Pell Frischmann

Lytham Green Golf Course

Flood Risk Assessment

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File Path	**\\rsbgukfs01\WAKEngineer\data\106513- Booth Ventures Golf Courses\01 - WIP\Documents\Drainage\006 Lytham Green GC\106513-PEF-XX-XX-RP-D-00006 Lytham Green GC FRA.docx**					
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P01	S3	First Issue	29-Nov-2022	N Starkey	M Duquemin	N Starkey
P02	S3	Updated for Planning	06/03/2023	N Starkey	M Duquemin	N Starkey
P03	S4	Minor amendments follow pre-app consultation	29/06/2023	N Starkey	M Duquemin	N Starkey
P04	S4	Updated Masterplan Drawing	20/02/2024	N Starkey	M Duquemin	N Starkey
P05	S4	Updated surface water details	20/05/2024	N Starkey	M Duquemin	N Starkey
Ref. reference. Rev revision. Suit suitability.						

Prepared for

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1 Introduction

Pell Frischmann have been appointed by Booth Ventures to undertake a Flood Risk Assessment (FRA) in accordance with the National Planning Policy Framework (NPPF). This report has been prepared to help establish the feasibility of reprofiling hole 4 of Lytham Green Golf Course, Lancashire.

1.1 Scope of Works

The following scope of works has been undertaken to provide a Flood Risk Assessment to meet the requirements set out in the National Planning Policy Framework (NPPF), the associated Planning Practice Guidance (PPG) and local policy:

- Collate and undertake a desk-based review of publicly available flood risk information, such as Environment Agency mapping, local data, policy and guidance;
- Undertake a desktop review of other data that has been made available, such as topographic surveys, existing drainage plans and proposed layout plans;
- Provide outline advice on flood risk; and
- Provide a preliminary FRA based on the above information.

1.2 Sources of Information

A review of the relevant information from a range of sources has been undertaken and includes the following:

- National Planning Policy Framework (NPPF), July 2021;
- Technical Guidance to the National Planning Policy Framework; and
- Ribble Valley Borough Council, Strategic Flood Risk Assessment, April 2017.

1.3 Environment Agency Data

The following information has been gathered from DEFRA's Spatial Data Catalogue, data.gov.uk (accessed July 2022):

- Flood Map for Planning (Rivers and Sea) – Flood Zone 2;
- Flood Map for Planning (Rivers and Sea) – Flood Zone 3;
- Flood Map for Planning (Rivers and Sea) – Areas Benefiting from Flood Defences;
- Risk of Flooding from Surface Water Extent (3.3%, 1% and 0.1% AEP);
- Risk of Flooding from Rivers and Sea;
- Statutory Main River Map; and
- LiDAR Composite DTM (2m).

2 The Site

The site, Lytham Green Golf Course, is located in the town of Lytham, to the south of Blackpool, Lancashire. The existing golf course is predominately green open space but includes a club house and car parking at the south of the site. The proposed scheme is to reprofile the ground levels in the north-eastern corner of the existing golf course as shown in Figure 1 below. The approximate centre of the site is positioned at National Grid Reference 337512, 428636.

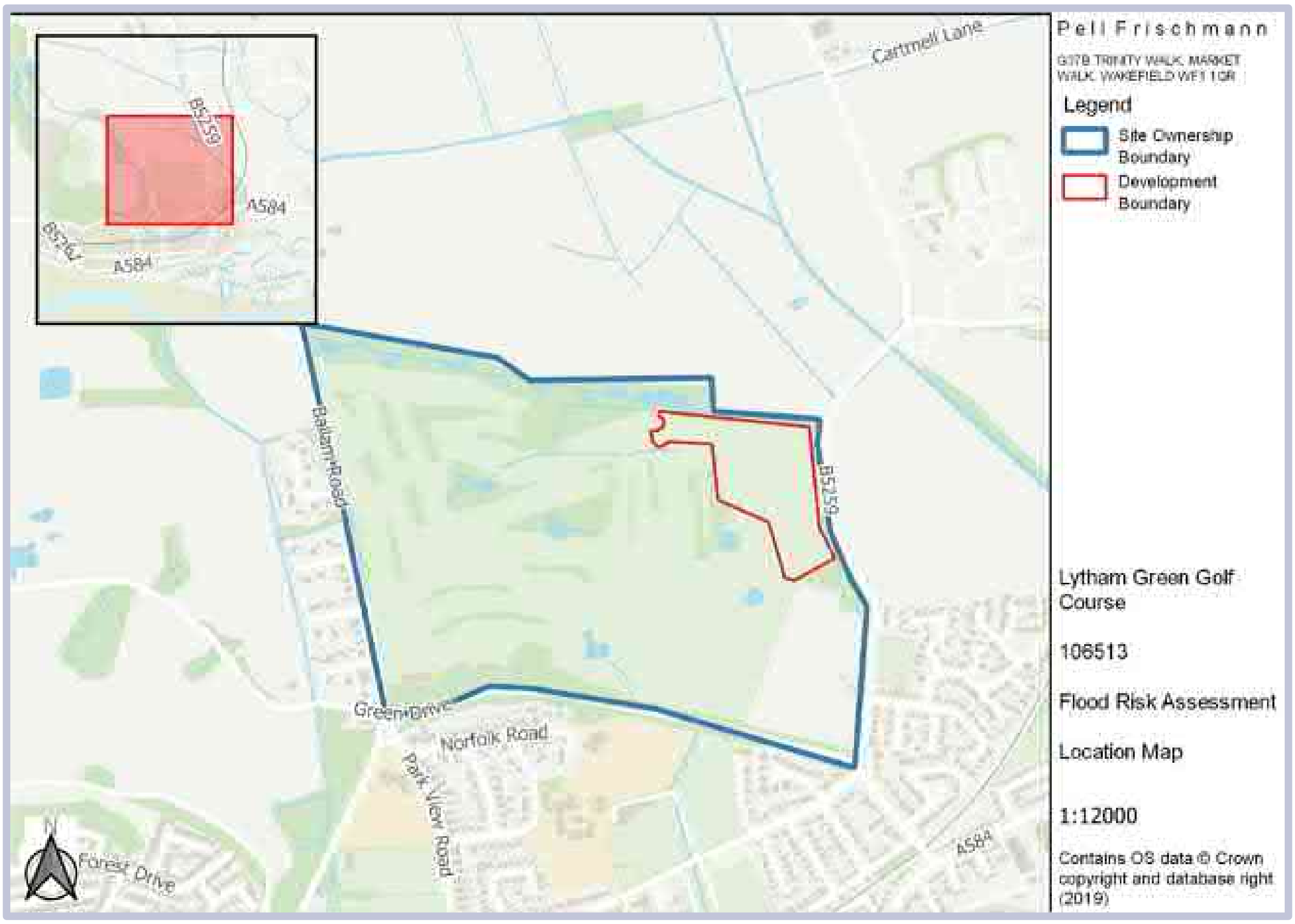

Figure 1 Site location plan

2.1 Site Description

The total area of the existing golf course site is 65.72 ha, with the development area being 5.25 ha. The site is currently a green open space. The existing golf course forms the western and southern site boundaries of the site, with the B5259 forming the eastern boundary.

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2.2 Topography

Figure 2 below shows the local topography around the site. The site lies within an area of low lying ground with a typical level of 1.3m AOD. The ground to the south of the site is typically 3 to 5m AOD.

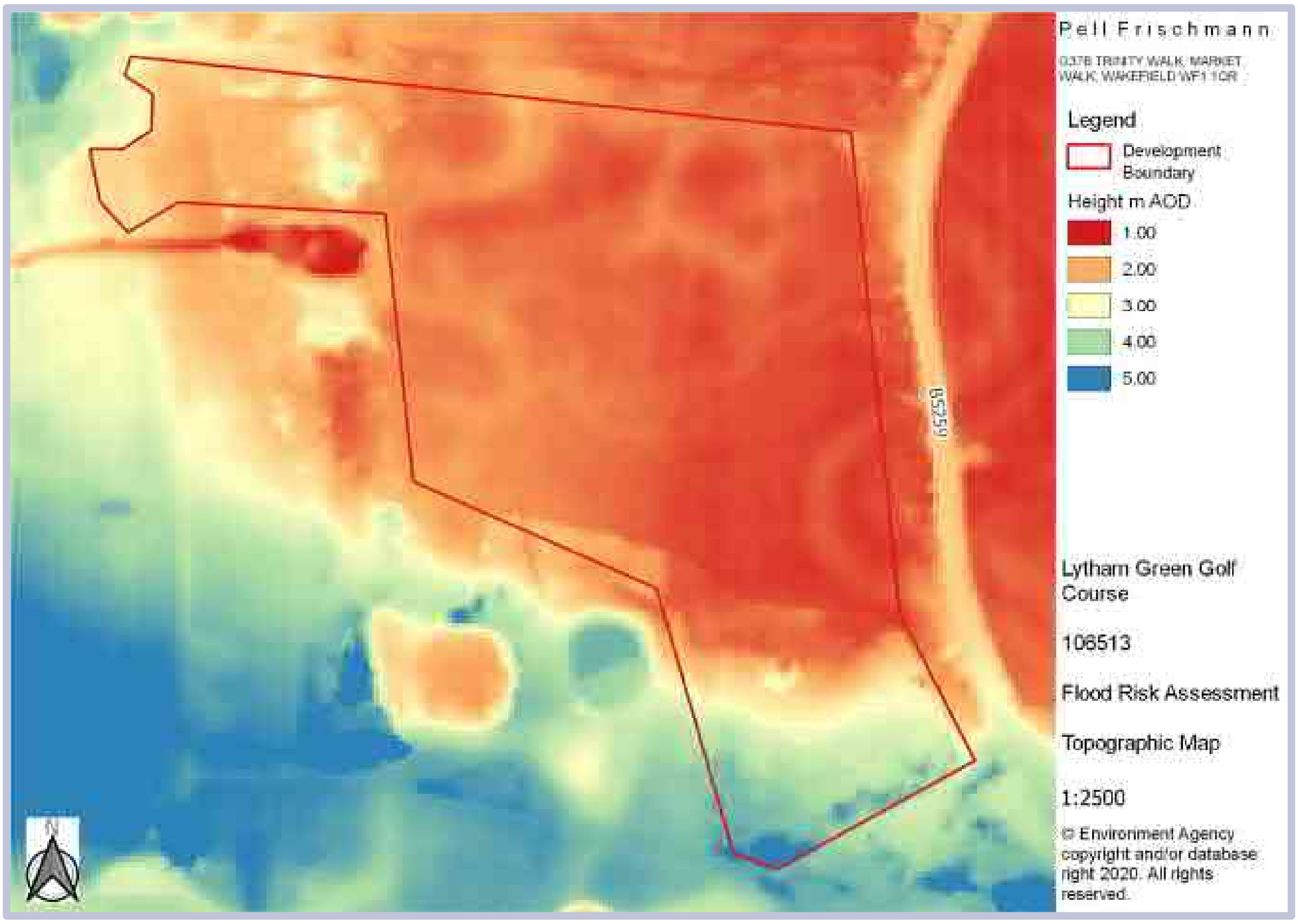


Figure 2 Site topography

2.3 Watercourses

There are two watercourses running in close proximity to the site, referred to as the Main Drain and Branch Drain. The Main Drain flows southward towards the Ribble Estuary to the east of the site; and the Branch Drain flows eastward, joining the Main Drain to the north of the site.

There are a number of formal flood defences both watercourse adjacent to the site, including flood walls and flood embankments.

Figure 3 Site watercourses and flood defence

2.4 Proposed Development

The proposed development is raising and reprofiling of the existing ground levels across the site to reprofile hole 4 of the existing golf course. A plan of the proposed development is included in **Appendix A**.

3 Existing Flood Risk

3.1 Flood Maps for Planning (Rivers and Sea)

The Environment Agency's flood risk data indicates the entire site falls within Flood Zone 3, land having a 1 in 100 or greater annual probability of river flooding; or land having a 1 in 200 or greater annual probability of sea flooding. The data set does not differentiate between fluvial and tidal flooding.

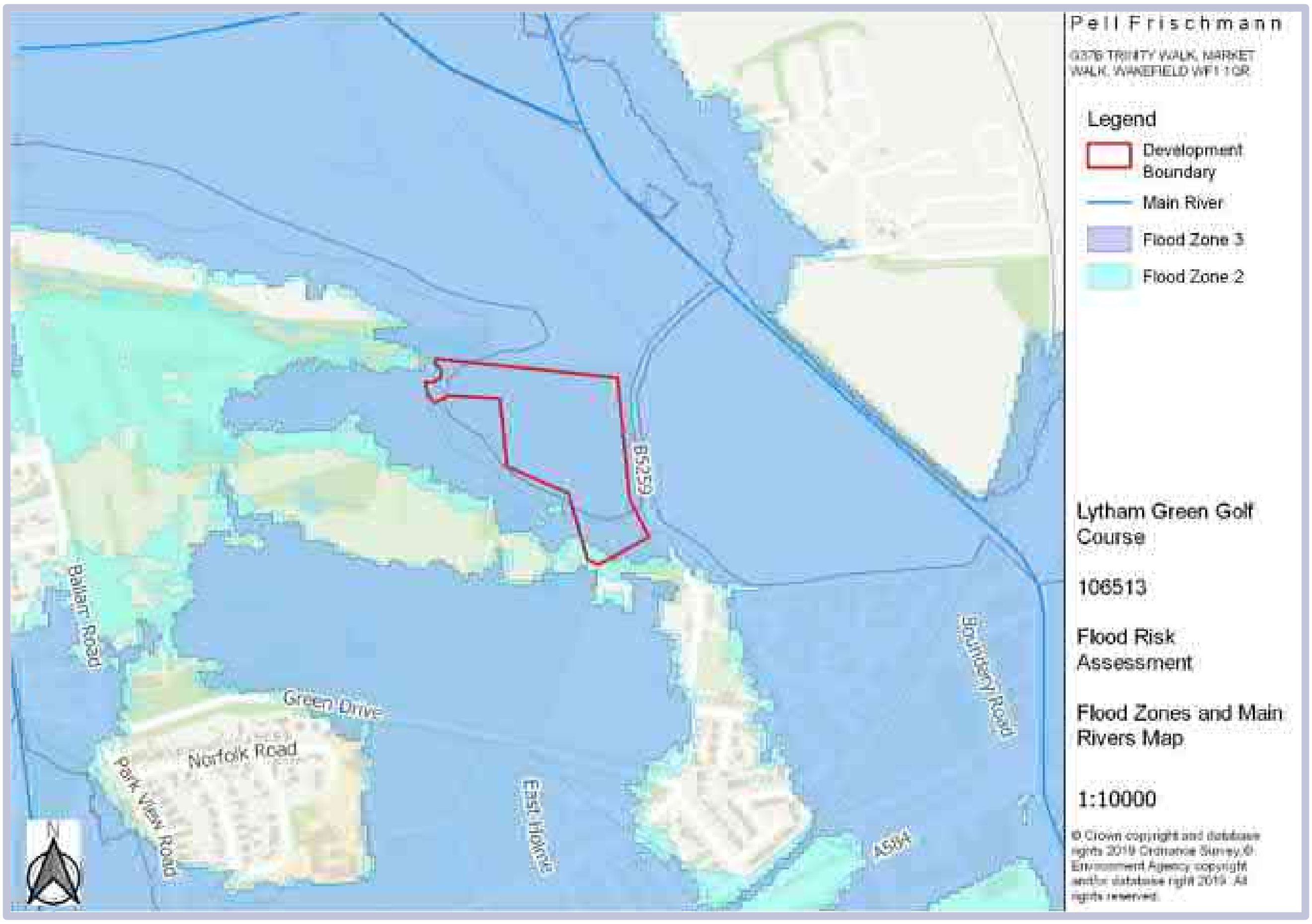


Figure 4 EA Flood Zone map

3.2 Flood Risk from Surface Water

The risk of surface water flooding has been assessed by viewing the Environment Agency's Flood Risk from Surface Water Mapping. The mapping indicates that the majority of the site is at risk of surface water flooding, however predominantly it is at low risk of flooding, between 1% and 0.1% annual exceedance probability.

