

# Flood Risk Assessment

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Site:

***Manor Farm, Joinery Works, Low Road, Besthorpe, NG23 7HJ***

Applicant:

***Mr & Mrs N Devos***

Prepared by:

***Mr R Cole of Origin Design Studio Ltd***

Checked by:

***Mr R Cole of Origin Design Studio Ltd***

Revision:

***A02 – July 2022***

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## **INTRODUCTION**

Origin Design Studio Ltd have been appointed by Mr & Mrs N De Vos to prepare a Flood Risk Assessment to accompany a planning application to Newark & Sherwood District Council for the conversion of the workshop buildings to a new residential dwelling.

The site is contained within a Flood Zone 2 & 3 and this is the basis upon which a Flood Risk Assessment is required. The approach to flood risk is set out in the National Planning Policy Framework (NPPF), refer to Appendix A with more local planning policy set out in the Newark & Sherwood Local Development Framework including the Core Strategy and associated Allocations and Development Management DPD, refer to Appendix B. This Flood Risk Assessment assesses the site in accordance with the policy requirements of the NPPF and the N&SDPD.

## THE SITE

The site is home to a historic two storey brick barn and range of outbuildings with a more modern single storey lean to attached to the western elevation. The site is currently used as a workshop.

The site is surrounded by residential development to the north, east and south. The western side of the site is open to the countryside with the River Fleet located approximately 80-100m to the west of the building. The site is accessed via a short private driveway located on Low Road in Besthorpe.

## FINDINGS

### RISK OF FLOODING FROM RIVERS AND SEAS

#### Flood Zone

The site is contained within a Flood Zone 2 & 3 and is at risk of flooding from an event exceeding 1% flood chance in relation to land in a Flood Zone 3 and an event exceeding 0.1% flood chance in relation to land in a Flood Zone 2.

Given the site and buildings straddle two flood zones the site will be treated on a worst-case basis and therefore the site will be treated as being contained in a Flood Zone 3 when assessing compatibility.

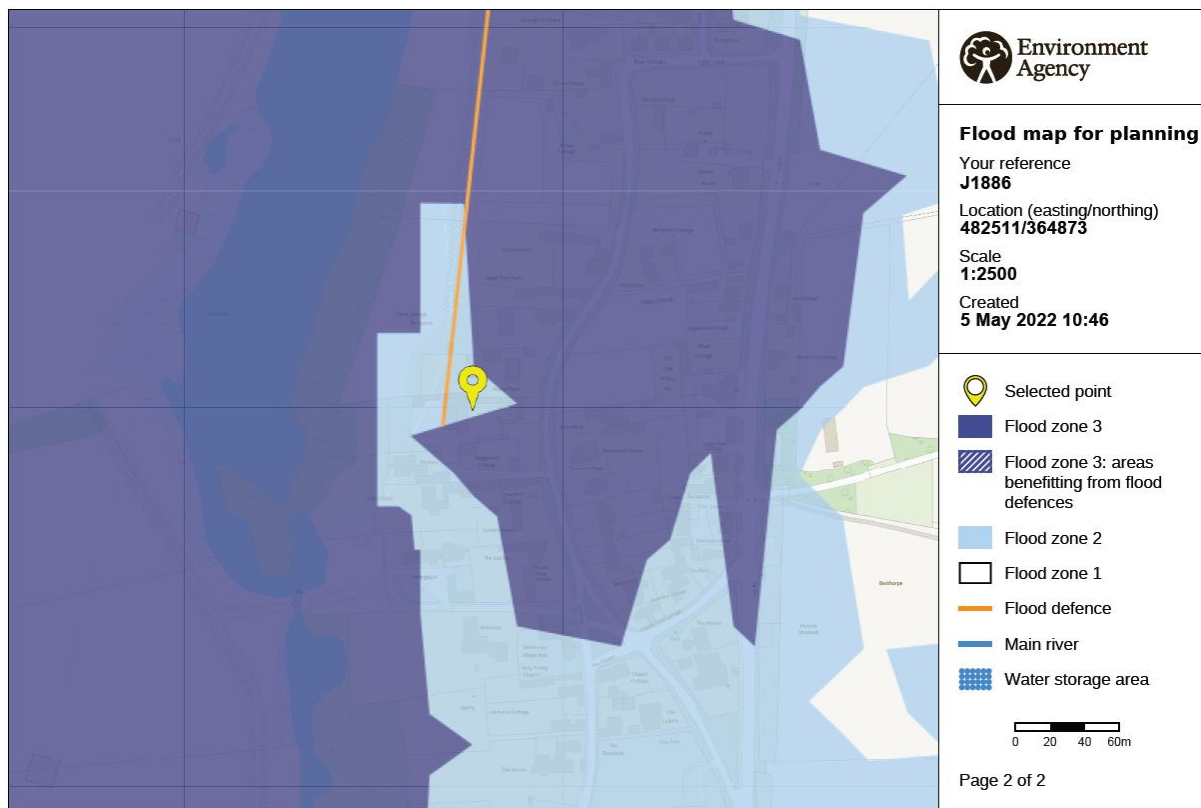


Figure 1: Flood zone map (the site is marked with a yellow marker).



## Historic Flooding

Data from the Environment Agency, refer to Appendix D, shows that the area has been impacted by historic flooding. The flooding events and their associated extents are shown in Figure 2. The last recorded event was in November 2000. It is possible that flood defences have been constructed since the historic flooding events.

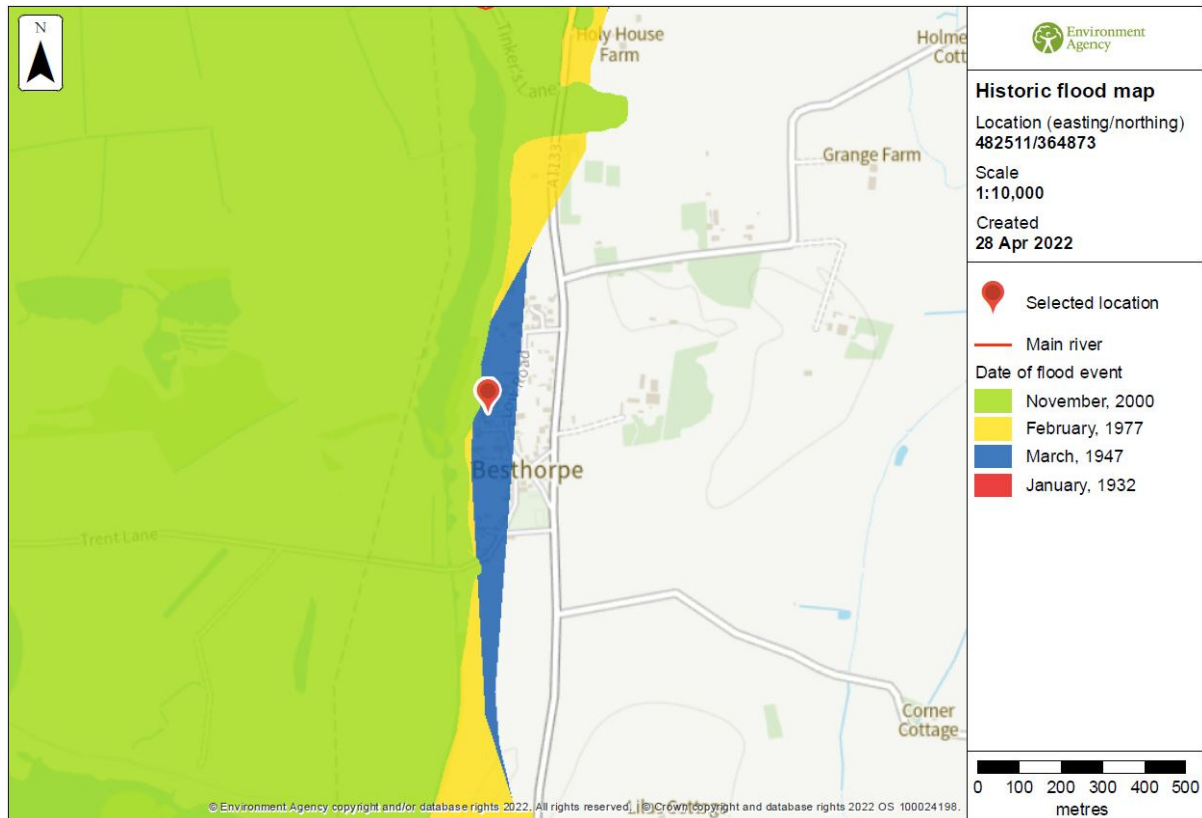


Figure 2 – Historic Flood Map

## Sequential & Exception Test

The proposed use for the building is residential and is undergoing a change of use from general industry. The proposal will result in a new dwelling on the site and the proposal would be for a two-storey dwelling. Therefore, flood risk is considered on this basis.

The residential use is classified as “more vulnerable” and the general industry use is classified as “less vulnerable” in accordance with Table 2 – Flood Risk Vulnerability Classification. Based on the change of use there is an increase in flood risk.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	X	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	X	X	X	✓*

**Key:**

✓ Development is appropriate

X Development should not be permitted.

Figure 3 – Table 3 – Flood Risk Vulnerability and Flood Zone Compatibility (www.gov.uk)

In accordance with Table 3 where a site is located in a Flood Zone 3a with a vulnerability classification of “more vulnerable” development is not considered to be compatible without the sequential or exception test being required to demonstrate the suitability of the land.

However, the application is for a Change of Use and accordingly no sequential test is required. Nonetheless there will be a requirement to ensure that the development remains safe and that a conversion should take place considering the constraints of the existing building as well as flooding matters.

**Site Levels**

A historic topographical survey was undertaken on the site in 2009, refer to Appendix C. This FRA uses this topographical survey to inform the design of the proposed conversion. An extract of the topographical survey centred around the proposed building to be converted is shown in Figure 4.

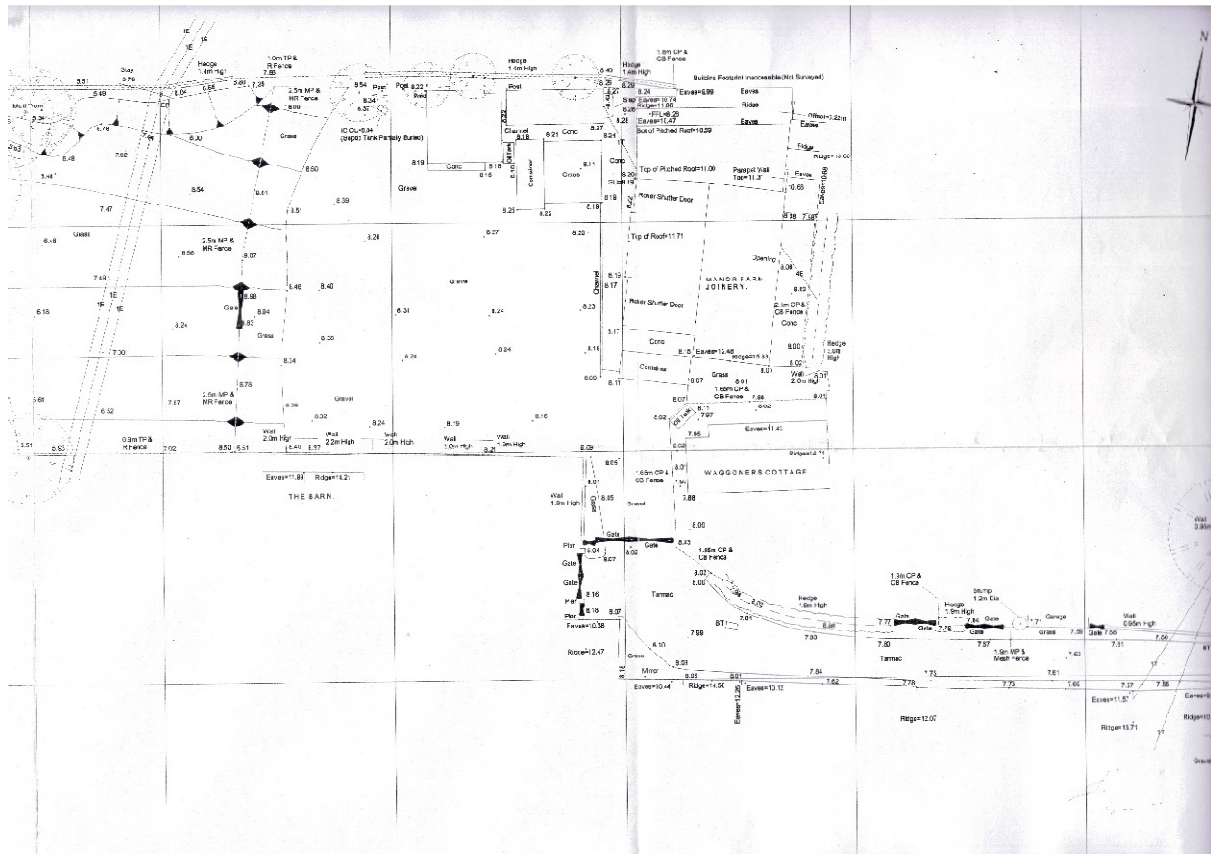


Figure 4 – Topographical Survey Extract

As can be seen from the land levels of the topographical survey the site is generally flat to the east of the existing raised earth embankment which provides flood protection for the property. To the west of the embankment the land slopes away to the Fleet The embankment crest is at +9.03m AOD. The existing ground is generally around +8.10m AOD and the existing floor of the barn/workshop is at +8.19m AOD. Based on the height of the existing building a two-storey conversion is appropriate however the constraints of the existing building would mean that a conversion would offer limited options for mitigating against flood.

