

Flood Risk Assessment

to support the Planning Application

for

the erection of one dwelling house

on

Land with Stables Myerscough Hall Drive

Bilsborrow

(350742E 440250N)

SCOPE OF THE ASSESSMENT

The National Planning Policy Framework (NPPF) sets out the Government's national policies on different aspects of land use planning in England in relation to flood risk. Supporting Planning Practice Guidance is also available.

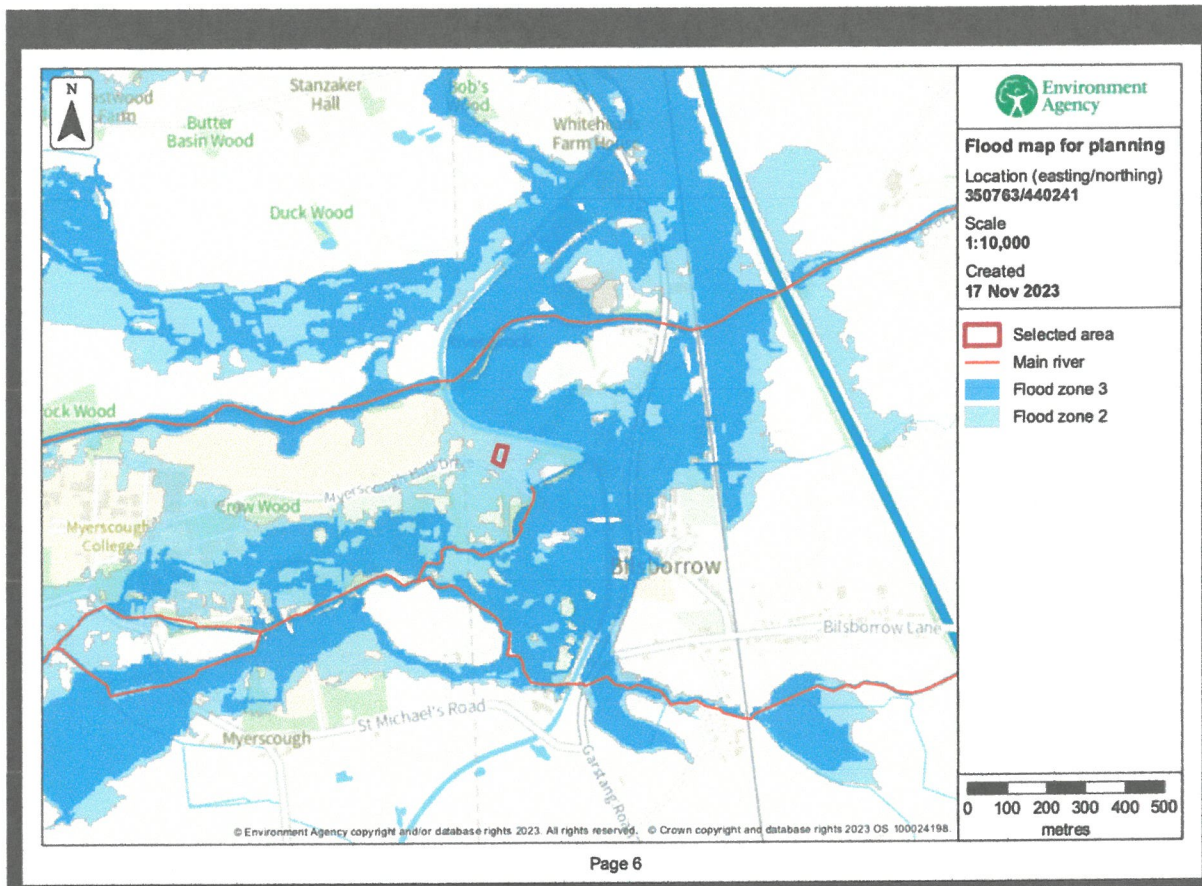
The NPPF sets out the vulnerability to flooding of different land uses. It encourages development to be located in areas of lower flood risk where possible and stresses the importance of preventing increases in flood risk off site to the wider catchment area.

The NPPF also states that alternative sources of flooding, other than fluvial (river flooding), should also be considered when preparing a Flood Risk Assessment.

As set out in the NPPF, local planning authorities should only consider development in flood risk areas appropriate where informed by a site specific Flood Risk Assessment. This document will identify and assess the risk associated with all forms of flooding to and from the development. Where necessary it will demonstrate how these flood risks will be managed so that the development remains safe throughout its lifetime, taking climate change into account.

In investigating the flood risk relating to the site, the Environment Agency flood mapping has been reviewed and has confirmed that the site lies within Flood Zone 2. Flood Zone 2 is identified as land assessed as having a Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

between a 1 in 1000 (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.



Strategic Flood Risk Assessment

The Strategic Flood Risk Assessment for Wyre Borough Council is dated July 2016 and was produced by Wyre Borough Council.

The SFRA sets out the distinct flood risk areas in Wyre. The site is within the Central Wyre Area.

The main risk of flooding within the area is from fluvial sources. Because of the flat nature of the topography many of the secondary water courses back up when the River Wyre is bank full during peak flow events. The flat topography also allows tidal influences to impact throughout most of the area and certainly further than the defined tidal limits at Cartford Bridge Little Ecclestone. Limited flood risk exists from sewer systems and canals.

Sources of Flood Risk

This section of the Flood Risk Assessment looks at the flood risk to the site before any mitigation measures are put into place and hence identifies where mitigation will be required. This document will continue to explain the mitigation measures proposed and the residual risk following implementation of any proposed mitigation.

River and Sea Flooding

During heavy or prolonged rainfall events, rivers can encounter large flows which can result in them exceeding their capacity (fluvial flooding). Additionally, when a river has a tidal influence, high tides and storm surges can result in river capacity exceedance. Tidal flooding can also occur when an exceptionally high tide, almost always accompanied by a storm tide surge, overtops and/or breaches the tidal defences along a coastline.

Surface Water Flooding

Flooding from surface water runoff usually occurs when rainwater does not drain away through drainage systems or soaks into the ground and instead lies on or flows over the ground. This form of flooding typically occurs following a period of prolonged rainfall when either the ground is saturated or sewers/drainage is at full capacity. It is inextricably linked to issues of poor drainage and sewer flooding. Surface water flooding can also occur when the intensity of the rainfall prevents rainwater from having time to flow into sewers or soak into the ground.

Groundwater flooding

Groundwater flooding occurs when heavy or prolonged rainfall makes the level of water underground rise above its natural surface. It is most likely to occur in areas underlain by permeable rocks, called aquifers. These can be extensive, regional aquifers, such as chalk or sandstone, or may be more local sand or river gravels in valley bottoms underlain by less permeable rocks. The risk of groundwater flooding can also be exacerbated by artificial factors, such as a reduction in water abstraction.

Sewer Flooding

Sewer flooding normally occurs when inflows into the sewer system exceed the underground system capacity resulting in the sewer system becoming overloaded.

Flooding from Artificial Sources

There are a number of reservoirs in the Borough - including Grizedale, Barnacre and Grizedale Lea - which provide storage for public water supply.

Proposed Development

The proposal is for one detached dwelling on land that is currently being used for horses and has 3 x stables, hay barn, tack room, menage and grazing.

The vulnerability classification of the proposed development as defined in the table below is: Flood Risk Vulnerability Classification of the NPPF is “more vulnerable”.

