FLOOD RISK ASSESSMENT
FOR PROPOSED
RESIDENTIAL DEVELOPMENT
AT COMMON WAY, TYDD ST MARY, LINCS.

FINAL REPORT

GEOFF BEEL CONSULTANCY

MAY 2018

GCB/SWANN EDWARDS

DISCLAIMER

This document has been prepared solely as a Flood Risk Assessment in support of a planning application for proposed Residential Development at land west of Tysdale Manor, Common Way, Tydd St, Mary, Lincs. "Geoff Beel Consultancy" accepts no responsibility or liability whatsoever for any use made of this document other than by the client "Mr M Mallett & Mr P Wood" for the purposes it was originally commissioned and prepared. All comments and opinions made are based upon information available to "Geoff Beel Consultancy" during the necessary investigative process, and the conclusions and recommendations could therefore, differ in the event of material subsequently being found erroneous, incomplete or misleading. "Geoff Beel Consultancy" therefore, accepts no liability should this prove to be the case.

CONTENTS

1.0 INTRODUCTION

2.0 LOCATION

3.0 THE SITE AND SEQUENTIAL TEST

4.0 EXISTING FLOOD ALLEVIATION MEASURES

5.0 POTENTIAL SOURCE OF FLOODING

6.0 EXTENT OF KNOWN FLOODING

7.0 PROBABILITIES AND TRENDS OF FLOODING

8.0 IMPACTS OF FLOODING

9.0 RESIDUAL RISKS – EXTREME EVENTS

10.0 CONCLUSIONS AND RECOMMENDATIONS

Fig 1 - Planning Drawing; Location Plan, Floor Plans & Elevations Swann Edwards Architecture drg. no. SE-947-10

Fig 2 - Planning Drawing; Site Plan – Swann Edwards Architecture drg. no. SE-947-11

Fig 3 - Topographical Survey – Ratcliff Land & Engineering Surveys drg. no. 6574-1

Fig 4 - Environment Agency Flood Map for Planning

Fig 5 - South Holland District Council Updated Strategic Flood Risk Assessment – Residual Depths - 2115

Fig 6 - Tidal Hazard Mapping – Depth, Hazard & Velocity of 1 in 200 and 1 in 1000 year events (2115) – CCN-2017-38044

Fig 7 - South Holland IDB district plan

1.0 INTRODUCTION

1.1 An outline planning application is to be submitted by Swann Edwards Architecture Ltd on behalf of Mr M Mallett & Mr P Wood for proposed residential development at land west of Tysdale Manor, Tydd St. Mary, Lincs.

1.2 Planning approval requires a Flood Risk Assessment to accompany the planning application and be submitted to the Environment Agency to meet the requirements and general principles contained in the Planning Practice Guidance to the National Planning Policy Framework (NPPF) and be submitted to the Environment Agency for approval.

The site is within defended Flood Zone 3 of the Environment Agency's Flood Map for Planning. The likely source of flooding is from the South Holland Main Drain which is under the jurisdiction of the South Holland IDB.

The Agency's latest Flood Zone Maps have been created as a tool to raise aware ness of flood risk with the public and partner organisations such as Local Authorities, Emergency Services and Drainage Authorities. The Maps take into account existing flood defences.

The site is also shown located in a defended Flood Zone 1 of the South Holland District Council's Updated Strategic Flood Risk Assessment Flood Zone Maps and unaffected by floodwaters on the Residual Depth Map of the SHDC Updated SFRA. (2016)

1.3 Geoff Beel Consultancy was appointed on 18th May 2018 to prepare a Flood Risk Assessment.

2.0 LOCATION

2.1 The development site is located immediately north of Common Way, Tydd St. Mary and 3.00kms west of the tidal River Nene. The National Grid Reference of the site is TF 44401865.

2.2 The position and extent of the site are shown on Fig 2 – Site Plan at the end of the document.

2.3 The site is located within the South Holland Internal Drainage Board district and is shown within a defended Flood Zone 3 as detailed on the Environment Agency Flood Map for Planning.

3.0 THE SITE AND SEQUENTIAL TEST

3.1 The site is currently part of an agricultural holding.

3.2 The area of development is approximately 0.20 hectare with land level generally at 3.30m aOD.

3.3 The proposed site layout consists the construction of a terrace of 4 two storey dwellings.

3.4 The Sequential Test and Exception Test will require to be applied by the Local Planning Authority but the development may be permitted as the site is protected against the 1 in 200 year return period tidal event as well as the 1 in 100 year return period fluvial event meeting the requirements of NPPF.

The site is shown in Flood Zone 1 of the Council's Updated Strategic Flood Risk Assessment and hence the Sequential Test is met.

4.0 EXISTING FLOOD ALLEVIATION MEASURES

4.1 The site is within a defended floodplain, as defined in Appendix 1 of the Environment Agency's 'Policy and Practice for the Protection of Floodplains' and is considered to be passive until such time as a flood greater than that for which the defences were designed occurs. The likelihood of flooding due to overtopping or failure of a flood defence embankment is considered to be small.

4.2 The site is located in the South Holland Drainage Board area, the nearest main drain is located immediately east of the site and drains in a northerly direction to the South Holland Main Drain.

4.3 The existing standard of drainage for the South Holland Internal Drainage Board district is 1 in 50 years return period, compatible with the Department of Environment, Food and Rural Affairs target level of service for rural urban drainage and flood defence works. The South Holland Main drain discharges to the tidal River Nene at the Sutton Bridge Outfall Sluice.

4.3 Tidal flood protection from the River Nene between Wisbech and Sutton Bridge is estimated to be a 1 in 200 years return period. The Environment Agency has recently carried out the River Nene Tidal Strategic Study, which covers the tidal River Nene from the Dog in a Doublet Sluice near Peterborough to its outfall in the Wash at Nene Lighthouses, a distance of some 39.5km.

4.5 The Strategic Study concluded that improvement works were cost effective to meet Department of the Environment, Food and Rural Affairs guidelines in order to sustain the existing tidal defences over the 50 year appraisal period up to a 1 in 200 year standard.

4.6 Current maintenance standards of the Environment Agency for tidal defences; and the South Holland Internal Drainage Board for surface water and land drainage are considered to be very good.

During the operation and maintenance of its pumping stations, associated structures and channel systems, particularly those that could affect property, the Board seek to maintain a general standard capable of providing flood protection to its district. A routine maintenance programme is in place to ensure that the Boards assets are commensurate with the standard of protection that is sought. However, bank slips, blocked culverts etc, may occur from time to time and these matters are usually dealt with promptly.

