

# FLOOD RISK ASSESSMENT

Single Dwelling  
Field Farm,  
Besthorpe Road,  
North Scarle

TH Gourley & Son Ltd  
January 2022

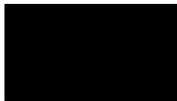


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## EXECUTIVE SUMMARY

This Flood Risk Assessment is compliant with the requirements set out in the National Planning Policy Framework, and the associated online Planning Practice Guidance. It has been produced on behalf of TH Gourley & Son Ltd. This report demonstrates that the proposed development is not at significant flood risk, and will not increase flood risk to others, subject to the recommended flood mitigation strategies being implemented.

### Policy

| Development Type | Flood Zone | Vulnerability   |
|------------------|------------|-----------------|
| Dwelling House   | 2          | More Vulnerable |

### Climate Change Allowance

#### Peak River Flow

| LOWER TRENT & EREWASH MANAGEMENT CATCHMENT |                     |
|--|---------------------|
| Allowance Category                         | Percentage Increase |
| Central                                    | 29                  |

### Flood Risk and Mitigation

| Flood Risk Source                       | Level of Risk Without Mitigation | Proposed Mitigation           |
|---|----------------------------------|-------------------------------|
| Fluvial<br>Groundwater<br>Reservoirs    | Low                              | Minimum floor level 7.70m AOD |
| Tidal<br>Pluvial<br>Sewers<br>Reservoir | None                             |                               |

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## 1.0 INTRODUCTION

- 1.1 This Flood Risk Assessment, (FRA), is compliant with the requirements set out in the National Planning Policy Framework, (NPPF), and the associated online Planning Practice Guidance.
- 1.1 The FRA has been produced on behalf of TH Gourley & Son Ltd in respect of a planning application for a single dwelling at Field Farm, Besthorpe Road, North Scarle.

### Data Used

- 1.1 This FRA is based on the following information:
- Topographic Survey
  - Proposed Plans
  - British Geological Survey Drift & Geology Maps
  - Environment Agency Consultation
  - Environment Agency Data
  - British Geological Survey Hydrogeology Data
  - Site visit

### Existing Site

- 1.1 The site is located at grid reference SK 84156 65975 as shown in Figure 1.1 below.