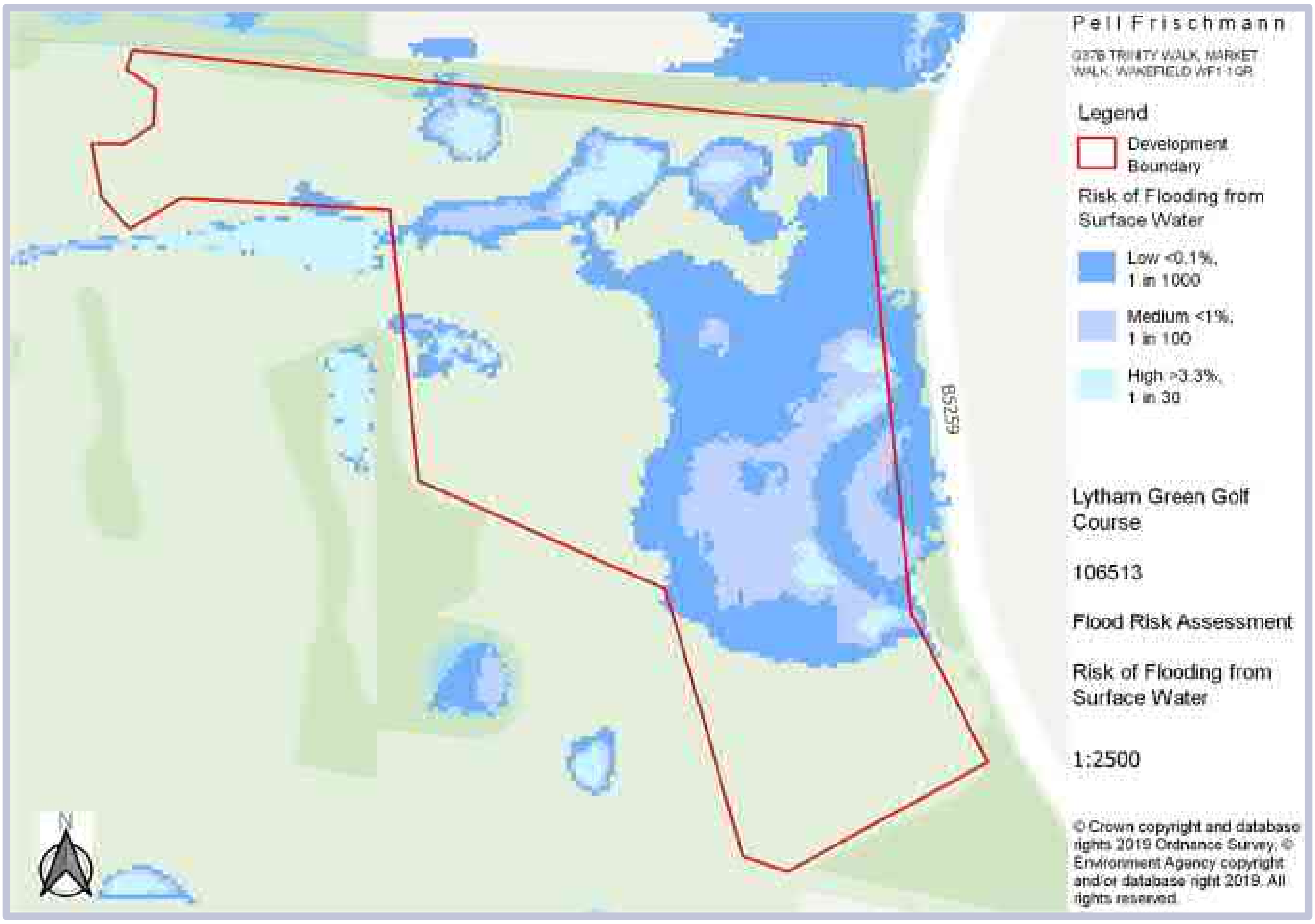


Figure 5 EA Flood risk from surface water

3.3 Groundwater Flooding

Details on groundwater flooding are shown in the Ribble Valley Borough Council SFRA. Based on the Environment Agency's Area Susceptible to Groundwater Flooding national dataset, the SFRA states: *"This is not considered by the Environment Agency to be a significant flood risk factor in the RVBC area."*

3.4 Sewer Flooding

The proposed development is on a golf course and there are no surface water or foul sewers present on the site.

3.5 Artificial Sources

The Environment Agency's *'Maximum extent of flooding from reservoir'* dataset indicates that the site is at risk from reservoirs. It is believed that the flooding is linked to the various drains in the surrounding area.

3.6 Summary

The table below provides a summary of the six sources of flood risk for the site. Overall, the site can be considered to have a high flood risk.

Table 1 Initial flood risk summary based on EA Data

Flood Sources	Flood Risk		
	Low	Medium	High
Fluvial			✓
Tidal			✓
Pluvial		✓	
Groundwater	✓		
Sewers	✓		
Artificial	✓		

4 Assessing Flood Risk

4.1 National Planning Policy Framework

The NPPF provides the planning framework on which this FRA has been based. The NPPF states that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk. Where development is necessary, the development should be made safe and not increase flood risk elsewhere.

4.2 Flood Risk Vulnerability Classification

Table 2 of the NPPF PPG is shown in Table 2 below. This outlines what classification of development is acceptable within each flood zone, what requires further testing and what is not deemed acceptable.

Table 2 Flood risk vulnerability classification

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	✗	Exception Test required	✓	✓
Zone 3b	Exception Test required	✗	✗	✗	✓

Buildings are classified depending on their uses and are placed in vulnerability classes depending on flood risk sensitivity. The golf course is classified as 'water compatible.' *'Water compatible'* assets are appropriate developments in Flood Zones 1, 2 or 3.

4.2.1 Sequential Test

The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. Development should not be permitted if there are reasonably available sites appropriate for development in areas at a lower risk of flooding.

It is necessary to undertake a Sequential Test for a planning application if both of the following apply:

- The proposed development is in Flood Zone 2 or 3; and
- A Sequential Test hasn't already been completed for a development of the type you plan to carry out on your proposed site.

The development areas are predominantly within Flood Zone 3, therefore a Sequential Test is required. The development is a modification / alteration to an existing golf course and therefore cannot be located in an area of lower flood risk.

The Sequential Test is deemed to be passed.

4.2.2 Exception Test

The proposed development is *'water compatible'* and located in Flood Zone 3. Based on Table 2 (see section 4.2) an Exception Test is not required for the site.

5 Climate Change

In February 2016, climate change allowances were published by the Environment Agency. These allowances are based upon predicted changes in fluvial flows and rainfall intensities due to climate change.

5.1.1 Peak Fluvial Flows

Table 3 has been extracted from the EA's peak river flow allowances by river basin district data.

Table 3: Peak river flow allowances for Wyre Management Catchment

Allowance category	Total potential change anticipated for '2020s' (2015 to 2039)	Total potential change anticipated for '2050s' (2040 to 2069)	Total potential change anticipated for '2080s' (2070 to 2115)
Upper end	29%	44%	67%
Higher central	22%	29%	44%
Central	18%	23%	35%

For *'water compatible'* and *'less vulnerable'* developments within Flood Zones 2 and 3a the EA guidance states that the central allowance should be used.

5.1.2 Peak Rainfall Intensity

The peak rainfall intensity is expected to increase as a result of climate change. Table 4 below has been extracted from EA's peak rainfall climate change allowances by management catchment data.

Table 4: Peak rainfall intensity allowances for Wyre Management Catchment

Allowance category	Total potential change anticipated for '2050s' (2040 to 2069)	Total potential change anticipated for '2080s' (2070 to 2115)
Upper end (100 year return period)	40%	50%
Central (100 year return period)	25%	35%
Upper end (30 year return period)	35%	45%
Central (30 year return period)	25%	30%

6 Managing Flood Risk

6.1 Fluvial and Tidal Flooding

Product 4 data was requested from the EA to assess at the magnitude of the flood risk; see **Appendix B** for further details.

The fluvial modelling for the site is based on JFlow data, which is typically not detailed enough for use in an FRA for sites in Flood Zones 2 or 3. The data provided shows that under an undefended scenario, the majority of the site unaffected by fluvial flooding, with only the north eastern corner being situated in Flood Zone 3. Under the defended scenario the depth of flooding is significantly reduced with the north east corner only flooding in a 1 in 1000 year (0.1% annual exceedance probability) event. This is the equivalent to the Flood Zone 2 classification. This would reduce the flood risk of fluvial flood risk from high (stated in Table 1) to low.

The site is also at risk from tidal flooding, however only in the undefended model, with the tidal defence providing a standard of protection in excess of a 1 in 1000 year (0.1% annual exceedance probability) event with the site being flooded to a depth over 500mm in a 1 in 75 year event in the undefended scenario.

A pre-application advice meeting was held with the EA on 3 February 2023. In the meeting it was agreed that floodplain compensation was not required due to the insignificant volume of fluvial flood water likely to be displaced, **see Appendix B**.

6.2 Surface Water Flooding

The site is greenfield and therefore is not positively drained, with surface water being allowed to infiltrate into the ground and runoff drainage ditches within the site.

The development on the site does not increase the impermeable area for the majority of the site therefore, surface water runoff from the site will be unaffected post development. The development maintains open green space and therefore post development the runoff rate will be naturally limited to greenfield rates therefore no mitigation is required.

The ground raising is designed to consider the overland surface water flood flow routes, with the flows directed towards the existing ditches and ponds, to match the existing flow routes. A hydraulic modelling exercise was undertaken to show the impacts on the surface water flooding. The model results showed no identifiable changes in the surface water, Figure 6 shows the current and proposed flooding for the 1 in 100 year storm event. Appendix C also includes the 1 year and 30 year storms maps.

Figure 6 Surface Water Flooding (1 in 100 year storm)
(Left – existing, right – proposed.)

7 Conclusion and Recommendation

This preliminary FRA has been prepared to help establish the feasibility of a help establish the feasibility of reprofiling hole 4 of Lytham Green Golf Course, Lancashire The conclusions and recommendations are:

- The site is situated within Flood Zone 3;
- The site is at high risk from tidal flooding;
- The site is currently defended from tidal flooding;
- The site is at low risk from fluvial flooding based on modelled water levels;
- The site is at low to high risk of surface water flooding;
- The development is classed as ‘water compatible’ development under the NPPF guidance. A Sequential Test has been passed and an Exception Test is not required;
- Following consultation with the EA, flood plain storage compensation is not required;
- The nature of the proposed works means that the proposed development will not increase the impermeable area and therefore no increase in runoff is expected;
- The development replaces green spaces with green spaces and therefore the runoff is limited to naturally limited greenfield runoff, therefore no betterment is required; and
- Hydraulic modelling shows that there are no impacts on surface water flooding associated with the ground raising.

In summary it is believed that the site can be developed as proposed.

8 Uncertainties and Limitations

This report has been prepared by Pell Frischmann with reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client in accordance with the agreed scope of services.

This report has been prepared solely for the use of the Client. The report may not be relied upon by other parties without written consent from Pell Frischmann. Pell Frischmann disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

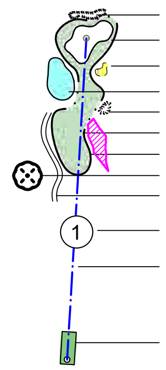
The report details the findings of work carried out by Pell Frischmann during a study period in November 2022 to May 2024. The report has been prepared on the basis of available information obtained during that study period. Information provided by the referenced third parties has been used in good faith and is taken at face value; however, Pell Frischmann cannot guarantee its accuracy or completeness.

Although every reasonable effort has been made to gather all relevant information within the context of the agreed scope of work, all potential flood risk constraints or liabilities associated with the site may not have been revealed. Should additional Information become available (including new legislation and changed practices), after the date of the report submission, Pell Frischmann reserves the right to reconsider the recommendations and alter the report accordingly.

Appendix A Proposed Development

L.G.D.G.C. 1913

Legend



Site Boundary
Work Area
Ex Contour Lines

Revision History

gaunt golf design
International golf course architects

Jonathan Gaunt
Director - Golf Course Architect

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Senior Member EIGCA European Institute of Golf Course Architects

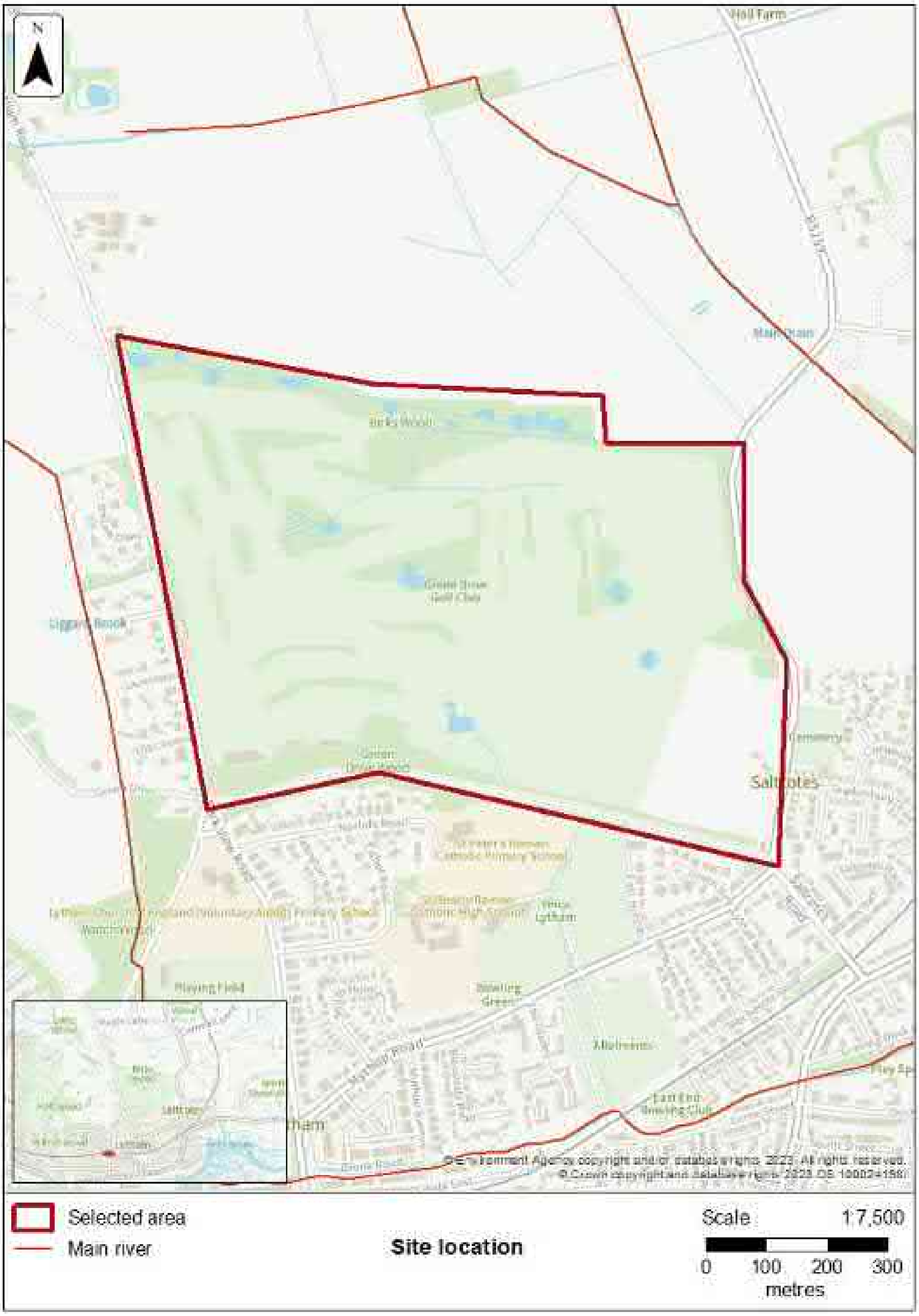
Client :	Lytham Green Drive Golf Club		
Project :	Course Improvements		
Drawing :	Masterplan		
Drawn By:	G.F.	Drawn Date:	4th Feb 2024
Scale :	1:750 @ A1	Revised:	
Drawing No. :	GGD-350-3090	Revision : A	16th Feb 2024

Appendix B EA Product 4 Data

Flood risk assessment data

Location of site: 337200 / 428430 (shown as easting and northing coordinates)
Document created on: 5 May 2023
This information was previously known as a product 4.
Customer reference number: 2MH9BTV6V33J

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
- information to help you assess if there is a reduced flood risk from rivers and the sea because of defences
- modelled data
- climate change 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: Liggard Brook 2006
Scenario(s): No defences exist fluvial, no defences exist climate change fluvial
Date: 1 February 2006

Model name: Ribble Estuary_Tidal 2014
Scenario(s): Defended tidal, defences removed tidal, defended climate change tidal, defences removed climate change tidal
Date: 30 July 2014

These models contain 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 occuring 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 selected location is in flood zone 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

