

Pendle Level 2 Strategic Flood Risk Assessment -Appendix B Draft Functional Floodplain Delineation Methodology

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1 Introduction

The Flood Risk and Coastal Change Planning Practice Guidance¹ (FRCC-PPG) states that local planning authorities (LPA) should identify in their Strategic Flood Risk Assessments (SFRA) areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency (EA). The Pendle functional floodplain (Flood Zone 3b) extent has therefore been updated as part of this Level 2 SFRA using the most up-to-date data available from the EA. The previous functional floodplain extent, delineated for the 2021 SFRA for Pendle, has been updated and superseded by more up-to-date modelled outputs, by the August 2024 version of Flood Zone 3, or by the June 2024 version of the Risk of Flooding from Surface Water dataset. This methodology note explains the delineation process.

Note that Flood Zone 3b is not included in the Flood Map for Planning. EA guidance states that the Level 1 SFRA should define the functional floodplain. This SFRA therefore subdivides Flood Zone 3 into Flood Zone 3a and Flood Zone 3b. This distinction is for the use of LPAs and developers in development planning. Flood Zone 3a can be considered to be 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 the 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 | 2022

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 (2024) and FRCC-PPG (2022) state that functional floodplain should show land that:

- "would flood from rivers or the sea with an annual probability of 1 in 30 (3.3%) or greater in any year, 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)."

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
- buildings."

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".

If there is not enough detailed modelled information available to identify the functional floodplain, this should be made clear within the Level 2 SFRA site assessments 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.

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² How to Prepare a Strategic Flood Risk Assessment | Environment Agency | 2024

3 Functional floodplain delineation

3.1 Datasets

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 delineation of the functional floodplain extent, which supersedes the previous extent covering the study area. Where possible, direct modelling of the present and future 3.3% AEP event has been used to delineate Flood Zone 3b in areas where there are accepted and finalised models. There are a number of exceptions to this, noted below:

- The 2% AEP event has been used for the Trawden Brook 2010 model
- The 1.3% AEP event has been used for the Wider Calder Padiham 2017 model

The hierarchy of methods used to define Flood Zone 3b is outlined below:

- 1. Use of detailed model outputs where they are available. Only final and approved model outputs have been used to delineate Flood Zone 3b (Table 3-1).
- 2. Use of a proxy approach in areas subject to detailed modelling, where approximate outputs are available (e.g. in areas where outputs for the 3.3% AEP event are not available, but where alternative AEP events are available and can be used as a proxy).
- 3. Use the current Flood Zone 3 (August 2024) outline in areas where no detailed modelling outputs are available (Table 3-2).
- 4. Use of the 1% AEP Risk of Flooding from Surface Water outline along ordinary watercourses in the absence of detailed modelling and Flood Zone 3.
- 5. Use of the buffered watercourse (8 metres either side of the channel) (Table 3-2).

Model	Year	AEP used to define the functional floodplain	Defended / Undefended?
Brun Calder	2021	3.3%	Defended
Clough Spring	2015	3.3%	No defences exist
Colne Water	2021	3.3%	No defences exist
Earby Beck	2018	3.3%	No defences exist
Earby Beck Phase 2	2021	3.3%	Defended
Edge End Brook	2021	3.3%	No defences exist
Hendon Brook	2018	3.3%	No defences exist
Hollin Mill	2021	3.3%	No defences exist
North Stream Valley	2021	3.3%	No defences exist
Pendle Water	2021	3.3%	Defended
Primet Bridge	2021	3.3%	No defences exist
Sefton Street	2021	3.3%	No defences exist
Swindon Clough	2021	3.3%	No defences exist
Trawden Brook	2010	2%	Defended
Walverden Water	2021	3.3%	Defended
Wider Calder Padiham	2017	1.3%	Defended

Table 3-1: EA modelled flood outlines

Along with the MFOs listed in Table 3-1, the datasets in Table 3-2 were also used to assist with the delineation. The EA's Flood Storage Area (FSA) dataset was interrogated, and it was found that there were no FSAs within the study area to be included within the functional floodplain outline.

