



# **Hampshire Local Flood Risk Management Strategy**

## **Draft for Consultation**

### **September 2012**

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Document Control Information

Document Information	
Document Reference	Draft Hampshire Local Flood Risk Management Strategy for consultation
Document Revision	-
Report Status	DRAFT
Date	September 2012
Author	
Checker	
Approver	
Date of Next Review	

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# 1 Introduction

## 1.1 Why flood risk is important in Hampshire?

- 1.1.1.1 The risk of flooding is an important issue across Hampshire with parts of the coastline low-lying with many towns and villages located near rivers. These areas are vulnerable to flooding both from the sea, and also from rivers following heavy rainfall.
- 1.1.1.2 Due to climate change, the risk of flooding may increase as sea levels rise, winter rainfall increases and intense storms become more frequent. This means more people are likely to be at risk more often. Flooding can never be completely prevented but can be managed by measures to reduce how likely it is to occur and the impact of it occurring.
- 1.1.1.3 The Hampshire Local Flood Risk Management Strategy (LFRMS) is an important new tool to help individuals, communities, businesses and authorities understand and manage flood risk within the county. Its primary focus is on **local flooding** from surface water, groundwater or ordinary water courses such as streams and ditches. Hampshire County Council is now responsible for managing this type of flooding. Local flooding is becoming increasingly common, and is becoming increasingly important, but until recently there has been little understanding of the risks or actions to address the risk. Historically flood risk management has concentrated on high impact and often low frequency river and tidal flooding. In addition, there has been a lot of confusion over who to contact about flooding, particularly surface water flooding.
- 1.1.1.4 Traditional approaches to flood risk management will need to be supplemented by everyone working together and by those at risk taking responsibility to help themselves, alongside the threat from flooding being reduced through robust planning policies, good land management practices, and regular maintenance of water bodies and water management structures. However the risk of flooding cannot be completely eliminated, nor can flood damage be entirely prevented. Where investment is required, it is important that it is spent in the highest risk areas, and that it is spent as effectively as possible. This Strategy has therefore undertaken a **county wide risk assessment** using the most recent and the most detailed data and evidence available on a county wide scale.
- 1.1.1.5 However, for those who suffer flooding, it matters little what type of flooding is causing the problem. Who to contact in an emergency, who to contact when you have experienced flooding, **who is responsible** for managing the risk, and **what you can do to protect yourself** are important questions that need to be answered. Sometimes it is not even

Local flooding is described in more detail in Chapter 2 of this document

The Hampshire County current and future flood risk assessment is presented in Chapter 4 and Annex F

Detailed Information about Flood risk management roles and responsibilities can be found in Chapter 3 and Annex C1

clear what the type of flooding is. Therefore this Strategy aims to provide information about all forms of flooding and the organisations involved in all aspects of flood risk management, from flood protection to dealing with a serious flooding event. However, it will not repeat information that is available elsewhere but will signpost the reader to relevant material.

## 1.2 Why are we doing this now?

1.2.1.1 The Flood and Water Management Act 2010 (FWMA) creates a new role for County Councils and Unitary Authorities as Lead Local Flood Authorities (LLFAs). The Act requires LLFAs to develop, maintain, apply and monitor a Strategy for local flood risk management (a Local Flood Risk Management Strategy – LFRMS) in its area.

Chapter 2 and Annex A2 provides further detail about the legislation and policy that covers local flood risk

1.2.1.2 The requirements of the Act and the duties it hands to LLFAs means that Hampshire County Council, like other Local Authorities across the Country, is now responsible for the management of flood risk related to groundwater, surface water and ordinary watercourse flooding. This Strategy is the means by which the Council will discharge its duty to provide leadership and coordinate local flood risk management.

1.2.1.3 The Environment Agency still retains responsibility for coastal and river flooding - therefore the County Council does not have a direct responsibility to deal with flooding from these sources. However, given the extensive length of coastline in Hampshire the LFRMS does not ignore risk management issues arising from coastal or Main River flooding. Whilst not wishing to operate beyond the County Council's powers there are clear and important links between coastal processes and surface water flooding and the Strategy recognises this.

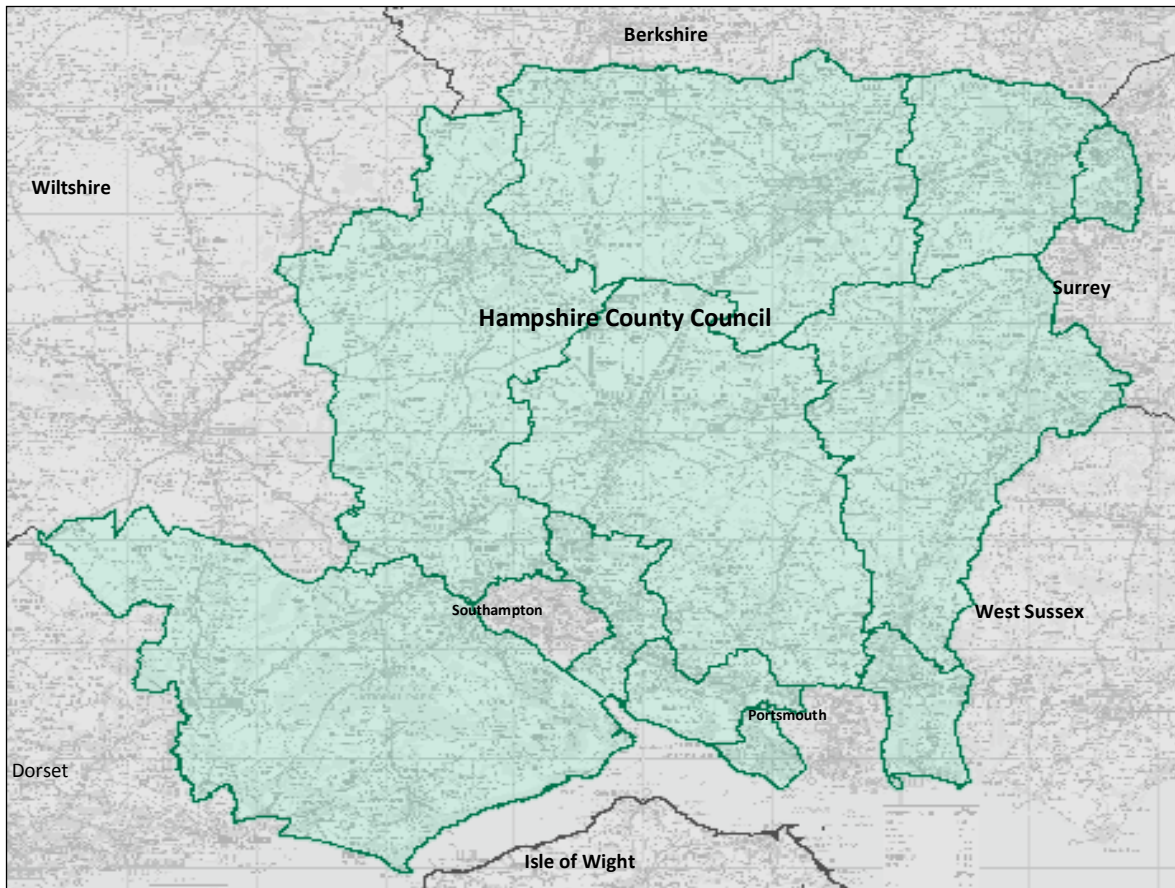
1.2.1.4 Where there is a risk of flooding from combined sources, or where the responsibility for flooding is not clear, Hampshire County Council will take a lead role in determining responsibility and coordinating other bodies.

## 1.3 What area this Strategy covers?

1.3.1.1 Although the geographic county of Hampshire includes the cities of Portsmouth and Southampton, these districts are unitary authorities and LLFAs in their own right, as is the Isle of Wight Council. Therefore this LFRMS does not cover Southampton, Portsmouth or the Isle of Wight. The administrative county of HCC is shown in Figure 1.1 below.

## 1.4 Who this Strategy is relevant to

- 1.4.1.1 The Strategy sets out measures to manage the local flood risk in Hampshire and is relevant to anyone who lives, works, visits or travels in the County. The Risk Management Authorities<sup>1</sup>, the Environment Agency, District Councils and Highways Authorities must act consistently with the Strategy, and Water and Sewerage Providers must have due regard for the Strategy when delivering their services.



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Figure 1-1 Administrative county of Hampshire

<sup>1</sup> Risk Management Authorities are defined in the Flood and Water Management Act as the LLFA, district/borough councils, the Environment Agency, water and sewerage companies, the Highways Authority and Internal Drainage Boards. Their role in LFRM is discussed in Annex C1.

## 1.5 Who has been involved in developing this Strategy?

1.5.1.1 In order to co-ordinate flood risk management activity across Hampshire County Council and other flood risk management authorities, the County Council established a Strategic Flood & Water Management Group comprising representatives from across the county council and a range of other organisations. A LFRMS steering group was established under the governance of the Strategic Group, and that steering group has been responsible for:

The partner and stakeholder engagement process is discussed in Chapter 3 and Annex C2

- developing the aims and objectives of the Strategy ensuring the most relevant and contemporary flood risk data is used
- ensuring consistency with the Environment Agency National Flooding and Coastal Erosion Risk Management Strategy and that it meets the requirements of all Risk Management Authorities in Hampshire
- identifying stakeholders and ensuring the engagement process is inclusive

1.5.1.2 Figure 1.2 shows how the steering group is governed and communicates with other parties.

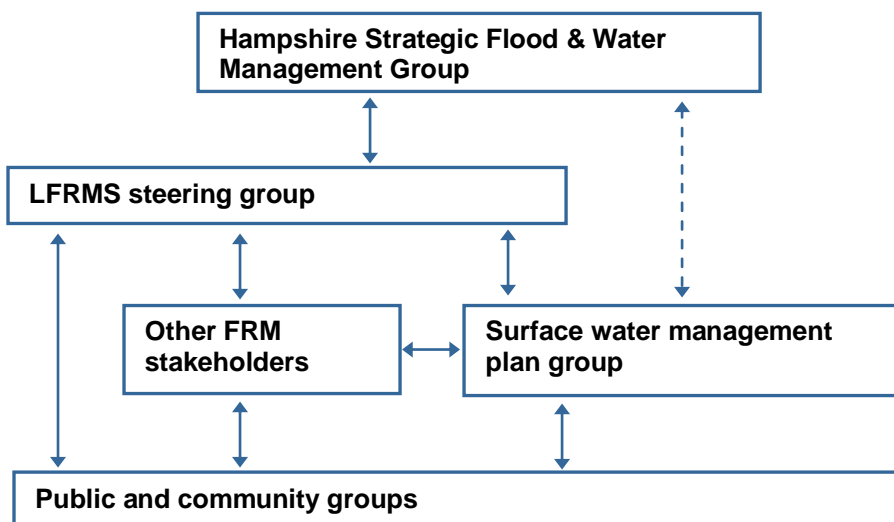


Figure 1-2 LFRMS governance

1.5.1.3 Figure 1.3 details the members of the LFRMS steering group.

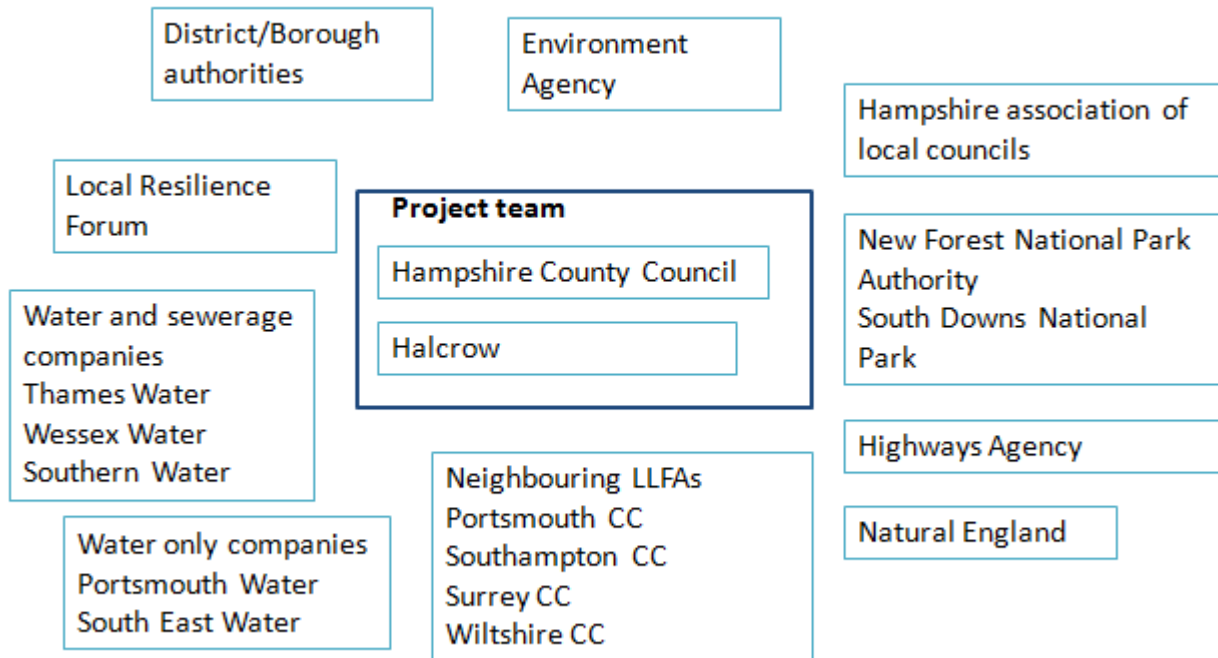


Figure 1-3 LFRMS steering group

## 1.6 Working together to achieve multiple benefits

1.6.1.1 The most cost effective measures to improve local flood risk management will only be determined and delivered through partnership working. By working with our partners and stakeholders, including community groups, Hampshire County Council will identify local flood risk management measures and together determine the most appropriate ways of funding these. Annex F details our funding strategy, and identifies the main funding mechanisms available to us. In order to successfully attract the funding necessary for local flood risk management measures, Hampshire County Council will need to work closely with all parties to ensure that multiple benefits from the measures are derived.

Annex F identifies the main funding mechanisms available for the local flood risk management

## 1.7 What period does this Strategy cover?

1.7.1.1 This Strategy has a 15 year timeframe, covering April 2013 to March 2028. This timeframe has been chosen to ensure sufficient longevity and that it can take a short, medium and long term view of flood risk across the county. It will also ensure that it is valid over a period that matches core strategies and local development plans being developed in accordance with the National Planning Policy Framework. There will be a formal update of the Strategy following the review of the Preliminary Flood Risk Assessment (PFRA) in 2017. A number of triggers have also been

identified that would require the Strategy to be reviewed. This is discussed in Chapter 6. The LFRMS Action Plan will be reviewed on a two yearly cycle.

