NOTE TO FILE

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Contract	Bradford SFRA Update
Client	City of Bradford Metropolitan District Council
Date	19 December 2023
Author	Laura Thompson
Reviewer	Krista Keating
Subject	Functional Floodplain Delineation

1 Introduction

The functional floodplain (Flood Zone 3b) extent has been delineated as part of this SFRA update using the most up-to-date data available from the Environment Agency (EA). This methodology note briefly explains the delineation process.

The LPA, LLFA and 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 council and the EA is therefore crucial in defining the functional floodplain as robustly and realistically as possible.

2 Functional floodplain definition

2.1 Flood Risk and Coastal Change PPG – Table 1, Paragraph 078

The Flood Zones, referred to in the table below, show the probability of river and sea flooding, ignoring the presence of defences. Flood zones 1, 2 and 3 are included within the Environment Agency's Flood Map for Planning (Rivers and Sea). Flood Zone 3b is the functional floodplain and is not included in the Flood Map. This zone is for the use of LPAs and developers. Flood Zone 3a is Flood Zone 3 of the Flood Map that is not functional floodplain.

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2, 3a and 3b)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	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. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise: - Land having a 1 in 30 or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or - Land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 1 in 1000 annual probability of flooding). Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

Source: https://www.gov.uk/guidance/flood-risk-and-coastal-change#Table-1-Flood-Zones

Note: The Flood Zones shown on the Environment Agency's Flood Map for Planning (Rivers and Sea) do not take account of the possible impacts of climate change and consequent changes in the future probability of flooding. Reference should therefore also be made to the Strategic Flood Risk Assessment when considering location and potential future flood risks to developments and land uses.

2.2 EA SFRA guidance, 2022

The EA guidance defines functional floodplain as:

'land where water has to flow, or which stores water, in times of flooding.'

The guidance sets out how to define the functional floodplain. It states:

'Take into account local circumstances when you define the functional floodplain. You should use the parameters set out in the planning practice guidance as a starting point to identify the functional floodplain.

In any modelling used to identify the functional floodplain, include 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
- Solid buildings

Water storage areas are shown on the flood map for planning. Contact the Environment Agency to check if they are suitable to include in your designation of the functional floodplain.

If you do not have enough detailed information to identify the functional floodplain, make this clear on your maps. This ensures the risk is not underestimated.

Instead, use site-specific flood risk assessments to determine whether a site is affected by functional floodplain. If sites are proposed for development in such areas in your local plan, you'll need to do a level 2 assessment to map the location of functional floodplain.'

3 Functional floodplain delineation

3.1 Datasets

Based on the above guidance and definitions provided in the FRCC-PPG, 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 outline. Where possible, direct modelling of the present and future 3.33% AEP event has been used to delineate Flood Zone 3b in areas where there are accepted and finalised models. There are three exceptions to this, noted below.

- The functional floodplain for Bradford Beck has been represented using the existing Flood Zone 3 outline as a proxy due to issues preventing the direct use of the existing model to generate present and future 3.33% AEP event outputs.
- For the River Worth (based on 2007 model outputs), flood extents for the 2% and 0.5% AEP events have been used as a proxy in the absence of present day and future 3.33% AEP event outputs. The selection of these events has been informed by an analysis of predicted water level change (in relation to applied flows) across existing modelled events, given the age and 1D only nature of the model that have prevented the model being directly used to simulate the present and future 3.33% AEP events as

part of the SFRA.

- In the River Wharfe catchment, 2% AEP event outputs have been used as a proxy given the absence of 3.33% AEP event hydrology.

The use of a proxy approach in these three areas is a short term interim measure; updated modelling is currently being completed and outputs are expected to be available later in 2023 for use within the Level 2 assessment. Whilst this modelling is being completed, it is accepted that there is a greater uncertainty in the delineated Flood Zone 3b outputs across these areas which justifies the use of a conservative approach, drawing on outputs from larger modelled events.

The hierarchy of methods used to define FZ3b is outlined below:

1. Use of detailed model outputs directly where they are available. Only final and approved model outputs have been used to delineate FZ3b.
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 3.33% AEP event are not available, but where alternative AEP events are available and can be used as a proxy). There are two approaches that have been taken:
    - Where existing models are usable but 3.33% AEP event hydrology is not available – in this case the next largest event (typically the 2% AEP event) has been used to generate present day and climate change enhanced outputs.
    - Where existing models are not directly usable, existing mapped flood extents have been used as a proxy.
3. Retain the current Flood Zone 3 outline in areas where no detailed modelling is available.
4. Use of the buffered watercourse and delineated Flood Storage Area layers as outlined in Table 3-2.

Model	Year	Annual Exceedance Probability (AEP)	Defended?
Upper Aire Tribs - Morton	2021	3.33%	No
Upper Aire Tribs - Nab Wood	2021	3.33%	No
River Wharfe Tribs - Backstone Beck	2021	3.33%	Yes
River Wharfe Tribs - Town Beck	2021	3.33%	Yes
River Wharfe Tribs - Woodhead Beck**	2021	3.33%	Yes
Upper Aire Tribs - Silsden	2021	3.33%	No
Kildwick to Esholt	2022	3.33%	Yes
Esholt to Rodley**	2022	3.33%	No
River Worth*	2007	2%***	No
Wharfe Catchment*	2014	2%***	Yes
Bradford Beck*	FMfP	1%	No

*subject to a proxy approach as outlined given that it was not possible to use these models directly to define FZ3b.