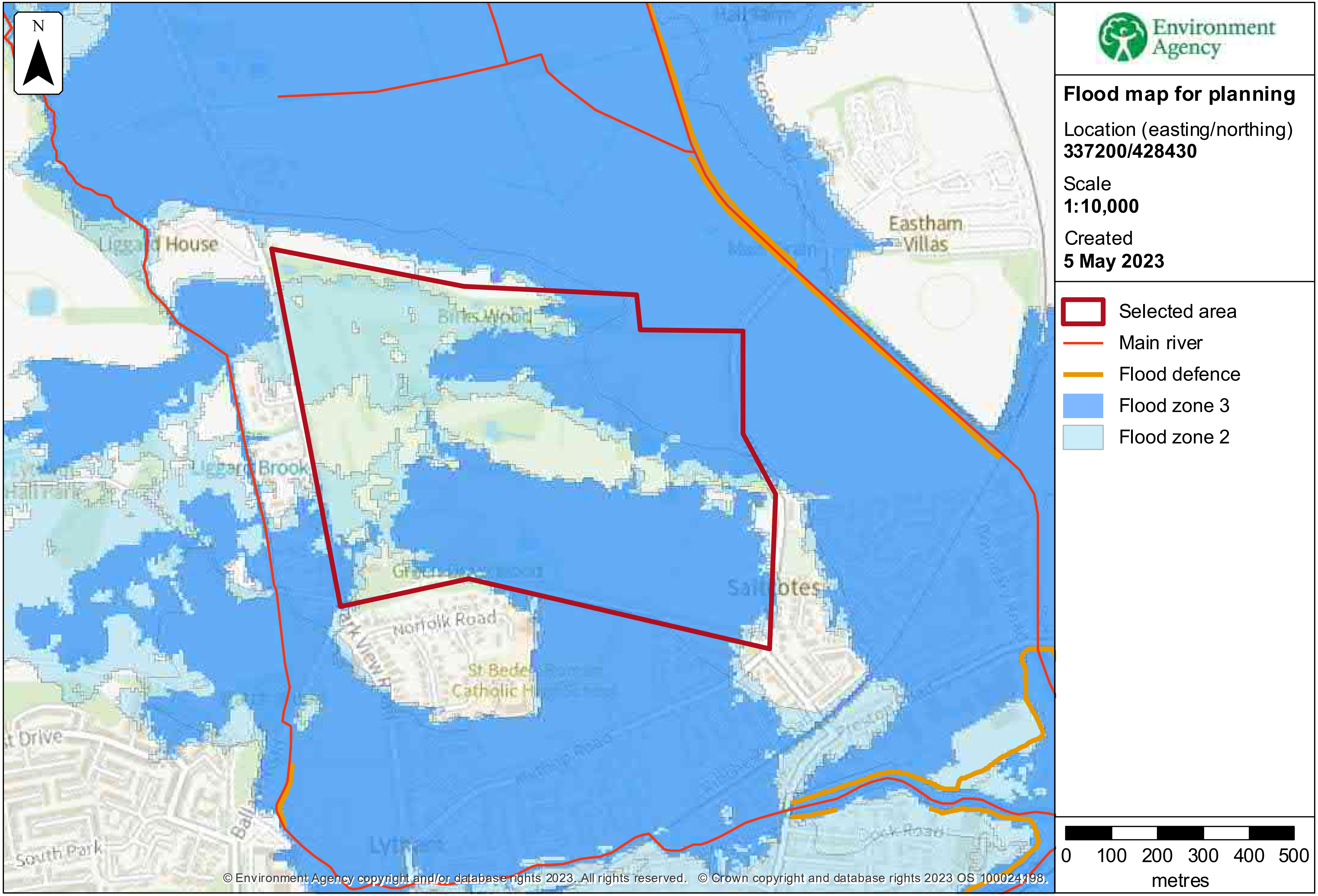
Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- 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.


N
Environment Agency
Flood map for planning
Location (easting/northing)
337200/428430
Scale
1:10,000
Created
5 May 2023
Selected area
Main river
Flood defence
Flood zone 3
Flood zone 2
0 100 200 300 400 500
metres
Eastham Villas
Birks Wood
Liggard Brook
Norfolk Road
South Park
© Environment Agency copyright and/or database rights 2023. All rights reserved. © Crown copyright and database rights 2023 OS 100024198.

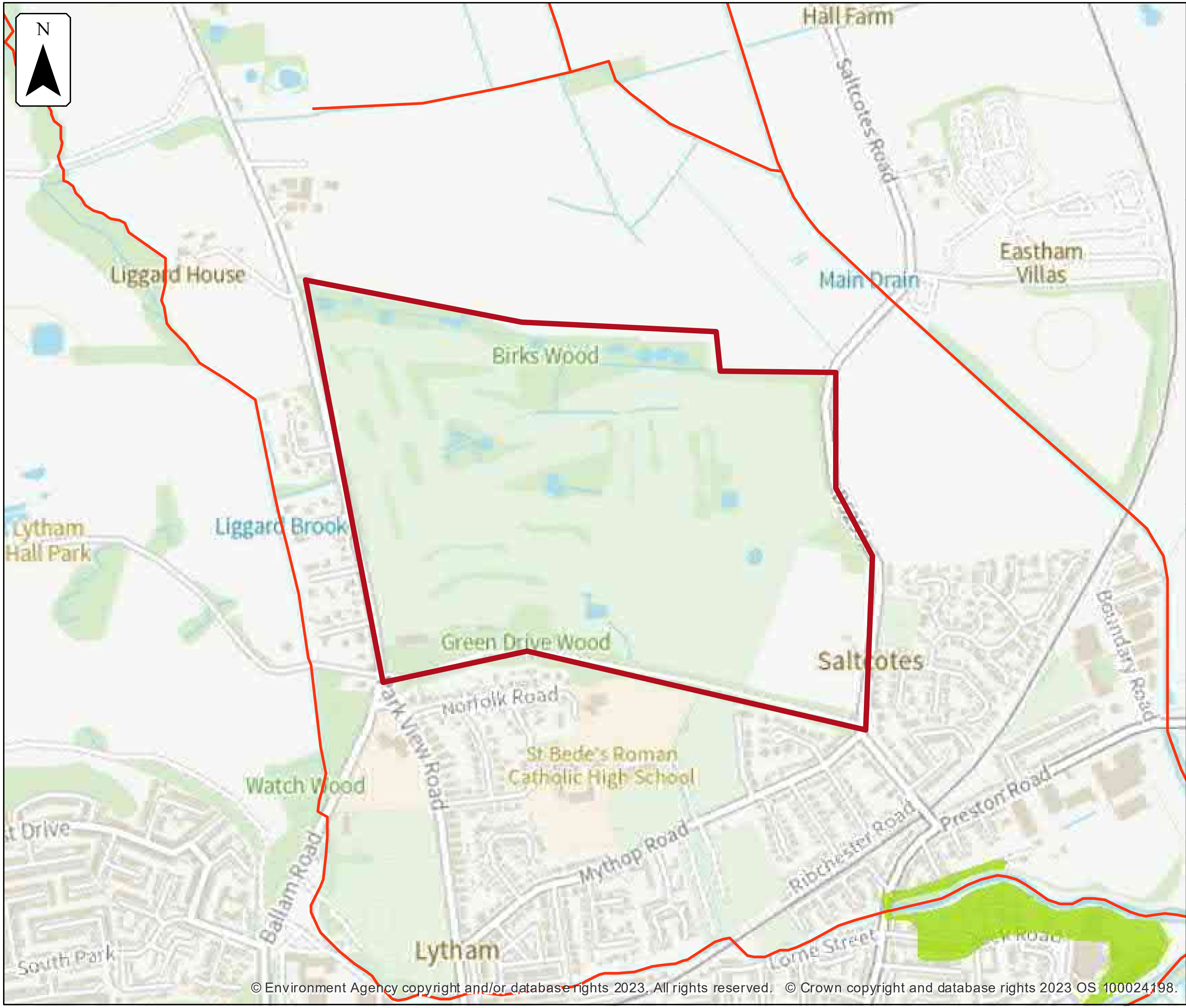
Historic flooding

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



Environment Agency

Historic flood map

Location (easting/northing)
337200/428430

Scale
1:10,000

Created
5 May 2023

Selected area

Main river

Date of flood event

November, 1977

0 100 200 300 400 500
metres

Historic flood event data

Start date	End date	Source of flood	Cause of flood	Affects location
11 November 1977	12 November 1977	other	overtopping of defences	No

Flood defences and attributes

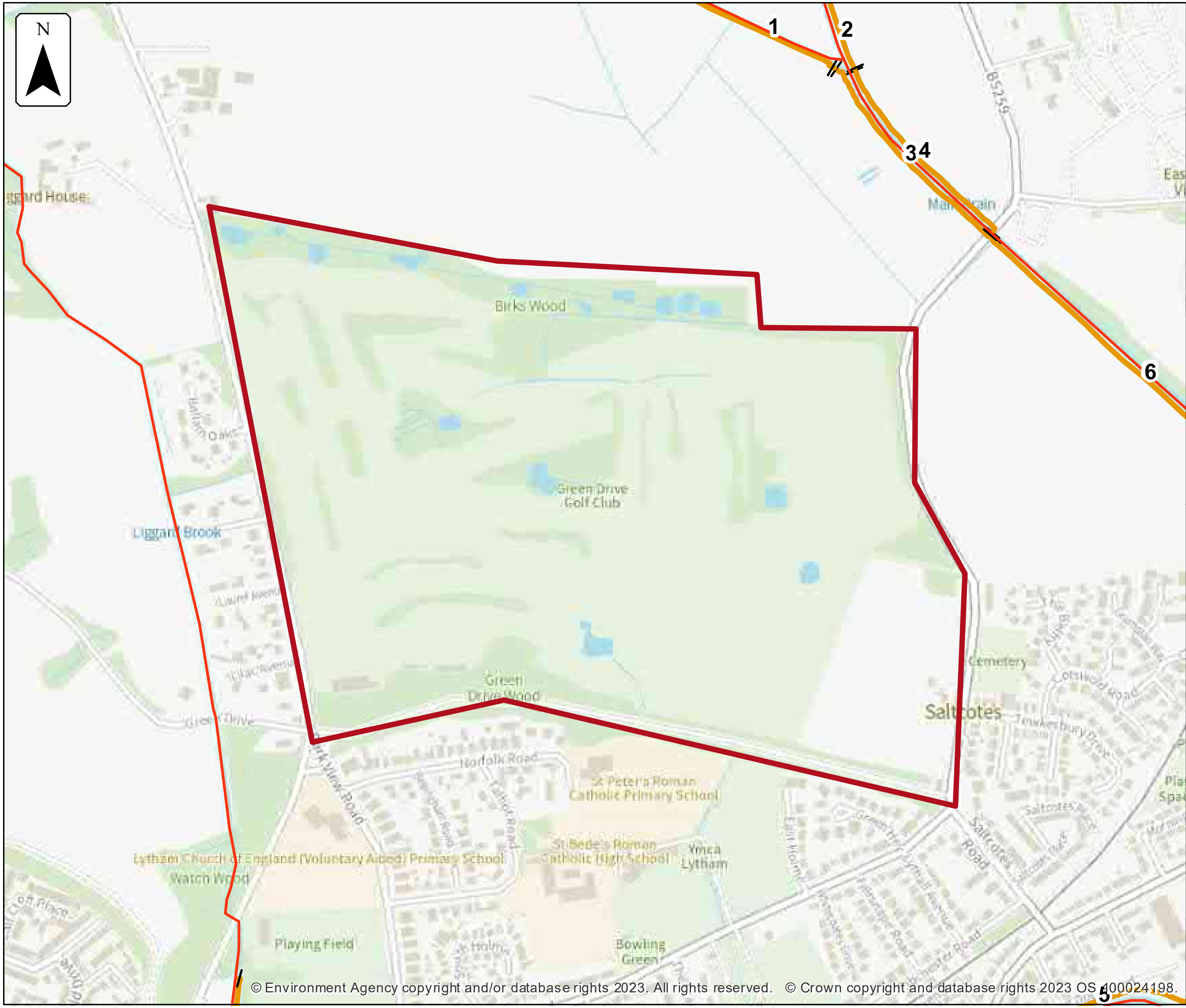
The flood defences map shows the location of the flood defences present.

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.

Use this information:

- to help you assess if there is a reduced flood risk for this location because of defences
- with any information in the modelled data section to find out the impact of defences on flood risk



Environment Agency

Flood defences

Location (easting/northing)
337200/428430

Scale
1:7,500

Created
5 May 2023

Selected area
Main river
Flood defence

0 100 200 300
metres

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	68662	Embankment	50	Fair	1.01	1.70	0.81
2	92105	Embankment	5	Fair	2.60	2.87	2.60
3	67023	Embankment	50	Fair	2.23	2.31	2.23
4	66599	Embankment	50	Fair	2.57	2.64	2.57
5	166967	Embankment	100	Fair	6.92	6.96	6.92
6	66591	Embankment	5	Fair	2.26	2.50	2.26

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 node point map(s) showing the points used to get the data to model the scenarios and table(s) providing details of the flood risk for different return periods
- map(s) showing the approximate water levels for the return period with the largest flood extent for a scenario and table(s) of sample points providing details of the flood risk for different return periods

Climate change

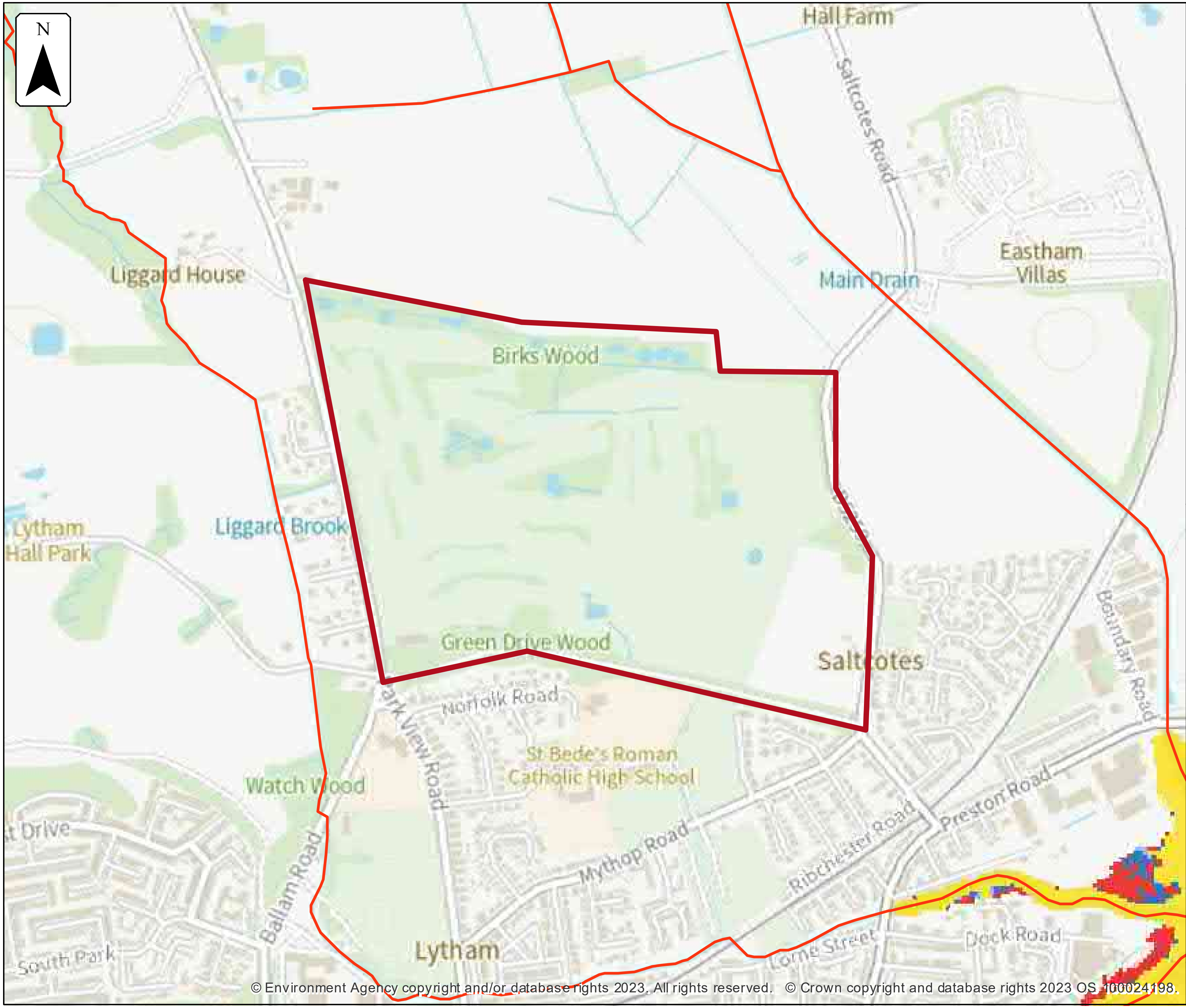
The climate change data included in the models may not include the latest flood risk assessment climate change allowances. Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

The Environment Agency will incorporate the new allowances into future modelling studies. For now, it's your responsibility to demonstrate that new developments will be safe in flood risk terms for their lifetime.