Flood Risk Vulnerability and Flood Zone compatibility	Essential Infrastructure e.g. Transport and utility infrastructure	Water Compatibility e.g. open space, docks, mains and wharves	Highly Vulnerable e.g. mobile homes and police, ambulance and fire stations	More Vulnerable e.g. Hospitals, residential institutions and dwellings	Less Vulnerable e.g. offices, industry and storage or distribution
Flood Risk Zone 1 – Low probability	Yes	Yes	Yes	Yes	Yes
Flood Risk Zone 2 – Medium probability	Yes	Yes	Exception Test Required	Yes	Yes
Flood Risk Zone 3a – High probability	Exception Test Required	Yes	No	Exception Test Required	Yes
Flood Risk Zone 3b – High probability	Exception Test Required	Yes	No	No	No

Consultation and Guidance

This site is identified on the Environmental Agency's flood mapping as lying within Flood Zone 2 and part of the site is in Flood Zone 1. The main risk of flooding is from flat lying land with the principal watercourse flowing through the Borough being the River Wyre which has a number of smaller tributaries including the River Calder and River Brock. The Lancaster canal also runs through the Borough as well as a large number of smaller drains and watercourses.

Historical Flooding Data

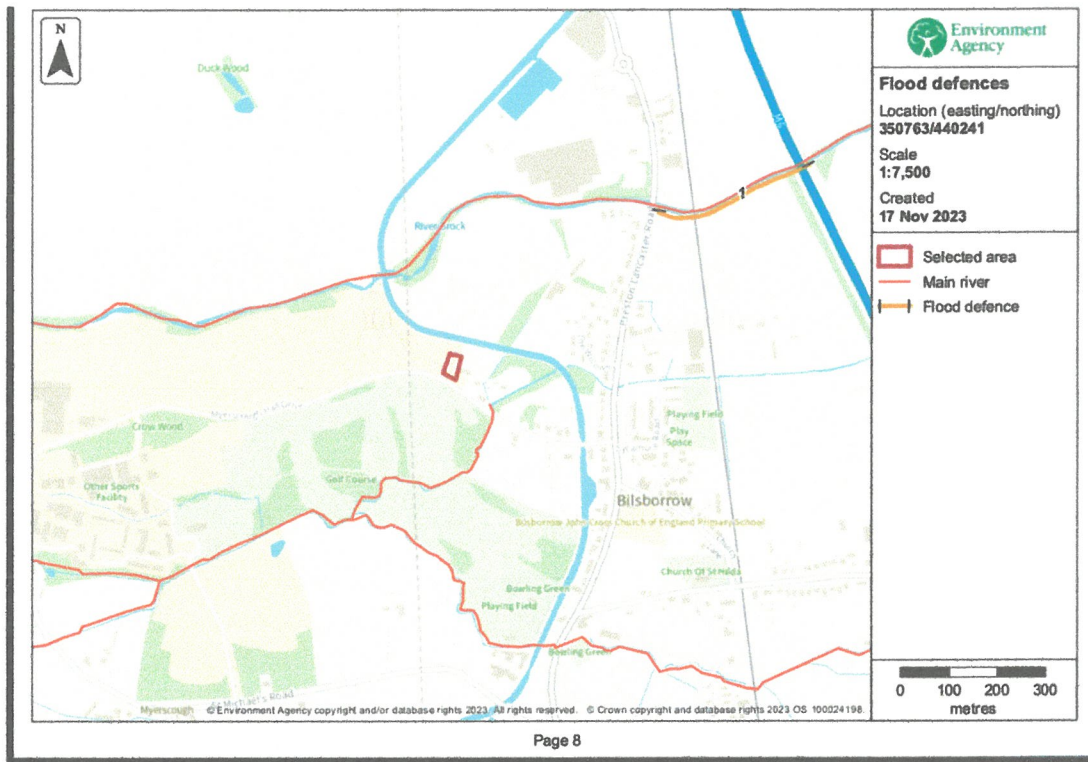
The Environment Agency have confirmed there is no historical Flooding Data for this site on record.

Assessment of Product 4 Information

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.



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	66936	Embankment	20	Fair	25.20	26.47	25.20

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

Modelled data : Risk of Flooding to the Development

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

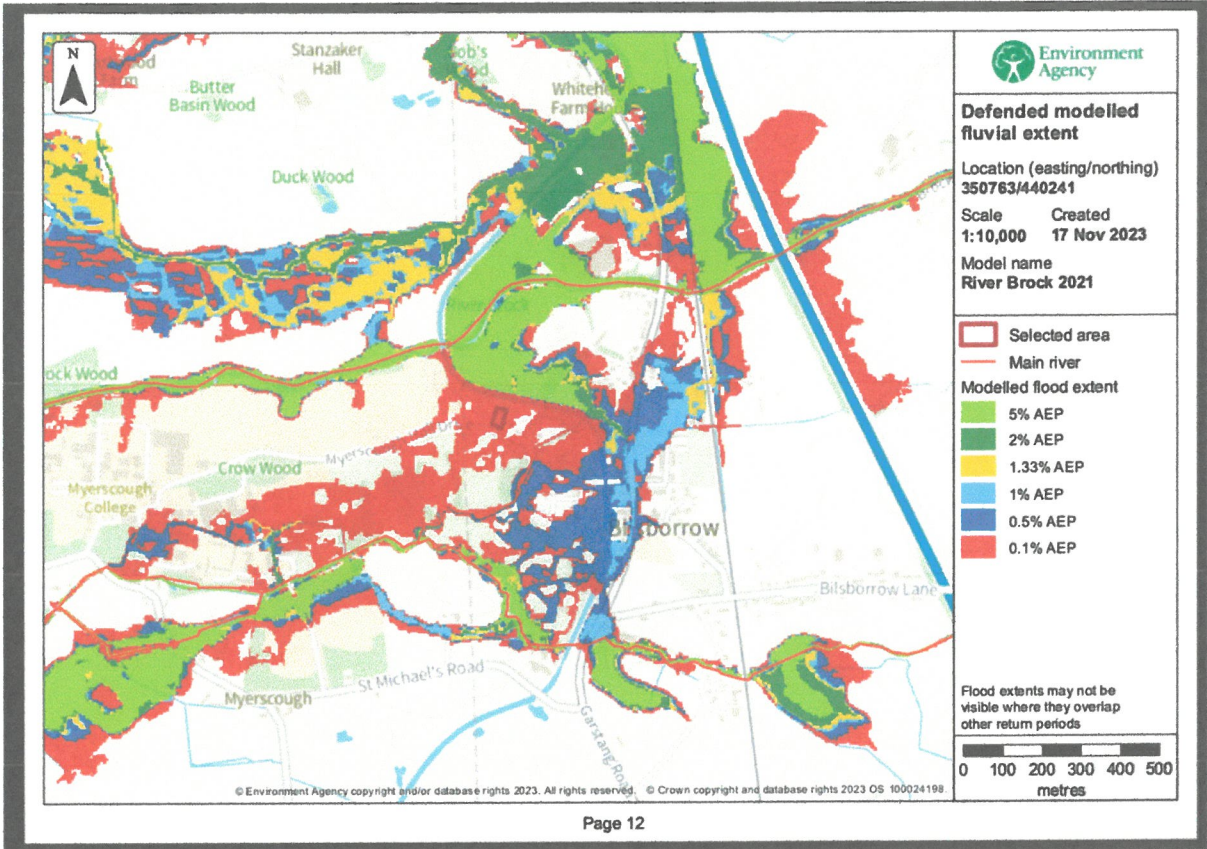
Climate change

The climate change data was included in the information sent from the Environmental Agency and has been considered when compiling this risk assessment.

