

Appendix B - Data sources used in the SFRA

1 Historical flooding

Melton Borough Council (MBC) provided records of flooding incidences across the Borough. These include records of flooding and properties which had been awarded flood grants based on reported flooding.

As Lead Local Flood Authority (LLFA), Leicestershire County Council (LCC) provided information on historic flood incidents across the Borough, in the form of a GIS dataset. The Environment Agency's (EA's) Historic Flood Map and Recorded Flood Outlines dataset was also used to understand the flood history across the Borough.

Section 4.1 of the Main Report documents the historic flooding records obtained.

2 Fluvial flooding

2.1 Hydraulic models

JBA received three fluvial hydraulic models from the EA. These models were reviewed to determine their age, type of model, and whether the required outputs were available. The SFRA has made best use of the available model data whilst balancing the MBC's timescales and budgets. No new modelling has been carried out as part of this Level 1 SFRA. Table 2-1 below provides details of the three models and the outputs available for use within the SFRA.

Table 2-1: Details of models available for use within this SFRA

Model	Watercourse	Year	Software	Model outputs availability
River Devon	River Devon	2021	1D-2D Flood Modeller- TuFLOW	3.3% AEP - Yes (defended) 1% AEP - Yes (defended) 0.1% AEP - Yes (defended)
River Wreake and Tribs	River Wreake, Thorpe Brook, Scalford Brook, Edendale Brook, Asfordby Relief Channel, Welby Brook	2011 with 2021 update	1D-2D ISIS- TuFLOW	3.3% AEP - No 1% AEP - Yes (defended) 0.1% AEP - Yes (defended)
Lower Wreake	River Wreake, Thrussington	2015	1D-2D ISIS-	3.3% AEP - Yes (defended) 1% AEP - Yes (defended)

Model	Watercourse	Year	Software	Model outputs availability
and Tribs	Brook, Rearsby Brook, Queniborough, Gaddesby Brooks, Barkby Brook		TuFLOW	0.1% AEP - Yes (defended)

2.2 Flood Zones 2 and 3a

Flood Zones 2 and 3a, as shown on [MBC's Mapping Portal](#), show the same extents as the online EA's Flood Map for Planning (FMfP), except for the EA's River Devon (2021) model. This data has recently been incorporated into the Flood Zones however it will not be available to view within the FMfP until 2025. Until then, a comment will appear in the area affected by the changes, informing that new information is available and to contact the EA to obtain it. This data was obtained for the purposes of this SFRA and is included within the Flood Zone 2 and 3 layers on the Interactive Mapping Portal.

The extents of the models used in this SFRA are shown in Figure 2-1. Over time, the online mapping is likely to be updated more often than the SFRA, so SFRA users should check there are no major changes in their area.

2.3 Flood Zone 3b (the Functional Floodplain)

Flood Zone 3b as shown in the Interactive Mapping Portal, has been compiled for the Borough as part of this SFRA and is based on the 3.3% AEP (1 in 30-year chance of flooding in any given year) extents produced from detailed hydraulic models, where available, which is in line with the Planning Practice Guidance (PPG). For this SFRA, the defended 3.3% AEP extents were available for the following models:

- River Devon (2021)
- Lower Wreake and Tribs (2015)

In agreement with the EA, Flood Storage Areas (FSAs) within the Borough have also been included in Flood Zone 3b.

For areas not covered by detailed hydraulic models, a precautionary approach should be adopted for Flood Zone 3b with the assumption that the extent of Flood Zone 3b would be equal to Flood Zone 3a. This layer is displayed as 'Indicative Flood Zone 3b' on the Interactive Mapping Portal. If development is shown to be in Flood Zone 3a, further work should be undertaken as part of a detailed site-specific Flood Risk Assessment to define the extent of Flood Zone 3b.

If the area of interest is located somewhere that shows large differences in extents between the Flood Zones; having checked the online mapping, developers will need to remap Flood Zone 3b as part of a detailed site-specific Flood Risk Assessment.

