FLOOD RISK ASSESSMENT
FOR A RESIDENTIAL EXTENSION AT
BUNGALOW FARM, CHATTERIS ROAD, MEPAL

FINAL REPORT

ECL1120/DAVID SYMONDS ASSOCIATES

DATE OCTOBER 2023

ELLINGHAM CONSULTING LTD

CONTENTS

1.0 INTRODUCTION

This Flood Risk Assessment has been prepared in accordance with National Planning Policy Framework (NPPF) and supporting planning practice guidance (PPG) on Flood Risk and Coastal Change.

In areas at risk of flooding or for sites of 1 hectare or more, developers are required to undertake a site-specific Flood Risk Assessment to accompany an application for planning permission. This Flood Risk Assessment has been produced on behalf of Janice Robinson in respect of a development that consists of a like for like replacement of an existing single storey extension at Bungalow Farm, Chatteris Road, Mepal.

A planning application for the proposed development is to be submitted by David Symonds Associates.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is situated at Bungalow Farm, Chatteris Road, Mepal, Cambridgeshire, CB6 2AZ. The National Grid Reference of the site is 54269/28233.

The location of the site is shown on Figure 1.

Figure 1 – Location Plan (© OpenStreetMap contributors)

2.2 Existing Site

The site is on the western side of Mepal Long Causeway approximately 200m south of the junction with Ireton's Way. The site consists of a single storey dwelling, the surrounding garden, and a paddock. The re is agricultural land to the south and west of the site and a commercial garage to the north. The area of development is approximately 0.04 hectares.

A topographic survey has been undertaken and is provided in Attachment 1. Ground levels within the site typically range between -0.2m OD and -0.6m OD. The ground levels around the bungalow are on average -0.4m OD. A building survey has shown that floor levels range between -0.16m OD and -0.33m OD.

The site is in the Sutton and Mepal Internal Drainage Board's (IDB) district. Surface water at the site would naturally drain through soakaway and hence to the local drainage system. There is an IDB watercourse approximately 200m north of Bungalow Farm.

The online British Geological Survey maps indicate that the site is likely to be underlain by Ampthill Clay Formation mudstone. The superficial deposits at the site are peat.

2.3 Proposed Development

The proposed development consists of a like for like replacement of an existing single storey extension on the western side of the dwelling. Details of the proposed development are shown in Attachment 1.

2.4 Local Development Documents

The East Cambridgeshire Local Plan 2015 is the adopted Local Plan for the district. Policy ENV 8 for Flood Risk states the requirements for flood risk reduction.

The East Cambridgeshire District Council Level 1 and Level 2 Strategic Flood Risk Assessment was prepared in June 2017.

The Cambridgeshire Flood and Water Supplementary Planning Document has been prepared by Cambridgeshire County Council (as the Lead Local Flood Authority) in conjunction with the other Cambridgeshire local planning authorities and other relevant stakeholders to support the implementation of flood risk and water related policies.

2.5 Available Flood Risk Information

An extract from the Environment Agency Flood Map for Planning is shown in Figure 2. The site is located within Flood Zone 3, an area with a high probability of flooding.

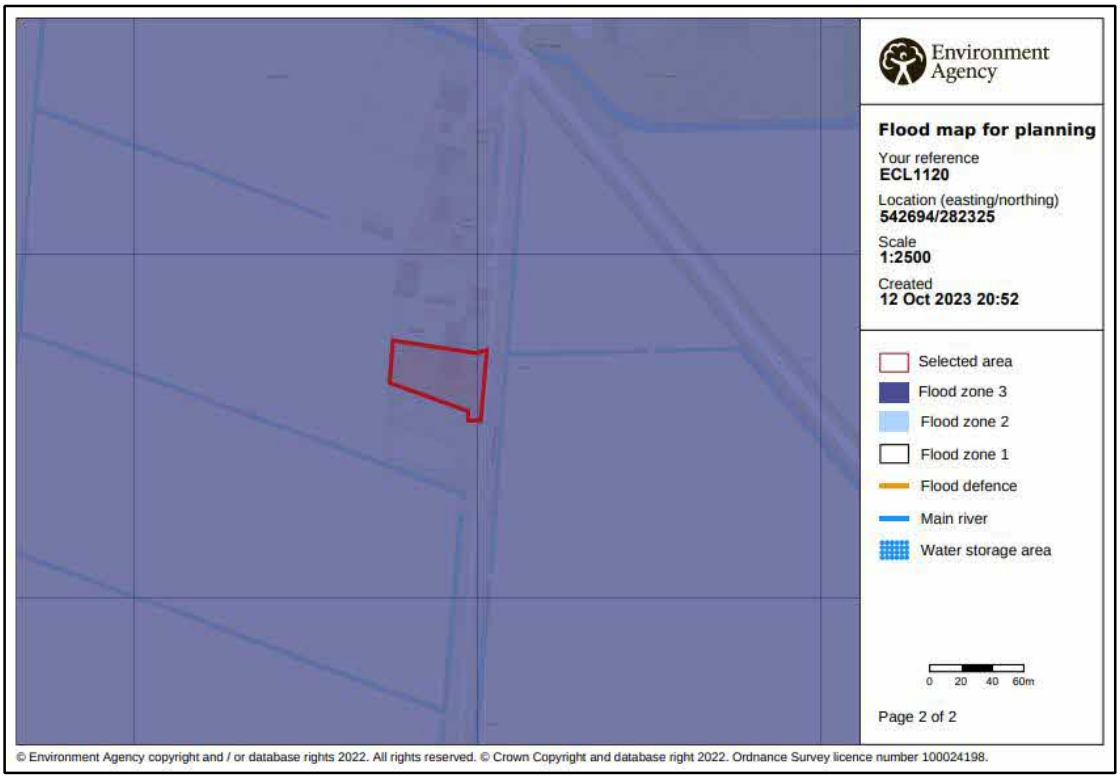


Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps show that:

the site has a medium risk of flooding from rivers (annual probability between 1% and 3.3%);
the site has a very low risk of surface water flooding (annual probability less than 0.1%); and
the site is within an area at risk of reservoir flooding when river levels are normal.

The maps within the East Cambridgeshire District Council SFRA of 2017 show that:

the site is in Flood Zone 3a;
the site is not at flood risk during the 1 in 100-year scenario considering climate change (Central, Higher Central or Upper End estimate);
the surface water flooding 1000-year extent shows that the site is not at risk; and
the site is in an area with a less than 25% susceptibility to groundwater flooding.