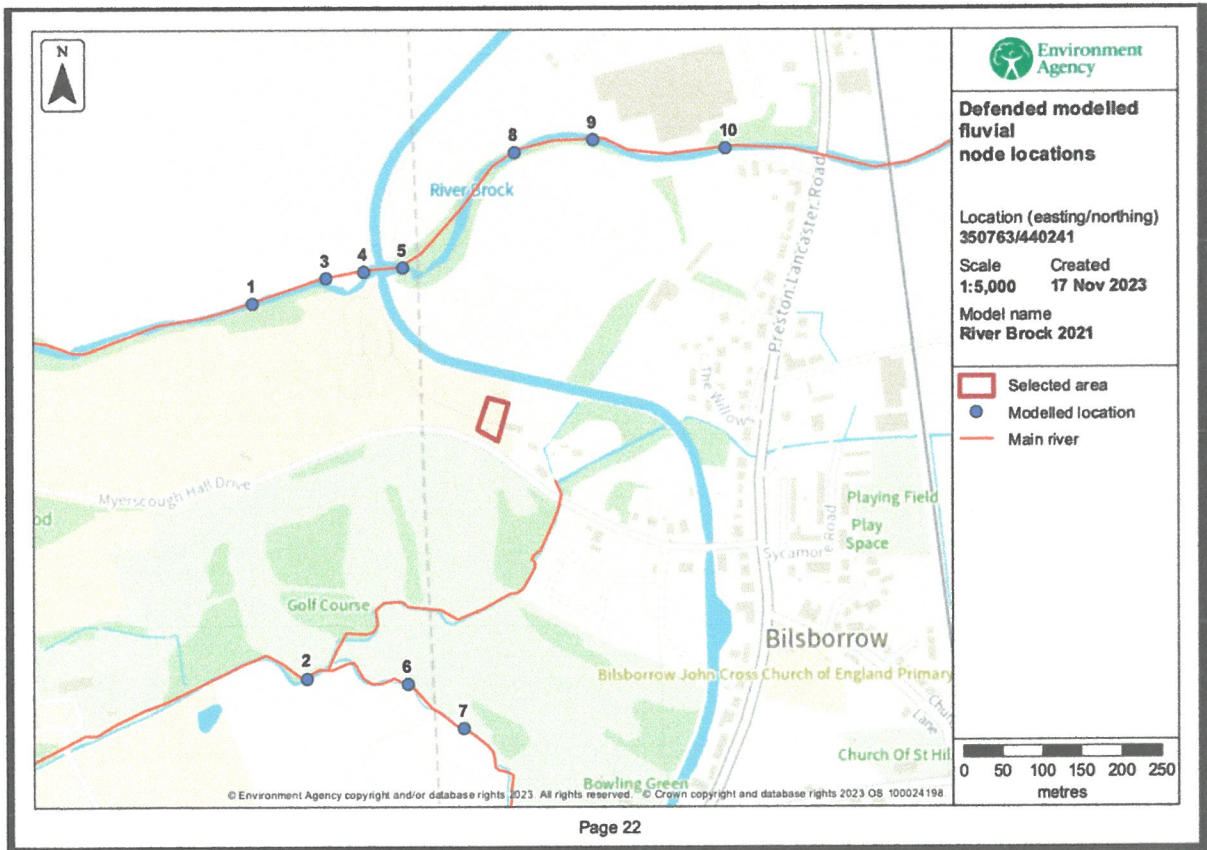
Modelled scenarios

The following scenarios are included:

- Defended modelled fluvial: risk of flooding from rivers where there are flood defences.
- Defences removed modelled fluvial: risk of flooding from rivers where flood defences have been removed.
- Defended climate change modelled fluvial: risk of flooding from rivers where there are flood defences, including estimated impact of climate change.
- Defences removed climate change modelled fluvial: risk of flooding from rivers where flood defences have been removed, including estimated impact of climate change.



Page 12



Page 22

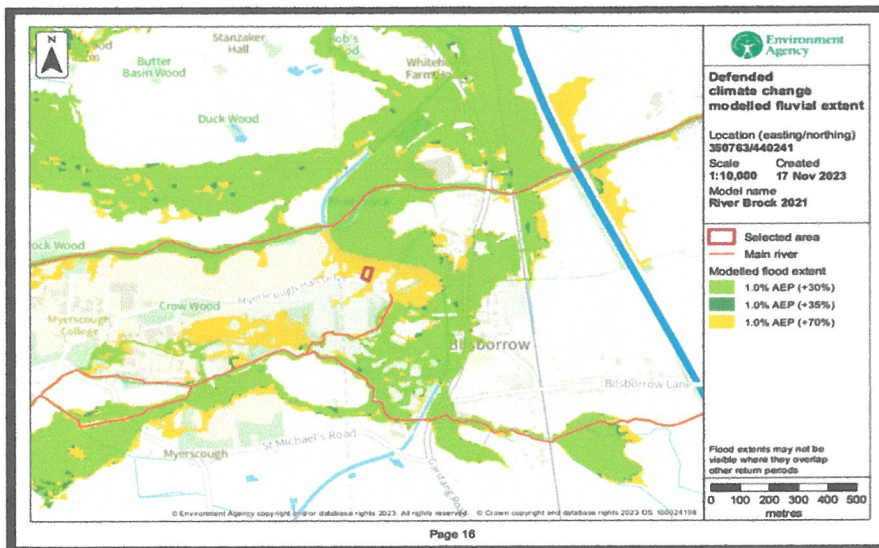
Modelled node locations data

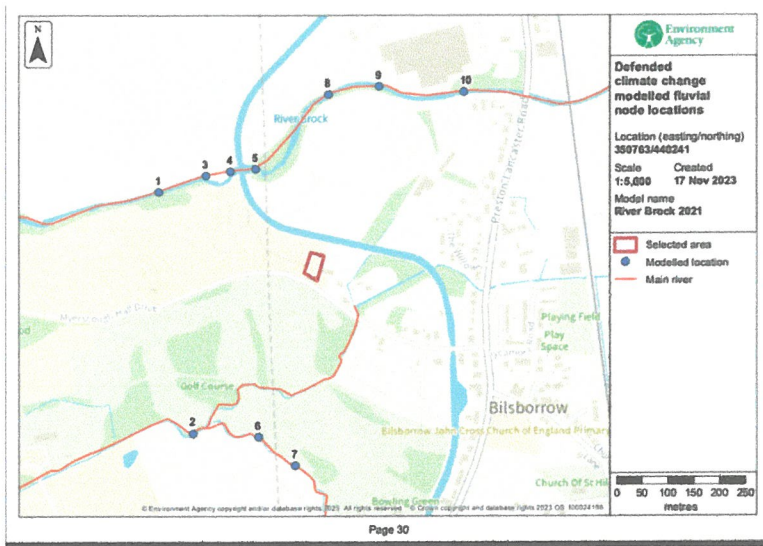
Defended

Label	Modelled location ID	Easting	Northing	5% 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	1182322	350462	440385	16.34	37.27	16.41	39.72	16.46	41.39	16.50	42.46	16.59	47.42	16.78	58.35
2	1182237	350528	439914	16.82	4.48	16.87	4.88	16.90	5.23	16.92	5.43	17.02	7.13	17.45	15.17
3	1182140	350554	440417	16.55	47.85	16.61	52.58	16.64	55.73	16.67	58.0	16.75	66.27	16.91	83.71
4	1182341	350601	440423	16.71	47.85	16.77	52.58	16.81	55.72	16.84	58.0	16.92	66.31	17.10	83.63
5	1182276	350850	440430	20.60	37.85	20.74	39.05	20.84	39.44	20.92	39.46	21.16	39.38	21.53	39.42
6	1182205	350855	439907	16.97	4.49	17.01	4.86	17.04	5.21	17.07	5.41	17.19	6.72	17.70	8.56
7	1182327	350726	439851	17.32	4.34	17.36	4.82	17.40	4.91	17.42	5.08	17.55	6.03	17.89	6.55
8	1182260	350791	440573	21.15	41.06	21.23	42.99	21.26	43.75	21.28	44.23	21.37	45.13	21.59	46.47
9	1182334	350889	440590	21.65	41.07	21.70	43.67	21.71	44.83	21.73	45.89	21.74	47.71	21.77	52.39
10	1182202	351054	440579	22.40	49.38	22.43	53.91	22.43	55.91	22.44	57.39	22.46	60.65	22.50	68.30

Data in this table comes from the River Brock 2021 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.