5.0 POTENTIAL SOURCES OF FLOODING

5.1 Four potential sources of flooding have been identified as a result of this assessment:

a) local blockages to existing IDB main drains
b) storm return period of 1 in 50 years being exceeded
c) failure of Sutton Bridge Outfall Sluice
d) overtopping and breaching of the River Nene and the North Level Main Drain outfall tidal defences

5.2 The probability of flooding from source a) is low due to the maintenance standards already achieved and managed by the South Holland IDB for the Board's main drains.

The probability of flooding from source b) is also low due to the South Holland Main Drain design standard incorporating a minimum 900mm freeboard to the lowest land level which provides adequate storage in events greater than 1 in 50 years. There are many hectares of agricultural land that would flood in such circumstances before the development site was put at risk.

5.3 Failure of the Sutton Bridge Outfall Sluice may occur due to mechanical breakdown or electrical failure. However, in these circumstances, if conditions were such to put properties and land at risk of flooding, the Internal Drainage Board would take emergency action to maintain the drainage level of service by utilising temporary pumping equipment. The probability of such an occurrence is also considered to be low.

5.4 The existing tidal defences between Wisbech and Sutton Bridge consist generally of strengthened and heightened earth embankments with a riverside berm. Crest levels are at 7.00m aOD. The highest recorded tidal surge level reached 5.60m aOD at Wisbech on 11th January 1978 when extensive areas of the town were flooded. The more recent tidal surge event of 5th December 2013 reached a level of 6.10m aOD and the town and surrounding areas were protected by the improved defences.

The site is located 3.00kms west of the River Nene tidal defences which were raised and strengthened after the 1978 surge event.

More recent studies by the Environment Agency have concluded a design water level for the 1 in 200 year tidal event between Sutton Bridge and Wisbech to be below existing tidal defence crest level with sufficient freeboard to take into account sea level rise during the next 100 years.

5.5 The updated version of the South Holland District Council Strategic Flood Risk Assessment shows the extent and depths of floodwaters as a result of a breach to the River Nene tidal defences in 2116. The site is also shown unaffected by floodwaters which is also confirmed by the Environment Agency's more recent Tidal Hazard mapping.

Finished floor levels of the development should be raised 300mm above existing ground level with flood resilient construction up to 300mm above finished floor level.

5.6 The developer should ensure that the eventual occupiers of the dwellings are 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. Indirect warnings are provided to all flood risk areas, even those at low risk of flooding. The main method is media broadcasts via local radio and also by television.

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 contacting 0345 988 1188 and the occupiers of the dwellings should register with the Floodline Direct Warnings Service to receive any future flood warnings.

6.0 EXTENT OF KNOWN FLOODING

6.1 During the preparation of this assessment, the site did not flood during the tidal surge event of February 1978 or December 2013 and since the 1978 date, the defences between Sutton Bridge and Wisbech have been raised to the 1 in 200 year standard.

The more recent tidal surge event of 5th December 2013 reached a level of 6.10m aOD on the River Nene at Wisbech and no flooding occurred as a result of the improved defences.

No flooding of this site has been experienced from the adjoining IDB main drains.

7.0 PROBABILITIES AND TRENDS OF FLOODING

7.1 The probability of this development flooding from localised drainage systems is very low. It is also intended to construct floor levels 300mm above existing ground level with a further 300mm of flood resilient construction above finished floor level.

7.2 The probability of the site flooding with water from the River Nene tidal river system is less than 0.5% because of the standards of the existing flood defences.

7.3 If under very extreme events, levels of floodwater from the South Holland Main drain or other IDB arterial systems rose to such an extent that the site was affected, the situation would not be sudden. It is very probable that sufficient time would be available to take precautionary actions to limit the extent and potential impact of flooding.

7.4 The water levels in the drainage channels will tend to rise as a result of the impacts of climate change. However the existing systems and defences together with the floor levels at 300mm above existing ground level will be appropriate for the design life of the development (i.e. 100 years).

7.5 Safe access and egress from the site is available onto Common Way and hence in a westerly direction to Tydd St. Giles village where land is located in Flood Zone 1.

8.0 IMPACTS OF FLOODING

8.1 No significant impacts of flooding are anticipated.

8.2 Floor levels of the development will be 300mm above existing ground level offering additional protection against impacts arising from any extreme short duration, localised events.

8.3 The general location of the site within the catchment is such that if flooding occurred from the IDB main drain or the River Nene tidal system sufficient warning time would be available.

8.4 No displacement of water from the site will affect any adjoining properties as the dwellings alongside Common Way will be provided with soakaway drainage to BRE 365 requirements and Building Regulations approval.

9.0 RESIDUAL RISK – EXTREME EVENTS

9.1 The residual risk from extreme events is very low on this site, because of its location, in the internal drainage system, existing levels of tidal and fluvial defences with proposed floor level compared to surrounding land and road levels.

9.2 Whilst the site is within Flood Zone 3 of the Environment Agency Flood Map for Planning but it is shown in Flood Zone 1 on the Council's Updated Residual Depth Map (2115) according to NPPF classification, with a very low risk of flooding due to the current standards of drainage and flood defence and land levels. The site is not located within a Functional Flood Plain of any 'main river' or 'main drain'. The Environment Agency Flood Map for Planning has been produced irrespective of existing flood defences and standards of protection. The risk of flooding to adjoining properties in the vicinity is not increased in terms of probability by the proposed development.

9.3 In the extreme event of a serious pumping station failure occurring to the IDB main drain system, or the overtopping of tidal defences, protection will be afforded by the floor levels being above existing ground level.

10.0 CONCLUSIONS AND RECOMMENDATIONS

10.1 As a result of the assessment, the following conclusions have been reached:-

- The proposed development is not in a Functional Floodplain. It is located in the Passive Floodplain protected by existing tidal defences to a standard of 1 in 200 years and fluvial defences to standard of 1 in 100 years.

- The site is in Flood Zone 3 of the Environment Agency Flood Map for Planning but shown in Flood Zone 1 of the Council's Updated Residual Depths Map (2116) according to NPPF classification with the actual risk of flooding from the tidal River Nene system being very low (less than 0.5%).

