

## Appendix A: GeoPDF User Guide

Please tick the boxes next to the dataset titles in the map legend to display the data. If data does not display, it means it is not present in that particular area. For the tickbox functionality to work, the GeoPDFs must be downloaded locally to your PC and opened with Adobe.

Legend	Description	Reference
<b>Authority Information</b> South Norfolk Council boundary	The boundary of the South Norfolk District Council, the study area for this SFRA.	<b>Section 1.5</b> SFRA study area
<b>Watercourses</b> Main Rivers All Watercourses	Main Rivers – the Environment Agency (EA) statutory main rivers map detailing the watercourses which are designated a Main River by the EA. Data available from the <a href="#">DEFRA Data Services Platform</a> . All Watercourses – the Ordnance Survey (OS) Open Rivers dataset for surface features	<b>Section 1.5</b> SFRA study area <b>Section 4.3</b> Hydrology and fluvial flood risk
<b>Modelled Flood Zones</b> Flood Zone 3b Flood Zone 3a Flood Zone 2	The Flood Zones are for use in development planning and flood risk assessments: <b>Flood Zone 3b</b> – Functional Floodplain: This zone comprises land where water must flow or be stored in times of flood. <b>Flood Zone 3a</b> – High probability: greater or equal to a 1% chance of river flooding in any given year (Excludes Flood Zone 3b, which is derived as part of the SFRA). <b>Flood Zone 2</b> – Medium probability: between a 1% and 0.1% chance of river flooding in any given year.  Flood Zone 3b is identified as land which would flood with an annual probability of 3.3% AEP where detailed hydraulic modelling exists.	<b>Section 3.2.1</b> Flood Zones – fluvial risk <b>Appendix B</b> – for model details and relevant flood outlines

The following models have appropriate outputs which have been included:

- River Waveney
- River Yare
- River Wensum (Upper Wensum and Wensum Norwich)
- River Tud
- Broome Beck
- Bungay Tin
- Frenze Beck
- River Tiffey (2% AEP)

For the Gillingham Strategic Model no 3.3% AEP output was available so the 1% AEP output should be used as a proxy.

Where no detailed hydraulic modelling exists, Flood Zone 3a should be used as a proxy.

Modelled Flood Zones 3 and 2a shows any detailed hydraulic modelling which was made available for this assessment but has not currently been incorporated into the FMfP. The following models are included:

- Fluvial Models:
  - River Tiffey
  - Bungay Tin
  - River Waveney
- 2D Strategic Models:
  - Gillingham (1% AEP fluvial and 0.5% AEP tidal extents)

<p><b>EA FMfP</b> Indicative Flood Zone 3b Flood Zone 3a Flood Zone 2</p>	<p>The Flood Zones are for use in development planning and flood risk assessments:</p> <p><b>Flood Zone 3b</b> – Functional Floodplain: This zone comprises land where water must flow or be stored in times of flood.</p> <p><b>Flood Zone 3a</b> – High probability: greater or equal to a 1% chance of river flooding in any given year (Excludes Flood Zone 3b, which is derived as part of the SFRA).</p> <p><b>Flood Zone 2</b> – Medium probability: between a 1% and 0.1% chance of river flooding in any given year.</p> <p>Flood Zones 3a and 2 show the same extent as the Environment Agency’s Flood Map for Planning.</p> <p>The Environment Agency’s Flood Map for Planning (FMfP) dataset can be downloaded from the DEFRA Data Services Platform for <a href="#">Flood Zone 2</a> and <a href="#">Flood Zone 3a</a>.</p> <p>Indicative Flood Zone 3b shows the same extent as Flood Zone 3b and should be used as a proxy where no hydraulic modelling is available.</p>	<p><b>Section 3.2.1</b> Flood Zones – fluvial risk <b>Appendix B</b> – for model details and relevant flood outlines</p>
<p><b>Fluvial Flood Extent with Climate Change</b> 1% AEP with Central Climate Change allowance 1% AEP with Higher Central Climate Change allowance 0.1% AEP with Higher Central Climate Change allowance</p>	<p>These extents are from existing fluvial hydraulic models, where the 1% AEP (100-year flow) and 0.1% AEP (1000-year flow) is upscaled by the EA’s climate change allowances for the 2080s epoch for the relevant management catchment.</p> <p>Climate change modelled flood extents can be compared to the 1% AEP flood extent (Flood Zone 3a), and where no detailed modelling exists, compared against Flood Zone 2, for an indication of areas most sensitive to climate change. South Norfolk District lies within the Broadland Rivers management catchment.</p> <p>From the modelled outlines available, the following allowances have been included:</p>	<p><b>Section 5</b> Impact of Climate Change <b>Appendix B</b> – for model details and relevant flood outlines</p>