Flood risk information provided by the Environment Agency has been used to assess the residual risk. The Environment Agency Flood Risk Information is provided in Attachment 2.

3.0 FLOOD RISK VULNERABILITY

3.1 The Sequential and Exception Test

The NPPF requires the application of a Sequential Test to ensure that new development is in areas with the lowest probability of flooding.

The Exception Test is a method to demonstrate and help ensure that flood risk to people and property will be managed, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available.

3.2 Vulnerability Classification

Table 2 of the PPG Flood Risk and Coastal Change categorises different types of uses and development according to their vulnerability to flood risk. The proposed develop is covered by the description of buildings used for dwellings and is classified as 'More Vulnerable'.

Table 3 of the PPG Flood Risk and Coastal Change sets out Flood Risk Vulnerability and flood zone 'compatibility'. The site is in Flood Zone 3 and the development is 'More Vulnerable' therefore it is necessary to complete the Exception Test.

PPG Flood Risk and Coastal Change defines that the lifetime of the development in terms of flood risk and coastal change is 100 years.

3.3 Application of the Sequential Test and Exception Test

It is for the Local Planning Authority, using the evidence provided and taking advice from the Environment Agency as appropriate, to consider whether an application passes the Sequential Test.

The development is an extension to an existing residential dwelling. As such the use of another site is not considered to be a feasible alternative. The development is considered to pass the Sequential Test.

The Exception Test requires consideration of the wider sustainability benefits of a development and that the development would be safe and residual risks managed.

Section 5 of this Flood Risk Assessment describes the flood mitigation measures and the management of the residual risks, demonstrating that there is no increase in flood risk associated with the development. The development is considered to pass the Exception Test.

4.0 SITE SPECIFIC FLOOD RISK

4.1 Local Flood Assets

The site is 1.4km to the north west of the Ouse Washes which stores flood flows from the Bedford Ouse. The site, and the Middle Level drainage area, is protected from the Ouse Washes by the Middle Level Barrier Bank. The barrier bank is inspected and maintained in accordance with the standards of the Reservoirs Act. This defence is the responsibility of the Environment Agency.

The Counter Drain is on the north western side of the Middle Level Barrier Bank. It is a high-level watercourse draining water from the highland catchment north of Earith. It receives pumped discharges from the Middle Level drainage area. During normal conditions, the Counter Drain discharges by gravity to the tidal River Great Ouse and during flood conditions discharges into the Ouse Washes at Welches dam pumping station. The Counter Drain is a main river managed and operated by the Environment Agency.

There is a long-term strategy for the maintenance of the Environment Agency defences which is reviewed and updated periodically.

The site is in the Sutton and Mepal Internal Drainage Board's (IDB) district. An IDB main drain is located 200m north of the site. The local drainage network drains by gravity to Mepal Pumping Station which discharges to the Counter Drain.

During the operation and maintenance of its pumping stations, associated structures, and channel systems, the IDB seeks to maintain a general standard capable of providing flood protection to its district. A routine maintenance programme is in place to ensure that the Board's assets are commensurate with the standard of protection that is sought.

Current maintenance standards of the Sutton and Mepal IDB and the Environment Agency's defences are generally good.

4.2 Sources of Flooding

A summary of the sources of flooding is provided in Table 1.

Source of Flooding	Level of Risk
Drainage Network Flooding	The risk is assessed in Section 4.3.
Surface Water Flooding	Based upon the EA maps the risk is very low.
Fluvial Flooding	The risk is assessed in Section 4.3 and 4.5.
Tidal Flooding	The risk is not at risk of tidal flooding.
Reservoir / Breach Flooding	The risk of flooding from the Ouse Washes is assessed in Section 4.6.
Groundwater Flooding	Based upon the local drainage network the risk is low.

Table 1 – Sources of Flooding

4.3 Probability of Flooding

The probability of flooding associated with blockages in the Sutton and Mepal IDB drainage system is low due to the maintenance standards already achieved and managed by the IDB. Failure of Mepal Pumping Station would lead to an increase level of risk in the IDB catchment.

Through the operation and maintenance of the pumping stations and the channel system the Board seek to maintain a general standard capable to providing flood protection to agricultural land and developed areas of 1 in 20 years and 1 in 100 years, respectively. The risk associated with flood events that exceed the standard of protection provided is lowered due to the Sutton and Mepal IDB main drains incorporating freeboard. This freeboard provides storage during the exceedance events.

The Counter Drain provides protection against the 1% annual probability (1 in 100 chance each year) fluvial event. The 1% annual probability (1 in 100 chance each year) water level is +1.85m OD. The lowest crest level along the defence alongside the counter drain is +2.27m OD. The site is not at risk during the 1% annual probability (1 in 100 chance each year) event.

The Middle Level Barrier Bank has been designed for the 0.1% annual probability (1 in 1000 chance each year) event. The barrier bank is inspected and maintained in accordance with the standards of the Reservoirs Act.

4.4 Historic Flooding

During the preparation of this assessment, no evidence was discovered of the site being flooded.

4.5 Climate Change

Climate change is likely to impact the site through increased rainfall intensity and duration affecting the local drainage network and flood levels in the IDB and Environment Agency watercourses and the Ouse Washes.

The Environment Agency peak river flow map shows that for the Old Bedford and Middle Level Management Catchment peak river flow central allowance is 6% and the higher allowance is 15% for the 2080's (100 year) timeframe.

The 1% annual probability (1 in 100 chance each year) event including 20% climate change in the Counter Drain has a flood level of +1.92m OD. Based upon this flood level the site is not at risk from the Counter Drain when climate change is considered.

The standards of the Reservoirs Act are such that the Middle Level Barrier Bank provides protection against the 1% annual probability (1 in 100 chance each year) event including climate change.

In summary the existing systems and defences are appropriate for the design life of the development (i.e. 100 years).

4.6 Residual Risks

Welches Dam Pumping Station has been designed for the 1% annual probability (1 in 100 chance each year) event including climate change. Should failure of Welches Dam Pumping Station lead to overtopping of the Counter Drain, the drainage network within the IDB district would limit the extent of flooding.

There is a residual risk of flooding at the site from a breach of the Middle Level Barrier Bank. A breach of the barrier bank could lead to significant flooding across the Fens. The frequency of inspection and requirements to mitigate against the risk of a breach specified within the Reservoirs Act are such that the probability of a breach is very low.

