



Appendix A: GeoPDF User Guide

Please tick the boxes next to the dataset titles in the map legend to display data. If data does not display, it means it is not present in that particular area.

Legend	Description	Reference
<u>Authority Information</u> <ul style="list-style-type: none"> District Boundaries Watercourses 	<ul style="list-style-type: none"> District Boundaries are the legal border lines that separate the study districts from other districts. Watercourses include freshwater rivers, tidal estuaries and canals, from the Ordnance Survey (OS) Open Rivers open-source mapping dataset. 	<p>Section 1.5 SFRA study area Figure 1-1 Figure 1-3</p>
<u>Historic</u> <ul style="list-style-type: none"> Historic Flood Map (EA) Recorded Flood Outlines (EA) Cayton Flood Extent 	<ul style="list-style-type: none"> The Environment Agency (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. EA Recorded Flood Outlines show all records of historic flooding from rivers, the sea, groundwater and surface water. This may not include all LA/ LLFA flood incidents or records. The Cayton Flood outline was generated from an existing flood risk in Cayton map (adapted from the Cayton Flood Alleviation Assessment 2004). <p>If an area is not covered by the Historic Flood Map/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 5.1).</p>	<p>Section 5.1 Historical Flooding Figure 5-1 Appendix E</p>
<u>EA FMfP Flood Zones</u> <ul style="list-style-type: none"> EA FZ3 EA FZ2 	<p>The EA's Flood Map for Planning (FMfP) is an online mapping portal which shows the Flood Zones in England. They are formed from older national 2D generalised (broad-scale) modelling and updated periodically every year with detailed modelling outputs. In most places they should therefore reflect latest modelling where available, but not always, for example in this case, the River Esk which was completed only this year. The Flood Zones are for use in development planning and flood risk assessments.</p> <ul style="list-style-type: none"> Flood Zone 3a – High probability: greater or equal to a 1% chance of river flooding in any given year or greater than a 0.5% chance of sea flooding in any given year. (Excludes Flood Zone 3b, which is derived as part of the SFRA). Flood Zone 2 – Medium probability: between a 1% and 0.1% chance of river flooding in any given year or 0.5% and 0.1% chance of sea flooding in any given year. This also includes the Historic Flood Map. 	<p>Section 3.2.1 The Flood Zones</p>



Legend	Description	Reference
<p><u>Flood Zones (Modelled)</u></p> <ul style="list-style-type: none"> Indicative Flood Zone 3b Flood Zone 3b Flood Zone 3a Flood Zone 2 	<p>These Flood Zones refer to where modelled outputs have been used.</p> <ul style="list-style-type: none"> Flood Zone 3b – Functional Floodplain: This zone comprises land where water has to flow or be stored in times of flood. Flood Zone 3b is identified as land which would flood with an annual probability of 1 in 20 years, where detailed hydraulic modelling exists. Indicative Flood Zone 3b – as above, but where no detailed modelled 20-year flood extent exists, then Flood Zone 3a has been used as a proxy – this is hatched to show the difference. This is conservative and developers would need to refine in a detailed site assessment. Flood Zone 3a – High probability: greater or equal to a 1% chance of river flooding in any given year or greater than a 0.5% chance of sea flooding in any given year. This is likely to be the same as the EA’s FMfP FZ3a, but if there are newer models not yet incorporated into the FMfP, then it will present the undefended 1% AEP event from the latest model. Flood Zone 2 – Medium probability: between a 1% and 0.1% chance of river flooding in any given year or 0.5% and 0.1% chance of sea flooding in any given year. This is likely to be the same as the EA’s FMfP FZ2, but if there are newer models not yet incorporated into the FMfP, then it will present the undefended 0.1% AEP (Annual Exceedance Probability) event from the latest model, combined with the Historic Flood Map. 	<p>Section 3.2.1 The Flood Zones (amber box)</p>
<p><u>Tidal Esk Flood Zones (Modelled)</u></p> <ul style="list-style-type: none"> Tidal Esk Flood Zone 3b Tidal Esk Flood Zone 3a Tidal Esk Flood Zone 2 	<p>These are the latest tidal modelling outputs representing the Flood Zone events from the EA’s ‘River Esk and Tributaries Flood Risk Mapping’ study 2016-2020, which are not yet incorporated into the EA’s Flood Map for Planning.</p>	<p>Section 3.2.1 The Flood Zones (amber box)</p>
<p><u>Climate Change Extent (Modelled)</u></p> <ul style="list-style-type: none"> Climate Change Central Climate Change Higher Central Climate Change Upper End 	<p>These extents are from existing hydraulic models, where the 1% AEP (100-year flow) is upscaled by the EA’s climate change allowances for the 2080s epoch for the relevant river basin.</p> <p>In the absence of modelled climate change outputs, Flood Zone 2 can be used as a proxy, until detailed modelling is undertaken at site-specific FRA stage.</p>	<p>Section 4 Impact of Climate Change</p>