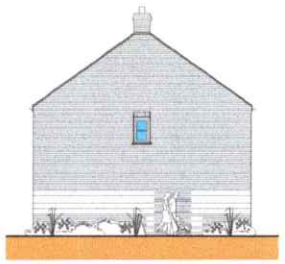
- The site is also shown as unaffected by any floodwaters on the latest Environment Agency Tidal Hazard mapping for year 2115.

- Surface water run-off discharge to soakaways to BRE365 design requirements and building Regulations approval.



Front Elevation

Scale: 1:100



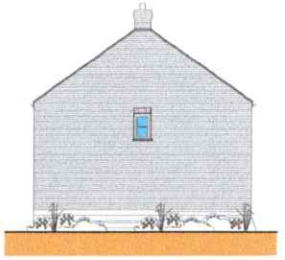
Side Elevation

Scale: 1:100



Rear Elevation

Scale: 1:100



Side Elevation

Scale: 1:100

ELEVATION KEY

Indicates brickwork

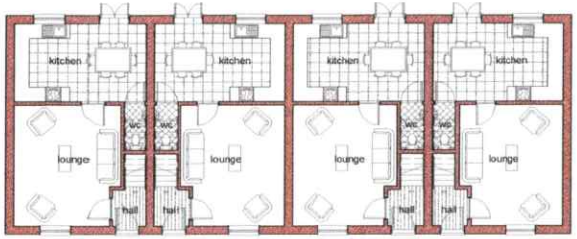
Indicates glazing

Indicates roof tiles



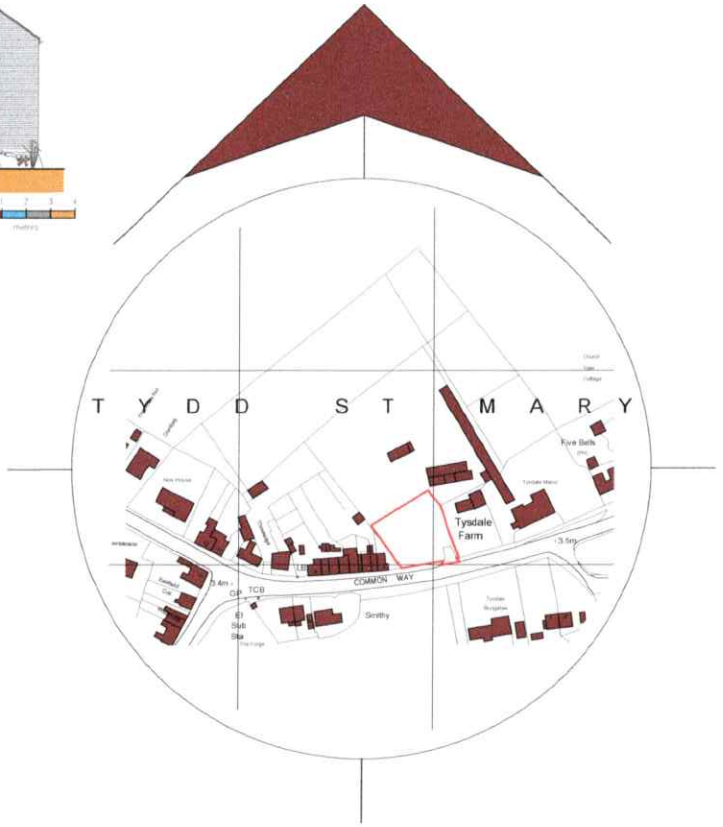
First Floor Plan

Scale: 1:100



Ground Floor Plan

Scale: 1:100



Location Plan

Scale: 1:1250

General Notes

1. This drawing shall not be scaled, figured dimensions only to be used.
2. All dimensions are shown in mm unless otherwise stated.
3. The contractor, subcontractors and suppliers must verify all dimensions on site prior to the commencement of any work.
4. This drawing is to be read in conjunction with all relevant engineers specialist consultants drawings and specifications.
5. Any discrepancies are to be brought to the Architects attention.

SWANN EDWARDS ARCHITECTURE

Swann Edwards Architecture Limited, First Floor, Dinham, Wadeck, Gantry, PE13 4AA

t: 01945 467084 e: mail@swannedwards.co.uk w: www.swannedwards.co.uk

Job Title: Proposed Residential Development Tysdale Farms, Common Way, Tydd St Mary for Mr M Mallett & Mr P Wood

Drawing Title: Planning Drawing

Date: April 2018

Scale: As Shown @ Sheet Size A1

Job No.: SE/447

Drawn by: JSD

Dwg No.: 110

Revision:

Issue ©



SITE PLAN KEY

- Indicates proposed buildings
- Indicates proposed grass
- Indicates proposed shrubs
- Indicates proposed parking
- Indicates proposed tarmac access to highways standard
- Indicates proposed patio
- Indicates footpath
- Indicates site access
- Indicates existing buildings
- Indicates existing trees and hedges
- Indicates structures to be demolished

General Notes

1. This drawing shall not be scaled, figured dimensions only to be used.
2. All dimensions are shown in 'mm' unless otherwise stated.
3. The contractor, sub-contractors, and suppliers shall verify all dimensions on site prior to the commencement of any work.
4. This drawing is to be read in conjunction with all relevant engineers and specialist documentation, drawings and specifications.
5. Any discrepancies are to be brought to the designers attention.

Landscaping Description	
SP - Shrub Planting to include: Lonicera Pileatea, Spiraea Gadi Flame, Scarlecio Cinyd, Rosa Rugosa, Prunus Laurocerasus, Syringa Vulgaris C3 pot size, planting size 40-60cm, planted at 750mm ctrs	GC - Ground Cover Plants Cotoneaster Horizontalis, Hedera Helix, Lavendula Spica 6 plants per sq m, 15cm planting size

Landscaping Notes - All planting, seeding or turfing as shown on the above landscaping plan are to be carried out in the first planting and seeding seasons following the occupation of the dwelling of the completion of the development, whichever is sooner, and any trees or plants which within a period of 5 years from the completion die, are to be removed and replaces with others of a similar size and species, unless the Local Planning Authority gives written consent to any variation.

Method statement for protection of trees on site during construction

- Prior to the commencement of any construction work on site, protective fencing shall be erected around each tree or tree group. Protective fencing in accordance with above table and BS 5837 unless otherwise agreed in writing with the local Planning Authority. Please see protected areas marked on proposed site plan.
- No trenches or pipe runs for services and drains shall be sited within 4m of the trunk of any trees retained on the site, unless otherwise agreed in writing with the local Planning Authority.
- New hard surfaces or paths in accordance with minimum recommended distances for protective fencing.
- No burning shall take place in a position where the flames could extend to within 5m of foliage, branches or the trunk of any tree to be retained.

