



Table 2-2 lists the settlements considered within the Local Plan: Preferred Development Strategy Consultation Paper (May 2013).

Table 2-2: Settlements proposed within the Local Plan

|   |                    |
|---|--------------------|
| Andoversford  | Moreton-in-Marsh   |
| Blockley  | Naunton ***        |
| Bourton-on-the-Water  | Northleach         |
| Chipping Campden  | Siddington*        |
| Cirencester *   | South Cerney       |
| Down Ampney**   | Stow-on-the-Wold   |
| Fairford  | Tetbury            |
| Kemble  | Upper Rissington   |
| Lechlade  | Weston Subedge** * |
| Mickleton   | Willesey           |
| * Cirencester and Siddington have been grouped together in the SFRA due to their proximity.   |                    |
| **Down Ampney - Included in the SFRA but not the Preferred Development Strategy (May 2013). Substantial development opportunities have since been put forward for review in the draft SHLAA; and combined with Down Ampney's potential as a sustainable location, as noted in the 2nd Issues and Options Paper (2010) and Evidence Paper it was considered pragmatic and appropriate to include this settlement in the SFRA |                    |
| ** *Weston Subedge and Naunton - Locations requested for inclusion in the SFRA by the Principal Engineer for West Oxfordshire and Cotswold District Councils.   |                    |

A review of the draft SHLAA/SELAA, incorporating a 'call for sites,' in the summer 2013, provided the initial 'draft' of potential sites for development, in line with identified settlements. These sites were further assessed through the SHLAA / SELAA process and community engagement in 2014, and are contained within this SFRA.

## 2.4 Local level

### 2.4.1 Localism Act <sup>11</sup>

The Localism Act gives communities new powers to plan the future of their areas through neighbourhood planning. A neighbourhood plan can establish general planning policies for the development and use of land in a neighbourhood. Once completed, a neighbourhood plan will become part of the development plan, which the council uses to decide planning applications in the local area.

#### Neighbourhood Plans<sup>12</sup>

Neighbourhood plans and development orders must meet certain important legal and policy requirements before they can come into force. For example, they must be in general conformity with the strategic policies of the local plan, have regard to national policy and be compatible with EU law and other legislative requirements. Neighbourhood plans and orders should not promote less development than set out in the local plan or undermine its strategic policies.

The following list describes the neighbourhood plans for the Cotswold and their status at the time of producing the SFRA:

- Stow-on-the-Wold - In July 2012, Stow-on-the-Wold Town Council approached CDC to have their Parish designated as a 'Neighbourhood Area'. Following the statutory consultation period, CDC designated this area on 6th September.
- Tetbury Town Council, with the support of Tetbury Upton Parish Council, has submitted proposals to designate a Neighbourhood Area. The consultation period has now closed.
- Lechlade on Thames - In August 2013, Lechlade-on-Thames Town Council approached CDC to have their parish areas designated as a Neighbourhood Area, the first formal step in developing a Neighbourhood plan. Following the statutory consultation period, CDC designated this area on 7th October 2013.
- Fairford - Fairford Town Council has submitted proposals to designate a Neighbourhood Area. The proposed area includes all of Fairford and two parcels of land currently in

<sup>11</sup>[http://www.local.gov.uk/web/guest/local-flood-risk-management/-/journal\\_content/56/10180/3572110/ARTICLE#flood management](http://www.local.gov.uk/web/guest/local-flood-risk-management/-/journal_content/56/10180/3572110/ARTICLE#flood+management)

<sup>12</sup> Cotswold District Council Neighbourhood plans



# COTSWOLD DISTRICT COUNCIL



Kempsford, but due to transfer to Fairford in 2015, following the Community Governance Review.

Up-to-date information on Neighbourhood Plans in the district can be found at <http://www.cotswold.gov.uk/residents/communities/neighbourhood-planning/neighbourhood-plans-in-force-or-development/>.