## **1.8 Assessments of the LFRMS**

- 1.8.1.1 As the LFRMS could have significant effects on the environment, either positive or negative, it will be the subject of a Strategic Environmental Assessment (SEA), which follows the requirements of the SEA Directive (2001/42/EC) and the UK SEA Regulations. The SEA will include consideration of how the LFRMS will meet Water Framework Directive (2000/60/EC) requirements for water quality and hydromorphology. A separate Habitats Regulations Assessment (HRA) screening will also be undertaken, to ensure the LFRMS complies with the Habitats Directive (92/43/EEC) and Birds Directive (79/409/EC) and their transposing UK Habitats Regulations. The SEA and HRA will be developed alongside and influence the LFRMS to ensure it complies with or exceeds the requirements of the legislation listed above.

## **1.9 Next steps**

- 1.9.1.1 This Strategy is based on the latest information and is still being updated in consultation with local communities and those organisations with a responsibility for, or interest in managing local flood risk. The Strategy will be kept up to date to reflect new information on local flood risk management as it becomes available.

## 2 Local Flood Risk Management Strategies

### 2.1 What is a LFRMS and why produce an LFRMS

- 2.1.1.1 Flooding is a natural phenomenon which can bring benefits to the environment such as improving soil fertility, increasing stores of groundwater and maintaining biodiversity in floodplains and along rivers. However where flooding affects people and property it can have devastating effects, threatening health and life, and incurring substantial costs. Hampshire County Council wants to manage flooding in a way that will benefit people, property and the environment.
- 2.1.1.2 Following the flooding in the summer of 2007, which affected much of the UK, the Government commissioned Sir Michael Pitt to carry out a review to examine the event and identify how the risk of flooding could be reduced. This review 'Learning Lessons from the 2007 floods' recognised that there were major limitations in the ways that flooding was managed. It proposed that upper tier authorities should lead local flood risk management and coordinate the different groups involved in this. The Flood and Water Management Act 2010 implements many of Sir Michael Pitt's recommendations and provides an opportunity for better management of flood risk.
- 2.1.1.3 Under the Flood and Water Management Act, Hampshire County Council is now a Lead Local Flood Authority (LLFA) and has new statutory powers and responsibilities for understanding and coordinating local flood risk management, in partnership with other organisations in Hampshire. Local flood risk management includes flooding from surface runoff, ordinary watercourses and groundwater. Key to our new responsibilities is that we must **'develop, maintain, apply and monitor a Strategy for local flood risk management' in Hampshire**. The Local Flood Risk Management Strategy (LFRMS) is the means by which we are doing this. It must be consistent with the National Flood and Coastal Erosion Risk Management Strategy (NFCERMS) published by Defra and the Environment Agency<sup>2</sup> and provides the vision and direction of flood risk management in Hampshire.
- 2.1.1.4 Building on other plans (see Figure 2.1 below, and Annex A1) this LFRMS identifies the extent of local flood risk in Hampshire, establishes priorities for managing local flood risk, and identifies how Hampshire County Council will work together with Risk Management Authorities, other stakeholders, and local communities to manage local flood risk. As part of the LFRMS we have produced an LFRMS Action Plan which outlines measures to achieve the Strategy's objectives, investment needs and planned actions to manage local flood risk in Hampshire. The measures to deliver the Strategy objectives are detailed in Chapter 5. Detailed

Other plans that precede or inform this strategy are available in Annex A1.

<sup>2</sup> <http://www.environment-agency.gov.uk/research/policy/130073.aspx>

actions to deliver the objectives have been developed for areas with the very highest risk, and these ward specific action plans are discussed in Chapter 5.

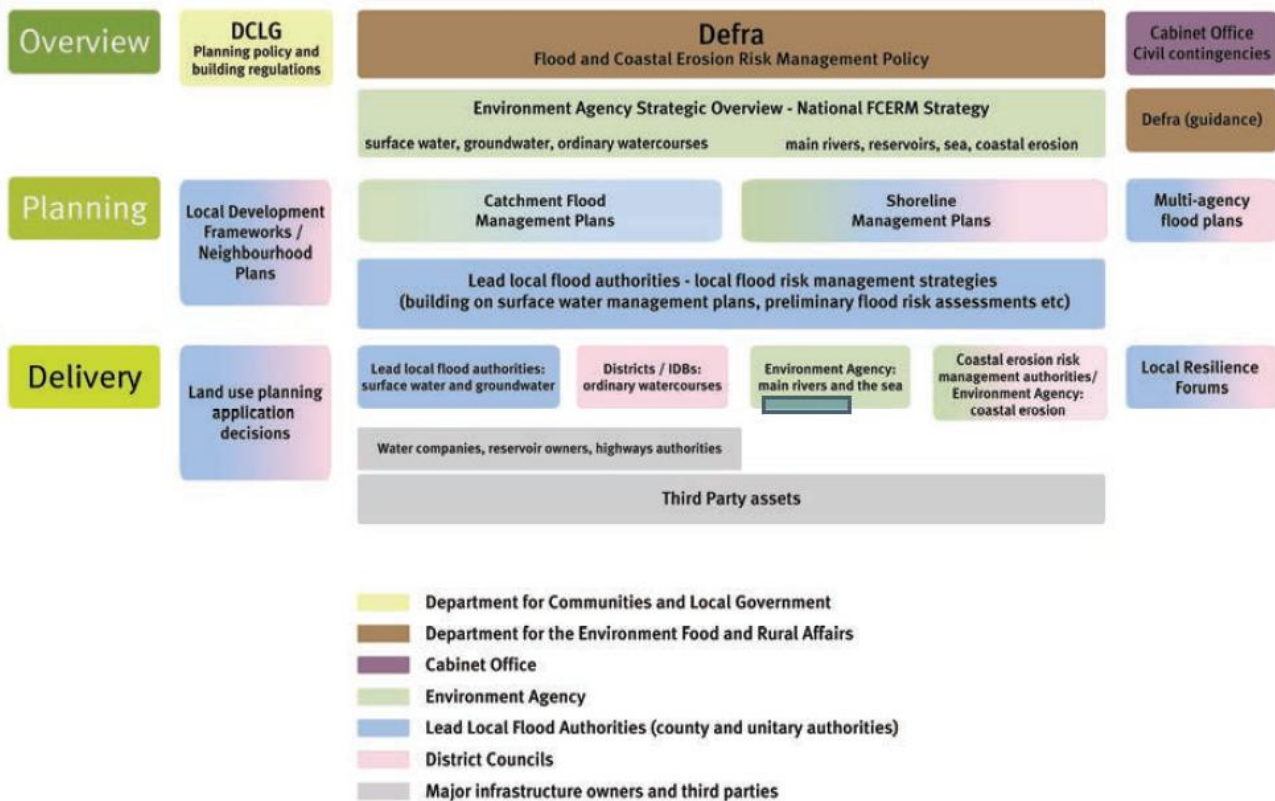


Figure 2-1 – How the LFRMS fits in with other plans and strategies. Source Environment Agency National Flood and Coastal Erosion Risk Management Strategy for England and Wales, 2011.

## 2.2 What is Flooding?

2.2.1.1 Flooding is often defined by where the water comes from. In this section the different sources of flooding are explained.

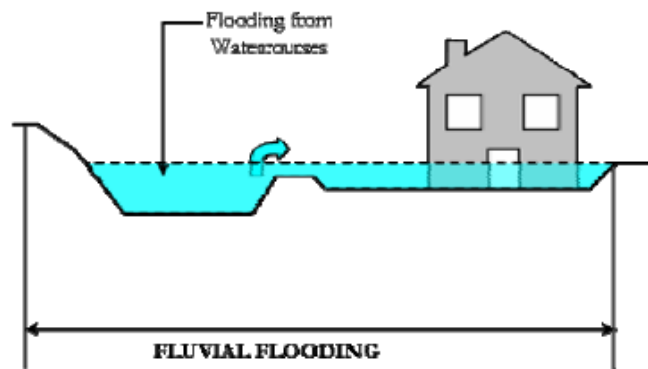
2.2.1.2 Flooding from surface water, groundwater and ordinary water courses is the focus of the Strategy, however we recognise that the most severe flooding is often caused when different sources combine. Whilst developing the Strategy we will therefore be mindful of the impact of river, coastal and sewer flooding and we will work in partnership with the Environment Agency and local water and sewerage companies where there are combined sources of flooding.

### 2.2.2 Fluvial flooding

2.2.2.1 Fluvial flooding is also known as river flooding. It occurs when a river cannot hold the volume of water which drains into it from the surrounding land (known as a catchment). In the context of this Strategy, we refer to fluvial flooding as flooding from Main Rivers.

2.2.2.2 Main Rivers can be thought of as larger streams and rivers, or smaller watercourses with strategic drainage importance. The definition of a Main River is

predominantly related to administrative responsibility; if a watercourse is designated as a Main River then the Environment Agency is responsible for managing flooding from that watercourse.



- 2.2.2.3 Watercourses which are not designated as Main Rivers are known as ordinary watercourses, Hampshire County Council is responsible for managing flooding from ordinary watercourses.

### 2.2.3 Coastal flooding

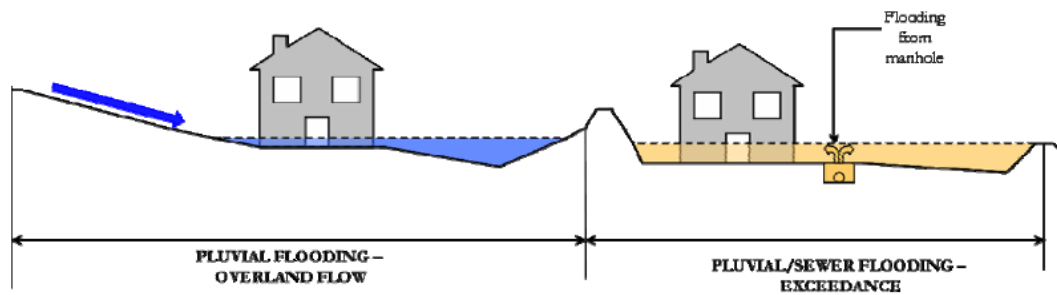
- 2.2.3.1 Flooding from the sea (coastal flooding) tends to occur as a result of high tides, surges in sea water and strong winds which raise the sea level above the ground level of the coast
- 2.2.3.2 Both river and coastal flooding are generally well understood, can be predicted to some extent and flood protection measures are in place at many locations at risk from these types of flooding. The Environment Agency is responsible for managing flooding from rivers and the sea.

### 2.2.4 Sewer flooding

- 2.2.4.1 Foul flooding, or flooding from sewers often occurs at the same time as other types of flooding (particularly surface water flooding) and can be a result of blocked drains or the sewer network not being able to hold all the water flowing into it. This type of flooding is the responsibility of the local sewerage company.

### 2.2.5 Surface Water flooding

- 2.2.5.1 Surface water flooding is also known as Pluvial flooding. This type of flooding occurs when rainfall cannot soak into the ground, overwhelms the local drains and flows across the ground. This type of flooding is often (but not exclusively) associated with high intensity rainfall and occurs very quickly during or after the rainfall event.



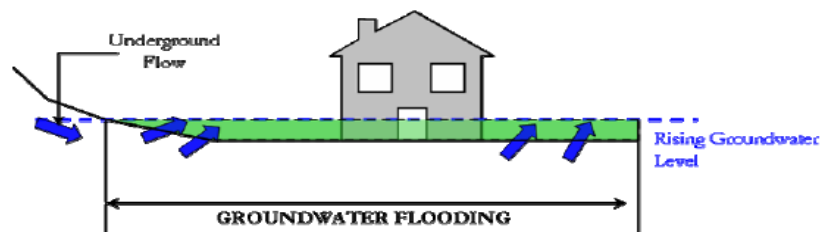
2.2.5.2 Surface water flooding is often quite localised and is much more difficult to predict than river or coastal flooding. This means there is often limited advanced notice of this type of flooding.

## 2.2.6 Groundwater flooding

2.2.6.1 Water held within permeable rocks beneath the surface of the ground is known as groundwater. This can cause flooding when the water level within these rocks rises above the surface. Groundwater flooding is therefore generally a feature of areas which lie above an aquifer.

2.2.6.2 Levels of groundwater tend to respond to rainfall more slowly than water levels in rivers or on the surface. Normally groundwater levels are highest in spring following the winter months when there is generally more rainfall. This slow response to weather patterns means that groundwater flooding can occur a long time after the occurrence of prolonged or heavy rainfall

2.2.6.3 This slow response of groundwater levels also means that when groundwater flooding occurs it tends to last longer than other forms of flooding, often for several weeks or months.



## 2.3 Aims and Objectives of the LFRMS

2.3.1.1 The aim of the Hampshire Local Flood Risk Management Strategy is to produce a plan to reduce and manage flood risk in a way that will benefit people, property and the environment.

2.3.1.2 In consultation with the steering group, and following consultation with stakeholders eight objectives have been developed to support this aim. These are listed and explained below:

- Improve our knowledge and understanding of local flood risk in Hampshire

Annex B provides a detailed breakdown of the objectives, outlining why each is important

- A thorough understanding of the risk from flooding is key to effective management of local flooding. This requires an understanding of where flooding may occur, how often these areas may flood and what the impacts of this flooding could be.
- Develop Strategy, policy and a LFRMS Action Plan to manage these risks, providing balanced social and environmental benefits for the identified investment need
  - The Local Strategy will identify a wide variety of potential measures that will reduce the negative impacts of flooding and where possible deliver additional benefits to wider society and the environment.
- Work in partnership with other flood risk management authorities to deliver the Strategy and LFRMS Action Plan
  - Partnership working and cooperation is vital to ensure that a thorough understanding of local flood risk is established and that the measures selected to manage this risk are realistic, sustainable and effective. Working together in this way will also help the delivery of multiple benefits above and beyond that of flood risk management
- Maintain, and improve where necessary, local flood risk management infrastructure and systems to reduce risk
  - The principle purpose of the Local Strategy is to reduce local flood risk. The Local Strategy will identify and develop a variety of means to do this, including maintenance and improvements to existing local flood risk management infrastructure
- Ensure that local planning authorities take full account of flood risk when allocating land and considering permitting development (by avoiding development in inappropriate locations and minimising flood risk wherever possible)
  - Whilst it is outside the scope of the Strategy to specify where development can occur, it will identify where flood risk may increase due to inappropriate development and help local planning authorities make informed decisions about flood risk when considering development.
- Engage with local communities to increase public awareness and reporting of flooding and promote appropriate individual and community level planning and action
  - Throughout the development of the Strategy the partners will engage with local communities to ensure that their knowledge and view are considered. The measures considered to mitigate flood risk will include awareness raising and knowledge sharing activities.
- Improve and support community level flood response and recovery
  - The actions under the Local Strategy will aim to reduce the likelihood of flooding whilst increasing the ability of individuals and the community to respond to and recover from flooding when it occurs.