The Breach Hazard Mapping undertaken by the Environment Agency considers breaches to the Middle Level Barrier Bank. The development is in an area shown to be at risk of flooding by depths between 1.0m and 2.0m.

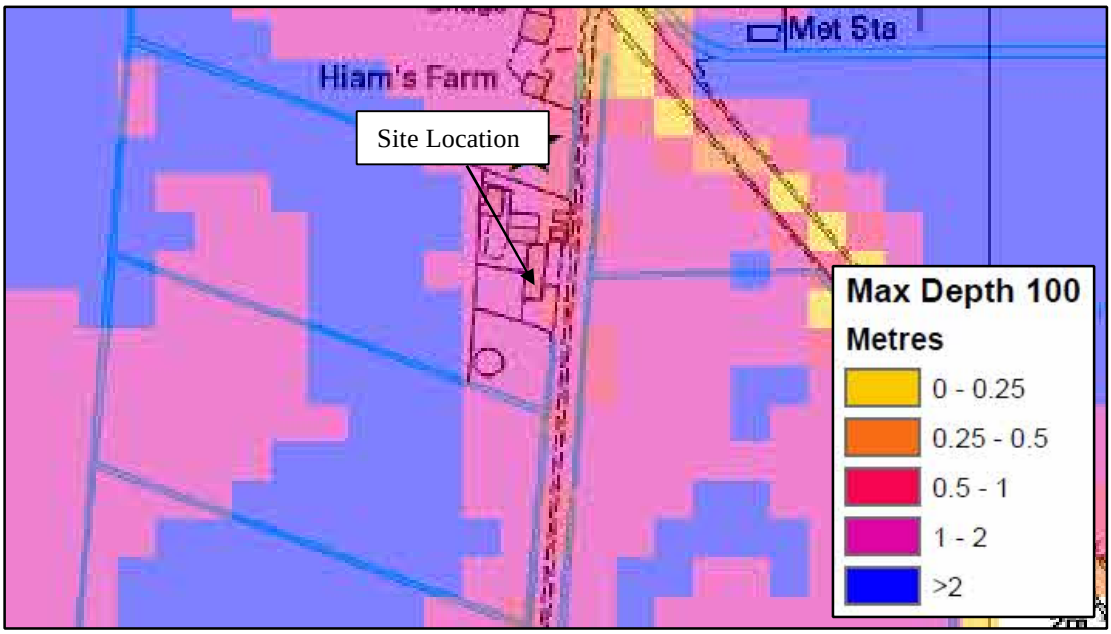


Figure 3 – Environment Agency Breach Hazard Mapping

Based upon the Environment Agency LiDAR levels and the flood depths shown in Figure 3 a flood level of +1.4m OD has been estimated. This is a depth of approximately 1.8m around the existing dwelling.

A breach of the defence alongside the Counter Drain may also affect the site however the extent and depth of flooding would not be as great as for a breach of the Middle Level Barrier Bank.

5.0 FLOOD RISK MITIGATION

5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of Mepal Pumping Station or Welches Dam Pumping Station could lead to an increased level of risk at the site.

The probability of the site flooding from any Environment Agency system is less than 1% annual probability (1 in 100 chance each year) because of the standards of the existing flood defences. Over time there will be a gradual increase in risk to the site due to climate change. During the design life of the development, it is not anticipated that the site would flood.

There is a residual risk of flooding at the site associated with a breach of the Middle Level Barrier Bank. The flood level around the proposed dwelling in the event of a breach is estimated to be +1.4m OD, a depth of approximately 1.6m within the dwelling.

Any increase in impermeable area associated with the development will be minimal so there is no potential that flood risk will be increased elsewhere due to surface water.

5.2 Mitigation Measures

Under PPG on Flood Risk and Coastal Change an extension is defined as a minor development. Guidance states that you should follow the Environment Agency's standing advice if you're carrying out a flood risk assessment for a minor extension (household).

The proposed floor levels of the extension will be -0.16m OD. The floor levels are no lower than existing floor levels and are therefore consistent with the Environment Agency's standing advice for minor extensions.

It is recommended that flood resilient construction is considered to a level 1.6m above finished floor level. The flood resilience measures could consist of water compatible flooring such as tiled floors, the use of horizontal plasterboard, sacrificial or water compatible kitchen/bathroom fittings, and raised electrical sockets.

The developer should ensure that the occupier of the dwelling is sufficiently aware of the risk of flooding, and the standard of the existing defences. The Environment Agency provides a Flood Warning Service which includes Flood Warning Codes and uses direct warning methods where the risks and impacts of flooding are high. In addition to direct and indirect flood warnings, the Environment Agency operates a 24 hour a day Floodline Service providing advice and information on flooding.

During an extreme event it is anticipated that sufficient time would be available to take precautionary actions to limit the potential impact of flooding. In the event of a

flood, safe egress would be in a north westerly direction on the A142 which is above the flood level during a breach, to the centre of Chatteris which is in Flood Zone 1.

Failure of Mepal Pumping Station or Welches Dam Pumping Station may occur due to long term mechanical breakdown or power supply being disrupted. However, in these circumstances, if conditions were such to put properties and land at risk of flooding, the IDB and Environment Agency would take emergency action to maintain the drainage level of service by using temporary pumping equipment.

It is recommended that surface water run-off is managed so that stormwater from the development will not affect any adjoining properties or increase the flood risk elsewhere.

6.0 CONCLUSIONS

As a result of the assessment, the following conclusions have been reached.

The proposed development consists of a like for like replacement of an existing single storey extension on the western side of an existing dwelling at Bungalow Farm, Chatteris Road, Mepal.

The site is located within an Internal Drainage Board catchment and through the operation and maintenance of the pumping stations and the channel system the Board seek to maintain a general standard capable to providing flood protection to agricultural land and developed areas of 1 in 20 and 1 in 100 years, respectively.

The proposed development is protected from the Counter Drain and Ouse Washes during the 1% annual probability (1 in 100 chance each year) event including climate change.