1% AEP with Central Climate Change allowance:

- Gillingham Strategic Model – 1% AEP plus 11% Climate Change

1% AEP with Higher Central Climate Change allowance:

- BKE3 - 1% AEP plus 25% climate change
- DIS3 - 1% AEP plus 25% climate change
- Gillingham Strategic Model - 1% AEP plus 20% climate change
- GNLP1055 - 1% AEP plus 25% climate change
- GNLP2168 - 1% AEP plus 25% climate change
- River Tiffey - 1% AEP plus 25% climate change
- River Yare - 1% AEP plus 25% climate change
- River Tud – 1% AEP plus 20% climate change
- River Waveney - 1% AEP plus 25% climate change
- Upper Wensum – 1% AEP plus 20% climate change
- Wensum Norwich – 1% AEP plus 20% climate change
- Broome Beck- 1% AEP plus 25% climate change
- Bungay Tin- 1% AEP plus 25% climate change
- Frenze Beck- 1% AEP plus 25% climate change

0.1% AEP with Higher Central Climate Change allowance

- River Yare – 0.1% AEP plus 25% climate change
- Upper Wensum – 0.1% AEP plus 20% climate change
- Wensum Norwich – 1% AEP plus 20% climate change
- River Waveney – 0.1% AEP plus 25% climate change
- River Tud – 0.1% AEP plus 20% climate change
- Broome Beck – 0.1% AEP plus 25% climate change
- Bungay Tin – 0.1% AEP plus 25% climate change

	<ul style="list-style-type: none"> <li>• Frenze Beck – 0.1% AEP plus 25% climate change</li> <li>• Gillingham Strategic Model – 0.1% AEP plus 20% climate change</li> </ul>	
<p><b>Risk of Flooding from Surface Water</b></p> <p><b>Surface Water Extent</b></p> <p>3.3% AEP</p> <p>1% AEP</p> <p>0.1% AEP</p>	<p>The EA's Risk of Flooding from Surface Water (RoFfSW) flood maps give an indication of the broad areas likely to be at risk of surface water flooding. This includes flooding that takes place from the surface runoff generated by rainwater. The data includes the extent, velocity, depth, and hazard mapping for the 3.3%, 1% and 0.1% AEP events. The extent of flooding for each of the events is shown in the mapping.</p> <p>Data available from the <a href="#">DEFRA Data Services Platform</a>.</p>	<p><b>Section 4.4</b></p> <p>Surface water flooding</p> <p><b>Appendix E</b></p> <p>Summary of flood risk</p>
<p><b>Surface Water Extent plus Climate Change</b></p> <p>1% AEP plus 40% Climate Change</p>	<p>The RoFSW was uplifted to represent surface water climate change for the 1% AEP plus 40% Climate Change scenario.</p>	<p><b>Section 5</b></p> <p>Impact of Climate Change</p> <p><b>Section 4.4</b></p> <p>Surface water flooding</p>

