



# **Local Flood Risk Management Strategy for Central Bedfordshire**

Final

February 2014

## **Foreword**

Following flooding in 2007, the government commissioned a review (The Pitt Review, 2008), which recommended urgent changes in the way the country is adapting to the increased risk of flooding. A principal change was to establish greater clarity in the roles and responsibilities and an increased focus on addressing surface water flood risk through the enactment of the Flood and Water Management Act (2010). Under the Act, Central Bedfordshire Council became a Lead Local Flood Authority.

To fulfil this role we now have new roles and responsibilities, duties and powers to enable us to manage flood risk from localised sources across Bedfordshire and a duty to develop, maintain, apply and monitor a Strategy for local flood risk management that encompasses all sources of flooding.

As part of the development of this Strategy we have worked in partnership with all Risk Management Authorities who have responsibility for flood risk across Central Bedfordshire and have consulted with our local communities.

This Strategy document has been subject to full public consultation and is our Adopted Strategy.

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**Executive member for Regeneration - Services**

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## Using this document

### Summary boxes

Throughout the document, we have provided summaries of each chapter using green text boxes.

### Hyperlinks

Throughout the document, we have provided hyperlinks where there are useful reference points. These are shown as **green bold text**.

# 1 Introduction

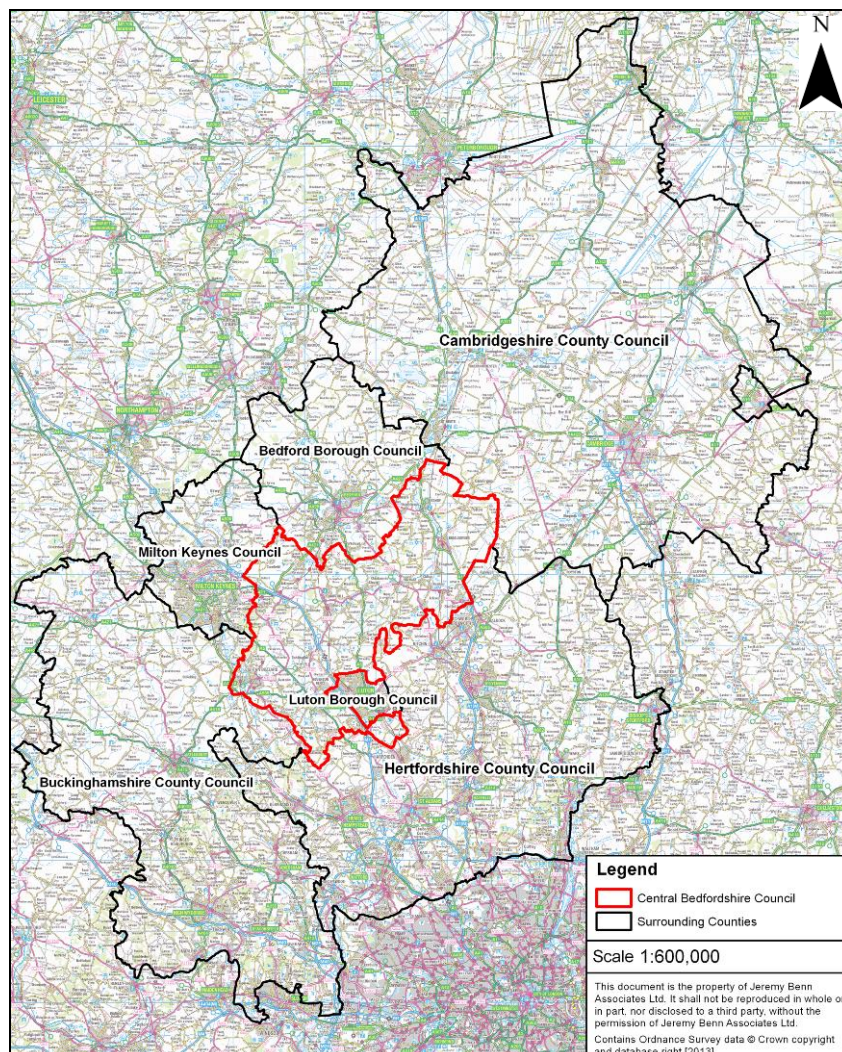
This chapter explains why we are preparing a Local Flood Risk Management Strategy and sets out our high level responsibilities as a Lead Local Flood Authority. We outline what will be in the Strategy, the area it affects and why the Strategy is important to different Central Bedfordshire Council departments, other Risk Management Authorities and our local communities.

## Why we have prepared this document

- 1.1 Following flooding in 2007, the government commissioned a review (**The Pitt Review**, 2008), which led to the recommended urgent changes in the way the country is adapting to the increased risk of flooding. A principal change was to establish greater clarity in the roles and responsibilities and an increased focus on addressing surface water flood risk through the enactment of the **Flood and Water Management Act 2010** (the Act). Under the Act, Central Bedfordshire Council became a Lead Local Flood Authority (LLFA), which involves having responsibility for:
- Developing, maintaining, applying and monitoring a Local Flood Risk Management Strategy (LFRMS)
  - Co-operating with other flood Risk Management Authorities (RMAs)
  - Maintaining a register of structures and features that significantly affect flood risk
  - Designation of features that significantly affect flood risk
  - Approving Sustainable Drainage (SuDS)
  - Land drainage responsibilities
  - Flood risk management responsibilities for Award Drains
  - Powers to manage flood risk from ordinary watercourses, surface water and groundwater
  - Preparing reports on flood events
  - Reviewing and updating (where appropriate) the Preliminary Flood Risk Assessment
- 1.2 The development of the local Strategy follows on from the preparation of the Preliminary Flood Risk Assessment (PFRA). The PFRA was prepared to meet the requirements of the Flood risk Regulations, 2009 and these Regulations transposed the EU 'Floods Directive', 2007 into English and Welsh law.
- 1.3 To fulfil this role we now have new roles and responsibilities, duties and powers to enable us to manage flood risk from localised sources across Central Bedfordshire and a duty to develop, maintain, apply and monitor a strategy for local flood risk management that encompasses all sources of flooding. This document is the Local Flood Risk Management Strategy (the local Strategy) for Central Bedfordshire and aims to provide a framework for how we will manage local flood risk.
- 1.4 We also offer further advice and guidance within our **flood risk management** and **emergency planning** pages on our website. A particularly useful reference document is our '**Flooding guide – where to find help and assistance**'.

- 1.5 The local Strategy covers Central Bedfordshire Council area only. Our neighbouring authorities (Figure 1-1) are Lead Local Authorities in their own right and as such have the same responsibilities for producing their own Local Flood Risk Management Strategies.
- 1.6 Central Bedfordshire is a diverse area containing a mixture of rural countryside, attractive villages, and small to medium sized towns. It is well connected, being traversed by the M1, A1, A5 and A6 as well as the East Coast Mainline, West Coast Mainline and the Midland Mainline. London Luton Airport is also in close proximity.
- 1.7 Covering 716 square kilometres, Central Bedfordshire currently has a population of approximately 255,200<sup>1</sup> and is the 18th largest unitary authority in England. Central Bedfordshire is one of the least densely populated areas and is classified as predominantly rural with just over half the population living in the rural area.
- 1.8 Central Bedfordshire has a number of towns of varying size. The two largest towns, Leighton Buzzard and Dunstable are located in the south of Central Bedfordshire whilst the north of Central Bedfordshire comprises a series of small towns including Biggleswade, Sandy and Flitwick.

**Figure 1-1 – Central Bedfordshire Council boundary and neighbouring authorities**



<sup>1</sup> Central Bedfordshire Key Facts and Figures. January 2012

## What types of flood risk have we considered

- 1.9 Flooding can occur from different sources, at different times and for different reasons. Often it will be from more than one source, such as a high water levels in a receiving watercourse combined with overland flows. Our Strategy includes assessment of the risks from all sources of flooding, including 'local sources' surface water (overland runoff), groundwater and ordinary watercourses (where water flows in channels and culverts that are not described on the Environment Agency Main River map).
- 1.10 Our Strategy includes the work and responsibilities of others such as the Environment Agency on Main Rivers, Internal Drainage Boards and Water Companies in relation to the drainage and sewer network. This approach is also consistent with Defra policy on "**Flood and Coastal Resilience Partnership Funding**", which encourages Risk Management Authorities to consider investment needs for all sources of flooding in the Local Flood Risk Management Strategy.

## Why is this document important to me

- 1.11 The local Strategy is an opportunity for Central Bedfordshire Council to set out how we plan to manage local flood risk both now and into the future. The document allows us to share our objectives and be transparent with our local communities and those who we already work closely with. The following information should help you as an organisation or individual understand why the Strategy may be of importance to you. We recognise that the Strategy could influence a wide range of individuals and organisations, not all of whom have been listed below.

### Central Bedfordshire Council: Internal Departments

- 1.12 Internal communications and engagement within Central Bedfordshire will become increasingly important. The Strategy could influence and require input from Central Bedfordshire Council departments, please note this list is not exhaustive:
- Assets
  - Building control
  - Countryside access
  - Emergency planning
  - Highways
  - Partnerships
  - Planning
  - Transportation

### Town and Parish Councils

- 1.13 The Strategy contains information received from local councils and describes how flood risk varies across the Central Bedfordshire area, how communities and businesses might be affected, how they can be better prepared if flooding occurs and how the authority is intending to respond to the existing and future circumstances.

## **Environment Agency**

- 1.14 The Strategy describes how we intend to fulfil our leadership role by adopting an all encompassing approach to management of flood risk from all sources which is reliant on working closely and in partnership with the Environment Agency. We also describe our approach to preparing Flood and Coastal Risk Management Grant in Aid (FCRMGiA) information for approval by the Environment Agency.

## **Regional Flood and Coastal Committee**

- 1.15 The Strategy defines our objectives and describes how these are linked to our priorities in the short and medium term. The Strategy and supporting annexes enables the Regional Flood and Coastal Committee (RFCC) to understand our requirements and inform appropriate decisions on investment and spending.

## **Water Companies**

- 1.16 The Strategy addresses flood risk from local sources and takes into consideration the performance and operation of existing and proposed Water Utility drainage assets. Wherever possible the Strategy seeks to identify measures and responses that make provision for multiple outcomes that potentially improve the resilience and performance of existing and proposed Utility assets.

## **Bedford Group of Internal Drainage Boards**

- 1.17 The Strategy describes an integrated approach to address land drainage and flood risk issues and is reliant on partnership working with the Bedford Group of Internal Drainage Boards (IDBs). The Outline Investment Strategy includes consideration of capital and operational investment in existing and new assets made by the Drainage Boards.

## **Transport and Energy Infrastructure**

- 1.18 The Strategy seeks to capture the potential multiple benefits gained from investment in new and existing infrastructure. Partnership working is expected to deliver long term adaptation and increased resilience flood risk outcomes.

## **The Canals and Rivers Trust**

- 1.19 The Strategy describes an integrated approach to address land drainage and flood risk issues and is reliant on partnership working with the Canals and Rivers Trust. Of note, is the Grand Union Canal, Leighton Buzzard.

## **Developers**

- 1.20 It is anticipated that new development will be sustainable and where appropriate contribute to the creation of infrastructure and communities that are safe for their intended lifetime. Sustainable Drainage systems (SuDs) must be implemented for new development and should satisfy strategic requirements. Mitigation measures must be implemented to address future flood risk conditions so that development is safe and does not adversely affect others for the intended lifetime. As a result any new development must incorporate appropriate SuDs.



## Local Communities

- 1.21 The Strategy provides information that enables communities to improve their knowledge and understanding of the risk of flooding across Central Bedfordshire and to contribute information on local issues. By being better prepared and more aware of flood risk, local communities can increase their resilience to flood risk.
- 1.22 We have provided appropriate links to information for riparian owners within sections 2.24 and 2.25.

## What does this Strategy cover

- 1.23 The local Strategy will be consistent with the overarching **National Flood and Coastal Erosion Risk Management Strategy** (National FCERM) developed by the Environment Agency. Content to be included in the National FCERM was specified within Section 7 of the Flood and Water Management Act 2010, and this has been used as the basis for the local Strategy for Central Bedfordshire to ensure compliance with the Act.
- 1.24 Section 9 of the Act defines what must be specified in the Local Flood Risk Management Strategy. Table 1-1 identifies the nine parts of the LFRMS that must be specified and indicates where information can be found in relation to the respective parts within this document.
- 1.25 In addition to the main Strategy document, we have also produced a series of annexes, which to summarise comprise the following:
  - Annex 1: Communications and Engagement – this annex includes responses from the questionnaire that we carried out in the early stages of developing our local Strategy. At a later date, we will also use this annex to share comments received during the formal consultation period.
  - Annex 2: Assessment of Local Flood Risk – this is where we have presented information and our assessment of local flood risk across Central Bedfordshire, using a combination of local information and Environment Agency data.
  - Annex 3: Outline Investment Strategy – we are working towards having a Strategic Investment Plan to support us in prioritising our management and investment of local flood risk and towards that end have initially prepared an Outline Investment Strategy. This annex provides information on potential funding sources and outlines how we plan to approach prioritisation of investment for local flood risk management over the short, medium and long term.
  - Annex 4: Flood Risk Policies – within this annex we have provided further information on what we are doing in order to fulfil our responsibilities as a LLFA.
  - Annex 5: Flood Legislation - this is a reference area which details links for where you can find more information about legislation of relevance to the Local Flood Risk Management Strategy.
  - Annex 6: Glossary and Abbreviations – this is a reference document for understanding more about terminology we have used through the main Strategy document.

**Table 1-1 Where to find information on specified parts of the Local Flood Risk Management Strategy in this document**

Requirement in Flood and Water Management	Location of content
(a) The risk management authorities in the authority's area	Chapter 2.
(b) The flood and coastal erosion risk management functions that may be exercised by those authorities in relation to the area	Chapter 2.
(c) The objectives for managing local flood risk	Chapter 4.
(d) The measures proposed to achieve those objectives	Chapter 8 (Action Plan).
(e) How and when the measures are expected to be implemented	Chapter 8 (Action Plan).
(f) The costs and benefits of those measures, and how they are to be paid for	Chapter 8 (Action Plan) and Annex 3.
(g) The assessment of flood risk for the purpose of the strategy	Chapter 3 and Annex 2.
(h) How and when the strategy will be reviewed	Chapter 6.
(i) How the strategy contributes to the achievement of wider environmental objectives	Chapter 7.

Having outlined the purpose of this Strategy document, the next chapter provides more information on flood risk within Central Bedfordshire.

## 2 How We Will Work Together To Manage Flood Risk

The roles and responsibilities of flood Risk Management Authorities are clearly set out within the relevant legislative documents and guidance. In this chapter we have provided an overview of these roles and responsibilities, followed by information on how Central Bedfordshire Council will work with other organisations to manage flood risk sustainably now and into the future.