Method statement for nature conservation

- The existing remaining tree on site is to be protected as above for the duration of the construction to safeguard the habitats of any nesting birds that may be present.

SWANN EDWARDS
ARCHITECTURE

Swann Edwards Architecture Limited, Fen Road, Clayton, Walpole, Cambs. PE13 1HA

Job Title
Proposed Residential Development
Tydaki Barns, Common Way
Tydd St Mary
for: Mr M. Mallett & Mr P. Wood

Drawing Title
Planning Drawing

Date: April 2018
Scale: As Shown
Sheet Size: A1
Job No.: SE-947
Dwg. No.: 11
Drawn by: JRB
Revision:



Ratcliff
Land & Engineering Surveys Ltd

www.ratcliffandsurveys.co.uk – info@rdasurveys.co.uk – Tel: 01733 270851

JOB TITLE
Topographical survey
Common Way,
Tydd St Mary

CLIENT
Swann Edwards
Architecture

DRAWING NUMBER: 6574-1
DRAWN BY: KL/NF

SHEET SIZE & SCALE: A1 @ 1:200
DATE SURVEYED: March 2018

REVISIONS/UPDATES & ASSOCIATED DETAILS

Dwg No	Details	By	Date

DRAWING KEY

STANDARD BOUNDARIES
SURFACES
STREET SERVICES
STREET SERVICES
FEATURES

This depiction of a wall, fence or hedge does not necessarily represent a legal boundary. It is the clients responsibility to confirm legal boundaries with the vendor.

Unless previously agreed, all services existing on site have been surveyed apart from where access is restricted by vehicles or other significant constructions.

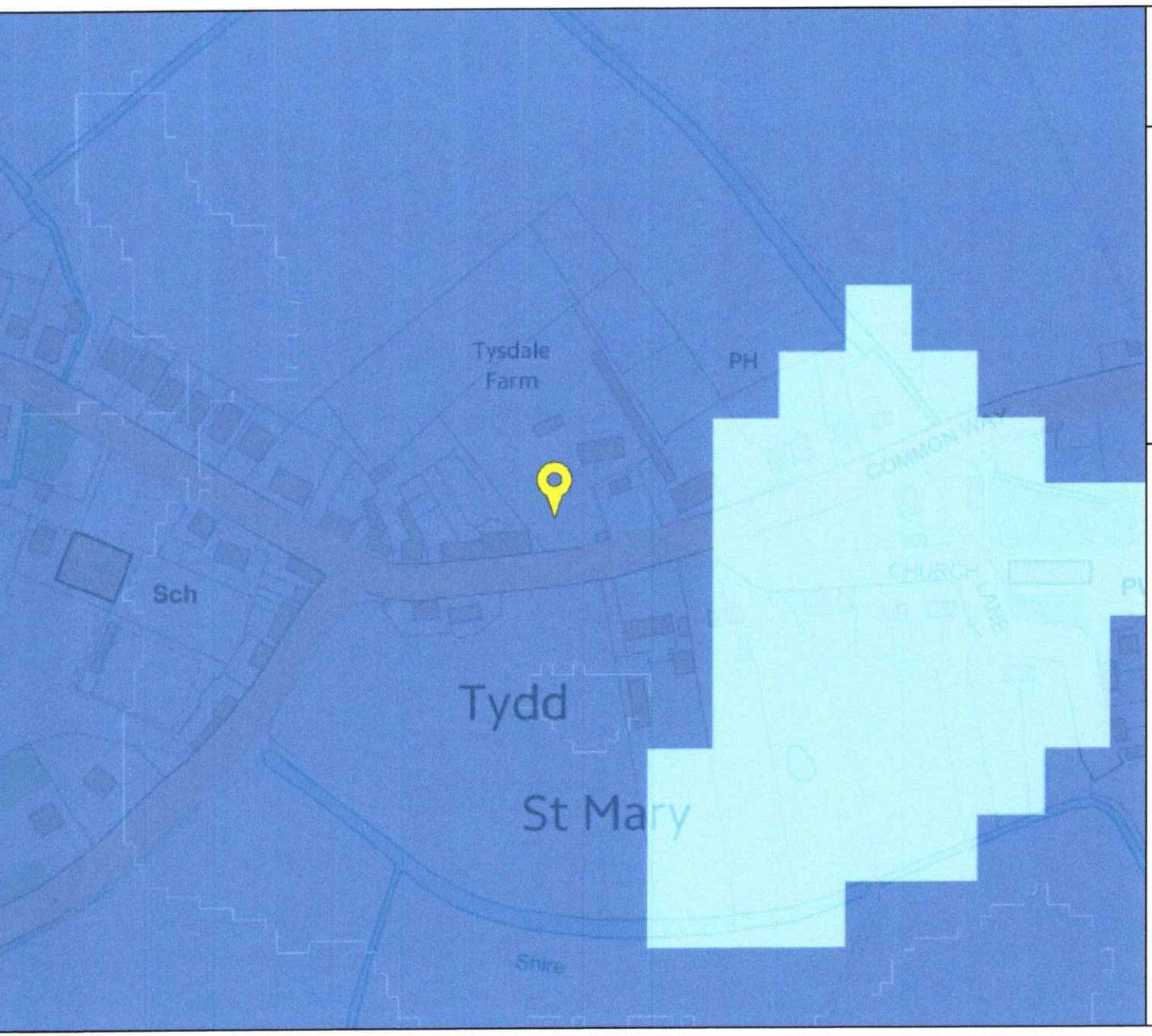
If applicable, manhole covers will be lifted unless this significantly obstructs the flow of traffic or vehicular access.
Manhole will not be lifted if this were to present any health & Safety risk to staff or the public. Irreplaceable or cracked covers will not be lifted.
All pipe directions are indicative only and have not been proved unless specifically instructed.
For safety reasons, pipe sizes and directions are estimated from above ground and are therefore approximate values.

All drawing units, levels and dimensions are in metres, unless otherwise stated.