<p><b>Risk of Groundwater Flooding</b> EA Areas Susceptible to Groundwater Flooding JBA Groundwater Emergence Map</p>	<p>The EA’s groundwater flooding susceptibility data shows the degree to which areas of England, Scotland and Wales are susceptible to groundwater flooding on the basis of geological and hydrogeological conditions. This is shown at a resolution of 50m. It does not show the likelihood of groundwater flooding occurring, i.e., it is a hazard not risk-based dataset. The dataset contains the following hazard categories:</p> <ul style="list-style-type: none"> <li>• &lt;25%</li> <li>• &gt;=25% &lt;50%</li> <li>• &gt;50% &lt;75%</li> <li>• &gt;=75%</li> </ul> <p>JBA’s Groundwater Flood emergence map shows the level of groundwater below the surface, at a resolution of 5m. Flood risk could increase when groundwater is already high or emerged, causing additional overland flow paths or areas of still ponding, which may occur at sites other than those shown in the emergence mapping. The dataset contains the following emergence categories:</p> <ul style="list-style-type: none"> <li>• Less than 0.025m from the surface</li> <li>• Between 0.025m and 0.5m from the surface</li> <li>• Between 0.5m and 5m from the surface</li> <li>• At least 5m from the surface</li> <li>• No risk</li> </ul>	<p><b>Section 4.7</b> Groundwater flooding <b>Appendix E</b> Summary of flood risk</p>
<p><b>Risk of Flooding from Reservoirs</b> Wet Day Dry Day</p>	<p>The EA reservoir flood extents show the predicted flooding which would occur if a dam or reservoir fails. The EA provide two scenarios:</p> <p><b>Dry Day</b> – the predicted flooding which would occur if the dam or reservoir fails when rivers are at normal levels.</p> <p><b>Wet Day</b> – the predicted worsening of the flooding which would be expected if a river is already experiencing an extreme natural flood.</p> <p>Data available from the <a href="#">DEFRA Data Services Platform</a>.</p>	<p><b>Section 4.8</b> Reservoir flooding</p>

<p><b>Defences</b> Natural High Ground</p>	<p>The EA Asset Information Management System (AIMS) spatial Flood Defence dataset, shows flood defences currently owned, managed, or inspected by the EA. A defence is any asset that provides flood defence or coastal protection functions.</p> <p>The primary defence type across the study area is 'Natural High Ground', located along both banks of main watercourses such as the River Wensum and River Yare, River Tiffey, River Tas, Frenze Beck, and Dickleburgh Stream. Additional engineered defences including a wall, embankments, and demountable defences also line parts of the River Yare, River Waveney, and Broome Beck. The AIMS dataset is available from the <a href="#">DEFRA Data Services Platform</a>.</p>	<p><b>Table 6-2</b> Locations shown in the 'EA AIMS' data set.</p> <p><b>Section 6.5</b> Existing and future flood alleviation schemes</p>
<p><b>Flood Mitigation</b> Flood Alert Areas Flood Warning Areas</p>	<p>The EA issue flood warnings to designated Flood Warning Areas when a river level hits a certain threshold, heavy rainfall or high tides and strong winds are forecast. "Flooding is expected, immediate action is required".</p> <p>Flood Alerts are issued when there is water out of bank for the first time anywhere in the catchment and when forecasts indicate flooding may be possible. "Flooding is possible, be prepared".</p> <p>Both datasets are a polygon GIS shapefile where the above are issued; they are not flood extents. Data available from the <a href="#">DEFRA Data Services Platform</a></p>	<p><b>Section 4.9</b> Flood alerts and flood warnings</p> <p><b>Appendix D</b> Flood Alert and Flood Warnings</p>
<p><b>Flood History</b> EA Historic Flood map Recorded Flood Outlines</p>	<p>The EA Historic Flood Map shows areas of land that have been previously subject to fluvial flooding in the area. This includes flooding from rivers, the sea and groundwater springs but excludes surface water. Data available from the <a href="#">DEFRA Data Services Platform</a>.</p> <p>The EA Recorded Flood Outlines shows all the EA records of historic flooding from rivers, the sea, groundwater, and surface water. Data available from the <a href="#">DEFRA Data Services Platform</a>.</p> <p>If an area is not covered by the Historic Flood Map and Recorded Flood Outlines, it does not mean that it has never flooded, only that currently there are no records of flooding in this area from the EA records. Other historic information is supplemented in the Level 1 report (Section 4.1).</p>	<p><b>Section 4.1</b> Historical Flooding</p> <p><b>Appendix E</b> Summary of flood risk</p>