- Identify all available national, regional and local funding mechanisms to deliver flood risk management interventions.
  - The Strategy needs to ensure that measures selected to reduce flood risk are economically viable. To achieve this, the Strategy will identify potential funding mechanisms which can help deliver the flood risk management actions identified within the LFRMS Action Plan.

2.3.1.3 Chapter 5 explains what actions are and will be undertaken to meet the objectives. Hampshire County Council will review these objectives according to the Strategy review timetable (see Chapter 6), to assess how we are performing and whether the objectives should be added to or updated. Every measure identified as part of the LFRMS Action Plan has been assessed against these objectives to confirm that the action or measure is appropriate.

## 2.4 Consistency with national objectives

2.4.1.1 The Flood and Water Management Act states that Local Strategies must be consistent with the National Flood and Coastal Erosion Risk Management Strategy (NFCERMS). Principally, this refers to consistency with the overall aims and objectives of the NFCERMS, and with the six “guiding principles”.

2.4.1.2 The aims and objectives of the Hampshire LFRMS, detailed in section 2.3, have been developed based on the objectives of the National Strategy, interpreting them for the specific Hampshire context. They have been developed and agreed at both steering group and stakeholder workshops. The Strategic Environmental Assessment of the LFRMS has been undertaken alongside the development of the Strategy, with the Strategy being adapted to seek environmental opportunities rather than purely to mitigate environmental impacts. Therefore we believe that the objectives we have chosen, which have been used as our guiding principles throughout the risk assessment process, and the development of the LFRMS Action Plan, will ensure that the Strategy will be consistent with the National Strategy.

2.4.1.3 The six guiding principles are outlined below.

- Community focus and partnership working
- A catchment and coastal “cell” based approach
- Sustainability
- Proportionate, risk-based approaches
- Multiple benefits
- Beneficiaries should be allowed and encouraged to invest in local risk management

The guiding principles are explained in Annex B

2.4.1.4 The NFCERMS identifies that careful planning is required to ensure that appropriate, sustainable options are selected and that they are implemented properly. This Local Strategy provides an opportunity to present a clear picture of what will be done to manage risk, and bring together relevant information contained in other plans and strategies such as Catchment Flood Management Plans

(CFMPs), Shoreline Management Plans (SMPs) and River Basin Management Plans (RBMPs) - prepared under the Water Framework Directive. In doing so, Hampshire County Council will help communities understand the risks they face, what they can do to manage them and how risk management authorities are working together to help manage them.

- 2.4.1.5 The Strategy has been developed as a suite of documents and assessments that combine to provide the overall strategic direction of local flood risk management in Hampshire. The LFRMS Action Plan is a separate document to the main Strategy document to enable the Action Plan and the Strategy to be reviewed and revised independently as necessary. The Strategic Environmental Assessment is a statutory document and must therefore be presented as a standalone document. These documents are supported by a non-technical summary and a series of annexes.
- 2.4.1.6 Figure 2.2 below shows how the different documents combine to form the overall Strategy.

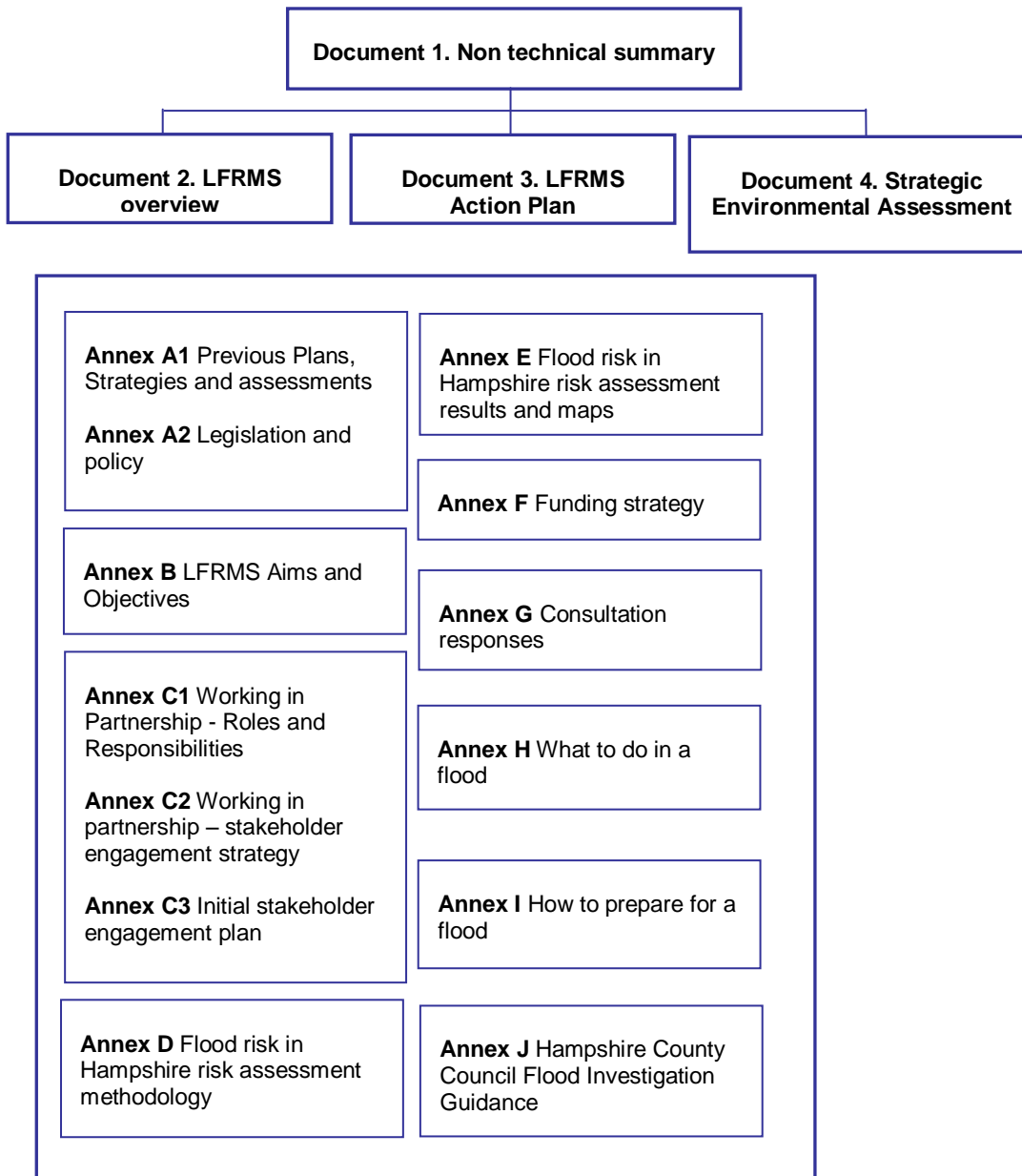


Figure 2-2 - Structure of the Local Flood Risk Management Strategy document

## 3 Working together

### 3.1 Why work in partnership?

- 3.1.1.1 Hampshire County Council is ultimately responsible for delivering the LFRMS. However we cannot deliver the aims and objectives set out in Chapter 2 alone. We need to work together with other organisations.
- 3.1.1.2 Our aim in producing the Local Flood Risk Management Strategy is to produce a plan to reduce and manage flood risk in a way that will benefit people, property and the environment. Working with a wide range of organisations and individuals helps us to consider these beneficiaries as part of the Strategy. By working together we are able to share information, develop realistic plans and achieve a better result than we would if we worked individually.
- 3.1.1.3 As already mentioned, the most cost effective measures to improve local flood risk management will only be determined and delivered through partnership working. Hampshire County Council needs to work closely with our partners and stakeholders, including community groups, to identify local flood risk management measures and together determine the most appropriate ways of funding these. Only by achieving multiple benefits are we likely to be able to attract the necessary investment to reduce local flood risk.

See Chapter 6 for further information on how flood risk management measures can achieve multiple benefits

### 3.2 Who is involved?

- 3.2.1.1 There are three main categories of organisations and individuals who Hampshire County Council will work with to deliver the LFRMS:
- **Risk Management Authorities**, as defined by the Flood and Water Management Act 2010. This includes relevant departments and services within Hampshire County Council and district/borough councils as well as external organisations. See footnote 1 on page 8 for a definition of RMAs.
  - **Other flood risk management stakeholders**, which are defined as organisations who have a responsibility for drainage and flood risk management, or who may be affected by the LFRMS (e.g. Network Rail), and;
  - **Public and local community groups**, which includes flood action groups, parish/town councils, businesses and individuals and households at risk from flooding.

Annex C2 provides further information about our community engagement approach

- 3.2.1.2 There is a range of other relevant organisations that have key roles to play in local flood risk management, have a responsibility for drainage and flood risk management, or may be affected by the LFRMS. Hampshire County Council will engage with these stakeholders to ensure that wider aspects of flood risk management are considered.
- 3.2.1.3 Figure 1.3 outlines the partnership model which we have adopted in the preparation of this Strategy.

### 3.3 Flood risk management roles and responsibilities

3.3.1.1 The Flood and Water Management Act identifies the responsibilities for the organisations which are defined as ‘Risk Management Authorities’ (RMAs). Some of these responsibilities were newly introduced by the Flood and Water Management Act, others are longstanding from previous legislation. All of the Risk Management Authorities share a number of duties and powers:

- Duty to be subject to scrutiny from the LLFA’s democratic processes.
- Duty to co-operate with other RMAs in the exercise of their flood and coastal erosion risk management functions, including sharing flood risk management data.
- Power to take on flood and coastal erosion functions from another risk management authority when agreed by both sides

3.3.1.2 In addition to these shared duties individual RMAs also have specific roles and responsibilities. They are summarised within this section of the Strategy and explained in greater detail in Annex C1.

The roles and responsibilities of the RMAs are detailed in Annex C1

- 3.3.1.3 **Hampshire County Council** is the Lead Local Flood Authority and is responsible for taking the lead in managing flood risk from local sources. This includes surface water, groundwater and ordinary watercourses and also where there is an interaction between these sources and main rivers or the sea. The county council also has other related roles in emergency planning and highway drainage.
- 3.3.1.4 The **Environment Agency** is responsible for managing flood risk from main rivers, large reservoirs and the sea, and also has a strategic overview role over all flood and coastal erosion risk management. It also has a key role in providing flood warnings to the public, supporting emergency responders when flooding occurs, protecting and improving the environment and promoting sustainable development.
- 3.3.1.5 **Southern Water, Thames Water and Wessex Water** are water and sewerage companies responsible for the provision of foul and surface water sewerage across the whole of Hampshire and providing water to the majority of Hampshire. **South East Water and Portsmouth Water** provide water services only.
- 3.3.1.6 The **Highways Agency** and **Hampshire County Council Highways Department** are responsible for managing flood risk on roads and highways within the county.
- 3.3.1.7 Within Hampshire there are **11 District or Borough Councils** who, in addition to their role as Local Planning Authority (LPA) have powers to undertake flood risk management work on ordinary water courses. The District or Borough Councils are

also category 1 responders to emergencies and are responsible for assisting in the preparation of Multi-Agency Flood Plans.

- 3.3.1.8 **Hampshire and the Isle of Wight Resilience Forum (HRF)** is the mechanism by which the emergency responding agencies in Hampshire routinely cooperate with each other as a partnership to discharge their duties under the Civil Contingencies Act 2004. The HRF is not a statutory body nor does it have powers to direct its members; however, it is the agreed forum that co-ordinates multi-agency emergency preparedness, including risk assessment, contingency planning, training and exercises to enhance Hampshire's preparedness for emergencies. The HRF has prepared the Hampshire County Multi-Agency Flood Plan which details roles and responsibilities for preparedness, contingency planning, training and emergency response.
- 3.3.1.9 There are three **Regional Flood and Coastal Committees (RFCC)** that operate within Hampshire. They are the Southern, Thames and Wessex Committees. The RFCC is primarily responsible for ensuring there are coherent plans to identify, communicate and manage the risk from all sources of flooding and all coastal erosion risk. They are established by the Environment Agency under the Flood and Water Management Act 2010, and comprise both independent members and those appointed by the LLFAs. They also act as a link between the Environment Agency, LLFA and other risk management authorities and are responsible for promoting efficient and risk based investment in flood risk management and coastal erosion.
- 3.3.1.10 Flood risk management is not something that can be left solely in the hands of certain organisations and forgotten by everyone else. Even if this Strategy was being devised at a time of substantial public sector budgets, the Risk Management Authorities would still not be able to prevent all floods or solve all concerns. **Households, businesses and landowners** have their part to play too. For example people who own land which adjoins a water course (also known as riparian owners) have a responsibility to make sure that the flow of water is not obstructed (for example, by clearing gullies and vegetation) and maintaining existing flood defences. Everyone has a role in reporting flooding problems and ensuring that they are themselves prepared for flooding. We recognise that individuals will need support and advice to help them engage with flood risk management. Ensuring that we communicate well and share information is therefore vital to the success of the Strategy. The means by which Hampshire County Council have engaged with local communities during the development of the Strategy and the ways in which we will continue to do so are explained in Annex C2.
- 3.3.1.11 **Developers** are responsible for property considering flood risk so that they do not put occupants of new developments at risk, or increase the flood risk elsewhere. Hampshire County Council will work with the Local Planning Authorities to address flood risk and development
- 3.3.1.12 The County Council is fully aware that flooding does not respect administrative boundaries, hence the broad extent of stakeholder engagement undertaken throughout the process of preparing this Strategy. While the LFRMS steering group and stakeholder group include the district councils in Hampshire and adjoining

Annex C2 details how Hampshire County Council have engaged with partners and stakeholders

LLFAs, the County Council recognises the need to engage even further to reflect the river basin catchments which flow through Hampshire.