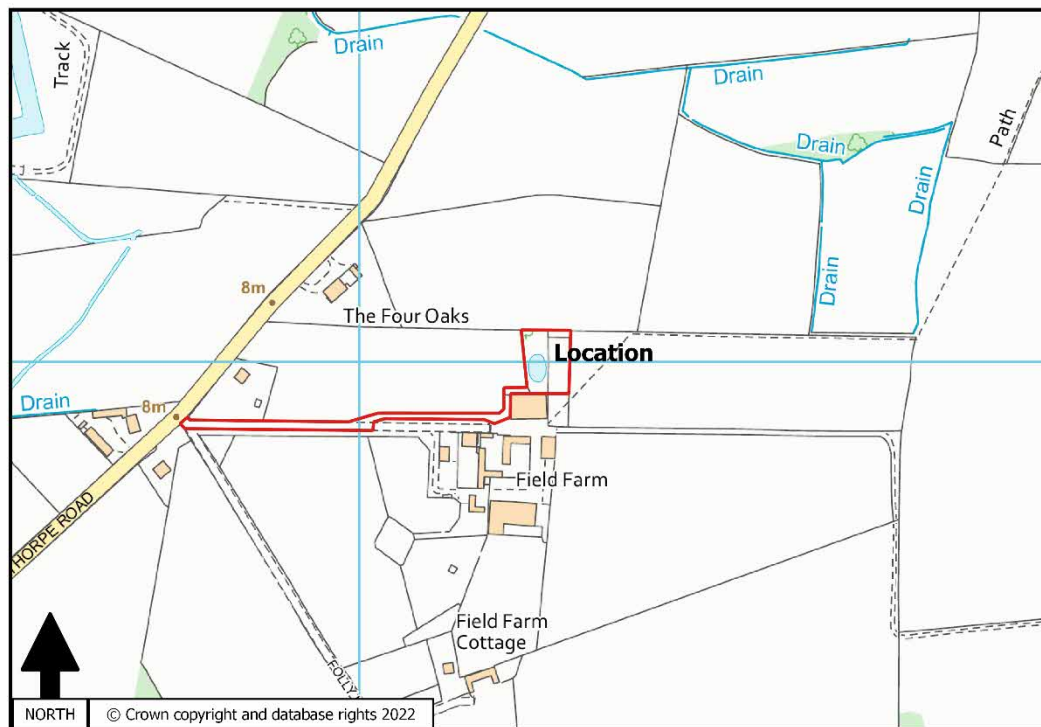


Figure 1.1 Site Location

- 1.1 A full topographic survey is included as Appendix 1 and the existing land levels in the location of the proposed dwelling are approximately 7.40m AOD.
- 1.1 The online British Geological Survey maps indicates that the site is located on superficial deposits of sand and gravel over a bedrock of mudstone.

### Proposed Development

- 1.1 The proposed development consists of a single dwelling as shown on the extract of the proposed plan below in Figure 1.2



Figure 1.2 Proposed Plan



## 2.0 FLOOD RISK PLANNING POLICY

### National Planning Policy Framework

- 1.1 The NPPF sets out the Government's national policies on different aspects of land use planning in England in relation to flood risk. A supporting web-based Planning Practice Guidance is also available.
- 1.1 The guidance uses four Flood Zones to characterise flood risk which refer to the probability of river and sea flooding, ignoring the presence of defences.

### Sequential Test

- 1.1 The NPPF requires the application of a Sequential Test to ensure that new development is in areas with the lowest probability of flooding and the Flood Zones provide the basis for applying the Test.

### Flood Zone Definition

|               |   |
|---------------|---|
| Flood Zone 1  | Low probability (1 in 1000 annual probability of river or sea flooding (<0.1%).)  |
| Flood Zone 2  | Medium probability (between 1 in 100 and 1 in 1000 annual probability of river flooding (1.0%-.0.1%) or between 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5%-.0.1%) in any given year).  |
| Flood Zone 3a | High probability (1 in 100 or greater annual probability of river flooding (>1.0%) or 1 in 200 or greater annual probability of sea flooding (>0.5%) in any given year).  |
| Flood Zone 3b | This zone comprises land where water must flow or be stored in times of flood. Land which would flood with an annual probability of 1 in 20 (5.0%), or is designed to flood in an extreme flood (0.1%) should provide a starting point for discussions to identify functional floodplain. |

- 2.4 The Flood Zones do not consider the projected effects of climate change and may not represent potential flooding from smaller watercourses.
- 1.1 The aim is to steer new development to Flood Zone 1 and where there are no reasonably available sites in Flood Zone 1, local planning authorities in their decision making should consider the flood risk vulnerability of land uses and consider reasonably available sites in Flood Zone 2, applying the Exception Test if required.
- 2.4 Only where there are no reasonably available sites in Flood Zones 1 or 2 should the suitability of sites in Flood Zone 3 be considered, considering the flood risk vulnerability of land uses and applying the Exception Test if required.
- 2.4 The guidance also sets out the vulnerability to flooding of different land uses and some of these are detailed below.

## Flood Risk Vulnerability Classification

|                          |   |
|--------------------------|---|
| Essential Infrastructure | Transport Infrastructure; Utility Infrastructure; Wind Turbines.  |
| Water Compatible         | Flood Control Infrastructure; Water and Sewage Infrastructure; Navigation Facilities.   |
| Highly Vulnerable        | Emergency Services (which are required in times of flood); Basement Dwellings; Caravans, Mobile Homes and Park Homes, (intended for permanent residential use); Installations requiring Hazardous Substances Consent.   |
| More Vulnerable          | Hospitals and other Health Services; Residential Institutions; Dwelling Houses, Drinking Establishments; Nightclubs; Hotels; Non-residential uses for Health Services; Nurseries; Educational Establishments; Landfill and Hazardous Waste Management Facilities; Sites used for Holiday or short-let Caravan and Camping sites, (subject to a specific warning and evacuation plan). |
| Less Vulnerable          | Commercial Establishments; Emergency Services not required in times of flood; Land and Buildings used for Agriculture and Forestry. Waste Treatment; Minerals Working; Water Treatment Works; Sewage Treatment Works.   |