Modelled scenarios

The following scenarios are included:

- No defences exist modelled fluvial: risk of flooding from rivers where there are no flood defences
- Defended modelled tidal: risk of flooding from the sea where there are flood defences
- Defences removed modelled tidal: risk of flooding from the sea where flood defences have been removed
- No defences exist climate change modelled fluvial: risk of flooding from rivers where there are no flood defences, including estimated impact of climate change
- Defended climate change modelled tidal: risk of flooding from the sea where there are flood defences, including estimated impact of climate change
- Defences removed climate change modelled tidal: risk of flooding from the sea where flood defences have been removed, including estimated impact of climate change



Environment Agency

Defended modelled tidal extent

Location (easting/northing)
337200/428430

Scale **1:10,000**

Created **5 May 2023**

Model name
Ribble Estuary Tidal 2014

Selected area

Main river

Modelled flood extent

1.33% AEP

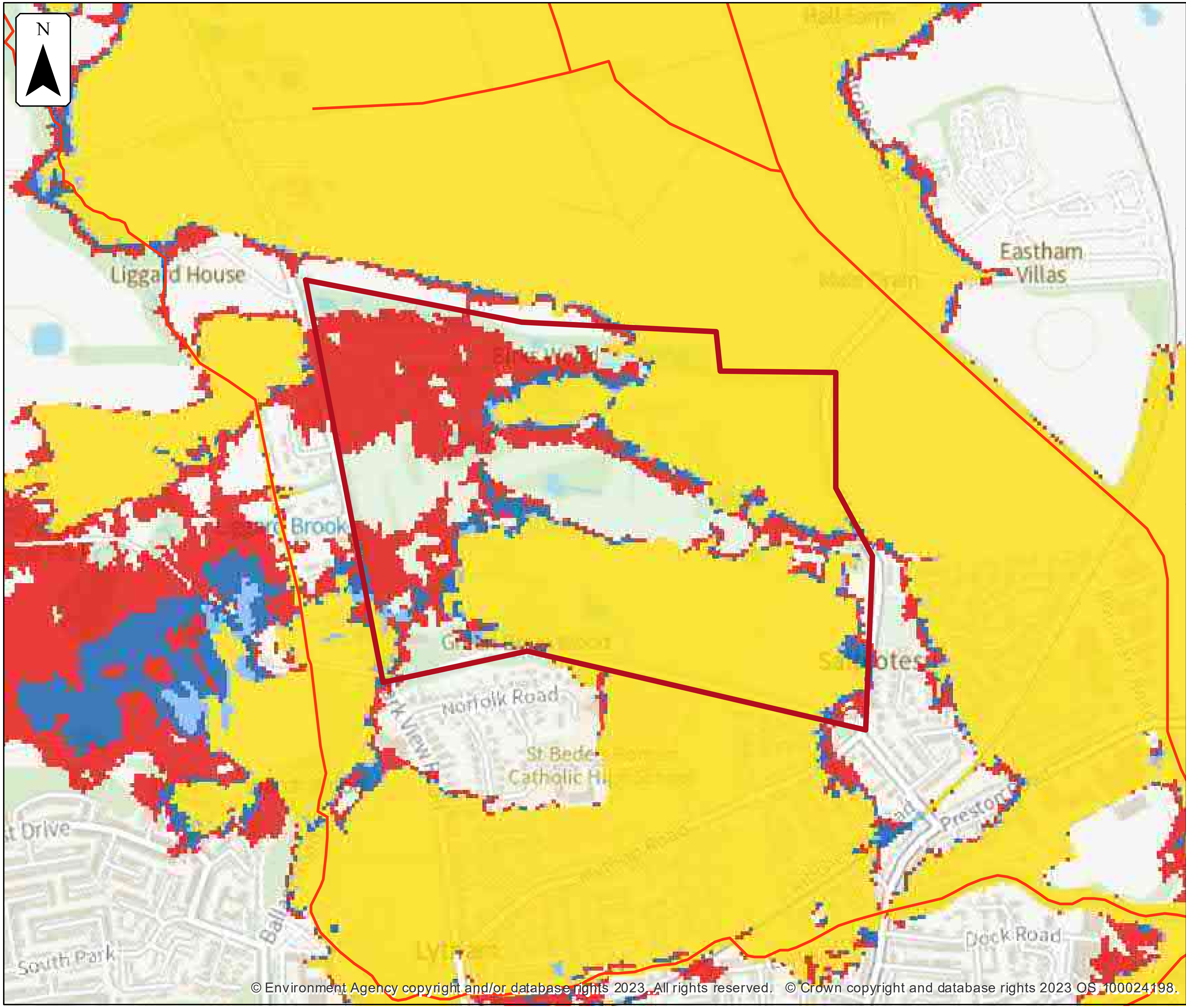
1% AEP

0.5% AEP

0.1% AEP

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

0 100 200 300 400 500
metres



Environment Agency

Defences removed modelled tidal extent

Location (easting/northing)
337200/428430

Scale **1:10,000**

Created **5 May 2023**

Model name
Ribble Estuary Tidal 2014

Selected area

Main river

Modelled flood extent

1.33% AEP

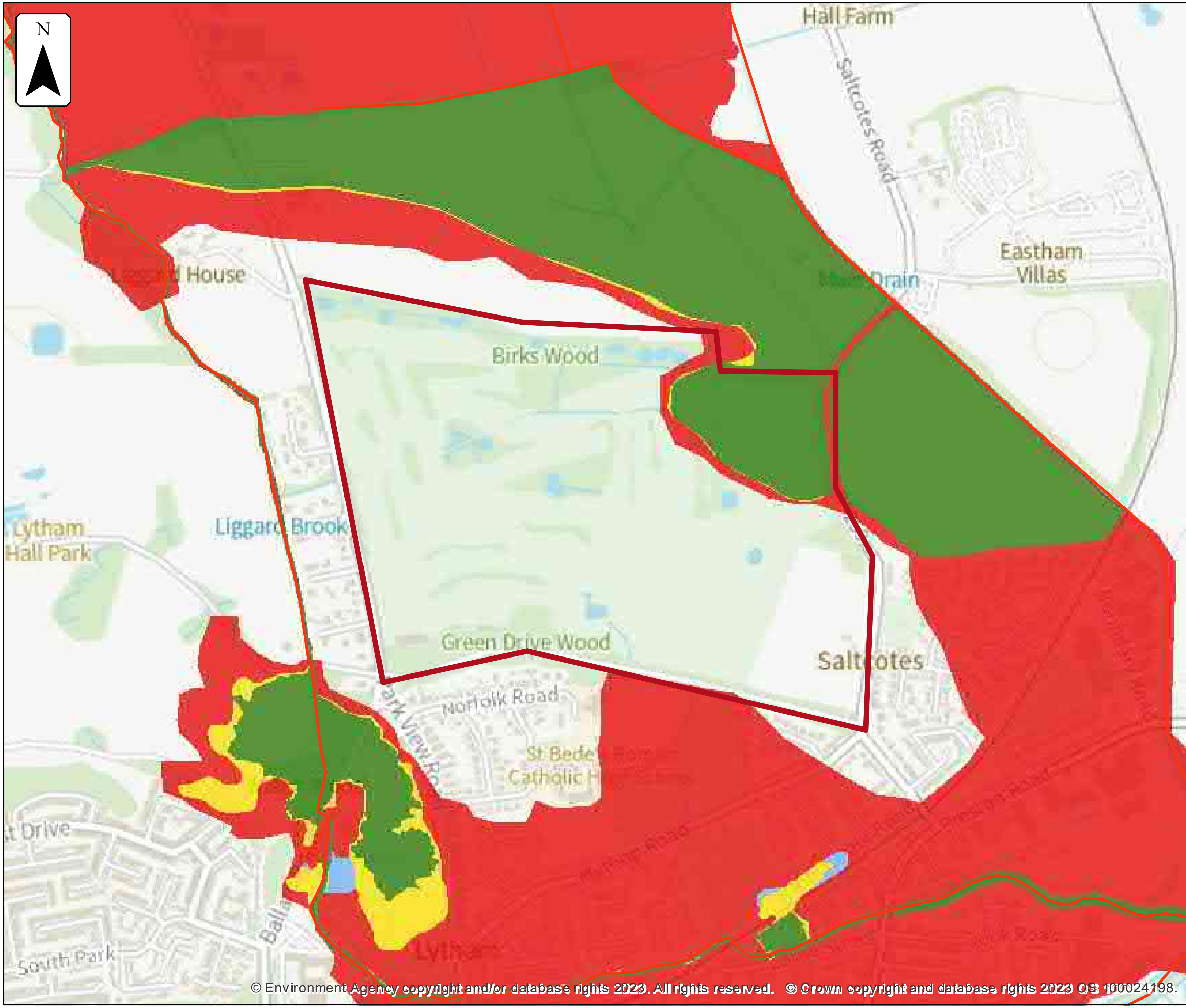
1% AEP

0.5% AEP

0.1% AEP

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

0 100 200 300 400 500
metres



Environment Agency

No defences exist modelled fluvial extent

Location (easting/northing)
337200/428430

Scale
1:10,000

Created
5 May 2023

Model name
Liggard Brook 2006

Selected area

Main river

Modelled flood extent

2% AEP

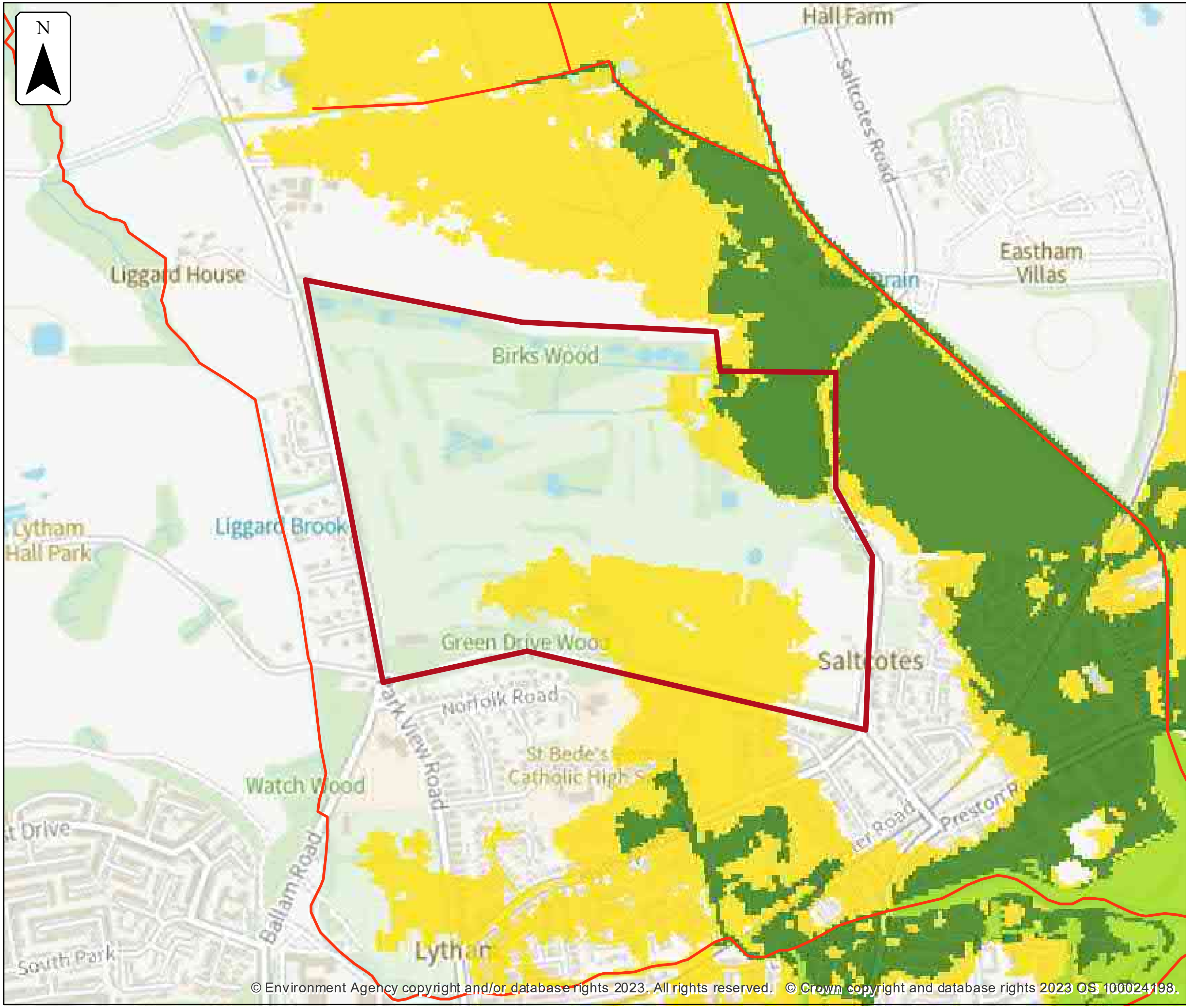
1.33% AEP

1% AEP

0.1% AEP

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

0 100 200 300 400 500
metres



Environment Agency

Defended climate change modelled tidal extent

Location (easting/northing)
337200/428430

Scale **1:10,000**

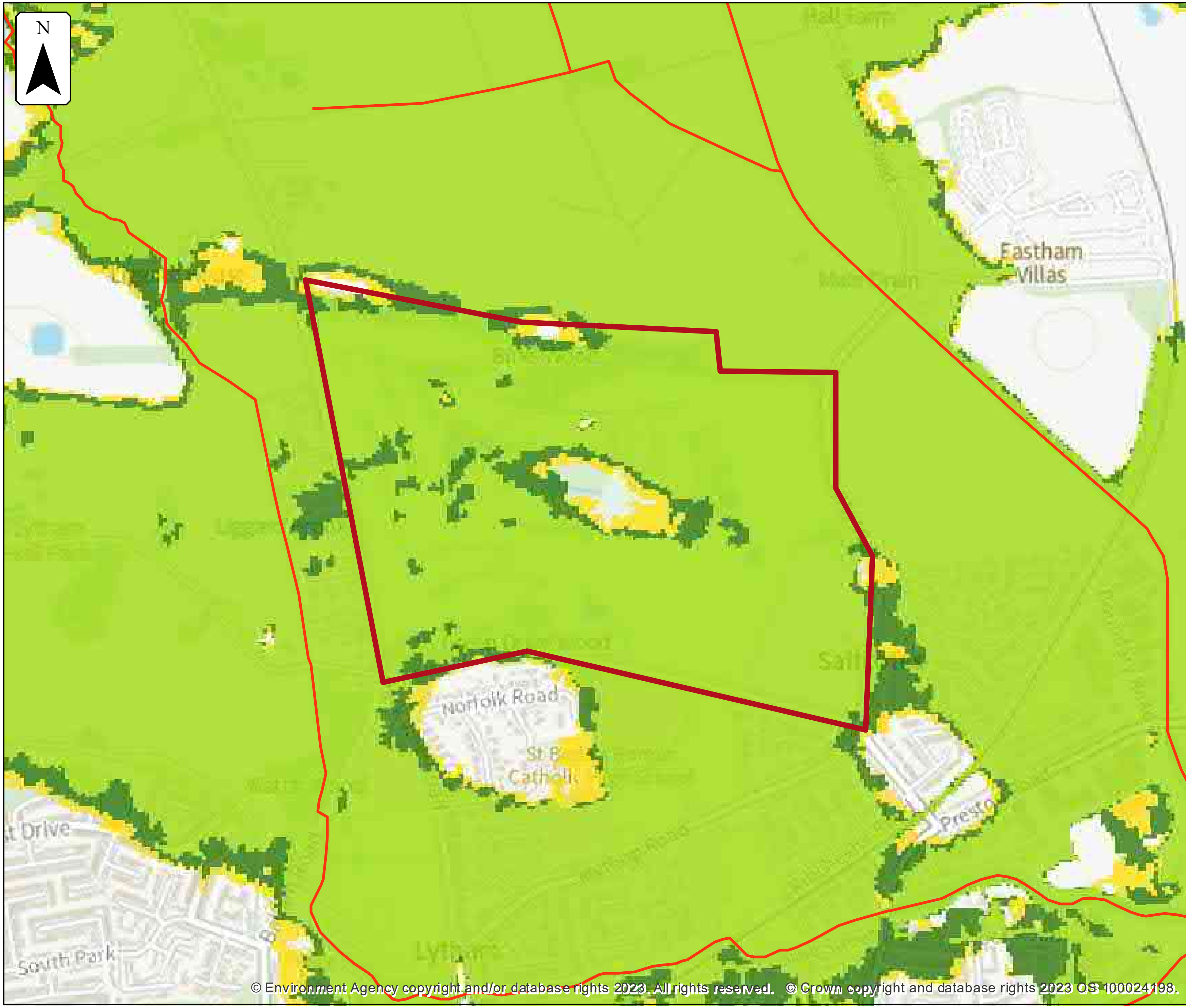
Created **5 May 2023**

Model name
Ribble Estuary Tidal 2014

Selected area
Main river
Modelled flood extent
0.5% AEP (+370mm)
0.5% AEP (+670mm)
0.5% AEP (+970mm)