The data used for the computation of the horizontal and vertical control for this survey was recorded using our survey grade GNSS receivers.
This data was provided by Leica Geosystems Smartnet RTK correction service.
Therefore primary survey controll is based on OSGB36(15)

A scale factor of 1 has been applied to this survey which has been based on station 1 and referenced to station 2.
Therefore this grid should be treated as arbitrary.
If in doubt please ask.

Plotting on paper may lead to a variety of scaling discrepancies due to paper stretching or inaccurate plotter settings etc.
Therefore any dimensions scaled from a paper reproduction of this survey should be treated with caution.
This drawing must be used in conjunction with all other relevant documentation.



Environment Agency

Flood map for planning

Your reference
Tydd St mary

Location (easting/northing)
544386/318616

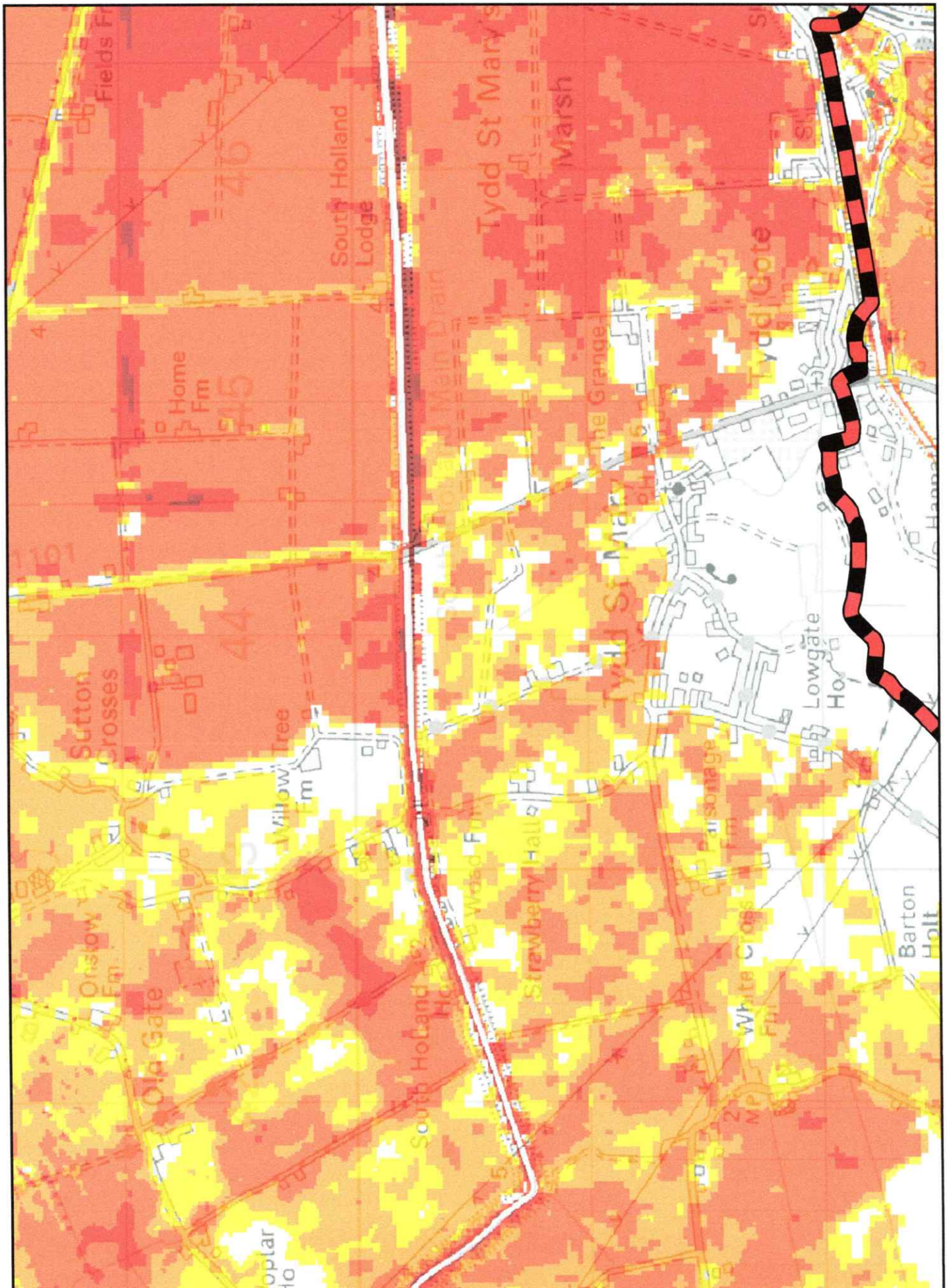
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Created
20 May 2018 2:25

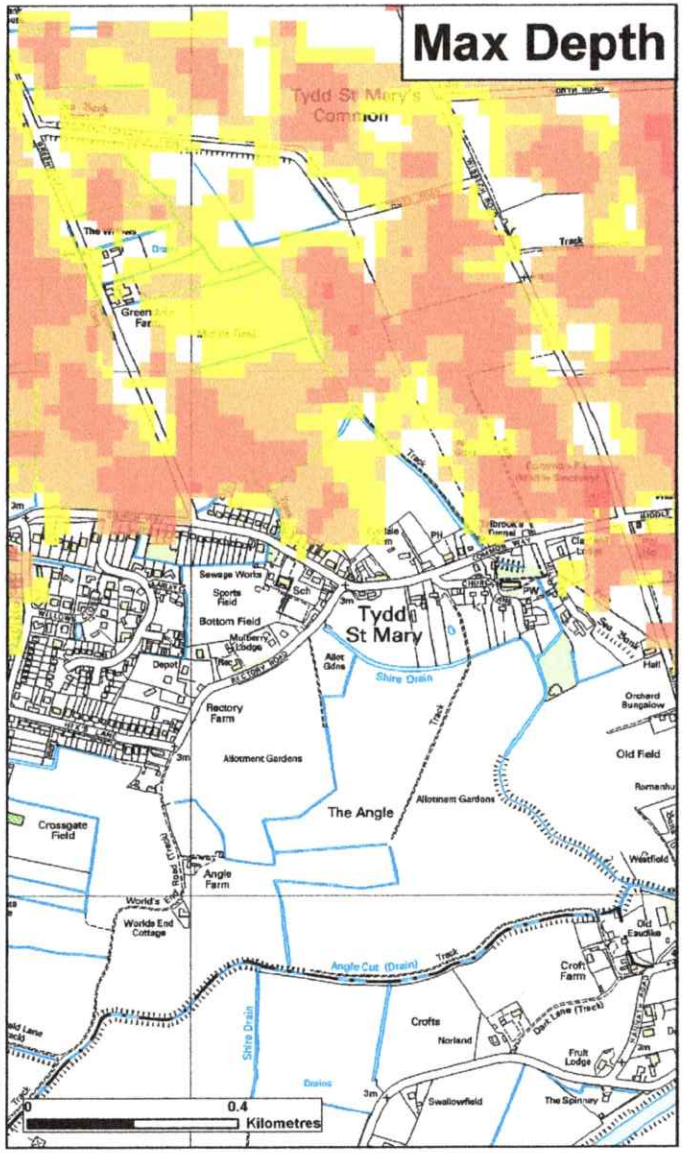
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- Flood zone 3
- Flood zone 3: areas benefitting from flood defences
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Flood storage area