Legend	Description	Reference
<p><u>Coastal (Modelled)</u></p> <ul style="list-style-type: none"> • PD (95%) 0.5% AEP • PD (95%) 0.1% AEP • Coastal Higher Central • Coastal Upper End 	<ul style="list-style-type: none"> • PD (Present Day) • 0.5% - each year the area has a 1 in 200 chance of flooding • 0.1% - each year the area has a 1 in 1000 chance of flooding • There are a range of allowances for sea level rise based on percentiles. A percentile describes the proportion of possible scenarios that fall below an allowance level. <p>The higher central climate change allowance is based on the 70th percentile and upper end climate change allowance is based on the 95th percentile. There is little change between the 70th and 95th percentiles in the mapping, hence only the 95th has been shown for present day.</p>	<p>Section 4.4 Representing climate change in the Level 1 SFRA</p>
<p><u>Risk of Flooding from Rivers and Sea (EA)</u></p> <ul style="list-style-type: none"> • Very low • Low • Medium • High 	<p>The Risk of Flooding from Rivers and Sea maps have been generated from the EA's National Flood Risk Assessment (NaFRA) and National Receptor Dataset (NRD).</p> <ul style="list-style-type: none"> • Very low risk: each year there is a chance of flooding of less than 1 in 1000 (0.1%) • Low risk: each year there is a chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%). • Medium risk: each year there is a chance of flooding of between 1 in 100 (1%) and 1 in 30 (3.3%). • High risk: each year there is a chance of flooding of greater than 1 in 30 (3.3%). 	<p>Section 5.4 Fluvial flood risk Appendix E</p>
<p><u>Risk of Flooding from Surface Water (EA)</u></p> <ul style="list-style-type: none"> • RoFSW 3.3% AEP • RoFSW 1% AEP • RoFSW 0.1% AEP 	<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.</p> <ul style="list-style-type: none"> • 3.3% - each year the area has a 1 in 30 chance of flooding • 1% - each year the area has a 1 in 100 chance of flooding • 0.1% - each year the area has a 1 in 1000 chance of flooding 	<p>Section 5.6 Surface water flooding Appendix E</p>
<p><u>EA Flood Alert and Warning Areas</u></p> <ul style="list-style-type: none"> • Flood Warning • Flood Alert 	<ul style="list-style-type: none"> • Flood Warnings are issued 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". • Flood Alerts are issued when there is water out of bank for the first time <i>anywhere in the catchment</i> and when forecasts indicate flooding may be possible. "Flooding is possible, be prepared". • Both of these datasets are a polygon GIS shapefile where the above are issued; they are not flood extents. 	<p>Section 5.10 Flood Alert and Flood Warnings Appendix D Flood Alert and Flood Warnings</p>



Legend	Description	Reference
<p><u>Defences</u></p> <ul style="list-style-type: none"> • Embankment • Wall • Foss FSA • Filey FAS 	<p>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. This layer has been categorised to show only formal embankments and walls where defences are known to be present.</p> <p>The outline of the following two Flood Alleviation Schemes has been digitised from data provided by the Councils for inclusion in the mapping:</p> <ul style="list-style-type: none"> - Foss FSA (Flood Storage Area) aims to reduce peak flows in the river and reduce risk of flooding downstream. - Filey FAS (Flood Alleviation Scheme) involves construction of flood defences, flood water storage areas and drainage channels and culverts to redirect floodwater flows around various sites in Filey. 	<p>Table 6-2 Locations shown in the 'EA AIMS' dataset</p> <p>Section 6.5 Existing and future flood alleviation schemes</p>
<p><u>Groundwater Levels Risk Mapping (JBA)</u></p> <ul style="list-style-type: none"> • Less than 0.025m below surface • Between 0.025-0.5m below surface • Between 0.5-5m below surface • At least 5m below surface • No risk 	<p>JBA's Groundwater Flood Risk 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.</p>	<p>Section 5.8 Groundwater flooding</p> <p>Appendix E</p>
<p><u>Susceptibility to Groundwater Flooding (EA)</u></p> <ul style="list-style-type: none"> • <25% • >=25%<50% • >=50%<75% • >=75% 	<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.</p>	<p>Section 5.8 Groundwater flooding</p> <p>Appendix E</p>