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

0 100 200 300 400 500
metres



Environment Agency

Defences removed climate change modelled tidal extent

Location (easting/northing)
337200/428430

Scale **1:10,000**

Created **5 May 2023**

Model name
Ribble Estuary Tidal 2014

Selected area

Main river

Modelled flood extent

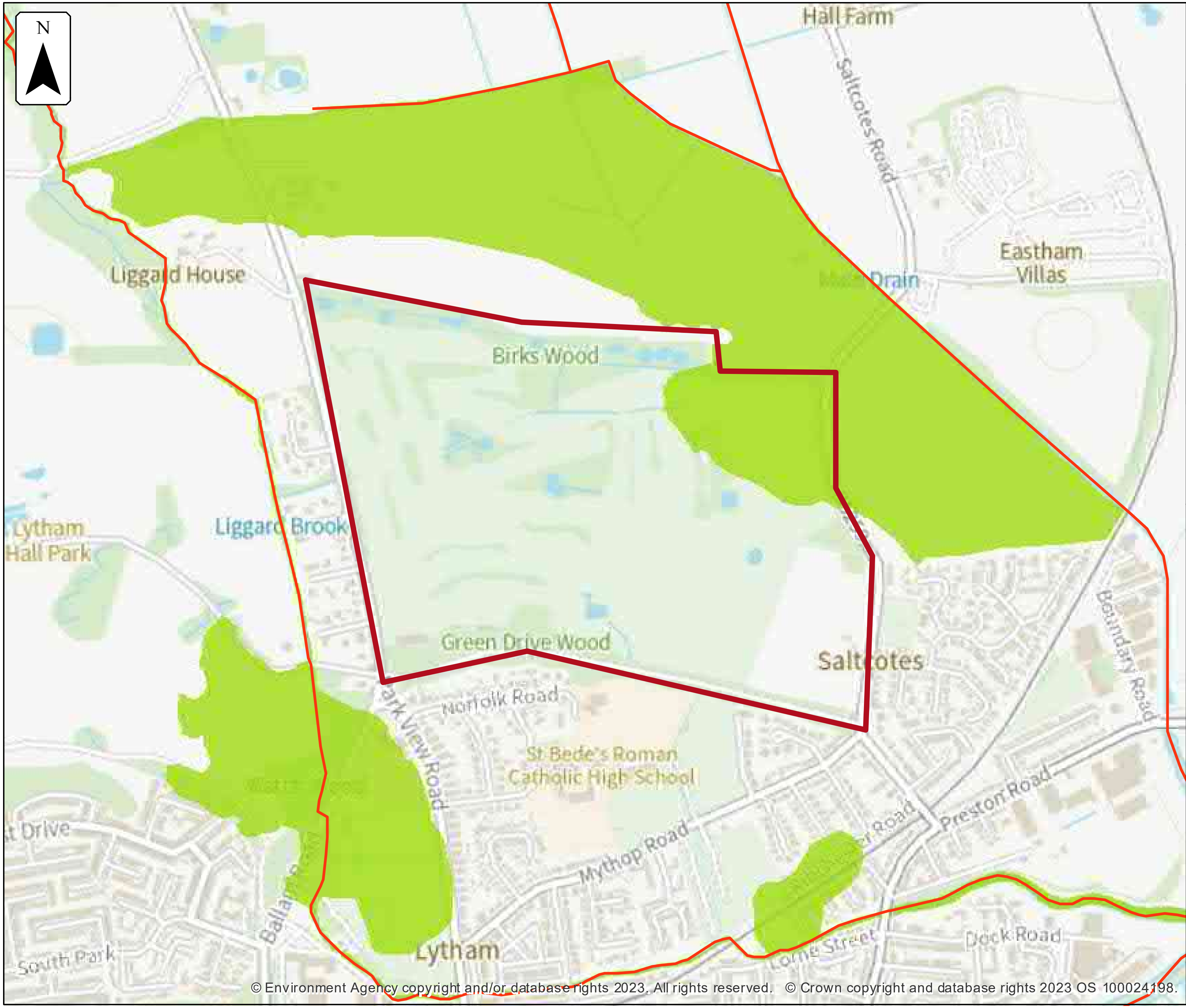
0.5% AEP (+370mm)

0.5% AEP (+670mm)

0.5% AEP (+970mm)

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

0 100 200 300 400 500
metres



Environment Agency

No defences exist climate change modelled fluvial extent

Location (easting/northing)
337200/428430

Scale **1:10,000**

Created **5 May 2023**

Model name
Liggard Brook 2006

Selected area

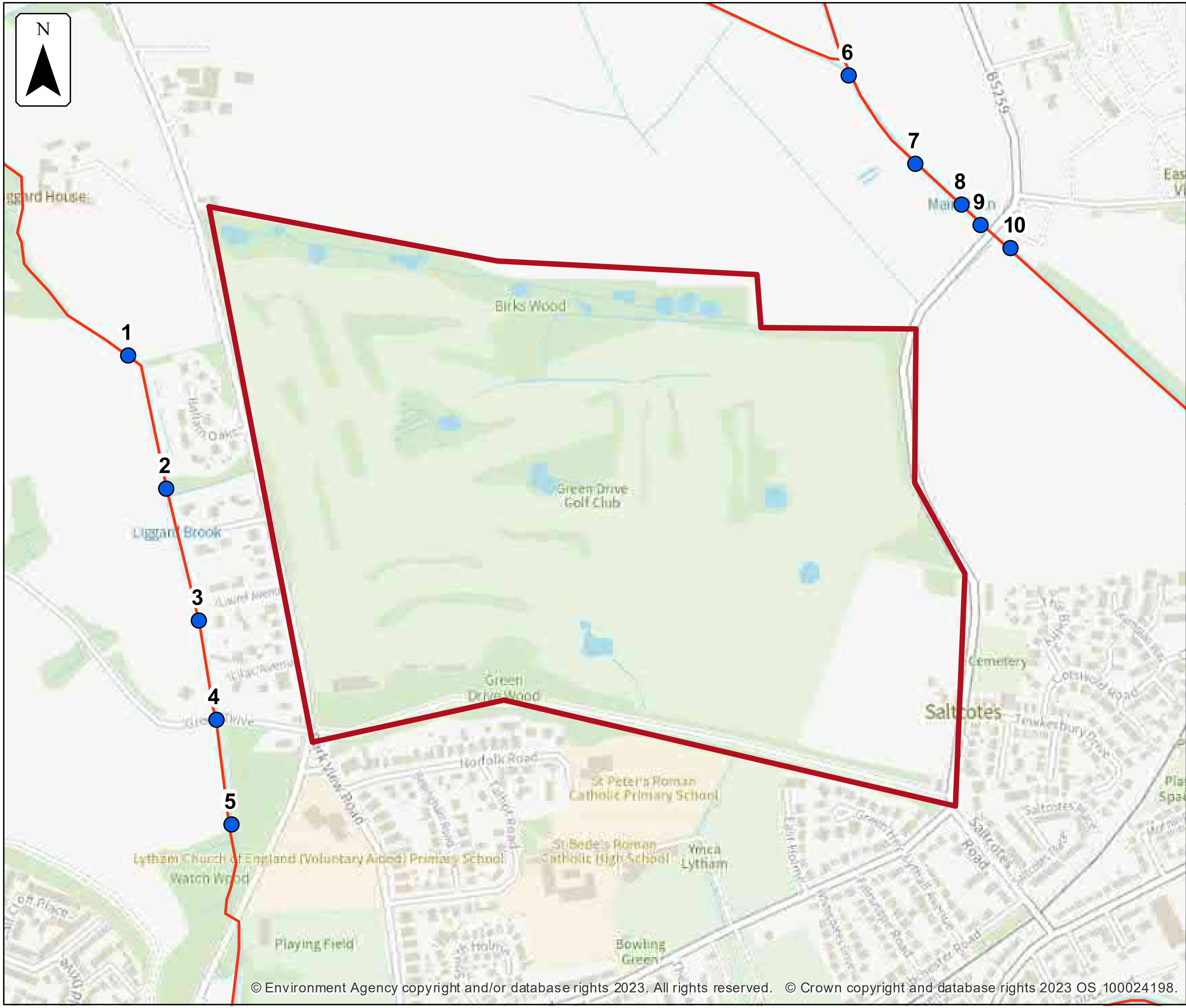
Main river

Modelled flood extent

1.0% AEP (+20%)

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

0 100 200 300 400 500
metres



Environment Agency

No defences exist modelled fluvial node locations

Location (easting/northing)
337200/428430

Scale
1:7,500

Created
5 May 2023

Model name
Liggard Brook 2006

Selected area
Modelled location
Main river

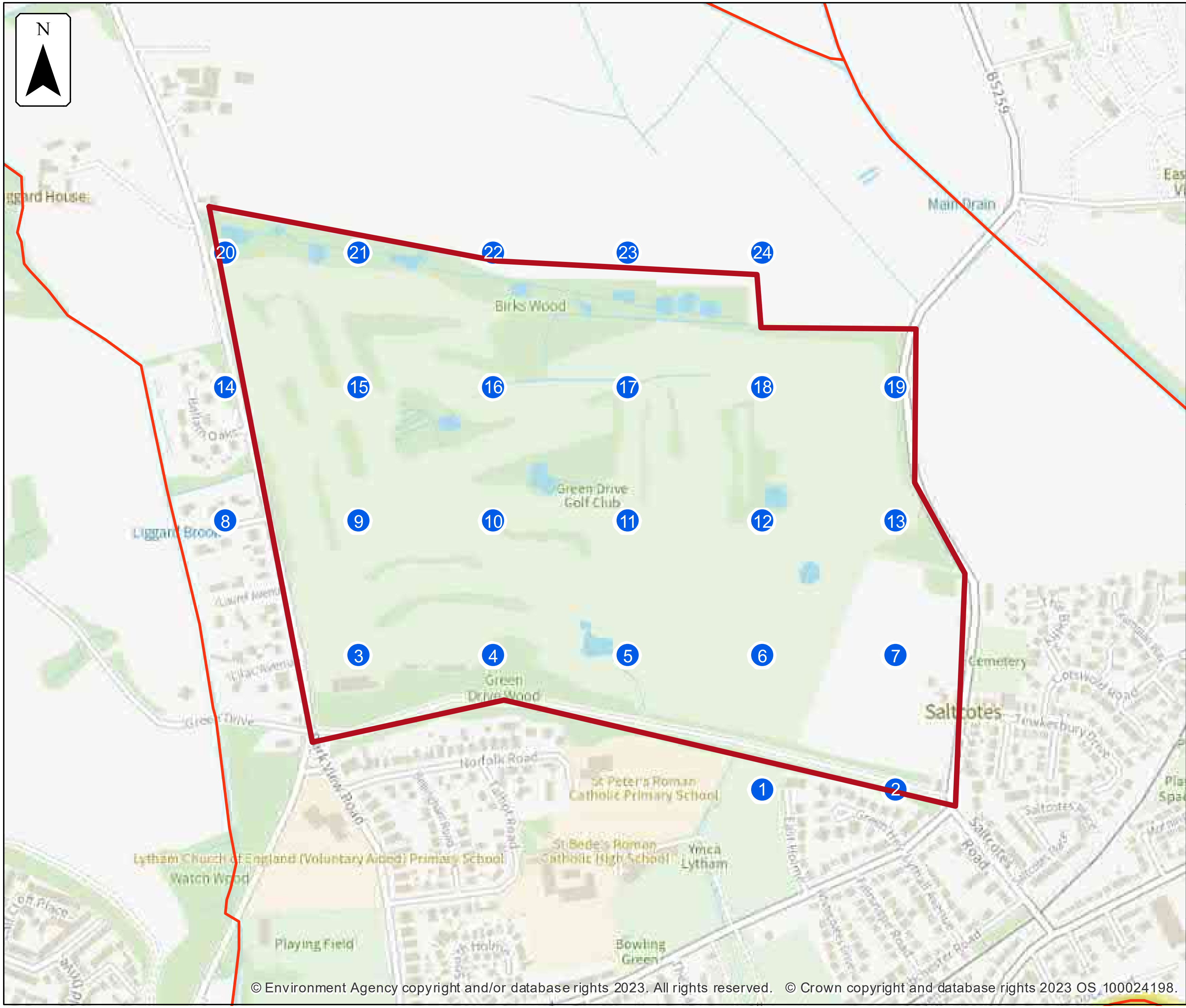
0 100 200 300
metres

Modelled node locations data

No defences exist

Label	Modelled location ID	Easting	Northing	4% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
				Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow
1	993338	336520	428645	3.43	0.59	3.47	0.58	3.48	0.58	3.50	0.59				
2	993172	336575	428451	3.45	0.60	3.49	0.58	3.51	0.58	3.52	0.59				
3	993154	336622	428258	3.48	0.61	3.52	0.59	3.54	0.59	3.55	0.59				
4	993316	336648	428113	3.50	0.61	3.54	0.59	3.56	0.59	3.57	0.59				
5	993217	336670	427961	3.54	0.62	3.57	0.59	3.59	0.59	3.60	0.59				
6	993283	337572	429053	2.03	7.62	2.13	8.45	2.19	8.86	2.23	9.12				
7	993128	337669	428925	2.02	7.62	2.12	8.46	2.18	8.87	2.22	9.12				
8	993127	337735	428866	2.01	7.63	2.12	8.46	2.18	8.87	2.22	9.13				
9	993142	337764	428836	1.99	7.63	2.10	8.46	2.16	8.87	2.20	9.13				
10	993161	337807	428801	1.99	7.63	2.10	8.46	2.16	8.87	2.21	9.13				

Data in this table comes from the Liggard Brook 2006 model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.