- 3.3.1.13 The South East Seven (SE7) group of strategic (County and Unitary) authorities has established a flooding sub-group as a means of sharing both best practice and understanding on how they are each responding to the new duties created under the FWMA. In recent times the SE7 has grown beyond its founding seven members and now incorporates both East and West Sussex County Councils along with Surrey, Kent and Hampshire and the Unitary Authorities of Southampton, Portsmouth, Medway, Brighton & Hove and the Isle of Wight. This group has been consulted on the Strategy and kept informed of progress on its preparation. Bournemouth, Dorset and Wiltshire Councils will also be given the opportunity to comment.

## 4 Our Understanding of Flooding in Hampshire

### 4.1 Characteristics of Hampshire

- 4.1.1.1 Hampshire is a predominantly rural county with its population centred around the main urban areas of South Hampshire (Eastleigh, Fareham, Gosport, Havant), Andover, Basingstoke and Winchester in Central Hampshire and Farnborough, Aldershot and Fleet to the north. This study focuses on the area within the administrative boundary of Hampshire County Council, so excludes the unitary authorities of Southampton and Portsmouth.
- 4.1.1.2 Bordered to the south by the Solent, the county is drained by 17 separate river catchments. To the north and east the rivers Kennet, Loddon and Wey Addleston Bourne drain towards the Thames. Much of central Hampshire is dominated by the catchments of the Test and Itchen, both high quality chalk streams, which, along with the Hamble and Meon, drain in a southerly direction to Southampton Water and the Solent. In the west of the county the Avon drains to the west and the Lymington River and Beaulieu River drain the New Forest towards the Solent and Southampton Water. Towards the south and east the River Wallington drains south to Portsmouth Harbour and the Rother flows east to join the Arun. The different characteristics of these rivers and catchments influence the flood risk of the surrounding areas with slow responding groundwater dominated catchments such as the Test and Itchen more prone to groundwater flooding whilst quick responding catchments may be more prone to river or surface water flooding.
- 4.1.1.3 A map of the location of Hampshire's Main Rivers/ordinary watercourses is shown in Figure 4.1.

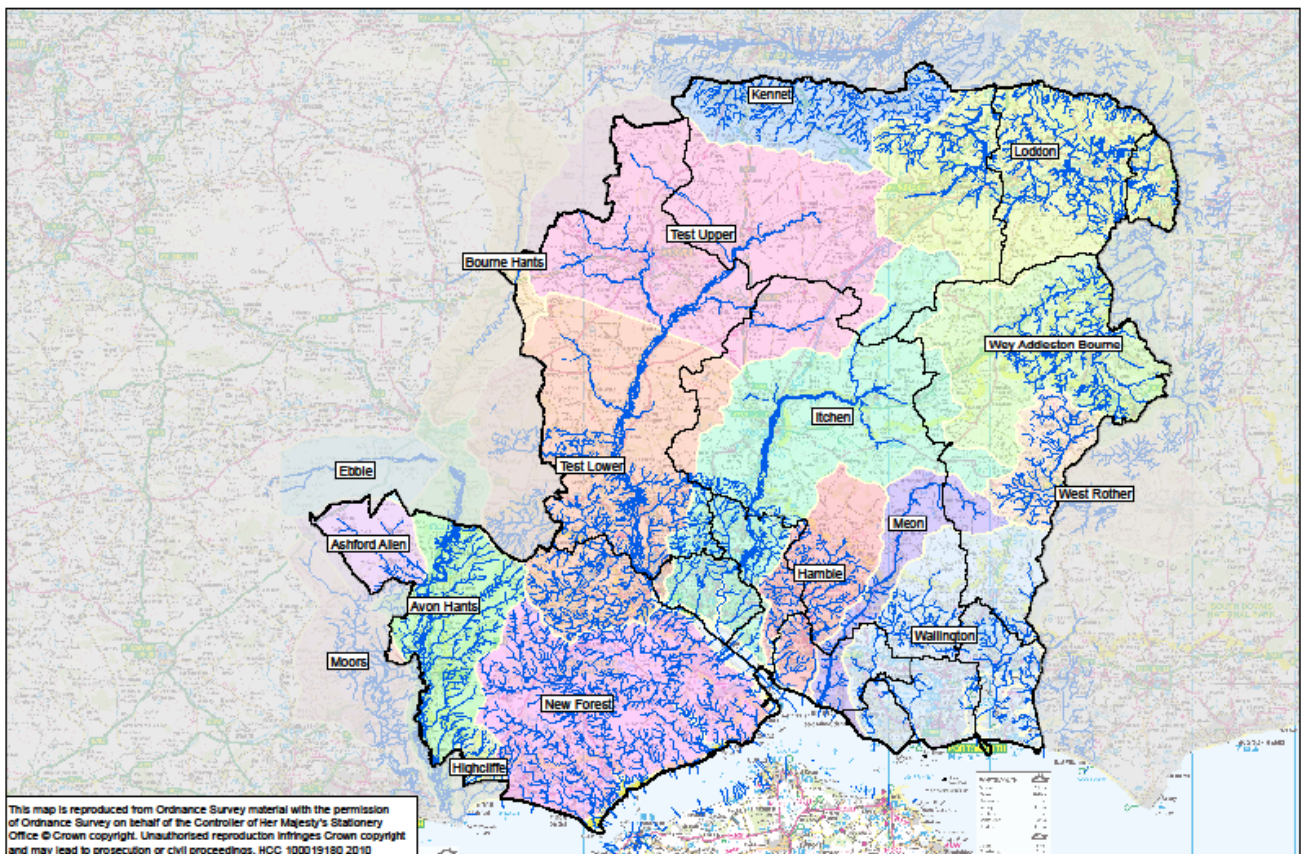


Figure 4-1 Main watercourses in Hampshire

## 4.2 Types of flooding in Hampshire

4.2.1.1 Flooding in Hampshire can occur for a variety of reasons due to the characteristics of the county which include an extensive coastline, large river network and chalk (and other) aquifers. This Strategy focuses on local flooding which is caused by surface water, groundwater and flooding from ordinary water courses. However as the most severe floods are often caused by the interaction of different sources of flooding it is important that we consider other types of flooding and work with those organisations responsible for its management.

## 4.3 Our understanding of historical flooding in Hampshire

4.3.1.1 Our understanding of past flooding in Hampshire is based on information gathered by Hampshire County Council, District and Borough Councils, the Environment Agency and local residents. This information is summarised below, however it is not intended to provide an exhaustive list of all flood events or areas affected by flooding, but rather an indication of the types of flood events which have occurred in the past. You can find further detail in the Hampshire Preliminary Flood Risk Assessment, Strategic Flood Risk Assessments and Catchment Flood Management Plans. Hyperlinks to these plans can be found in Annex A.

#### 4.3.2 Groundwater flooding

- 4.3.2.1 Groundwater is a significant cause of flooding in Hampshire. Past flooding from groundwater has been caused both directly as water levels rise above ground level, or indirectly as high groundwater causes flooding of rivers which are dominated by water from aquifers. This has been the case in a number of areas of Hampshire, such as Basingstoke and Deane where flooding has mainly been due to high groundwater-fed flows on the rivers Test and Loddon which caused overtopping of river banks. In addition within this area there have been reports of localised flooding in the upper parts of the Loddon catchment due to high groundwater levels.
- 4.3.2.2 In Hampshire groundwater flooding can be extensive in the Hampshire chalk groups shown in Figure 4.2.
- 4.3.2.3 By their nature, the impacts from groundwater flooding (in the Chalk) are hard to prevent, so groundwater flood risk management necessarily focuses on development of flood warning systems (including information dissemination) and mitigation is focussed both on increased conveyance and property resilience measures.
- 4.3.2.4 Hampshire County Council is currently preparing a Groundwater Surface Water Management Plan (GWSWMP) which will provide further detail about groundwater flood risk and measures required to reduce the risk.
- 4.3.2.5 There is already a county wide groundwater flood warning system operated by the Environment Agency. The Environment Agency's existing groundwater flood warning system, based on trigger levels identified in selected "sentinel" boreholes, is already fairly well developed, although this is being reviewed by the GWSWMP. The Environment Agency also provides advice on developing properties resilient to groundwater flooding and this will be referred to within the LFRMS Action Plan.

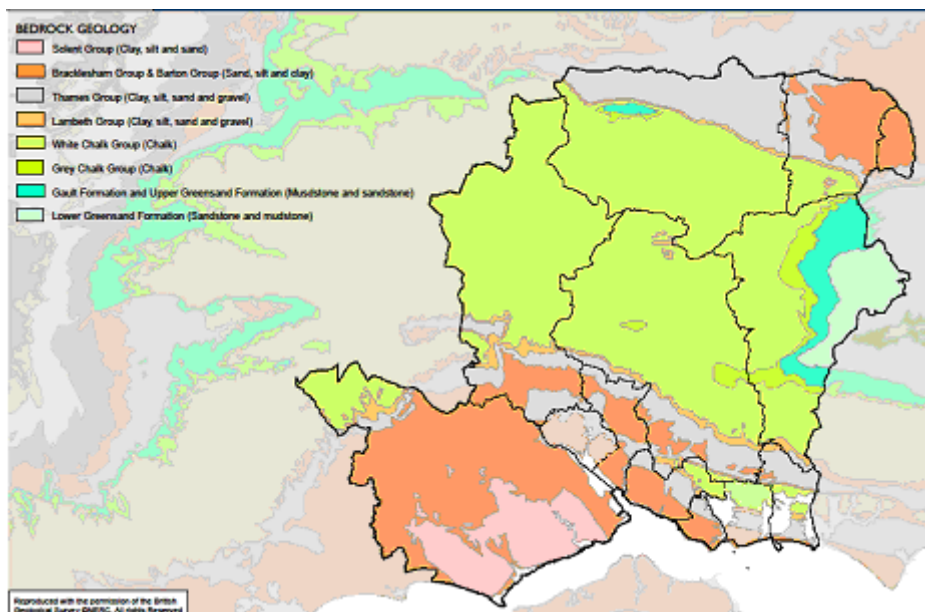


Figure 4-2 - Hampshire underlying geology

- 4.3.2.6 Significant groundwater flooding occurred across Hampshire in 2000/2001, particularly in the areas of the Rivers Test, Itchen, Meon, Wallington and Lavant. More than 700 properties in over 100 settlements throughout the county were affected by groundwater flooding during this period. Parts of the south west of the county, in the New Forest and Hamble catchments also flooded during this period as a result of springflows from local minor aquifers and flow into rivers fed from chalk aquifers underlying Salisbury plain.
- 4.3.3 Fluvial flooding
- 4.3.3.1 Fluvial flooding (from rivers) has occurred throughout the county, including New Forest streams in December 2000 and January 2001, when 10 properties were affected; along the River Test and Loddon (both often with some groundwater influence). The River Blackwater caused severe flooding in 2006/07. Along the coast, high tides have exacerbated river flooding, as rivers are prevented from discharging into the sea. This has occurred in the south west in areas including Milford on Sea, Brockenhurst and Lymington.
- 4.3.4 Surface water flooding
- 4.3.4.1 Surface water flooding has occurred throughout the county and on occasion has combined with foul flooding as the drainage systems are overwhelmed by heavy rainfall. Notable surface water flooding occurred in Portsmouth and Langstone harbours in 2000/01 when 114 properties were flooded. Overwhelmed drainage networks have also caused flooding in other areas including (but not limited to) Lyndhurst, Hamble, Andover and Romsey.
- 4.3.4.2 Hampshire County Council has collated information about flooding gathered by local officers and reported by the public. This along with the locations of the 1997/98, 2000/01 and 2003/04 groundwater flooding is shown in Figure E1 in Annex E. This map shows the location of known incidents, but it is important to remember that it does not show how severe the flooding was.

#### 4.4 Our understanding of current and future flood risk

4.4.1.1 Information about historical flooding in Hampshire gives us some indication of areas which may be at risk of flooding now and in the future. However this evidence will not tell us everywhere that may flood. To understand this potential risk (where risk is the likelihood of flooding occurring multiplied by the consequence of that flooding to people, property and the environment) we use modelled data.

Risk = Frequency of  
flooding x  
Consequence of  
flooding

4.4.1.2 The Environment Agency has modelled and mapped flood risk from Main Rivers (and some ordinary watercourses<sup>3</sup>) for over 10 years. Until recently less attention has been paid to the assessment of flood risk from other sources of flooding (most notably surface runoff, the majority of ordinary watercourses and groundwater) although knowledge is rapidly improving as new studies and assessments are undertaken as explained below.

#### 4.4.2 Surface Water and Ordinary Watercourse Flood Risk

4.4.2.1 Since the large scale flooding in the summer of 2007 much work has been undertaken to better understand flood risk from surface runoff and ordinary watercourses. At the national scale the Environment Agency has produced two national surface water maps:

- Environment Agency 'Areas Susceptible to Surface Water Flooding' national map (AStSWF) – this map, which covers England and Wales, was released in June 2009 to provide a general indication of areas which are more likely to suffer from surface water flooding, and;
- Environment Agency 'Flood Map for Surface Water' national map (FMfSW) – this map, which covers England and Wales, was released in November 2010 and provides a revised approach to mapping surface water flooding including accounting for the presence of drainage systems.

<sup>3</sup> The Environment Agency's Flood Map only consider watercourses where the upstream catchment is >3 km<sup>2</sup>, therefore many ordinary watercourses will not be included

- 4.4.2.2 These maps primarily represent surface runoff, but they can also be used to identify flooding from ordinary watercourses. The Environment Agency's national maps are satisfactory to help identify broad areas of risk across the county. To build on this information Hampshire County Council produced a Preliminary Flood Risk Assessment.
- 4.4.2.3 As part of the PFRA all of the available modelling was analysed by Hampshire County Council, the District Councils, the Environment Agency and water companies to identify which sources of mapping were most representative of known flooding in Hampshire. This is known as the 'locally agreed surface water information'. Within Hampshire we have agreed that the following three datasets are suitable for inclusion in the 'locally agreed surface water information':
- Area susceptible to surface water flooding
  - Flood Map for Surface Water 1:200
  - Localised Flooding Incidents
- 4.4.2.4 The County Council is now in the process of producing more detailed Surface Water Management Plans (SWMP) in the areas identified by the PFRA to be at the highest risk. The aim of the SWMPs is to improve understanding of flood risk and identify specific measures to reduce or mitigate this risk in those areas. These SWMPs have been produced, or are currently being produced in Basingstoke and Deane, Eastleigh and Rushmoor and will be undertaken elsewhere to ensure complete county-wide coverage (by individual district) by 2015.
- 4.4.2.5 This LFRMS is separate and distinct from these SWMPs. However, the LFRMS risk assessment process and the LFRMS are consistent with the draft findings of the SWMPs. The final outputs of the SWMPs will be used in future revisions of the Strategy and LFRMS Action Plan. Chapter 6 provides details of how and when the Strategy and LFRMS Action Plan will be updated.
- 4.4.3 Groundwater flood risk
- 4.4.3.1 Current understanding of groundwater flood risk is very limited due to the complexities of representing the flow and emergence of groundwater. There is no currently available method to predict the future risk of groundwater flooding and existing approaches have tended to focus on the susceptibility of areas to groundwater flooding.
- 4.4.3.2 The Environment Agency has produced a groundwater susceptibility map, known as the Areas Susceptible to Groundwater Flooding map, which identifies vulnerability to groundwater flooding on a 1km square grid. It was developed specifically for LLFAs for use in PFRA's to enable them to obtain a broad understanding of whether an area is vulnerable to groundwater flooding. Each 1km square grid has been classified by the percentage (<25%, >=25%-<50%, >=50%-<75%, >=75%) of that square which is vulnerable to groundwater flooding.
- 4.4.3.3 As part of the discussion about 'locally agreed surface water information' for the PFRA, the suitability of Areas Susceptible to Groundwater Flooding map was reviewed. It was agreed that due to the extreme groundwater flooding that occurred in Hampshire in 2000-2001 that existing records

Figure E2 in Annex E maps the Areas Susceptible to Groundwater flooding.

are likely to be more accurate than the modelled information. This approach was confirmed during the second LFRMS steering group workshop, and the risk assessment uses this data.

