



Bury Council Level 1 SFRA

Appendix D - Functional Floodplain Delineation

Final Report

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Prepared by	Laura Thompson-Jones BSc FRGS Senior Analyst
Reviewed by	Mike Williamson BSc MSc CGeog FRGS EADA Principal Analyst
Authorised by	Mike Williamson BSc MSc CGeog FRGS EADA Principal Analyst

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Abbreviations

AEP	Annual Exceedance Probability
EA	Environment Agency
GMCA	Greater Manchester Combined Authority
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
MFO	Modelled Flood Outline

1 Introduction

The Flood Risk and Coastal Change Planning Practice Guidance¹ (FRCC-PPG) states that local planning authorities (LPA) should identify and assess, in their Strategic Flood Risk Assessments (SFRA), areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency (EA). The functional floodplain (Flood Zone 3b) extent for Bury has therefore been updated and delineated as part of this Level 1 SFRA using the most up-to-date data available from the EA. The previous functional floodplain extent, delineated for the GMCA 2019 Level 1 SFRA Update, has been superseded by more up-to-date modelled outputs, and new national flood mapping, as updated by the EA as part of the Flood Map for Planning in November 2025. This methodology note explains the delineation process.

Note that the functional floodplain (Flood Zone 3b) is not included in the Flood Map for Planning. Although the most recent Flood Map for Planning does include for the 3.3% AEP defended event, the functional floodplain should also account for other available data indicating land where water has to flow, or which stores water, in times of flooding. This SFRA therefore sub-divides Flood Zone 3 into Flood Zone 3a and Flood Zone 3b (functional floodplain). This distinction is for the use of LPAs and developers in development planning and management. Flood Zone 3a is Flood Zone 3 of the Flood Map for Planning that is not functional floodplain.

The LPA, Lead Local Flood Authority (LLFA) and the EA must all agree on the extent of the functional floodplain outline and the methodology used. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. The local knowledge of the LPA, LLFA and EA is therefore crucial in defining the functional floodplain as robustly and realistically as possible.

¹ [Flood Risk and Coastal Change Planning Practice Guidance | UK Government | 2025](#)

2 Functional floodplain definition

The EA's SFRA guidance² states that the Level 1 SFRA should include the functional floodplain extent on maps with a detailed explanation of how the functional floodplain was defined. This methodology note provides this definition.

The EA's SFRA guidance (2025) states that functional floodplain should show land that:

"Would flood from rivers or the sea with an annual probability of 1 in 30 (3.3%), with flood risk management features and structures operating effectively

Would normally form the river channel

Is designed to flood (such as flood attenuation schemes), even if it would only flood in more extreme events (such as 0.1% annual probability)"

How to Prepare an SFRA, Environment Agency, 2025

Regarding the impact of defences on the functional floodplain:

"In any modelling used to identify the functional floodplain, include existing defences and other flood risk management features and structures.

You may not need to designate the functional floodplain in locations where evidence shows flooding would be prevented by existing flood defences, flood risk management features or structures, or buildings"

How to Prepare an SFRA, Environment Agency, 2025

Regarding the impact of existing buildings on the functional floodplain:

"The footprints of existing buildings may be removed from functional floodplain extents. However, it may be simpler to include existing buildings and use local policies to control the redevelopment or changes of use that may be acceptable.

Use local policies or guidance to explain the approach you will take when buildings are demolished in functional floodplain. It may be reasonable to assume that sites revert to functional floodplain when buildings have been demolished for more than a year."

How to Prepare an SFRA, Environment Agency, 2025

If there is not enough detailed modelled information available to identify the functional floodplain, this should be made clear on the Level 1 SFRA maps to ensure risk isn't underestimated. In these areas, site-specific flood risk assessments should determine whether a site is affected by functional floodplain through additional modelling. If sites are proposed for development in such areas in the local plan, a Level 2 SFRA will be required to robustly map the functional floodplain extent².

2 [How to Prepare a Strategic Flood Risk Assessment | Environment Agency | 2025](#)

3 Available datasets

3.1 EA Detailed Flood Modelling

Areas within the modelled defended 3.3% AEP extent should be considered as functional floodplain, which is defined as land having a 3.3% or greater annual probability of flooding with consideration of flood defence infrastructure.