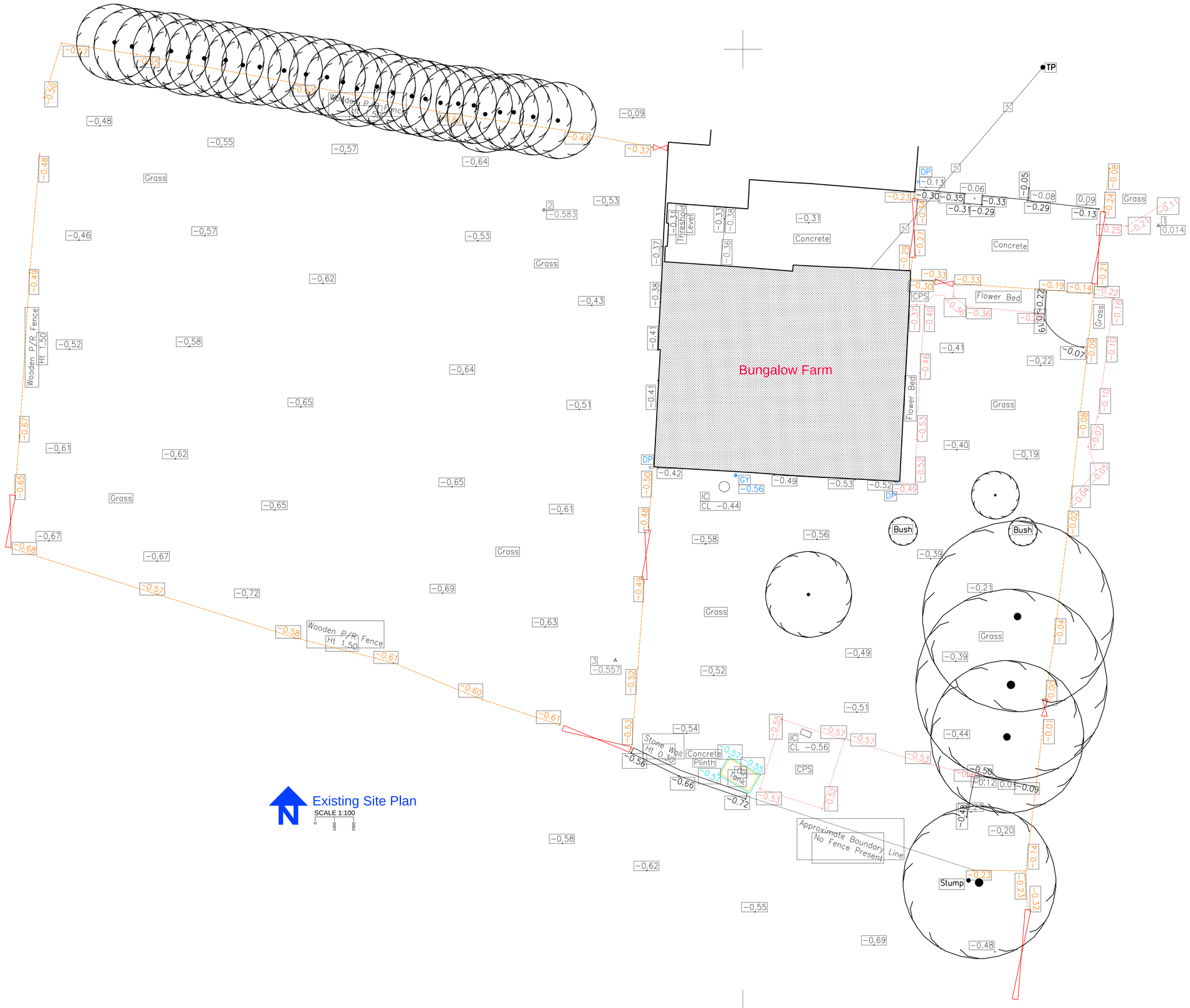
In accordance with the EA Standing Advice for extensions the finished floor level will not be lower than the existing floor level. It is recommended that the occupant receives flood warnings and the use of flood resilient construction is considered.

The development passes the Sequential Test and the Exception Test and is therefore suitable for the proposed location.

ATTACHMENT 1

TOPOGRAPHIC SURVEY
(Dwg 223098-S-03)

PROPOSED PLANS AND ELEVATIONS
(Dwg 223098-S-10)



DO NOT SCALE - ONLY FIGURED DIMENSIONS ARE TO BE USED. LEVELS TO BE CONFIRMED ON SITE. DWG TO BE READ IN COLOUR

A1

NOTES:-

REV	AMENDMENT	DATE	BY
P	Preliminary	xx.xx.23	GR

STATUS:- ONLY BUILD TO CONSTRUCTION STATUS

Preliminary

CLIENT:-

Janice Robinson

CONTRACT:-

Bungalow Farm, Chatteris Road, Mepal, Ely, Cambs, CB6 2AZ

TITLE:-

Existing SitePlan

DESIGN:-	DRAWN:-	CHKD:-
JDS	GR	

SCALE:- A1 as shown

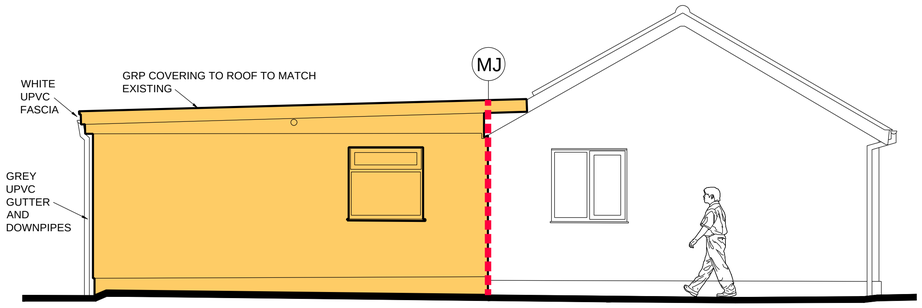
DATE:- Oct 2023

David Symonds Associates
3 Imperial Court, 12 Sovereign Road
Kings Norton Business Centre
Birmingham B30 3FH