### Roles and responsibilities

#### Central Bedfordshire Council

- 2.1 Central Bedfordshire Council had taken an active role in investigating local flooding issues since its formation into a unitary authority. Our flooding role has been extended with the introduction of the Act, when we became a 'Lead Local Flood Authority' and were given new legislative responsibilities for flood risk management. The background to the Act encouraged the formation of partnerships, and we are actively participating in formation of new partnerships with other flood risk management authorities to enhance the delivery of these new measures.
- 2.2 Most importantly the changes mean that we must work more efficiently and effectively so that all our strategies, proposals, policies and actions take consideration of the objectives contained in our Local Flood Risk Management Strategy. These improved working arrangements started during the preparation of the Draft Strategy. In particular we will coordinate our actions with those of our Highways, Development Planning and Emergency Planning. This way we will make best use of available resources, prevent inappropriate development in areas at risk from flooding and support and inform preparations for flood emergencies, tactical responses and recovery following a flood event.
- 2.3 The new duties for us as a Lead Local Flood Authority include:
- **Flood Investigations:** Investigating and reporting on flooding incidents in Central Bedfordshire, where considered appropriate or necessary to;
  - **Register of Flood Risk Features:** Developing and maintaining a register of structures or features which, in the opinion of the authority, are likely to have a significant effect on flood risk in its area;
  - **Designation:** Exercise powers where considered appropriate to designate structures and features that affect flooding requiring the owner to seek consent from the authority to alter, remove or replace it;
  - **Sustainable Drainage Systems (SuDS):** From April 2014 we have the responsibility to approve proposed drainage systems in new developments and redevelopments as a Sustainable Drainage Approving Body (SAB) (we have provided further information on this new role within the following section and within Annex 4);
  - **Local Flood Risk Management Strategy:** Developing a Local Flood Risk Management Strategy (this document) to outline how we will manage flood risk in Central Bedfordshire, identify areas vulnerable to flooding and target resources where they are needed most; and
  - **Consenting:** Undertaking consenting of works on ordinary watercourses, and across Central Bedfordshire this is currently delivered by a service agreement with the Bedford Group of Internal Drainage Boards.

- 2.4 Sustainable drainage systems provide a more natural approach to managing water close to its source, where the rainfall first falls. SuDS schemes can reduce the impact of development by slowing runoff, encouraging infiltration, trapping pollutants, providing biodiversity and increasing amenity for residents through provision of open space.
- 2.5 In order to be approved, the proposed drainage system will have to meet new National Standards for sustainable drainage. The National Standards have been prepared by Defra in collaboration with appropriate stakeholders, including Local authorities and representatives of the House Builders Federation.
- 2.6 The approving body considers whether the application meets National Standards and consults statutory consultees, which include the relevant sewerage undertaker, Environment Agency, highways authority and internal drainage boards.

### **Internal Drainage Boards**

- 2.7 Each Internal Drainage Board (IDB) is a local public authority established in areas of special drainage need in England and Wales. They have permissive powers to manage water levels within their respective drainage districts. IDBs undertake works to reduce flood risk to people and property and manage water levels to meet local needs.
- 2.8 The administrative area of Central Bedfordshire is managed by the IDB known as the Bedford Group of Drainage Boards (who works on behalf of three IDBs). This IDB is a consortium of statutory bodies providing local storm water management by undertaking watercourse maintenance and improvement. IDB's are defined as Flood Risk Management Authorities; they undertake Consenting and Enforcement of works to ordinary watercourses under Section 23 of the Land Drainage Act 1991 within their district, and beyond their district also undertake consenting of works on ordinary watercourses, managed via a service agreement between Central Bedfordshire Council and the IDB. They also adopt and maintain sustainable drainage systems and provide advice and direction to local authorities as part of the planning application process in relation to flood and water management.
- 2.9 IDBs have an important role to play in flood risk management and in habitat creation and management. They are able to involve local people, as well as raise funds from beneficiaries and stimulate volunteer activity. They are independent public authorities and their membership includes representatives of the occupiers of the land within their district and local authority nominees to represent other interests.
- 2.10 Further information can be found on their [website](#).

### **Environment Agency**

- 2.11 The Environment Agency retains its responsibility for the management of flood risk from the sea, main rivers and reservoirs. It gains a strategic overview role for all forms of flooding in addition to existing responsibilities for the prevention, mitigation and remedying of flood damage for main rivers and coastal areas.
- 2.12 Main rivers are watercourses shown on the statutory main river map held by the Environment Agency and Defra. The Environment Agency has powers to work on main rivers and the sea to manage flood risk. These powers allow it to do work. However, it does not have to maintain or construct new works on main rivers or the sea. It is unlikely to maintain a watercourse to improve the amenity of the river or to stop erosion that does not increase flood risk.

- 2.13 The Environment Agency enforces the Reservoirs Act 1975, which is the safety legislation for reservoirs in the United Kingdom. Although the responsibility for safety lies with the owners, the Environment Agency is responsible as Enforcement Authority of reservoirs in England and Wales that are greater than 25,000m<sup>3</sup> (this will reduce to 10,000m<sup>3</sup>). The Environment Agency is also responsible for establishing and maintaining a register of reservoirs. As Enforcement Authority the Environment Agency must ensure flood plans are produced for specified reservoirs.
- 2.14 The Environment Agency is responsible for controlling works which affect main rivers and flood defences through consenting works under the Water Resources Act 1991 and their Land Drainage and Sea Defence Byelaws.
- 2.15 The Environment Agency provides advice to planning authorities, issues flood warnings on sections of main river and the coast, monitors and supports emergency responders when flooding occurs.
- 2.16 The Environment Agency provides:
- Advice to Government on flood and coastal erosion risk, supporting future national responses, policy and strategy;
  - Technical and administrative support to the Regional Flood and Coastal Committee;
  - Allocation of flood and coastal erosion risk management capital funding; and
  - Support to LLFAs by providing data and guidance on assessing, planning and carrying out flood risk management for flooding from ordinary watercourses, surface runoff and groundwater.
- 2.17 Further information about the Environment Agency can be found on their [website](#).

### **Water and Sewerage Undertakers**

- 2.18 Water and sewerage companies are responsible for managing the risks of flooding from foul and surface water sewers, as well as from burst water mains. This may need to be carried out in partnership with others, for example, working with developers and landowners to reduce the input of rainfall into sewers through attenuation, storage and sustainable drainage.
- 2.19 Two water companies operate within Central Bedfordshire:
- Anglian Water Services Ltd
  - Thames Water Utilities Ltd
- 2.20 Anglian Water Services Ltd (or "Anglian Water") covers the vast majority of Central Bedfordshire. Thames Water Utilities Ltd covers a small portion of the south eastern area of Central Bedfordshire, covering the parishes of Caddington, Hyde, Kensworth, Slip End, Streatley, Studham, Sundon and Whipsnade.
- 2.21 A further water supply company also covers Central Bedfordshire:
- Affinity Water Limited

### **Highways Authority**

- 2.22 Central Bedfordshire Council's Highways Authority (in partnership with their contractors) is responsible for the provision and management of highway drainage and roadside ditches under the Highways Act (1980). This excludes motorways and trunk roads that are the responsibility of the Highways Agency.

- 2.23 The owners of land adjoining a highway also have a common law duty to maintain ditches to prevent them causing a nuisance to road users.

### **Riparian Owners**

- 2.24 If you own land adjoining a watercourse, you have certain rights and responsibilities, and in legal terms you are a 'riparian owner'. Some of your responsibilities include:
- Maintaining river beds and banks;
  - Allowing the flow of water to pass without obstruction; and
  - Controlling invasive alien species such as Japanese knotweed.
- 2.25 We recommend that if you are a riparian owner you read the Environment Agency publication '**Living on the Edge**' (2012) to find out more information about your responsibilities.

## **Governance and scrutiny**

### **Central Bedfordshire Committee**

- 2.26 Scrutiny ensures that the decision making process is clear and accessible to the public. It enables members of the community and councillors to play a part in influencing policy and improving public service delivery. Therefore, the local Strategy will be required to go through the councils scrutiny procedures. This is planned for February 2014, following which the Strategy will then gain final endorsement from the Executive Committee in March 2014.

### **Local Flood Risk Technical Group**

- 2.27 The Unitary Councils of Central Bedfordshire, Milton Keynes, Bedford Borough and Luton Borough meet as a partnership at approximately 6 month intervals to review new duties from the Flood and Water Management Act and exchange best practice. The Environment Agency, Bedford Group of Internal Drainage Boards and Anglian Water have also attended the partnership meetings.

### **Milton Keynes Water and Flood Management Group**

- 2.28 Central Bedfordshire Council attends this forum which normally meets on an annual basis to consider flood risk issues impacting on the Milton Keynes catchment and neighbouring flood risk authorities.

### **Key Stakeholders**

- 2.29 The Environment Agency, Internal Drainage Board, and Anglian Water have contributed to the Strategy and their feedback on the strategy and future partnership working will be important for delivery of various items in the strategy's action plan.

## Regional Flood and Coastal Committee

- 2.30 Central Bedfordshire is covered by the Anglian (Central) RFCC. All Lead Local and Risk Management Authorities in the Great Ouse Catchment are represented by the Anglian RFCC and feedback will be important from this group formed under the Defra and Environment Agency umbrella.
- 2.31 Comments will be welcomed from this informed audience as it provides feedback on all LFRM strategies and performs a vital role in prioritising and approving funding recommendations for capital improvements known as Flood and Coastal Risk Management Grant in Aid (FCRMGiA).

This chapter has described the roles and responsibilities of key Risk Management Authorities and how we will work together. The next chapter provides more information on flood risk within Central Bedfordshire.

### 3 Understanding Flood Risk in Central Bedfordshire

This chapter discusses different types of flooding that can affect Central Bedfordshire; notably fluvial flooding, surface water, sewer and groundwater flooding. The Central Bedfordshire Climate Change Strategy acknowledges the risks of climate change to Central Bedfordshire and high level information has been used from this document to consider how flood risk may change in the future.

- 3.1 **The Flood Risk Regulations** (2009) transposed the **EU Floods Directive** into UK legislation and required all Lead Local Flood Authorities to prepare a Preliminary Flood Risk Assessment (PFRA) report. The PFRA is a high level screening exercise to identify areas of significant risk, referred to as Indicative Flood Risk Areas across England. Areas of significant risk were defined to be locations where 30,000 people or more are at risk from flooding and if present had to be reported to Europe in accordance with the requirements of the Directive. The **PFRA** established that there are no significant Indicative Flood Risk Areas within Central Bedfordshire.
- 3.2 The PFRA report looked at past flooding and where future flooding might occur across Central Bedfordshire and the consequences it might have to people, properties, the environment and cultural heritage. We have used the information within this document to inform our local Strategy.

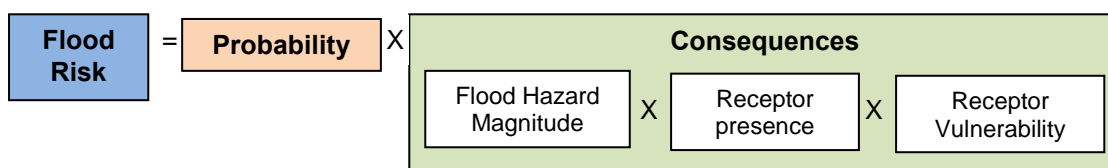
#### How we assess flood risk

- 3.3 A flood is now formally defined in the Flood and Water Management Act, 2010 as:  
*"including cases where land not normally covered by water becomes covered by water and can be the result of water emanating from a number of sources"*.
- 3.4 Flood risk is defined as the combination of the probability of flooding occurring (which is often expressed as a return period or Annual Exceedance Probability) and the potential consequences should that flooding occur (for example the effects on people, homes, business, critical infrastructure and services and the environment [including sites of cultural heritage]). In this report we have expressed flood probability as an Annual Exceedance Probability (AEP). Hence a flood with a 1% AEP has a 1 in 100 chance of happening in any one year. Thus it is possible to define flood risk as:

Flood Risk = (Probability of a flood) x (scale of the consequences)

On that basis it is useful to express the definition as illustrated in Figure 3-1.

**Figure 3-1 – Flood risk definition**





## Current assessment of flood risk

- 3.5 Central Bedfordshire is affected by flooding from the following sources:
- Fluvial (rivers and watercourses)
  - Surface water (overland flow and surface runoff)
  - Sewer (from pipe, pumping station and manhole systems)
  - Groundwater
- 3.6 In many cases flooding occurs due to a combination of different forms of flooding so it is important that our local Strategy describes all types of flooding. Where the flood risk is managed by other Risk Management Authorities (RMA), for example the Bedford Group of IDBs, we have provided useful links where further information can be found.
- 3.7 Information contained within this section of the Strategy is complemented by local flood risk information that we have presented in annex 2. Within annex 2 we have shown where there are historical records of flooding (from local sources) and show how we have prioritised parishes based on analyses we have completed using the Flood Map for Surface Water (FMfSW). We plan to keep annex 2 regularly updated as we gather further information and improve our understanding of local flood risk over the lifetime of the Strategy.

### Fluvial flooding

- 3.8 Fluvial flooding occurs when rivers and channels overflow and overtop and this type of flooding is often referred to as fluvial flooding. Fluvial flooding often happens following heavy or prolonged rainfall, which causes river water levels to increase and can result in rivers not having enough capacity to contain all the flow. Flooding from rivers can also be caused by blockages or obstructions, as a result of fly tipping or fallen trees, for example.
- 3.9 Rivers in England and Wales have been divided into two categories, and are either classified as main rivers or ordinary watercourses.
- Main Rivers*
- 3.10 The Environment Agency is one of the risk management authorities as defined by the Flood and Water Management Act 2010. Protecting the river environment and managing flood risk is part of its job. This means that some of its duties and powers affect riparian owners. The Environment Agency is the risk management authority you need to contact if you would like more information on main rivers and matters relating to flooding from main rivers and the sea. The Environment Agency has powers to work on main rivers and the sea to manage flood risk. These powers allow it to do work. However, it does not have to maintain or construct new works on main rivers or the sea. It is unlikely to maintain a watercourse to improve the amenity of the river or to stop erosion that does not increase flood risk.
- 3.11 Policies for the management of main rivers are set out in Catchment Flood Management Plans (CFMPs) that were produced by the Environment Agency. The main rivers in Central Bedfordshire are covered by the **Great Ouse CFMP**. The role of CFMPs was to establish flood risk management policies that would deliver sustainable flood risk management for the long term. In developing our local strategy we need to be mindful of the flood risk management policies that the Great Ouse CFMP set across Central Bedfordshire. Our objectives for managing local flood risk need to align with

these, ensuring all plans are working together, which in turn will help inform and assist us in making future policy and investment decisions across Central Bedfordshire.

- 3.12 The local Strategy has only considered flooding from main rivers where they are perceived to contribute or affect local flood risk. We have not mapped flooding from main rivers within our local Strategy as the latest information is available from the [Environment Agency's website](#).

#### *Ordinary watercourses*

- 3.13 Ordinary watercourses are those that do not form part of a main river. They are usually smaller watercourses and the scale of risk is often lower than the flood risk posed by main rivers. The causes of flooding from ordinary watercourses are similar to that of main river, although often flooding along ordinary watercourses occurs due to small structures such as undersized culverts restricting the flow or due to water levels in a nearby main river, stopping the ordinary watercourse from discharging freely.
- 3.14 Ordinary watercourses are generally the responsibility of the owners of the land through which they flow. Both Central Bedfordshire Council and the Bedford Group of Internal Drainage Board have permissive powers to manage and carry out maintenance work on ordinary watercourses within their respective areas. To determine if a watercourse is in the drainage board's area, an [interactive map](#) is available on the Internal Drainage Board's website. We may investigate drainage problems on watercourses within our operating area or may use our permissive powers under the Act to carry out maintenance and new works.
- 3.15 Flooding from ordinary watercourses is hard to quantify as flooding mechanisms are often complex and determining an accurate level of risk generally requires detailed studies to be undertaken. As part of our local Strategy we will identify where flooding from ordinary watercourses requires further investigation or improved understanding and we will use our action plan (chapter 8) to prioritise this work. The Environment Agency are preparing flood information that can be used to identify communities at risk within Central Bedfordshire, and information that they have provided us with regards to flood risk from ordinary watercourses is detailed within annex 2.

