

# Appendix B - Data sources used in the SFRA

## 1.1 Historical flooding

The following LLFA organisations provided historic flooding records:

- Hampshire County Council provided information on recorded highway flooding in Hampshire and flood investigations.
- East Sussex County Council provided their Flood Incident Database.
- West Sussex County Council did not provide any historic flooding data

The Environment Agency's (EA's) Historic Flood Map and Recorded Flood Outlines dataset were also used to understand the flood history across the study area.

## 1.2 Fluvial flooding

### 1.2.1 Flood Zones 2 and 3a

Flood Zones 2 and 3a show the same extent as the online EA's Flood Map for Planning (FMfP) and have not been updated for this SFRA.

### 1.2.2 Functional Floodplain (Flood Zone 3b)

Flood Zone 3b, as shown in Appendix A mapping, has been compiled for the study area as part of this SFRA and is based on the 3.3% AEP defended extents produced from detailed hydraulic models, where available, which is in line with the latest Planning Practice Guidance (PPG). In areas of detailed hydraulic models where the 3.3% AEP extents were not available, the 2% AEP extent has been used as a conservative proxy. The following list details the outputs used for each of the available hydraulic models:

- Petersfield - 2% AEP (defended)
- Upper Lavant - 2% AEP (defended)
- Itchen- 3.3% AEP (defended)
- Lower Ouse- 2% AEP (defended)
- Lower Ouse for the tidal reach- 5% (defended)
- Adur- 1.3% AEP (defended)
- Hassocks- 3.3% AEP (defended)
- SFRM for the Lower Fluvial River Arun- 1.3% AEP (defended)
- SFRM for the Lower Tidal River Arun- 1.3% AEP (defended)
- Itchen- 3.3% AEP (defended)
- River EMS- 3.3% (AEP)

For areas not covered by detailed hydraulic models, a precautionary approach has been adopted for Flood Zone 3b with the assumption that the extent of Flood Zone 3b would be equal to Flood Zone 3a (1% AEP).

### 1.2.3 Fluvial climate change

#### **3.3% AEP (Functional floodplain - Flood Zone 3b)**

None of the EA hydraulic models provided for this SFRA currently have available outputs for 3.3% AEP plus climate change events so a pragmatic and conservative approach has been taken. No hydraulic models were re-run specifically for this as part of this Level 1 SFRA.

For areas where no appropriate model outputs exist, a precautionary approach has been taken by using the extent of Flood Zone 3a to define the future extent of Flood Zone 3b.

#### **1% AEP (Flood Zone 3a)**

The existing 1% AEP plus climate change outputs have been used for the modelled watercourses within this Management Catchment.

For areas with no hydraulic modelling, the modelled 0.1% AEP outline is used as an indicative climate change extent. This is appropriate given the Upper End climate change estimates are often similar to the 0.1% AEP/ Flood Zone 2 extents; therefore, the differences in the effects of climate change are anticipated to be minimal.

#### **0.1% AEP (Flood Zone 2)**

None of the EA hydraulic models provided currently have available outputs for 0.1% AEP plus climate change events. To identify areas which may be affected by climate change in the 0.1% AEP event, a 100m buffer has been applied to Flood Zone 2 and has been defined as the 'Climate Change Impact Zone'.

## **1.3 Surface Water flooding**

The mapping of surface water flood risk in the study area 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 to help LLFAs, the EA, and any potential developers focus their management of surface water flood risk.

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

Table 1: RoFSW risk categories.

Category	Definition
High	Flooding occurring as a result of rainfall with a greater 3.3% AEP
Medium	Flooding occurring as a result of rainfall of between a 1% and 3.3% AEP
Low	Flooding occurring as a result of rainfall of between 0.1% and 1% AEP

Although the RoFSW offers an 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 SFRA 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.

### 1.3.1 Surface water climate change

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

Modelled Climate Change uplifts for the 3.3% and 1% AEP events were developed as part of this SFRA and are presented in Appendix A for the following events and scenarios:

- 3.3% AEP with +20% uplift (2050s Central allowance)
- 3.3% AEP with +25% uplift (2050s Central allowance)
- 3.3% AEP with +35% uplift (2070s Upper End allowance)
- 3.3% AEP with +40% uplift (2070s Upper End allowance)
- 1% AEP with +25% uplift (2050s Central allowance)
- 1% AEP with +45% uplift (2070s Upper End allowance)

## 1.4 Sewers

Southern Water provided their Hydraulic Sewer Flooding Records which includes a list of internal and external sewer flooding incidents. Historic sewer flooding records were also requested from Thames Water, who indicated no incidents of flooding in the SDNPA area.

Section 5.6.1 of the Main Report presents this data.