Based on the above guidance, the modelled flood outlines (MFO) listed in Table 3-1 below were provided by the EA to assist in the update of the 2019 functional floodplain outline. Where possible, direct modelling of the present day 3.3% Annual Exceedance Probability (AEP) defended event has been used to delineate the functional floodplain in areas where there are acceptable and finalised models. Where the present day 3.3% AEP defended event was not included within a detailed model, the 2% AEP defended event was used where available, as agreed with the EA.

The 2006 Parr Brook, 2006 Pigs Lee Brook, 2008 Kirklees Brook, 2009 Gipsey Brook and 2009 Holcombe Brook models were also provided for consideration. However, no suitable 3.3% AEP or 2% AEP defended outlines were available. These areas are therefore represented by the EA Rivers and Sea 3.3% AEP defended flood risk extent (Section 3.1).

Table 3-1: Available EA modelled flood outlines

Model	Year	Annual Exceedance Probability	Defended?
Crow Trees Farm Brook	2016	3.3%	Yes
Radcliffe and Redvales	2016	3.3%	Yes
Lower Irwell	2017	2%	Yes
Lower Roch	2017	3.3%	Yes
Mid Irwell	2017	3.3%	Yes

3.2 EA Rivers and Sea 3.3% AEP defended flood risk extent

The EA has now published the 3.3% AEP defended event extent for both present day and accounting for climate change. The defended scenario considers the presence of flood defences and assumes that they operate in the way they were designed to function. This scenario does not include any asset failure or removal scenarios.

The 3.3% AEP defended event extent has been used to represent the functional floodplain in areas where no suitable detailed modelling is available, as agreed with the EA.

3.3 Greater Manchester Combined Authority SFRA JFlow Modelling

To inform the Greater Manchester Combined Authority (GMCA) 2019 SFRA, new broadscale JFlow fluvial models were built to understand the flood hazard in areas not subject to modelling by the EA or LLFA. These models provide a high-level indication of risk. Through consultation with the EA, it was agreed that the outputs of the two models within Bury would be used to inform the functional floodplain. These models cover the watercourses of Castle Brook, Brightley Brook, Whittle Brook and Crow Trees Brook.

3.4 Additional datasets

In addition to the available EA detailed models and EA Rivers and Sea 3.3% AEP defended flood risk extent, the datasets outlined below were also used to assist with the delineation of the functional floodplain:

- EA Statutory Main River Map
 - To define areas of the channel that are designated as main river by the EA.
 - This dataset includes both open channel and culverted watercourses.
 - The dataset has been buffered by 8m either side of the channel line to broadly represent the width of the river across the area. It is recognised that this is an approximation. Policy relating to functional floodplain applies to the actual location of the river and not the buffered channel within the functional floodplain mapping in locations where they may differ.
- EA Flood Map for Planning - Flood Storage Areas
 - To define areas of land which store water during a flood event.
 - Flood Storage Areas should be consulted on for appropriateness with the EA.
 - The Flood Storage Area dataset has been reviewed, and it was found that there are no EA defined Flood Storage Area's within the Bury authority area.

4 Functional floodplain delineation methodology

4.1 GIS methodology

The below steps summarise the methodology used to delineate the functional floodplain:

- All EA detailed models supplied for consideration within this assessment were included within the functional floodplain extent where appropriate outputs were available. The EA Rivers and Sea 3.3% AEP defended extent was not considered in areas of detailed modelling.
- The broadscale GMCA 2019 SFRA JFlow models were included within the functional floodplain in areas not represented by existing detailed modelling.
- The EA Rivers and Sea 3.3% AEP defended extent covering the Bury authority area was used to define the functional floodplain in areas not subject to detailed modelling.
- All main river channels, including culverted sections of river, were added to the functional floodplain outline. This is required by the EA SFRA guidance to define areas that would normally form the river channel and where water has to flow in times of flooding. At a local scale, this may lead to some inaccuracies, especially in hydrologically complex areas where there are man-made interactions or interactions with other bodies of water such as reservoirs or canals.
- Recognising this, functional floodplain policy relates to the river and not the mapping where they are different. For main rivers, the functional floodplain should include for an 8m buffer either side of the channel to allow for access to the channel for maintenance.
- Each polygon within the functional floodplain GIS outline has been attributed with the source dataset so it is possible to ascertain which dataset each polygon within the outline is based on.
- Checks on the geometry of the functional floodplain outline were carried out to ensure geometric correctness in GIS.