## Appropriate Development

- 2.4 Based on the vulnerability of a development the guidance states what Flood Zone(s) the development is appropriate within. The flood risk compatibility is summarised below.

|               |   |
|---------------|---|
| Flood Zone 1  | Appropriate Development – All.  |
| Flood Zone 2  | Exception Test - Highly vulnerable.<br>Appropriate Development - Essential Infrastructure; More vulnerable; Less vulnerable and Water Compatible.                           |
| Flood Zone 3a | Should not be permitted – Highly vulnerable.<br>Exception Test – Essential Infrastructure, More vulnerable.<br>Appropriate Development – Less vulnerable; Water compatible. |
| Flood Zone 3b | Should not be permitted – Highly vulnerable; More vulnerable; Less vulnerable.<br>Exception Test – Essential Infrastructure.<br>Appropriate Development –Water compatible.  |

- 1.1 The Planning Practice Guidance also states that all sources of flooding should be considered when preparing a FRA.

## Exception Test

- 2.10 The Exception Test is a method to demonstrate and help ensure that flood risk to people and property will be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available.
- 2.11 The first part of the Exception Test is to show that the proposed development will provide wider sustainability benefits to the community that outweigh flood risk. The second part is the requirement for a FRA to demonstrate that it will be safe for its lifetime, without increasing flood risk elsewhere and where possible reduce flood risk overall.

## Development Proposals

2.11 The proposed development consists of a Dwelling House.

### Flood Zones

2.11 The Flood Zones are shown on Figure 2.1 below which shows the site to be in Flood Zone 2.

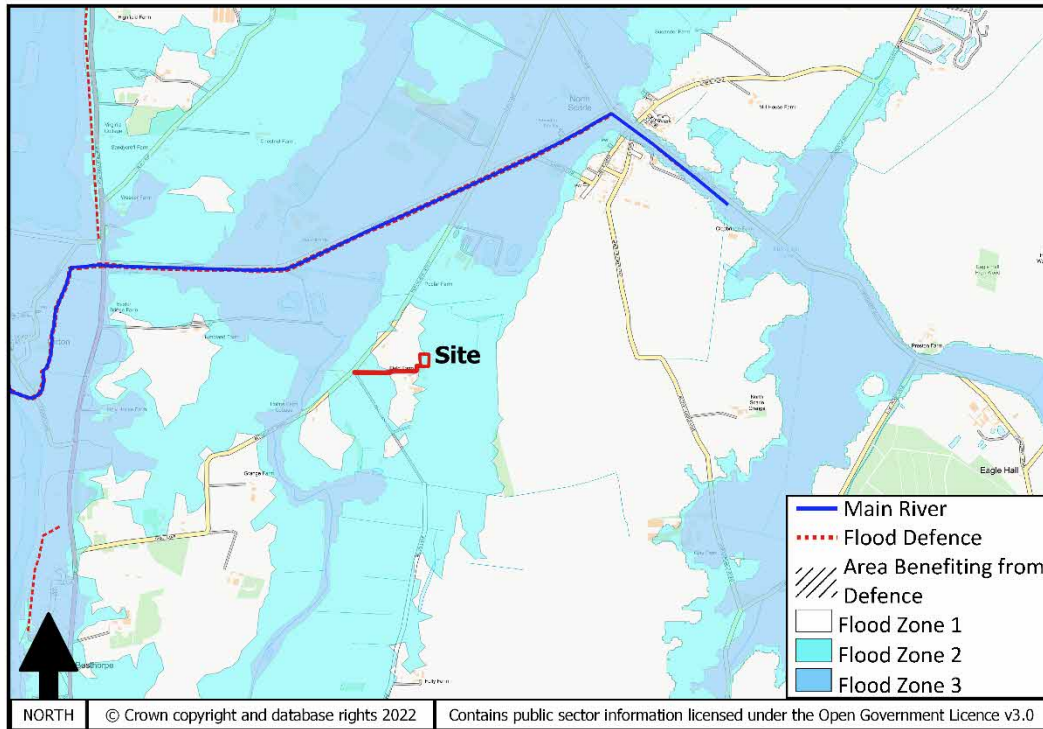


Figure 2.1 Flood Zones

### Development Vulnerability

2.10 Dwelling House are More Vulnerable.

### Exception Test

2.11 A FRA is required to ensure the development will remain safe over its lifetime from all sources of flooding and not increase flood risk elsewhere.