### **Surface water**

- 3.16 Surface water flooding occurs when heavy rainfall exceeds the capacity of local drainage networks and water flows across the ground or rainfall ponds in low lying areas or localised depressions.
- 3.17 There are two sources of information relating to the identification of potential surface water flood risk, which we have outlined below. The Environment Agency has produced these maps but as we undertake further work to better understand local flood risk we will review and improve upon these datasets, where appropriate.
- Areas Susceptible to Surface Water Flooding (AStSWF) - since July 2009, these maps have been available to Local Resilience Forums and Local Planning Authorities, and provide a starting point in understanding the broad areas where surface water flooding is likely to cause problems.
  - Flood Maps for Surface Water (FMfSW) - these followed on from the AStSWF maps and provide a more realistic representation than the AStSWF maps in many circumstances. The Environment Agency considers this to be the national source of information.

- 3.18 Our local Strategy and the analysis we have completed with regards to surface water has used the FMfSW (chapter 8, annex 2). We are aware that national datasets such as these are subject to change and updates, and through our monitoring and review of our local Strategy we will, where appropriate, update our analysis.

### **Sewer flooding**

- 3.19 For the purpose of the Local flood Risk Management Strategy, sewer flooding occurs when the volume of water entering the sewer network exceeds the capacity of the sewer drainage network.
- 3.20 Public sewers are designed to protect properties from the risk of flooding in normal wet weather conditions. However, in extreme weather conditions there is a risk that sewer systems can become overwhelmed and result in sewer flooding.
- 3.21 Flooding might also be a result of blocked or damaged pipes, but if these are owned by Thames Water or Anglian Water such flooding is the responsibility of the respective Water Utility Company.
- 3.22 In certain instances, flooding from sewers can be a combined issue as a result of heavy rainfall resulting in surface water flooding surcharging the underground pipe systems. In these circumstances, it is the responsibility of several RMAs to work together.

### **Groundwater flooding**

- 3.23 Groundwater flooding occurs as a result of water rising up from the underlying aquifer or from water flowing from ephemeral springs, and it tends to occur following periods of prolonged wet weather when the water table is high, and the areas at most risk are often low-lying where the water table is more likely to be at shallow depth.
- 3.24 As part of our PFRA we undertook an assessment of areas susceptible to groundwater flooding and this mapping can be found within our PFRA.

### **Reservoir flooding**

- 3.25 Flooding from reservoirs is a consequence of the complete or partial failure of a reservoir structure. It may be caused by erosion due to seepage, overtopping of the dam beyond its design level or through accidental damage to the structure.

### **How flood risk may change in the future**

- 3.26 Our Climate Change Strategy acknowledges the risks of climate change to Central Bedfordshire and sets out our strategic goals and targets for reducing carbon emissions and for increasing preparedness which will need to be carried through into the Climate Change Adaptation Plan. With particular reference to flood risk we will follow Environment Agency guidance as described in the document '**Adapting to climate change: Advice for Flood and Coastal Erosion Risk Management Authorities**'. This document provides specific guidance on the assumptions to be included in our Strategy and Action Plan. We have committed to preparing and implementing this plan through our Climate Change Strategy, and we have completed a Climate Change Study to provide the evidence base for developing this adaptation plan. The content of our climate change study demonstrates why our local strategy

must have due regard as to how local flood risk may change in the future. We will need to ensure that flood risk management measures make allowances for climate change to ensure that any investment delivers longer term benefits.

3.27 The UK Climate Projections (UKCP09) confirm that the national climate trends are broadly applicable to Central Bedfordshire:

- Warmer wetter winters
- Hotter drier summers
- Fewer days of ice, frost and snow
- A higher likelihood of extreme weather events including heatwaves and intense rainfall
- The impact of climate change on wind speeds is uncertain and little confidence is assigned to existing projections.

This chapter has outlined the different types of flooding and how they could affect Central Bedfordshire, with further level of detail also included with annex 2. The next chapter sets out the objectives we have developed for managing local flood risk.

## 4 Objectives for Managing Local Flood Risk

This chapter details the six objectives we have developed which set out the outcomes we would like from our flood risk management work. The objectives will allow us to set targets for managing flood risk so that we can monitor progress as we implement the Strategy.

### Our vision and objectives

- 4.1 Our vision is that Central Bedfordshire great place to live and work'. This strategy aims to enhance local communities.
- 4.2 We have clear and explicit ambitions for Central Bedfordshire, which is set out in our Medium Term Plan. This document sets out our six priorities which will help and support our communities to progress and prosper. Our six priorities are:
- Enhancing Central Bedfordshire
  - Improved educational attainment
  - Promote health and wellbeing and protecting the vulnerable
  - Better infrastructure
  - Great universal services
  - Value for money
- 4.3 We will adopt a pragmatic approach to flood risk management when maintaining, applying and monitoring the Local Flood Risk Management Strategy. In performing our role we will endeavour to deliver solutions that consider the potential effects of climate change, take account of flooding from all sources, result in improved water quality, enhance the environment wherever possible and provide better places for people.
- 4.4 The objectives we have set for managing local flood risk will contribute and support delivery of these priorities. We have also ensured that they are consistent with the objectives and guiding principles within the National Flood and Coastal Erosion Risk Management Strategy and have recognised the aspirations of other Risk Management Authorities who have a vested interest in flood risk across Bedfordshire.

#### Objective 1: Partnership Working

Establish and maintain effective partnerships within our own organisation, with other Risk Management Authorities, with our neighbouring Lead Local Flood Authorities and with our local communities.

## **Objective 2: Flood Risk and Development**

Ensure that development looks to reduce the causes and impacts of flooding and that all development uses SuDS as normal practice, and where appropriate safeguard land which is needed for current and future flood management.

## **Objective 3: Local Flood Risk**

Develop a greater understanding of local flood risk by identifying where assets may influence the impact of local flood risk, how local flood risk may change in the future and improve local knowledge and recording of flooding incidents.

## **Objective 4: Delivery**

Establish processes to enable identification of priorities, sources of funding and schemes so that we meet our objectives.

## **Objective 5: Resource**

To take a collaborative approach, working more effectively as an authority and with our partners, to reduce flood risk and where appropriate seeking opportunities for packaging work. We will aim to use all available resources and funds in an integrated way to support our priority of achieving efficiency savings.

## **Objective 6: Local Communities**

Limit the effect of flooding on people's normal way of life by taking action with our partners to minimise the impact of local flood risk on our communities and environment, engaging with and empowering affected communities and ensuring that we provide clear and useful information to enhance our local communities' preparedness and resilience to local flood risk.

This chapter has described our objectives for managing local flood risk and in the next chapter we have provided high level information with regards to measures and funding to manage flood risk.

## 5 Measures and Funding to Manage Flood Risk

This chapter shows how measures to manage flood risk can be categorised. The chapter then goes on to discuss funding for flood risk, and we introduce our intention to prepare a Strategic Investment Plan to support our Strategy. We recognise that flood risk from local sources in Central Bedfordshire is relatively low when compared with other areas of the Anglian Region and across the UK. Therefore, this chapter highlights that securing Government funding for implementing flood risk management measures will be difficult. Delivery of flood risk management works will be dependent on sourcing local contributions, both public and private.

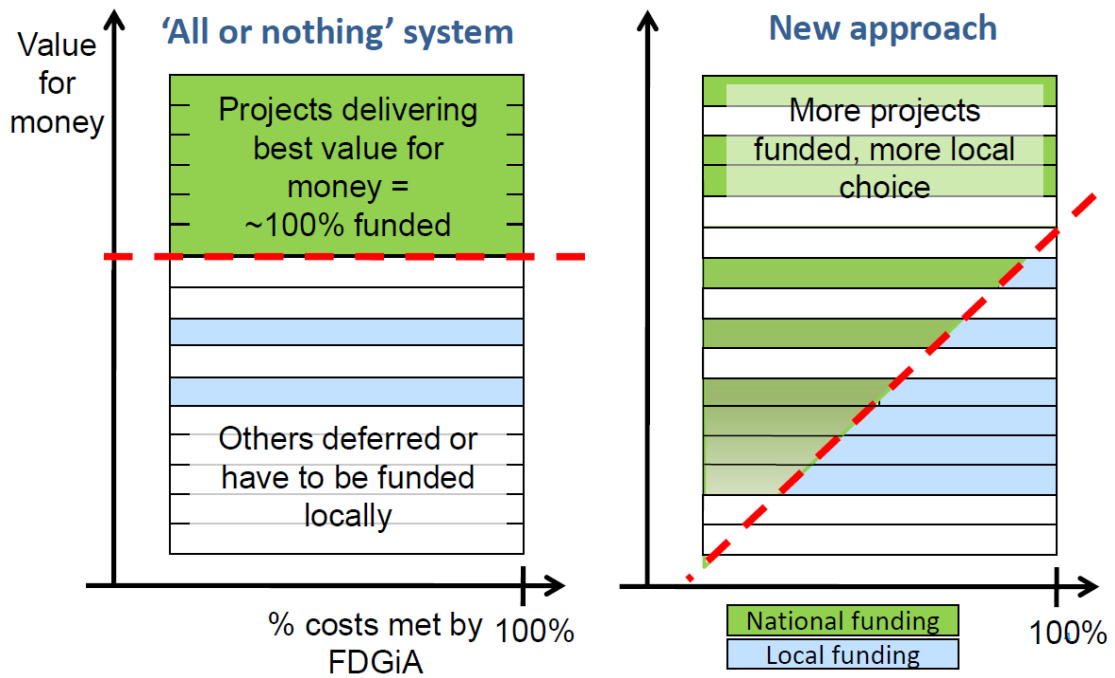
### Measures

- 5.1 A key output from our local strategy is the Action Plan (see section 8). Our action plan sets out the actions that we plan to undertake as we work towards meeting our local strategy objectives (as previously set out within section 4).
- 5.2 Measures that we have considered as part of the action planning process can be categorised into the following high level themes:
- Studies, assessments and plans
  - Development planning and adaptation
  - Flood awareness, response and recovery
  - Land management
  - Asset management and maintenance
  - Project / scheme / works delivery

### Funding

- 5.3 Defra introduced Resilience Partnership Funding for Flood and Coastal Risk Management (FCERM) in May 2011. The partnership funding policy means that central government money (FCRMGiA) is potentially available to meet the costs, partially or in full, of any worthwhile scheme, instead of meeting the full costs of just a limited number of schemes. The level of funding is now based on the outcomes and benefits being delivered. Funding can also be obtained to deliver required health and safety improvements on existing flood risk management assets. The Partnership Funding policy context and FCRMGiA processes are explained on the Environment Agency's website.

**Figure 5-1 - Defra partnership funding model**



- 5.4 Another source of funding is known as Local levy, this is raised by each RFCC to fund things that are a Committee priority, but which would not receive full funding from FCRMGiA in the current financial year. This local levy has existed since 2004 and has evolved over recent years; the levy can only be applied to expenditure within the remit of the Environment Agency.
- 5.5 The Flood and Water Management Act has extended the use of levy from 1 April 2012, so that local Authorities with coastal, ordinary watercourse, surface water or groundwater issues can seek levy funding from the RFCC.
- 5.6 Examples of activities using local levy are:
- Providing funding to increase the Partnership Funding score to unlock FCRMGiA for Environment Agency schemes.
  - Providing funding to increase the Partnership Funding score to 'unlock' capital grant for Local Authority and Internal Drainage Board schemes.
  - Delivering a programme of locally significant capital works without FCRMGiA or capital grant.
- 5.7 As a Lead Local Flood Authority, Central Bedfordshire (and other flood "Risk Management Authorities") are required to submit an annual Plan, referred to as the Medium Term Plan (MTP), to the Environment Agency. This plan indicates whether FCRMGiA is sought and provides the key information needed for the Agency to assess what, if any, level of FCRMGiA support is possible.
- 5.8 In comparison with many other Lead Local Flood Authority areas in the Anglian Region the flood risk from local sources in Central Bedfordshire is relatively low and therefore securing funds through FCRMGiA will be difficult.
- 5.9 Due to the way in which FCRMGiA is allocated, securing other contributions and/or local funds to meet part of the cost of flood risk management measures will be necessary so that schemes receiving partial funding through the FCRMGiA process can be delivered.



- 5.10 It is important that we grasp the opportunity to align stakeholders, particularly those with available funding, with those who would benefit from further investment in flood risk management. Within this process, developing options for investment will need to test the local appetite for reducing the risk against willingness to meet any additional costs not covered by central government support via Flood Defence Grant in Aid. With money comes influence: local democracy and engagement is vital.
- 5.11 It is a difficult concept to grasp but our local Strategy needs to be realistic. Set against a backdrop of limited resources and low economic activity, we recognise that we will be unable to provide the level of investment to resolve all flooding issues across Central Bedfordshire and with our increasing responsibilities under the Act; greater investment will also be needed by us and our partners to increase our resources.
- 5.12 To help us make best use of funding that may be available to support the management of flood risk now and into the future and to use available investment and resources effectively and efficiently, we are developing a Strategic investment Plan which will inform our local Strategy. In the first instance we have prepared an Outline Investment Strategy which describes how we intend to develop a more detailed plan over time, as summarised within chapter 8, annex 3. Annex 3 provides some information on potential sources of funding that may be available to contribute towards flood risk management and describes our approach to preparing a more detailed plan.
- 5.13 We are preparing a Strategic Investment Plan to take advantage of the new ways of paying for the things that are needed most. We will use the Investment Plan to look at the opportunities to find money for things that are needed from a variety of different organisations, businesses and communities. By working together with other RMAs and our partners we will be able to make the best use of all the money that is available allowing us to use public funds to help those who are in most need.
- 5.14 This approach will help us to deliver more affordable schemes and plan for a future when flood risk is expected to get worse. In explicitly trading-off appetite for risk against investment costs and affordability, it is hoped that the resulting investment plan will create:
- Good engagement amongst key decision makers, partners, communities and other stakeholders.
  - More effective and transparent prioritisation between potentially competing projects throughout the county and also between projects tackling different sources of risk.
  - A compelling business case for external contributions and other local investment
- 5.15 We appreciate that this may be challenging, particularly as different organisations and funding sources may be working to different timescales. As an organisation we are committed to seeking out these opportunities in order to drive forward efficiencies, make things happen and make money go further.

This chapter has outlined how we intend to fund flood risk and the measures we could take. The next chapter outlines how we will review the strategy.

## 6 Reviewing the Strategy

The Local Flood Risk Management Strategy is a 'living' document and this chapter sets out how we intend to monitor and update the Strategy moving forward. We also highlight what may influence us to deviate from the timescales we have set out.

- 6.1 We have a duty to maintain and monitor the strategy and make the following commitments to ensure that this document remains as a 'living document', which will continue to support us and other Risk Management Authorities to manage local flood risk across Bedfordshire both now and into the future.
- We will review the 'main' strategy document every five years, and where appropriate update it.
  - We will review the annexes annually, and where appropriate update them.
  - We will review and update the Action Plan annually.
- 6.2 This responsibility for maintaining, reviewing and updating the strategy will be undertaken by the Building Control Head of Service. We recognise that we may need to be reactive and update sections of the strategy more frequently. The following may prompt a more frequent review:
- Legislation changes that may result in changes to policy, which could affect roles and responsibilities.
  - Alterations to the understanding or nature of local flood risk.
  - A significant flood event.