** subject to a proxy approach only for the future FZ3b dataset.

***2% AEP event used as the closest design event greater than the 3.33% AEP event.

Table 3-1: EA modelled flood outlines

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

Dataset	Detail
Flood Zone 3 Dataset (August 2023 release)	Dataset downloaded August 2023. 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.
OS Open Rivers Dataset, Watercourse Link Shapefile	To create river channel areas within FZ3b 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 watercourses across the area. It is recognised that this is an approximation. Policy relating to FZ3b applies to the watercourse and not the mapping where they are different.
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. Refer to Section 3.2 for details on how the Flood Storage Area dataset has been included within the FZ3b outline.

Table 3-2: Additional datasets

3.2 GIS methodology

- A new shapefile feature was created (Flood Zone 3b) and the MFOs listed in Table 3-1 were appended where appropriate using the Append tool in ArcGIS. Of note, for present day FZ3b, flood extent outputs provided by the Environment Agency (that include MapEdit processing) have been used directly rather than the unprocessed flood extents from the model or from re-runs of the model, that were found to be slightly different in placing due to the post-processing completed. This approach was agreed with the Environment Agency, to retain full consistency with their datasets.
- Flood Zone 3 has been used to define FZ3b 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 FZ3b should draw on outputs from new detailed modelling exercises when they are completed to refine and improve the dataset.
- 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 or accurate. 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 FZ3b outputs where datasets differ.
- The river channel dataset contains open river channels and culverted sections of channel only and does not include other types of waterbody.
- 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 FZ3b outline, however waterbodies should be considered as functional floodplain.
- The EA FSA dataset has been reviewed and was found to include 19 Flood Storage Areas (FSAs) within the CBMDC area. The Environment Agency have advised that the FSAs should be incorporated into FZ3b. The FSAs have been included within the Flood Zone 3b outline as a default approach. The Level 1 assessment has identified one exception at Steeton-with-Eastburn which has been investigated; here the FZ3b extent has been updated to remove the existing residential development within the FSA from the outline. The Supplementary Information contained at the end of this document (Part 1) contains further information about the investigations carried out at the Steeton-with-Eastburn FSA.
- Construction of a formal reservoir is currently ongoing at Apperley Bridge as part of the Leeds FAS Scheme. As the scheme is not yet complete / reservoir is not online, this area hasn't been incorporated into FZ3b (as a FSA) but will be in the future once the scheme is online and the FSA layer has been updated to include this area. Note the area to be covered by the new FSA falls within the Leeds FAS Esholt to Rodley model within the accepted FZ3b layer.
- 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 they are of solid

construction and would prevent flood water ingress.
The Council agreed with the EA that the delineation of the functional floodplain WOULD NOT account for the presence of existing infrastructure or buildings. Such areas have therefore NOT been removed from the functional floodplain outline. The guidance 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 approach adopted within the SFRA is therefore a local approach and will be supported by a policy to explain how development of buildings/footprints in FZ3b will be considered, see Policy recommendation 1 in Section 8 of the Main Level 1 SFRA Report.

- Each polygon within the Flood Zone 3b outline was 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. Manual edits were made to areas where there were unrealistic small gaps between the modelled outputs and the buffered watercourse.

3.3 Future FZ3b 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 51% has been applied to make allowance for the future impacts of climate change on peak river flows in accordance with Environment Agency advice. Table 3-3 outlines how the proxy approach has been extended (as outlined in Section 3.1 for Bradford Beck, the River Worth and the River Wharfe), where it hasn't been possible to use detailed models directly. Further technical information that supports the approach adopted is included at the back of the document.

As stated in Section 3.1, the proxy approach applied in these three areas is a short term interim measure; updated modelling is currently being completed and outputs are expected to be available later in 2023 for use within the Level 2 assessment. Whilst this modelling is being completed, it is accepted that there is a greater uncertainty in the delineated Flood Zone 3b outputs across these areas which justifies the use of a conservative approach to the delineation of present day FZ3b. This uncertainty extends to the future FZ3b extent, where a varied approach has been taken drawing on the outputs that are available as an interim measure.

In all cases where detailed modelling has been completed to inform the study (either directly or via the adoption of a proxy approach), unprocessed outputs directly from the model(s) has been used.

Area	Present Day FZ3b Approach	Future FZ3b Approach
Bradford Beck	Based on Flood Zone 3	Based on Flood Zone 3
River Worth (2007)	2% AEP event flood outline used to delineate Flood Zone 3b. This has been informed by an extreme water level equivalence assessment completed using the available model outputs. The water level equivalence assessment is provided in the Supplementary Information (Part 2) contained at the end of this document.	Present day 0.5% AEP event outline has been used to delineate future FZ3b. Informed by the water level equivalence assessment.
River Wharfe (2014)	EA supplied 2% AEP event flood outline used to delineate Flood Zone 3b.	Climate change enhanced 2% AEP event outline used to delineate future FZ3b.
Esholt to Rodley (2022)	EA supplied 3.33% AEP event flood outline used to delineated Flood Zone 3b.	EA supplied 1% AEP event outline used to delineate future FZ3b.
River Wharfe Tribs - Woodhead Beck (2021)	EA supplied 3.33% AEP event flood outline used to delineated Flood Zone 3b.	EA supplied 1% AEP event outline used to delineate future FZ3b.

Table 3-3: Proxy Approach

3.4 Conclusions

The draft functional floodplain outline has been assessed by the LPA, LLFA and the EA and review comments have been considered by JBA to agree on the final outline.

The extent of the functional floodplain outline produced from this 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.