Tel: 0121 444 1313
Email: eng@dsace.co.uk
Website: www.dsace.co.uk

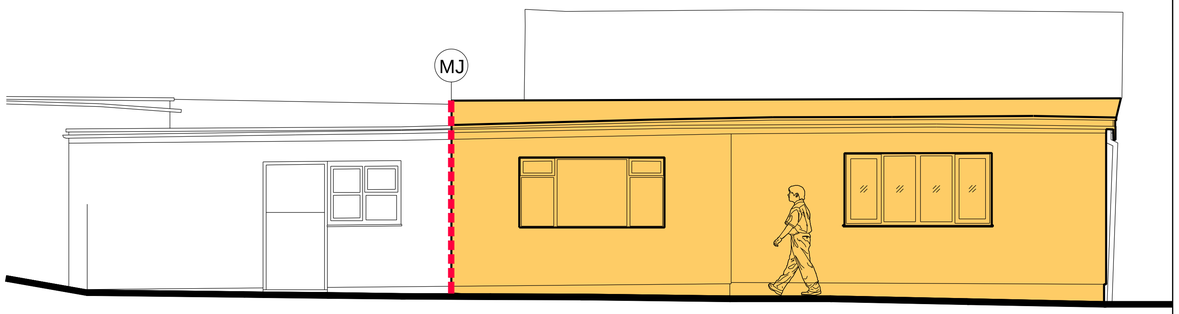
DRAWING No:- 223098-S-03

REV P



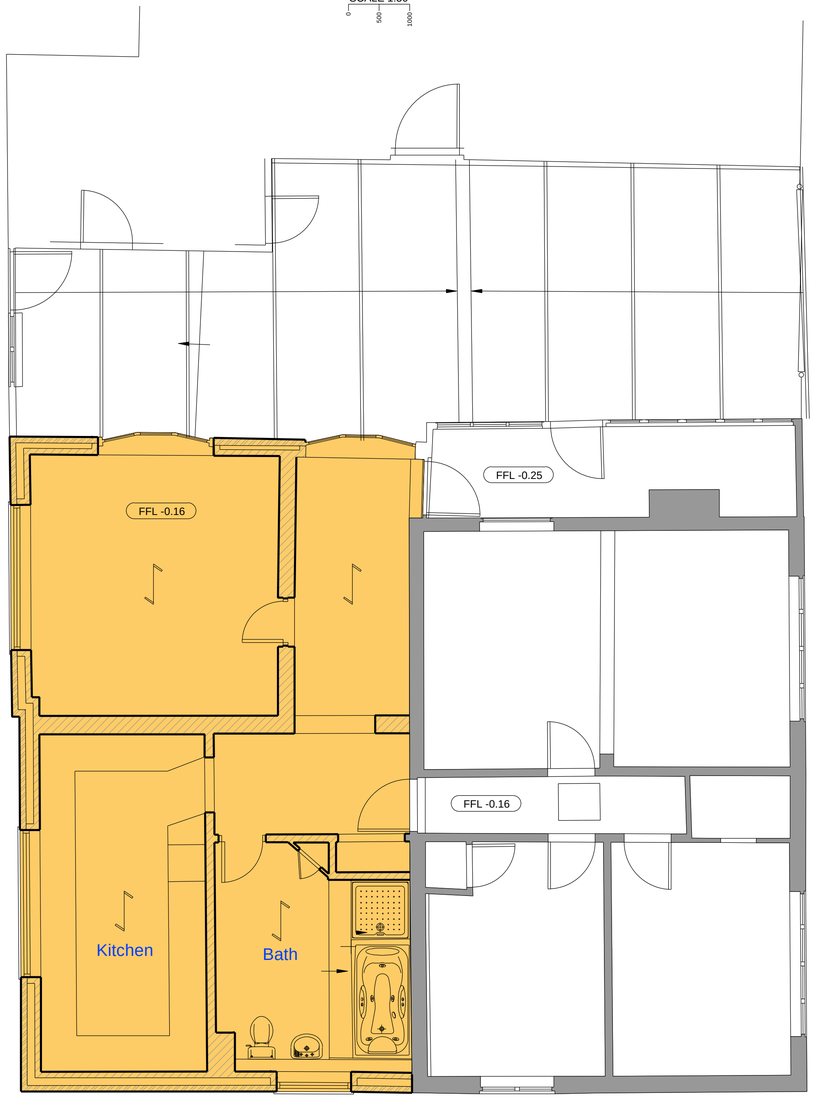
Side Elevation

SCALE 1:50



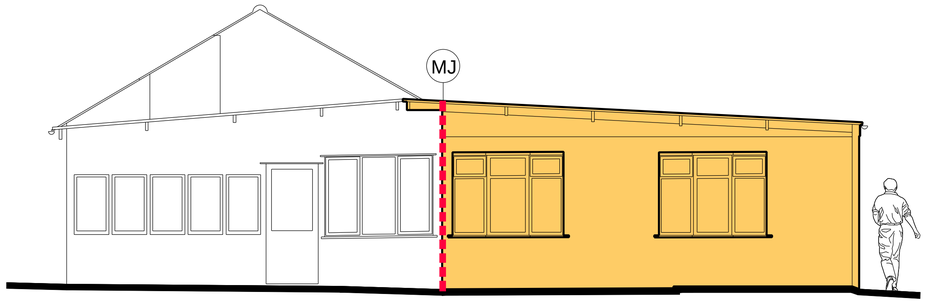
Rear Elevation

SCALE 1:50



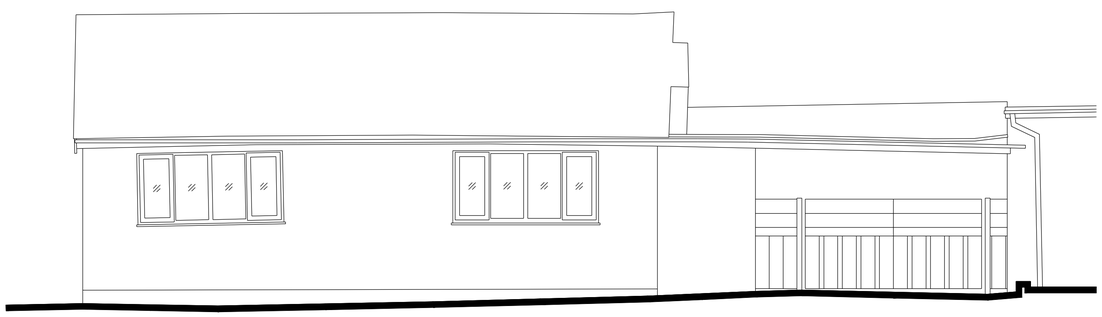
Proposed Plan - 150mm RC ROOF BEAM AND BLOCK FLOOR

SCALE 1:50



Side Elevation

SCALE 1:50



Front Elevation

SCALE 1:50

DO NOT SCALE - ONLY FIGURED DIMENSIONS ARE TO BE USED. LEVELS TO BE CONFIRMED ON SITE. DWG TO BE READ IN COLOUR

A1

NOTES:-

MJ - MOVEMENT JOINT

ALL NEW WINDOWS TO BE WHITE UPVC TO MATCH EXISTING.