## **7 The Strategy and Wider Environmental Objectives**

- 7.1 The Flood and Water Management Act requires that the local Strategy demonstrates how it contributes to the achievement of wider environmental objectives.
- 7.2 The development of the local Strategy often includes the preparation of a Strategic Environmental Assessment (SEA), the consultation on the screening for this was undertaken during February 2013. The outcome of the screening was that an SEA is required and so a scoping study and report will be prepared in support of the local Strategy.
- 7.3 The aim of the SEA is to identify potentially significant environmental effects likely to be created as a result of the implementation of the plan or programme on issues such as “biodiversity, population, human health, fauna, flora, soil, water, air, climate, material assets including architectural and archaeological heritage, landscape and the interrelationship between the above factors” (Annex 1(f), European Directive 2001/42/EC). It will provide a platform for the identification of opportunities to achieve wider environmental objectives.
- 7.4 We consulted on the SEA scoping assessment for a five week period during summer 2013. At the end of the five week SEA scoping period, a high level Environmental Report was produced. The Environmental Report incorporates information from the Scoping Stage taking on board comments and information brought to light during the consultation period. The Environmental Report assessed the environmental impact of the measures in the local strategy, in comparison with a number of alternative options.
- 7.5 The SEA will be used to identify how the strategy contributes to the achievement of wider environmental objectives.

## 8 Action Plan and Annexes

The information presented from this point forward will be reviewed and where appropriate, updated annually. You will now find the following information:

- Action Plan: This details our proposed actions for working towards delivering our objectives as set out within chapter 4.
- Annex 1: Communications and Engagement – this annex includes responses from the questionnaire that we carried out in the early stages of developing our local Strategy. At a later date, we will also use this annex to share comments received during the formal consultation period.
- Annex 2: Assessment of Local Flood Risk – this is where we have presented information on local flood risk across Central Bedfordshire, using a combination of local information and Environment Agency data.
- Annex 3: Outline Investment Strategy – we are working towards having an investment strategy to support us in prioritising our management and investment of local flood risk. This annex provides information on potential funding sources and outlines how we plan to approach prioritisation of investment for local flood risk management over the short, medium and long term.
- Annex 4: Flood Risk Policies – within this annex we have provided further information on what we are doing in order to fulfil our responsibilities as a LLFA.
- Annex 5: Flood Legislation - this is a reference area which details links for where you can find more information about legislation of relevance to the Local Flood Risk Management Strategy.
- Annex 6: Glossary and Abbreviations – this is a reference document for understanding more about terminology we have used through the main Strategy document.

## Action Plan

Where appropriate, in delivering our actions we will work in partnership with other organisations.

Action	Priority (High: up to 3 years, Medium: 3-6 years, Low: 6+ years)	Potential Funding Source	Lead Partner	Support Partner
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### *Objective 1: Partnership Working - Establish and maintain effective partnerships within our own organisation, with other Risk Management Authorities, with our neighbouring Lead Local Flood Authorities and with our local communities*

Improve the Local Flood Risk Technical Group by bringing together more local partners that have an interest in or a duty to manage local flood risk.	High, then ongoing	-	CBC	MKC, BBC, BGIDB, EA, AW, TW
Work more closely across all Central Bedfordshire Council departments to provide joined up services that take account of flood risk management so that all our work programmes are based on the Strategy and have opportunities to influence its development.	High	-	CBC	-
Continue to promote partnership working with Parish Councils and local communities.	Ongoing	-	CBC	-

Action	Priority (High: up to 3 years, Medium: 3-6 years, Low: 6+ years)	Potential Funding Source	Lead Partner	Support Partner
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### *Objective 2: Flood Risk and Development - Ensure that development looks to reduce the causes and impacts of flooding and that all development uses SuDS as normal practice, and where appropriate safeguard land which is needed for current and future flood management*

NB: Some of these actions refer to the acronym SuDS. This stands for Sustainable Drainage Systems, which are systems that include ways of making runoff from rainfall behave as if it was flowing off land that was not developed. The natural runoff effect can be achieved by using a variety of measures and these also improve the quality of the water discharging to the rivers and channels. The measures can help to reduce the volume and flow of surface water runoff, trap pollutants and promote biodiversity.

Establish a SuDS Approval Body (SAB) to approve proposed sustainable drainage systems used as part of new developments and develop local standards to aid the design process.	High	-	CBC	EA
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Ensure Central Bedfordshire Council's Planning policies and development control responses take account of local flood risk management, for example supporting the control of inappropriate development in flood risk areas.	Ongoing	-	CBC	EA
Ensure new developments comply with Central Bedfordshire Council's flood risk management objectives, using sustainable drainage as normal practice.	Ongoing	-	CBC	EA
Decide whether new bylaws are needed to ensure that people, who own land, including a watercourse, manage their land responsibly to reduce the risk of flooding for the benefit of the wider community.	High	-	CBC	BGIDB, EA
Work with other RMAs to develop a surface water policy	High	-	CBC and AW	BGIDB, EA

Action	Priority (High: up to 3 years, Medium: 3-6 years, Low: 6+ years)	Potential Funding Source	Lead Partner	Support Partner
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**Objective 3: Local Flood Risk - Develop a greater understanding of local flood risk by identifying where assets may influence the impact of local flood risk, how local flood risk may change in the future and improve local knowledge and recording of flooding incidents**

Develop and maintain a record of all known flooding on a parish by parish basis to ensure that local knowledge of flood risk is accessible to all.	High, then ongoing	-	CBC	-
Develop an asset register of things (e.g. assets such as culverts) or features (e.g. walls, banks) in Central Bedfordshire that have a significant effect on flood risk.	High, then ongoing	-	CBC	-
Investigate the things that affect flood risk, such as blockages to culverts, to understand what might be done to reduce the risk of flooding.	High	-	CBC	-
Continue to develop prioritisation of parishes (through the investment plan process) and use this information to inform and influence updates to the action plan	High, then ongoing	-	CBC	BGIDB, EA, AW, TW
Investigate local flooding and identify possible solutions, taking enforcement action where appropriate if a landowner has failed in their responsibility to take action to reduce flooding risk.	Ongoing	-	CBC	BGIDB, EA, AW, TW

Carry out an assessment to determine where Central Bedfordshire Council may have a responsibility with regards to the risk of flooding from reservoirs and understand the implications of similar assessments prepared by others. Ensure emergency plans are put in place where necessary to counter these risks and keep communities informed of potential risks.	High	-	CBC	-
Take steps to better understand local flood risk by preparing Surface Water Management Plans (or undertake a similar assessment) for areas at higher risk of flooding. Currently we anticipate that we will be completing studies for: <ul style="list-style-type: none"> <li>• Arlesey (and Stotfold)</li> <li>• Blunham</li> <li>• Caddington</li> <li>• Biggleswade</li> <li>• Leighton Buzzard <i>(note: see additional information at the end of the action plan table)</i></li> <li>• Southill</li> </ul>	High	Defra grants is a possible source of partial funding	CBC	EA, BGIDB, AW, TW
As new information becomes available, reassess flooding risks in areas categorised as medium risk and monitor risks in areas categorised as low risk.	High (for years 2-3 pending funding)	Defra grants is a possible source of partial funding	CBC	EA, BGIDB
Liaise with Emergency Planning team with regards to local flood risk analysis and understand linkages with community risk register.	High	-	CBC (flood risk management)	CBC (emergency planning)
Review the groundwater analyses completed as part of the PFRA and establish whether the analysis requires updating in light of new information that may be available.	High	-	CBC (flood risk management)	CBC (emergency planning)

Action	Priority (High: up to 3 years, Medium: 3-6 years, Low: 6+ years)	Potential Funding Source	Lead Partner	Support Partner
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**Objective 4: Delivery - Establish processes to enable identification of priorities, sources of funding and schemes so that we meet our objectives**

Develop processes to align investment across RMAs in order for all organisations to work together in identifying priorities across Central Bedfordshire to maximise opportunities	High	-	CBC	EA, BGIDB, AW, TW
Investigate opportunities for property level protection (PLP) at properties at risk of flooding in Leighton Buzzard/Linslade.	High	-	CBC	EA

Action	Priority (High: up to 3 years, Medium: 3-6 years, Low: 6+ years)	Potential Funding Source	Lead Partner	Support Partner
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**Objective 5: Resource - To take a collaborative approach to reducing flood risk and where appropriate seeking opportunities for packaging work to deliver multiple outcomes. We will aim to use all available resources and funds in an integrated way to support our priority of achieving efficiency savings.**

Take advantage of new ways of paying for things that are most needed. We will use an Investment Plan to look at the opportunities to find funding from a variety of organisations, businesses and communities. By working together with our partners we will be able to make best use of the available money.	High		CBC	EA, BGIDB, AW, TW
Prioritise what action we can take to minimise flood risk based on this funding.	High		CBC	-



Action	Priority (High: up to 3 years, Medium: 3-6 years, Low: 6+ years)	Potential Funding Source	Lead Partner	Support Partner
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**Objective 6: Local Communities - Limit the effect of flooding on people's normal way of life by taking action with our partners to minimise the impact of local flood risk on our communities and environment, engaging with and empowering affected communities and ensuring that we provide clear and useful information to enhance our local communities' preparedness and resilience to local flood risk**

Encourage local communities to become involved in reducing flood risk by giving those communities that wish to help themselves the training and support to run community response groups. This might see a community take responsibility for recording the level flooding reaches, for instance.	Ongoing	-	CBC	-
Make local communities more aware of the work Central Bedfordshire Council and risk management authorities do.	Ongoing	-	CBC	-
Continue to work with local communities to improve awareness of flood risks and to better understand where help and information can be obtained when flooding occurs or looks likely to occur.	Ongoing	-	CBC	-

### **Leighton Buzzard and Linslade (additional note)**

The floods of 1992 caused 43 properties to flood in Leighton Buzzard, the flood waters were principally from the Clipstone Brook which is designated as a main river watercourse and managed by the Environment Agency (EA). The EA started a project to investigate main river flood risk in Leighton Buzzard. The project found that the construction of an upstream flood storage facility would reduce flood risk in Leighton Buzzard; however the economics of the scheme could not attract the required levels of grant to make the project viable.

In 1998/99 the Bedford Group of Internal Drainage Boards constructed flood storage ponds on the Eggington Brook, a tributary which joins the Clipstone Brook at Hockliffe Road in Leighton Buzzard. This measure has reduced peak flows on the Eggington Brook before its waters enter the Clipstone Brook.

Whilst the levels of risk are reduced from those experienced in 1992 there remains a residual risk that could affect existing properties. The EA has been undertaking further modelling work to fully identify all the flooding issues in Leighton Buzzard. We will continue to work with the EA and IDB to evaluate the need for a smaller project for those properties that may still have a degree of flood risk and support the communication of further outcomes to the community.

CBC Countryside Access services manage vegetation maintenance programmes on the Clipstone Brook and River Ouzel to minimise restrictions to flow, these programmes have attracted additional funding to raise maintenance standards. Arrangements are progressing well to further increase bank side tree and vegetation maintenance by the development of a joint management plan for the Clipstone Brook and River Ouzel between key stakeholder organisations.

## **Annex 1: Communications and Engagement**

Whilst developing our local Strategy we have prepared and issued a local flooding questionnaire. Our objective was to gather local flooding knowledge from as many different sources as possible, and understand views and experiences of flooding at all levels so this could inform our Strategy. We have not included full details of all responses to the questionnaire within our main Strategy document but we have used the responses where appropriate, to inform what has been included in the content.

This annex includes a summary of the responses received.

During subsequent stages of the preparation of the Strategy we will also use this annex as an area to share consultation comments received during the formal consultation period. It will also be used as an area for documenting and recording any comments that are received over the lifetime of the Strategy, which may influence and inform any future revisions.

## Questionnaire: Flooding in your Local Area – Results

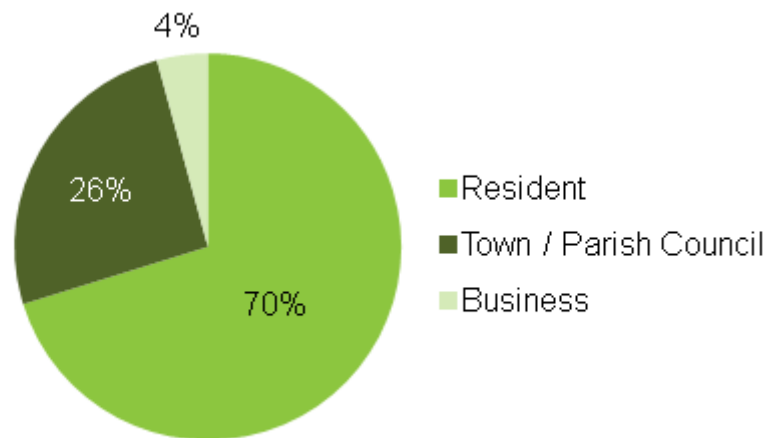
The results presented below are those directly recorded from the questionnaires. We have not performed any additional interpretation of the information we received and the results show the perception of flood risk within Central Bedfordshire as obtained from the responses received from those within the residing communities. The results therefore include the assumption that the responses received were representative of the general population of the Central Bedfordshire and therefore applicable to the council area as a whole.

### **Question 1 – Respondents**

Figure Q1-1 summarises the responses to question 1.

The majority of the respondents were local residents (70%), whilst roughly a quarter were Town/Parish council representatives (26%). Responses from businesses formed a small proportion of the overall respondents (4%).

**Figure Q1-1: Percentage of respondents from businesses, councils and the local community respectively**

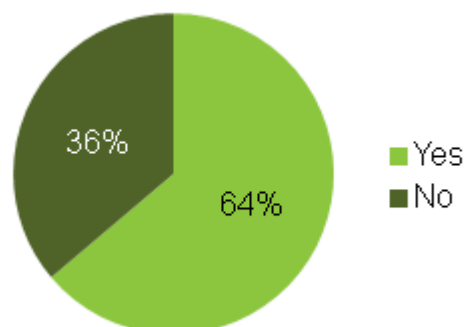


### **Question 3 - Have you been affected by flooding in Central Bedfordshire?**

A summary of the results of question 3 are displayed in Figure Q3-1.

Of respondents, sixty-four percent of have been affected by flooding in Central Bedfordshire, whilst thirty-six have not been affected.