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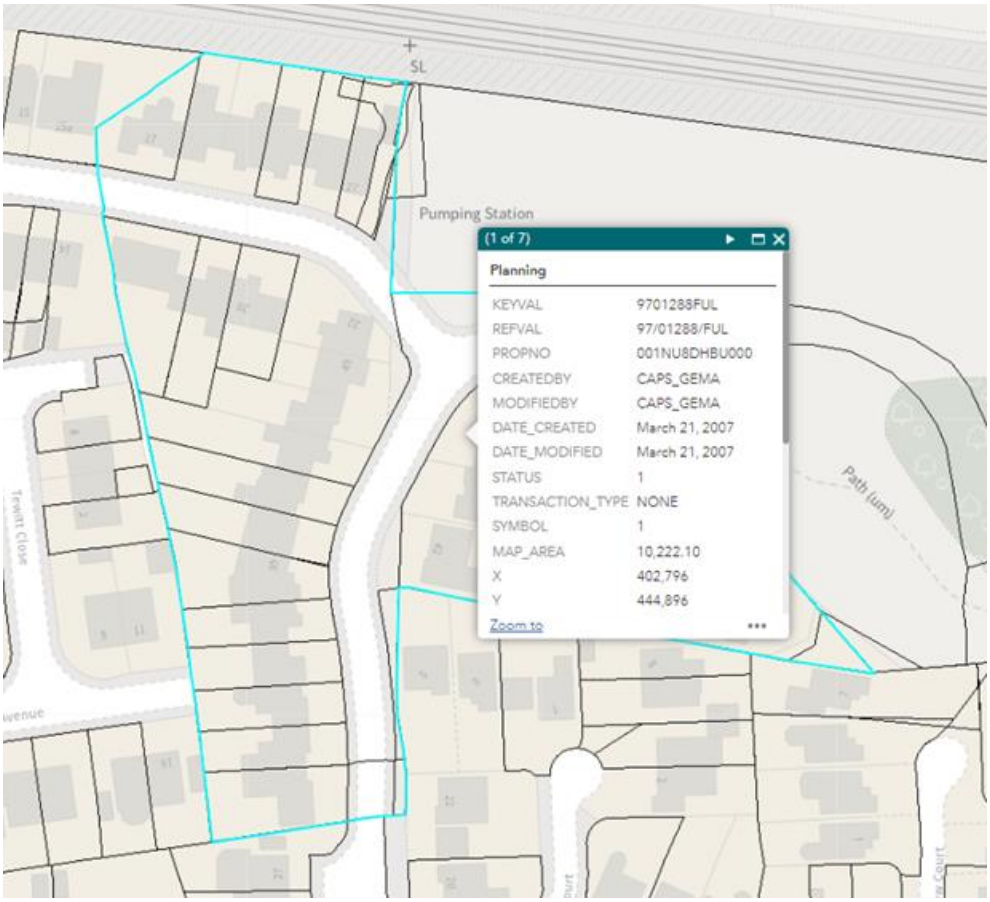
Supplementary Information – Part 1 Steeton-with-Eastburn FSA

Existing Development Site

Planning permission was granted in 1997 for the development of 25 houses and garages and the extension of Currer Walk within the delineated Steeton-with-Eastburn Flood Storage Area (FSA). This area is shown in Figure 1-1 below.

Figure 3-1 Planning application details for the site at Steeton



The UDP flood risk policy on washlands at the time of the development was as follows:

"Development will not be permitted on washlands defined on the proposals maps except where:

(i) The proposed development would not significantly affect the function of the washland; and

(ii) There would be no serious risk to the development from flood debris or pollution"

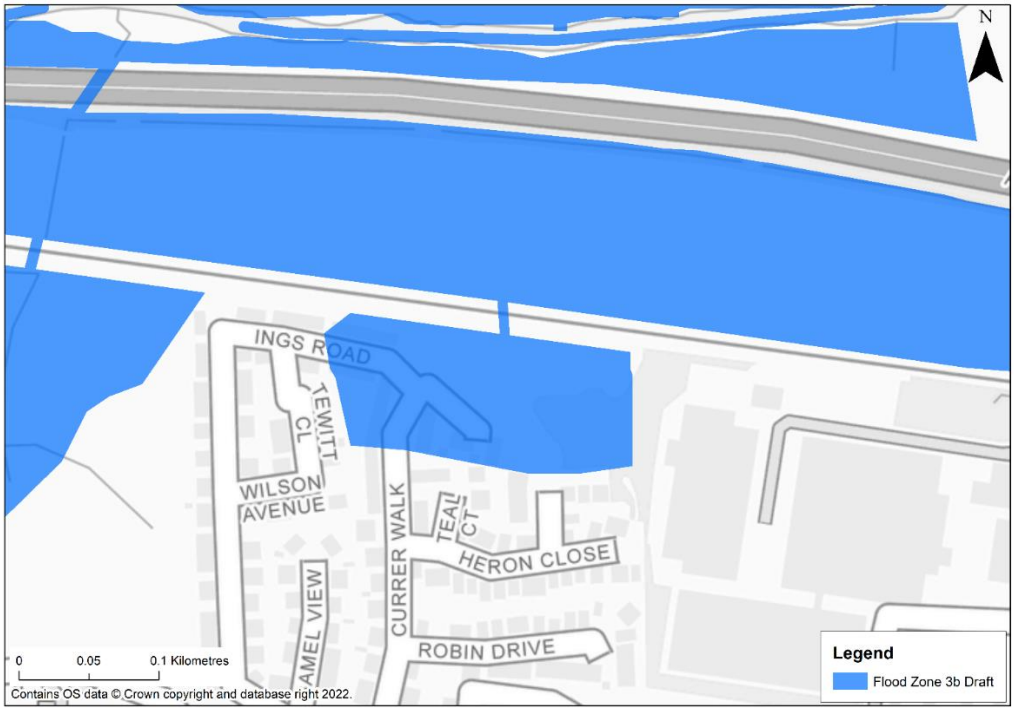
The current FSA outline indicates that this policy would not have been satisfied, given the extent to which the developed area would have been impacted by the flooding of the washland.