4.2 Methodology hierarchy

The hierarchy of methods used to define the functional floodplain is outlined below:

1. Use of the 3.3% AEP defended event MFO's where available
2. Use of the GMCA 2019 SFRA broadscale JFlow modelling
3. Use of the EA Rivers and Sea 3.3% AEP defended flood risk extent (downloaded October 2025)
4. Use of the buffered EA Statutory Main River Map (8 metres either side of the channel).

Error! Reference source not found. provides a description of each source attribute within the functional floodplain dataset.

Table 4-1: Functional floodplain source attribute definitions

Source attribute	Description
Crow Trees Farm Brook 2016 30-year defended	Detailed model output from the Crow Trees Farm Brook 2016 model.
Radcliffe and Redvales 2016 30-year defended	Detailed model output from the Radcliffe and Redvales 2016 model.
Lower Irwell 2017 50-year defended	Detailed model output from the Lower Irwell 2017 model.
Lower Roch 2017 30-year defended	Detailed model output from the Lower Roch 2017 model.
Mid Irwell 2017 30-year defended	Detailed model output from the Mid Irwell 2017 model.
Elton Reservoir JFlow Model, GMCA SFRA 2019 50-year No Defences Exist	Broadscale model output from the Elton Reservoir JFlow model.
Northern Gateway JFlow Model, GMCA SFRA 2019 50-year No Defences Exist	Broadscale model output from the Northern Gateway JFlow model.
Rivers and Sea 3.3% defended flood risk extent (EA)	Areas of the functional floodplain defined by the EA's Rivers and Sea 3.3% defended flood risk extent dataset. This has only been used in areas where suitable detailed modelling is unavailable.
Main River (EA)	8m buffered polygon of the Statutory Main River map indicating areas of fluvial river channel.

4.3 Culverted rivers

The EA Statutory Main River Map includes a high-level and approximate representation of culverted sections of watercourses. These sections are subject to a higher degree of uncertainty as it is more challenging to identify and verify below ground alignments. Within culverted sections, functional floodplain policy relates to the actual confirmed alignment of culverted sections, as identified through site investigation, rather than the alignment shown in the functional floodplain where it differs. The EA or LLFA may be able to advise on the culverted sections in the functional floodplain for main rivers and ordinary watercourses respectively.

It is recommended that investigations of onsite culverted watercourses to establish their full route, condition and capacity are carried out through a site-specific flood risk assessment and incorporated into the surface water sustainable drainage strategy, as required.

4.4 Waterbodies

The river channel datasets contain open river channels and culverted sections of channel only and do not include other types of waterbody such as reservoirs, canals, lakes or ponds. Waterbodies are only included in the delineated functional floodplain where they are present within the EA Rivers and Sea 3.3% AEP defended extent or detailed model outputs. There is no reliable dataset to identify waterbodies that can be used to delineate the functional floodplain.

4.5 Buildings and infrastructure

Buildings and infrastructure within the functional floodplain have been retained within the outline, i.e. they have not been removed on the assumption that floodwater ingress may occur. The EA's SFRA guidance states that you do not need to designate functional floodplain in locations where evidence shows flooding would be prevented by existing buildings, however it may be simpler to include existing buildings and use local policies to control the redevelopment or changes of use that may be acceptable.

4.6 Dry islands

Areas of higher land shown as 'dry islands' within the functional floodplain should also be considered undevelopable, where safe access and escape routes are unachievable. The only exception to this is for water compatible or essential infrastructure uses. It has been assumed that any 'dry islands' within the functional floodplain outlines should be considered as functional floodplain where these areas are located within Flood Zone 3 of the EA's Flood Map for Planning.

5 Future functional floodplain

In addition to the present day functional floodplain outline, a future functional floodplain outline, as advised in EA guidance, has been delineated. No suitable 3.3% AEP defended event climate change modelling was available within the supplied EA detailed models, therefore the Rivers and Sea 3.3% AEP defended event plus climate change extent has been used to represent the future functional floodplain. The climate change allowances used to produce this dataset are based on the latest UK Climate Projections (UKCP18) from the Met Office, using the Representative Concentration Pathway (RCP) 8.5.