Table 3-2: Additional datasets

Dataset	Purpose
Flood Zone 3 - EA Flood Map for Planning	Dataset version August 2024 Use of this dataset in areas not subject to detailed modelling will reflect outputs from the national generalised modelling exercise that are incorporated into Flood Zone 3.
EA Risk of Flooding from Surface Water	Dataset version June 2024. Use of this dataset in areas not subject to detailed modelling or not covered by Flood Zone 3 will reflect the risk of flooding from ordinary watercourses.
Flood Storage Areas - EA Flood Map for Planning	Dataset version August 2024. It was found that there were no FSAs within the study area to be included within the functional floodplain outline.
Watercourse Link - OS Open Rivers	To create river channel areas within Flood Zone 3b as requested by EA SFRA guidance. This dataset includes only watercourses and does not include waterbodies. The dataset has been buffered by 8m either side of the line to broadly represent the width of the watercourse across the area. It is recognised that this is an approximation. Policy relating to Flood Zone 3b applies to the watercourse and not the mapping where they are different.

4 GIS methodology

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

- The previous Flood Zone 3b outline was used as a starting point and the MFOs listed in Table 3-1 were appended to update the outline.
- Flood Zone 3 (August 2024) has been used to define Flood Zone 3b in areas not subject to detailed modelling. This may be a conservative approach, however, in the absence of other better information, Flood Zone 3b policy should relate to these areas. The future delineation of Flood Zone 3b should draw on outputs from new detailed modelling exercises when they are completed to refine and improve the dataset, either as part of an update to this Level 1 SFRA or through a more detailed Level 2 SFRA.
- The 1% AEP Risk of Flooding from Surface Water extent (June 2024) has been used to define Flood Zone 3b along ordinary watercourses not covered by detailed modelling or Flood Zone 3.
- All river channels including culverted sections were added to the Flood Zone 3b outline, as required by the EA's guidance. It is noted that the river channel dataset used (OS Open Rivers Dataset, Watercourse Link Shapefile) is a high level dataset that may not be spatially correct in many areas. At a local scale, this could lead to 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, Flood Zone 3b policy relates to the watercourse including an 8m buffer either side of the channel and not the mapping where they are different.
- The river channel dataset includes a high-level and approximate representation of culverted sections of watercourses. These (culverted) sections are subject to a higher degree of uncertainty as it is more difficult to identify and verify below ground alignments. Within culverted sections, Flood Zone 3b policy relates to the actual confirmed alignment of culverted sections identified through site investigation rather than the alignment shown in Flood Zone 3b outputs where datasets differ. The EA and LLFA may be able to advise on the culverted sections in Flood Zone 3b.
- The river channel dataset contains open river channels and culverted sections of channel only and does not include other types of waterbodies such as reservoirs, lakes or ponds.
- Waterbodies, such as canals and reservoirs, are only included in the delineated Flood Zone 3b outline where they are present within detailed models that have been used. There is no reliable dataset to delineate waterbodies that can be used to delineate the Flood Zone 3b outline, however waterbodies should be considered as functional floodplain i.e. not developable.
- The EA's FSA dataset has been reviewed for inclusion in Flood Zone 3b, and it was found that there were no FSAs within the Pendle authority area.

- Buildings and infrastructure within the Flood Zone 3b outline have been retained within the outline i.e. they have not been removed on the assumption that floodwater ingress may occur. The guidance³ states that you do not need to designate functional floodplain in locations where evidence shows flooding would be prevented, for example, by solid buildings. The SFRA should be supported by local policies to control the redevelopment or changes of use that may be acceptable.
- It has been assumed that any dry islands within the Flood Zone 3b outline should be considered as functional floodplain where these areas are within the Flood Zone 3 extent, and therefore manual edits have been made to include these dry islands within the outline.
- Each polygon within the Flood Zone 3b outline has been attributed with the source MFO or dataset, so it is possible to ascertain which model or dataset each polygon within the outline came from.
- Checks on the geometry of the Flood Zone 3b outline were carried out to ensure geometric correctness in GIS.

³ How to prepare a strategic flood risk assessment | Environment Agency | May 2024



5 Conclusions

The draft functional floodplain outline should be assessed and agreed upon by the LPA, LLFA and the EA. The extent of the functional floodplain outline produced from this Level 2 SFRA should always be assessed in greater detail where any more detailed study such as a site-specific FRA is undertaken.





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