Additional evidence supports the claim that the development is located outside of the FSA at Steeton. At planning stage, the developer "negotiated to remove the condition relating to the

provision of compensatory flood land" arguing that the condition was "unnecessary given that the majority of the site was not within the washlands area".

As shown in Figure 3-2, the current Flood Storage Area included within the Flood Zone 3b outline overlaps the development along Currer Walk. If the draft Flood Zone 3b output is adopted, existing policy would prohibit future development of these properties. Further investigations have been completed to determine whether the developed area should be classed as part of the Flood Zone 3b outline given its location within a designated FSA.

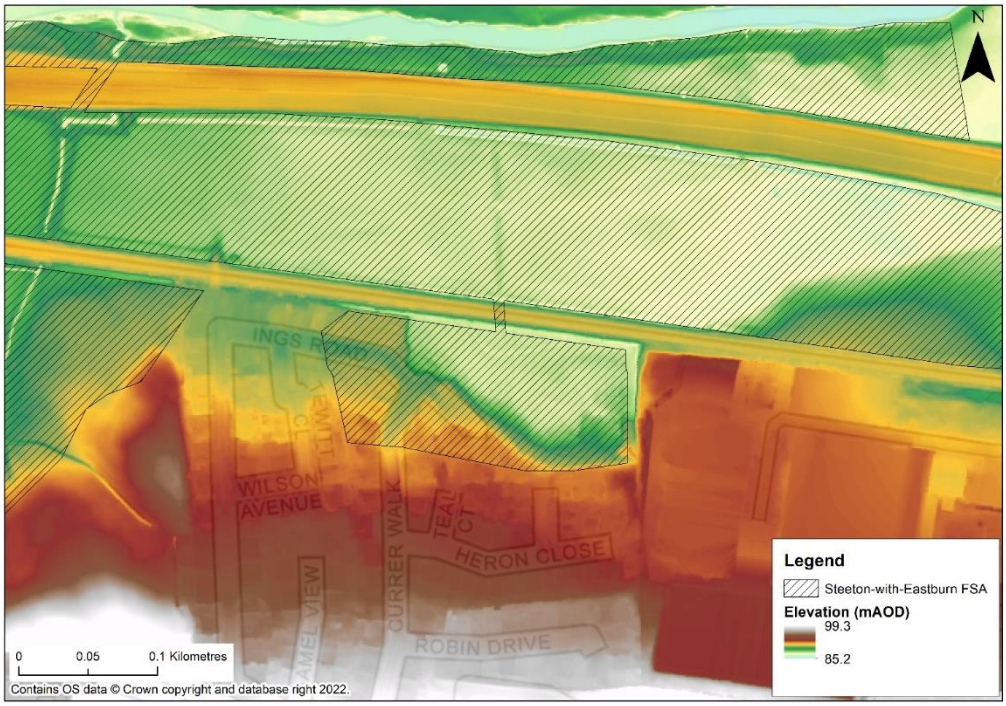
Figure 3-2 Current Flood Zone 3b Draft outline



Elevation Analysis

Figure 1-3 illustrates the elevation within the Steeton-with-Eastburn FSA and adjacent land. The average elevation within the FSA is around 87.4 mAOD. The elevation of the railway line to the north is approximately 89.9 mAOD.

Figure 1-3 Elevation at the Steeton-with-Eastburn FSA



The 1997 officer report supporting the development at Steeton states that "none of these houses shall be built below flood level and should have a floor level of a minimum 89.54 mAOD". Figure 1-4 indicates the areas around the Steeton-with-Eastburn FSA that are above the 89.54 mAOD threshold. Based on LiDAR data, the development at Currer Lane is above the threshold outlined within the officer report. There are some properties along Ings Road that are shown to be below 89.54mAOD as estimated from LiDAR data.

Figure 1-4 Elevation greater than 89.54 mAOD

Modelled Outputs

Outputs from the Kildwick to Esholt model (identified as 2022_EA12311450_Leeds_FAS_Phase_2_DRAFT) have been reviewed to assess the risk to properties within the Steeton-with-Eastburn FSA. No flooding to properties is predicted within the present day or climate change enhanced 3.33% AEP event outline, the event typically used delineate Flood Zone 3b, as shown in Figure 1-5.

Ings Road is predicted to remain free from flooding up to the climate change enhanced 0.5% AEP event (this event includes a 23% increase in present day flows to take into account future climate change). The predicted flooding in this event is shown in Figure 1-6. This is a much larger event when compared to the climate change enhanced 3.33% AEP event. Most of the developed part of the site is not shown to flood in this event.