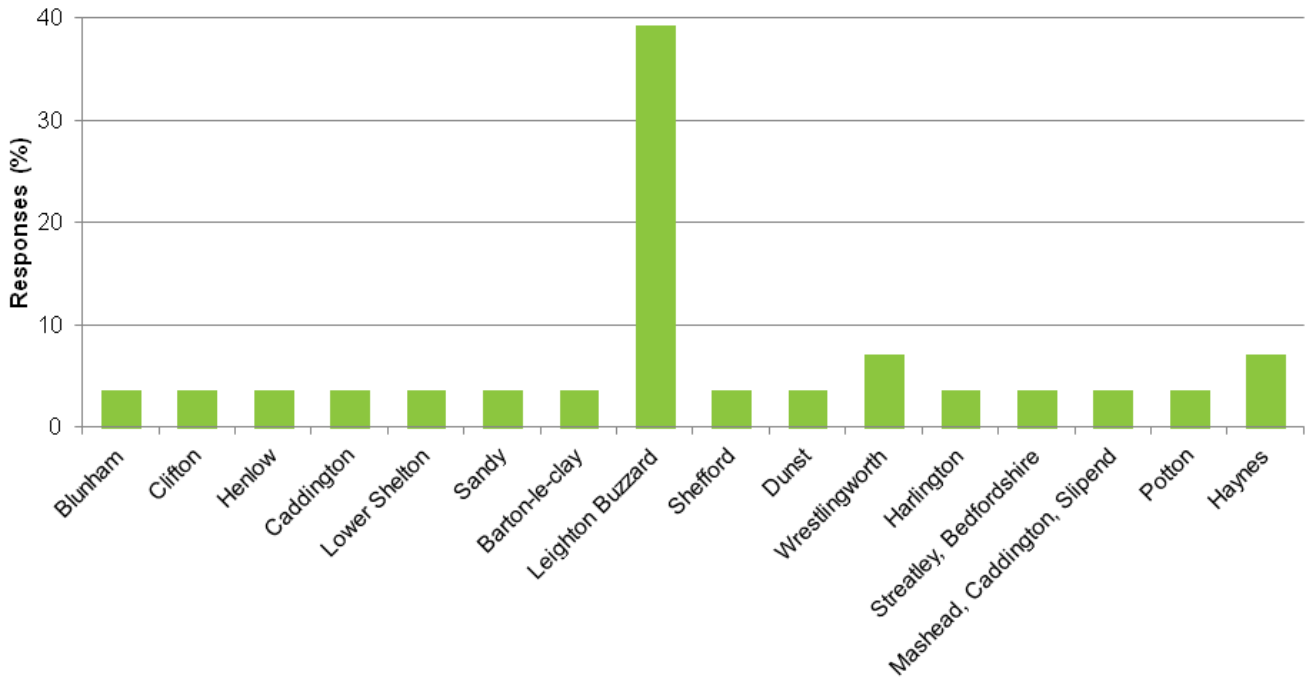
**Figure Q3-1: Percentage of respondents affected by flooding in Central Bedfordshire**



**Question 4 - If you have been affected by flooding, please tell us when and where this was**

A summary of the results of question 4 are displayed in Figure Q4-1. The area within Central Bedfordshire receiving the highest proportion of responses indicating that respondents have been affected by flooding is Leighton Buzzard (39%).

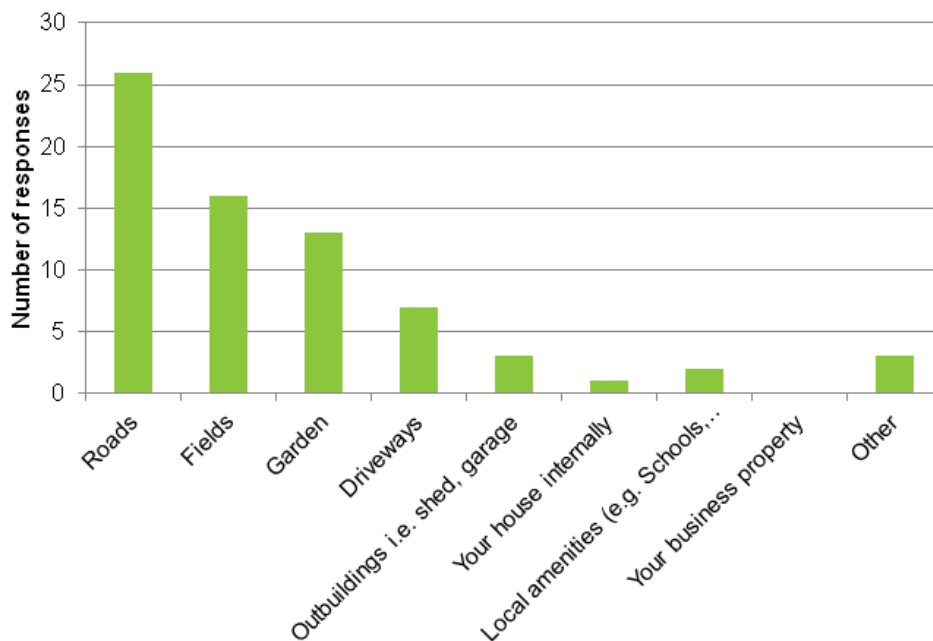
**Figure Q4-1: Flood History in Central Bedfordshire**



**Question 5 - Which part of your property/ local area did the flooding affect? Please tick all that apply**

A summary of the results of question 5 are displayed in Figure Q5-1. The main areas reported to be affected by flooding are roads, fields and gardens, which comprise of three-quarters of the total areas reported as flooded. A moderate reporting of driveways flooding is apparent, but internal flooding to houses is relatively low.

**Figure Q5-1: Areas affected by flooding**

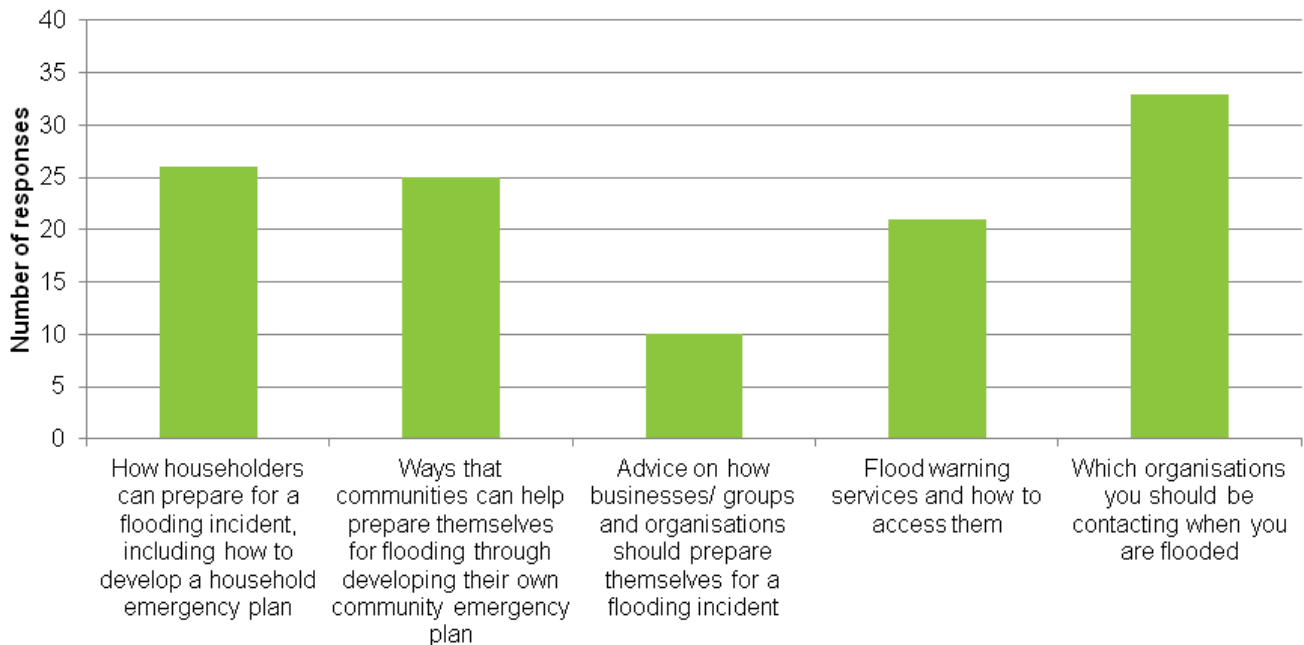


**Question 6 - Which of the following areas would you like to see information and advice be made available? Please tick all that apply**

Figure Q6-1 summarises the responses to question 6.

The greatest share of information and advice that respondents would like to be made available is which organisations they should contact once their properties have been flooded. However, the other aspects of information and advice listed also score highly, particularly in relation to preparing for a flooding incident by means of household or community emergency plans.

**Figure Q6-1: Responses relating to availability of information and advice**

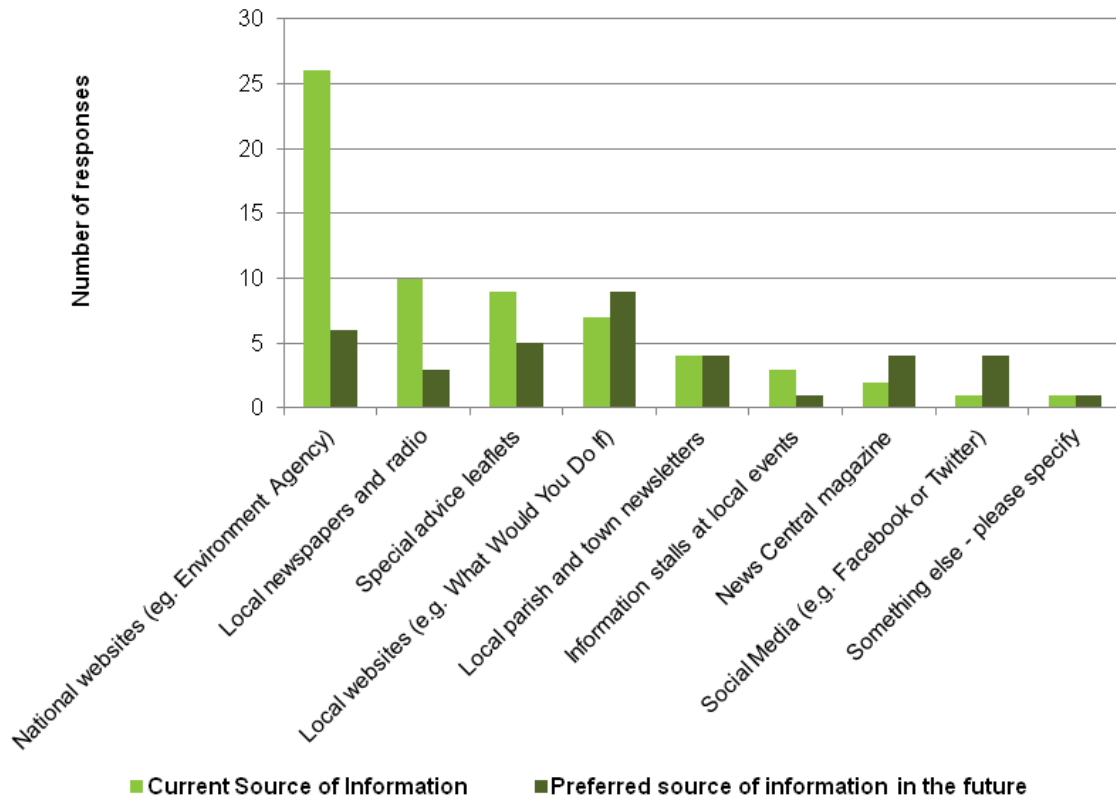


**Question 7 - Please tell us how you currently receive information and advice on flooding and other emergency planning issues and how you would like to receive this in the future?**

A summary of the results of question 7 are displayed in Figure Q7-1.

According to the questionnaire results, currently the main source of flooding information and advice accessed by respondents is national websites such as the Environment Agency. However, in the future the most respondents would prefer to receive more information from local websites as well as social media. One suggestion was also made for receiving information via an email messaging system. Receiving information via local newspapers or radio was indicated by fewer people.

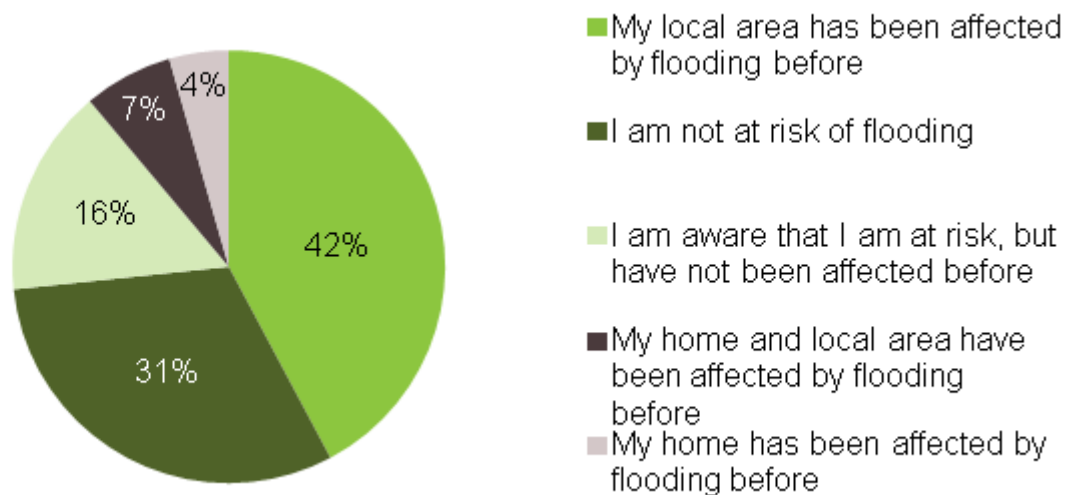
**Figure Q7-1: Current source of flooding information and how residents would like to receive the information in the future**



**Question 8 - What is your current understanding of flood risk in your local area? Please tick one**

A summary of the results of question 8 are displayed in Figure Q8-1. Nearly half of the respondents have said that their local area has previously been affected by flooding, whilst 7% reported that their local area and home had previously been affected by flooding. Thirty-one percent of respondents noted that they are not at risk of flooding, whilst 16% of respondents are aware that they are at risk but have not been affected by flooding before.