Risk of Flooding from Rivers where flood defences, with climate change :-





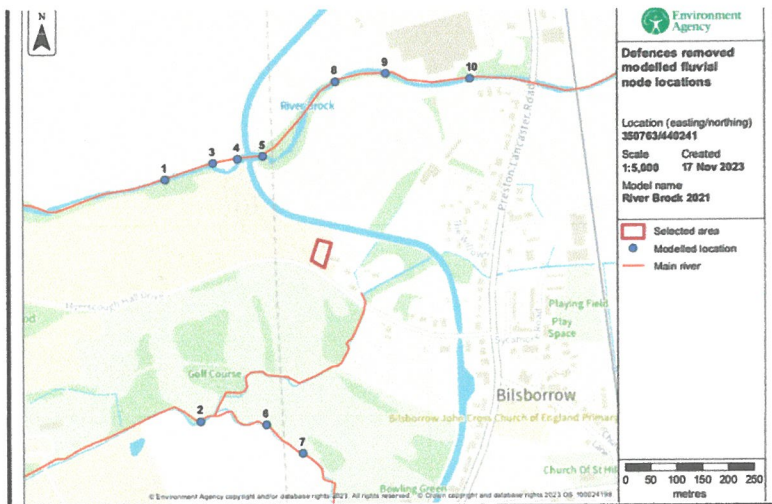
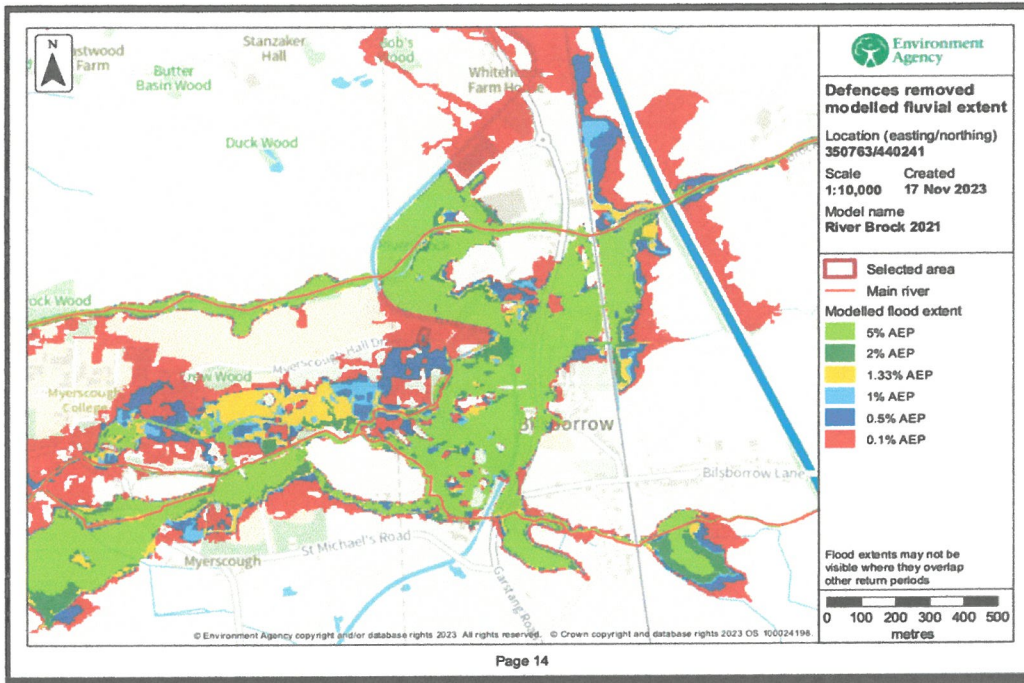
Modelled node locations data

Defended climate change

Label	Modelled location ID	Easting	Northing	1.0% AEP (+30%)		1.0% AEP (+35%)		1.0% AEP (+70%)	
				Level	Flow	Level	Flow	Level	Flow
1	1182322	350462	440385	16.63	49.70	16.65	50.60	16.77	57.48
2	1182237	350528	439914	17.14	9.0	17.18	9.47	17.39	13.72
3	1182140	350554	440417	16.79	70.08	16.80	71.48	16.91	82.53
4	1182341	350601	440423	16.96	70.18	16.98	71.56	17.09	82.38
5	1182276	350650	440430	21.25	39.38	21.28	39.39	21.50	39.41
6	1182205	350655	439907	17.31	8.04	17.37	8.21	17.65	8.51
7	1182327	350726	439851	17.67	6.32	17.70	6.36	17.85	6.56
8	1182260	350791	440573	21.42	45.43	21.44	45.58	21.57	46.23
9	1182334	350889	440590	21.75	48.50	21.75	48.82	21.76	51.50
10	1182202	351054	440579	22.47	61.73	22.47	62.18	22.50	66.47

Data in this table comes from the River Brock 2021 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.

Risk of Flooding from Rivers with flood defences removed :-



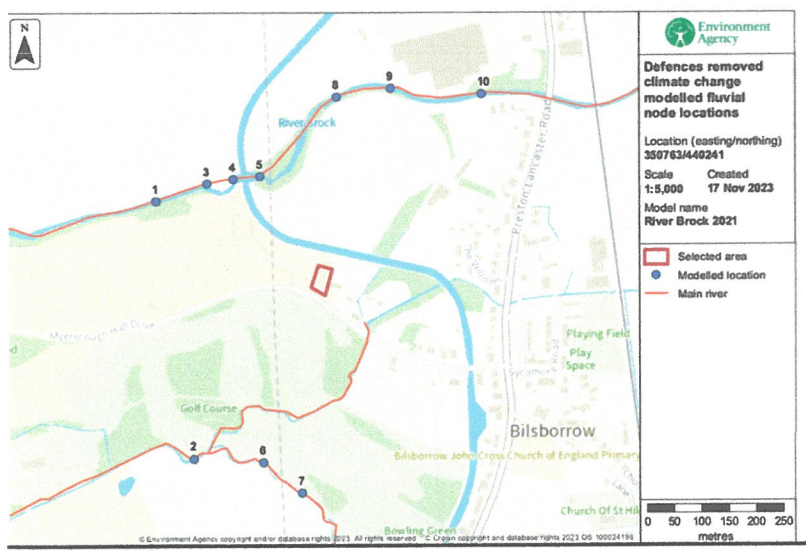
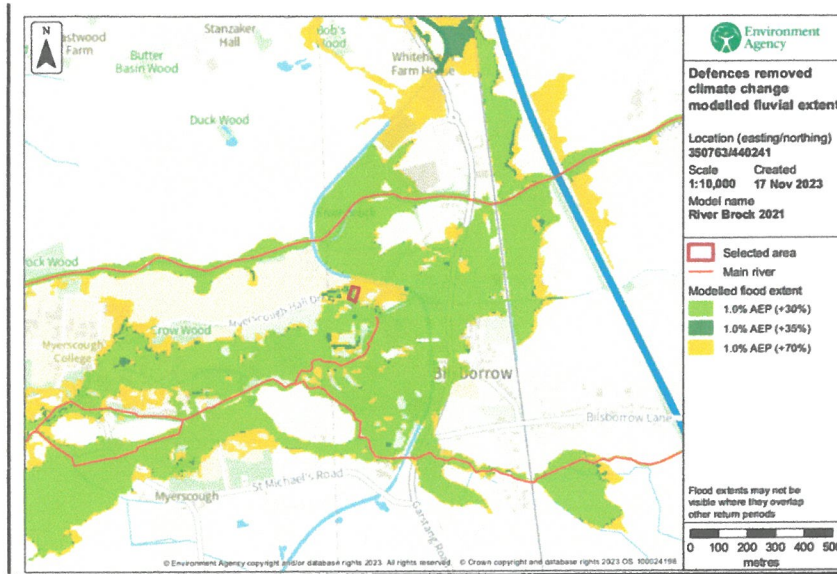
Modelled node locations data