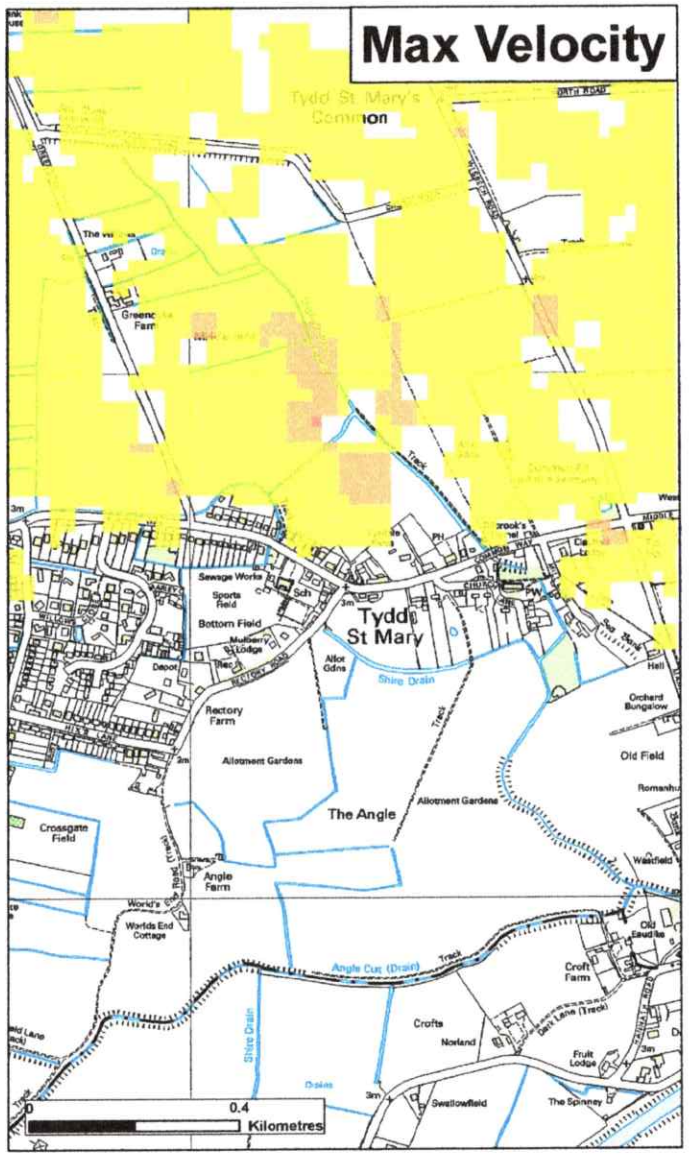
0 20 40 60m

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Fields Fm
South Holland Lodge
Tydd St Mary's
Marsh
Main Drain
The Grange
Tydd Gote
Home Fm
46
45
44
Sutton Crosses
Willow Tree
Lowgate
Barton Holt
Orslow Fm
Old Gate
Strawberry Hall
South Holland
Poplar







★ **Modelled Breach Locations** - see also the accompanying plan "Location of Modelled Breaches"

Max Hazard
(Risk to People : FD2320)

- Less than 0.75 (Low Hazard)
- Between 0.75 and 1.25 (Danger for Some)
- Between 1.25 and 2.0 (Danger for Most)
- Greater than 2.0 (Danger for All)

Max Depth (m)

- 0 - 0.25
- 0.25 - 0.50
- 0.50 - 1.0
- 1.0 - 1.6
- 1.6 +

Max Velocity (m/s)

- 0 - 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.5
- 2.5 +

ed	March 2017	Scenario year	2115	Scenario Annual Chance	0.5% (1 in 200)	CCN Number	CCN-2017-38044

This map shows the level of flood hazard to people (called a hazard rating) if our flood defences are breached at certain locations, for a range of scenarios. The hazard rating depends on the depth and velocity of floodwater, and maximum values of these are also mapped.

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, different sized tidal surges or flood flows may all give different results.

The map only considers the consequences of a breach, it does not make any assumption about the likelihood of a breach occurring. The likelihood of a breach occurring will depend on a number of different factors, including the construction and condition of the defences in the area. A breach is less likely where defences are of a good standard, but a risk of breaching remains.

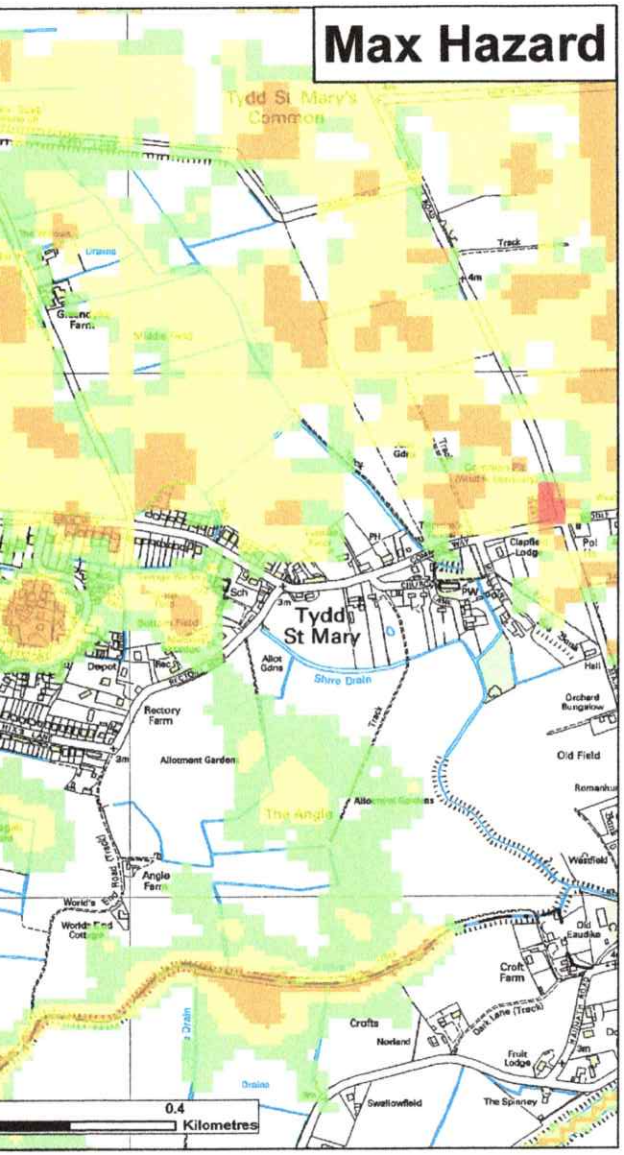
General Enquiries No: 03708 506 506. Weekday Daytime calls cost 5p plus up to 6p per minute from BT Weekend Unlimited. Mobile and other providers' charges may vary