**Figure Q8-1: Current flood risk**

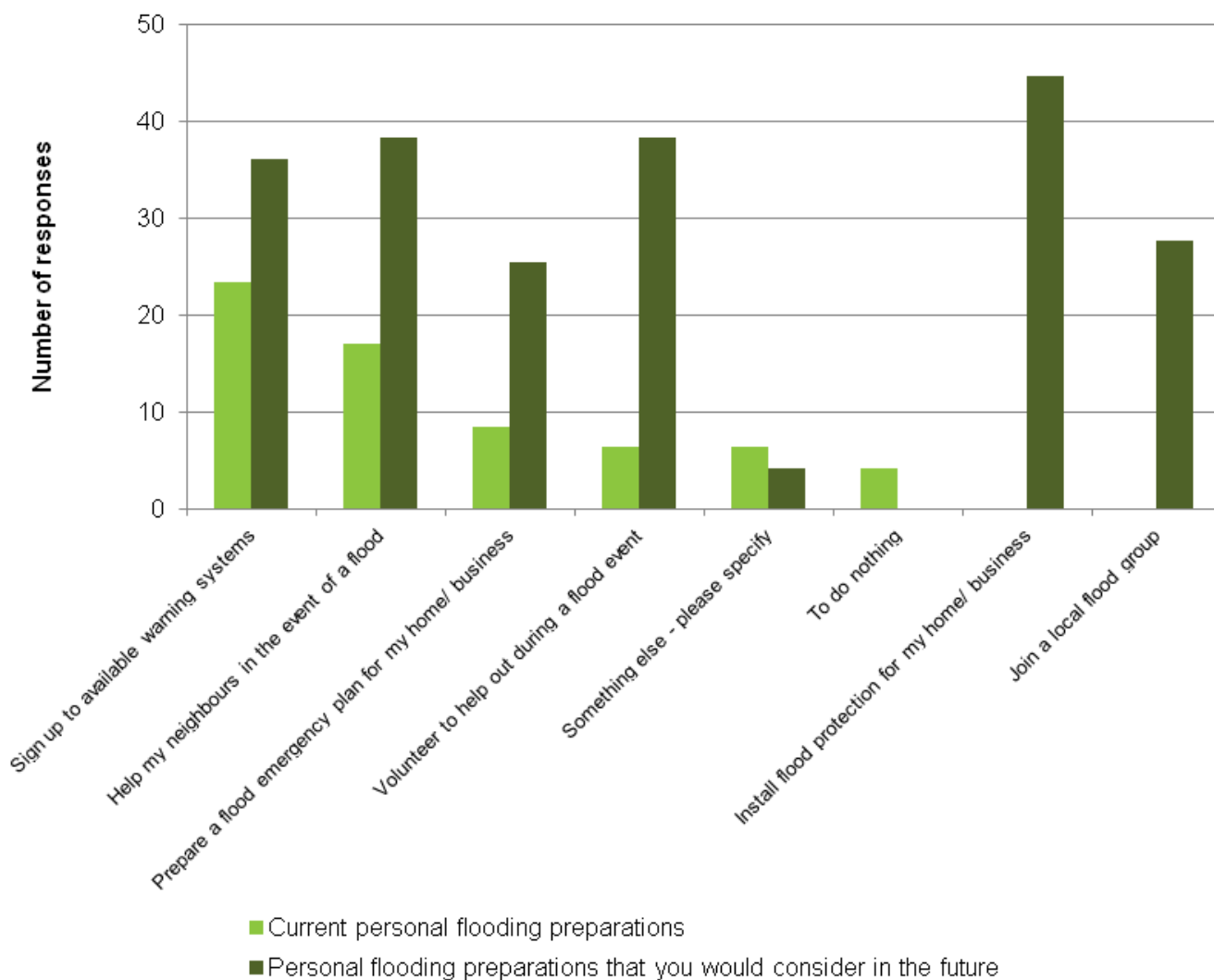


**Question 9 - Which of the following things do you currently do to prepare for flooding? and, Which of the following things would you consider doing to prepare for flooding?**

A summary of the responses to question 9 are displayed in Figure Q9-1.

Currently, respondents indicated that the flood preparation mechanism most used at present is signing up to available warning systems. Following this, respondents helping their neighbours in the event of a flood was the second highest recorded. High numbers of responses were received for future consideration of each of the flood preparation mechanisms listed. Of those responses, the greatest number received related to respondents considering installing flood protection for their homes/businesses in the future.

**Figure Q9-1: Current and future flood preparations**



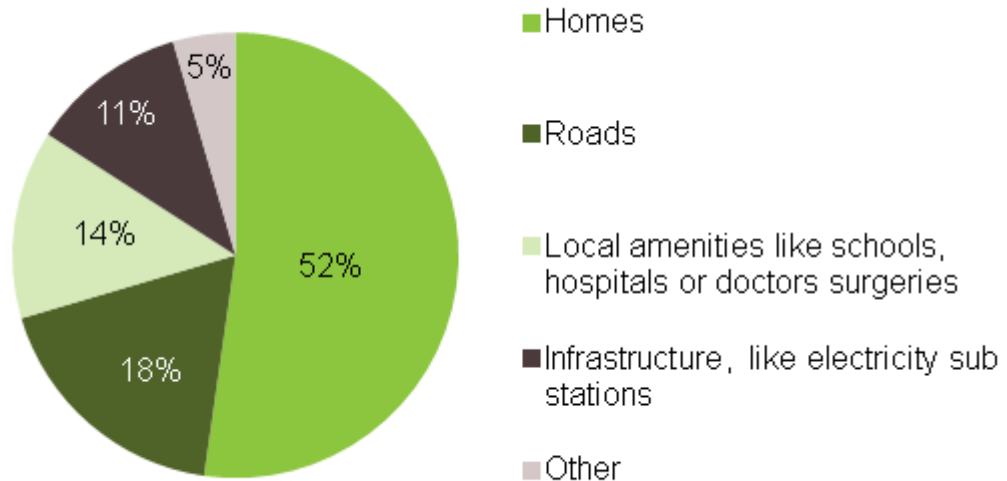
**Question 10 - Keeping people safe and protecting life in an emergency will always be our priority. Beyond this, what do you think should be our highest priority for flood risk management? Please tick one.**

A summary of the responses to question 10 are displayed in Figure Q10-1.

Respondents consider that the highest priority for flood risk management should be residential properties, followed by roads, then local amenities (such as schools or doctors surgeries).



**Figure Q10-1: Highest priority for flood risk management**

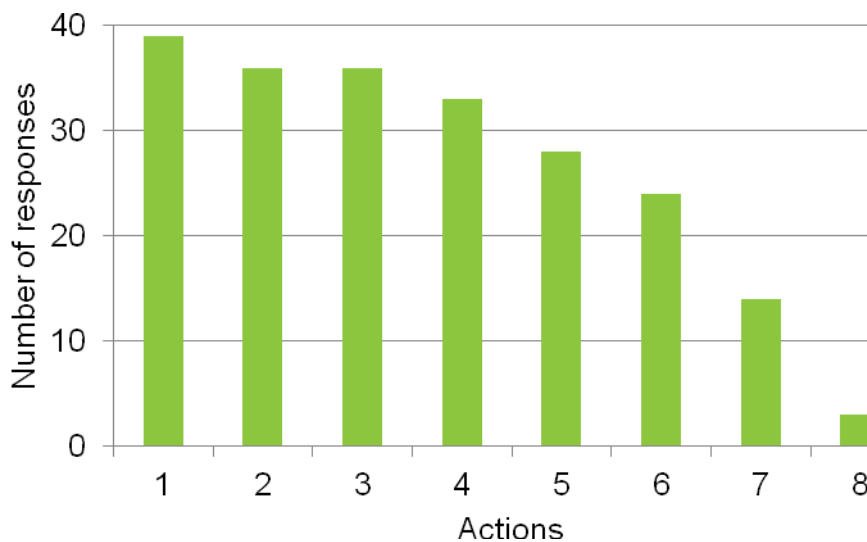


**Question 11 - What do you think the Council and its partners should be doing to manage flood risk across Central Bedfordshire? Please tick all that apply.**

A summary of the responses to question 11 are displayed in Figure Q11-1.

The action with the highest response rate considered by respondents that the council and its partners should be focusing on to manage flood risk across Central Bedfordshire is working with planners to ensure that new development does not increase flood risk. However, actions 2-6 also scored highly, suggesting it is considered that a range of actions should be undertaken to manage flood risk across Central Bedfordshire.

**Figure Q11-1: Actions considered by respondents for flood risk management**



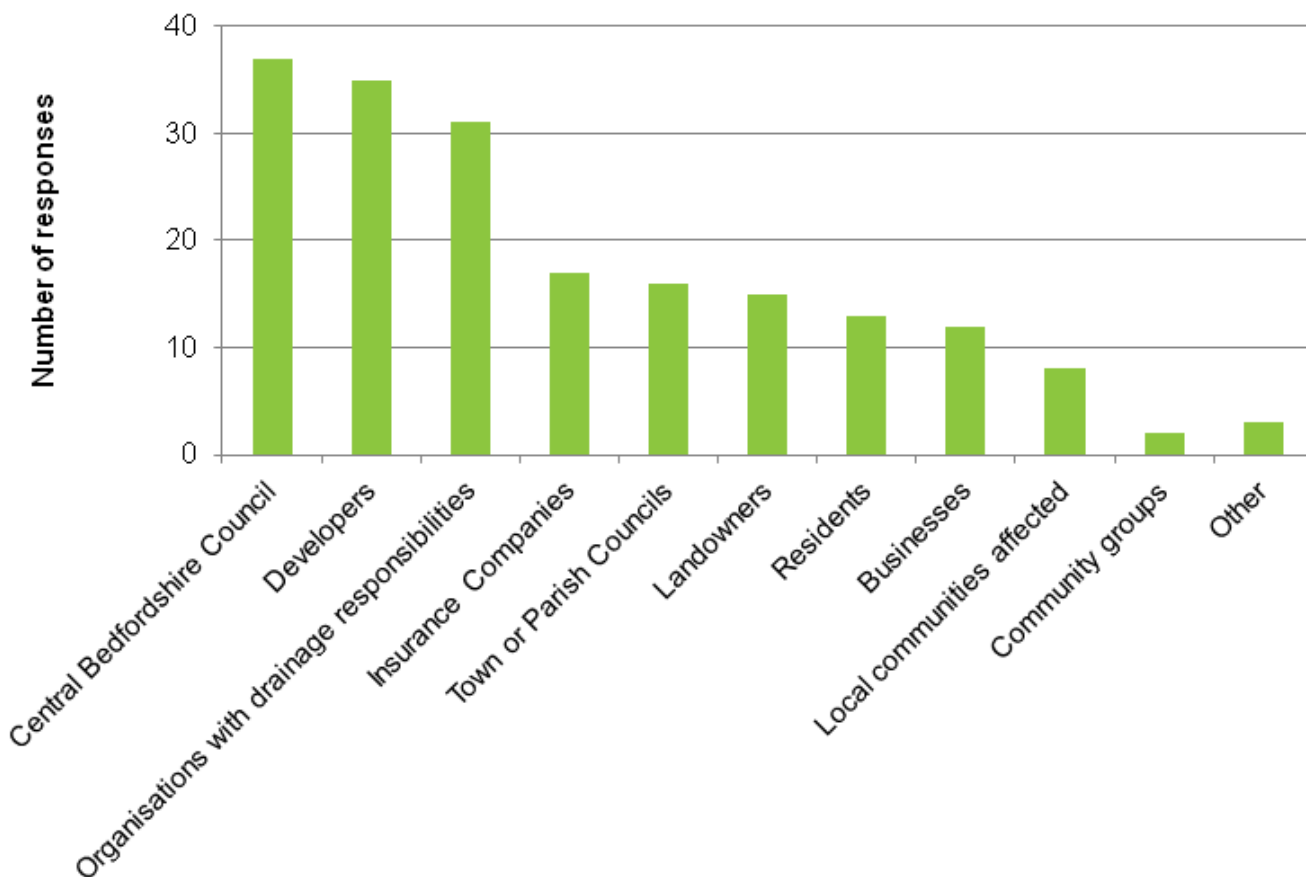
1. Working with planners to ensure new development does not make flooding worse
2. Cleaning out watercourses more frequently
3. Managing assets to help reduce the chance of flooding (e.g. culverts to flow water under a road)
4. Cleaning out road gullies more frequently
5. Constructing new flood defence schemes in highest risk areas
6. Constructing flood defence schemes wherever possible
7. Working with local communities to help them prepare for flooding
8. Other

**Question 12 - Who do you think should contribute towards the cost of measures to reduce flood risk? Please tick all that apply**

Figure Q12-1 summarises the responses to question 12.

Of the responses received the greatest number indicate that Central Bedfordshire Council should contribute most towards the cost of mitigation and protection measures against flooding. Receiving similar numbers of responses to Central Bedfordshire Council are developers and organisations with drainage responsibilities. A lower number of responses were assigned to other potential cost payers.

**Figure Q12-1: Financial contributions to reduce flood risk**



## Annex 2: Assessment of Local Flood Risk

### An Overview of Flood Risk in Central Bedfordshire

Figure A2-1 shows an outline view of the Main Rivers, ordinary watercourses and Internal Drainage Board (IDB) boundaries within Central Bedfordshire. The majority of the land in Central Bedfordshire drains to the catchment of the river Great Ouse, which discharges to the sea in The Wash. A small area of land at the south of Central Bedfordshire drains to the catchment of the River Lee, which discharges to the Thames Estuary upstream of the Thames Barrage.

The Environment Agency has responsibilities for the Main Rivers, which are located to the east and far west of Central Bedfordshire. The River Ivel/Hiz/Purwell and River Ivel Navigation/Hit/Flit flow in a northerly direction through and out of Central Bedfordshire to the northeast, whilst the River Ouzel/Clipstone Brook flow through and out of the council boundary to the far west. Both the River Great Ouse and Backwaters, and the Rhee/Mill Stream flow along the northeast and east of council boundary, respectively.

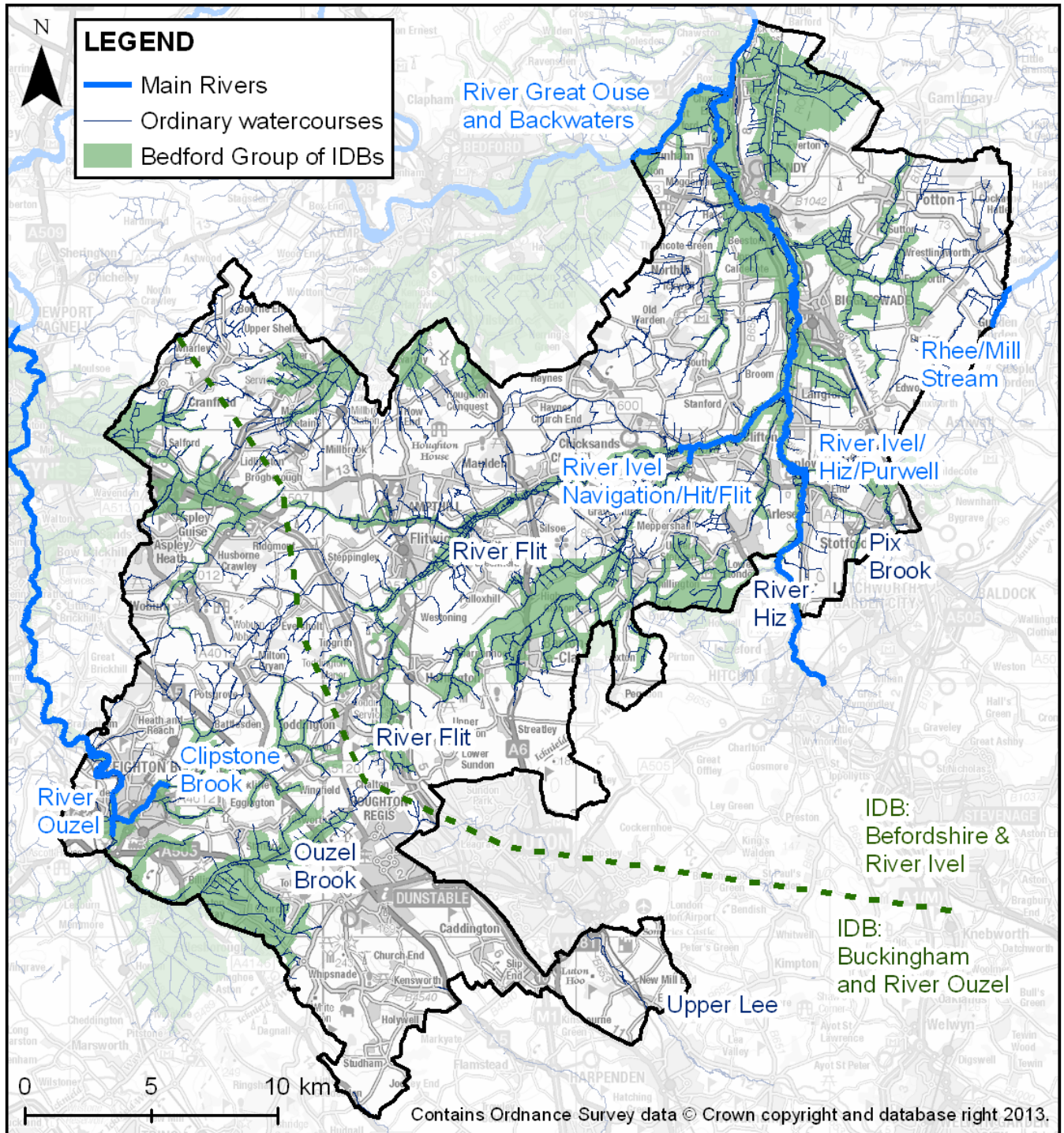
The River Ivel flows to the west of the settlements of Biggleswade and Sandy, whilst the River Ouzel flows through Leighton Buzzard.