### Calculating the Flood Level

Where possible all habitable floors should be above the 1 in 100-year flood level plus climate change where the accommodation is proposed to be two storeys. In the case where a single storey building is proposed habitable floors should be above the 1 in 1000-year flood level. In both cases a safe point of refuge can be established and therefore provide protection to the inhabitants of the building.

In this case it is proposed to create a two-storey dwelling. To determine the 1 in 100-year flood level the fluvial sources will be looked at to determine the worst case and therefore an appropriate floor level.

Data from the Environment Agency includes on plain flood levels from the potential fluvial sources, refer to Appendix D.

## Fluvial Flood Sources

There is a single fluvial source of flooding near to the site. This is the River Trent located approximately 1.2km to the west of the site. The site is protected by manmade raised earth embankment defences, and these are in a fair condition providing a level of protection of 1:100 year. There is a residual risk of a breach of the flood defences and a breach analysis can provide a basic assessment of potential flood depths on site.

Data from the Environment Agency includes in channel data for the River Trent, refer to Appendix D. It also contains flood mapping for modelled breaches and/or overtopping which may affect the site.

A comparison of in channel levels to on plain levels for the 1:100-year event and 1:100-year + climate change shows that in reality there is only a nominal draw down of flood water at the site compared to the in-channel level. Consequently, using the in-channel levels of the River Trent offer the best way to establish a 1:100-year flood level including climate change for the site. The nearest node to the site is TRENT\_75 and this node will be used to establish the onsite level.

Global warming is now recognised that it is likely to affect the frequency and severity of extreme events such as both tidal and fluvial flooding. The climate change allowances in the NPPF Guidance were updated on the 19th February 2016 and again on 17th December 2019. The site lies within the Anglian River Basin and allowances for climate change should be made on the following basis. For a worst-case scenario, the site shall be considered to be in a Flood Zone 3a and the use classification is 'more vulnerable' therefore Peak River flows use the central range of allowances for this flood risk assessment. However, the sensitivity of the mitigation is tested using the upper end.

The adjustments for peak flows can be seen in the table below. For simplicity, for design a 29% increase to peak flow will be used to determine the 1 in 100-year flood level plus climate change and the design will be tested for sensitivity using a 62% increase to peak flows for the 1 in 100-year event.

<b>River basin district</b>	<b>Allowance category</b>	<b>Total potential change anticipated for the '2020s' (2015 to 2039)</b>	<b>Total potential change anticipated for the '2050s' (2040 to 2069)</b>	<b>Total potential change anticipated for the '2080s' (2070 to 2115)</b>
Lower Trent & Erewash	Upper end	29%	38%	62%
	Higher central	18%	23%	39%
	Central	13%	17%	29%

Figure 5 - Table 1 peak river flow allowances by river basin district (use 1961 to 1990 baseline)

A flow discharge curve can be established using the increase in flow to calculate and establish in-channel levels of the River Trent for the climate change scenarios.

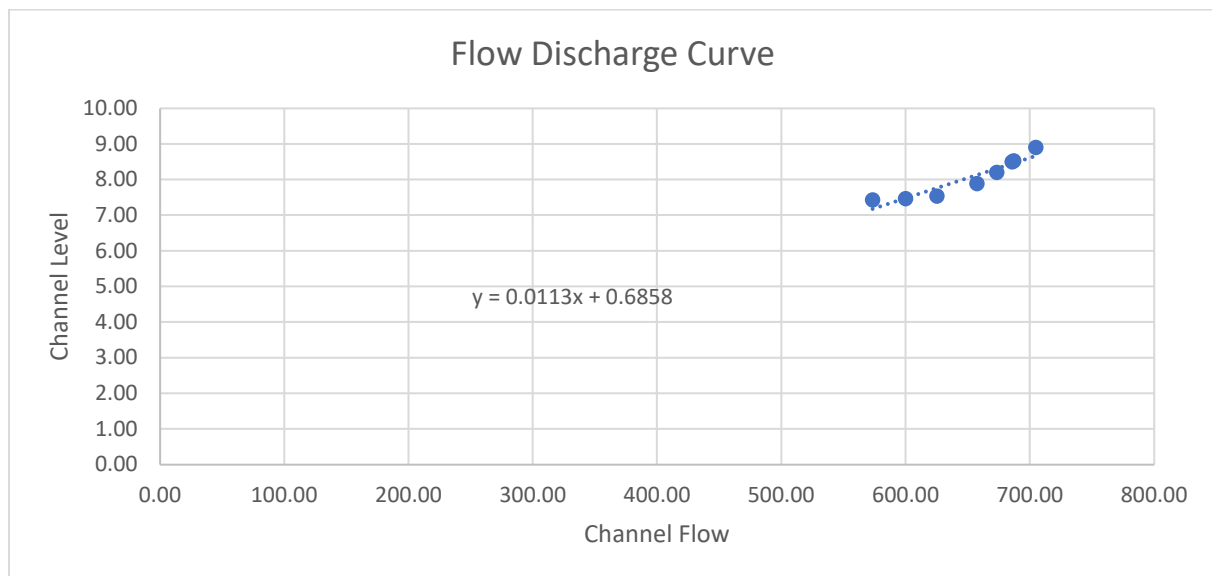


Figure 6 – Flow discharge curve

Event & Climate Change (%)	Flow (m³)	Level (m)
1% +29%CC	693.03	8.52
1% +62%CC	715.41	8.77

Figure 7 – Calculated Levels For Climate Change

The 1% +29%CC level is higher than the 1% +20%CC level and therefore will be used for calculating the 1 :100-year flood level plus climate change allowance. On the basis that for the 1:100-year flood level for the site compared to the in-channel level at node TRENT\_75 shows a nominal 10mm draw down the same allowance will be included for the 29%CC scenario. Therefore, on this basis, the 1:100-year flood level for the site including a 29% climate change allowance can be reduced from +8.52mAOD to +8.51mAOD.

No flood cell is assumed to be formed near to the site, that would result in higher flood levels, due on plain levels included within the flood data.

### Tidal Flood Sources

The site is not at risk from fluvial sources of flooding.

### Setting the floor level

Environment Agency Standing Advice requires that finished floor levels should be a minimum of whichever is higher of 300mm above the:

- average ground level of the site

- adjacent road level to the building
- estimated river or sea flood level

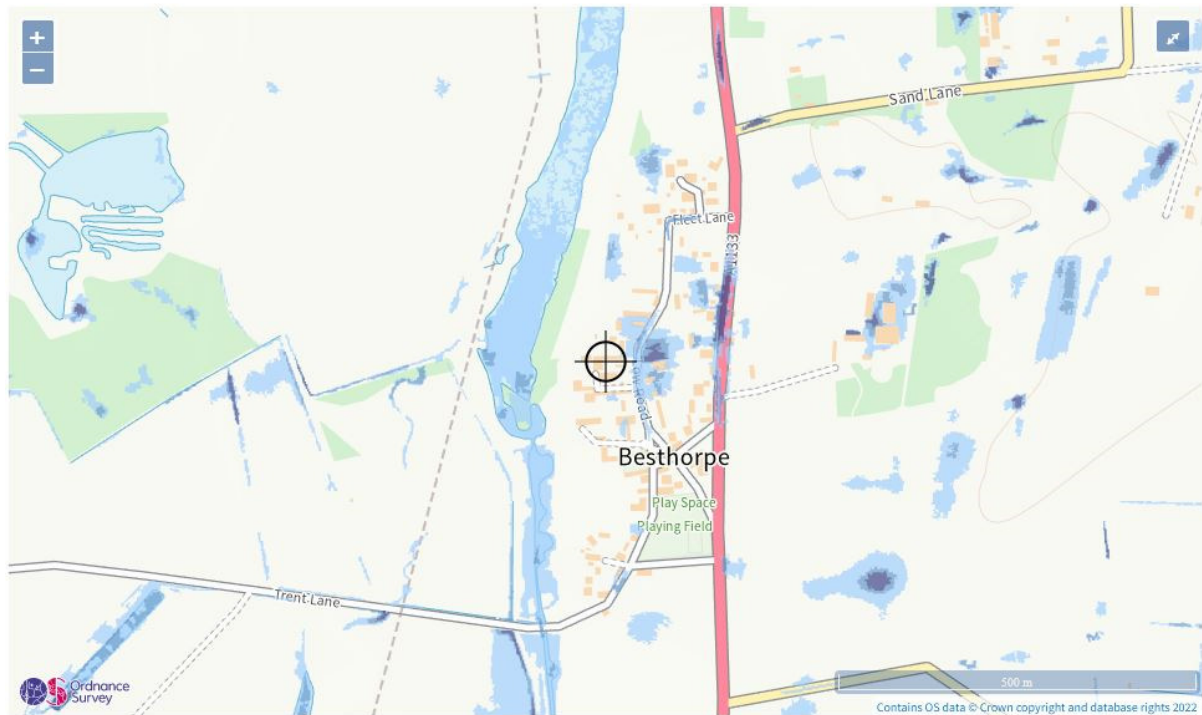
In this case the proposed development reuses an existing building. Standing Advice from the EA also requires that an FRA for a change of use provides mitigation in line with what would be required for a new development of the same type, as far as practicable.

This would result in a floor level of +8.81mAOD.



## RISK OF FLOODING FROM SURFACE WATER

The risk of flooding from surface water is very low. The following map shows the Environment Agency's Risk of Flooding from Surface Water map:



Extent of flooding from surface water

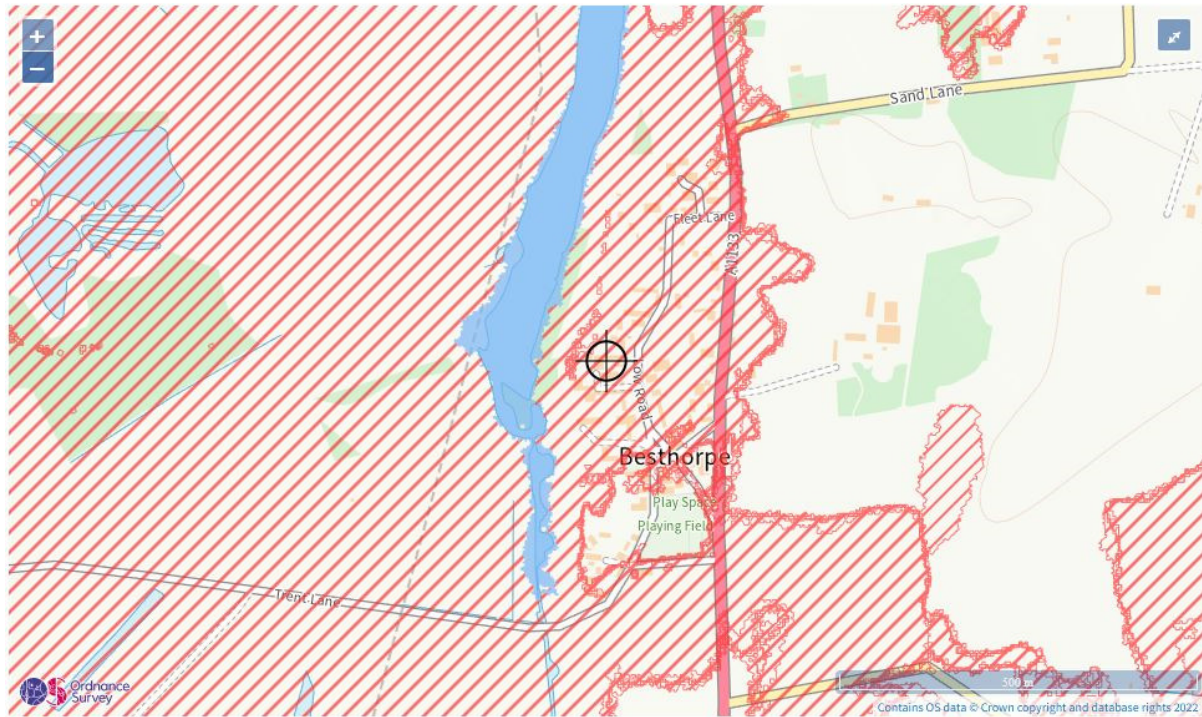
● High ● Medium ● Low ○ Very low ⊕ Location you selected

Figure 3: Surface Water Flood Map ([www.gov.uk](http://www.gov.uk))

No further action is required.