Defences removed

Label	Modelled location ID	Easting	Northing	5% 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	1182322	350482	440385	16.31	38.72	16.46	41.45	16.52	43.31	16.55	44.83	16.62	48.90	16.76	58.45
2	1182237	350528	439914	17.06	9.53	17.21	12.66	17.31	15.04	17.36	16.30	17.44	16.21	17.69	26.08
3	1182140	350554	440417	16.54	46.32	16.64	55.81	16.69	59.54	16.71	62.07	16.77	68.90	16.89	81.24
4	1182341	350801	440423	16.69	46.32	16.81	56.82	16.85	59.53	16.88	62.06	16.95	68.93	17.07	81.17
5	1182276	350850	440430	20.54	38.08	20.64	40.28	20.97	40.32	21.05	40.38	21.22	40.39	21.48	40.47
6	1182205	350555	439907	17.28	7.75	17.50	8.23	17.62	8.33	17.68	8.37	17.79	8.42	18.31	11.66
7	1182327	350726	439851	17.64	5.82	17.76	6.11	17.82	6.17	17.87	6.17	17.98	6.21	18.42	6.37
8	1182260	350791	440573	21.12	35.62	21.25	36.77	21.29	37.09	21.31	37.29	21.39	37.77	21.55	38.76
9	1182334	350889	440590	21.53	35.69	21.58	37.03	21.59	37.47	21.59	37.85	21.62	39.10	21.70	41.13
10	1182202	351054	440579	22.30	38.23	22.34	41.19	22.35	42.35	22.36	43.10	22.37	45.23	22.40	46.85

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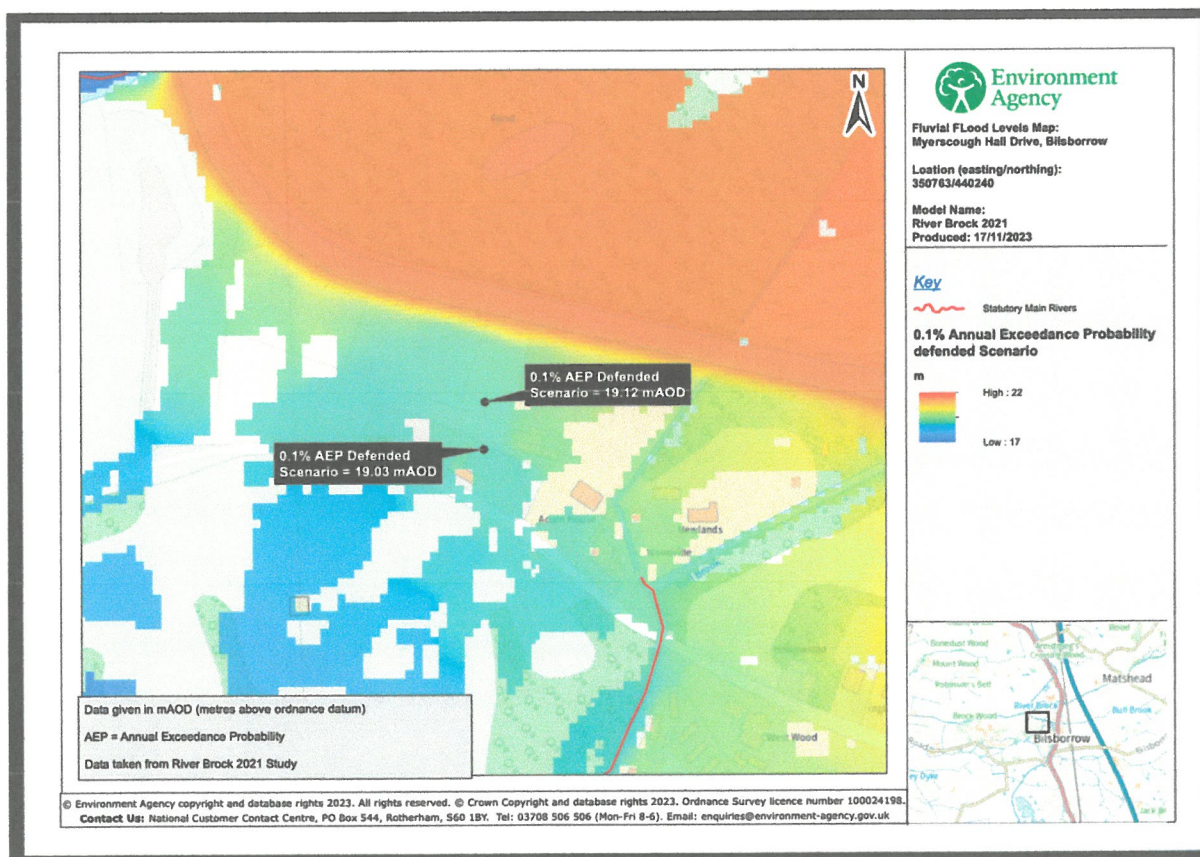
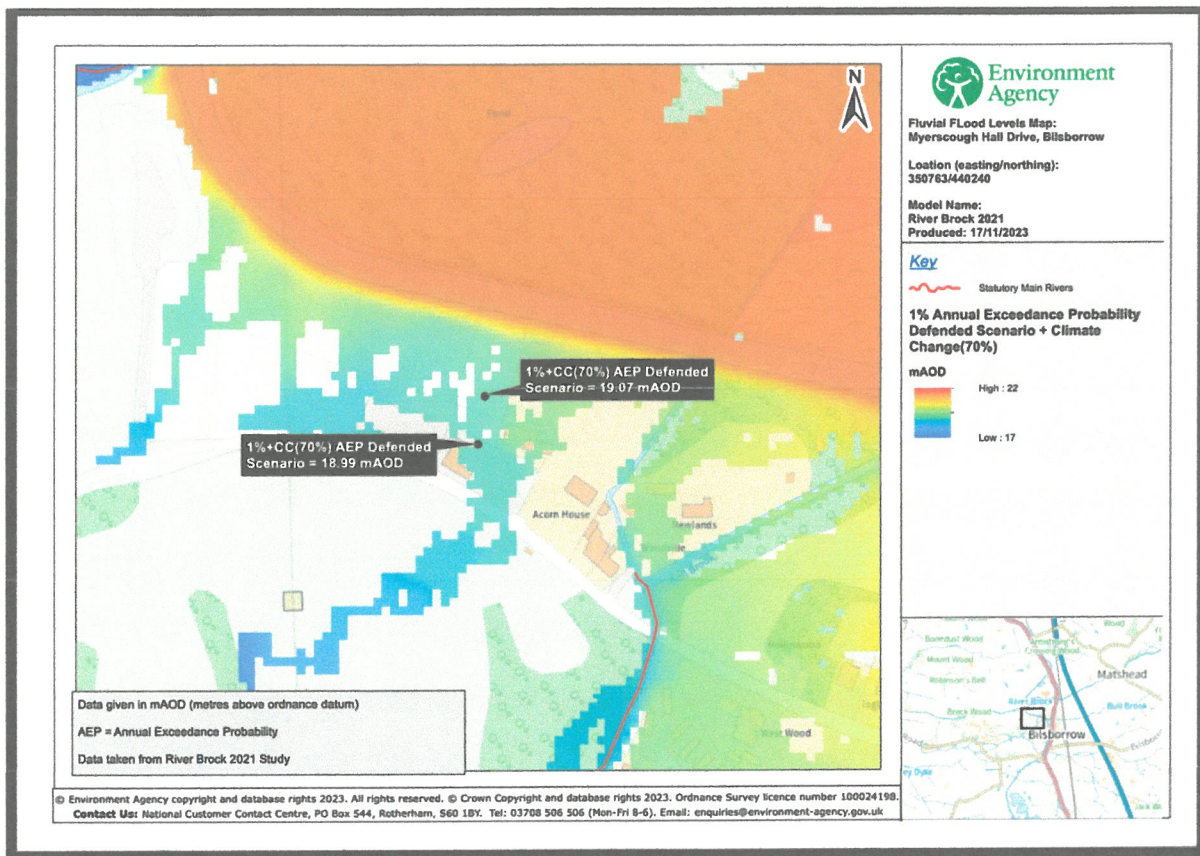
Risk of Flooding from Rivers with flood defences removed, including estimated impact of climate change :-