- 4.4.3.4 HCC is currently developing a study (known as a Groundwater Surface Water Management Plan - GWSWMP) to assess Groundwater Flood Risk and potential mitigation measures across Hampshire. The outputs from the study will help to inform future investigations required to enhance our understanding of groundwater flood risk. The outputs of the GWSWMP will be used in the annual reviews of the LFRMS Action Plan and the planned reviews of the LFRMS.
- 4.4.4 Coastal and river flood risk
- 4.4.4.1 While this LFRMS is primarily concerned with flooding from ground and surface water (consistent with the County Councils responsibilities under the FWMA), as stated in section 2.2, all sources of flooding are inter-related.
- 4.4.4.2 This is most apparent when flooding and coastal erosion on the coast (reflecting the impacts of climate change on sea level and high tides) can impact on the ability of water, to drain from the land. This is particularly the case when high tides coincide with high river or groundwater levels and heavy rainfall inland.
- 4.4.4.3 The LLFA is not responsible for determining the risk of river flooding, coastal flooding or coastal erosion. Any information on these risks presented in this document and the Risk Assessment in Annex D is just a snapshot, and may be updated at any time by the Environment Agency. Therefore the most appropriate source of information regarding these risks is the Environment Agency's What's in Your Backyard website ([www.environment-agency.gov.uk/wiyby](http://www.environment-agency.gov.uk/wiyby)).
- 4.4.4.4 The ward specific action plans for the high risk wards identify where local flood risk combines with coastal or river flooding, and this information is then used to determine what stakeholders need to be involved in delivering the actions.
- 4.4.4.5 In addition to identifying combined sources of flood risk through this Strategy, the County Council, working with partners, stakeholders and local communities, is working on a number of projects addressing issues arising from coastal flooding. These are projects, and how they are helping coastal communities adapt to climate change risks are described in the measures section of Chapter 5.

## 4.5 Changes to current and future flood risk

4.5.1.1 Flood risk in Hampshire may change for a variety of reasons including climate change, urban developments, 'urban creep'<sup>4</sup> and maintenance regimes or deterioration of assets which perform a flood management function.

### 4.5.2 Climate Change

- 4.5.2.1 There is clear scientific evidence that global climate change is happening now. It cannot be ignored. Over the past century around the UK we have seen sea level rise and more of our winter rain falling in intense wet spells. Seasonal rainfall is highly variable. It seems to have decreased in summer and increased in winter, although winter amounts changed little in the last 50 years. Some of the changes might reflect natural variation; however the broad trends are in line with projections from climate models.
- 4.5.2.2 Greenhouse gas (GHG) levels in the atmosphere are likely to cause higher winter rainfall in future. Past GHG emissions mean some climate change is inevitable in the next 20-30 years. Lower emissions could reduce the amount of climate change further into the future, but changes are still projected at least as far ahead as the 2080s.
- 4.5.2.3 We have enough confidence in large scale climate models to say that we must plan for change. There is more uncertainty at a local scale but model results can still help us plan to adapt. For example we understand rain storms may become more intense, even if we can not be sure about exactly where or when. By the 2080s, the latest UK climate projections (UKCP09)<sup>5</sup> are that there could be around three times as many days in winter with heavy rainfall (defined as more than 25mm in a day). It is plausible that the amount of rain in extreme storms (with a 1 in 5 annual chance or rarer) could increase locally by 40%.
- 4.5.2.4 Climate changes can affect local flood risk in several ways. Impacts will depend on local conditions and vulnerability. The latest UK climate projections provide information about possible changes at a number of scales, including river basin district (RBDs). Hampshire lies predominantly within the South East RBD, with parts also in Thames and South West RBDs. Table 4.1 outlines the projected changes in winter rainfall, sea level rise and peak river flows in Hampshire.

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<sup>4</sup> Urban creep includes extensions to existing properties and the paving over of gardens. As urban creep often falls outside the development control process, its impacts on peak flows and volumes are less likely to be mitigated than development which is subject to planning applications.

<sup>5</sup> <http://ukclimateprojections.defra.gov.uk/>

Table 4.1: UKCP09 Climate projections for 2050s medium emission scenario for the RBDs covering Hampshire

South East RBD	South West RBD	Thames RBD
Winter precipitation increase by around 18% and is very likely to be between 2 and 39%	Winter precipitation increase by around 12% and is very likely to be between 2 and 26%.	Winter precipitation by around 15% and is very likely to be between 2 and 32%
Precipitation on the wettest day in winter increase by around 16% and is very unlikely to be more than 34%	Precipitation on the wettest day in winter increase by around 9% and is very unlikely to be more than 22%	Precipitation on the wettest day in winter increase by around 15% and is very unlikely to be greater than 31%
Relative sea level at Portsmouth is very likely to increase by between 10 and 40 cm above the 1990 level.*	Relative sea level at Bristol is very likely to increase by between 10 and 40 cm above the 1990 level.*	Relative sea level at Sherness is very likely to increase by between 10 and 40cm from the 1990 levels.*
Peak river flows in a typical catchment are likely to increase by between 11 and 24%	Peak river flows in a typical catchment are likely to increase by between 9 and 18%	Peak river flows in a typical catchment are likely to increase by between 8 and 18%

\* Projected sea level rise does not include the extra potential rise as a result of polar ice sheet loss

4.5.2.5 Within Hampshire the UKCP09 projections indicate that winters will become wetter, with central estimates of increase in winter precipitation of about 18%. These wetter winters and more of this rain falling in wet spells may increase river flooding within Hampshire. A typical catchment could experience increased peak river flows of between 8 and 24%.

4.5.2.6 More intense rainfall causes more surface runoff, increasing localised flooding and erosion. In turn, this may increase pressure on drains, sewers and water quality. Storm intensity in summer could increase even in drier summers, so we need to be prepared for these eventualities. The sea level within Hampshire is very likely to increase by between 10 and 40cm above the levels in 1990. This combined with potential rising river levels may also increase local flood risk inland or away from major rivers because of interactions with drains, sewers and smaller watercourses.

#### 4.5.3 Urban development

4.5.3.1 Increased urbanisation and development within urban areas can have an impact on flooding, particularly surface water flooding. Urban creep describes activities such as paving over gardens and building extensions. This sort of development increases the hard surfaces in a town, reducing the opportunity for water to filter into the soil, increasing the volume of water which has to run off into drains and the speed at which it flows so increasing the intensity of the peak flow. The activities which make up urban creep are often outside the development control process so their impacts on flooding are less likely to be controlled than development which is subject to normal planning procedures. This is especially true in the short term as

planning policies governing permitted development look set to be relaxed in the name of economic development.

- 4.5.3.2 There are a number of significant development proposals that will, as they move forward, affect the population numbers, distributions and patterns across the County. The planned housing development, as of the 1<sup>st</sup> April 2011 are summarised in Table 4.2 which provides a picture of where the more significant developments are expected in the county, excluding Southampton and Portsmouth districts. There are other developments, such as the Whitehill Bordon Eco town and Fareham Strategic Development Area which have been finalised since the April 2011 cut off date. Table 4.2 will be updated to April 2012, to include such developments, in the final version of this Strategy.
- 4.5.3.3 Population growth is likely to result in increased demand on existing infrastructure and services, such as sewerage networks and local water supplies. The requirement for additional housing can result in new development that causes land take of greenfield (and brownfield) land, visual intrusion, and increased flood risk (to the new development or the surrounding local area) or development unsympathetic to the surrounding landscape or built heritage. In turn this can increase pressure on biodiversity and ecosystems. However, new development could also bring opportunities – most notably the retro-fitting of SuDS to adjacent existing development.

Table 4.2 Planned housing developments in Hampshire (excluding Portsmouth and Southampton)

District	Population Centre	Area	Estimated number of new residential dwellings
Basingstoke and Deane	Basingstoke	Park Prewett	1330
Basingstoke and Deane	Basingstoke	Popley (Sherborne Road)	950
Basingstoke and Deane	Basingstoke	Popley (Chineham Lane)	751
Basingstoke and Deane	Basingstoke	Chineham	960
Basingstoke and Deane	Basingstoke	Rooksdown Lane	750
Gosport	Gosport	Weevil Lane	698
Gosport	Gosport	Rowner (Renewal Project)	700 units (including retail)
Eastleigh	Southampton	Hedge End	765
Hart	Fleet	Church Crookham	872
Rushmoor	Aldershot	Aldershot urban extension	4500
Test Valley	Andover	Land east of Icknield Way	2500
Test Valley	Andover	Land at Picket Twenty	1200
Test Valley	Romsey	Abbotswood	800
Winchester	Waterlooville	Grainger development site	2114
Winchester	Winchester City North	Andover Road	2000
Winchester	Fareham	Whiteley Farm	1054
Winchester	Fareham	Knowle village	707

- 4.5.3.4 New residential or commercial developments generally increase the hard surfaces and could therefore increase the risk of surface water flooding. However new legislation, including the National Planning Policy Framework requirement for all development to be sustainable, the National SuDS standards and the forthcoming requirement for a drainage strategy for new development to be approved by the SuDS Approving Body (SAB), will help ensure that new developments do not increase the risk of local flooding.
- 4.5.3.5 The County Council has established a SuDS working group which will, in partnership with the other RMAs will be developing procedures and processes for the implementation of the SAB. The group will also provide guidance and design principles for developers that will establish region wide principles and processes to ensure that new development does not increase the risk of local flooding.
- 4.5.3.6 However, there is also a need to ensure that the evidence base used to determine planning decisions is consistent, and appropriate for the local flood risk. Until the LLFA becomes the approval body for SuDS, planning authorities should use the outputs of this Strategy's risk assessment when making planning decisions and if they update their Strategic Flood Risk Assessments. The Lead Local Flood Authority will take responsibility for the system for reporting and recording local flooding incidents. The LLFA will also maintain a list of structures which are likely to have a significant affect on flood risk, this is called the Flood Risk Register and is currently available from [www.hants.gov.uk/flooding/floodriskregister](http://www.hants.gov.uk/flooding/floodriskregister)). Both the Flood Risk Register and records of local flooding incidents will be readily available to all who need to see them.
- 4.5.3.7 The Flood and Water Management Act requires RMAs to co-operate and share information which relates to the management of flood risk. The Act also contains a general requirement to contribute to the achievement of the principles of 'sustainable development.' One of the main means of delivering the Government's policy objectives on sustainable development, as set out in the National Planning Policy Framework, is through the preparation by local planning authorities of local plans.
- 4.5.3.8 As set out in sections 1 and 5 of this Strategy, one of the principles under-pinning the County Council's approach to preparing this Strategy is 'working together to deliver multiple benefits'. There are strong links between many aspects of the LLFA's new duties under the Act and the local planning process. The County Council is keen to ensure that the local planning authorities in Hampshire encapsulate the key principles and messages from this Strategy in the planning process when allocating land for development, making decisions about the detailed design and layout of developments and considering the provision of infrastructure on specific sites. Flood risk management infrastructure, while less glamorous than new schools or community facilities, is just as important to the long-term quality of life of those who will occupy a new development
- 4.5.3.9 Therefore, while local planning authorities will undoubtedly prepare their own Strategic Flood Risk Assessments in support of their own local policy making, the County Council recommends that district and borough councils treat this Strategy as an important 'material consideration' in the planning process. This Strategy

should be referred to in Local Plans and decisions and should help influence the location, design and layout of new developments. The measures identified in the LFRMS Action Plan should be considered when local planning authorities prepare infrastructure assessments and Community Infrastructure Levy (CIL) Charging Documents.

#### 4.5.4 Maintenance and deterioration of assets

- 4.5.4.1 As assets age and deteriorate they will become less capable of performing their original flood risk management function. The impact on flood risk will vary depending on the type of asset. For example drains may silt up, or ditches become blocked by rubbish or extensive plant growth reducing their capacity to carry water and therefore increasing the risk of surface water flooding. Other assets, such as flood walls can weaken over time and become less able to withstand the forces of flood water which they hold back. Routine maintenance, such as clearing drains can mitigate this risk and extend the lifetime of assets. However without this regular maintenance and a programme of replacement and remediation, the deterioration of assets with age would increase flood risk.