## 3 Mapping and the risk based approach

### 3.1 How flood risk is assessed

#### 3.1.1 Definitions

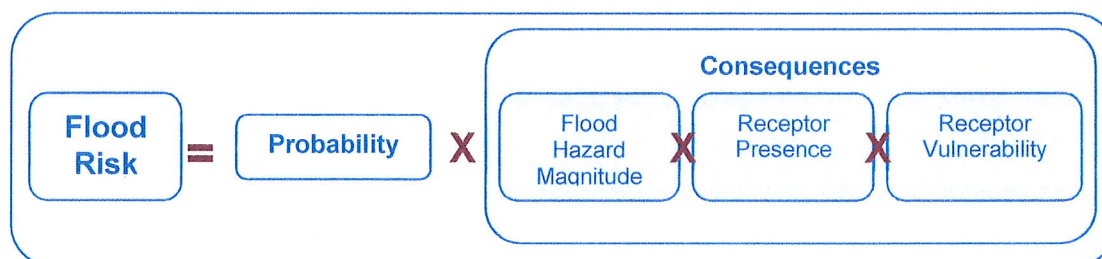
A flood is formally defined in the Flood and Water Management Act<sup>13</sup> as

*"including cases where land not normally covered by water becomes covered by water and can be the result of water emanating from a number of sources".*

Flood risk can be described as the combination of the statistical probability of a flood occurring and the scale of its potential consequences, whether inland or on the coast, and includes consideration of development located outside of the river and tidal flood risk areas. Thus it is possible to define flood risk as:

**Flood risk = (probability of a flood) x (scale of the consequences)**

On that basis it is useful to express the definition as follows:



The **probability** of flooding can be expressed as a return period in years (the average time between years with at least one larger flood), or as an annual exceedance probability (%) (the probability that a certain magnitude of flood will be exceeded in any one year).

**Increasing the probability or chance of a flood being experienced increases the flood risk.** In situations where the probability of a flood being experienced increases gradually over time, for example due to the effects of climate change, then the magnitude of the flood risk will increase.

**The severity of the consequences can increase the flood risk:**

- **Flood hazard magnitude:** If the direct hazard posed by the depth of flooding, velocity of flow, the speed of onset, rate of rise in flood water or duration of inundation is increased (for example due to the effects of climate change), then the consequences of flooding, and therefore risk, is increased. New development can potentially increase the hazard if it causes an increase in surface runoff flows.
- **Receptor presence:** The consequences of a flood will be increased if there are more receptors affected. Additionally, if there is new development that increases the probability of flooding or increased density of infrastructure then consequences will also be increased.
- **Receptor vulnerability:** If the vulnerability of the people, property or infrastructure is increased then the consequences are increased. For example, old people or children are more vulnerable if they are caught up in a flood event.

#### 3.1.2 Using SFRA risk information

The SFRA contains information that should be used for planning in advance of flooding. It also provides information on the effects of flood events (due to failure or overtopping of defences). The SFRA flood risk data should be updated following flood events.

The NPPF sets out a sequential approach to steer new development to areas with the lowest probability of flooding. This is initially based on the Flood Map for Planning (Rivers and Sea)

<sup>13</sup> Flood and Water Management Act (2010) <http://www.legislation.gov.uk/ukpga/2010/29/contents>  
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(see Section 3.2) but should be refined by the SFRA to take into account the probability of flooding, other sources of flooding and the impact of climate change.

A number of national mapping products were provided by the Environment Agency through their DataShare website, including:

- Flood Map for Planning (Rivers and Sea)
- Flood Map for Surface Water (1 in 30 year, 1 in 200 year)
- Updated Flood Map for Surface Water (1 in 30 year, 1 in 100 year, 1 in 1000 year)
- Areas Susceptible to Surface Water Flooding
- Areas Susceptible to Ground Water Flooding
- Historic Flood Map
- Detailed River Network v3
- Defences
- Areas Benefiting from Defences
- Flood Storage Areas

The data was downloaded in February and March 2013.

This national data is supplemented by various sources of more detailed local data, as described through the following sections.

