TECHNICAL NOTE

JBA Project Code	2021s1178
Contract	Cotswold Level 1 SFRA
Client	Cotswold District Council
Date	15 September 2023
Author	Laura Thompson
Reviewer	Mike Williamson
Subject	Functional Floodplain update

1   Introduction

The Flood Risk and Coastal Change Planning Practice Guidance[1] (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 Cotswold functional floodplain (Flood Zone 3b) extent has therefore been delineated as part of this Level 1 SFRA using the most up-to-date data available from the EA. 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 sub-divides 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.

Cotswold District Council's (CDC) 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 CDC and the EA is therefore crucial in defining the functional floodplain as robustly and realistically as possible.

2   Functional floodplain definition

The EA's SFRA guidance[2] says 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 technical note provides this definition and the SFRA GeoPDF maps include the functional floodplain.

The EA's SFRA guidance states:

- *In any modelling used to identify the functional floodplain, include defences and other flood risk management features and structures,*

- *Functional floodplain may not be required in locations where evidence shows flooding would be prevented by existing:*
    - *flood defences*
    - *flood risk management features or structures*
    - *solid buildings*

- *Water storage areas are shown on the Flood Map for Planning. The EA should confirm whether these areas are suitable to include in the functional floodplain extent.*

The FRCC-PPG states the functional floodplain:

- *Comprises land where water from rivers or the sea has to flow or be stored in times of flood,*

- *Should comprise of land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively, or*

- *Should comprise of land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding),*

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[1] Flood Risk and Coastal Change Planning Practice Guidance | UK Government | 2022
[2] How to Prepare a Strategic Flood Risk Assessment | Environment Agency | 2022

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- *Should take account of local circumstances and not be defined solely on rigid probability parameters*.

If there is not enough detailed information 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. If sites are proposed for development in such areas in the local plan, a Level 2 SFRA will be required to map the functional floodplain extent.

3   Functional floodplain delineation

Based on the above guidance, the EA provided the models relevant to the Cotswold District for use within this SFRA, which were remodelled using a more up to date software version. The present day modelled flood outlines (MFOs) listed in **Table 3-1** below were used to assist in the update of the functional floodplain outline.

Table 3-1: modelled flood outlines

Model	Year	Annual Exceedance Probability (AEP)	Defended?
Bledlington Brook	2012	5%	Yes
Churn (Baunton to Siddington)	2011	3.33%	Yes
Windrush (Bourton-on-the-Water)	2014	5%	Yes
Thames (MRL to St Johns)	2014	2%	Yes

Along with the above MFOs, the datasets in the table below were also interrogated to assist with the delineation.

Table 3-2: Additional datasets

Dataset	Purpose
Watercourse Link – OS Open Rivers	To create river channel areas within FZ3b as stated in EA SFRA guidance. A buffer of 8m either side of the channels was used to account for the EA's recommended 8m non-development areas from the banks of a watercourse. Culverted and canalised sections have been excluded.
Buildings – OS OpenMapLocalRaster	To remove existing development from functional floodplain. A buffer of 1m was included around the building perimeters to roughly account for curtilages.
Road Link – OS Open Roads	To remove existing transport infrastructure from functional floodplain.
Flood Zone 3 – EA Flood Map for Planning (August 2023)	To include in the absence of MFOs or where there has been a change to the Flood Zone 3a extent used within 2014 functional floodplain.

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Dataset	Purpose
EA Flood Storage Areas (FSA)	EA Flood Storage Areas are advised to be included within the FZ3b outline but should be consulted on for appropriateness with the EA. One Flood Storage Area was found to be present within CDC and has been included in the functional floodplain.

3.1   GIS methodology

- The MFOs listed in **Table 3-1** were appended together to form one outline.

- Any areas not covered by MFOs were represented by the previous 2014 functional floodplain.

- Where there were areas represented solely by the buffered watercourse layer, the EA's Flood Zone 3 outline was used to delineate the functional floodplain.

- All river channels were added to the outline using OS Open Data Rivers layer plus 8m buffer.

- The EA FSA dataset was reviewed, and it was found that there was one FSA within the CDC administrative area.

- Each polygon within the functional floodplain outline was attributed with the source MFO or flood risk dataset to easily identify the source of each polygon.

- The OS Open Data Buildings layer plus 1m buffer for curtilages was used to identify existing buildings which were removed from the outline. The accuracy of this process is limited by the Open Data used. The Level 2 SFRA and / or subsequent FRAs should further assess the functional floodplain extent in more detail.

- Checks on the geometry of the outline were performed to ensure geometric correctness in GIS.

  The draft functional floodplain outline has been assessed and accepted by the LPA and LLFA. The draft outline should be assessed by the EA any comments or questions should be referred to JBA in order to agree on a finalised outline. The extent of the functional floodplain outline produced from this Level 1 SFRA and those areas where functional floodplain has not been delineated due to lack of data should always be assessed in greater detail where any more detailed study such as a Level 2 SFRA or site-specific FRA are undertaken, as directed by EA guidance.

3.2   Future Flood Zone 3b dataset

The above methodology has been used to prepare an updated FZ3b extent. In addition to the current extent, a future FZ3b extent has been produced using the present day updated FZ3b as a starting point. This has been enhanced drawing on climate change enhanced flood modelling across the modelled extents provided in Table 3.1. Within this modelling, an uplift in peak flow estimates of 43% has been applied to make allowance for the future impacts of climate change on peak river flows in accordance with Environment Agency advice. Areas not covered by a climate change uplifted modelled flood outline were represented by the previous 2014 functional floodplain or the Environment Agency's Flood Zone 3 outline.