## 4.6 Current and future risk assessment methodology

- 4.6.1.1 We have undertaken a risk assessment of flooding in Hampshire to identify the wards which are most vulnerable to local flooding so that we can target investment where it will provide the greatest benefit. To identify the likelihood of flooding we have used:
- Flood Map for Surface Water 1 in 30 and 1 in 200
  - HCC records of localised flooding incidents<sup>6</sup>
  - Records of the 2000-2001 groundwater flooding.
- 4.6.1.2 We have chosen to use the Flood Map for Surface Water in preference to the Areas Susceptible to Flooding map because it uses slightly more sophisticated modelling techniques including assumptions about ground permeability, drainage capacity and flow routing around structures. As part of the PFRA the use of the Flood Map for Surface Water was agreed among stakeholders as being more representative than the Areas Susceptible to Flood Map.
- 4.6.1.3 We have assessed the consequences of this flooding in relation to:
- The residential properties which flood internally

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<sup>6</sup> Where measures have already been applied to reduce any risk within this dataset a view has been taken as to the extent of the residual risk and this has been used in the subsequent assessment

- The non residential properties (such as shops and factories) which flood internally
- The number of critical infrastructure features which flood internally (such as schools, hospitals, electricity sub stations)
- The length of motorway and A-roads which flood

- 4.6.1.4 In order to effectively target flood risk management measures in high risk areas, the spatial resolution of the risk assessment needs to be small enough to effectively identify risk, whilst not being so small to pinpoint and name individual properties at risk. Following consultation with the steering group and stakeholders we have chosen to assess the risk at a ward level. A ward is also a geographical scale that is understood by communities, applicable across the county and at which published data is readily available.
- 4.6.1.5 We are aware that flooding does not respect administrative boundaries such as wards, so when we look at managing this risk or investigating the flood risk in more detail we will examine it more closely and will consider the issue both at a ward and a river catchment scale.
- 4.6.1.6 The method followed seeks to ascribe a monetary value to an incidence of flooding from each data sources (identified in paragraph 4.6.1.1) based on assigning standardised costs to flooded property and roads (as listed in paragraph 4.6.1.3). This enables an objective and comparative assessment of flood risk to be carried out for each source of data. Each data source represents both a different type of flooding and different frequencies of flooding. We have therefore been able to sum the costs of flooding to each ward, from each data source to establish a 'combined' risk. Undertaking fresh modelling has not been possible during the development of this Strategy; instead our approach has sought to make the best use of available data.
- 4.6.1.7 The outcome of this assessment is a series of maps which express the risk of flooding as an annual economic value. The assessment provides a relative comparison of estimated damages only across the whole of Hampshire. It should not be interpreted as expressing the real cost of flooding.
- For a detailed explanation of the risk assessment methodology, refer to Annex D.
- 4.6.1.8 Figures 4.3 – 4.6 below show the outputs of the Hampshire wide risk assessment by ward, for groundwater, surface water flooding, reported flooding incidents and combined risk. Annex E shows these maps in more detail, presented at a district level.
- 4.6.1.9 The method followed provides a comparative assessment of flood risk between wards in terms of annualised economic cost. We have used this information to rank the wards, '1' being the ward with the highest risk of flooding. Table 4.3 lists the wards identified with the highest ranked combined risk of flooding and identified for each individual data source. Fifteen ward specific action plans have been produced, this represents the 5% of wards with the highest ranked risk. They include the 5 wards with the highest 'combined' risk of flooding, 5 wards with the highest groundwater only flood risk, the 3 wards with the highest ranked risk according to

the HCC<sup>7</sup> dataset and the 5 wards with the highest ranked risk calculated from the Environment Agency Flood Map for Surface Water.

Risk rank	Combined risk	Groundwater risk	HCC reported incidents	Environment Agency surface water risk
1	Droxford, Soberton and Hambledon	Droxford, Soberton and Hambledon	Tadley North	St Mary's
2	Fareham East	Fareham East	Eversley	Popley East
3	Penton Bellinger	Upper Meon Valley	Totton East	Eastrop
4	St Mary's	Battins	Abbey	Brookvale and Kings Furlong
5	Popley East	Cheriton and Bishops Sutton	Lymington Town	Hart Plain
6	Upper Meon Valley	Ashurst, Copythorne South and Netley Marsh	Fair Oak and Horton Heath	Penton Bellinger
7	Eastrop	Abbey	Eastleigh North	Highclere and Bourne
8	Ashurst, Copythorne South and Netley Marsh	Clanfield and Finchdean	Fleet Central	Cowplain
9	Highclere and Bourne	Rowlands Castle	Hiltingbury West	Aldershot Park
10	Brookvale and Kings Furlong	Town	Lyndhurst	Waterloo
11	Abbey	Wickham	Leesland	Basing
12	Hart Plain	Penton Bellinger	Ashurst, Copythorne South and Netley Marsh	Fleet Pondtail
13	Basing	Upton Grey and The Candovers	Basing	Fleet West
14	Cowplain	Kings Worthy	St Faith's	Buckskin
15	Clanfield and Finchdean	Broughton and Stockbridge	Bishopstoke East	Cherrywood

<sup>7</sup> The annualised costs of flooding for the ward ranked 3 in the HCC database is £17.5k. The ward with the same annualised impact in terms of modelled EA surface water flooding is ranked 162, and the equivalent ward in terms of groundwater flooding is ranked 18. Therefore because of the smaller relative cost of HCC reported incidents, only three wards were selected for ward specific LFRMS Action Plans.

16	Battins	Colden Common and Twyford	Bondfields	Fleet North
17	Cheriton and Bishops Sutton	Totton East	Penton Bellinger	South Ham
18	Aldershot Park	Bourne Valley	Oakley and North Waltham	St Barnabas
19	Waterloo	The Alresfords	Totton Central	Fernhill NE
20	Buckskin	Itchen Valley	Emsworth	Oakley and North Waltham

Table 4.3: The risk assessment results by ranked ward.

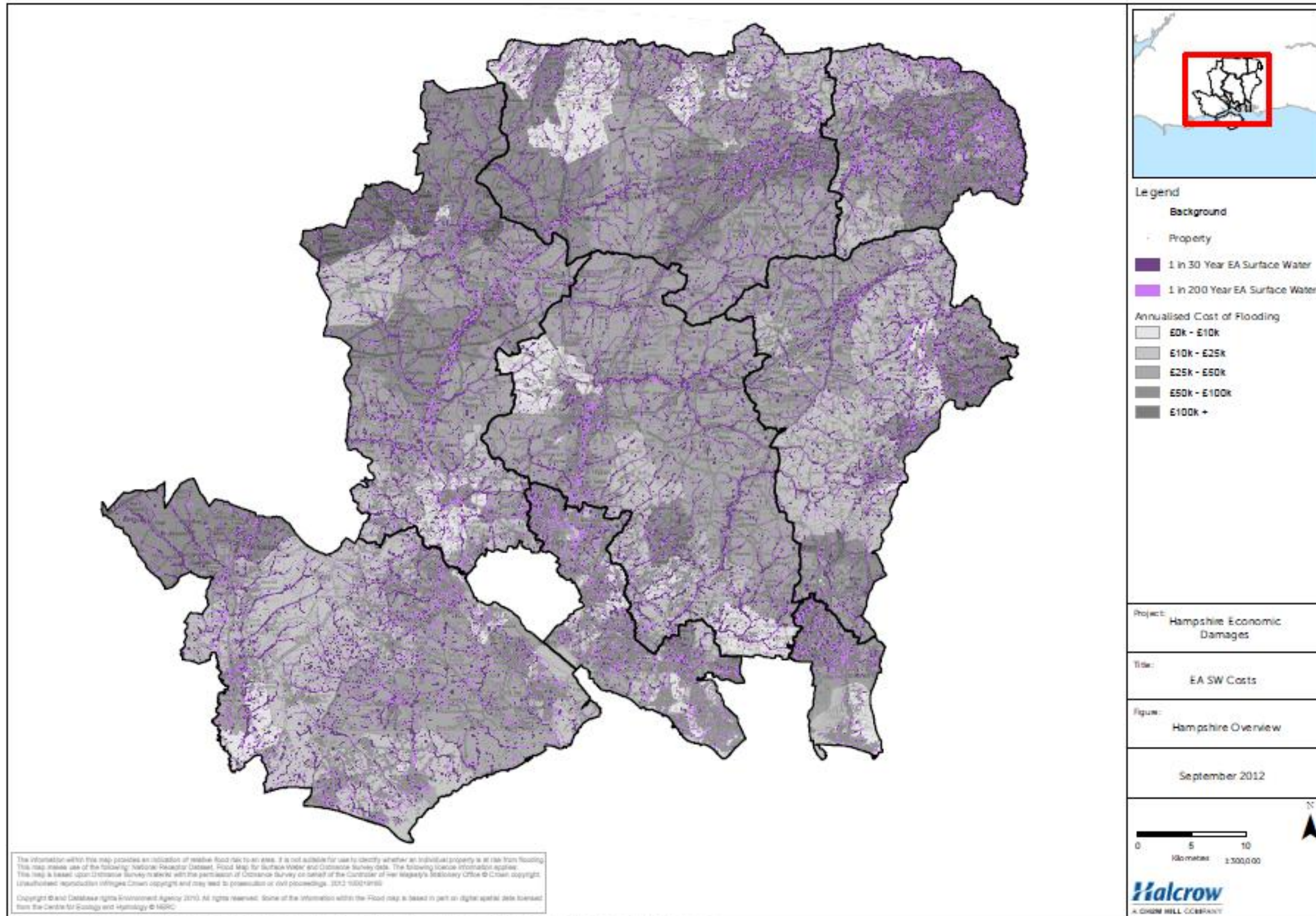


Figure 4.3: Risk of flooding calculated as an economic cost from the Environment Agency Flood Map for Surface Water

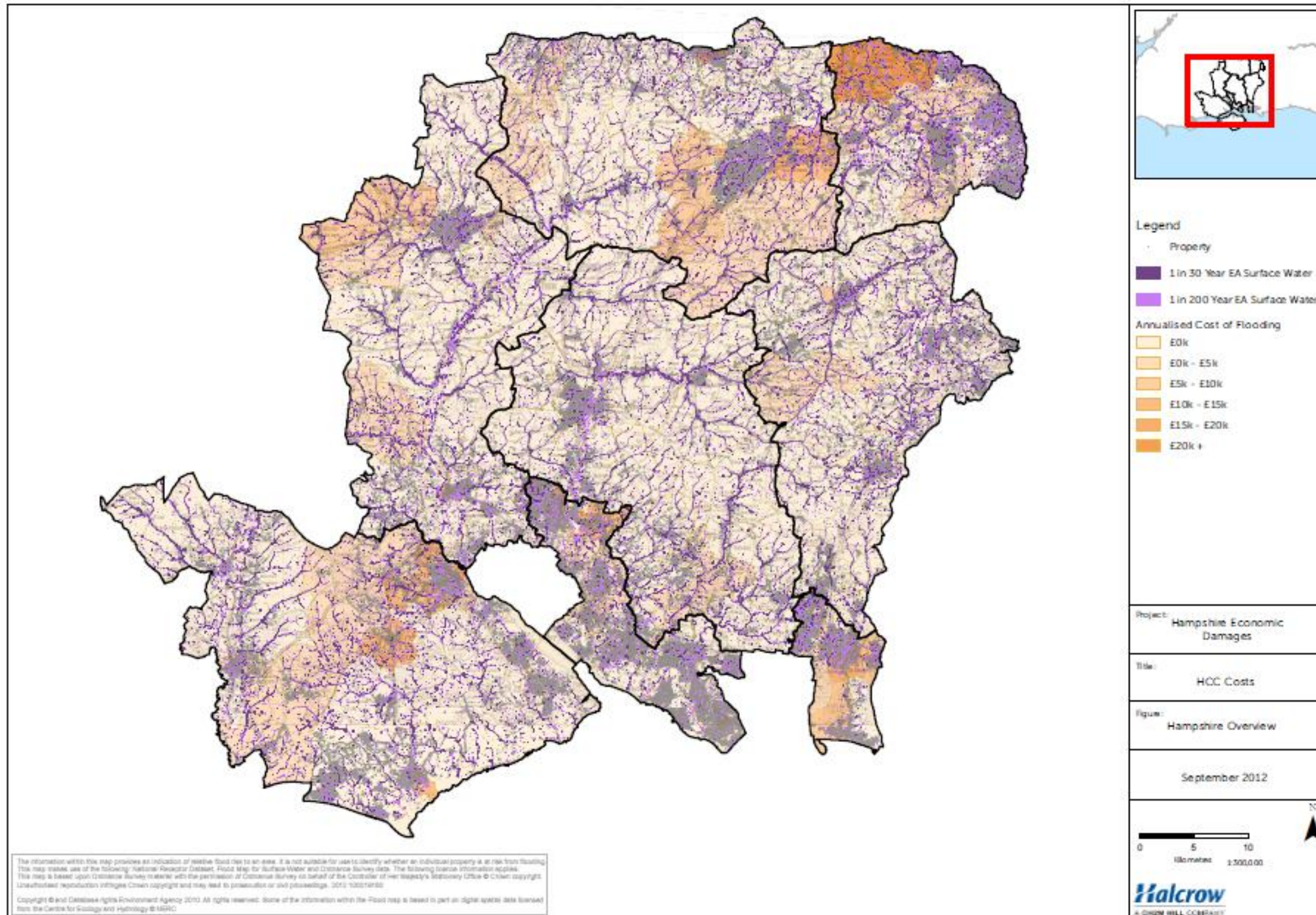


Figure 4.4: Risk of flooding calculated as an economic cost from Hampshire County Council reported incidents.