The following sections describe the evidence base provided by available national flood risk mapping and other locally available flood risk information, to support the application of the Sequential approach using the SFRA.

## **3.2 NPPF Fluvial Flood Zones**

### **3.2.1 Flood Map for Planning (Rivers and Sea) (Flood Zone 2 and 3a)**

The Flood Map for Planning (Rivers and Sea), as provided by the Environment Agency, is made up of a suite of GIS layers, including Flood Zone 2 and 3a, Defences, Areas Benefiting from Defences and Flood Storage Areas.

The Environment Agency Flood Zones describe the land that would flood from rivers if there were no defences present. They are based on broad scale modelling that has been refined with detailed hydraulic models in areas of higher risk. Areas Benefiting from Defences can be identified using the accompanying layers.

For planning purposes under the NPPF, a more detailed breakdown of risk within the Flood Zones is required, and the SFRA is required to define Flood Zone 3b (also known as Functional Floodplain) and Flood Zone 3a with climate change, as described in the following sections.

### **3.2.2 Functional floodplain (Flood Zone 3b)**

The 'functional floodplain' is defined as an area of land where water has to flow or be stored in times of flood. This forms Flood Zone 3b in terms of the NPPF. Following discussion between CDC and Environment Agency, the following definition of the functional floodplain was agreed:

- Use the 1 in 20 year modelled flood extent wherever suitable hydraulic models are available.
- Elsewhere, take a precautionary approach and assume that Flood Zone 3a (1 in 100 year flood extent) represents the functional floodplain

The extent is shown in the Map 1.

### **3.2.3 Climate change (Flood Zone 3a plus climate change)**

The Flood Map supplied by the Environment Agency does not provide any indication of the impact of climate change on the Flood Zones.

As advised in the NPPF, It was agreed between CDC and Environment Agency that the SFRA should:

- Use the 1 in 100 year plus 20% climate change modelled flood extent wherever suitable hydraulic models are available<sup>14</sup>.
- Elsewhere, take a precautionary approach and assume that the current Flood Zone 2 outline (1 in 1000 year flood extent) represents a future Flood Zone 3a taking into account climate change.

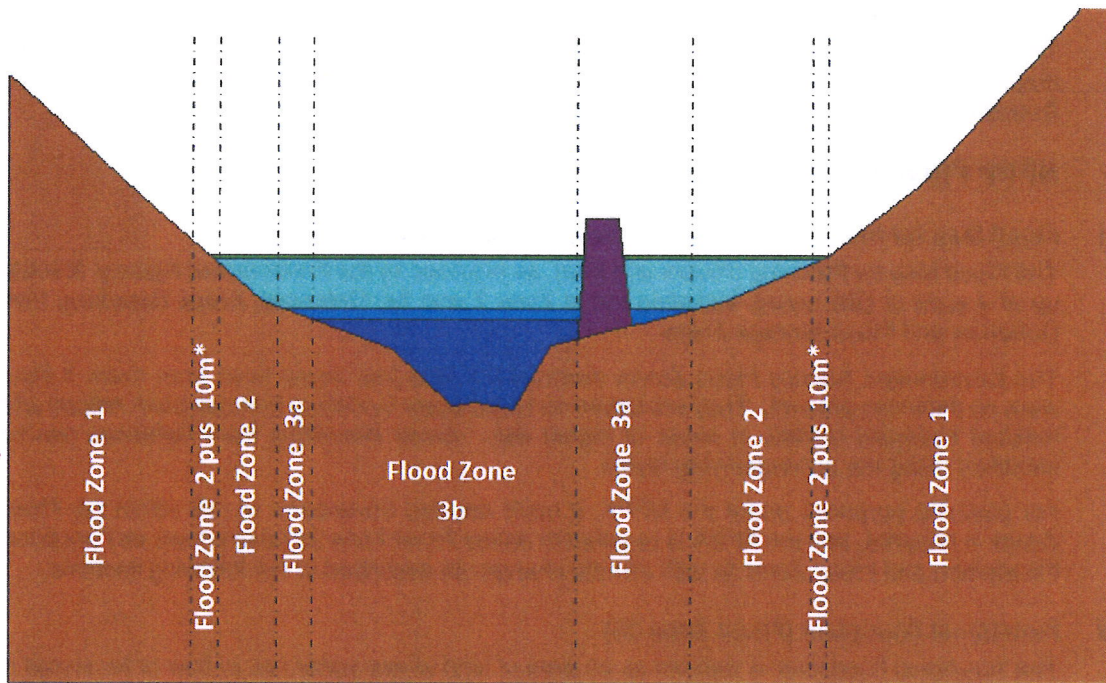
The combined extent, Flood Zone 3a plus climate change, is shown in Map 1. There is no direct guidance for this Zone under the NPPF however it suggests that the impact of climate change must be taken into account when considering location and potential future flood risks to developments and land uses.