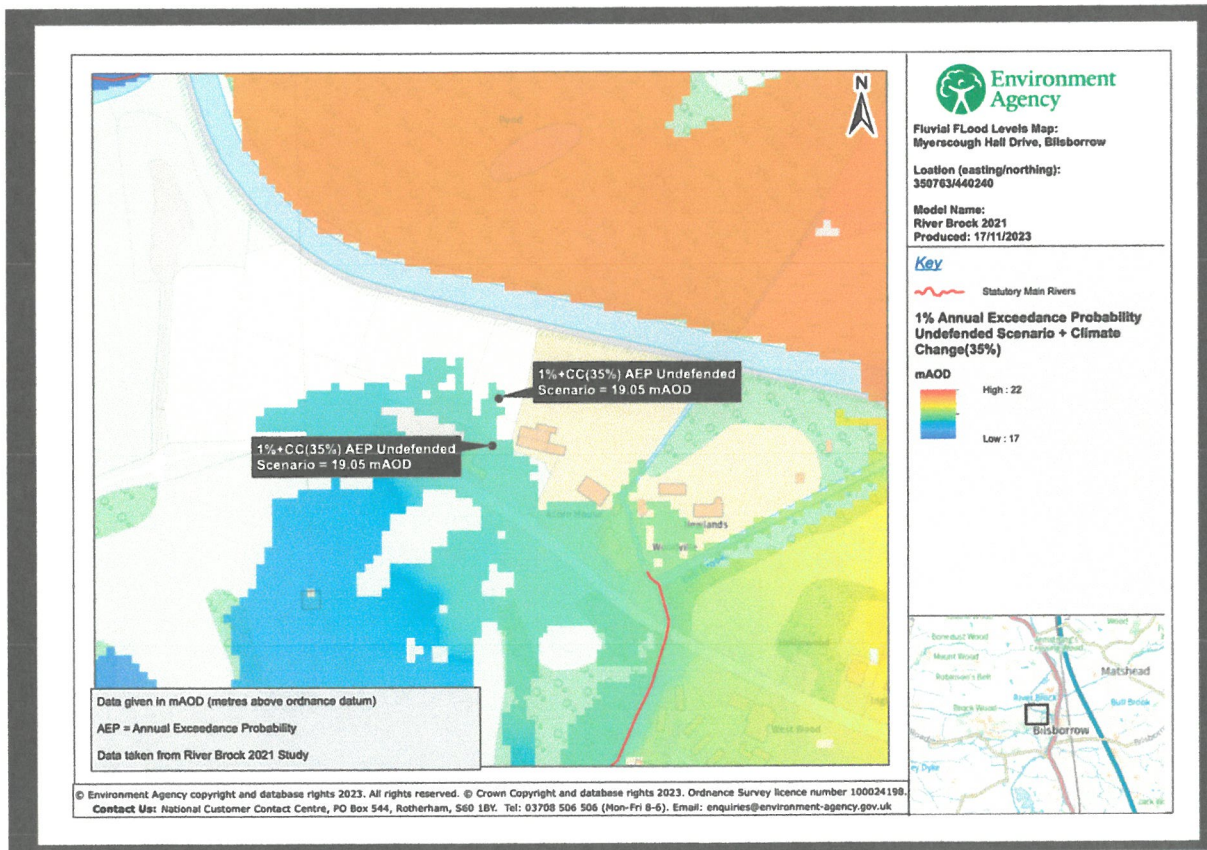
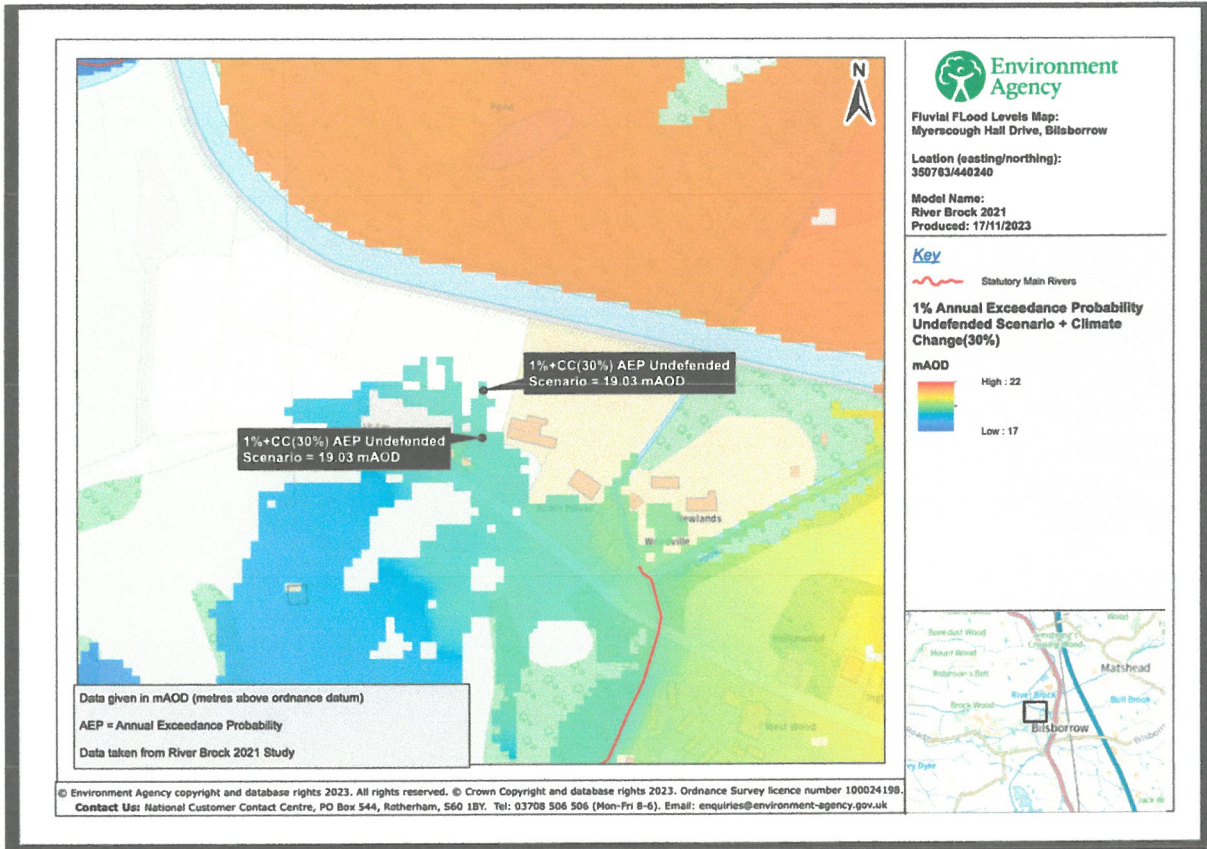