ALL EXTERNAL WALLS RENDERED AND PAINTED WHITE WITH TWO COATS OF MASONRY PAINT.

ALL FASCIA AND GUTTERING TO BE WHITE UPVC TO MATCH EXISTING

REV	AMENDMENT	DATE	BY
P	Preliminary	xx.xx.23	GR

STATUS:- ONLY BUILD TO CONSTRUCTION STATUS

Preliminary

CLIENT:-

Janice Robinson

CONTRACT:-

Bungalow Farm, Chatteris Road, Mepal, Ely, Cambs, CB6 2AZ

TITLE:-

Proposed Plans and Elevations

DESIGN:-	DRAWN:-	CHKD:-
JDS	GR	

SCALE:-	DATE:-
A1 as shown	Oct 2023

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3 Imperial Court, 12 Sovereign Road
Kings Norton Business Centre
Birmingham B30 3FH

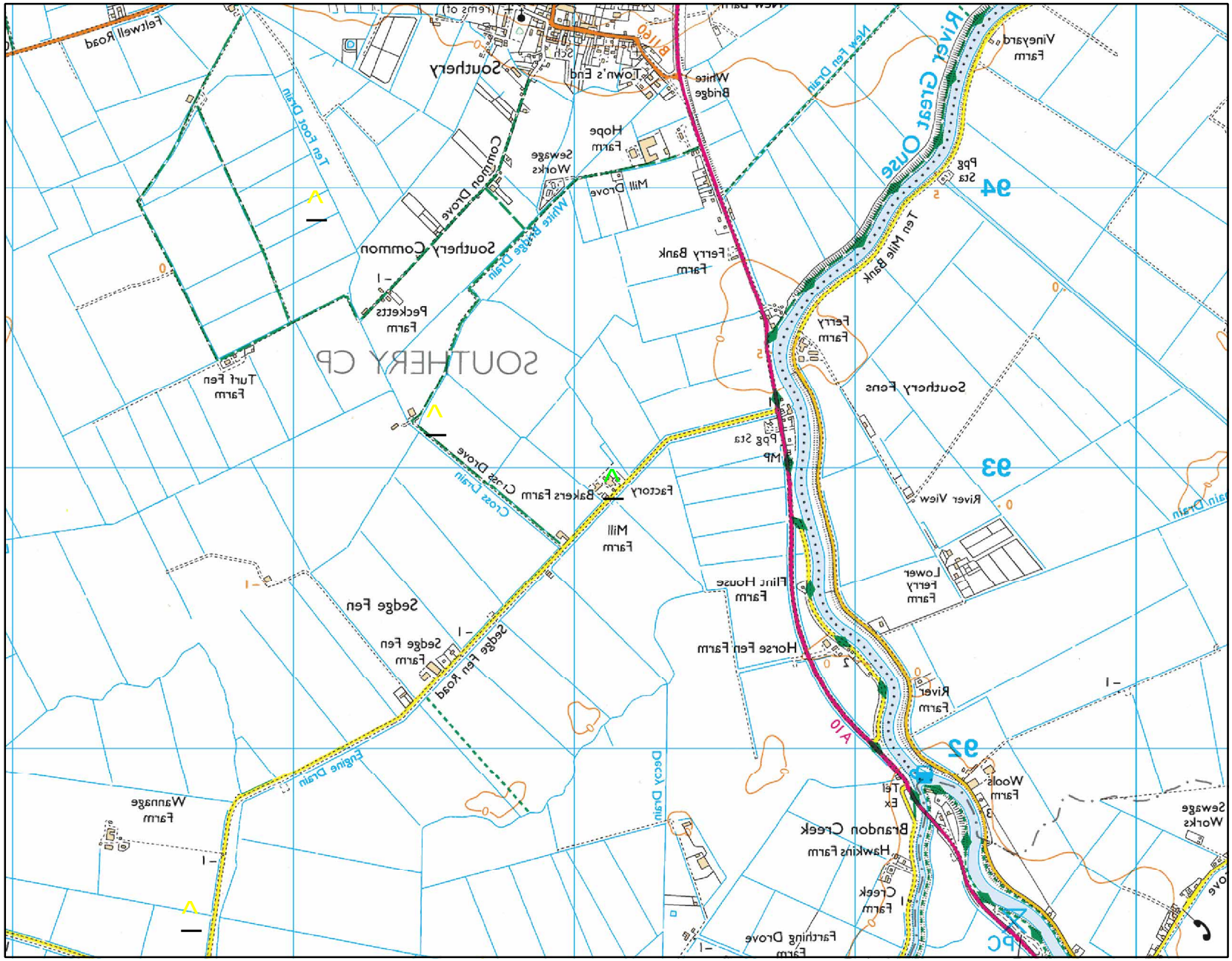
Tel: 0121 444 1313
Email: eng@dsace.co.uk
Website: www.dsace.co.uk

DRAWING No:- 223098-S-10 REV P

ATTACHMENT 2

ENVIRONMENT AGENCY FLOOD RISK INFORMATION

Modelled Breach Locations centred on Hiams Farm, Chatteris Road, Mepal. NGR TL 42699 82428. Ref 58259. Created on 14 September 2017.