### 3.0 CLIMATE CHANGE

- 2.4 The NPPF sets out how the planning system should help minimise vulnerability and provide resilience to the impacts of climate change.
- 2.4 As the Government's expert on flood risk on 19<sup>th</sup> February 2016 the Environment Agency, (EA), published revised climate change allowances to support the NPPF. The sea level rise allowances were revised on the 17<sup>th</sup> December 2019 and the peak river flows revised on the 20<sup>th</sup> July 2021.
- 2.4 The climate change allowances are based on projections and different scenarios of carbon dioxide (CO<sub>2</sub>) emissions to the atmosphere and provide predictions of anticipated change for:
- peak river flow by river Management Catchment;
  - peak rainfall intensity;
  - sea level rise;
  - offshore wind speed and extreme wave height.

#### Peak River Flow Allowances

- 2.4 The peak river flow allowances show the anticipated changes to peak flow by Management Catchment, which are sub-catchments of River Basin Districts, with three allowances; central; higher central and upper end.
- 2.4 This proposed development is in the Lower Trent & Erewash Management Catchment.
- 2.4 The appropriate allowance depends on the Flood Zone and vulnerability classification of the development and for this proposal it is appropriate to use the Central allowance.
- 2.4 The allowances change over three periods of time over the next century. The appropriate period should be chosen based on the expected lifetime of the development and for residential that is 100 years.
- 2.4 The following climate change allowances in peak river flows therefore need to be applied:

| LOWER TRENT & EREWASH |                     |
|-----------------------|---------------------|
| Allowance Category    | Percentage Increase |
| Central               | 29                  |

Table 3.1 Climate Change Allowances for Peak River Flow

#### Peak Rainfall Intensity Allowance

- 2.4 Increased rainfall affects river levels and land and urban drainage and should be applied to surface water drainage systems. However, the proposed development does not increase the impermeable area enough for these allowances to apply.

#### Sea Level Allowances

- 2.10 There is a range of allowances for each region and epoch or time frame for sea level rise. However, this site is not affected from tidal sources, see section 4.

## 4.0 FLOOD RISK SOURCES

2.4 The following flood risk sources have been identified and where mitigation is required to reduce the flood risk this is discussed in Section 5.

### Fluvial

#### Main River

2.4 The nearest EA Main River to the site is approximately 600m to the north west which is a tributary of the River Trent approximately 3.0km to the west.

2.4 Information provided by the EA gives the following modelled levels on and adjacent to the site as shown in Figure 4.1.

- 1 in 100 year (including climate change forecast) floodplain level = 7.22m AOD
- 1 in 1000 year floodplain level = 7.70m AOD