## RISK OF FLOODING FROM RESERVOIRS

The risk of flooding from reservoirs is low when river levels are normal. The following map shows this on the Environment Agency's Risk of Flooding from Reservoirs map:



Maximum extent of flooding from reservoirs:

● when river levels are normal    ■ when there is also flooding from rivers    ⊕ Location you selected

Figure 4: Reservoir Flood Map ([www.gov.uk](http://www.gov.uk))

No further action is required.

## **RISK OF FLOODING FROM SEWERS**

There are no known public surface water and foul water sewers that currently exist on the site that are known to suffer from sewer surcharging. All new infrastructures to service the building shall be appropriately designed to the relevant standards to ensure failures do not present a problem.

## **FLOOD RISK MITIGATION MEASURES**

Site floor levels should ideally be set to provide a minimum of 300mm above the anticipated flood levels in a 100-year + climate change event. This would mean a minimum floor level of +8.81m as identified above, for the proposed converted buildings on the site. It would be impractical to raise the ground floor to +8.81mAOD. This would result in the need to demolish the existing first floor due to limited headroom and similarly potential to raise the roof of the existing single storey elements. The design arrived at proposes a ground floor of +8.30mAOD.

On this basis it is suggested to provide alternative mitigation measures. This would include the use of property-level protection to prevent water entering the building envelope. In practical terms this could include a number of solutions however based on heritage matters it is considered that a solution that does not affect the external appearance of the building.

A solid concrete ground floor tied into the vertical structure. This would create a 'bathtub' arrangement where the ground floor and walls are formed from concrete and designed and constructed as a water-retaining structure. The reinforced tanking solution would extend to at least +8.81mAOD to provide suitable protection against the 1 in 100 year + climate change flood level. This will be coupled with flood-resistant doorways (with demountable defences) and service entries to prevent water entry at openings into the building. It is possible to obtain and fit high quality hardwood timber doorways to the external entrances of the building. These would be mounted in a structurally sound frame and supported by the masonry and concrete tanking in the building. These would provide flood resistance to the building in conjunction with reinforcement and waterproofing to the walls and floor of the building. Anti-backflow valves on surface water drains and foul sewers serving the building would also insist prevent water entry in time of flooding.

## CONCLUSION

The site is contained wholly within a Flood Zone 2 & 3.

The site is protected by adequate fluvial flood defences which are maintained by the Environment Agency. These currently are in good condition and provide a 1 in 150-year standard of protection. A residual risk to breaching of these defences exist.

The change of use from agricultural use to residential use falls within "more vulnerable" uses of land in Table 2 Flood Risk Vulnerability Classification and Table 3 shows that developments of this nature are appropriate in flood zone 3a subject to passing the Sequential and Exception Test. A change of use does not require a sequential test and therefore the development should be made as safe as practicably possible.

The calculated flood level 1:100-year flood level including 29% allowances for climate change is +8.51mAOD. On this basis the standing advice would require a proposed ground floor level of +8.81mAOD.

However, this is not practical, and the design of the building proposes a ground floor of +8.30mAOD with an internal concrete 'bathtub' extending to +8.81mAOD. Flood resilient construction will be extended to this height including the use of high quality timber doors with consideration to demountable defences to provide a water exclusion strategy.

At the detailed design stage of the development advice contained in "Improving the Flood Performance of New Buildings - Flood Resilient Construction" should be followed.

Further to this the property will register to Floodline to receive advance warning of potential flooding.

New foul and surface water drains will be designed to the relevant standards.

## APPENDICES

### APPENDIX A – NATIONAL PLANNING POLICY FRAMEWORK

#### PLANNING AND FLOOD RISK

155. Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.
156. Strategic policies should be informed by a strategic flood risk assessment, and should manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and take account of advice from the Environment Agency and other relevant flood risk management authorities, such as lead local flood authorities and internal drainage boards.
157. All plans should apply a sequential, risk-based approach to the location of development—taking into account the current and future impacts of climate change<sup>49</sup> Except for applications for the repowering of existing wind turbines, a proposed wind energy development involving one or more turbines should not be considered acceptable unless it is in an area identified as suitable for wind energy development in the development plan; and, following consultation, it can be demonstrated that the planning impacts identified by the affected local community have been fully addressed and the proposal has their backing so as to avoid, where possible, flood risk to people and property. They should do this, and manage any residual risk, by:
- a) applying the sequential test and then, if necessary, the exception test as set out below;
  - b) safeguarding land from development that is required, or likely to be required, for current or future flood management;
  - c) using opportunities provided by new development to reduce the causes and impacts of flooding (where appropriate through the use of natural flood management techniques); and
  - d) where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to relocate development, including housing, to more sustainable locations.
158. The aim of the sequential test is to steer new development to areas with the lowest risk of flooding. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. The strategic flood risk



assessment will provide the basis for applying this test. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding.

159. If it is not possible for development to be located in zones with a lower risk of flooding (taking into account wider sustainable development objectives), the exception test may have to be applied. The need for the exception test will depend on the potential vulnerability of the site and of the development proposed, in line with the Flood Risk Vulnerability Classification set out in national planning guidance.
160. The application of the exception test should be informed by a strategic or site-specific flood risk assessment, depending on whether it is being applied during plan production or at the application stage. For the exception test to be passed it should be demonstrated that:
  - a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; and
  - b) the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.
161. Both elements of the exception test should be satisfied for development to be allocated or permitted.
162. Where planning applications come forward on sites allocated in the development plan through the sequential test, applicants need not apply the sequential test again. However, the exception test may need to be reapplied if relevant aspects of the proposal had not been considered when the test was applied at the plan-making stage, or if more recent information about existing or potential flood risk should be taken into account.
163. 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<sup>50</sup>. Development should only be allowed in areas at risk of flooding where, in the 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;
  - 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.

164. Applications for some minor development and changes of use<sup>51</sup> should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 50.

165. 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.

## **APPENDIX B – NEWARK & SHERWOOD LOCAL DEVELOPMENT FRAMEWORK**

### **Core Strategy**

#### Core Policy 9 - Sustainable Design

The District Council will expect new development proposals to demonstrate a high standard of sustainable design that both protects and enhances the natural environment and contributes to and sustains the rich local distinctiveness of the District. Therefore all new development should:

- Achieve a high standard of sustainable design and layout that is capable of being accessible to all and of an appropriate form and scale to its context complementing the existing built and landscape environments;
- Through its design, pro-actively manage surface water including, where feasible, the use of Sustainable Drainage Systems;
- Minimise the production of waste and maximise its re-use and recycling;
- Demonstrate an effective and efficient use of land that, where appropriate, promotes the re-use of previously developed land and that optimises site potential at a level suitable to local character;
- Contribute to a compatible mix of uses, particularly in the town and village centres;
- Provide for development that proves to be resilient in the long-term. Taking into account the potential impacts of climate change and the varying needs of the community; and
- Take account of the need to reduce the opportunities for crime and the fear of crime, disorder and anti-social behaviour, and promote safe living environments.

The District Council will prepare an SPD which provides guidance to developers on the sustainable design of development and the consideration of making homes fit for purpose over their lifetime including ensuring adaptability and provision of broadband.

### **Allocations & Development Management Development Plan Document (A&DM DPD)**

#### Policy DM5

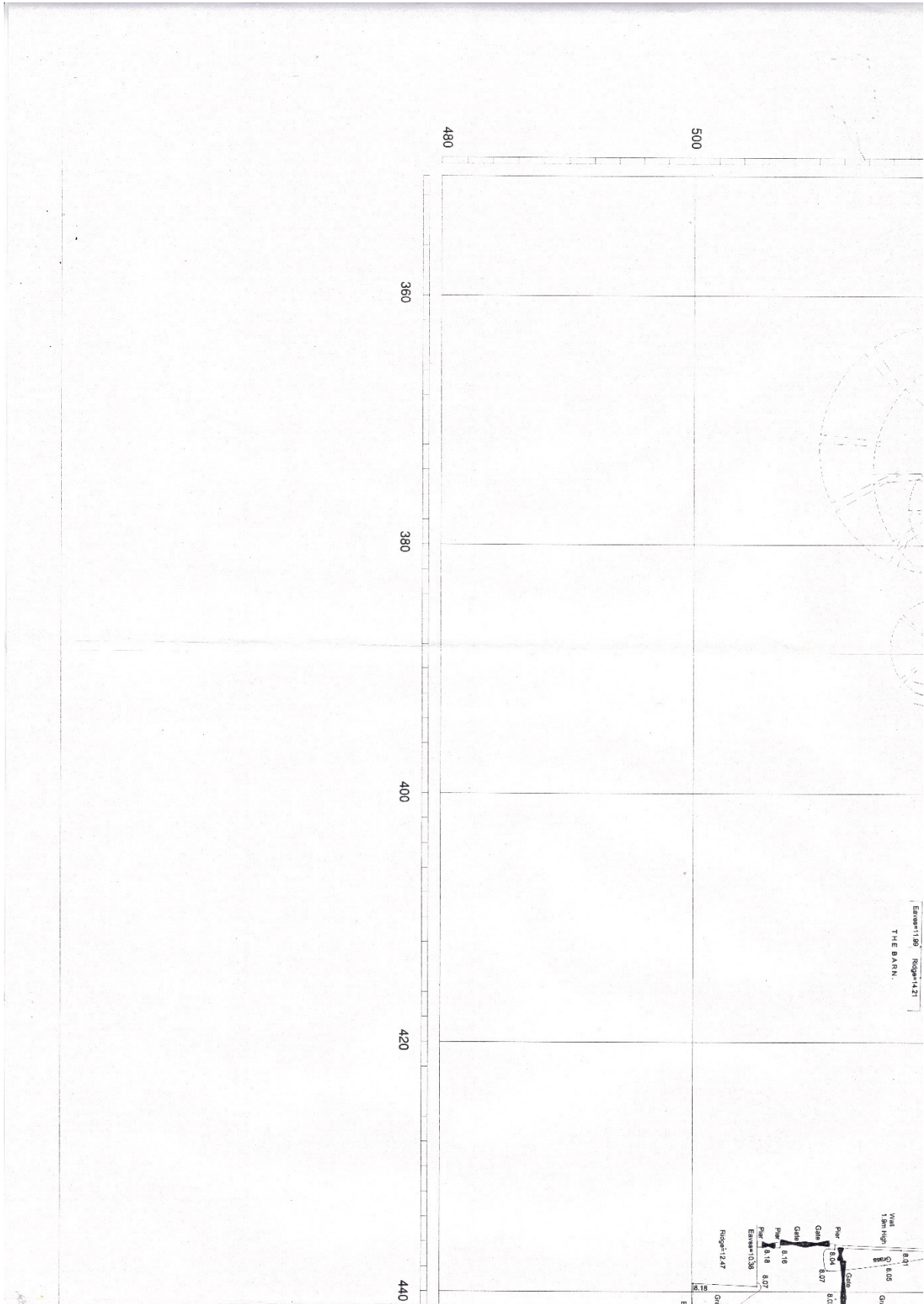
#### 9. Flood Risk and Water Management

The Council will aim to steer new development away from areas at highest risk of flooding. Development proposals within Environment Agency Flood Zones 2 and 3 and areas with critical drainage problems will only be considered where it constitutes appropriate development and it can be demonstrated, by application of the Sequential Test, that there are no reasonably available sites in lower risk Flood Zones.