Figure 1-5 Kildwick to Esholt 30-year present day and climate change events at Steeton

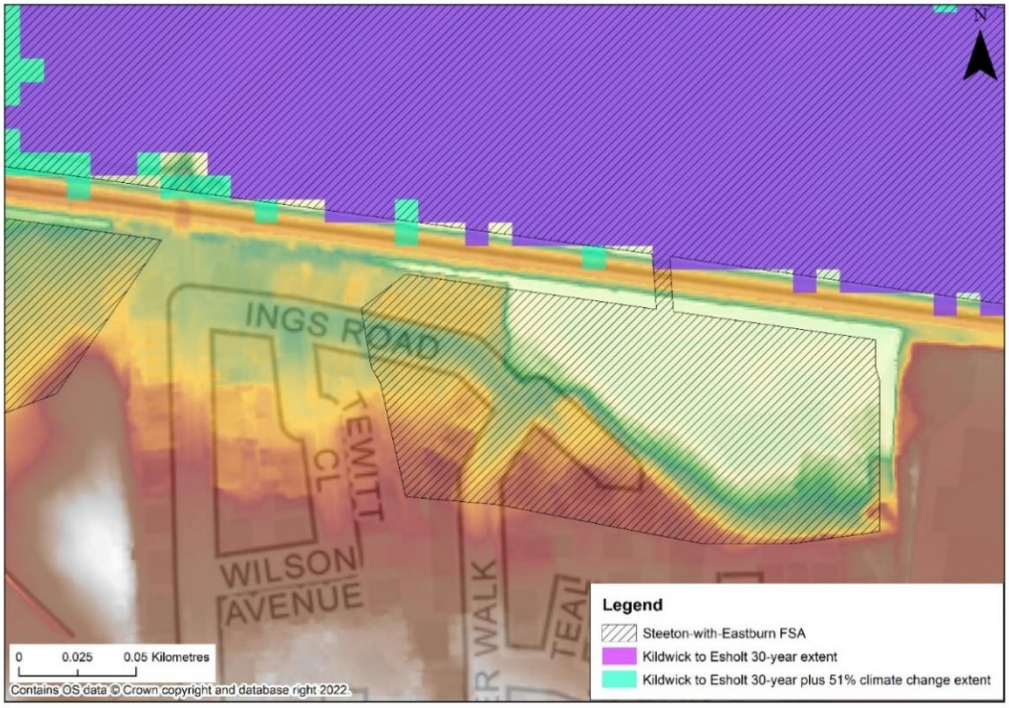


Figure 1-6 Kildwick to Esholt 200-year plus climate change event at Steeton

Figure 1-7 shows the predicted flooding in the present day 0.2% and 0.1% AEP events. The figure highlights that there is very low risk of flooding to properties within the Steeton-with-Eastburn FSA in these extreme events with parts of the FSA not shown to be inundated. Maximum flood depths in the developed part of the site are between 0.3m and 0.6m for the 0.1% AEP event.

Conclusion

The Steeton-with-Eastburn FSA is an exceptional and isolated case where there is existing residential development sited within the designated FSA. The standard policy adopted within the Bradford SFRA is to incorporate FSA extents into the delineated Flood Zone 3b extent. This site has been investigated in further detail given the current development within the FSA to avoid precluding/preventing future development (minor modifications of existing properties) within the currently developed part of the site.

The developed parts of the site are elevated and have been intentionally elevated as part of the residential development that took place in 1997 to remove them from the area designed to flood. Furthermore, predicted model outputs show that the scale of flood risk to the developed parts of the site is low, with these areas falling outside the future 3.33% AEP flood extent. They are first shown to flood during much larger, extreme events, with flooding initiated during the climate change enhanced 0.5% AEP event.

Given the existing land use and predicted levels of risk, an exception to the standard methodology adopted within the SFRA (of incorporating designated areas within Flood Zone 3b extents) is justified and has been applied within the SFRA. As shown in Figure 1-8, the developed part of the FSA has been removed from the delineated Flood Zone 3b extent, with the lower lying and undeveloped parts of the site retained within the Flood Zone 3b outline.