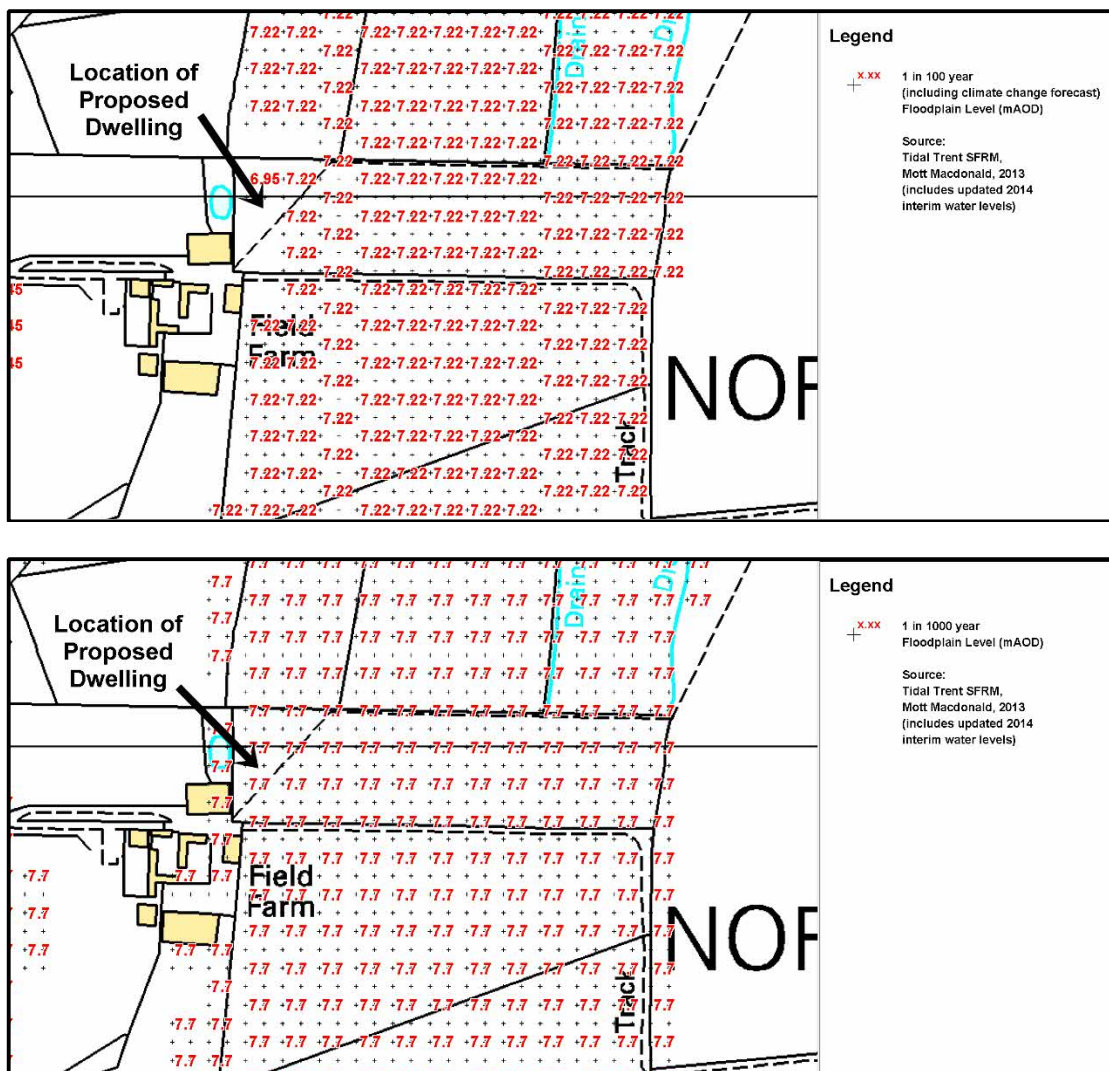


Figure 4.1 Floodplain Levels



Ordinary Watercourses

4.4 The site lies within the district of the Trent Valley Internal Drainage Board, (IDB), and the Boards maintained watercourse are near the site.

2.4 The risk of flooding from fluvial sources is low.

Climate Change

4.4 The above results have a climate change increase of 20% added to the peak river flows whereas the guidance now indicates that in the Lower Trent & Erewash Management Catchment, for residential developments 29% should be added.

4.4 Given the scale and nature of the proposed development it is considered that additional hydraulic modelling is not appropriate to determine the revised river levels and the 1 in 1000 year floodplain level of 7.70m AOD will be used as a substitute.

Residual Risk

4.4 The site is protected from flooding from River Trent by defences, including a raised defence. However, if that defence was to be overtopped or fail then flooding could occur, and the EA have breach mapping for a range of return periods.

2.4 Figure 4.2 below show the results of a breach for the 1.0% (1:100) + 20% climate change event with a floodplain level of 7.22m AOD.