Environment Agency

Defended modelled tidal extent and height

Location (easting/northing)
337200/428430

Scale	Created
1:7,500	**5 May 2023**

Model name
Ribble Estuary Tidal 2014

Selected area

Main river

Modelled 2D grid

Water level in mAOD

- 0 - 6.0
- 6.0 - 6.125
- 6.125 - 6.25
- 6.25 - 6.375
- 6.375 - 6.5
- 6.5 - 6.625
- 6.625 - 6.75
- 6.75 - 6.875
- 6.875 - 7.0

This map shows the 0.1% AEP height data

0 100 200 300
metres

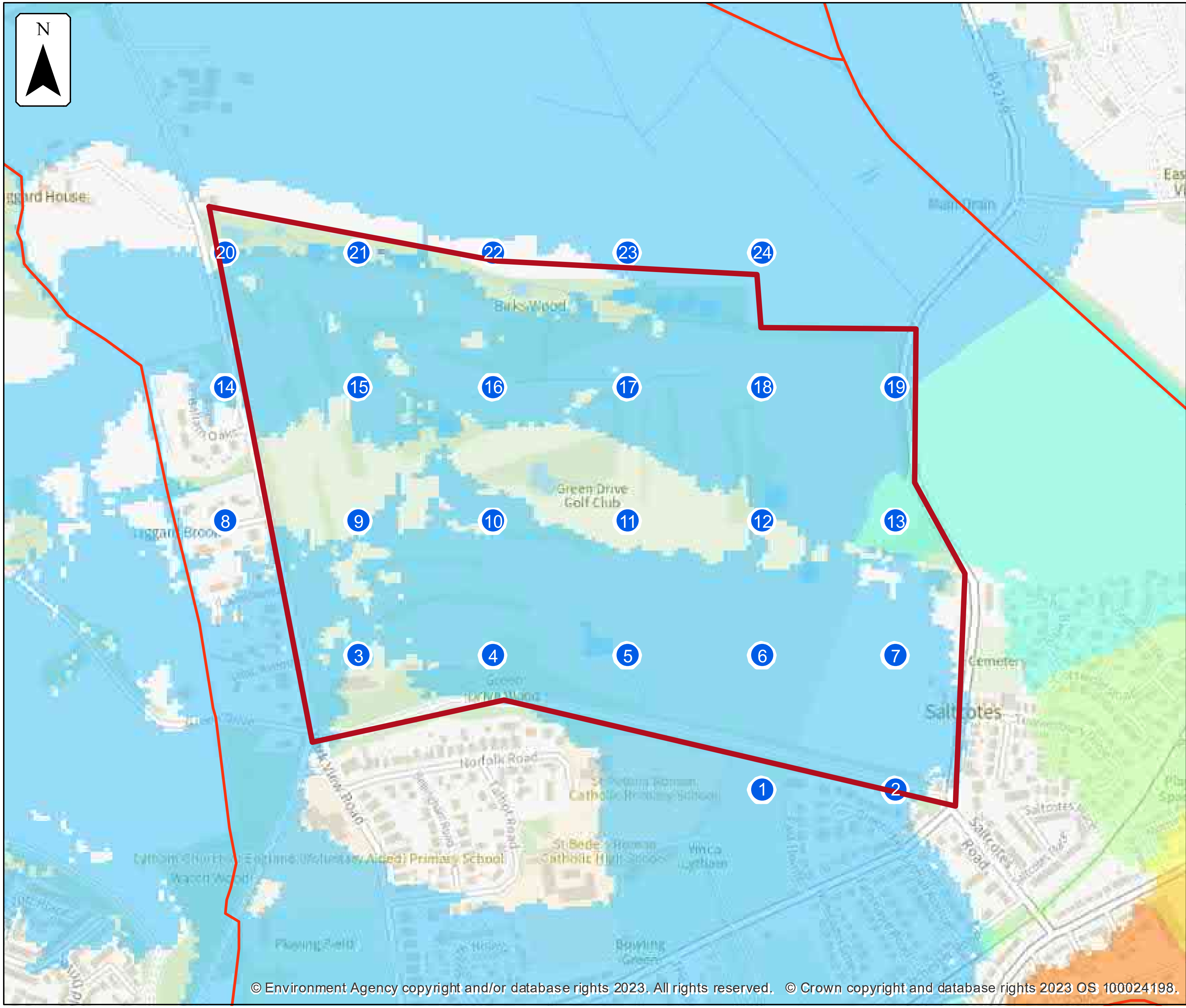
Sample point data

Defended

Label	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height
1	337444	428013					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
2	337640	428013					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
3	336856	428209					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
4	337052	428209					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
5	337248	428209					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
6	337444	428209					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
7	337640	428209					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
8	336660	428405					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
9	336856	428405					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
10	337052	428405					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
11	337248	428405					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
12	337444	428405					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
13	337640	428405					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
14	336660	428601					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
15	336856	428601					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
16	337052	428601					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height
17	337248	428601					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
18	337444	428601					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
19	337640	428601					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
20	336660	428797					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
21	336856	428797					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
22	337052	428797					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
23	337248	428797					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
24	337444	428797					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Data in this table comes from the Ribble Estuary Tidal 2014 model.
Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.



Environment Agency

Defences removed modelled tidal extent and height

Location (easting/northing)
337200/428430

Scale **1:7,500**

Created **5 May 2023**

Model name
Ribble Estuary Tidal 2014

Selected area

Main river

Modelled 2D grid

Water level in mAOD

- 0 - 4.0
- 4.0 - 4.25
- 4.25 - 4.5
- 4.5 - 4.75
- 4.75 - 5.0
- 5.0 - 5.25
- 5.25 - 5.5
- 5.5 - 5.75
- 5.75 - 6.0

This map shows the 0.1% AEP height data

0 100 200 300
metres

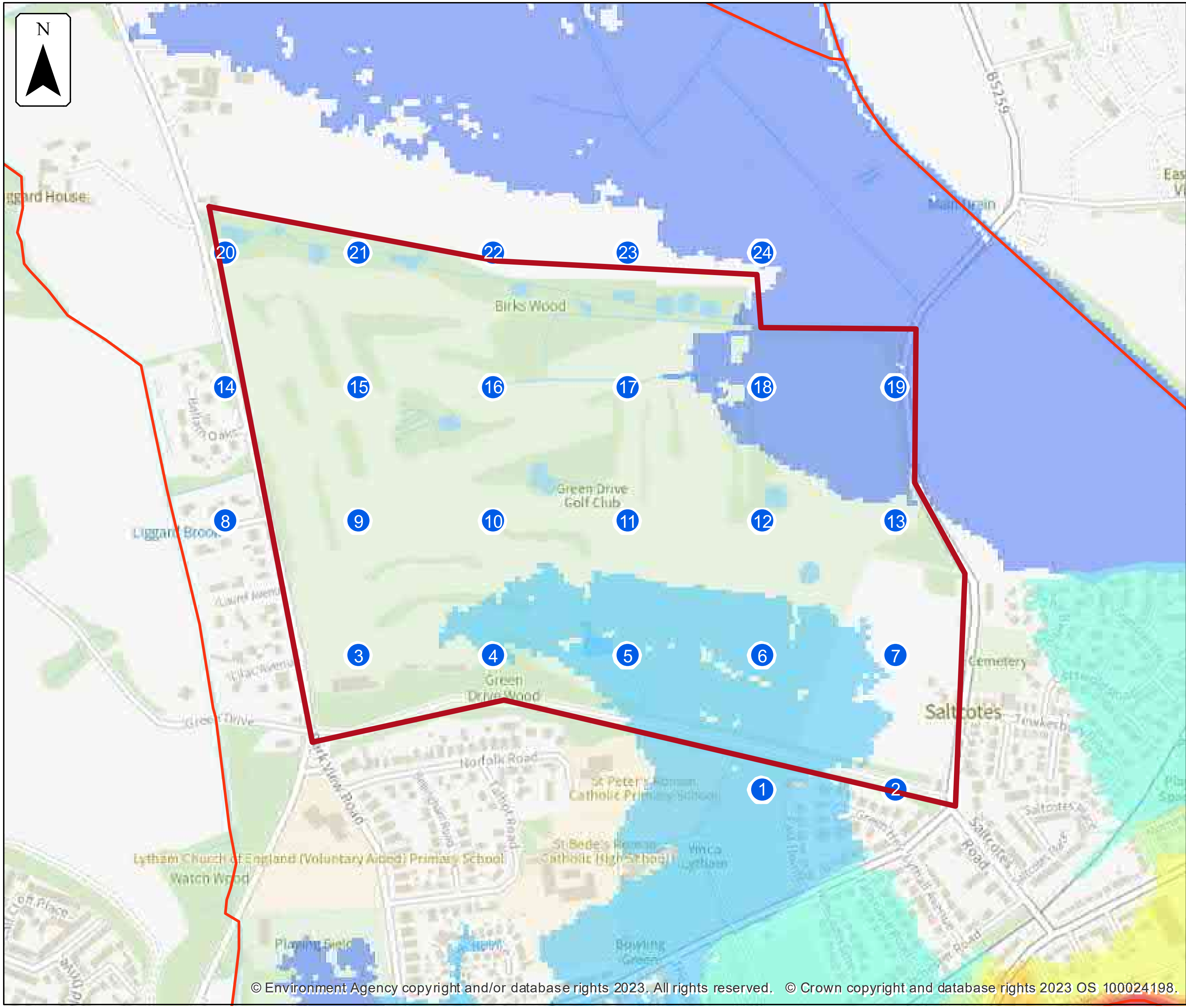
Sample point data

Defences removed

Label	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height
1	337444	428013					1.76	4.17	1.78	4.19	1.88	4.29	2.07	4.48
2	337640	428013					0.10	4.17	0.12	4.19	0.21	4.29	0.40	4.48
3	336856	428209					NoData	NoData	NoData	NoData	NoData	NoData	0.06	4.42
4	337052	428209					0.75	4.17	0.77	4.19	0.87	4.29	1.06	4.48
5	337248	428209					1.41	4.17	1.43	4.19	1.53	4.29	1.71	4.48
6	337444	428209					1.61	4.17	1.64	4.19	1.73	4.29	1.92	4.48
7	337640	428209					0.70	4.17	0.72	4.19	0.82	4.29	1.00	4.48
8	336660	428405					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
9	336856	428405					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
10	337052	428405					NoData	NoData	NoData	NoData	0.06	4.28	0.26	4.48
11	337248	428405					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
12	337444	428405					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
13	337640	428405					0.41	3.90	0.46	3.96	0.65	4.14	1.01	4.50
14	336660	428601					NoData	NoData	NoData	NoData	NoData	NoData	0.24	4.36
15	336856	428601					NoData	NoData	NoData	NoData	NoData	NoData	0.11	4.42
16	337052	428601					0.49	3.90	0.55	3.96	0.74	4.14	1.08	4.49

Label	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height
17	337248	428601					0.50	3.90	0.56	3.96	0.75	4.14	1.10	4.49
18	337444	428601					2.11	3.90	2.17	3.96	2.36	4.14	2.71	4.49
19	337640	428601					2.08	3.90	2.14	3.96	2.33	4.14	2.68	4.50
20	336660	428797					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
21	336856	428797					NoData	NoData	NoData	NoData	NoData	NoData	0.41	4.42
22	337052	428797					NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
23	337248	428797					0.37	3.90	0.43	3.96	0.62	4.14	0.95	4.47
24	337444	428797					2.08	3.90	2.14	3.96	2.33	4.14	2.67	4.48

Data in this table comes from the Ribble Estuary Tidal 2014 model.
Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.



Environment Agency

Defended climate change modelled tidal extent and height

Location (easting/northing)
337200/428430

Scale **1:7,500**

Created **5 May 2023**

Model name
Ribble Estuary Tidal 2014

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 2.0
- 2.0 - 2.75
- 2.75 - 3.5
- 3.5 - 4.25
- 4.25 - 5.0
- 5.0 - 5.75
- 5.75 - 6.5
- 6.5 - 7.25
- 7.25 - 8.0

This map shows the 0.5% AEP +970mm height data

0 100 200 300
metres

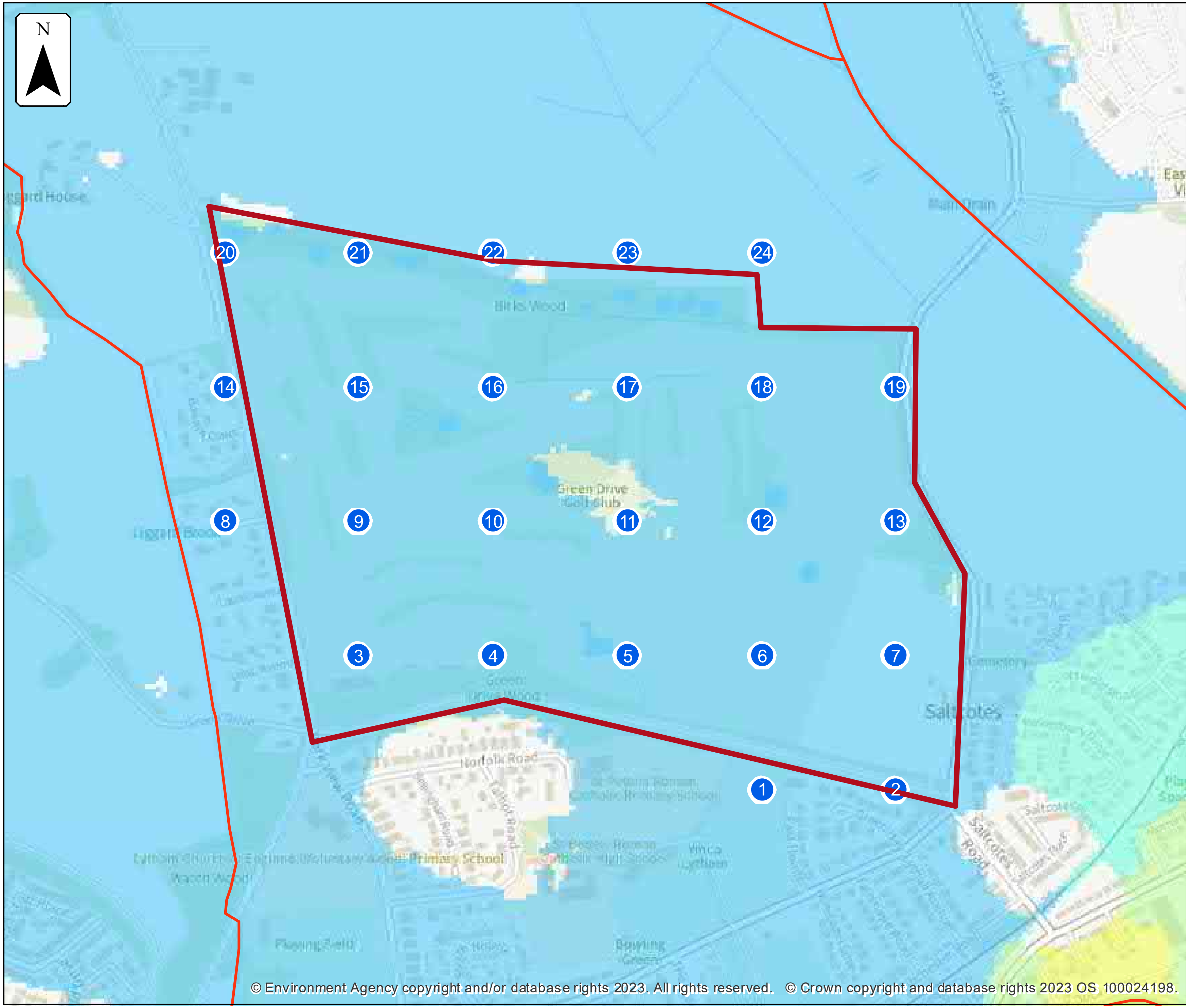
Sample point data

Defended climate change

Label	Easting	Northing	0.5% AEP (+370mm)		0.5% AEP (+670mm)		0.5% AEP (+970mm)	
			Depth	Height	Depth	Height	Depth	Height
1	337444	428013	NoData	NoData	NoData	NoData	0.89	3.32
2	337640	428013	NoData	NoData	NoData	NoData	NoData	NoData
3	336856	428209	NoData	NoData	NoData	NoData	NoData	NoData
4	337052	428209	NoData	NoData	NoData	NoData	NoData	NoData
5	337248	428209	NoData	NoData	NoData	NoData	0.58	3.32
6	337444	428209	NoData	NoData	NoData	NoData	0.74	3.32
7	337640	428209	NoData	NoData	NoData	NoData	NoData	NoData
8	336660	428405	NoData	NoData	NoData	NoData	NoData	NoData
9	336856	428405	NoData	NoData	NoData	NoData	NoData	NoData
10	337052	428405	NoData	NoData	NoData	NoData	NoData	NoData
11	337248	428405	NoData	NoData	NoData	NoData	NoData	NoData
12	337444	428405	NoData	NoData	NoData	NoData	NoData	NoData
13	337640	428405	NoData	NoData	NoData	NoData	NoData	NoData
14	336660	428601	NoData	NoData	NoData	NoData	NoData	NoData
15	336856	428601	NoData	NoData	NoData	NoData	NoData	NoData
16	337052	428601	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	0.5% AEP (+370mm)		0.5% AEP (+670mm)		0.5% AEP (+970mm)	
			Depth	Height	Depth	Height	Depth	Height
17	337248	428601	NoData	NoData	NoData	NoData	NoData	NoData
18	337444	428601	NoData	NoData	NoData	NoData	0.49	2.21
19	337640	428601	NoData	NoData	0.15	1.79	0.18	2.29
20	336660	428797	NoData	NoData	NoData	NoData	NoData	NoData
21	336856	428797	NoData	NoData	NoData	NoData	NoData	NoData
22	337052	428797	NoData	NoData	NoData	NoData	NoData	NoData
23	337248	428797	NoData	NoData	NoData	NoData	NoData	NoData
24	337444	428797	NoData	NoData	NoData	NoData	0.41	2.21

Data in this table comes from the Ribble Estuary Tidal 2014 model.
Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.