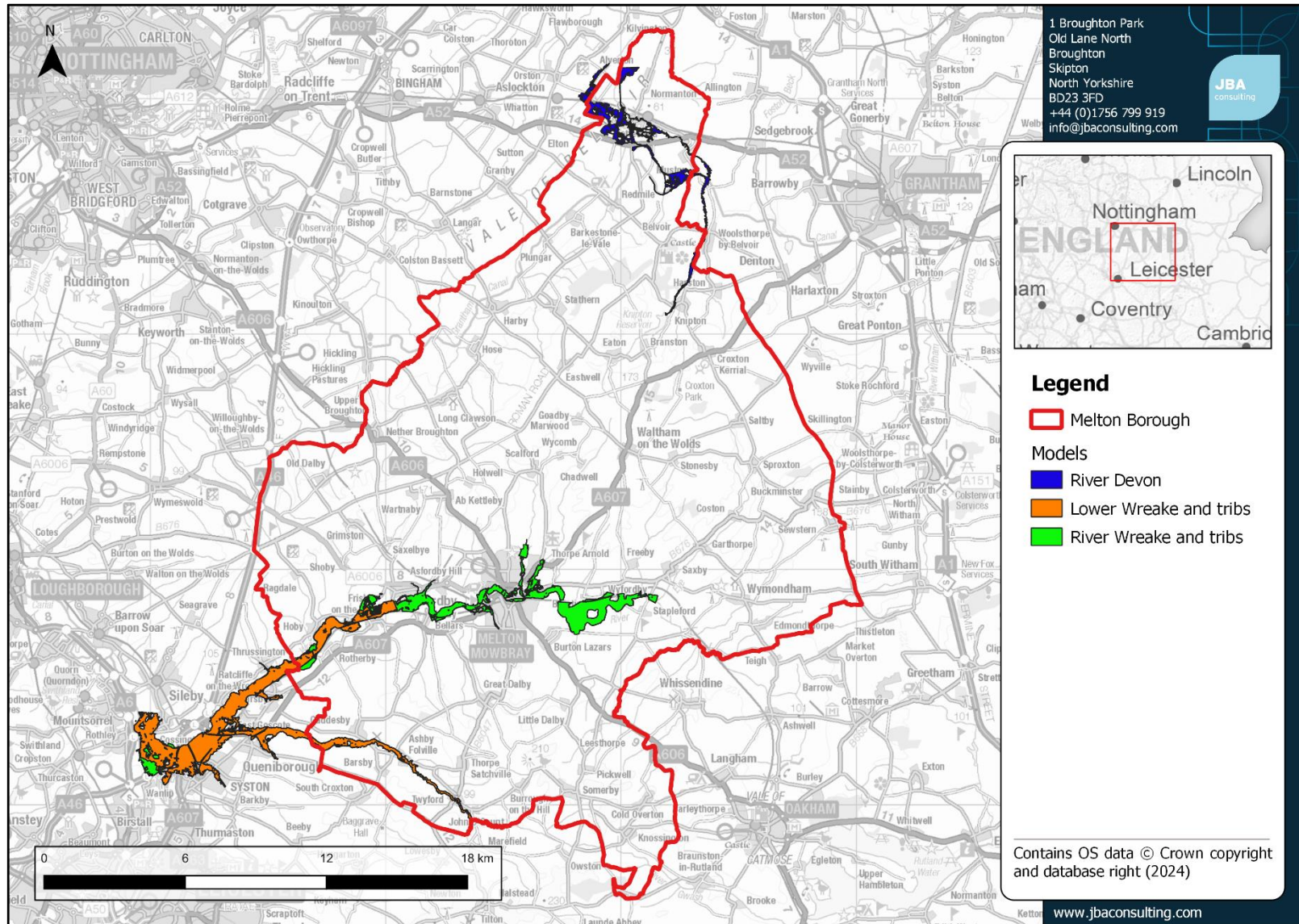


Figure 2-1: Extents of the hydraulic models used in this SFRA.