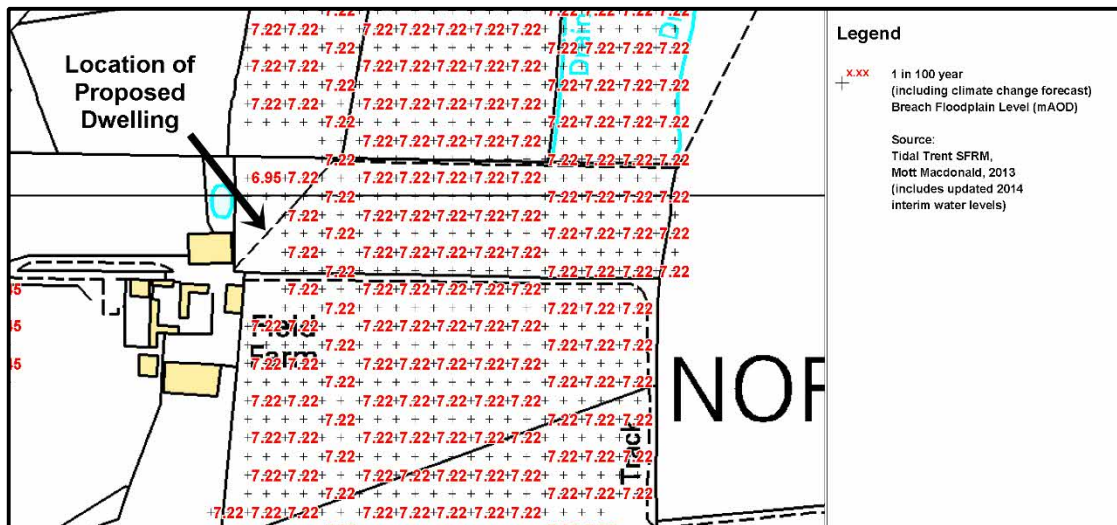


Figure 4.2 Breach Floodplain Levels for 1.0% (1:100) + 20% Climate Change Event

4.10 The residual risk of flooding is low.

Tidal

2.10 The site is not at direct risk of flooding from tidal sources.

## Pluvial

- 2.10 The EA have produced maps showing flooding when rainwater lies or flows over the ground. The surface water flooding extents are shown below in Figure 4.3. Unlike the fluvial mapping, which is based on a detailed hydraulic model, this mapping is based purely on applying rainfall to a digital terrain model. As such this mapping serves to represent a worst-case scenario which may well overstate the actual probability of flooding in this area.
- 2.10 There is a caveat, as to the use of these maps and that they are not to be used to identify that an individual property will flood. Because of the way they have been produced and the fact that they are indicative these maps are not appropriate to act as the sole evidence for any specific planning or regulatory decision or assessment of risk in relation to flooding at any scale without further supporting studies or evidence.