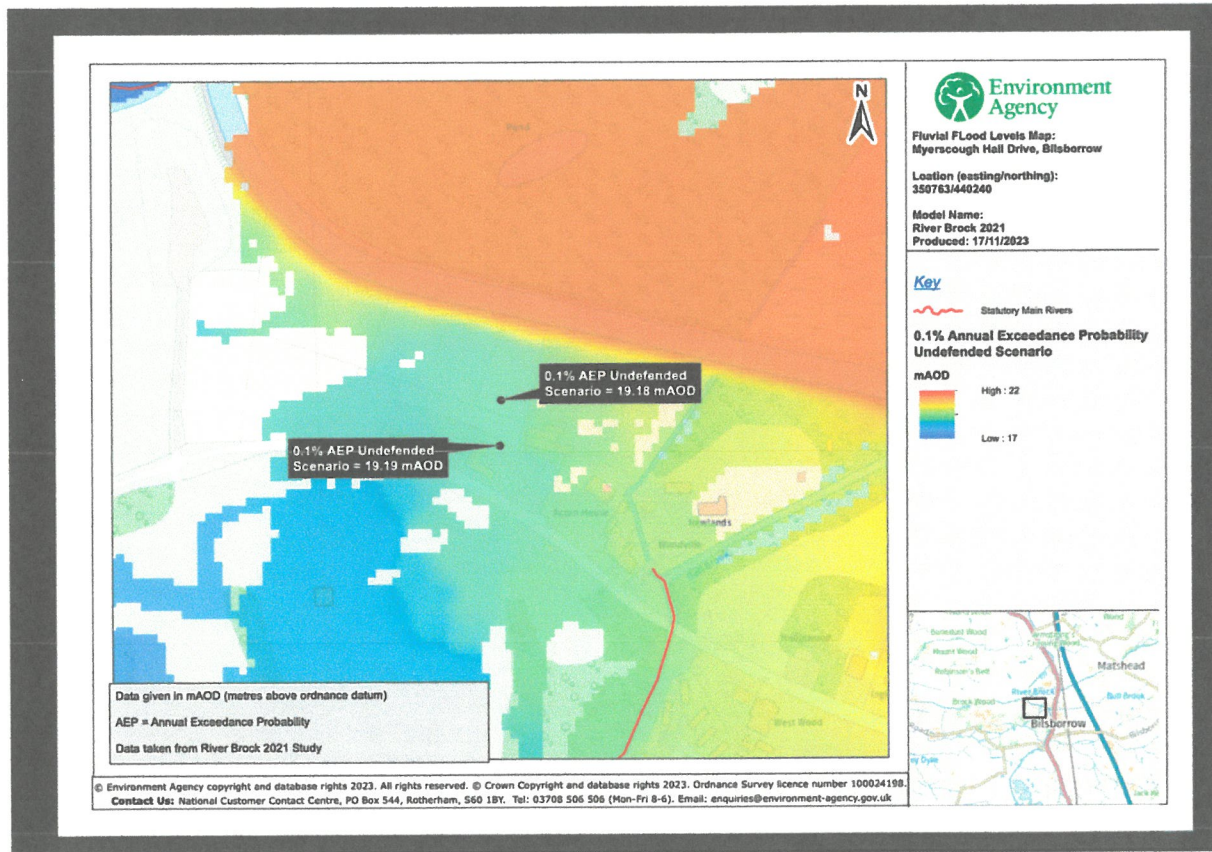
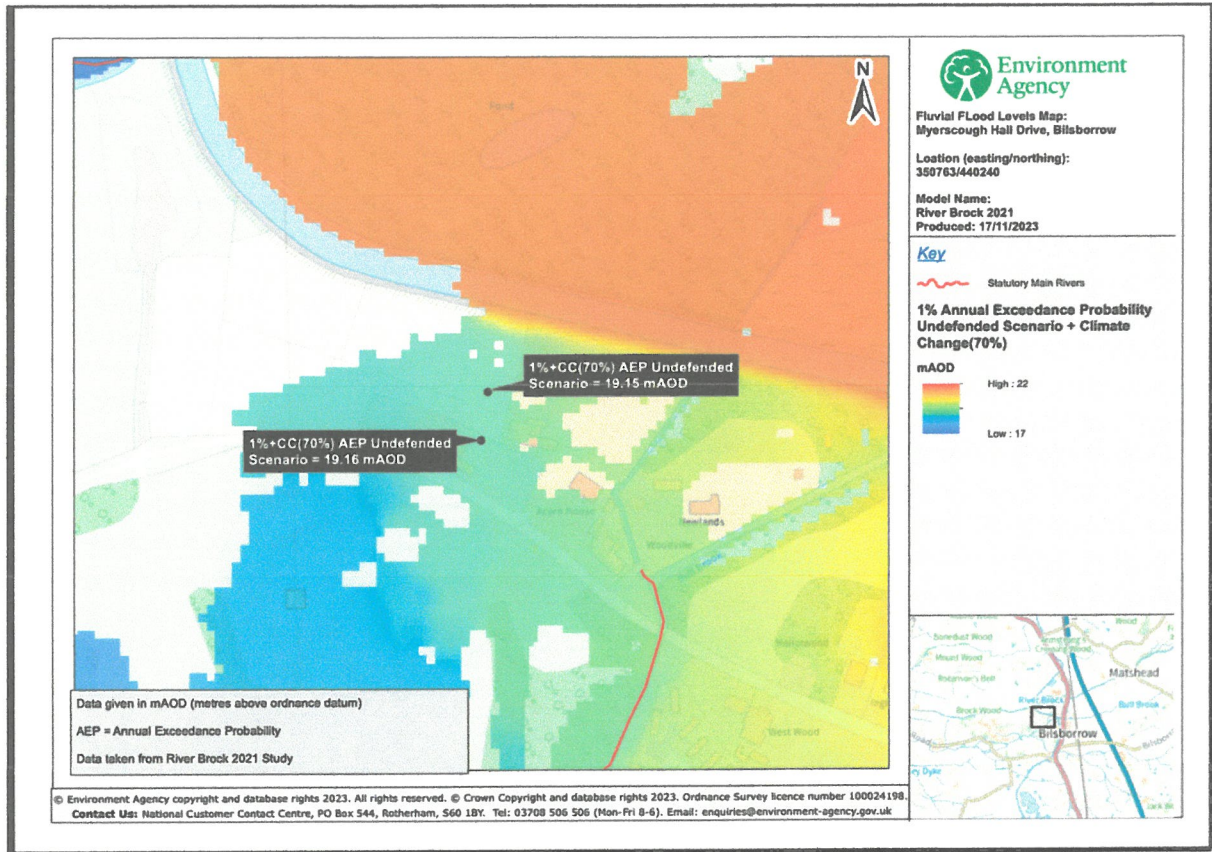
Modelled node locations data Defences removed climate change

Label	Modelled location ID	Easting	Northing	1.0% AEP (+30%)		1.0% AEP (+35%)		1.0% AEP (+70%)	
				Level	Flow	Level	Flow	Level	Flow
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2	1182237	350528	439914	17.49	19.62	17.52	20.25	17.66	24.99
3	1182140	350554	440417	16.80	71.81	16.81	73.10	16.88	79.83
4	1182341	350601	440423	16.98	71.82	16.99	73.10	17.06	79.76
5	1182276	350650	440430	21.29	40.42	21.32	40.45	21.46	40.47
6	1182205	350655	439907	17.89	8.66	17.94	9.08	18.26	11.26
7	1182327	350726	439851	18.07	6.25	18.11	6.25	18.38	6.34
8	1182260	350791	440573	21.44	37.99	21.45	38.08	21.53	38.56
9	1182334	350889	440590	21.65	39.72	21.66	39.92	21.69	40.92
10	1182202	351054	440579	22.38	46.04	22.38	46.34	22.39	48.26

Data in this table comes from the River Brock 2021 model.
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Mitigation & future proofing against flooding

The site will be future proofed against future flood events. The measures will include

- The use of concrete floors and hard floor coverings throughout the ground floor.
- Routing of all electrical wiring down from ceiling level.
- All electrical sockets & appliances will be positioned at least 800mm above internal ground floor level. This will ensure all electrical sockets are above the design flood level.
- All bedrooms will be located on the 1st floor.
- Evacuation / flood warning plan (appendix below) to be displayed within the dwelling.
- Flood barriers to be installed to all ground floor door openings & any windows with a sill lower than 400mm above ffl.
- The use of fully permeable outdoor surfacing.
- The use of attenuation & flow meters for all surface water.
- Registration with Flood line Warning system.

CONCLUSIONS & RECOMMENDATIONS

The site lies within Flood Zone 2 and 1, with no history of Flooding on this site or at the adjoining properties, ever being recorded with the Environment Agency, or in the last 100 years. A neighbour from 1 Woodville Myerscough Hall Drive who confirmed he has lived in this property for over forty years confirmed no history of flooding to his knowledge.