Environment Agency

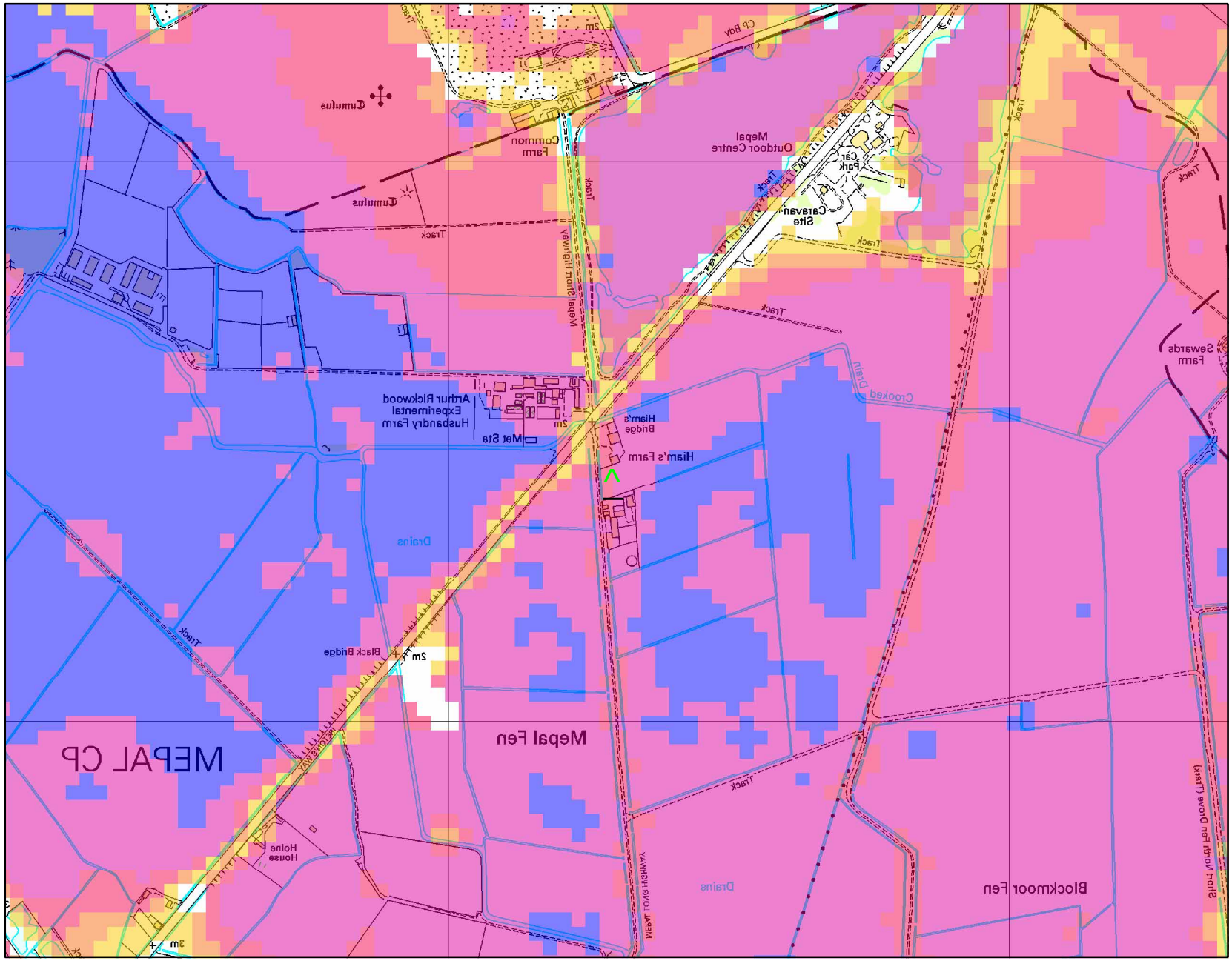
Scale 1:20,000

Legend

- Breach Locations 100yr
- Site

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Map Showing the Maximum Flood Depth (combined breach) centred on Hiams Farm, Chatteris Road, Mepal. NGR TL 42699 82428. Ref 58259. Created on 14 September 2017.