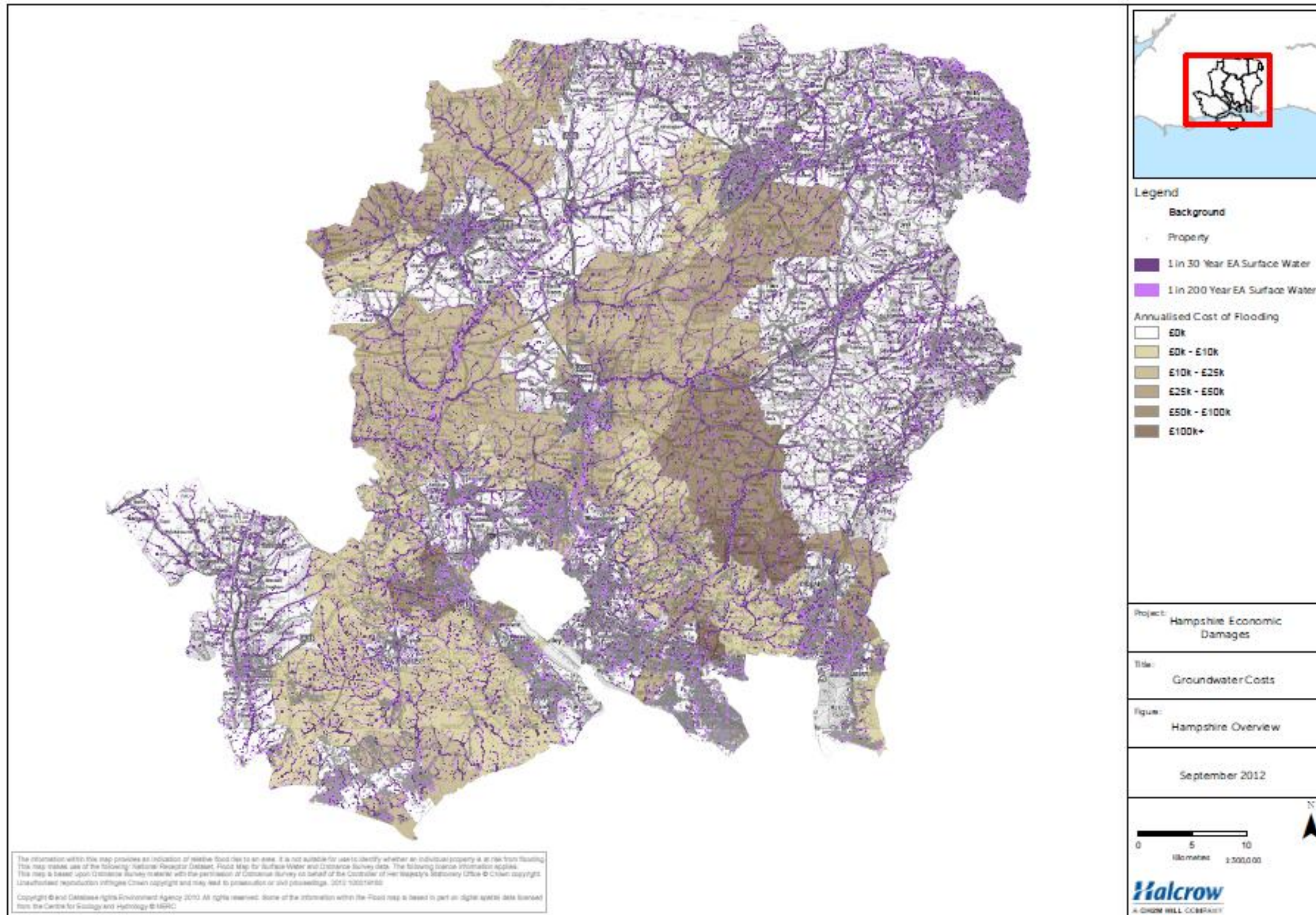


Figure 4.5: Risk of flooding calculated as an economic cost from records of groundwater flooding in 2000/2001

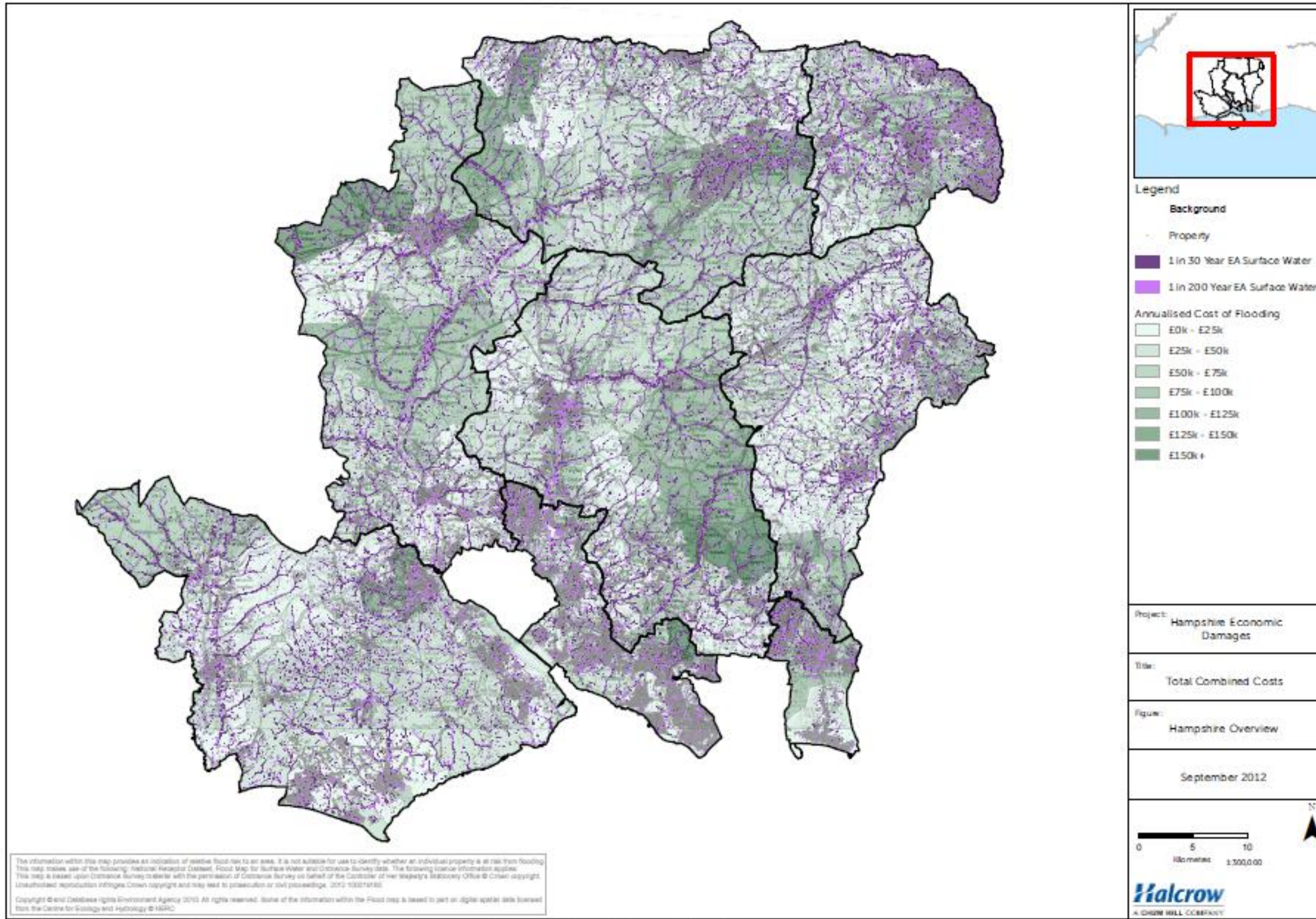


Figure 4.6: Risk of flooding calculated as an economic cost by combing all three data sources

## 4.7 Understanding uncertainty

- 4.7.1.1 Our assessment of risk is inherently uncertain. The approach we have followed is aimed at producing a high level, standardised understanding of risk to allow comparison of relative flood risks. It cannot tell us whether individual properties or features are at risk from flooding. We have used a method which is proportional to the aims of the Strategy and the data which we have available. The reasons for uncertainty arise from features of the data we have used and assumptions we have made.
- Historical data: we know that it has flooded in this location, and so know that it could flood again. However we also know that some areas that could be susceptible to flooding may not yet have flooded or we may not have recorded information when and if they did. In addition, changes in land use and climate which may affect the likelihood of flooding cannot be shown in our records of past flooding.
  - Modelled flooding: this shows more information on locations that could flood and can be used to examine the potential changes due to land use and climate change. However we have to make lots of assumptions when modelling data and we can never be certain that these are correct.
- 4.7.1.2 As more data becomes available and more detailed studies are undertaken through surface water management plans and other studies, our understanding of flooding and climate processes increase. We will ensure that this increased understanding is used to refine our assessment of local flood risk in future revisions of the LFRMS Action Plan and the Strategy.

## 5 Measures

5.1.1.1 The risk assessment has identified the highest, high, moderate and low flood risk wards within Hampshire. In order for the Strategy to be proportionate in the way in which it manages and mitigates local flood risk, the individual actions or procedures (known as measures) to achieve the objectives must be balanced with the risk. Therefore a different approach to measures development is appropriate for each level of risk.

### 5.2 Types of local flood risk management measures

- 5.2.1.1 One of the key concepts to consider when identifying the most suitable measure to manage flood risk in a location is the source-pathway-receptor model. For flooding to occur there must be a source of flooding, such as heavy rainfall, groundwater or high flows in a river. The water from this source then reaches a receptor (something affected by flooding, such as people and property) by a pathway (such as sewers and drains, land, or the floodplain).
- 5.2.1.2 Measures to mitigate flooding can be defined by whether they manage flooding at the source, pathway or receptor. Source measures aim to reduce the volume or rate of water causing the flooding. Pathway measures are designed to manage the passage of flood water both in terms of volume and direction. Measures which focus on receptors are designed to reduce the negative impact of flooding on people, property and the environment. Before Hampshire County Council is able to decide how best to address flooding, we need to fully understand it so that the most appropriate type of activity to mitigate flood risk can be identified. Therefore further investigation into flooding is often required before any control measure can be identified. Such investigation can be considered a type of measure in itself.
- 5.2.1.3 Measures to mitigate flood risk can also be defined in terms of the measure themselves, rather than the issue they address. Structural measures are those which require development of permanent or fixed physical structures, for example extending drainage infrastructure or building a flood defence wall.
- 5.2.1.4 Non structural measures are those which do not involve the development of fixed or permanent physical infrastructure. They are often related to changing behaviour, providing information or maintaining existing structural measures.
- 5.2.1.5 Table 5.1 identifies a number of measures identifying whether their focus is on investigation, source, pathway or receptor and whether they are structural or non structural.

*Table 5.1: Types of flood risk management measures*

Focus	Type	Theme	Example
Investigation	Non structural	Study	Surface water management plans, local flood risk studies
Investigation	Non structural	Survey/modelling	Flow survey, topographical survey, modelling
Investigation	Non structural	Social	Community perception surveys
Source	Structural	Flow reduction/Source control	SuDS (new and retrofit)
			Land management practices
Source	Non structural	Policy	Planning policies to influence location of development
Source	Non structural	Resilience	Temporary or demountable flood defences
			Improved resilience and resistance measures
			Improved weather warning
Source	Non structural	Education	Social change, education and awareness
Pathway	Structural	Conveyance	Restoring or increasing capacity in drainage systems
			Separation of foul and surface water sewers
			Managing overland flows (e.g. changing cambers, raising kerbs)
Pathway	Structural	Diversion (of pluvial runoff)	New or altered runoff routes
Pathway	Structural	Storage (pluvial)	Offline/online attenuation of pluvial flow

Focus	Type	Theme	Example
Pathway	Non structural	Maintenance	Improved maintenance regimes or enforcement
Pathway	Non structural	Policy	Land management practices
Receptor	Structural	Protection/permanent defences	Property level resilience (permanent)
			Community level resilience (permanent)
Receptor	Structural	Exceedence	Matrix signs, permanent signage of exceedence routes etc
Receptor	Non structural	Resilience	Improved weather warning
			Property level resilience (non-permanent)
			Community level resilience (non-permanent)
Receptor	Non structural	Education	Social change, education and awareness
Receptor	Non structural	Policy	Planning policies secure mitigation in new development

## 5.2.2 Investigations

- 5.2.2.1 The risk assessment undertaken in this Strategy has identified where Hampshire County Council needs to be focussing its attention, and has identified the type of flooding that causes the greater risk in each ward. However, a regional risk assessment is not normally detailed enough to understand the exact sources, pathways and receptors of flooding. Therefore a study, assessment or plan may be required. Examples of plans already in development are the Hampshire Groundwater Surface Water Management Plan and the Eastleigh, Rushmoor and Basingstoke Surface Water Management Plan.
- 5.2.2.2 Hampshire County Council, within their role as Lead Local Flood Authority, has a responsibility to record and investigate significant flood events, as detailed in Section 19 of Part 3 of the Flood and Water Management Act 2010. The council has developed a procedure to be followed when a flood is reported. This procedure is set out in Annex J.
- ## 5.2.3 Source control
- 5.2.3.1 Source control measures for surface water flooding normally aim to reduce flooding by increasing storage of flood water, reducing the rate of runoff or increasing the volume of water which soaks into the ground.
- 5.2.3.2 Sustainable Drainage Systems (SuDS) are often an effective means to implement source control. SuDS encompass a variety of measures such as permeable paving which allows more water to soak into the ground than traditional impermeable road and path surfaces. Other SuDS measures may include introducing ponds and wetlands that can hold flood water, or swales and detention basins which slow the movement of water and reduce the volume of runoff. Within Hampshire SuDS will be most easily introduced with new urban developments, where they can be included in the overall design. However, whilst more challenging, they can also prove useful in existing properties or communities, for example encouraging the use of water butts, or replacing existing hard surfaces (such as car parks) with permeable paving.
- 5.2.3.3 The new National SuDS standards, alongside the guidance being developed by the SuDS group of the Hampshire Strategic Flood Water Management Group, will help promote source control SuDS on new and redevelopments. The new LLFA role as the SuDS Approving Body (when it commences) will give HCC more control in ensuring that SuDS are delivered.

#### 5.2.4 Pathway control

- 5.2.4.1 Pathway control measures aim to manage the movement of flood water through both natural and man made drainage systems. Measures may be structural, for example involving the development of new drainage systems, or separating foul and surface water sewers, or may be non structural for example encouraging land management practices which reduce runoff. Hampshire County Council recognises that maintenance of its existing drainage infrastructure will be an important aspect to managing flooding; it can reduce flood risk with minimal capital investment, freeing up funds for measures elsewhere.

#### 5.2.5 Receptor level management

- 5.2.5.1 The County Council recognises that it will not be possible to completely prevent local flooding. When considering measures to mitigate flood risk we, therefore, also need to consider receptor level measures. These measures aim to reduce the likelihood but more often the impact of flooding on people, property and environment.
- 5.2.5.2 Hampshire County Council will work with our partners to increase awareness of flood risk so that individuals and communities understand that there will always be some risk of flooding and the ways in which they can help to manage that risk. We will help people to understand how they can resist and become more resilient to flooding. This will better equip people to take measures to prevent flooding entering their properties (resistance), and recover if they are affected by flooding.

## Achieving multiple benefits

A well designed local flood risk management solution could have wider benefits for flood risk management, water quality protection, biodiversity, health and recreation, and water resource management.

For example, the use of SuDS in existing or new developments in Hampshire can provide many benefits in addition to that of flood mitigation. Ponds and wetlands may add amenity value to open spaces and create new green spaces which benefit the local community and improve biodiversity. Slowing the movement of water and encouraging infiltration will often improve water quality by removing many of the pollutants which are normally found in runoff from urban areas. Initiatives such as encouraging the use of rainwater harvesting using water butts in gardens can also help manage water during droughts as well as flooding.

Historically it has been difficult to achieve these multiple benefits under the traditional planning approach, because of complex stakeholder responsibilities and priorities. However, recent changes in legislation and policy, alongside plus pressure from reduced public sector funding and strong competition for flood risk management funding, mean that measures to reduce flood risk will need to achieve multiple benefits to be successfully delivered. In delivering the strategy and action plan, Hampshire County Council will work alongside the initiatives already underway to help secure multiple benefits.