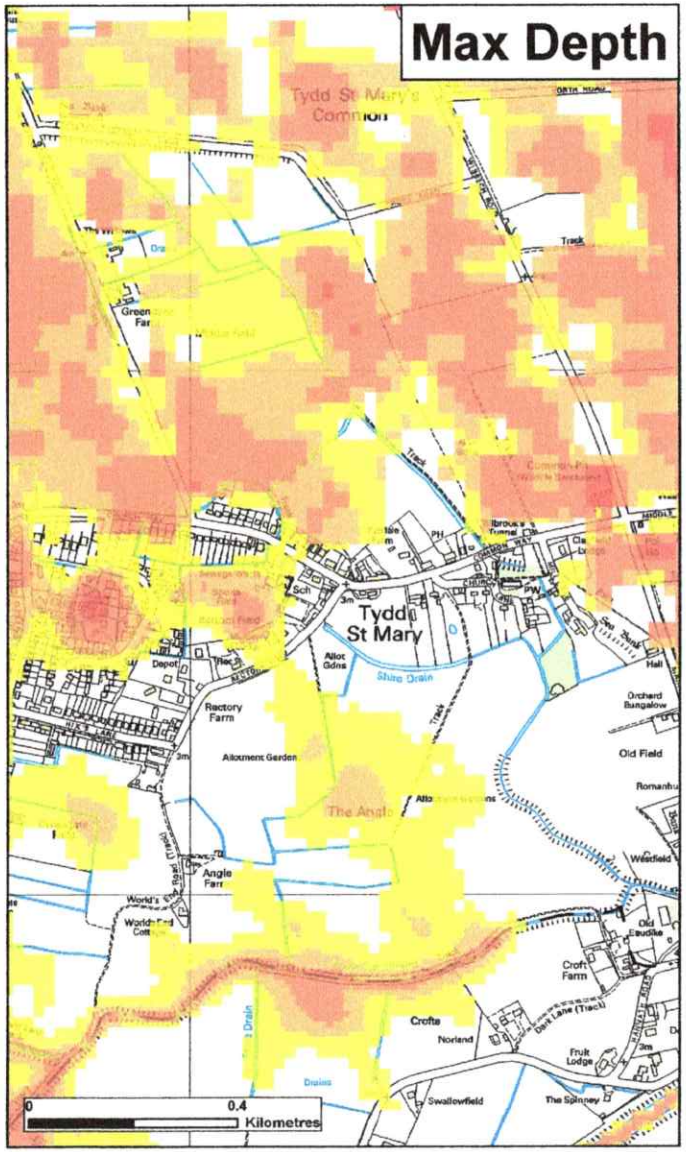
Environment Agency

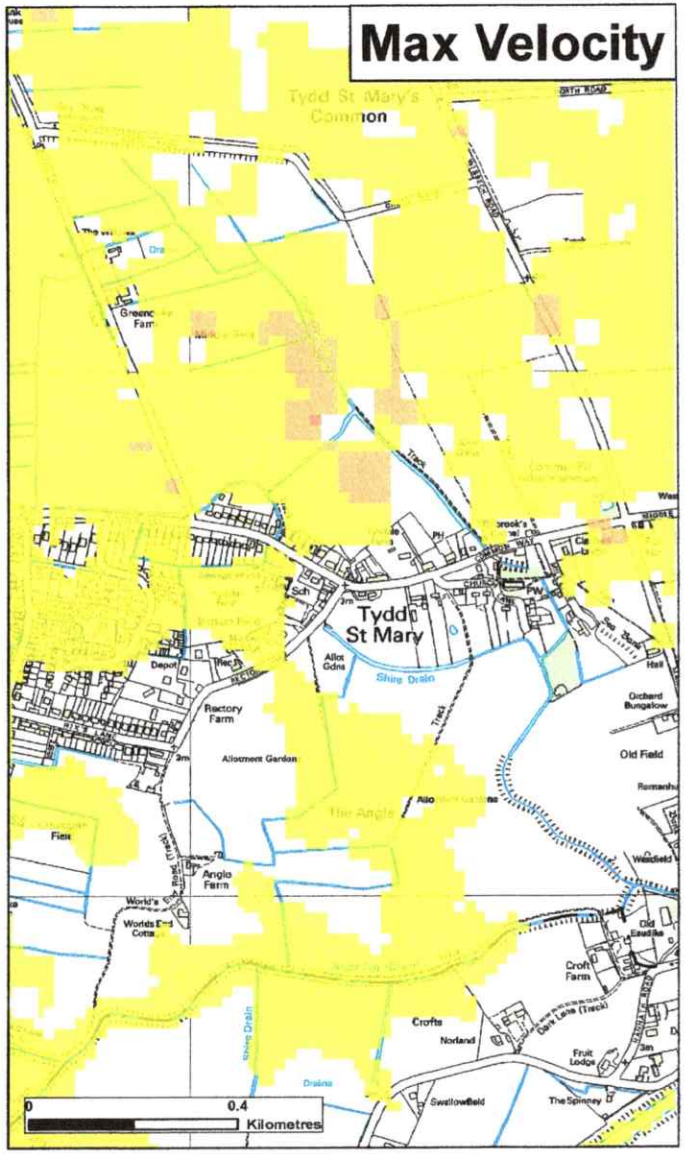
Lincolnshire and Northamptonshire Tidal Breaching Hazard Mapping