3 Surface water flooding

Mapping of surface water flood risk in the Borough has been taken from the Risk of Flooding from Surface Water (RoFSW) maps published online by the EA. These maps are intended to provide a consistent standard of assessment for surface water flood risk across England and Wales in order to help LLFAs, the EA, and any potential developers to focus their management of surface water flood risk.

The RoFSW map is derived primarily from identifying topographical flow paths of existing watercourses or dry valleys that contain some isolated ponding locations in low lying areas. The map displays different levels of surface water flood risk depending on the annual probability of the land in question being inundated by surface water, as outlined in Table 3-1.

Table 3-1: RoFSW risk categories.

Category	Definition
High	Flooding occurring as a result of rainfall with a greater than 1 in 30 chance in any given year (annual probability of flooding 3.3%).
Medium	Flooding occurring as a result of rainfall of between 1 in 100 (1%) and 1 in 30 (3.3%) chance in any given year.
Low	Flooding occurring as a result of rainfall of between 1 in 1,000 (0.1%) and 1 in 100 (1%) chance in any given year.

Whilst the categories in Table 3-1 are used in the national RoFSW mapping, the following approach has been used to inform the sequential test.

Surface water zones have been used to define locations at either lower or higher risk of surface water flooding based on the extent of the 1% AEP plus 2070s upper end (+40%) climate change allowance surface water event:

- Zone A – lower risk of surface water flooding (lies outside the 1% AEP plus 40% climate change surface water extent)
- Zone B – higher risk of surface water flooding (lies within the 1% AEP plus 40% climate change surface water extent)

Although the RoFSW offers improvement on previously available datasets, the results should not be used to understand flood risk for individual properties. The results should be used for high level assessments such as SFRAs for local authorities. If a site is indicated in the EA mapping to be at risk from surface water flooding, a more detailed assessment should be considered to illustrate the flood risk more accurately at a site-specific scale.

4 Climate change

4.1 Fluvial flooding

4.1.1 Hydraulic modelling

Detailed hydraulic models for the River Devon and River Wreake were obtained under licence for this SFRA.

Climate change allowances which align with the latest guidance were available for the River Devon model only. This model is located within the Lower Trent and Erewash catchment therefore the uplifts that had been applied to the 1% AEP were +29% for the central allowance and +39% for the higher central allowance.

4.1.2 Proxy approach

Where there were no suitable climate change outputs available, a proxy approach has been taken as follows.

1% AEP (Flood Zone 3a) plus climate change scenario:

- Where hydraulic modelling was available, the 0.1% AEP outline was used as an indicative climate change extent. Where not available, Flood Zone 2 was used.

3.3% AEP (Flood Zone 3b) plus climate change scenario:

- Where hydraulic modelling was available, the 1% AEP outline was used as an indicative climate change extent. Where not available, Flood Zone 3a was used.

0.1% AEP (Flood Zone 2) plus climate change scenario:

- there is currently no available flood extent which could be used as a proxy. It is therefore recommended that developers undertake detailed modelling as part of their detailed site assessment as part of the planning application process when preparing FRAs.

4.2 Surface water flooding

Modelled Climate Change uplifts for the 3.3% and 1% AEP events for the 2070s are included as part of this SFRA and are presented in the Interactive Mapping Portal. The Borough is covered by four management catchments (Lower Trent and Erewash, Soar, Welland, and Witham), which all have the same climate change allowances. Therefore, the following uplifts have been applied across the entire borough.

- 3.3% AEP with 25% and 35% uplifts
- 1% AEP with 25% and 40% uplifts

In addition, the 0.1% AEP surface water extent can be used as an indication of surface water risk from smaller watercourses which are too small to be covered by the EA's Flood Zones.