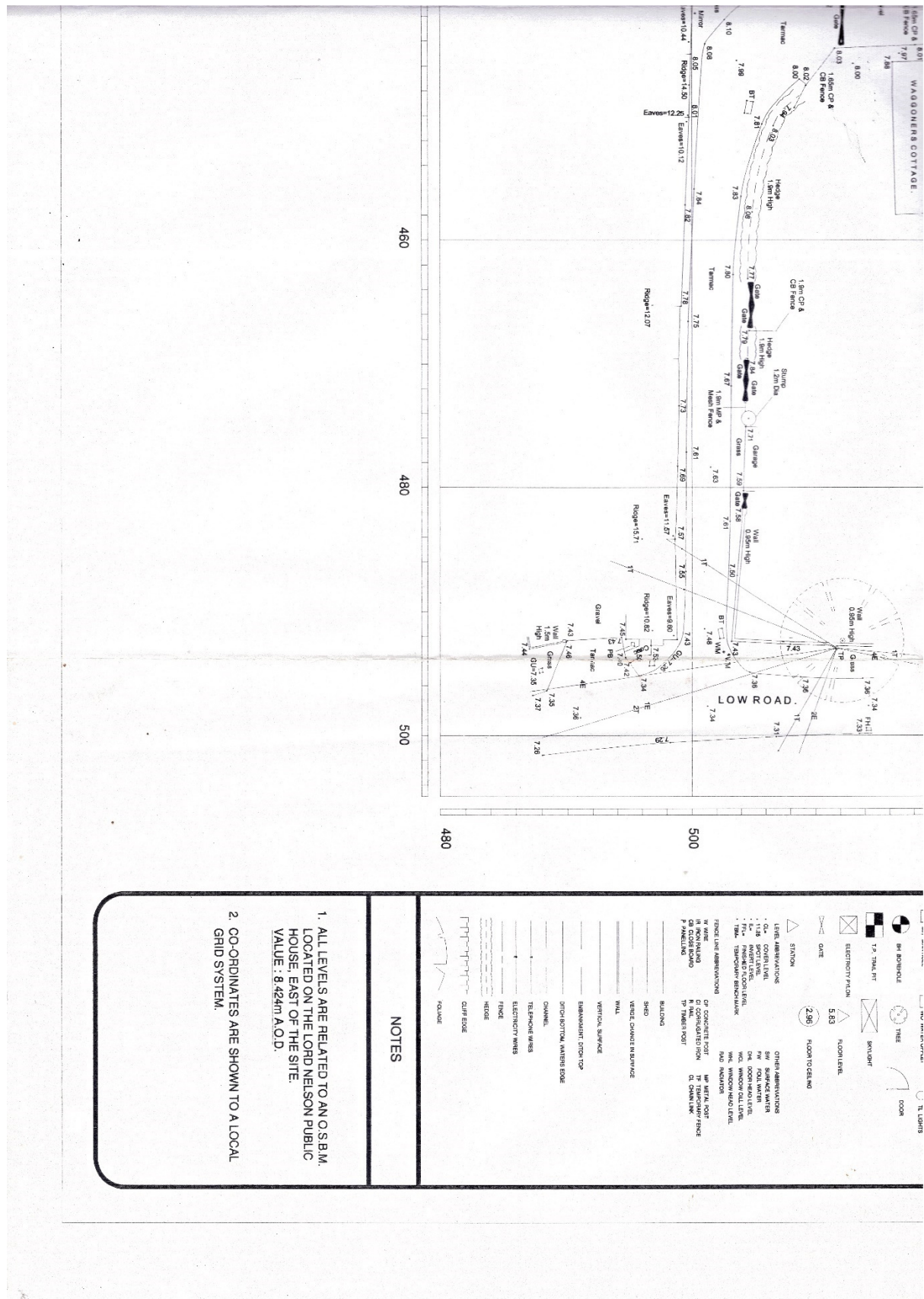
Where development is necessary within areas at risk of flooding it will also need to satisfy the Exception Test by demonstrating it would be safe for the intended users without increasing flood risk elsewhere.

In accordance with the aims of Core Policy 9, development proposals should wherever possible include measures to pro-actively manage surface water including the use of appropriate surface treatments in highway design and Sustainable Drainage Systems.

## APPENDIX C – TOPOGRAPHICAL SURVEY

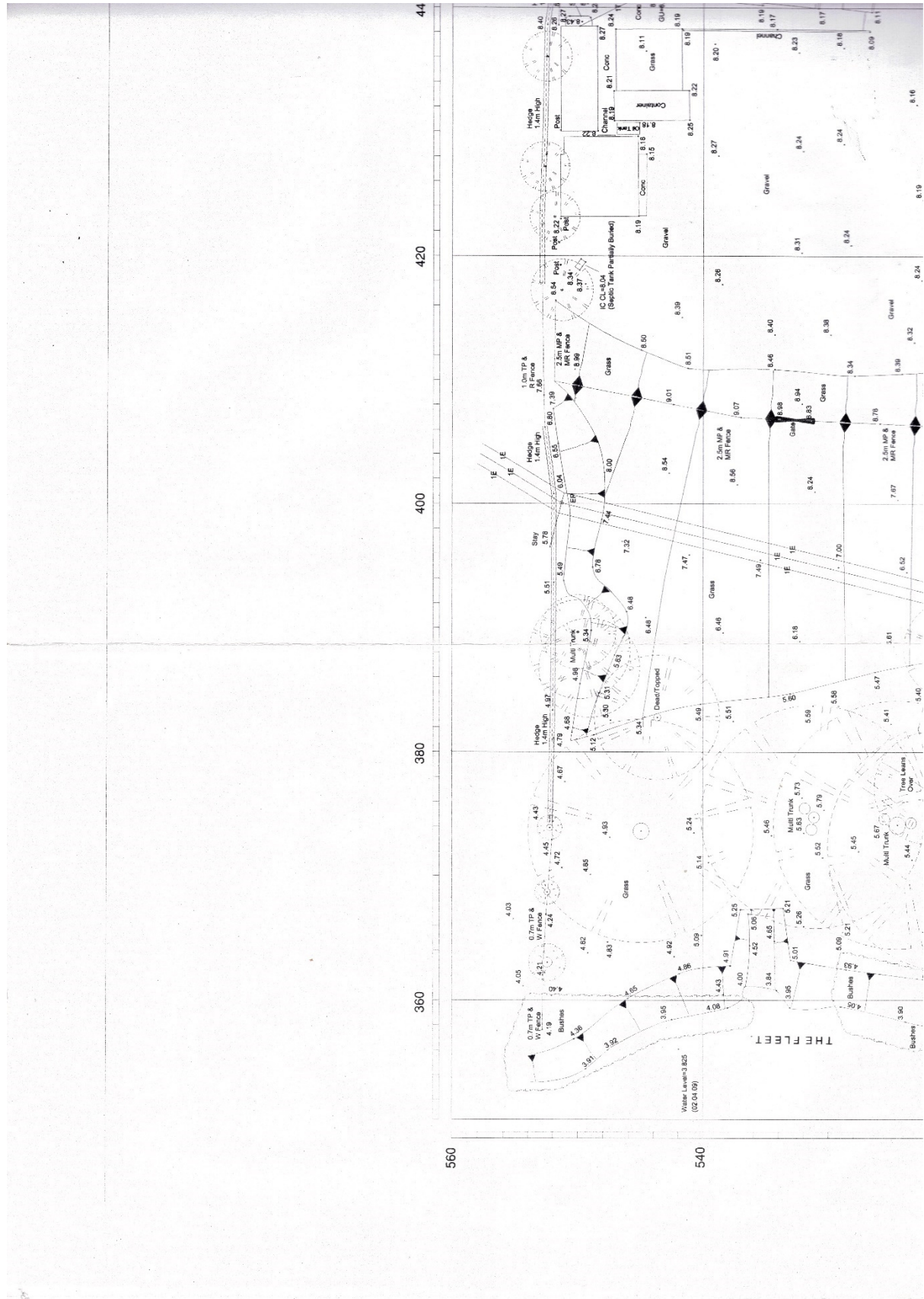












## **APPENDIX D – ENVIRONMENT AGENCY FLOOD DATA**



Robert Cole  
Via Email

**Our Ref:** EMD-260031

**Your Ref:**

**Date:** 27 May 2022

Dear Robert

**Product 4 - Low Road, Besthorpe**

Thank you for your enquiry which was received on 28 April 2022.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004. The information is attached.

**Product 4**

Detailed Flood Risk Assessment Map/data for the above site.

The Flood Map for Planning is now classed as Open Data. As such it can be downloaded free of charge under an open data licence from the following address:  
<https://data.gov.uk/publisher/environment-agency>

Please refer to [Open Government Licence](#) which explains the permitted use of this information.

**Information Warning - OS background mapping**

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**Attribution**

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Contains Ordnance Survey data © Crown copyright 2017 Ordnance Survey 100024198.

## Data Available Online

Many of our flood datasets are available online:

- Flood Map For Planning ([Flood Zone 2](#), [Flood Zone 3](#), [Flood Storage Areas](#), [Flood Defences](#), [Areas Benefiting from Defences](#), , )
- [Risk of Flooding from Rivers and Sea](#)
- [Historic Flood Map](#)
- [Current Flood Warnings](#)

Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

Yours sincerely

Ray Gallagher  
Customers & Engagement Officer  
East Midlands

For further information please contact the Customers & Engagement Team on 02084 747770

Direct e-mail:- [EMDenquiries@environment-agency.gov.uk](mailto:EMDenquiries@environment-agency.gov.uk)

ENC – FRA Advisory Text

# Flood risk assessment data



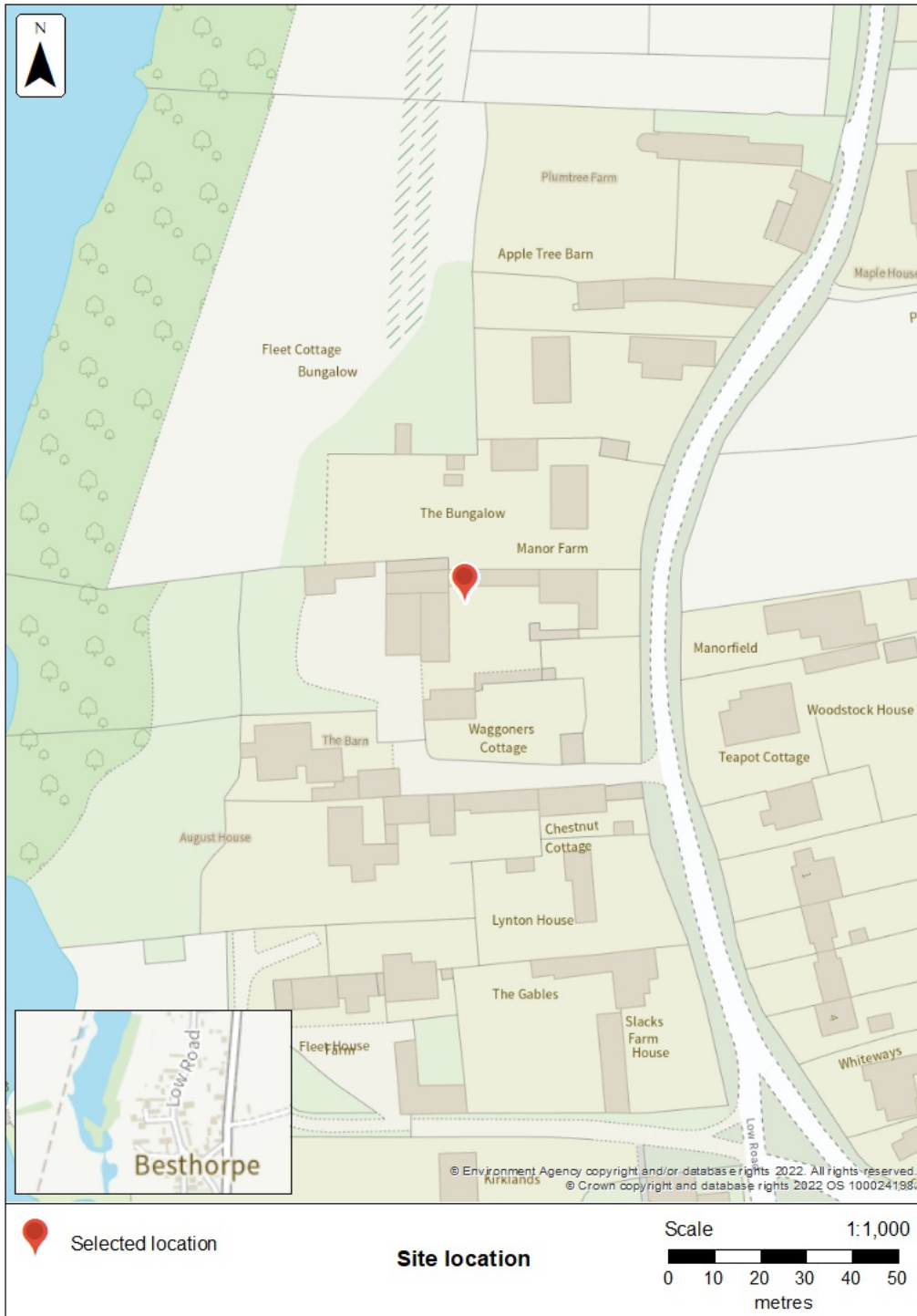
**Location of site:** 482511 / 364873 (shown as easting and northing coordinates)

**Document created on:** 28 April 2022

**This information was previously known as a product 4.**

**Customer reference number:** 7392UD6AGMUY

Map showing the location that flood risk assessment data has been requested for.



## How to use this information

You can use this information as part of a flood risk assessment for a planning application. To do this, you should include it in the appendix of your flood risk assessment.