In areas where the present day functional floodplain is represented by the GMCA 2019 SFRA JFlow modelling, the future functional floodplain has been represented by the modelled 1% AEP event from these models.

The future functional floodplain indicates areas likely to be within the functional floodplain in the future, however should take into account local circumstances. The future functional floodplain extent should not be included in the functional floodplain designation² and is not included in any policy for planning decisions.

6 Conclusions

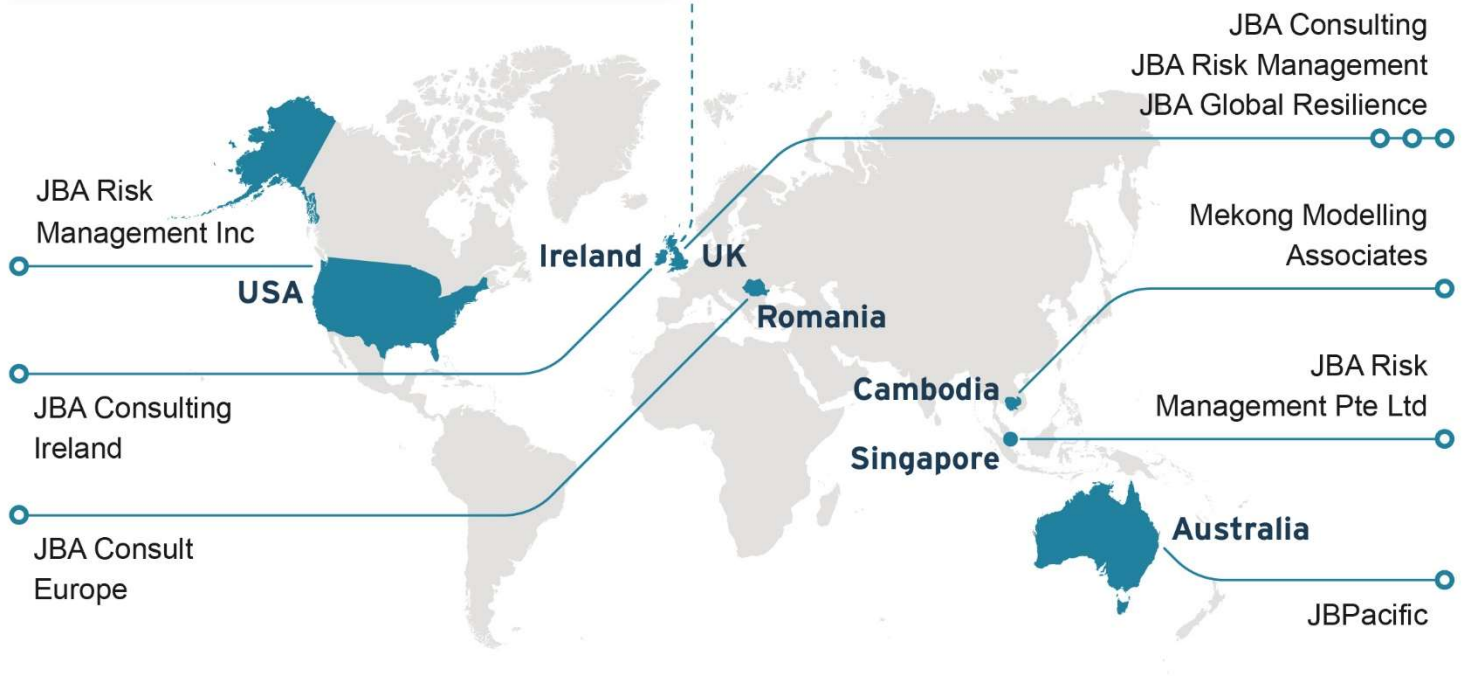
The functional floodplain outline has been assessed and agreed upon by the LPA, LLFA and the EA. The extent of both the present day and future functional floodplain outlines produced from this Level 1 SFRA should always be assessed in greater detail where any more detailed study such as a Level 2 SFRA or site-specific FRA are undertaken. The future functional floodplain extent should not be included in the functional floodplain designation².



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Registered Office

1 Broughton Park
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Broughton
SKIPTON
North Yorkshire
BD23 3FD
United Kingdom

+44(0) 1756 799919
info@jbaconsulting.com
www.jbaconsulting.com

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