Environment Agency

Scale 1:10,000

Legend

Max Depth 100

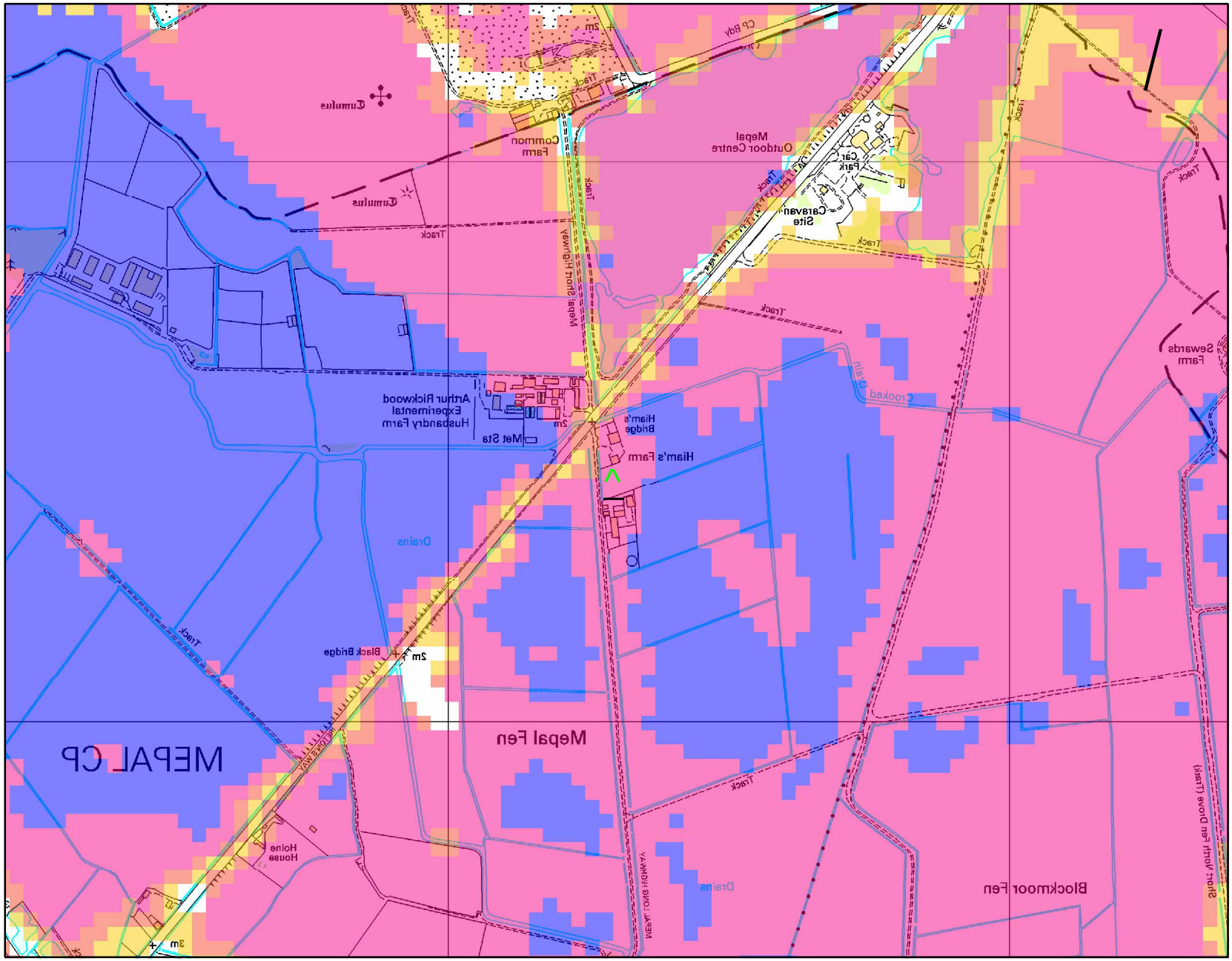
Metres

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 2
- >2
- Site

1. The map is based on computer modelling of simulated breaches at specific locations and a failure of Earith Sluice for the 1% AEP event. Each breach/failure has been modelled individually and the results combined to create this map. Multiple breaches, other combinations of breaches, or different flood flows may all give different results.
2. The map only considers the consequences of a breach, it does not make any assumption about the likelihood of a breach occurring.
3. An allowance for climate change has only been incorporated into the modelling for a limited number of breaches. If available, these outlines have been provided, but are based on a 20% increase in flows to account for climate change impacts. We have recently released updated guidance on climate change allowances for flood risk assessments.

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Map Showing the Maximum Hazard Rating (combined breach) centred on Hiams Farm, Chatteris Road, Mepal. NGR TL4269982428. Ref 58259. Created on 14 September 2017.



Environment Agency

Scale 1:10,000

Legend

Max Hazard Rating 100

<VALUE>

- 0 - 0.75 - Very Low Hazard
- 0.75 - 1.25 - Danger to Some
- 1.25 - 2 - Danger to Most
- >2 - Danger to All

Site

1.This map shows the level of flood hazard to people (hazard rating) if our flood defences are breached at certain locations and a failure of Earith Sluice. The hazard rating depends on the depth and velocity of floodwater and maximum values of these are also mapped.
2.The map is based on computer modelling of simulated breaches at specific locations. Each breach has been modelled individually and the results combined to create this map. Multiple breaches, other combinations of breaches, or different flood flows may all give different results.
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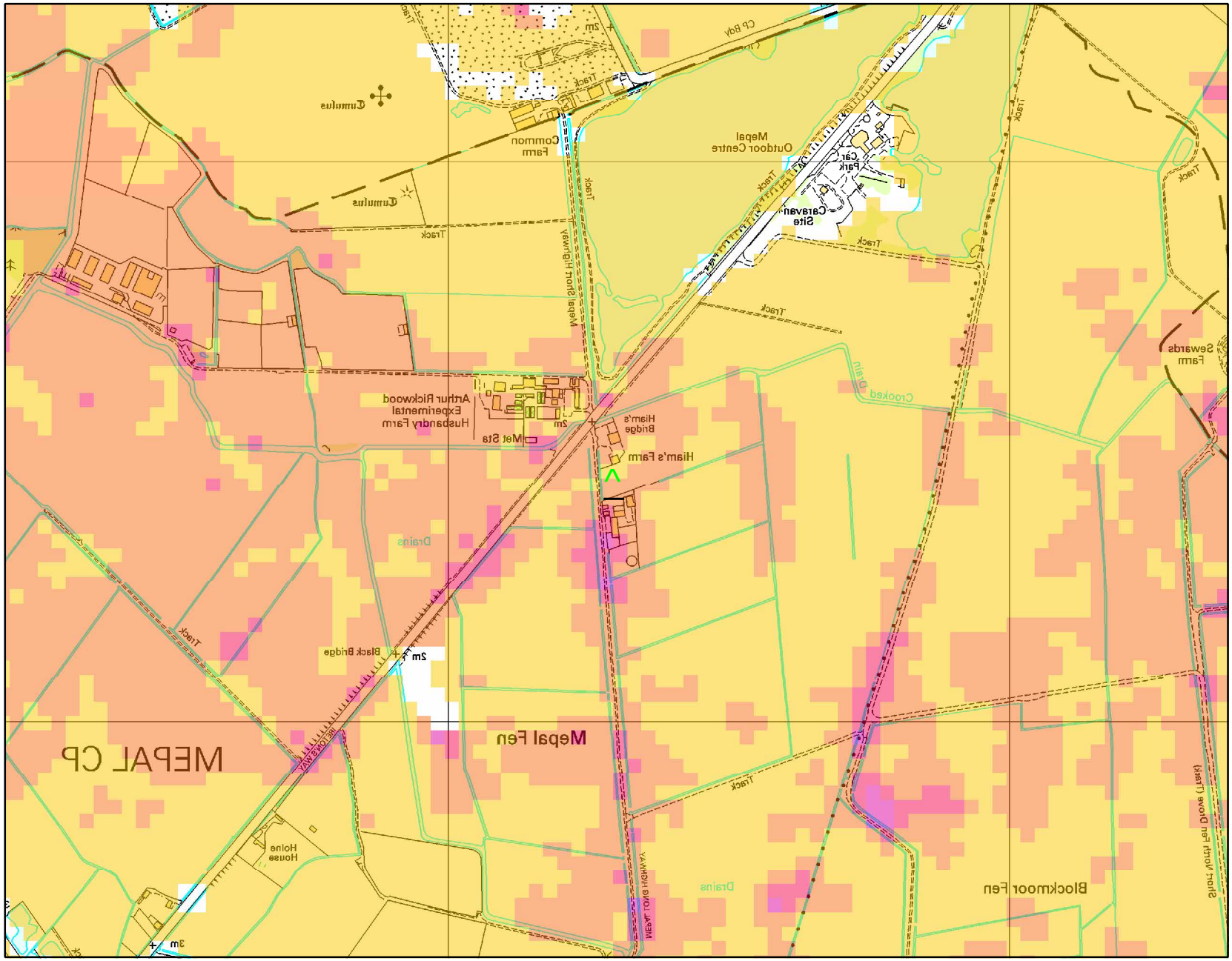
Map Showing the Maximum Water Velocity (combined breach) centred on Hiams farm, Chatteris Road, Mepal, NGR TL 42699 82428. Ref 58259. Created on 14 September 2017.



Environment Agency

Scale 1:10,000

Legend

Max Velocity 100

m/s

- 0 - 0.3
- 0.3 - 1
- 1 - 1.5
- 1.5 - 2.5
- >2.5
- Site

1.The map is based on computer modelling of simulated breaches at specific locations. Each breach has been modelled individually and the results combined to create this map.Multiple breaches, other combinations of breaches, or different flood flows may all give different results.
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