There are no available modelled outlines for Flood Zone 2 with climate change and consideration of this is not a requirement of NPPF. However, as a broad-brush indicator of areas that might be at risk, CDC has requested that a 10m buffer be added onto Flood Zone 2.

### 3.2.4 Appropriate development in the Flood Zones

A concept diagram showing the classification of NPPF Flood Zones graphically is included in Figure 3-1 below. Table 3-1 includes a description and discussion of appropriate development. A fuller discussion of Flood Zones and their relation to planning policy can be found in the NPPF and the technical guidance.

Figure 3-1: Definition of Flood Zones



\* Flood Zone 2 plus 10m is shown for information only

<sup>14</sup> Contact with the Environment Agency should be made at the earliest opportunity to ascertain the availability of the most up to date models.





Table 3-1: Flood Zone descriptions

| Probability                 |                     | Description   | Suitable Development under NPPF   |
|-----------------------------|---------------------|---|---|
| Zone 1                      | Low                 | This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).  | All uses of land  |
| Zone 2 plus 10m buffer      |                     | Information only - CDC requested that The previous SFRA recommended that an additional 10m buffer should be placed around Flood Zone 2 to provide an indication of climate change impact.   | Not applicable  |
| Zone 2                      | Medium              | This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (0.1% - 1%) or between 1 in 200 and 1 in 1000 annual probability of sea flooding (0.1% – 0.5%) in any year.   | Water compatible, less vulnerable and more vulnerable uses of land and essential infrastructure are appropriate.<br>The highly vulnerable uses are only appropriate if the Exception Test is passed.  |
| Zone 3a plus climate change |                     | The likely extent of Flood Zone 3a in the future taking into account the effects of climate change.   | Not applicable  |
| Zone 3a                     | High                | This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1.0%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.  | Water compatible and less vulnerable uses of land are appropriate.<br>More vulnerable and essential infrastructure should only be permitted if the Exception test is passed.<br>Highly vulnerable uses should not be permitted.   |
| Zone 3b                     | Function Floodplain | This zone comprises land where water has to flow or be stored in times of flood. SFRA should identify this Flood Zone (land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1%) flood, or at another probability to be agreed between the LPA and the Environment Agency, including water conveyance routes. | Water compatible uses of land are appropriate.<br>Essential infrastructure should only be permitted if the Exception Test is passed. If the Exception Test is passed essential infrastructure should be designed and constructed to meet a number of flood risk related targets.<br>Less vulnerable, more vulnerable and highly vulnerable uses should not be permitted |

New development should, whenever possible, be placed in Flood Zone 1. The Flood Zones are indicative of the potential undefended floodplain. Allocating sites in Flood Zone 1 means that future development is not reliant on fluvial or coastal flood defences. This negates the requirement of committing future generations to costly long term expenditure, which becomes unsustainable in light of the effects of climate change.

However, developers should be aware that the runoff from development on Flood Zone 1 land can potentially cause an increase in the probability of flooding. Information in the SFRA should be used to address this issue.