5 Groundwater

Two datasets were used to assess potential areas that are likely to be at higher risk of groundwater flooding:

- The EA's Areas Susceptible to Groundwater Flooding 2010 (ASStGWF) dataset, showing the degree to which areas are susceptible to groundwater flooding based on geological and hydrogeological conditions on a 1km square grid. It does not show the likelihood of groundwater flooding occurring, i.e., it is a hazard, not risk, based dataset. This dataset covers a large area of land, and only isolated locations within the overall susceptible area are likely to suffer the consequences of groundwater flooding.
- The JBA groundwater emergence map, showing the risk of groundwater flooding to both surface and subsurface assets, based on predicted groundwater levels on a 5m square grid. For each grid cell, a depth range is given for modelled groundwater levels in the 1% AEP event. It takes account of factors including topography, groundwater recharge volumes and spatial variations in aquifer storage and transmission properties.

Section 4.6 of the Main Report details the approach adopted in this SFRA to assess the risk of groundwater flooding.

6 Sewers

Severn Trent Water provided their Hydraulic Sewer Flooding Risk Register for the Borough which includes a list of properties which have reported at least one incidence of external or internal sewer flooding, relating to public foul, combined or surface water sewers. This was provided for the period from January 1990 until April 2024. For confidentiality, this data is included using truncated postcodes. Data from Anglian Water was not available at the time of publication.

Section 4.5 of the Main Report presents this data.

7 Reservoirs

The risk of inundation because of reservoir breach or failure of reservoirs within the study area has been mapped using the outlines produced as part of the National

Reservoir Flood Mapping (RFM) study and are shown online on the Long-Term Risk of Flooding website at the time of publication.

The EA provide two flooding scenarios for the reservoir flood maps: a 'dry-day' and a 'wet-day'. The 'dry-day' scenario shows the predicted flooding which would occur if the dam or reservoir fails when rivers are at normal levels. The 'wet-day' scenario shows the predicted worsening of the flooding which would be expected if a river is already experiencing an extreme natural flood.

Section 4.8 of the Main Report presents the reservoirs affecting Melton borough.

8 Flood defences

The EA supplied the location of all flood defences within the Borough in their Asset Information Management System (AIMS) database, including information relating to the type of flood defence and their standard of protection. Section 6 of the Main Report provides information on flood defences and schemes.

9 Overview of supplied data

Table 9-1 below provides an overview of the supplied data from stakeholders, which has been used to inform the Melton SFRA.

Table 9-1: Summary of data supplied to inform the Melton SFRA.

Source of flood risk	Data used to inform the assessment	Data supplier
Historic (all sources)	Historic flood map Recorded flood outlines	Environment Agency
Historic (all sources)	Historic flooding incidents	Melton Borough Council
Historic (all sources)	Historic flooding incidents	Leicestershire County Council
Historic (sewers)	Hydraulic flood risk register	Severn Trent Water
Fluvial (including climate change)	Devon (1D-2D Flood Modeller-TuFLOW) Lower Wreake and tribs (1D-2D ISIS-TuFLOW) Wreake and tribs (1D-2D ISIS-TuFLOW)	Environment Agency
Fluvial (including climate change)	Flood Map for Planning Water storage areas Risk of flooding from Rivers and Sea	Environment Agency

Source of flood risk	Data used to inform the assessment	Data supplier
Surface water (including climate change)	Risk of Flooding from Surface Water dataset	Environment Agency
Sewers	Internal and external historic drainage records	Severn Trent Water
Canals	Records of overtopping and/or breach incidents	Canal and River Trust
Groundwater	Areas Susceptible to Groundwater Flooding	Environment Agency
Groundwater	Groundwater Emergence Map	JBA
Reservoir	National Inundation Reservoir Mapping (Long term flood risk map) including Dry Day and Wet Day extents	Environment Agency
Flood defences	AIMS Spatial Flood Defences Reduction in Risk of Flooding from Rivers and Sea due to defences	Environment Agency
Cross-boundary impacts	Neighbouring authority sites and Local Plan information	Planners at neighbouring authorities (Rushcliffe Borough, Newark and Sherwood District, South Kesteven District, Rutland, Harborough District, Charnwood Borough)
Other datasets	Source Protection Zones Aquifer Designation maps (Bedrock Geology and Superficial Deposits) Detailed River Network Flood Alert and Flood Warning Areas Groundwater Vulnerability National Receptor Dataset	Environment Agency (via Melton Borough Council)