Central Bedfordshire has an extensive network of ordinary watercourses. The majority of these are categorised as ditches, but more notable watercourses are:

- The Upper Lee which intersects the very southern extent of the council boundary southeast of Luton.
- The Ouzel Brook which flows to the west of Dunstable and is located at the headwaters of the River Ouzel.
- The River Flit, to the north of Dunstable which flows towards and beyond Flitwick, discharging into the River Ivel.
- The River Hiz and Pix Brook, respectively, discharge into the River Ivel and flow northwards through Hitchin and Letchworth Garden City.

A number of watercourses in Central Bedfordshire are managed by the Bedford Group of Internal Drainage Boards, which is a consortium of three Internal Drainage Boards (IDBs). Areas managed by both the Buckingham and River Ouzel IDB and Bedfordshire and River Ivel IDB fall within Central Bedfordshire. The former has responsibilities for a number of watercourses located within the River Ouzel catchment and the Bedfordshire and River Ivel IDB has responsibilities for a number of watercourses over a large area of Central Bedfordshire, primarily to the east of the M1, as shown in Figure A2-1. The boundary separating the respective IDB areas is shown on Figure A2-1.

**Figure A2-1 – Overview map of watercourses and IDB boundaries within Central Bedfordshire**



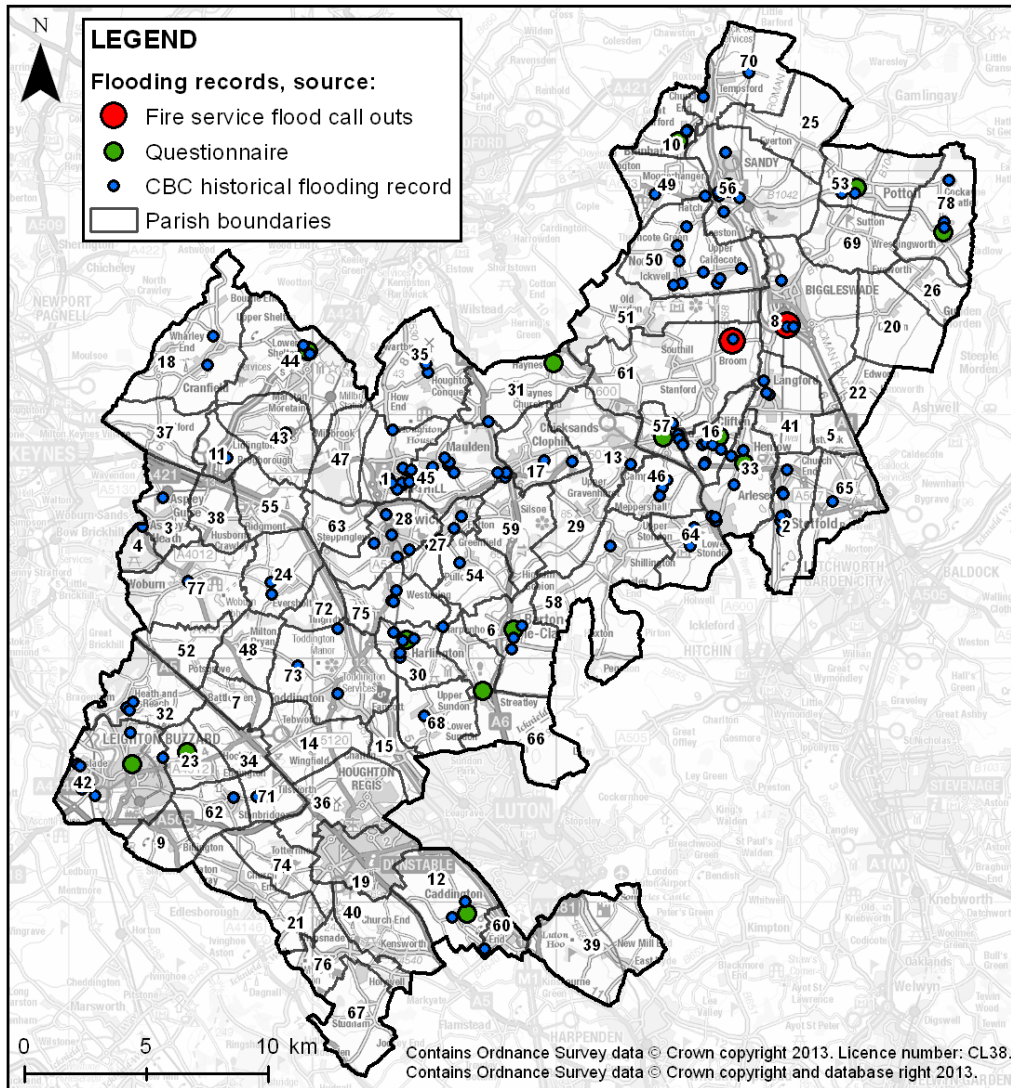
### Historic Flood Risk across Central Bedfordshire

Locations where historic records of flooding have been collected within Central Bedfordshire are shown in Figure A2-2. The locations of recorded flood events shown in Figure A2-2 identify fire service call outs, the results from the questionnaire that we carried out in the early stages of developing our local Strategy and places where we have our own internal records of flood reports.

Records of historic flooding are spread throughout Central Bedfordshire, but there is a greater intensity of reported events to the centre and northeast of the area. The parishes of Ampthill, Arlesey, Clifton, Harlington, Northill, Sandy and Shefford have the greatest density of historical

flooding incidences. Generally historic incidences within these parishes have been attributable to high water levels in field or highway drainage (ditches). We have sought to alleviate some of these issues and many incidences recorded are over five years old, and no repeat occurrences have been noted since. Other parishes listed have incidences of historical flooding reported, but these are less frequent, and less intensive than for those locations listed above.

**Figure A2-2 – Records of historic flood risk within Central Bedfordshire**



ID	Parish Name	ID	Parish Name	ID	Parish Name	ID	Parish Name
1	Amptill	17	Clophill	33	Henlow	49	Moggerhanger
2	Arlesey	18	Cranfield	34	Hockliffe	50	Northill
3	Aspley Guise	19	Dunstable	35	Houghton Conquest	51	Old Warden
4	Aspley Heath	20	Dunton	36	Houghton Regis	52	Potsgrove
5	Astwick	21	Eaton Bray	37	Hulcote & Salford	53	Potton
6	Barton-le-Clay	22	Edworth	38	Husborne Crawley	54	Pulloxhill
7	Battlesden	23	Eggington	39	Hyde	55	Ridgmont
8	Biggleswade	24	Eversholt	40	Kensworth	56	Sandy
9	Billington	25	Everton	41	Langford	57	Shelford
10	Blunham	26	Eyeworth	42	Leighton Buzzard	58	Shillington
11	Brogborough	27	Flitton & Greenfield	43	Lidlington	59	Silsoe
12	Caddington	28	Flitwick	44	Marston Moretaine	60	Slip End
13	Campton & Chicksands	29	Gravenhurst	45	Maulden	61	Southill
14	Chalgrave	30	Harlington	46	Meppershall	62	Stanbridge
15	Chalton	31	Haynes	47	Millbrook	63	Steppingley
16	Clifton	32	Heath & Reach	48	Milton Bryan	64	Stondon
						65	Stotfold
						66	Streatley
						67	Studham
						68	Sundon
						69	Sutton
						70	Tempsford
						71	Tilsworth
						72	Tingrith
						73	Toddington
						74	Totternhoe
						75	Westoning
						76	Whipsnade
						77	Woburn
						78	Wrestlingworth & Cockayne Hatley

(Note – the numbering system used to identify Parishes does not imply any ranking with respect to flood risk)

## **Residual Local Flood Risk across Central Bedfordshire**

### ***Introduction***

It is possible to use national data obtained from the Environment Agency to increase our understanding of where flooding might be experienced and how it might be caused. This data can also be used to improve our understanding of how flood risk might change in the future as a consequence of the effects of climate change. Where we have access to nationally available datasets we have used this information to help identify parishes across Central Bedfordshire that might be more susceptible to flooding from local sources. Local sources of flooding are high intensity rainfall, groundwater and local drainage systems.

As better information becomes available either through improved nationally available datasets (for example the Updated Flood Map for Surface Water, due for release autumn 2013) or from more detailed flood risk studies, we will update this annex to ensure we continually improve our understanding.

### ***From ordinary watercourses***

Flooding from ordinary watercourses is caused when the ditches, drains and watercourses are too small to discharge the volume of water that is flowing down them. When this happens the excess flood water that cannot flow down the watercourses will flow across the land next to the watercourse (the floodplain). We are aware that the Environment Agency is preparing flood information that can be used to identify communities at risk within Central Bedfordshire. The Environment Agency has already provided information from this assessment and this is summarised in the following two paragraphs. As better information becomes available we plan to update the content of this annex. The information presented by the Environment Agency to date has focused on Parishes at risk, rather than specified locations within a particular Parish. This broadscale approach will allow future updates to be implemented in a similar manner, thereby providing context to any general trends that show changes to flood risk for respective Parishes.

Generally, the areas identified by the Environment Agency to be at risk of flooding from ordinary watercourses are well distributed throughout Central Bedfordshire and the number of properties predicted to be at risk in any one locality is relatively low.

The areas of Ampthill, Campton and Chicksands parish and Henlow, each sited close to ordinary watercourses which flow eastwards towards the River Ivel, as well as Eaton Bray, are reported to have higher numbers of properties at risk than elsewhere within Central Bedfordshire. Other areas which have a lesser number of properties predicted to be at risk are: Eversholt, Gravenhurst, Harlington, Marston Moretaine, Northill, Old Warden, Potton, Shefford, Shillington, Tempsford and Wrestlingworth.

### ***From surface water flooding***

Surface water flooding is normally the result of local severe rainfall that results in extensive flow of runoff across the ground and accumulation in low lying areas or depressions. It is the flooding that occurs before the runoff has reached a watercourse or has been collected in a drainage system, or when water leaves a drainage system. The risk of surface water flooding described within this section is based on a classification of the number of properties at risk from local high intensity rainfall events within each parish. The risk is classified as greater if a larger number of properties is affected.

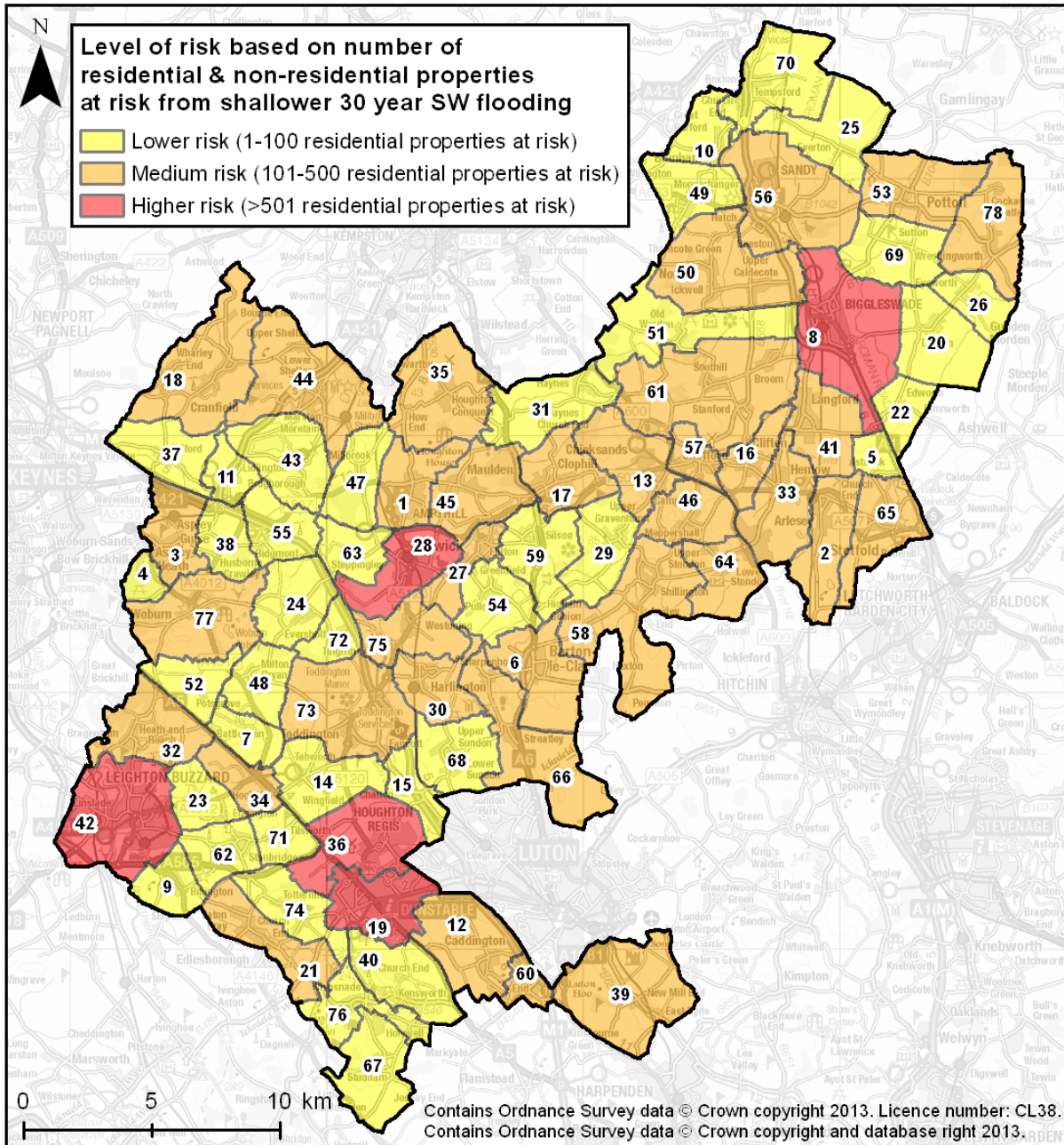
For the purpose of the assessment of surface water flooding the risk is split into the following four categories: no risk, lower risk, medium risk and higher risk of flooding. The criteria for each of these categories is summarised below:

- No risk = 0 residential properties at risk
- Lower risk = 1-100 residential properties at risk
- Medium risk = 101-500 residential properties at risk
- Higher risk = >501 residential properties at risk

Using these categories the level of risk for each parish within Central Bedfordshire has been assessed and is shown in Figure A2-3. In summary the results obtained show:

- No risk - No parishes are deemed as having no risk.
- Lower risk - (38 out of 78 parishes / or 49% of all parishes).
- Medium risk - (35 out of 78 parishes / 45% of parishes).
- Five parishes are classified as higher risk (6% of parishes); Biggleswade, Dunstable, Flitwick, Houghton Regis and Leighton Buzzard.