**We recommend that you work with a flood risk consultant to get your flood risk assessment.**

## Included in this document

In this document you'll find:

- how to find information about surface water and other sources of flooding
- information on the models used
- definitions for the terminology used throughout
- flood map for planning (rivers and the sea)
- historic flooding
- flood defences and attributes
- modelled data
- information about strategic flood risk assessments
- information about this data
- information about flood risk activity permits
- help and advice



## Surface water and other sources of flooding

Use the [long term flood risk service](#) to find out about the risk of flooding from:

- surface water
- ordinary watercourses
- reservoirs

For information about sewer flooding, contact the relevant water company for the area.

## About the models used

Model name: Tidal Trent Floodzone3

Scenario(s): No defences exist fluvial

Date: 1 October 2006

This model contains the most relevant data for your area of interest.

## Terminology used

### Annual exceedance probability (AEP)

This refers to the probability of a flood event occurring in any year. The probability is expressed as a percentage. For example, a large flood which is calculated to have a 1% chance of occurring in any one year, is described as 1% AEP.

### Metres above ordnance datum (mAOD)

All flood levels are given in metres above ordnance datum which is defined as the mean sea level at Newlyn, Cornwall.

## **Flood map for planning (rivers and the sea)**

Your development is in flood zone 2 and 3.

Flood zone 3 shows the area at risk of flooding for an undefended flood event with a:

- 0.5% or greater probability of occurring in any year for flooding from the sea
- 1% or greater probability of occurring in any year for fluvial (river) flooding

Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- between a 0.1% and 0.5% probability of occurring in any year for flooding from the sea
- between a 0.1% and 1% probability of occurring in any year for fluvial (river) flooding

It's important to remember that the flood zones on this map:

- refer to the land at risk of flooding and do not refer to individual properties
- refer to the probability of river and sea flooding, ignoring the presence of defences
- do not take into account potential impacts of climate change

This data is updated on a quarterly basis as better data becomes available.








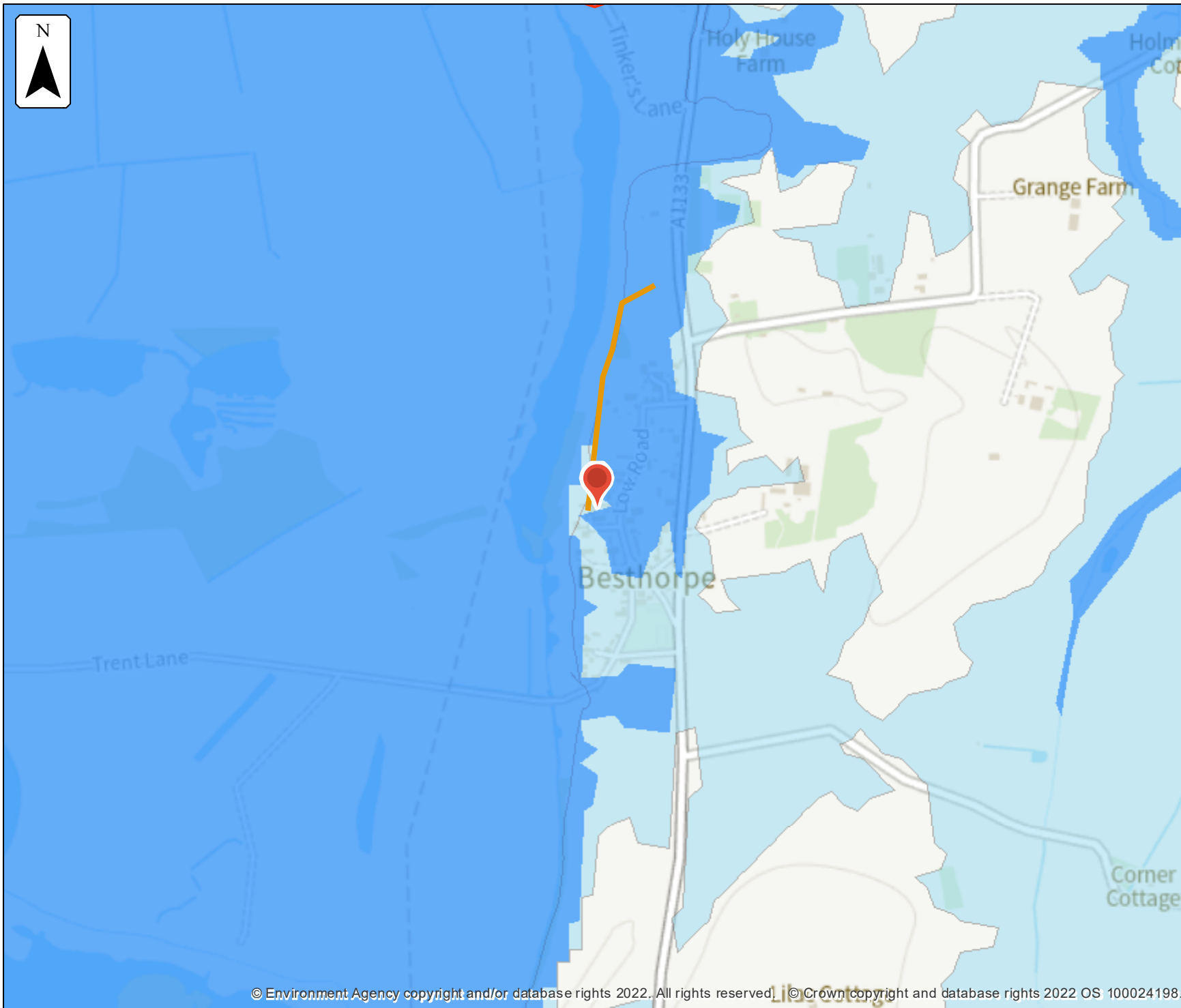
### Flood map for planning

Location (easting/northing)  
**482511/364873**

Scale  
**1:10,000**

Created  
**28 Apr 2022**

-  Selected location
-  Main river
-  Flood defence
-  Flood zone 3
-  Flood zone 2



## Historic flooding

This map is an indicative outline of areas that have previously flooded. Remember that:

- our records are incomplete, so the information here is based on the best available data
- it is possible not all properties within this area will have flooded
- other flooding may have occurred that we do not have records for
- flooding can come from a range of different sources - we can only supply flood risk data relating to flooding from rivers or the sea

You can also contact your Lead Local Flood Authority or Internal Drainage Board to see if they have other relevant local flood information. Please note that some areas do not have an Internal Drainage Board.

[Download recorded flood outlines in GIS format](#)



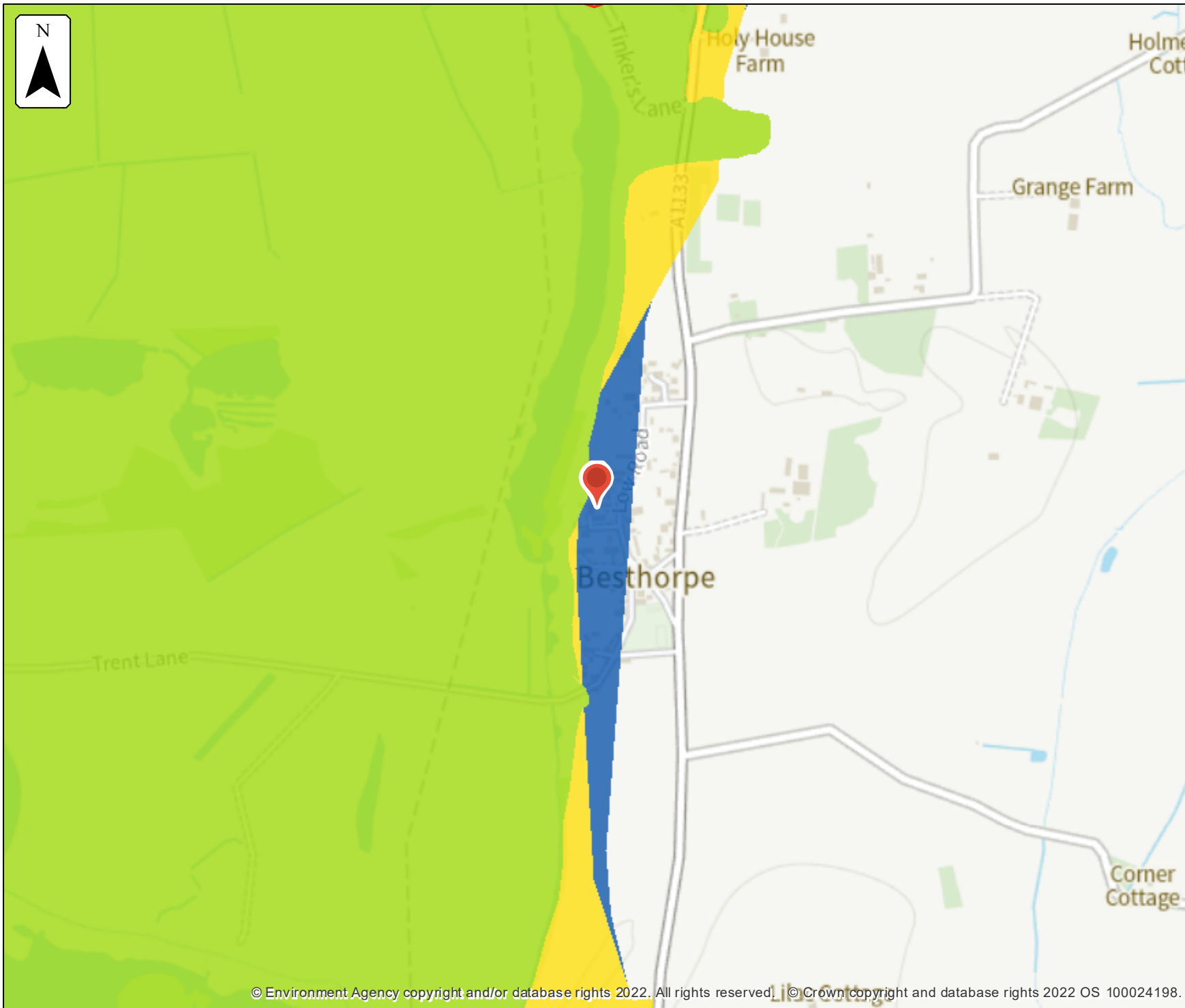
### Historic flood map

Location (easting/northing)  
**482511/364873**

Scale  
**1:10,000**

Created  
**28 Apr 2022**

- Selected location
- Main river
- Date of flood event
  - November, 2000
  - February, 1977
  - March, 1947
  - January, 1932



## Historic flood event data

Start date	End date	Source of flood	Cause of flood	Affects location
12 November 2000	12 November 2000	main river	channel capacity exceeded (no raised defences)	No
8 November 2000	8 November 2000	main river	channel capacity exceeded (no raised defences)	No
26 February 1977	26 February 1977	main river	channel capacity exceeded (no raised defences)	No
1 February 1977	1 February 1977	main river	channel capacity exceeded (no raised defences)	No
March 1947	March 1947	main river	channel capacity exceeded (no raised defences)	Yes
1 January 1932	1 January 1932	main river	channel capacity exceeded (no raised defences)	Yes



## **Flood defences and attributes**

The flood defences map shows the location of the flood defences present.

The flood defences data table shows the type of defences, their condition and the standard of protection. It shows the height above sea level of the top of the flood defence (crest level). The height is in mAOD which is the metres above the mean sea level at Newlyn, Cornwall.

It's important to remember that flood defence data may not be updated on a regular basis. The information here is based on the best available data.