Figure 1-7 Kildwick to Esholt 500-year and 1000-year events at Steeton

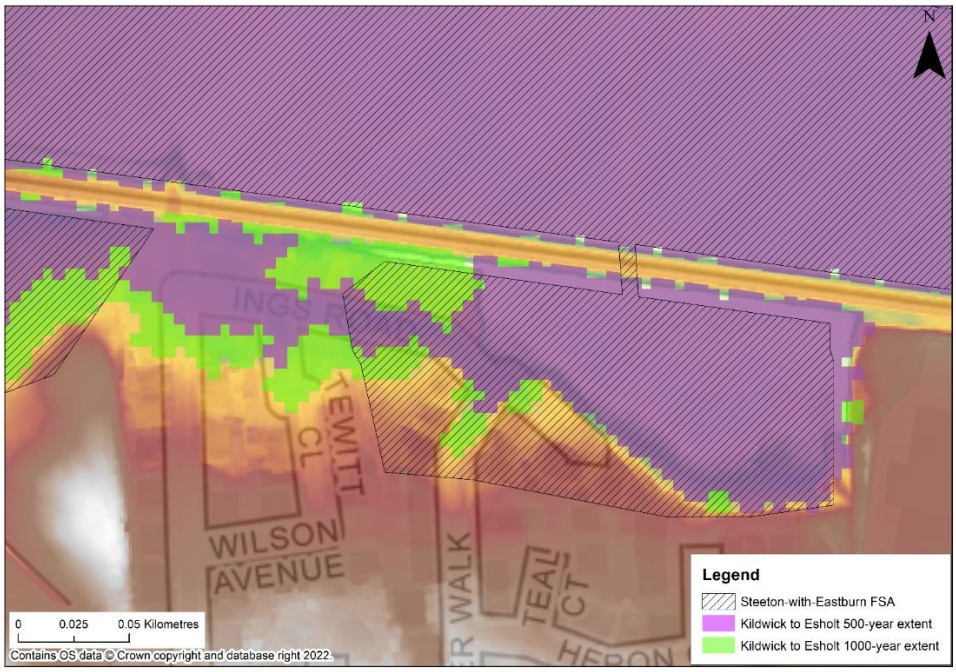


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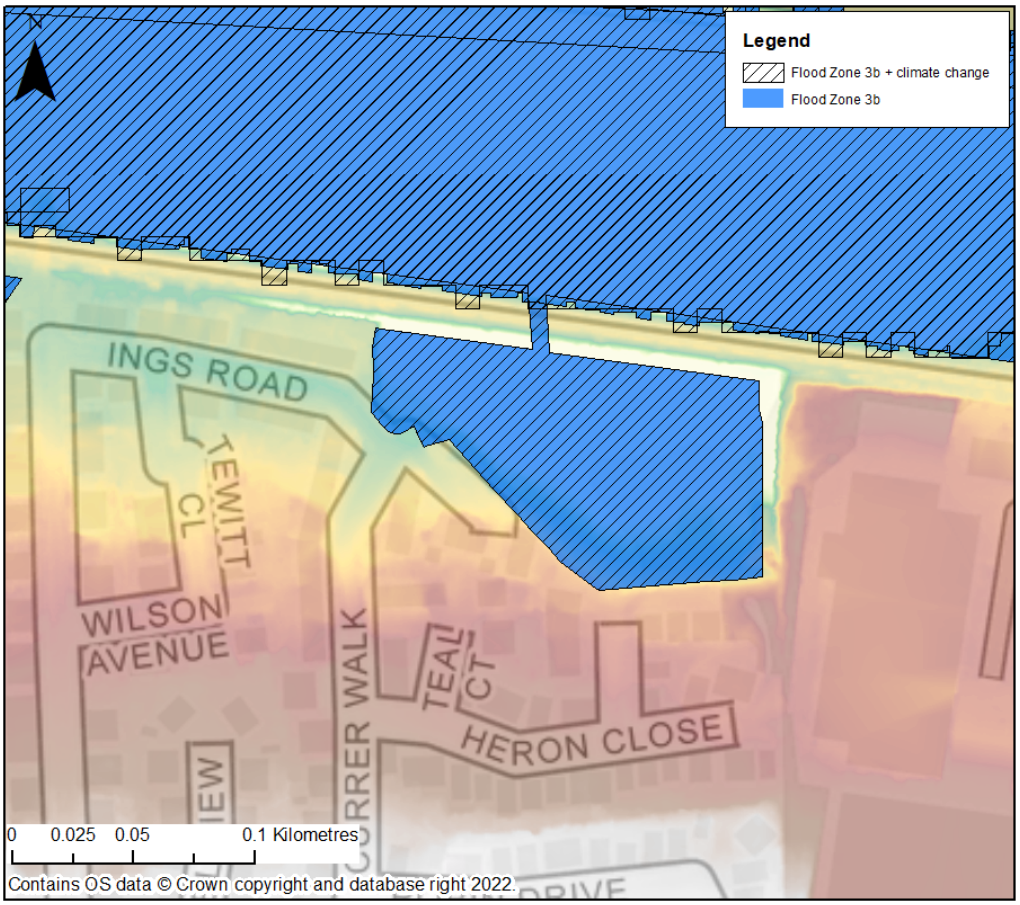
Figure 1-8 Updated present day and future Flood Zone 3b extents



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Supplementary Information – Part 2 Water Level Equivalence Assessment

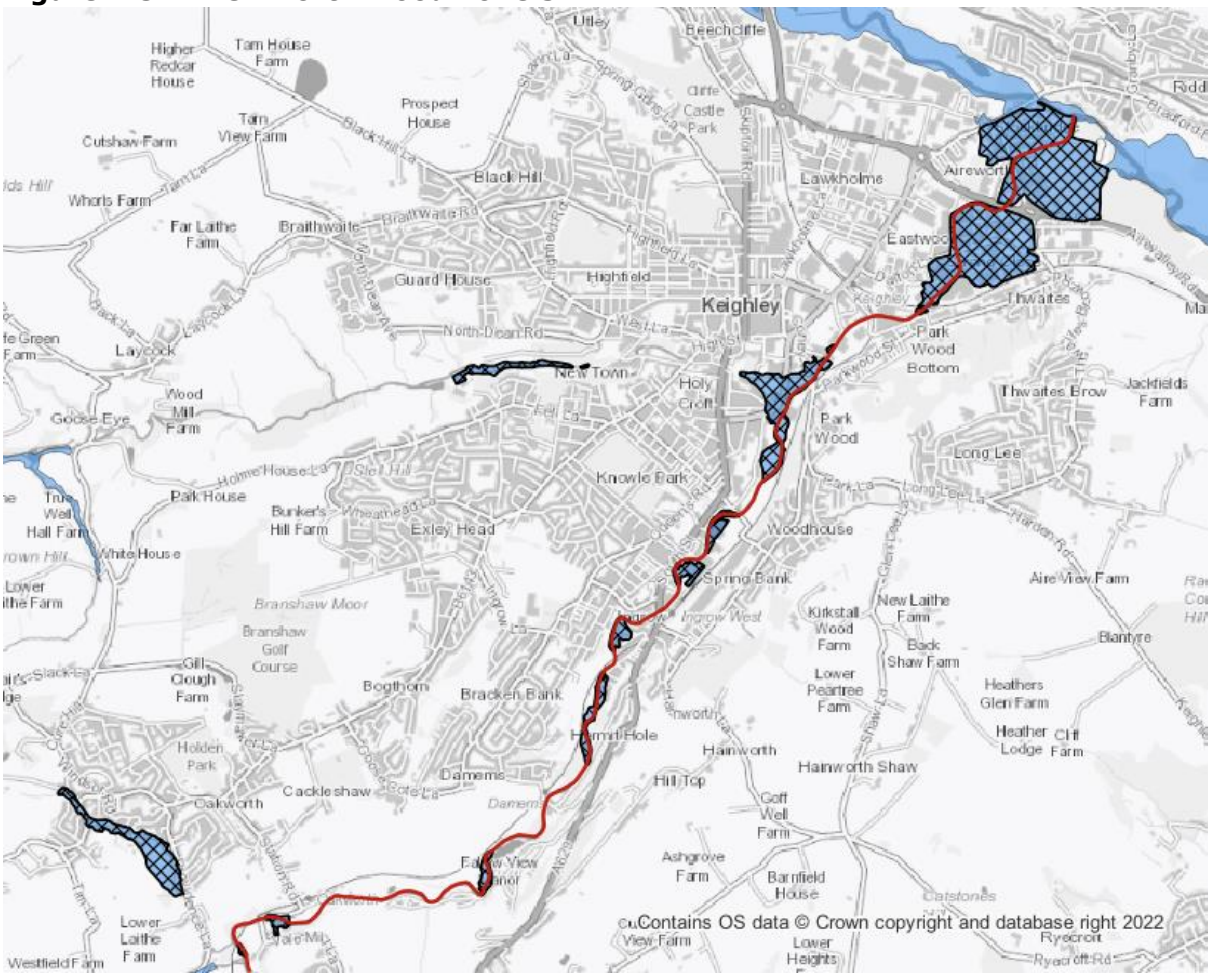
The below technical information supports the proxy approach that is outlined in Table 3-3 of the document.