The most up to date version of the Flood Map for Planning (Rivers and Sea) should always be used, and can be viewed on the Environment Agency's website<sup>15</sup>

If it has not been possible for all future development to be situated in Flood Zone 1, or away from areas at flood risk from other sources, then a more detailed assessment is needed to understand the implications of locating proposed development in Flood Zones 2 or 3. It may be necessary to apply the Exception Test (see Table 3-1), in which case the scope of the SFRA must be expanded to take into account the 'actual' and 'residual' risk considering the presence

<sup>15</sup> Flood Map for Planning (Rivers and Sea) [http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=\\_e&topic=floodmap&utm\\_source=Poster&utm\\_medium=FloodRisk&utm\\_campaign=FloodMonth13](http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=floodmap&utm_source=Poster&utm_medium=FloodRisk&utm_campaign=FloodMonth13).



of flood risk management infrastructure and its effect on the frequency, impact, speed of onset, depth and velocity of flooding.

### 3.2.5 Updating the Flood Zone mapping

Into the future, the Environment Agency's Flood Zone 3a and 2 are updated quarterly with any new detailed hydraulic modelling information, and planners and developers should always refer to the most up to date issue.

The Flood Zone 3b and 3a plus climate change provided by the SFRA will not be automatically updated. However users should be aware that if Flood Zone 3a and 2 have been updated, this is an indication that new detailed information is also available which are could be used to refine Flood Zone 3b and 3a plus climate change.

### 3.3 Surface water mapping

The updated Flood Map for Surface Water (uFMfSW) is a national level broad-scale map indicating areas that are likely to be at risk from surface water flooding. It is not suitable for identifying individual properties at risk. According to the accompanying information, the type of flooding shown by the uFMfSW fits with the definition in the Flood and Water Management Act (2010) and shows:

The flooding that takes place from the 'surface runoff' generated by rainwater (including snow and other precipitation) which:

- (a) is on the surface of the ground (whether or not it is moving), and
- (b) has not yet entered a watercourse, drainage system or public sewer.

The uFMfSW will pick out natural drainage channels, rivers, low areas in floodplains, and flow paths between buildings, but it will only indicate flooding caused by local rainfall. It does not show flooding that occurs from overflowing watercourses, drainage systems or public sewers caused by catchment-wide rainfall events or river flow. It has been subject to a review by LLFAs who were able to incorporate local data and information if available.

The uFMfSW was provided to CDC for use in the SFRA and is publically available on the Environment Agency's website under [Risk of Flooding from Surface Water](#)<sup>16</sup>. Three rainfall events, with return periods of 1 in 30 years, 1 in 100 years and 1 in 1000 are modelled and mapped. All are shown on Map 2.

### 3.4 Groundwater mapping

Areas Susceptible to Groundwater Flooding (AStGWF) is a strategic scale map showing groundwater flooding susceptibility on a 1km square grid. It was developed specifically by the Environment Agency for use by Lead Local Flood Authorities (LLFAs) for use in Preliminary Flood Risk Assessment (PFRA) as required under the Flood Risk Regulations. It is not available publicly.

This data has used the top two susceptibility bands of the British Geological Society (BGS) 1:50,000 Groundwater Flood Susceptibility Map and thus covers consolidated aquifers and superficial deposits. It does not take account of the chance of flooding from groundwater rebound. It shows the proportion of each 1km grid square where geological and hydrogeological conditions show that groundwater might emerge. The susceptible areas are represented by one of four area categories showing the proportion of each 1km square that is susceptible to groundwater emergence. It does not show the likelihood of groundwater flooding occurring.

In common with the majority of datasets showing areas which may experience groundwater emergence, this dataset covers a large area of land, and only isolated locations within the overall susceptible area are actually likely to suffer the consequences of groundwater flooding.

The data should not be interpreted as identifying areas where groundwater is actually likely to flow or pond, thus causing flooding, but may be of use to identifying where, for example, further studies may be useful.

The Areas Susceptible to Groundwater Flooding data for the Districts is shown in Map 2.

<sup>16</sup> Environment Agency, Risk of Flooding from Surface Water map <http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=ufmfsw#x=357683&y=355134&scale=2>  
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