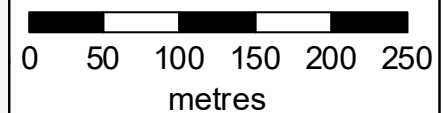
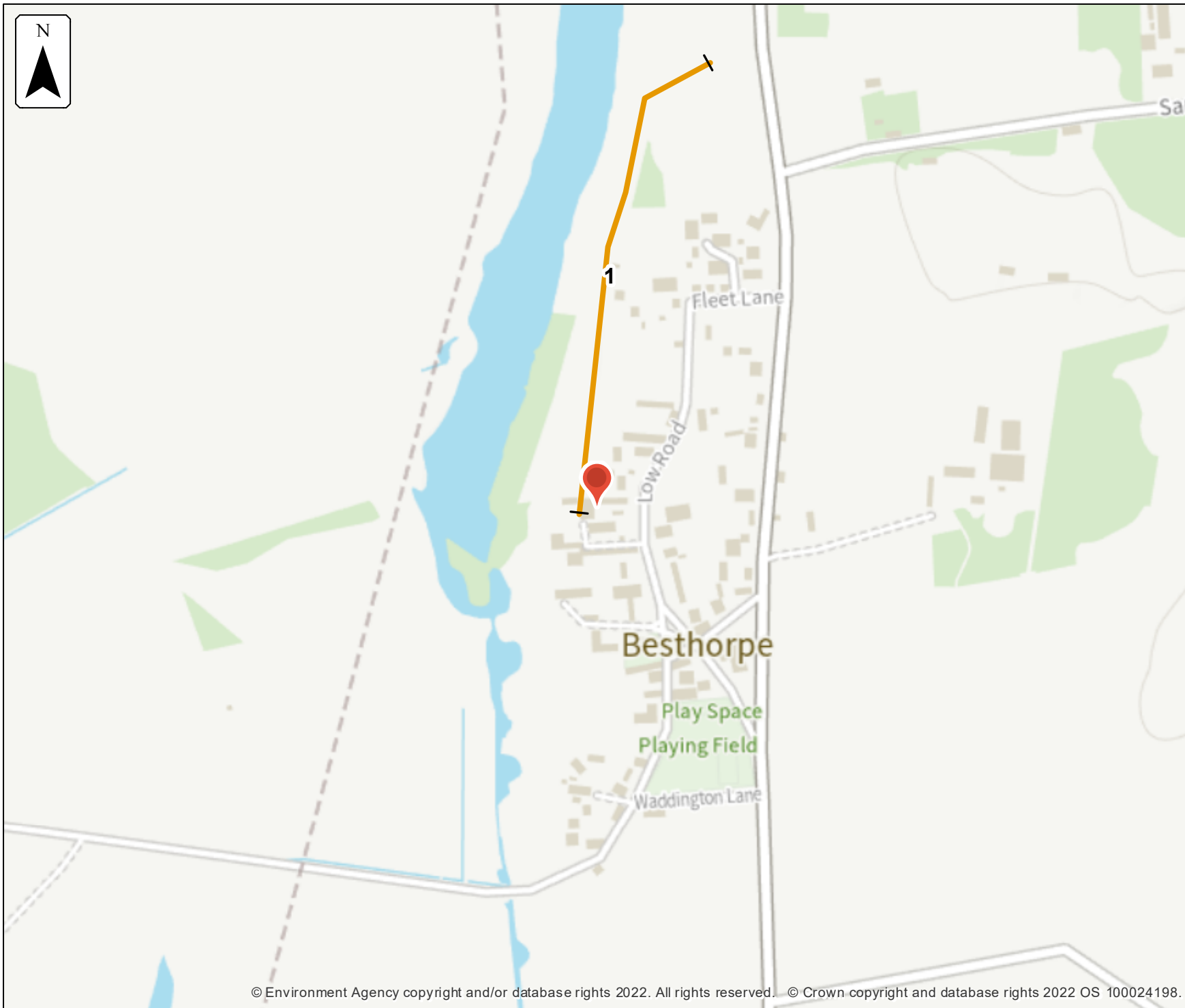
### Flood defences

Location (easting/northing)  
**482511/364873**

Scale  
**1:5,000**

Created  
**28 Apr 2022**

-  Selected location
-  Flood defence



## Flood defences data

Label	Asset ID	Asset Type	Standard of protection (years)	Current condition	Downstream actual crest level (mAOD)	Upstream actual crest level (mAOD)	Effective crest level (mAOD)
1	106928	Embankment	100	Fair	8.80	8.80	

Any blank cells show where a particular value has not been recorded for an asset.

## **Modelled data**

This section provides details of different scenarios we have modelled and includes the following (where available):

- outline maps showing the area at risk from flooding in different modelled scenarios

## **Modelled scenarios**

The following scenarios are included:

- No defences exist modelled fluvial: risk of flooding from rivers where there are no flood defences



### No defences exist modelled fluvial extent

Location (easting/northing)  
**482511/364873**

Scale          Created  
**1:10,000      28 Apr 2022**

Model name  
**Tidal Trent  
Floodzone3**

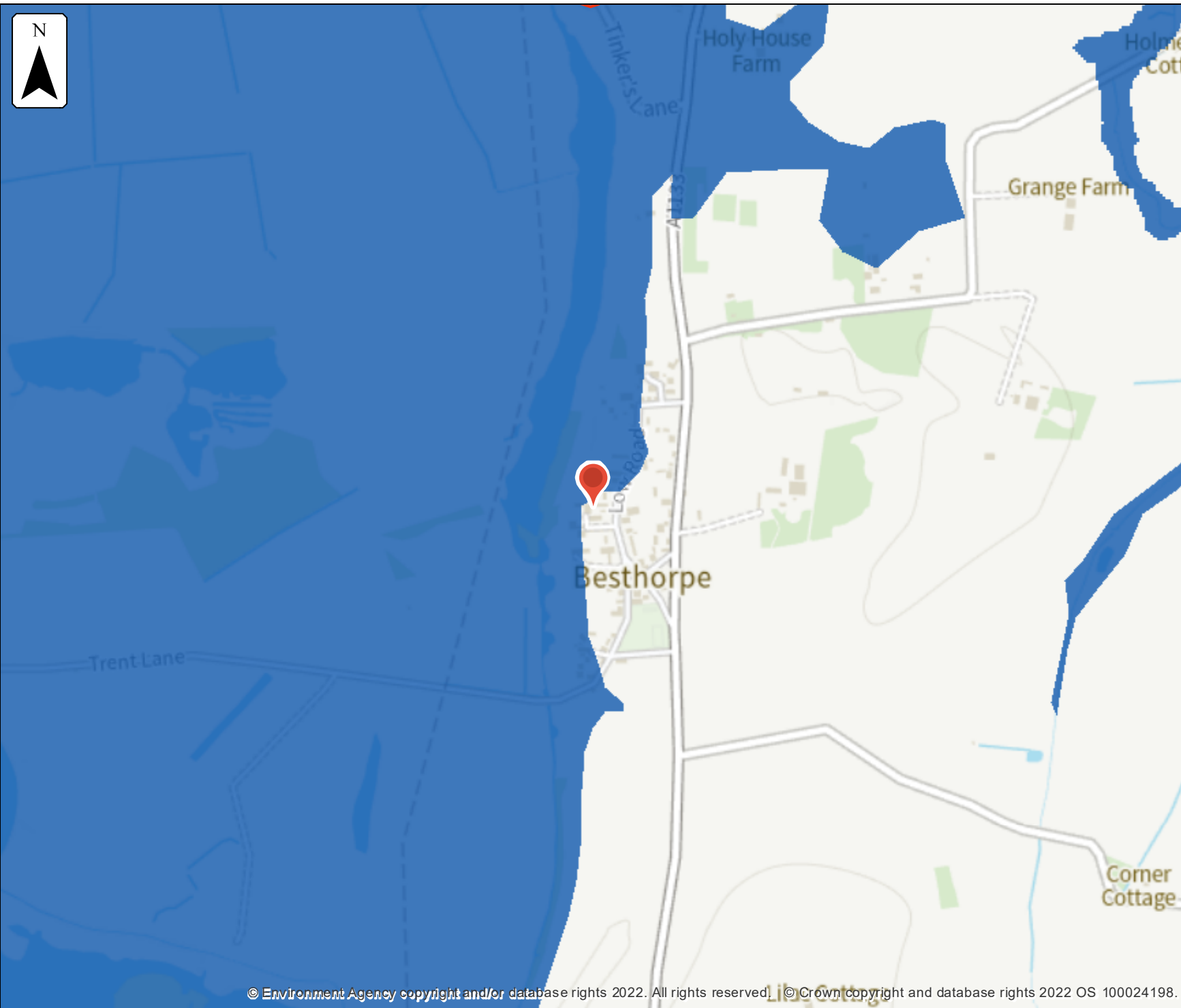
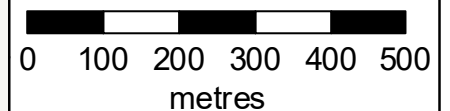
Selected location

Main river

Modelled flood extent

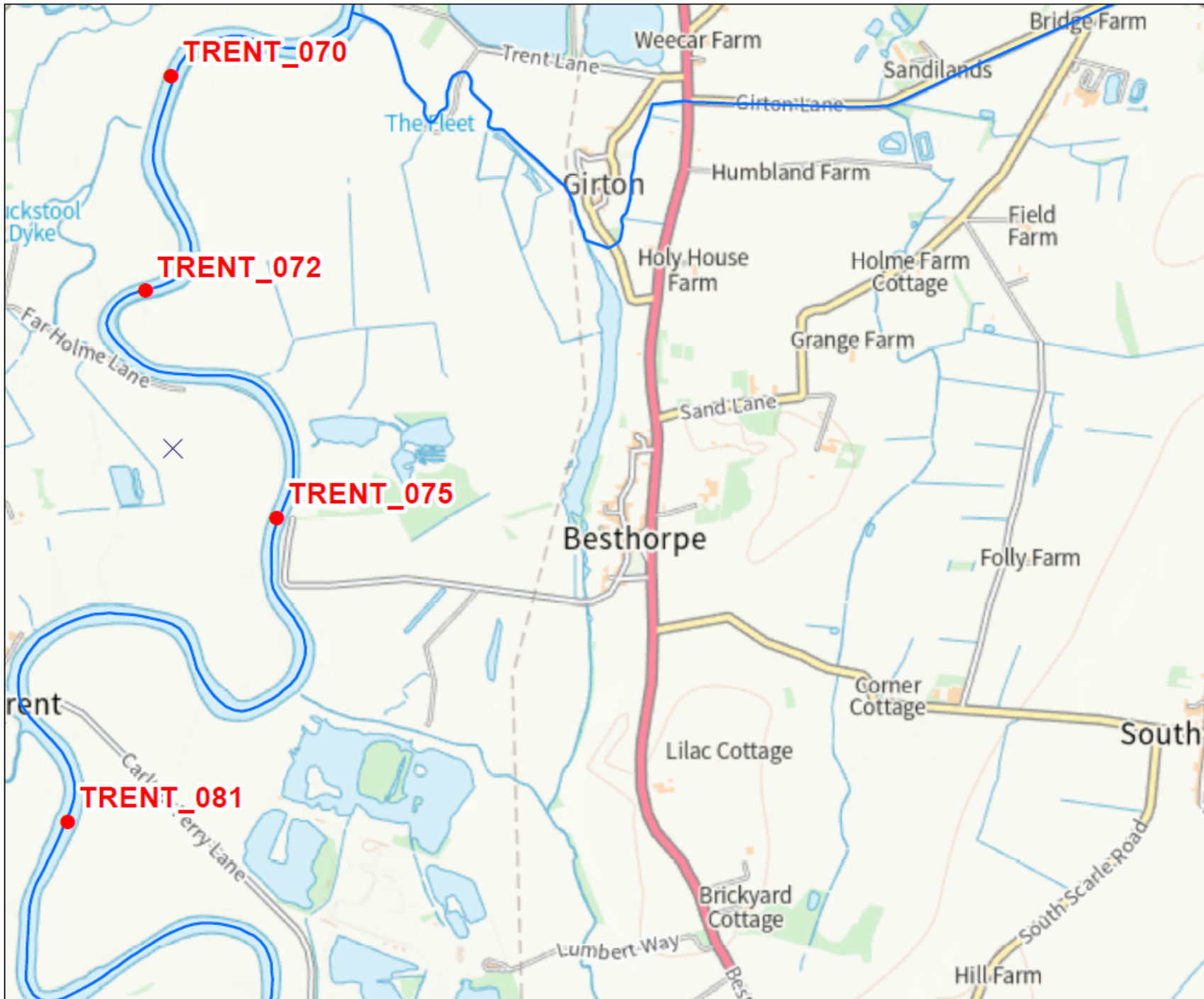
0.5% AEP

Flood extents may not be visible where they overlap other return periods



# Modelled Nodes Map centred on Low Road, Besthorpe

Ref: [EMD260031]



Scale 1:20,000  
Date created: 19 May 2022

**Legend**

- Modelled Nodes
- Main Rivers

Source:  
Tidal Trent SFRM,  
Mott Macdonald, 2014.