River Worth

The Environment Agency have provided mapped flood extents for the 10%, 4%, 2% 1.33%, 1%, 0.5% and 0.1% AEP events, from the 2007 River Worth study.

A check on the 1% AEP event outputs has confirmed that these outputs are currently used to define Flood Zone 3 within the Flood Map for Planning. The below figure (Figure 1-9) compares Flood Zone 3 (blue shaded area) against the 1% AEP event outline produced from the River Worth 2007 study (shown by the black cross hatched outline).

Figure 1-9 River Worth Flood Zone 3



The closest proxy to the 3.33% AEP event is the 4% AEP event outline, however it is proposed that the 2% AEP event outline is used to ensure that Flood Zone 3b is not underpredicted by the assessment.

A comparison of the predicted flood extents for the 4%, 2% and 1% AEP events is shown in Figure 1-10 below. Within this figure, the flood extents are ordered with the highest frequency, lowest magnitude event (4% AEP) on top.

Figure 1-10 River Worth 2007 Modelling – Predicted Flood Extents for the 4% (green), 2% (pink) and 1% (black cross hatched) AEP Events

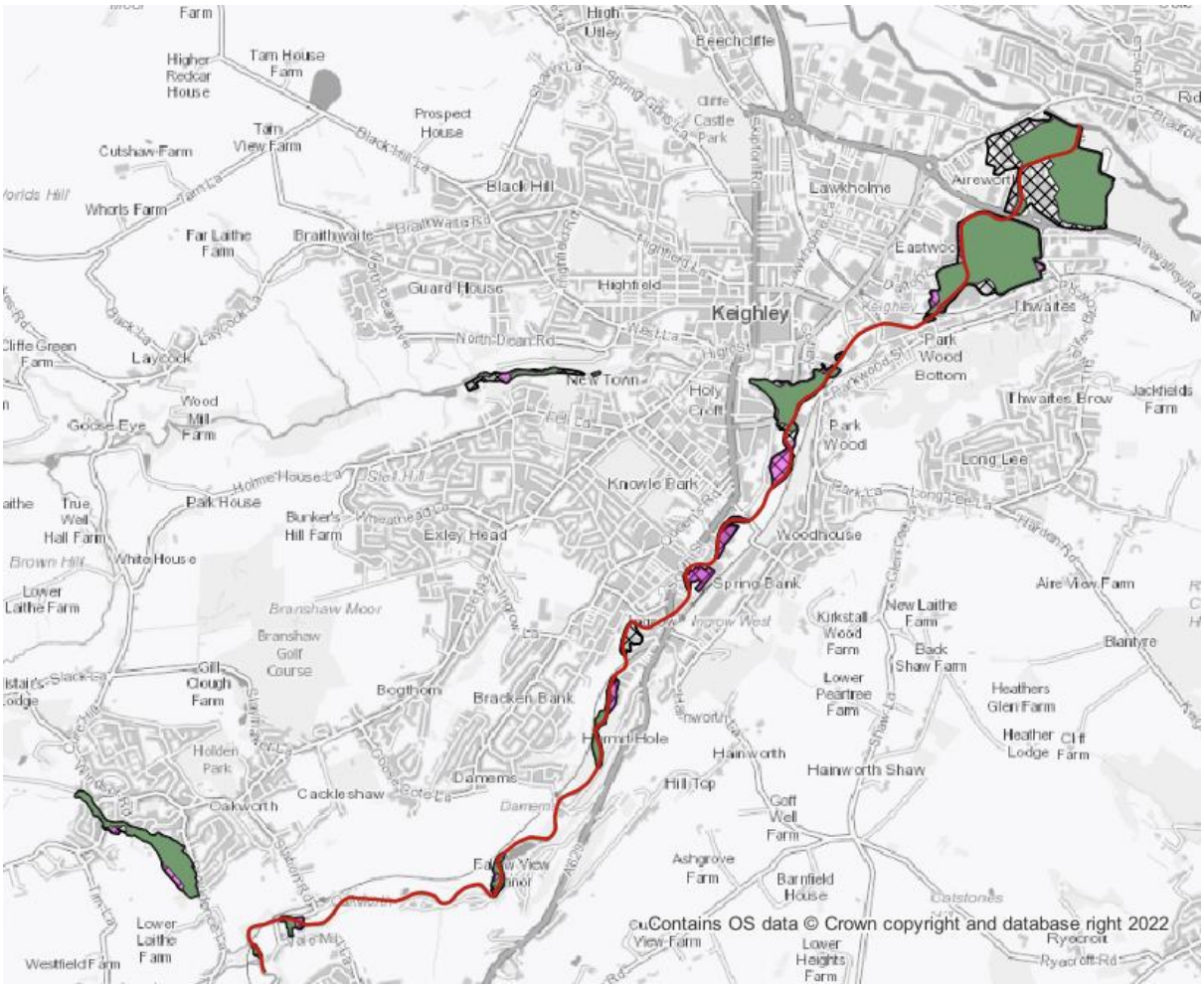


Figure 1-10 highlights a visible difference in the predicted 4% and 2% AEP flood extents in the upper section of the River Worth within Holy Croft, Knowle Park and Ingrow.

Within the Worth 2007 model, the future impacts of climate change are represented in the 1% AEP event by a 20% increase in flow, which equates to an average water level increase of 0.26m. Current climate change science estimates a longer term increase in flows of up to 51%. In the absence of any tailored modelling (that is not possible as testing has determined that the model no

longer runs as the set-up is incompatible with current Flood Modeller Pro software), a linear relationship between increases in flow and increases in water level has been assumed. This is a conservative assumption. This results in an estimated water level increase of 0.66m, which is broadly comparable to the water level increase between the 1% and 0.1% AEP events (of 0.74m on average, for context the increase between the 1% and 0.5% AEP events is 0.15m). On the basis of this information, JBA have adopted the below approach:

- 2% AEP event flood outline is used to delineate Flood Zone 3b.
- 0.5% AEP event outline is used to delineate the climate change enhanced FZ3b (noting that the average water level difference between the 2% and 0.5% AEP events is 0.28m justified given the conservative nature of the linear relationship assumption).
- 1% AEP event outline is used to delineate Flood Zone 3.
- 0.1% AEP event outline is used to delineate the climate change enhanced FZ3.
- 0.1% AEP event outline is used to delineate FZ2.
- There are no model outputs available for any larger events that can be used to define the future climate change enhanced FZ2, so this will remain as the present case Flood Zone 2. This will be acknowledged as a short-term interim limitation in the report and will be updated as part of the Level 2 assessment.

Bradford Beck Modelling

JBA have a copy of the Bradford Beck InfoWorks modelling files (provided in icmm format) and have some limited mapped outputs for the 5%, 1% 1%CC and 0.1% AEP events.