- The Partnership for Urban South Hampshire (PUSH) Green Infrastructure Strategy identifies where there is a need for investment in Green Infrastructure in the PUSH area of South Hampshire. It sets out where opportunities exist to maximise the potential of local green space, make more effective use of existing assets to absorb pressure from new development and reduce the impacts on sensitive landscapes. PUSH is in the process of working with a wide range of partners to develop an implementation plan and begin to implement the strategy;
- The Green Infrastructure Study for East Hampshire was prepared to support the sustainable development of communities, towns and villages throughout East Hampshire and that part of the South Downs National Park that lies within East Hampshire. It is an essential part of the evidence to support the work of the South Downs National Park (SDNP) Authority;
- Total Environment Hampshire (TE) is one of 11 DEFRA national pilots. In response to significant reductions in government grant to local authorities, funding to Government agencies and the knock-on impact that this has on the voluntary and not-for-profit sector, a range of partners including local authorities, the Environment Agency, Natural England, Forestry Commission, English Heritage and the voluntary sector are working together to maximise opportunities for collaborative working to deliver environmental programmes more effectively and economically, including securing delivery of blue and green infrastructure.



Tree planters provide flood risk protection by providing storage and by the tree using the water. They also provide visual amenity, biodiversity and general health and wellbeing benefits.

Rain gardens and vegetated kerb extensions provide all of these benefits and can also be used as part of traffic calming measures.



### 5.3 Measures to achieve our objectives

5.3.1.1 It will not be possible to deliver all potential flood risk management measures within the first phase of this Strategy, therefore we have developed a phased approach to implementation. The first LFRMS developed with this Strategy focuses on quick wins and short term measures that will deliver demonstrable benefit.

5.3.1.2 Table 5.2 below shows the general measures that we have put in place to achieve our objectives. There are a number of measures already being delivered through the Hampshire strategic group that will reduce or manage flood risk, and these have been included in Table 5.2.

The accompanying document – Hampshire LFRMS Action Plan - contains further details about how we plan to deliver these measures in specific locations.

Table C1.1 in Annex C1 identifies specific responsibilities of the organisations involved in flood risk management and how HCC will engage with them to achieve the objectives of this Strategy.

Table 5.2 Measures planned to achieve our objectives

Objectives	HCC Actions to deliver the objective
<p>Improve our knowledge and understanding of local flood risk in Hampshire</p>	<p>This Strategy provides clear explanation of the types of local flooding and who is responsible for local flooding. It includes an annex which details what to do in a flood, and how to prepare for a flood.</p> <p>It includes a ward risk assessment that provides a solid evidence base for prioritising future activities.</p> <p>The County Council has developed a reporting and investigation procedure that will ensure future incidents improve the understanding of flooding.</p> <p>The County Council will ensure that the public is aware of this procedure through our public consultation and awareness events.</p> <p>The County Council is developing a consistent approach to the recording and designation of structures.</p>
<p>Work in partnership with other flood risk management authorities to deliver the Strategy and LFRMS Action Plan</p>	<p>All RMAs are part of the LFRMS steering group, and also are represented on the strategic group that provides oversight and scrutiny of this Strategy. The Strategy has been developed through a series of workshops with the RMAs, and with the support of the Regional Flood and Coastal Committees. Hampshire County Council will facilitate the Hampshire Strategic Flood and Water Management Group</p> <p>The LLFA will undertake investigations of significant flooding events following the procedure set out in Annex J, and will share investigation reports with other RMAs and with the public.</p>

Objectives	HCC Actions to deliver the objective
<p>Maintain, and improve where necessary, local flood risk management infrastructure and systems to reduce risk</p>	<p>The County Council provides guidance and administers a new process for consenting of new structures and maintenance of existing structures.</p> <p>Hampshire County Council will develop a risk based approach to the maintenance of assets based on the risk assessment undertaken by the Strategy and through the process of preparing the Register and Record as required by the FWMA</p> <p>Hampshire County Council will maintain a database of assets so that responsibility can be established in the case of a problem or a failure to maintain</p>
<p>Ensure that local planning authorities take full account of flood risk when allocating land and considering permitting development (by avoiding development in inappropriate locations and minimising flood risk wherever possible)</p>	<p>Hampshire County Council is working with Districts/Boroughs to prepare SuDS guidance and developing its SAB procedures that will ensure that new development will not increase runoff entering water bodies.</p> <p>The County Council will ensure that planning authorities are made aware of the risk of local flooding, and will recommend that district and borough councils develop policies that ensure that the type and quantity of development is commensurate with the risk of flooding as determined through this Strategy</p>
<p>Engage with local communities to increase public awareness and reporting of flooding and promote appropriate individual and community level planning and action</p> <p>Improve and support community level flood response and recovery</p>	<p>The Strategy LFRMS Action Plan identifies where risk management authorities will work with local communities in the highest risk areas to promote local capital schemes to reduce the risk of flooding</p> <p>Hampshire County Council will engage with local communities and businesses across the risk envelope to encourage and support them to take appropriate local action to prepare for flooding. This will include encouraging the preparation of flood action plans in high risk areas.</p> <p>The risk management authorities will support the formation of local flood action groups where they do not already exist in the highest risk areas</p>

Objectives	HCC Actions to deliver the objective
Identify national, regional and local funding mechanisms to deliver flood risk management interventions.	The Strategy has developed a funding strategy and funding guidance that identifies the primary sources of local flood risk management funding. The Strategy also identifies how to maximise other non flood related outputs to secure contributions from other secondary sources of funding.
Develop strategy, policy and a LFRMS Action Plan to manage these risks, providing balanced social and environmental benefits for the economic investment	The Strategy has developed an LFRMS Action Plan that is based on a detailed assessment of risk from local sources of flooding and considers river and coastal flooding. The LFRMS Action Plan detail is commensurate with the level of risk and the cost of flooding. The actions and measures to reduce risk have been tested through the SEA scoping process to ensure that where possible they achieve multiple benefits and maximise opportunities to deliver social and environmental benefits

## Coastal adaptation

Work is underway on a **Coastal Adaptation Project**. The aim is to define a strategic county-wide approach to adaptation in the coastal zone, in order to allow all public bodies within the county of Hampshire to make informed and prioritised risk-based decisions in relation to their assets now and in the future.

The project is broken down into 5 task areas:

- Assessment of Risk of Hampshire's publicly owned assets which could be affected by coastal change.

- Develop a long term overarching strategy for adaptation of all publicly owned assets that have been identified as at risk from coastal change

- Develop an overarching Funding Strategy

- Develop a Coastal Engagement Strategy

- Study of requirements and availability of mitigation land

The CAP is initially focussing on Hampshire County Council assets and all publicly owned assets that have been identified as 'Essential Local Services'. A risk assessment is being undertaken which will identify assets at risk of coastal change (flooding and erosion) over the next 100 years split, into three epochs 0-20, 20-50 and 50-100 years. Once the assessments are completed and assets critical to service delivery have been identified an Adaptation LFRMS Action Plan will be developed in order to identify which assets will have emergency evacuation plans prepared (if not already in existence), which would be suitable for property level resilience measures, which could benefit from a change of use or disposed of altogether.

The aim is to complete this initial assessment of County Council assets by March 2013.

The County Council is also working on a project in partnership with other local partners (e.g. District Councils) known as **Coastal Communities Adapting to Change (CCATCH) – the Solent** '.

This forms part of an EU Interreg IVa – 2 seas cross-border programme project called 'Coastal Communities 2150 and Beyond' (CC2150) which is being led by the Environment Agency. The aim is to engage vulnerable communities who are at risk from coastal change, by raising their awareness and developing visions for how their coast should adapt in the future. The project is focusing on six discrete stretches of coast. These sites may not be the most at risk but reflect a range of the different communities and issues around the Solent and are: Beaulieu to Calshot; Southampton, Upper West Itchen; Netley and Royal Victoria Country Park ; Solent Breezes Holiday Park; Hayling Island and Langstone and Yarmouth, Isle of Wight

The project will work with the local communities to raise awareness and understanding of coastal change in their area. The aim will be to develop visions of how the community want their coast to look in the future and a strategy to help the community achieve that vision. This will then help communities to adapt and become more resilient to future changes. Community involvement will take place to make sure that views are heard and knowledge shared through workshops, public exhibitions and demonstrations of resilience measures, as well as contributing to publications. The funded project runs until June 2014, after that is it hoped that the communities will be in a position to implement the strategy themselves. The project website provides further details see <http://www.solentforum.org/current/CCATCH/>

## 6 Next steps

### 6.1 Development of the Strategy

6.1.1.1 This Strategy is based on the latest published information available at the time of its preparation. It will be updated, in consultation with other organisations and individuals involved in managing flood risk. The Strategy should be considered a 'live' product which will evolve over time as new information becomes available and flood events occur. The Strategy will also be supplemented by bi-annual update of the LFRMS Action Plan, preparation of further Surface Water Management Plans, by the County Council using the Strategy to seek influence the preparation of Local Plans and the plans and strategies of other bodies.

### 6.2 Working in partnership

6.2.1.1 Hampshire County Council will work in partnership with the other RMAs and our stakeholders, including local communities to deliver the aims and objectives of this Strategy. We know that the most cost effective measures to improve local flood risk management can only be determined and delivered through true partnership working. Hampshire County Council will continue to work with our partners to deliver the actions identified in this Strategy and LFRMS Action Plan, and ensure that measures promoted achieve multiple benefits for the community, the county and the environment.

### 6.3 Monitoring

6.3.1.1 Hampshire County Council will review the Strategy against its aims and objectives annually and present a monitoring report to the Hampshire Strategic Flood and Water Management group. This will be published on the HCC website. The County Council will also continue to gather information and investigate significant flood events as appropriate.

### 6.4 Review of Strategy

6.4.1.1 This Strategy and the supporting LFRMS Action Plan will remain live documents over the Strategy period.

6.4.1.2 The Strategy is valid to 2028, and is not planned for full update until 2017, following the review of the Hampshire PFRA. However, the Strategy may need to be updated within this period if:

- There are significant flood events that challenge the conclusions of the risk assessment
- There are significant changes to any of the datasets that underpin the risk assessment
- There are significant policy changes that amend the roles and responsibilities of the Flood Risk Management Agencies
- The annual monitoring identifies that the Strategy is not achieving its objectives
- There is a change in funding availability which has a significant affect on the actions proposed in this Strategy.

## 6.5 Review of LFRMS Action Plan

6.5.1.1 The LFRMS Action Plan will be reviewed biannually or as otherwise agreed with the strategic group. The review of the LFRMS Action Plan will

- Assess if measures have been delivered that mitigate risk
- Assess if there have been any material impact that changes the risk prioritisation of high, moderate and low risk wards

## 7 Conclusions and recommendations

### 7.1 Conclusions

- 7.1.1.1 This Strategy is the Local Flood Risk Management Strategy for Hampshire. It identifies, at a strategic level, the priority flood risk areas for the administrative county of Hampshire. These areas have been identified using published data sources and supplemented by data collected from partner organisations and local communities. The methodology used allows an objective analysis of comparative risk in different areas to be devised. It seeks to apply a monetary value to the risk based on a number of specified assumptions about the nature, extent, type and duration of identified flood events.
- 7.1.1.2 The Strategy has been prepared in partnership with other Risk Management Authorities, district, borough and local councils, neighbouring authorities, key stakeholders and local communities. Whilst providing an overview of local flood risk in Hampshire, the Strategy does not confine itself to those aspects of flooding which are the responsibility of the County Council in its role as a Lead Local Flood Authority. It also tries to identify the interactions between different causes of flooding.
- 7.1.1.3 Considering flooding in a broad context, the Strategy also links to land use planning, the principles of sustainable development and the need to ensure that measures to mitigate flood risk deliver multiple benefits. It seeks to ensure that flood risk management is not viewed in isolation, but within a wider context. Within this background, the Strategy deliberately tries to consider how flood risk can be reduced or mitigated in realistic and achievable way.
- 7.1.1.4 Table 4.3 of the strategy identifies the wards with the highest potential flood risk in Hampshire. The full outputs of the risk assessment are presented in Annex E. The wards with the highest risk of flooding from combined sources (taking all data sources into account) are:
- Droxford, Soberton and Hambledon
  - Fareham East
  - Penton Bellinger
  - St Mary's
  - Popley East

## 7.2 Recommendations

7.2.1.1 The LFRMS Action Plan accompanying this main Strategy document set out both county wide measures, and ward specific actions which may be pursued to mitigate and reduce the identified risk in high risk wards. The ward specific action plans set out where those measures might be delivered and which RMA might best take the lead in delivering them. In many cases a number of organisations will be required to work together to deliver the action. The roles and responsibilities of those involved in local flood risk management are outlined in Annex C1 of this document. In summary the key actions required by the different organisations and individuals involved can be summarised as outlined in the following paragraphs.

7.2.1.2 Hampshire County Council actions are set out in full in table 5.2, they include (but are not limited to):

- Building an evidence base to improve understanding of local flood risk
- Working with partners to develop this Strategy and related plans and guidance
- Managing and maintaining assets that help manage flood risk
- Encouraging other organisations, groups and individuals to consider and manage flood risk
- Developing the funding strategy for local flood risk management
- Ensuring the findings of the Strategic Environmental Assessment are taken into account

7.2.1.3 The main actions required from the Borough and District Councils are:

- Take this LFRMS into account when preparing local plans, making decisions over land allocation for development, considering planning applications and identifying local infrastructure requirements
- Consider the need to designate significant flood risk features
- Continue to undertake work to ordinary watercourses where needed

7.2.1.4 Parish and Local Councils, Local Community Groups and flood groups should:

- Prepare flood action plans
- Consider whether they are able to take on any role in the inspection / maintenance of flood risk management infrastructure
- Take the lead in locally publicising information to help individuals manage their own flood risk

- 7.2.1.5 The Environment Agency is responsible for managing flood risk from main rivers, large reservoirs and the sea, and has a strategic overview of all flood and coastal erosion risk management. It also plays a key role in providing flood warnings to the public and supporting emergency responders when flooding occurs. The Environment Agency will continue to work with Hampshire County Council to develop this Strategy.
- 7.2.1.6 The Water Companies serving Hampshire are responsible for foul flooding, or flooding from sewers. They will continue to work with Hampshire County Council to develop this Strategy.
- 7.2.1.7 Developers should:
- Take this Strategy into account when making decisions over land acquisitions
  - Design and layout sites to make the best use of natural drainage and topography
  - Ensure SuDS are used, wherever possible, to provide multiple benefits
- 7.2.1.8 Individuals and households should:
- Sign up to Environment Agency flood warning services where available and appropriate
  - Take proportionate steps to make their properties more resilient to flooding