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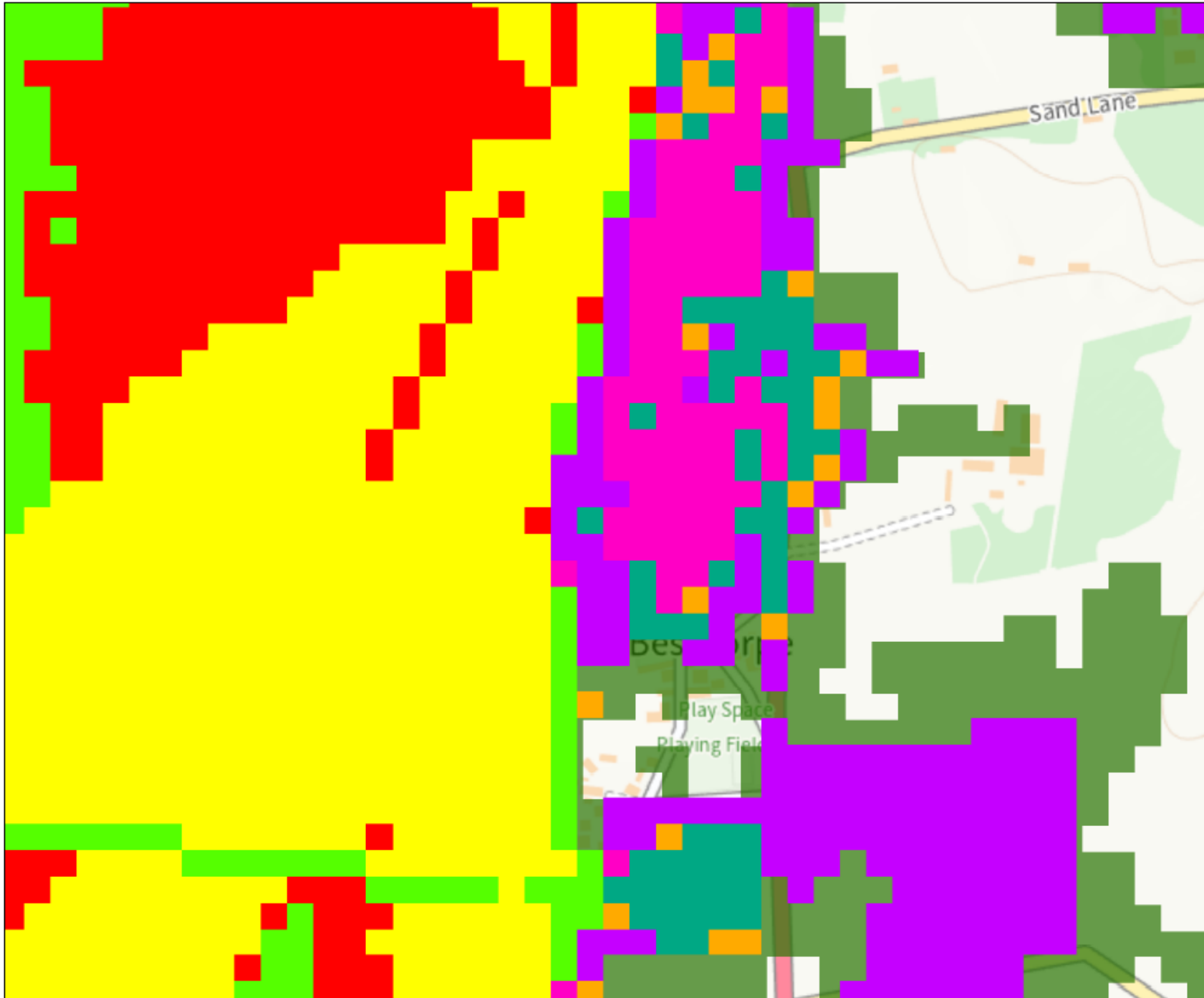


# Modelled Flood Extents Map (fluvial) centred on Low Road, Besthorpe Ref: [EMD260031]



Scale 1:5,000

Date created: 17 May 2022



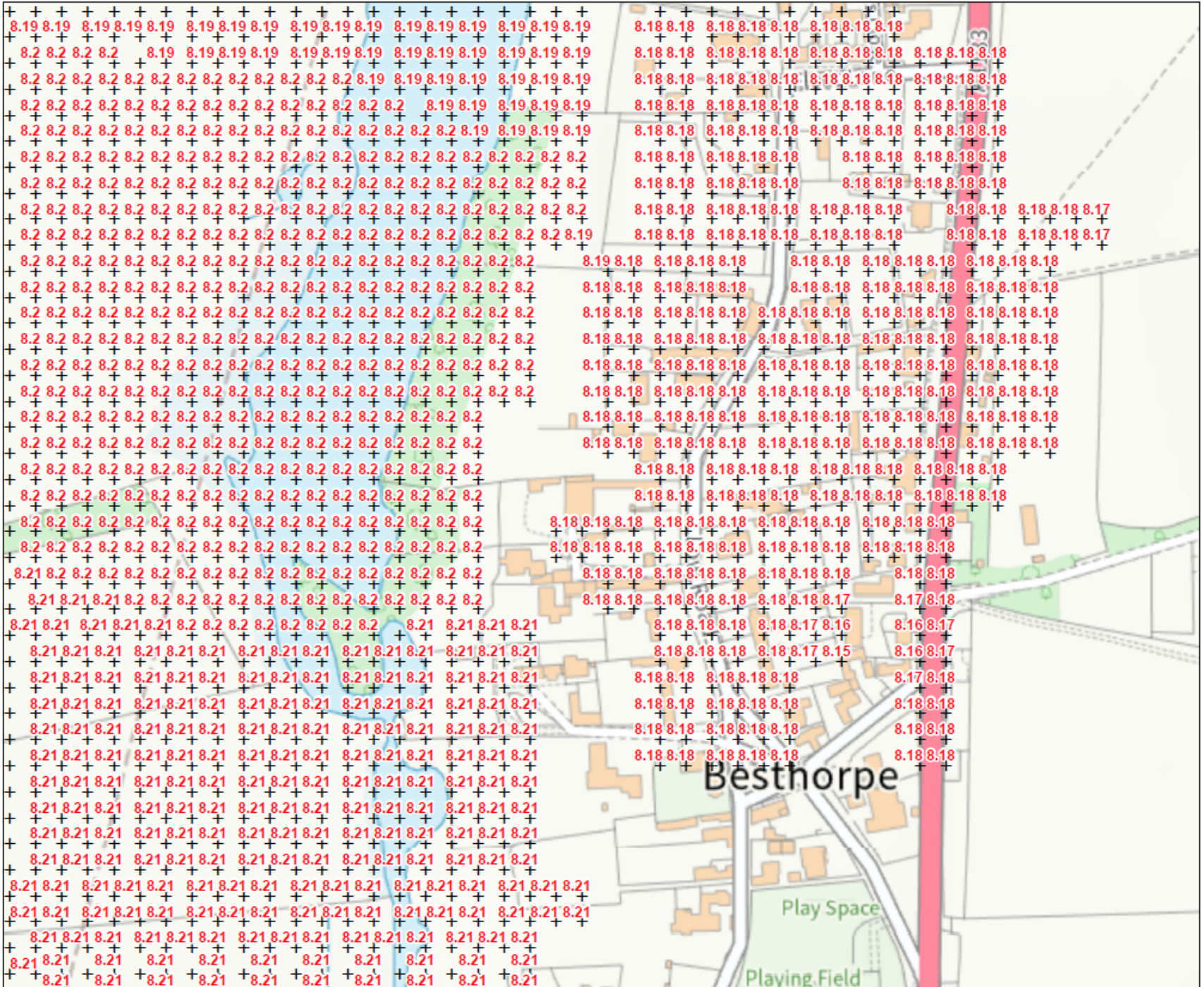
## Tidal Trent MFO Map Legend (FLUVIAL)

-  1 in 5 year Modelled Extent (with 5 year Tidal flow)
-  1 in 10 year Modelled Extent (with 5 year Tidal flow)
-  1 in 20 year Modelled Extent (with 5 year Tidal flow)
-  1 in 50 year Modelled Extent (with 5 year Tidal flow)
-  1 in 75 year Modelled Extent (with 5 year Tidal flow)
-  1 in 100 year Modelled Extent (with 5 year Tidal flow)
-  1 in 100 year Modelled Extent including climate change forecast (with 5 year Tidal flow)
-  1 in 200 year Modelled Extent (with 5 year Tidal flow)
-  1 in 1000 year Modelled Extent (with 5 year Tidal flow)
-  Modelled Node Location and Reference

**Source:**  
Tidal Trent SFRM,  
Mott Macdonald, 2014.

# Modelled Heights Map (fluvial) centred on Low Road, Besthorpe

Ref: [EMD260031]



Scale 1:2,500  
Date created: 19 May 2022

**Floodplain Heights Map Legend**

+ 1 in 100 year  
Floodplain Level (mAOD)

**Source:**  
Tidal Trent SFRM,  
Mott Macdonald, 2014.

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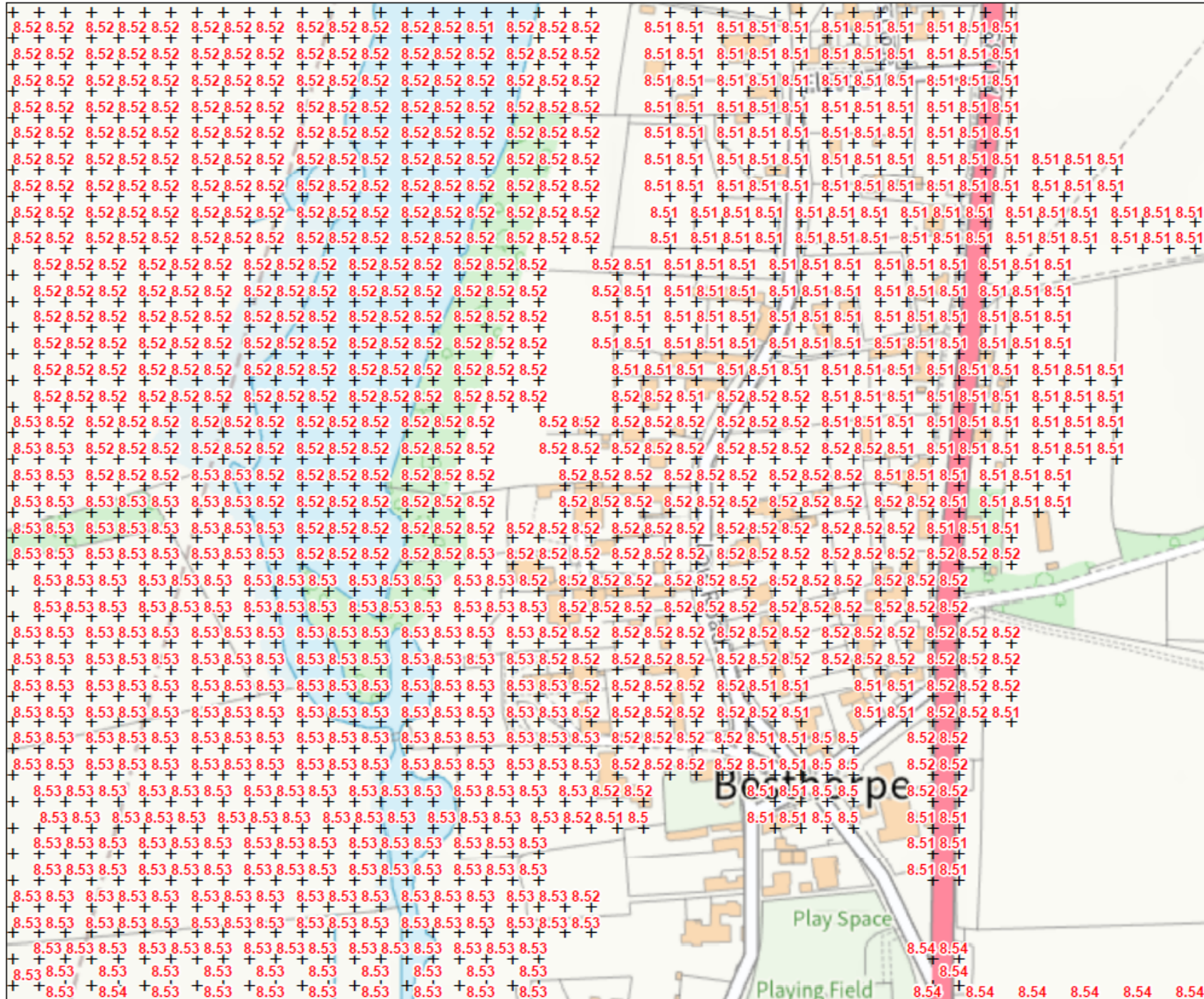
# Modelled Heights Map (fluvial) centred on Low Road, Besthorpe

Ref: [EMD260031]



Scale 1:2,500

Date created: 19 May 2022



### Floodplain Heights Map Legend

+ 1 in 100 year + CC  
Floodplain Level (mAOD)

Source:  
Tidal Trent SFRM,  
Mott Macdonald, 2014.