Environment Agency

Defences removed climate change modelled tidal extent and height

Location (easting/northing)
337200/428430

Scale	Created
1:7,500	**5 May 2023**

Model name
Ribble Estuary Tidal 2014

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 5.0
- 5.0 - 5.25
- 5.25 - 5.5
- 5.5 - 5.75
- 5.75 - 6.0
- 6.0 - 6.25
- 6.25 - 6.5
- 6.5 - 6.75
- 6.75 - 7.0

This map shows the
0.5% AEP +970mm height data

0 100 200 300
metres

Sample point data

Defences removed climate change

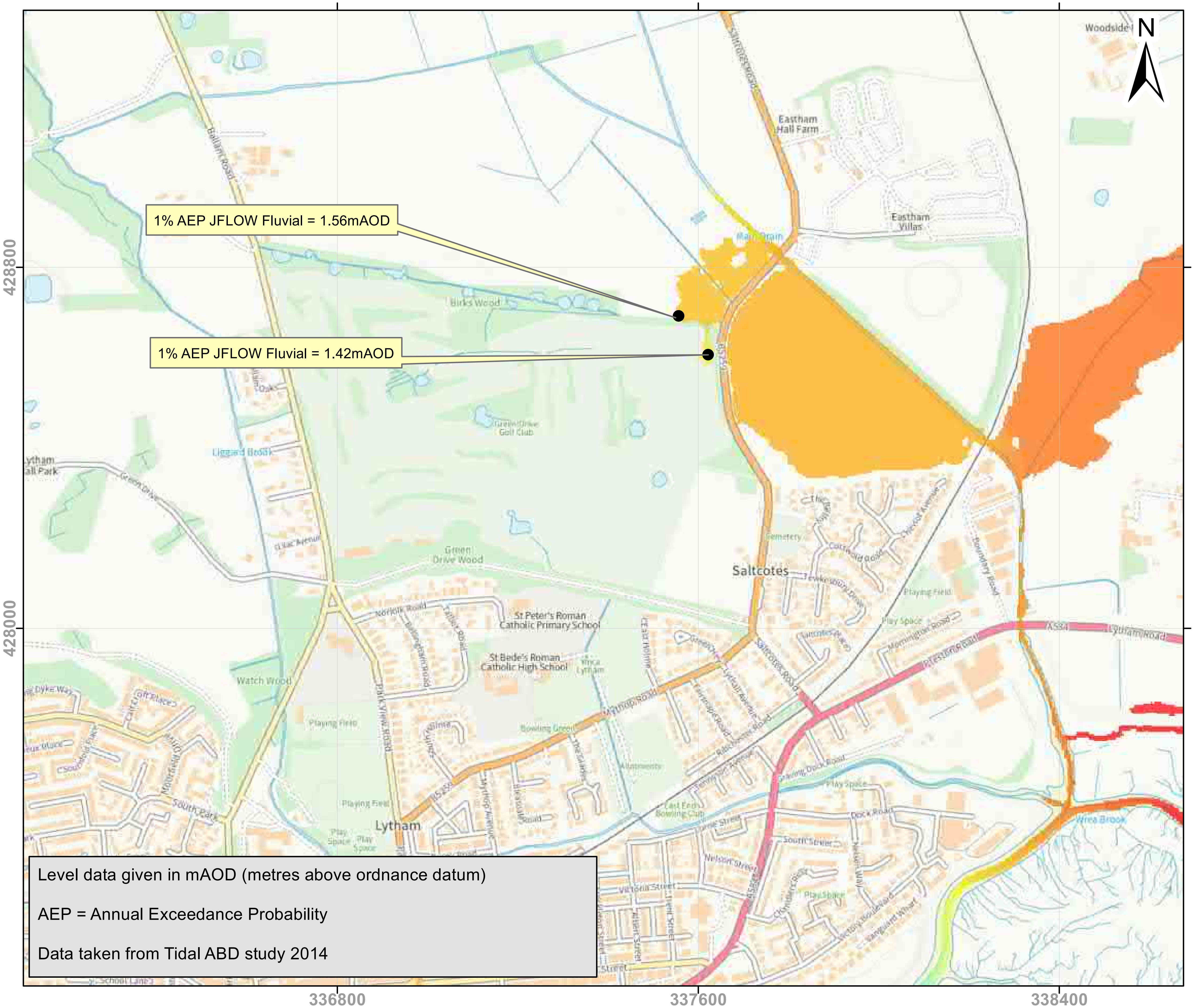
Label	Easting	Northing	0.5% AEP (+370mm)		0.5% AEP (+670mm)		0.5% AEP (+970mm)	
			Depth	Height	Depth	Height	Depth	Height
1	337444	428013	2.18	4.61	2.63	5.04	2.93	5.36
2	337640	428013	0.45	4.61	0.96	5.04	1.20	5.36
3	336856	428209	0.26	4.55	0.68	5.04	1.06	5.36
4	337052	428209	1.17	4.61	1.62	5.04	1.92	5.36
5	337248	428209	1.87	4.61	2.28	5.04	2.62	5.36
6	337444	428209	2.03	4.61	2.49	5.04	2.78	5.36
7	337640	428209	1.12	4.61	1.57	5.04	1.87	5.36
8	336660	428405	NoData	NoData	0.25	5.04	0.72	5.35
9	336856	428405	0.14	4.59	0.59	5.04	0.90	5.35
10	337052	428405	0.41	4.61	0.82	5.04	1.16	5.36
11	337248	428405	NoData	NoData	NoData	NoData	NoData	NoData
12	337444	428405	0.02	4.67	0.36	5.03	0.68	5.35
13	337640	428405	1.19	4.68	1.54	5.03	1.87	5.36
14	336660	428601	0.47	4.55	0.91	5.04	1.26	5.35
15	336856	428601	0.32	4.58	0.73	5.03	1.09	5.35
16	337052	428601	1.36	4.65	1.63	5.03	2.06	5.35

Label	Easting	Northing	0.5% AEP (+370mm)		0.5% AEP (+670mm)		0.5% AEP (+970mm)	
			Depth	Height	Depth	Height	Depth	Height
17	337248	428601	1.50	4.66	1.64	5.03	2.19	5.35
18	337444	428601	2.94	4.67	3.24	5.03	3.63	5.35
19	337640	428601	2.51	4.67	3.22	5.03	3.19	5.35
20	336660	428797	0.05	4.55	0.55	5.03	0.83	5.35
21	336856	428797	0.65	4.57	1.03	5.03	1.43	5.34
22	337052	428797	NoData	NoData	0.08	5.01	0.41	5.32
23	337248	428797	1.20	4.63	1.49	5.01	1.89	5.33
24	337444	428797	2.85	4.65	3.21	5.02	3.53	5.34

Data in this table comes from the Ribble Estuary Tidal 2014 model.
Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.

Environment Agency

Modelled 2d Data Map:
Lytham Green Drive Golf Course, FY8 4LE, Lancashire
Produced: 05/05/2023
Our Ref: CL307583
NGR: SD3720228368



Level data given in mAOD (metres above ordnance datum)

AEP = Annual Exceedance Probability

Data taken from Tidal ABD study 2014

Key

1% AEP JFLOW Fluvial Scenario

mAOD

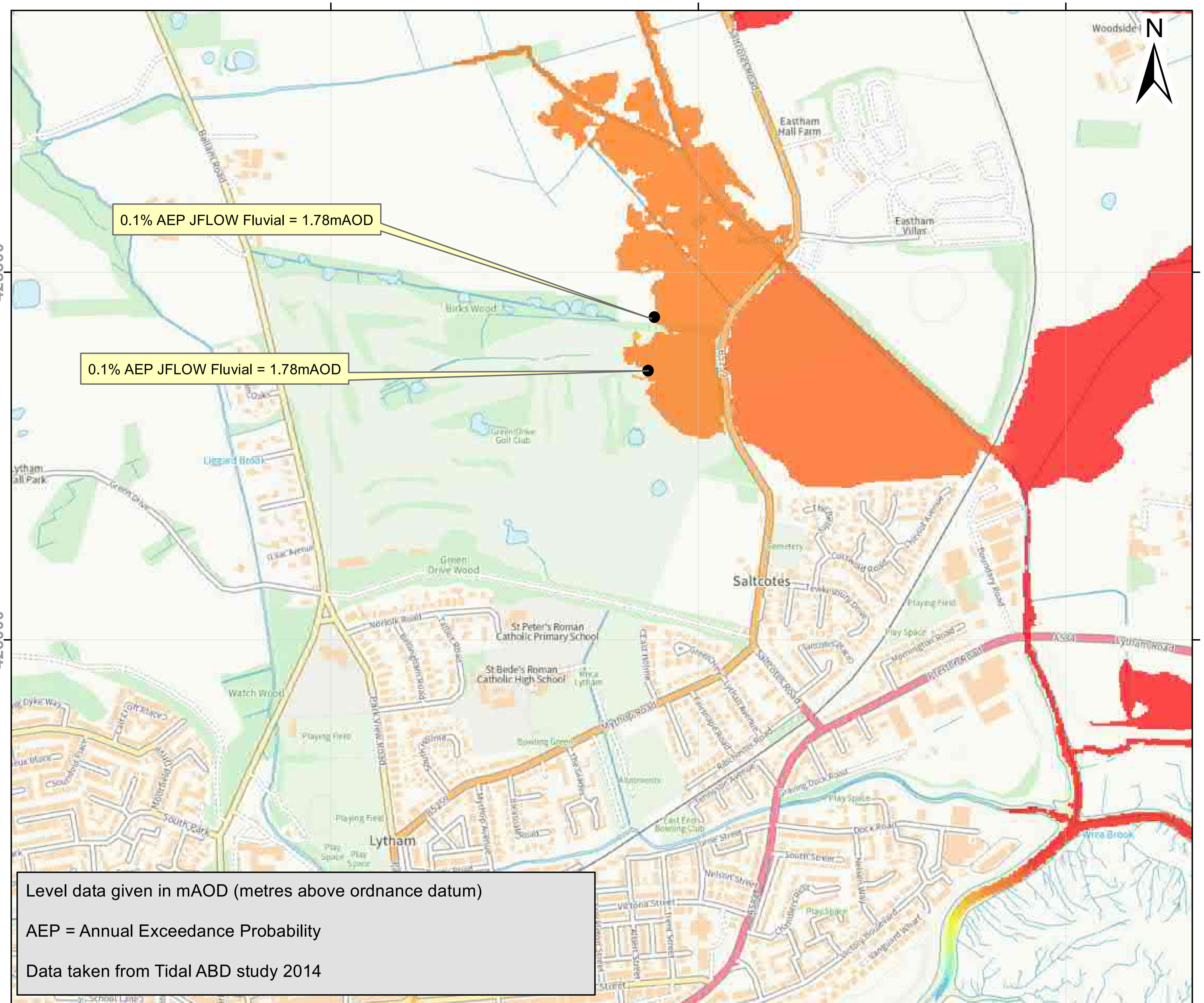
High : 2

Low : 0

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

Environment Agency

Modelled 2d Data Map:
Lytham Green Drive Golf Course, FY8 4LE, Lancashire
Produced: 05/05/2023
Our Ref: CL307583
NGR: SD3720228368



Level data given in mAOD (metres above ordnance datum)

AEP = Annual Exceedance Probability

Data taken from Tidal ABD study 2014

Key

0.1% AEP JFLOW Fluvial Scenario

mAOD

High : 2

Low : 0

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

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 Cumbria and Lancashire Environment Agency team at inforequests.cmblnc@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

Neil Starkey
Pell Frischmann
Unit G37b Market Walk
Wakefield
WF1 1QR

Our ref: NO/2023/115030/01-L01
Your ref: Lytham Green Drive GC

Date: 03 February 2023

Agreement Number: ENVPAC/1/CLA/00164

Dear Neil

CHARGED PLANNING ADVICE MEETING TO DISCUSS FLOOD RISK ISSUES IN RELATION TO PROPOSED EXTENSION TO GOLF COURSE INVOLVING LANDSCAPING/EARTHWORKS

LYTHAM GREEN DRIVE GOLF CLUB, BALLAM ROAD, LYTHAM ST. ANNES, FY8 4LE

Thank you for seeking our advice through our chargeable service in relation to the above.

We attended a virtual meeting (via Microsoft Teams) on 3 February 2023 at 14:15 in relation to the above. The outcome of the meeting is as follows:

We have no in principle objections or significant concerns regarding your development proposals in relation to any fluvial or tidal flood risk.

You advised that notional compensatory storage, if required could be provided. At the present time, we have not reviewed any design proposals, but feel that it would be unlikely that there would be any measurable detriment to fluvial flood risk. However, our opinions are just that and we reserve our judgment on this until the proposed design has been subject to your draft flood risk assessment (FRA).

We are currently reviewing some 2010 fluvial defended data which has not been in use. Once we have reviewed it, we will provide the data to you, but we don't expect it to affect our position on the proposal.

Based on our the available undefended fluvial J-Flow data (supplied in a Product 4 package to you) and the presence of defences along Liggard Brook (main river) to the east of the site (as shown in the Product 4 package), the site can be considered defended, and therefore in an area at reduced risk of flooding from river and sea, from high risk (undefended) to low risk (defended), we are satisfied therefore that no compensatory flood storage is likely to be required for any loss of volume associated with raising land on site, in this instance.

We trust that the meeting was useful and enables you to positively progress your development proposal.

If you have any queries or require further chargeable advice (such as reviewing your FRA) before you submit your planning application, please contact us.

Yours sincerely

Mr Alex Hazel
Planning Advisor - Sustainable Places Team

Tel: 020 302 51215
E-mail: clplanning@environment-agency.gov.uk

Minutes of meeting

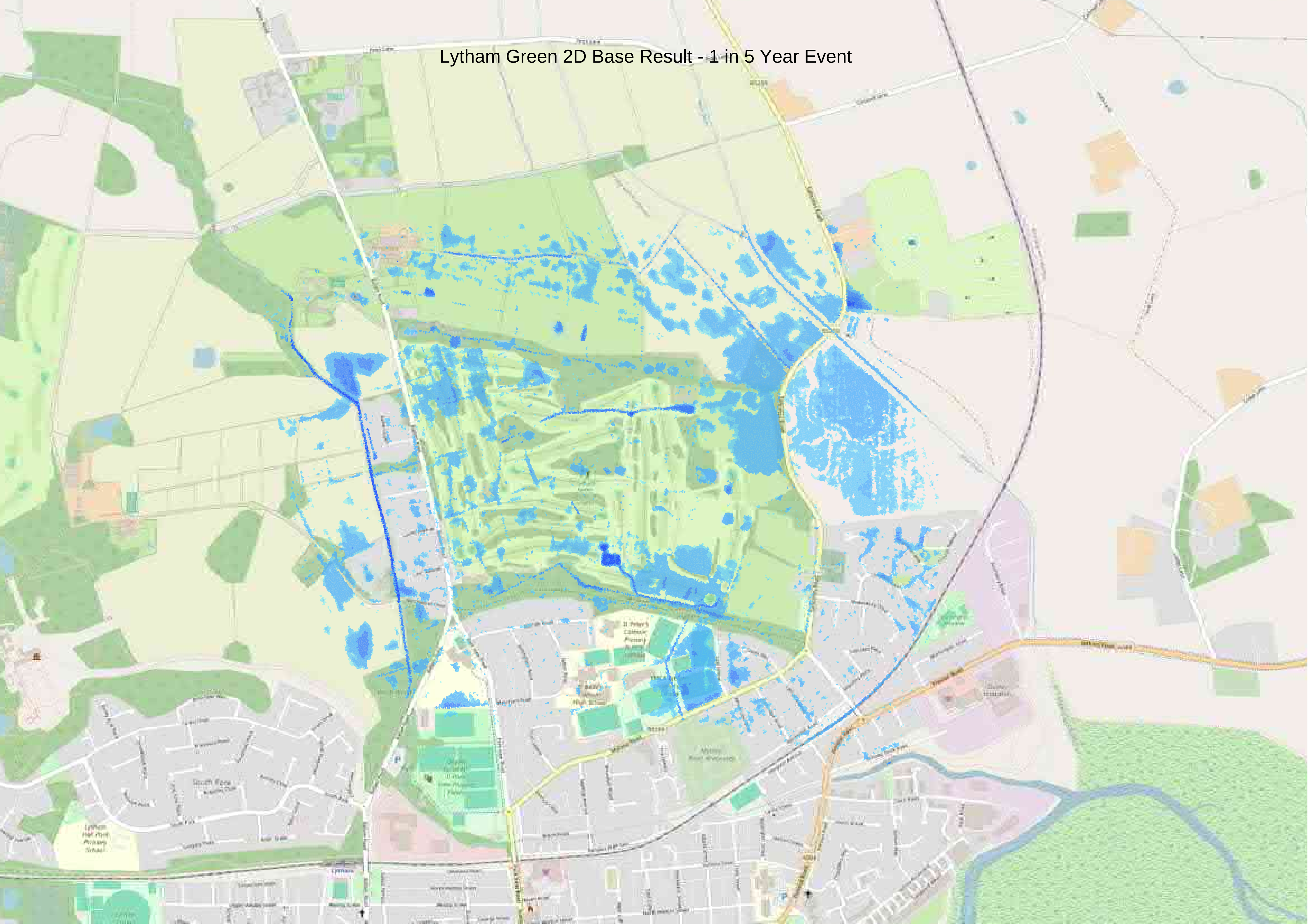
project title	Lytham Green Golf Course	project no.	106513
meeting ref. / no.	-	file ref.	
location	Teams Meeting	date of meeting	03/02/2023
purpose	EA Pre-App Discussions		
present	Alex Hazel – EA, Paul Sadowski – EA, Neil Starkey – Pell Frischmann, Richard Lord – Booths, Johnathan Gaunt – Gaunt Golf Design		
apologies	-		
circulation	-		

item	content	action
01	NS explained the scheme concept. The scheme is looking to raise ground levels the tidal floodplain and partially within the fluvial flood zone. NS proposed that compensatory storage is not required for tidal flooding as stated in the A guidance. PS agreed	
02	NS showed the fluvial outline taken from the Product 4 Data and where the proposed overlap. It was also noted the water levels came from a “defended” JFlow model. NS asked in compensatory storage was necessary. PS stated the potential impact of the raised ground on the fluvial floodplain is insignificant and would not require compensatory storage.	