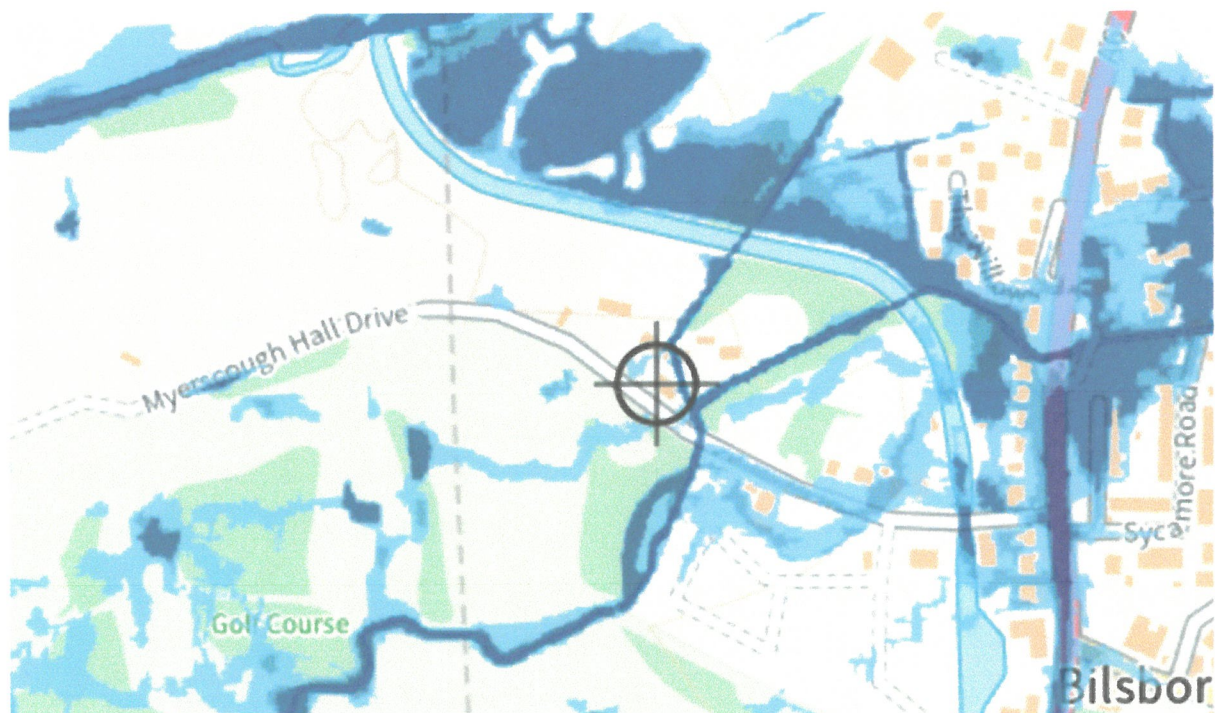
The development is not in a functional floodplain.

Sewer Flooding - The probability of this site flooding from localised drainage systems is **very low** due to it not being located within an Internal Drainage district, the mains drains are located a considerable distance away and do not pose a risk.

Sea Flooding - There is **no risk** from tidal flooding from Sea due to the coastline being a considerable distance away.

River Flooding - The main risk would be from the River Brock which is a tributary from the River Wyre. The River Brock is located 4-500 meters away, at peak flow events, the river is fast flowing and water is carried away downstream at rapid speed. The river is low lying with a steep 10 meter banking to the adjoining land west of the site, in addition there is also a 10 meter mound that protects the land and acts as a defence barrier (see appendix photos). The risk to this property of flooding from the River Brock is **very low** due to the height and steepness of the banking, the narrowness of the river and the addition of a land mound standing between 5-10 meters height.

Surface Water Flooding - The risk from Surface Water Flooding is **Low risk** means that this area has a chance of flooding of between 0.1% and 1% **each year**. Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding <https://check-long-term-flood-risk.service.gov.uk/map?easting=350817&northing=440175&map=SurfaceWater>



Groundwater Flooding - Groundwater flooding could occur due to heavy or prolonged rainfall making the level of water underground rise above its natural surface. In order to mitigate the risk of Groundwater Flooding, a drainage plan will be devised prior to development, there is a flood risk plan in the case of emergency flooding, the ground level of the land is on average 18.900aOD therefore the proposed ground level of the development will be no less than 19.300 aOD to reduce the risk to **Low**.

The development is to use flood avoidance as mitigation (detailed above).

The site owners are to be registered to receive free flood warnings when flooding is expected to enable the evacuation of people for a range of flooding events up to and including the extreme event.

Finished Floor Levels will be a minimum of 19.300aOD with flood resistant measures incorporated into the design and constructed on the properties up to 400mm above ground level.

The following is proposed to be an emergency response to Flooding in the area, although deemed unlikely, and there being no report of Flooding in this area on record, this plan will remain in force to act as a protective measure to safety and life.

Flood Response Plan



FLOOD ALERT

FLOODING IS POSSIBLE. BE PREPARED.

Site Location: Land with Stables, Myerscough Hall Drive, Bilsborrow Preston, PR3 0SE

Existing Control Measures

The owners will register with **Flood line Warning Direct** and will receive an early warning notification from them.

A battery operated radio with spare batteries will be kept in the house to monitor local radio news and weather stations.

Charged torches will be kept in the house with spare batteries.

Emergency/portable heating and lighting stored at first floor level within the building.

An open channel of communication maintained with all occupants and visitors to the site.

Sandbags will be palletised and kept in the curtilage where they will be dry and manageable to handle. In the event of flooding these will be used to either help stop water ingress into the building or to keep an area clear for evacuation.

Contact numbers will be in the building in case of flash flooding during the night. Occupants and visitors to the site are made aware of this upon arrival.

A marker post will be situated within the grounds which is clearly marked for depth and early warning water build up.

Containers are available for use to allow a fresh supply of drinking water to be stored, taking into account each person requires 1.5L of water per day.

Occupants and visitors should refrain from walking through flood water.

Local Flood Response Plan

Upon receipt of a call from Flood line Watch or information gained from local Radio/TV:

The homeowner / occupant will phone Flood line Watch for an up to date message

A Flood Coordinator will be appointed. This will entail monitoring flood levels via local weather reports and build-up of water around the site.

If prolonged weather is forecast and water reaches sufficient levels that breaches the site and surrounding roads is deemed likely, then an evacuation of the ground floor will be initiated to the second floor until the weather improves or local flooding has subsided.

Once all occupants and visitors have left the ground floor, all services (gas, electricity and water) to be switched off at the mains, by the flood coordinator.

Severe Flash Flood response plan

It is most likely that this will happen during the night and the following response steps are detailed below:-

Emergency services to be called to make them aware of the incident

None of the proposed dwelling's bedrooms are located on the ground floor

All occupants and visitors to remain upstairs inside the dwelling where they can remain warm, dry and free from danger

Local services (Gas, Water & Electricity) to be isolated if possible

Monitoring of the weather to remain constant

Re-evaluate situation hourly if possible and record

Once daylight has arrived, provisions for food, water and full evacuation, (if necessary by the emergency services), to be implemented.

Contact Numbers

Emergency Services 999

Local Police 0845 125 3545

Transco 0800 111 999

Electricity Northwest 0800 195 4141

Flood Watch 0345 988 1188

Wyre Council 01253 891000

Lancashire Road Flooding 0845 053 0011

Laterooms 0843 713 0641

Last minute.com 0330 100 9126

Travel Lodge 08719 848484 (hotel in Preston 7 mile away)

Premier Inn 0871 5279 222 (hotel 0.3 miles from site)

Millers CiTax (24hour) 01772 884000

Garstang Local Cabs (not 24 hour) 01995 511195



Photos of the steep banking which is the closest point of the River Wyre to the site (Myerscough football pitches seen in the background). Due to the River's narrowness during peak flow events it is fast flow and does not rise up the banking.