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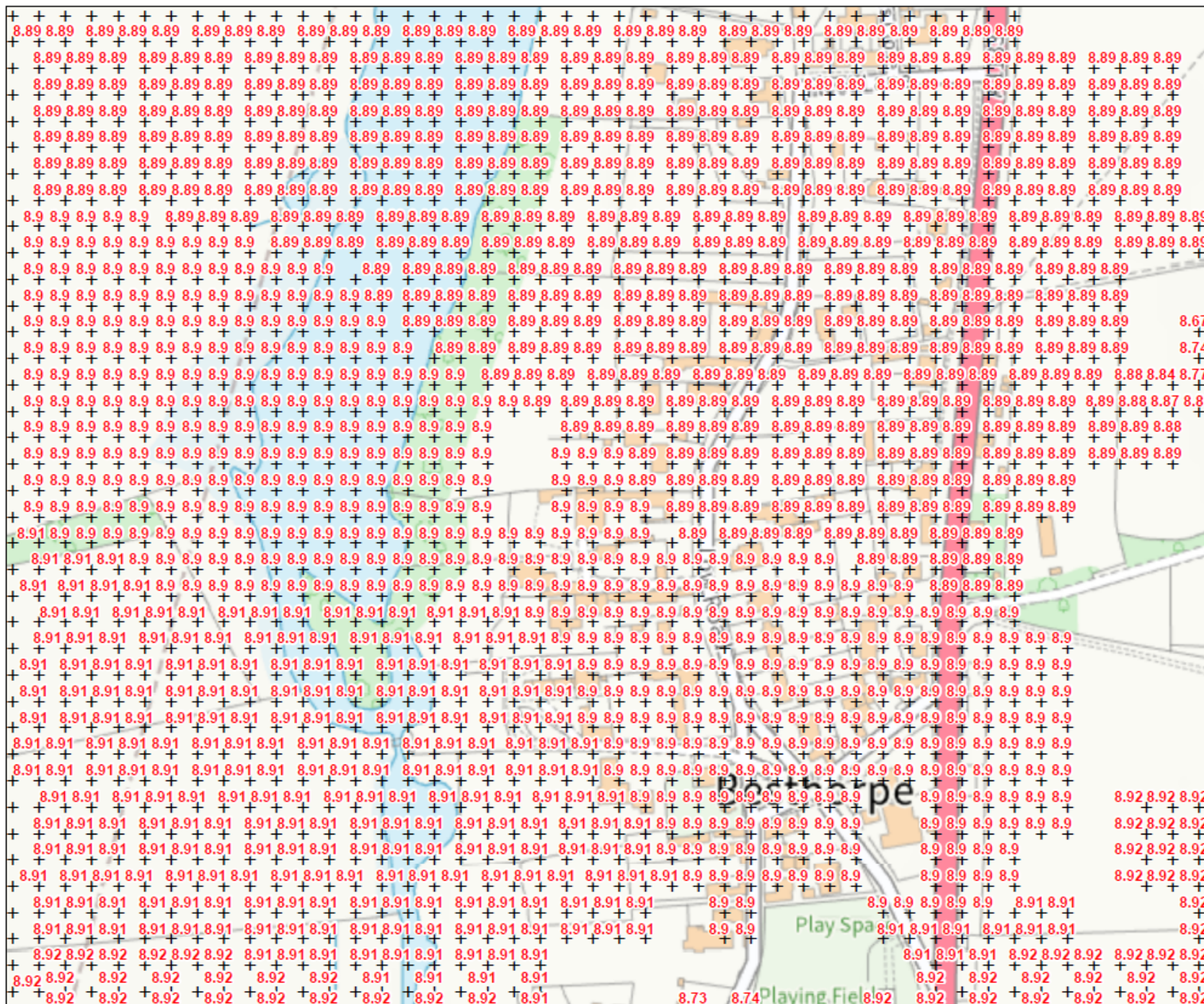


# Modelled Heights Map (fluvial) centred on Low Road, Besthorpe

Ref: [EMD260031]



Scale 1:2,500  
Date created: 19 May 2022



### Floodplain Heights Map Legend

+ 1 in 1000 year  
Floodplain Level (mAOD)

Source:  
Tidal Trent SFRM,  
Mott Macdonald, 2014.

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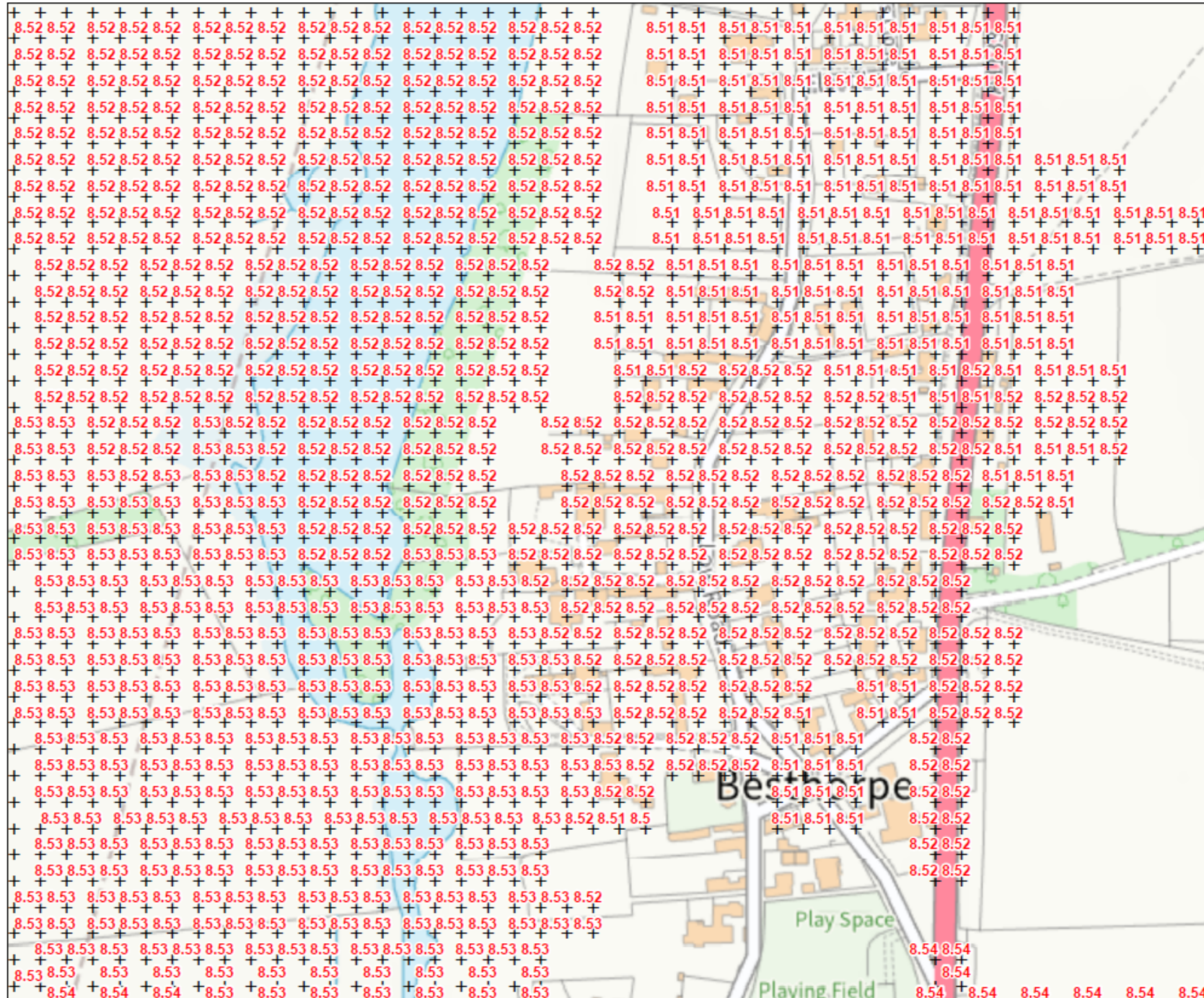


# Modelled Breach Heights Map centred on Low Road, Besthorpe

Ref: [EMD260031]



Scale 1:2,500  
Date created: 19 May 2022



## Tidal Trent Breach Heights Map Legend

- Breach Locations
- + 1 in 100 year (including climate change forecast) Breach Floodplain Level (mAOd)

Source:  
Tidal Trent SFRM,  
Mott Macdonald, 2014.

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Node point reference	Location	50% (1 in 2 year) modelled level (mAOD)	50% (1 in 2 year) modelled flow (m <sup>3</sup> /s)	20% (1 in 5 year) modelled level (mAOD)
TRENT_070	SK 80846 66497	N/A	N/A	7.29
TRENT_072	SK 80748 65679	N/A	N/A	7.36
TRENT_075	SK 81247 64817	N/A	N/A	7.43
TRENT_081	SK 80454 63663	N/A	N/A	7.74

Node point reference	Location	20% (1 in 5 year) modelled flow (m <sup>3</sup> /s)	10% (1 in 10 year) modelled level (mAOD)	10% (1 in 10 year) modelled flow (m <sup>3</sup> /s)
TRENT_070	SK 80846 66497	562.48	7.33	577.08
TRENT_072	SK 80748 65679	564.39	7.40	581.18
TRENT_075	SK 81247 64817	573.34	7.47	600.04
TRENT_081	SK 80454 63663	515.89	7.80	553.43

Node point reference	Location	5% (1 in 20 year) modelled level (mAOD)	5% (1 in 20 year) modelled flow (m <sup>3</sup> /s)	4% (1 in 25 year) modelled level (mAOD)
TRENT_070	SK 80846 66497	7.44	589.77	N/A
TRENT_072	SK 80748 65679	7.49	594.55	N/A
TRENT_075	SK 81247 64817	7.54	625.31	N/A
TRENT_081	SK 80454 63663	7.86	592.89	N/A

Node point reference	Location	4% (1 in 25 year) modelled flow (m <sup>3</sup> /s)	2% (1 in 50 year) modelled level (mAOD)	2% (1 in 50 year) modelled flow (m <sup>3</sup> /s)
TRENT_070	SK 80846 66497	N/A	7.85	604.25
TRENT_072	SK 80748 65679	N/A	7.86	616.61
TRENT_075	SK 81247 64817	N/A	7.89	657.48
TRENT_081	SK 80454 63663	N/A	8.06	646.77

Node point reference	Location	1.33% (1 in 75 year) modelled level (mAOD)	1.33% (1 in 75 year) modelled flow (m <sup>3</sup> /s)	1% (1 in 100 year) modelled level (mAOD)
TRENT_070	SK 80846 66497			8.17
TRENT_072	SK 80748 65679			8.18
TRENT_075	SK 81247 64817			8.21
TRENT_081	SK 80454 63663			8.29

Node point reference	Location	1% (1 in 100 year) modelled flow (m <sup>3</sup> /s)	0.67% (1 in 150 year) modelled level (mAOD)	0.67% (1 in 150 year) modelled flow (m <sup>3</sup> /s)
TRENT_070	SK 80846 66497	625.75	N/A	N/A
TRENT_072	SK 80748 65679	638.03	N/A	N/A
TRENT_075	SK 81247 64817	673.37	N/A	N/A
TRENT_081	SK 80454 63663	677.33	N/A	N/A

Node point reference	Location	0.5% (1 in 200 year) modelled level (mAOD)	0.5% (1 in 200 year) modelled flow (m <sup>3</sup> /s)	0.1% (1 in 1000 year) modelled level (mAOD)
TRENT_070	SK 80846 66497	8.45	639.27	8.84
TRENT_072	SK 80748 65679	8.47	656.40	8.87
TRENT_075	SK 81247 64817	8.50	685.80	8.91
TRENT_081	SK 80454 63663	8.55	702.80	8.97

Node point reference	Location	0.1% (1 in 1000 year) modelled flow (m <sup>3</sup> /s)	1% + 20% flow (1 in 100 year plus climate change) modelled level (mAOD)	1% + 20% flow (1 in 100 year plus climate change) modelled flow (m <sup>3</sup> /s)
TRENT_070	SK 80846 66497	665.20	8.48	641.26
TRENT_072	SK 80748 65679	673.42	8.50	658.46
TRENT_075	SK 81247 64817	704.87	8.53	686.93
TRENT_081	SK 80454 63663	733.96	8.58	705.00

Source: Tidal Trent SFRM Model, Mott Macdonald, 2013 (includes updated 2014 interim water levels)

## Strategic flood risk assessments

We recommend that you check the relevant local authority's strategic flood risk assessment (SFRA) as part of your work to prepare a site specific flood risk assessment.

This should give you information about:

- the potential impacts of climate change in this catchment
- areas defined as functional floodplain
- flooding from other sources, such as surface water, ground water and reservoirs

## About this data

This data has been generated by strategic scale flood models and is not intended for use at the individual property scale. If you're intending to use this data as part of a flood risk assessment, please include an appropriate modelling tolerance as part of your assessment. The Environment Agency regularly updates its modelling. We recommend that you check the data provided is the most recent, before submitting your flood risk assessment.

## Flood risk activity permits

Under the Environmental Permitting (England and Wales) Regulations 2016 some developments may require an environmental permit for flood risk activities from the Environment Agency. This includes any permanent or temporary works that are in, over, under, or nearby a designated main river or flood defence structure.

[Find out more about flood risk activity permits](#)

## Help and advice

Contact the East Midlands Environment Agency team at [dnlquiries@environment-agency.gov.uk](mailto:dnlquiries@environment-agency.gov.uk) for:

- [more information about getting a product 5, 6, 7 or 8](#)
- general help and advice about the site you're requesting data for