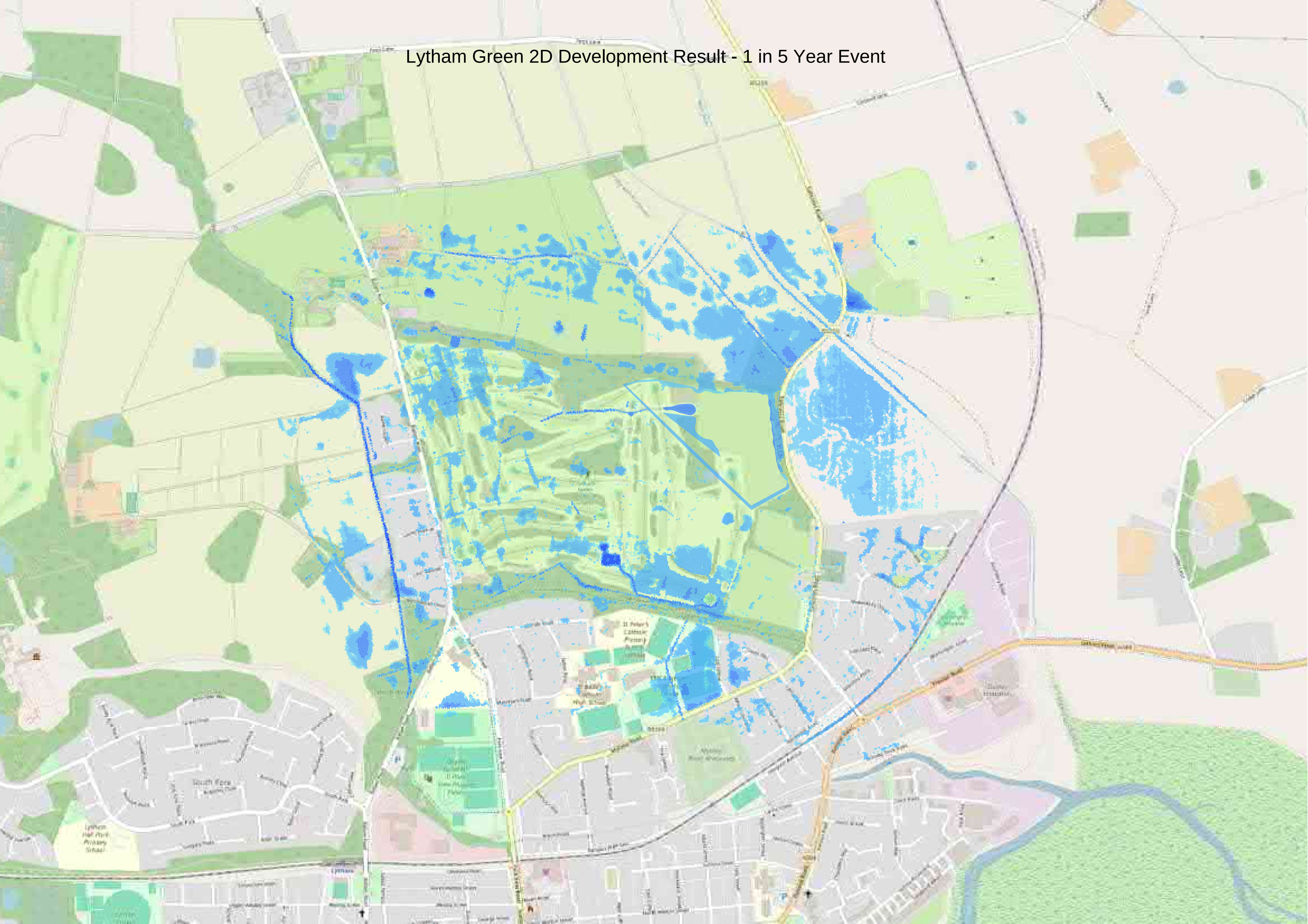
prepared by	Neil Starkey
date circulation	21/02/2023
date of next meeting	

Appendix C Surface Water Modelling

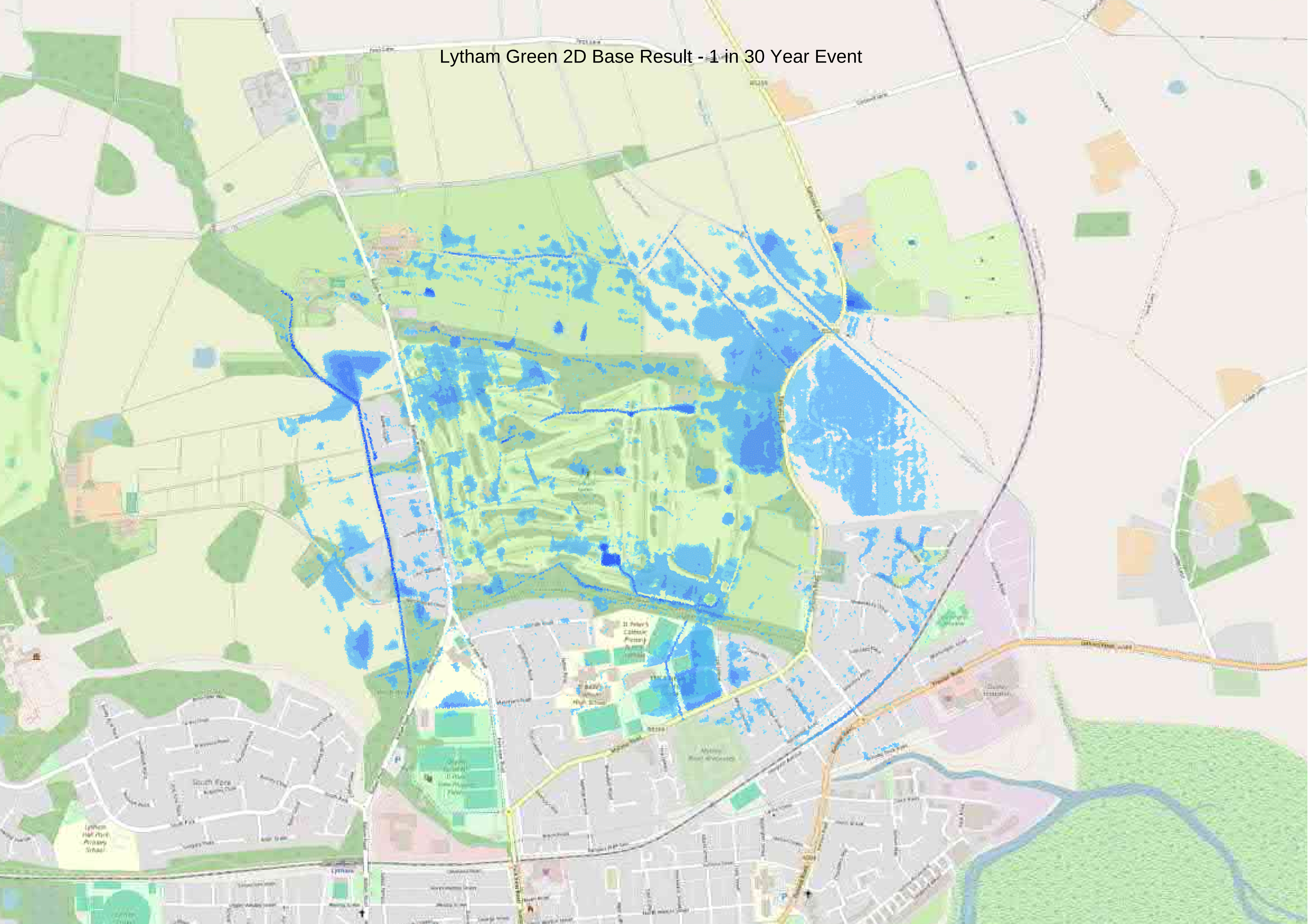
Lytham Green 2D Base Result - 1 in 5 Year Event



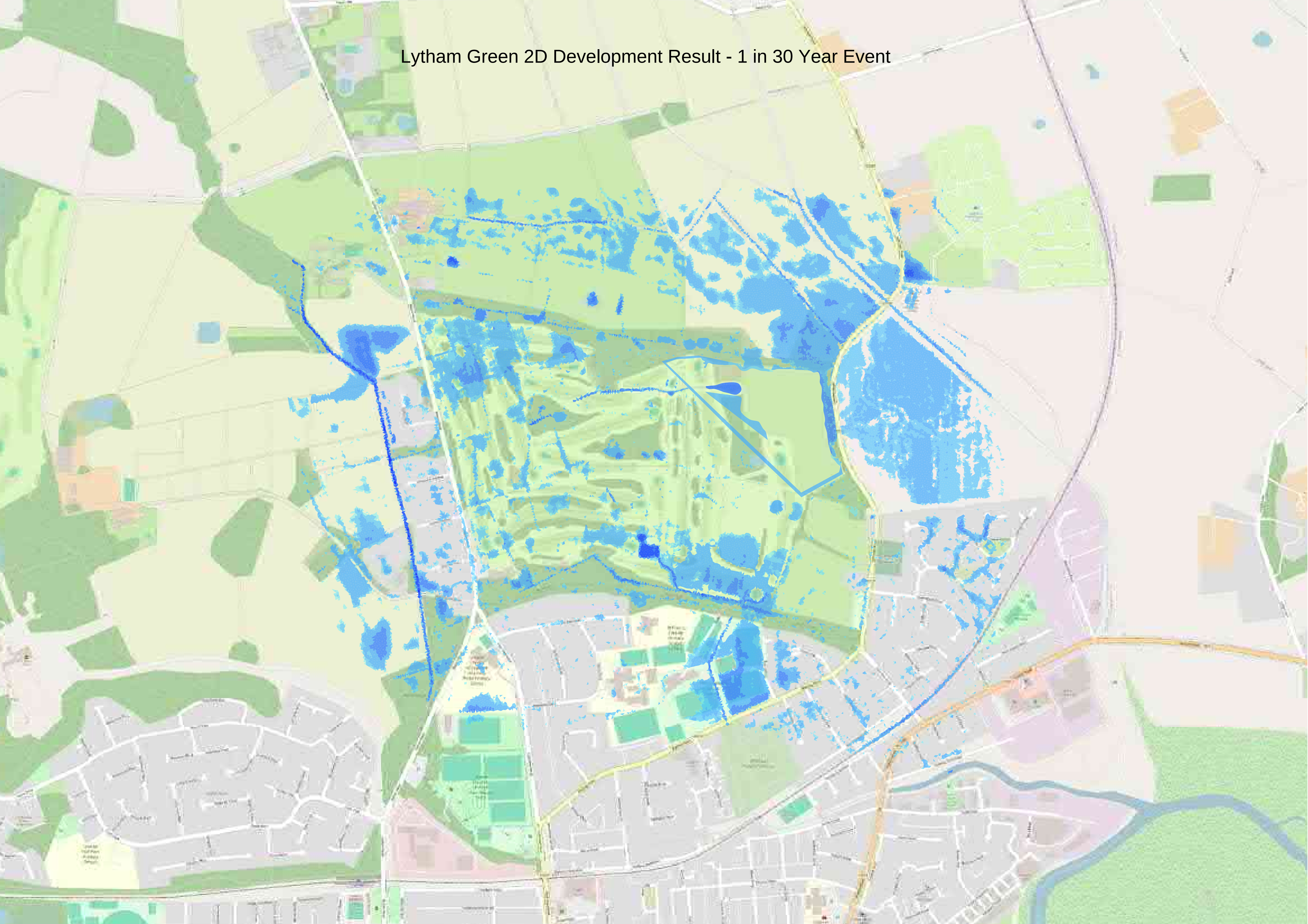
Lytham Green 2D Development Result - 1 in 5 Year Event



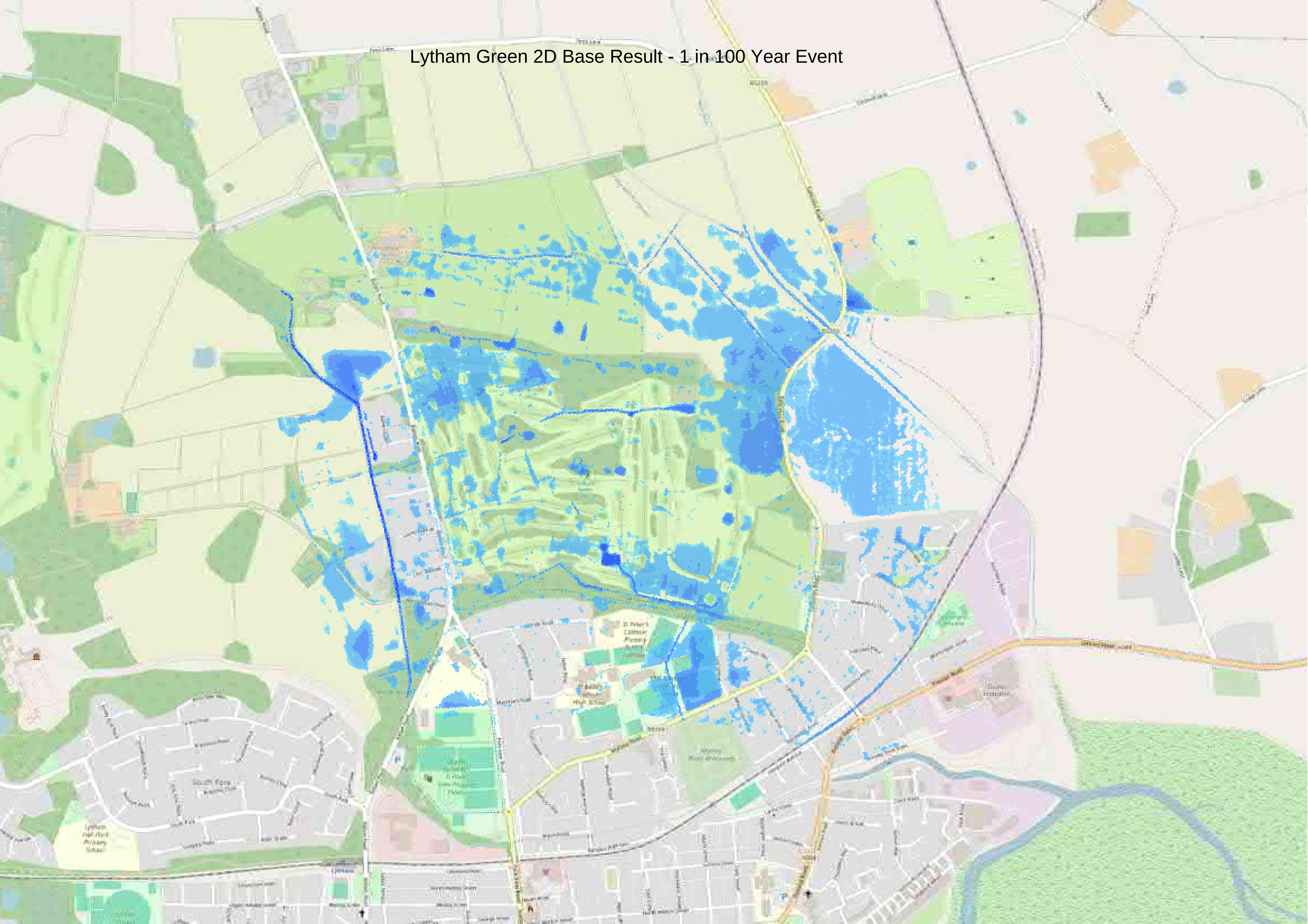
Lytham Green 2D Base Result - 1 in 30 Year Event



Lytham Green 2D Development Result - 1 in 30 Year Event



Lytham Green 2D Base Result - 1 in 100 Year Event



Lytham Green 2D Development Result - 1 in 100 Year Event