Map Centred on TF 44290 18607

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★ **Modelled Breach Locations** - see also the accompanying plan "Location of Modelled Breaches"

Max Hazard (od Risk to People : FD2320)	Max Depth (m)	Max Velocity (m/s)
Less than 0.75 (Low Hazard)	0 - 0.25	0 - 0.3
Between 0.75 and 1.25 (Danger for Some)	0.25 - 0.50	0.3 - 1.0
Between 1.25 and 2.0 (Danger for Most)	0.50 - 1.0	1.0 - 1.5
Greater than 2.0 (Danger for All)	1.0 - 1.6	1.5 - 2.5
	1.6 +	2.5 +

e ted	March 2017	Scenario year	2115	Scenario Annual Chance	0.1% (1 in 1000)	CCN Number	CCN-2017-38044

This map shows the level of flood hazard to people (called a hazard rating) if our flood defences are breached at certain locations, for a range of scenarios. The hazard rating depends on the depth and velocity of floodwater, and maximum values of these are also mapped.

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, different sized tidal surges or flood flows may all give different results.

The map only considers the consequences of a breach, it does not make any assumption about the likelihood of a breach occurring. The likelihood of a breach occurring will depend on a number of different factors, including the construction and condition of the defences in the area. A breach is less likely where defences are of a good standard, but a risk of breaching remains.

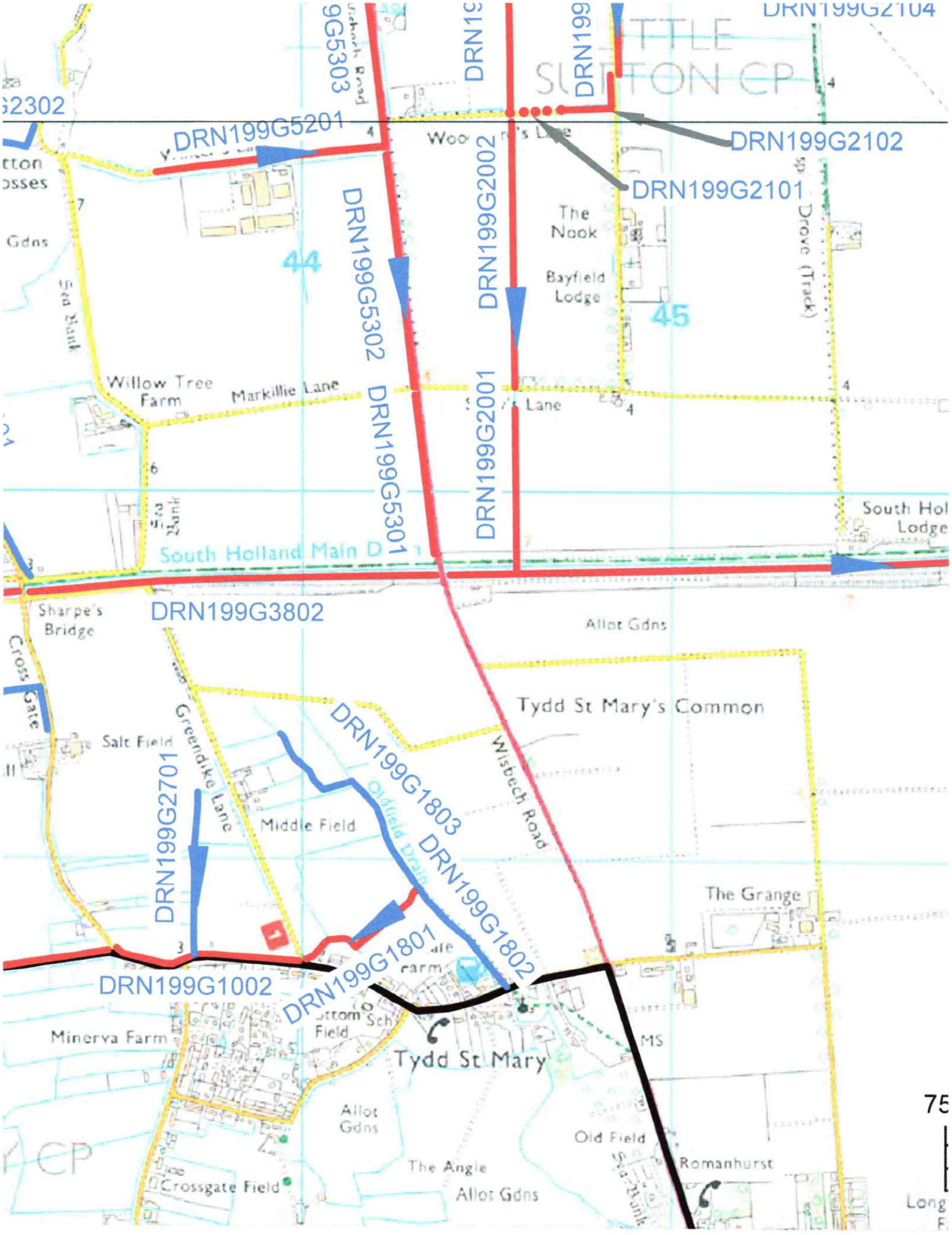
General Enquiries No: 03708 506 506. Weekday Daytime calls cost 5p plus up to 6p per minute from BT Weekend Unlimited. Mobile and other providers' charges may vary

Environment Agency

Lincolnshire and Northamptonshire Tidal Breaching Hazard Mapping

Map Centred on TF 44290 18607

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DRN199G2104
DRN199G5303
DRN199G5201
DRN199G2102
DRN199G2101
DRN199G2002
DRN199G5302
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DRN199G5301
DRN199G3802
DRN199G2701
DRN199G1803
DRN199G1802
DRN199G1801
DRN199G1002
South Holland Main D
Willow Tree Farm
Markillie Lane
The Nook
Bayfield Lodge
Drove (Track)
South Hol Lodge
Sharpe's Bridge
Cross Gate
Salt Field
Greendike Lane
Middle Field
Oldfield Drain
Wisbech Road
Allot Gdns
Tydd St Mary's Common
The Grange
Minerva Farm
Tydd St Mary
Crossgate Field
The Angle
Old Field
Romanhurst
44
45