The model has been previously assessed as unsuitable for flood mapping/for use within the Level 1 SFRA due to its nature, its age, run-time issues (that have prevented JBA from running/using the model) and reported accuracy issues. Outputs from the Environment Agency's review of the model shared in the e-mail on 21 October 2022 raise concerns about the accuracy of the model and highlight the lack of suitable representation of open channel sections and need for further checking of key components of the model including the 1D network, structures, boundaries, 2D component and calibration and sensitivity. A new model is being developed for Bradford Council and is expected to be available for use in the latter part of 2023, however, the Level 1 SFRA needs to be finished before the new modelling and outputs are available.

Given the deficiencies with the existing model, extensive re-build work would be needed to upgrade the existing model for use within the study. It is understood that small scale development and related de-culverting projects have recently updated parts of the model but more extensive upgrade work would be needed to use the existing model to inform the SFRA. This work is considered to be outside the scope of the Level 1 SFRA, that should draw on readily available information. It is therefore proposed that existing outputs are used, however given the uncertainty and accuracy issues noted existing outputs need to be used with a high degree of caution. Outputs need to be carefully caveated and replaced as part of the future Level 2 assessment once updated datasets are available.

Existing model outputs for the 5% and climate change enhanced 1% AEP event (+50%) are compared to Flood Zone 3 and 2 in Figure 1-11.

The outputs highlight:

- Flood Zone 3 is significantly larger than the predicted 5% AEP event outputs within the central area of Bradford.
- Climate change enhanced outputs broadly align with Flood Zone 2, except in Dirk Hill, Lidget Green and Hillam Road area of the city.

Given the uncertainty (and the lack of direct alignment between the mapped outputs and the Flood Map for Planning) a simple yet conservative approach is proposed based on re-using the existing flood zones as a proxy, as outlined in the table below.

Flood Zone	Proxy Approach
FZ3b (present and future)	Based on existing FZ3
FZ3	Present day - based on existing FZ3 Future - based on existing FZ2 (supported by below GIS outputs).
FZ2	Present day - based on existing FZ2 Future - report to acknowledge that no information available and acknowledge this as a short term limitation that will be addressed by the Level 2 assessment when the Bradford Beck 2023 model is expected to have been finalised.

Conclusion

The adopted way forward in both areas is based on a conservative approach and is based on the use of readily available datasets. It is acknowledged that the use of the documented methodology is a short-term interim approach and will be replaced when new modelling datasets become available in the near future.

Figure 1-11 Bradford Beck – Predicted Flood Extents for the 5% (yellow) and 1%+50%CC (green) compared to Flood Zone 3 (blue) and Flood Zone 2 (pink)