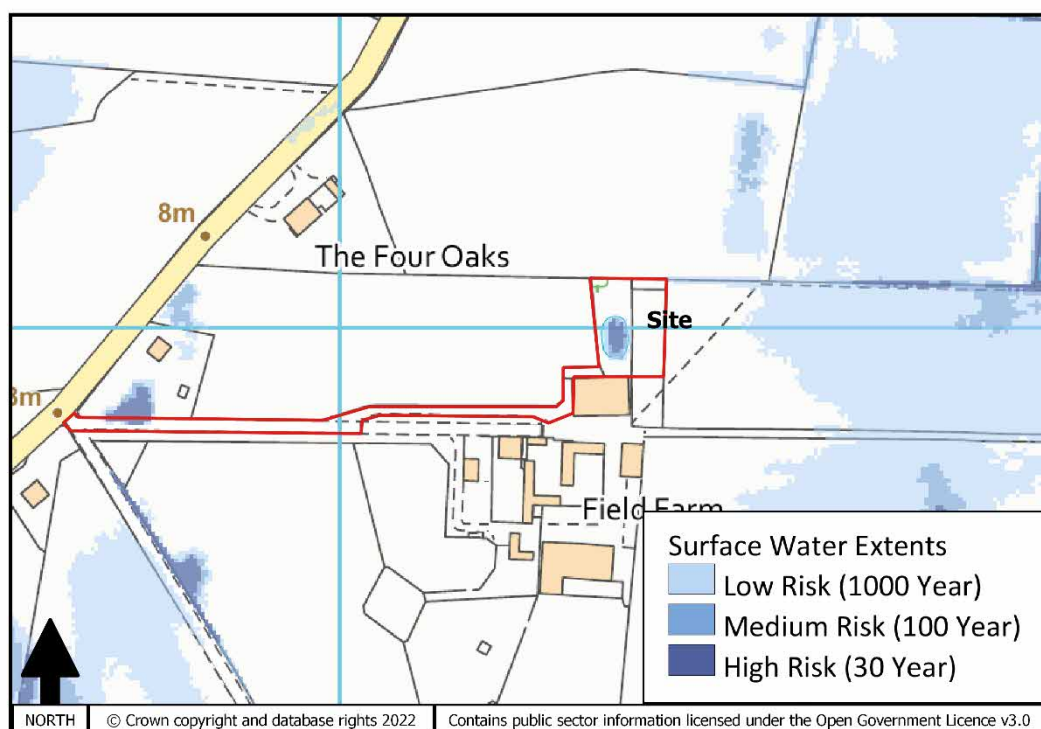


Figure 4.3 Surface Water Flooding Extents

- 4.10 The location of the proposed dwelling is not at risk of flooding from pluvial sources.

## Groundwater

- 2.10 The site is located on a low productivity aquifer and there are no known instances of groundwater flooding in the area.
- 2.10 The risk of flooding from groundwater is low.

## Sewers

- 2.10 There are no public sewers near to the site.

## Reservoirs

2.10 The EA has prepared reservoir failure flood risk mapping to show the largest area that might be flooded if a reservoir were to fail and release the water it holds. The mapping displays two scenarios as follows:

- Dry this is the extent when the river levels are normal,
- Wet this is the extent when there is also flooding from rivers.

2.10 The mapping displays a worst-case scenario and is only intended as a guide.

4.10 The site is shown to be at risk of flooding due to the failure of a large, raised reservoir in the wet scenarios. However, given the legal requirement to design, construct, inspect and maintain a reservoir under the Reservoirs Act this type of failure is very unlikely and therefore the risk of flooding is considered to be low.

## Canals and Artificial Water Bodies

2.10 The site is not at risk of flooding from canals.



## 5.0 MITIGATION

- 2.4 Section 4.0 has identified the sources of flooding which could potentially pose a risk to the site and the proposed development. This section of the FRA sets out the mitigation measures which are to be incorporated within the proposed development to address and reduce the risk of flooding to within acceptable levels.

### Site Layout

- 2.4 The proposed development is only at a low risk of flooding from fluvial sources, including the residual risk, groundwater and reservoirs failure in the wet scenario.
- 2.4 The 1 in 100 year (+ 20% climate change forecast) floodplain level is 7.22m AOD and the 1 in 1000 year floodplain level is 7.70m AOD
- 2.4 The 1 in 100 year (including climate change forecast) breach floodplain level is 7.22m AOD.
- 2.4 The existing site level is approximately 7.40m AOD and the minimum ground floor level will 7.70m AOD.

## 6.0 CONCLUSIONS

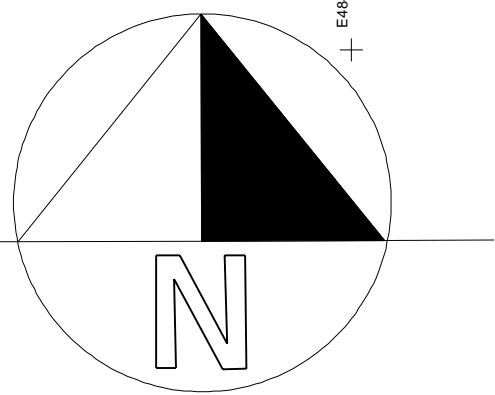
- 2.4 This FRA is compliant with the requirements set out in the NPPF and the associated online Planning Practice Guidance.
- 2.4 The FRA has been produced on behalf of TH Gourley & Son Ltd.
- 2.4 This report demonstrates that the proposed development is not at significant flood risk, and will not increase flood risk to others, subject to the recommended flood mitigation strategies being implemented.
- 2.4 The identified risks and mitigation measures are summarised below;

| Flood Risk Source                       | Level of Risk Without Mitigation | Proposed Mitigation           |
|---|----------------------------------|-------------------------------|
| Fluvial<br>Groundwater<br>Reservoirs    | Low                              | Minimum floor level 7.70m AOD |
| Tidal<br>Pluvial<br>Sewers<br>Reservoir | None                             |                               |

Table 6.1 Summary of Risk and Mitigation

Appendix 1  
Topographic Survey





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