided.

Additionally, a flood evacuation route will be provided which will direct occupants to land within flood zone 1 when flood warning are issued.

### 5.3 Historic Flooding

The Environment Agency historic flood map is shown below. As shown the development site has no previous history of flooding, even within severe storm events where defences were overtopped.



**Environment Agency Historic Flooding Map**

#### **Historic flood event data**

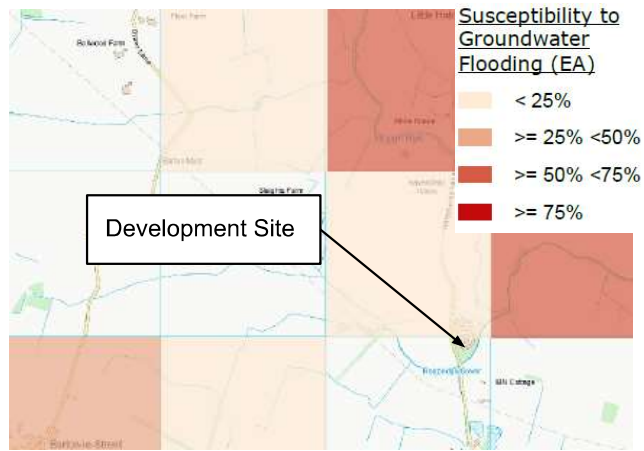
Start date	End date	Source of flood	Cause of flood	Affects location
15 February 2020	19 March 2020	main river	channel capacity exceeded (no raised defences)	No
19 June 2005	20 June 2005	main river	channel capacity exceeded (no raised defences)	No
30 October 2000	15 November 2000	unknown	overtopping of defences	No
2 March 1999	16 March 1999	unknown	overtopping of defences	No
21 February 1991	27 February 1991	unknown	overtopping of defences	No

**Environment Agency Historic Flooding Event Data**

This demonstrates that the development is at very low risk from fluvial and pluvial sources of flooding.

**5.4 Groundwater Flooding**

The Level 1 Strategic Risk Assessment details areas susceptible to groundwater flooding, an extract from this map can be found below.



**Level 1 SFRA Groundwater Flooding Susceptibility Map**

The site falls outside of all groundwater vulnerability classifications.

The groundwater levels risk mapping is shown below.

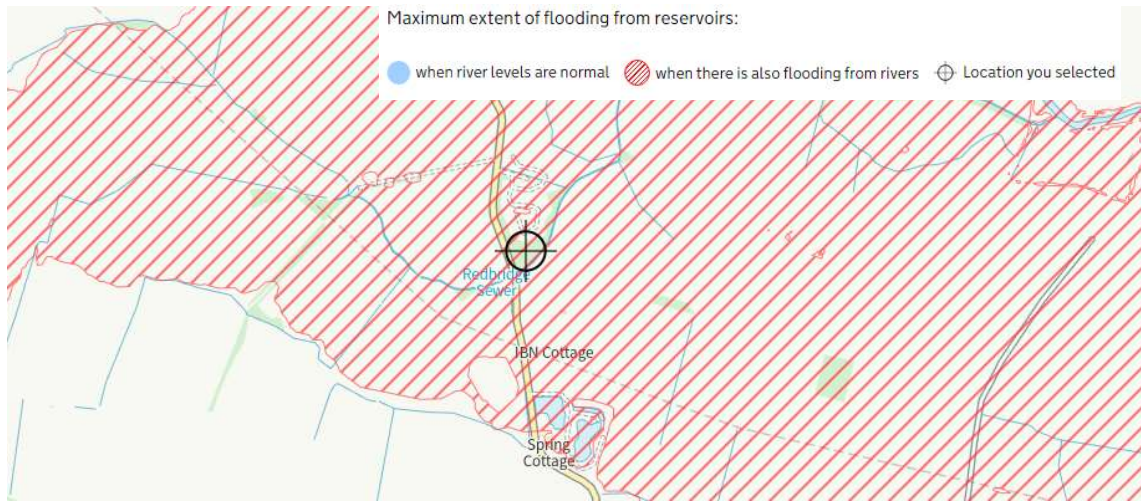


**Level 1 SFRA Groundwater Levels Risk Map**

Therefore, the risk of groundwater flooding is considered negligible.

## 5.5 **Reservoir Flooding**

The Environment Agency reservoir flood risk map identifies that the development site is at risk of flooding from a reservoir during river flooding.



**Environment Agency Reservoir Flooding Map**

As the holiday lodges will be raised a minimum of 600mm above ground level, mitigation is provided.

## 5.6 **Sewer Flooding**

No manhole chambers or other drainage features are located within the development site. For the development, it is proposed to install a positive drainage system which will be designed to attenuate and restrict flows from the site.

Therefore, the risk of sewer flooding is considered negligible.

## 6.0 Evacuation Route

This assessment demonstrates that the development is at risk of fluvial flooding from a 1:100 year event. The Environment Agency provides a flood risk warning for the development area. The occupant of the caravans should sign up to the warning system.

When a flood alert is issued, the occupants should exit the site and head south to flood zone1 , adjacent to Brickyard Lakes Country Park. This route is shown on the below plan.



Google Maps Extract of Evacuation Route

## **7.0 Summary and Recommendation**

The FRA demonstrates that the flood risk to the site from various sources is low, considering local flood defences and the elevated cabin levels.

The site is at risk of flooding from fluvial flooding in a 1:100 year event.

The sequential and exception test has demonstrated the development is acceptable and offers sustainable benefits over the potential flood risk.

The proposed holiday lodges will be raised by 600mm above ground level with the incorporation of 300mm of flood resilience, therefore, sufficient mitigation has been provided.

The proposed development will not increase flood risk to neighbouring properties.

It is recommended that the land owner sign up to the Environment Agency flood warning system;

<https://www.gov.uk/sign-up-for-flood-warnings>

In the event of a flood warning, the occupants should evaluate the development to the south into flood zone 1.

In addition the owners should prepare a site flood plan and be included within each lodge welcome pack. The template can be found below;

<https://www.gov.uk/government/publications/personal-flood-plan>

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**APPENDIX I**  
Site Location Plan

**APPENDIX II**  
Site Topographical Survey

**APPENDIX III**  
Site Layout