## 1.5 Groundwater

The JBA 5m Groundwater Flood Map, shows the likelihood of groundwater emergence posing a risk to both surface and subsurface assets, based on predicted groundwater levels during a 1% AEP event. This divides groundwater emergence into five categories:

- Groundwater levels are either at or very near (within 0.025m of) the ground surface. Within this zone there is a risk of groundwater flooding to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
- Groundwater levels are between 0.025m and 0.5m below the ground surface. Within this zone there is a risk of groundwater flooding to both surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
- Groundwater levels are between 0.5m and 5m below the ground surface. There is a risk of flooding to subsurface assets, but surface manifestation of groundwater is unlikely.
- Groundwater levels are at least 5m below the ground surface. Flooding from groundwater is not likely.
- No risk. This zone is deemed as having a negligible risk from groundwater flooding due to the nature of the local geological deposits.

Section 5.5 of the Main Report details the approach adopted in this SFRA to assess the risk of groundwater flooding.

## 1.6 Reservoirs

The risk of inundation because of reservoir breach or failure of reservoirs within the 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 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.

The EA also provides the 'fluvial contribution' extent, which shows the extent of river flooding added to the reservoir model to determine the impacts of failure on a wet day. This can be compared with the FMfP Rivers and Sea dataset to see the impact of reservoir flooding.

Section 5.7 of the Main Report presents the reservoirs affecting the SDNPA area.

## **1.7 Flood defences**

The EA supplied the location of all flood defences within the SDNPA area in their AIMS database, including information relating to the type of flood defence and their standard of protection.

Information on localised schemes was also provided by Hampshire County Council.

Section 7 of the Main Report provides information on flood defences and schemes.

## **1.8 Overview of supplied data**

Table 2 below provides an overview of the supplied data from stakeholders which has been used to inform the South Downs National Park Authority SFRA. Hyperlinks are provided where the datasets are openly available for download.

Table 2: Summary of supplied to inform the South Downs National Park SFRA.

Source of flood risk	Data used to inform the assessment	Data supplier
Historic (all sources)	Historic flood map (data.gov.uk) Recorded flood outlines (data.gov.uk)	Environment Agency
Historic (all sources)	Recorded Highway flooding Flood Investigations 2012-2015 Confirm Flood Investigations	Hampshire County Council
Historic (all sources)	Flood Incident Database	East Sussex County Council
Fluvial (including climate change)	River Adur Intertidal Model (2022) 1D-2D FMP-TUFLOW model Hassocks Climate Change modelling (2017) 1D-2D ISIS-TUFLOW model Petersfield (2011) 1D-2D ISIS-TUFLOW model Lower Tidal River Arun (2010) Infoworks 1D/2D Upper Arun (2017) ISIS 1D Upper Lavant (2007) ISIS 1D West Sussex Flood Zone improvements (2008) JFLOW Wey Lower (2009) ISIS-TUFLOW 1D-2D Wey Jacobs Well to Weybridge (2019) Flood Modeller/TUFLOW 1D-2D Wey Middle (Cranleigh) (2020) Flood Modeller/TUFLOW 1D-2D Wey Middle (Godalming to Guildford) (2020) Flood Modeller/TUFLOW 1D-2D Wey Upper (2020) Flood Modeller/TUFLOW 1D-2D	Environment Agency
Fluvial (including	Flood Map for Planning Flood Zone 3 (data.gov.uk)	Environment Agency

Source of flood risk	Data used to inform the assessment	Data supplier
climate change)	and Flood Zone 2 (data.gov.uk) Flood Storage Areas (data.gov.uk)	
Surface water (including climate change)	Risk of Flooding from Surface Water (data.gov.uk)	Environment Agency
Sewers	Internal and external historic sewer flooding records	Southern Water
Groundwater	JBA 5m Groundwater Flood Map	JBA
Reservoir	Risk of Flooding from Reservoirs dataset	Environment Agency
Flood defences	AIMS Spatial Flood Defences (data.gov.uk) Reduction in Risk of Flooding from Rivers and Sea due to defences (data.gov.uk)	Environment Agency
	A32 Farringdon-Chawton flood alleviation scheme	Hampshire County Council
Flood warnings and alerts	Flood Warning Areas (data.gov.uk) Flood Alert Areas (data.gov.uk)	Environment Agency
Cross-boundary impacts	Neighbouring authority sites and Local Plan information, to help assess cross-boundary impacts and the cumulative impact assessment	Planners at neighbouring authorities (Winchester City Council, East Hampshire District Council, Eastbourne Borough Council, Chichester District Council, Arun District Council, Adur District Council, Mid Sussex District Council, The City of Brighton and Hove Borough Council, Eastbourne Borough Council.
Other datasets	Aquifer Designation maps (Bedrock Geology and Superficial Deposits)	BGS (via the South Downs National Park Authority)