Figure A2-3 – Flood Risk from Surface Water (using FMfSW)



ID	Parish Name	ID	Parish Name	ID	Parish Name	ID	Parish Name	ID	Parish Name
1	Amphill	17	Clophill	33	Henlow	49	Moggerhanger	65	Stotfold
2	Arlesey	18	Cranfield	34	Hockliffe	50	Northill	66	Streatley
3	Aspley Guise	19	Dunstable	35	Houghton Conquest	51	Old Warden	67	Studham
4	Aspley Heath	20	Dunton	36	Houghton Regis	52	Potsgrove	68	Sundon
5	Astwick	21	Eaton Bray	37	Hulcote & Salford	53	Potton	69	Sutton
6	Barton-le-Clay	22	Edworth	38	Husborne Crawley	54	Pulloxhill	70	Tempersford
7	Battlesden	23	Eggington	39	Hyde	55	Ridgmont	71	Tilsworth
8	Biggleswade	24	Eversholt	40	Kenzworth	56	Sandy	72	Tingrith
9	Billington	25	Everton	41	Langford	57	Shefford	73	Toddington
10	Blunham	26	Eyeworth	42	Leighton Buzzard	58	Shillington	74	Totternhoe
11	Brogborough	27	Flitton & Greenfield	43	Lidlington	59	Silsoe	75	Westoning
12	Caddington	28	Flitwick	44	Marston Moretains	60	Slip End	76	Whipsnade
13	Compton & Chicksands	29	Gravenhurst	45	Maulden	61	Southill	77	Woburn
14	Chalgrave	30	Harlington	46	Meppershall	62	Stanbridge	78	Wrestlingworth & Cocksays Hatley
15	Chalton	31	Haynes	47	Millbrook	63	Steppingley		
16	Clifton	32	Heath & Reach	48	Milton Bryan	64	Stondon		



Risk of surface water flooding has used data obtained from the Flood Map for Surface Water (FMfSW). An update to this data known as the 'updated Flood Map for Surface Water' (uFMfSW) has recently been released for stakeholder consultation and is due for final issue at the end 2013. In light of this we have compared the 'consultation mapping' available for the uFMfSW with the FMfSW for the higher risk areas. On the basis of this, comparison suggests it is anticipated that the Parishes already identified will remain as higher risk. The results of this comparison are summarised below.

### ***Biggleswade***

- Generally, a greater area is shown as flooded by the uFMfSW. Through Biggleswade town and to the south the uFMfSW extent appears to be greater in most areas with more areas at risk.
- However, where the predicted flooding shown in the uFMfSW is deeper, the extent tends to be greater than the FMfSW and the extent of flooding shown in the uFMfSW is greater immediately northeast of Biggleswade.
- In general we expect the predicted risk to reduce with the uFMfSW dataset.

### ***Dunstable***

- Generally, the FMfSW covers a greater extent than the uFMfSW. An exception to this is greater extent indicated by the uFMfSW in the Beecroft area and south of the railway line.
- In general we expect the predicted risk to reduce with the uFMfSW dataset.

### ***Flitwick***

- Broadly, the FMfSW covers a greater extent than the uFMfSW. However, exceptions are present such as to the north of Flitwick at the A507.
- In general we expect the predicted risk to reduce with the uFMfSW dataset.

### ***Houghton Regis***

- In the most part, the FMfSW covers much greater extent than uFMfSW. Small areas of greater flooding indicated by the uFMfSW are present in Dunstable (see above)
- In general we expect the predicted risk to reduce with the uFMfSW dataset.

### ***Leighton Buzzard***

- To the west, the FMfSW extent is greater. Some new areas are highlighted by the uFMfSW within Leighton Buzzard itself, although coincident areas tend to have a greater coverage within the FMfSW dataset. A greater extent is indicated by the uFMfSW towards the south of Leighton Buzzard, notably along the canal
- In general we expect the predicted risk to increase overall with the uFMfSW dataset.

## ***Parish assessment of local flood risk***

As we continue to improve our understanding of local flooding across Central Bedfordshire, it will be necessary for us to prioritise our actions. In the first instance, Central Bedfordshire has allocated each parish a flood risk priority based on a high level assessment using national data obtained from the Environment Agency and more detailed local knowledge where this is available.

The categories that have been assigned are higher risk, medium risk or lower risk, and these have been based on information already presented within this annex, in addition to local knowledge from drainage engineers (note that we have assumed risk from groundwater will have been highlighted through historic records and local knowledge). To summarise therefore, the analysis has been based on:

- Assessment of surface water flood risk (using FMfSW)
- Assessment of flood risk from ordinary watercourses
- Assessment of historic risk
- Local knowledge

Higher risk parishes are those that have:

- Low, Medium or High risk from surface water and known local knowledge emphasising the need for further investigations
- Medium or High risk from surface water and ordinary watercourse analysis suggesting more than 10 properties may be at risk from local fluvial flooding

Medium risk parishes are those that have:

- High risk from surface water and no other risk highlighted from local knowledge and ordinary watercourses
- Medium risk from surface water and no other risk highlighted from local knowledge and ordinary watercourse analysis suggesting that no, or less than 10, properties may be at risk from local fluvial flooding
- Low risk from surface water and ordinary watercourse analysis suggesting that between 1-10 properties may be at risk from local fluvial flooding

Lower risk parishes are those that have:

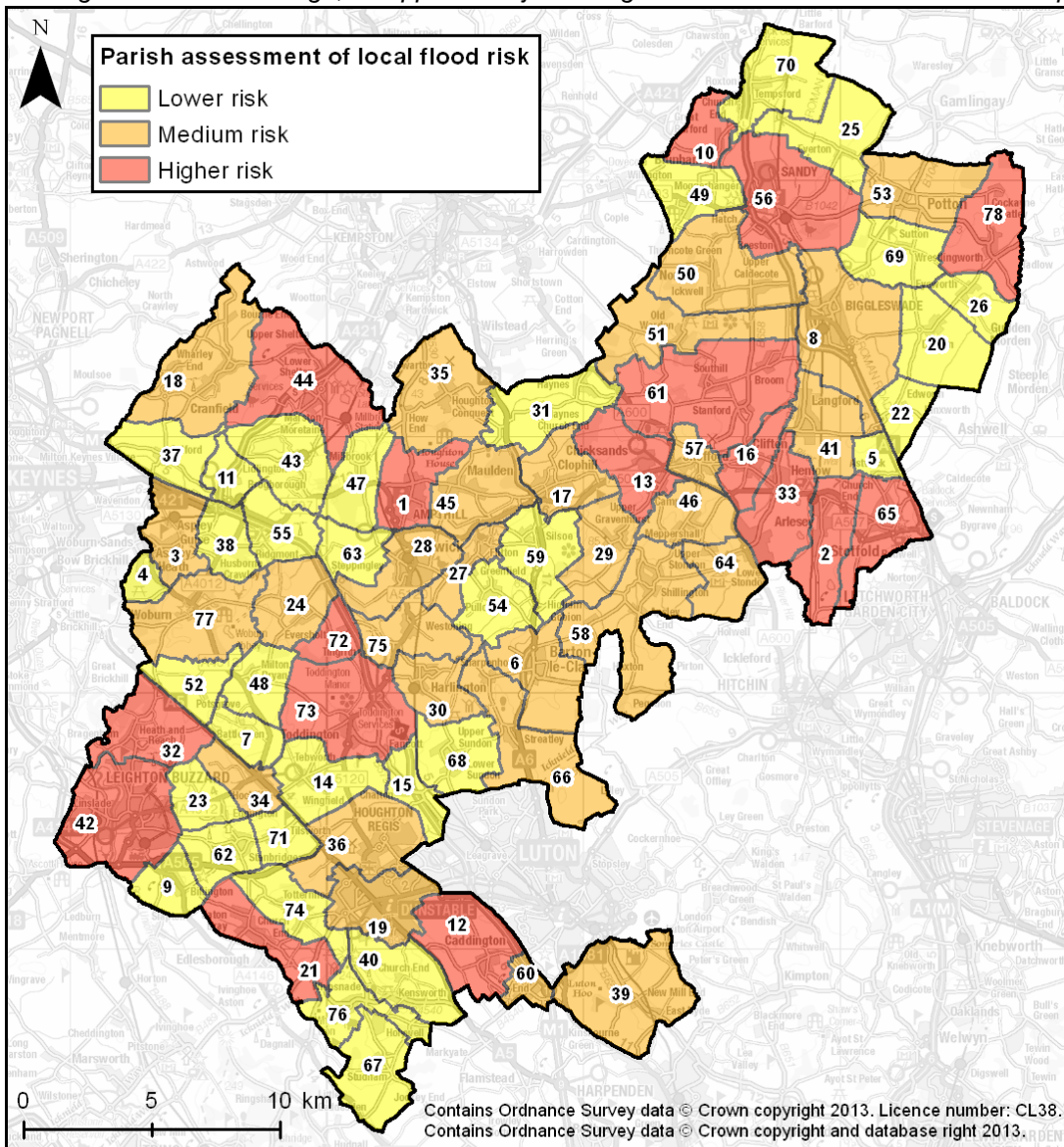
- Low risk from surface water and no other risk highlighted from historic knowledge and ordinary watercourses
- Low risk from surface water and no other risk highlighted from local knowledge and ordinary watercourses

This categorisation will be used to help us prioritise work for our action plan. However, please be aware that our priorities will be influenced by the availability of funding or partnership opportunities as these arise. Accordingly parishes that are categorised as low or medium in our assessment may subsequently be prioritised as 'high' to allow us to capture as much benefit as possible. We are currently working on developing this approach via the Investment Strategy that we are preparing and more information on this is presented in annex 3.

As improved local and national information becomes available on local flooding, we will review and update this analysis and make amendments where needed through our programmed annual review of Strategy annexes.

### Figure A2-4 – Parish Assessment of Local Flood Risk

Note that map is different to Figure A2-3 as it also considers risk from ordinary watercourses, historical records of flooding and local knowledge, as opposed to just being based on national surface water mapping.



ID	Parish Name	ID	Parish Name	ID	Parish Name	ID	Parish Name
1	Amphill	17	Clophill	33	Henlow	49	Moggerhanger
2	Arlesey	18	Cranfield	34	Hockliffe	50	Northill
3	Aspley Guize	19	Dunstable	35	Houghton Conquest	51	Old Warden
4	Aspley Heath	20	Dunton	36	Houghton Regis	52	Potsgrove
5	Astwick	21	Edon Bray	37	Hulcote & Salford	53	Potton
6	Barton-le-Clay	22	Edworth	38	Husborne Crawley	54	Pulloxhill
7	Battlesden	23	Eggington	39	Hyde	55	Ridgmont
8	Biggleswade	24	Eversholt	40	Kensworth	56	Sandy
9	Billington	25	Everton	41	Langford	57	Shefford
10	Blunham	26	Eyeworth	42	Leighton Buzzard	58	Shillington
11	Brogborough	27	Flitton & Greenfield	43	Lidlington	59	Silsoe
12	Caddington	28	Flitwick	44	Marston Moretaine	60	Slip End
13	Compton & Chicksands	29	Gravenhurst	45	Maulden	61	Southill
14	Chalgrave	30	Harlington	46	Meppershall	62	Stanbridge
15	Chalton	31	Haynes	47	Millbrook	63	Steppingley
16	Clifton	32	Heath & Reach	48	Milton Bryan	64	Stondon
						65	Stotfold
						66	Streatley
						67	Studham
						68	Sundon
						69	Sutton
						70	Tempstord
						71	Tilsworth
						72	Tingrith
						73	Toddington
						74	Totterhoe
						75	Westoning
						76	Whipsnade
						77	Woburn
						78	Wrestlingworth & Cockayne Hatley

## Annex 3: Outline Investment Strategy

### Context

As part of our local Strategy we have started to develop an investment strategy, which should help us to focus how we prioritise investment for flood risk now and into the future. The Outline Investment Strategy will be developed overtime to enable us to prepare a Strategic Investment Plan, as we work towards achieving our local Strategy objective 5.

**Objective 5: To take a collaborative approach, working more effectively as an authority and with our partners, to reduce flood risk and where appropriate seeking opportunities for packaging work. We will aim to use all available resources and funds in an integrated way to support our priority of achieving efficiency savings.**

To date our investment strategy includes:

- Identification of funding sources
- An assessment of potential for FCRMGiA across Central Bedfordshire
- High level summary of priorities
- Process for agreeing priorities
- Next steps

We will use the Strategic Investment Plan to identify measures and where possible packages of measures that we can afford and which meet our priorities. This will require that we work in partnership with other Risk Management Authorities and other parties and secure the necessary level of commitment from them.

### Funding sources

It is unlikely that Central Bedfordshire Council will be able to provide all the investment needed to deliver the local Strategy action plan year on year. In meeting the local Strategy objectives collaborative working and joint funding will be needed. One of the advantages of preparing an investment strategy is to set out potential funding sources and opportunities that may be a route for funding of local flood risk management measures (Table A3-1).

**Table A3-1: Potential funding sources**

Funding source	Overview
European funding	Possible sources of funding include LIFE+ which is a programme providing specific support for the implementation of European environment policy; INTERREG which is a collection of funds aimed at promoting inter-region cooperation across the EU; and the European Fisheries Fund which could fund actions to protect and develop fish habitats.
National Funding	This is made available through FCRMGiA and can be obtained through the provisions of Resilience Partnership Funding (Refer to Chapter 5)
Defra Grants	Defra grants are either allocated directly to support the introduction of new legislation and practices, or made available for local authorities to submit grant applications for funding.
The Growing Places	This is available for Local Enterprise Partnerships (LEPs) and is to

Funding source	Overview
Fund	make provision for investment in infrastructure which unlocks development.
The catchment restoration fund	This is a fund administered by the Environment Agency aimed at the restoration of more natural features in and around water bodies.
Regional Flood and Coastal Committee (RFCC) Levy	This is an additional locally raised source of funding that is raised by a levy on local authorities and used to support prioritised local projects, under the direction of the RFCC.
Central Bedfordshire Capital Budget	This is a fund administered by Central Bedfordshire Council specifically for local flood risk management.
Central Bedfordshire Revenue Budget	This is a small fund administered by Central Bedfordshire Council specifically used for maintenance of award drains.
Partnership Working with other Risk Management Authorities (RMAs)	<p>Through a partnership working approach we will work with other RMAs and continuously seek to identify opportunities where commitment to respective investment could deliver multiple outcomes (and provide direct benefit) that meet the objectives of the local Strategy. Examples of this include:</p> <ul style="list-style-type: none"> <li>• The Environment Agency – funding linked to River Basin Management Planning and flooding from Rivers and Reservoirs.</li> <li>• Internal Drainage Boards – Funding for capital and maintenance schemes to manage water levels and land drainage.</li> <li>• Water companies – Funding for schemes to reduce flood risk and improve water quality.</li> <li>• Highways – funding for provision of maintenance and major infrastructure that could deliver Flood Risk Management benefits.</li> </ul>
Other Sources of funding	<p>It is a difficult concept to grasp but our local Strategy needs to be realistic. Set against a backdrop of limited resources and low economic activity, we recognise that we will be unable to provide the level of investment to resolve all flooding issues across Central Bedfordshire and with our increasing responsibilities under the Act; greater investment will also be needed by us and our partners to increase resource.</p> <p>We will need to identify as many funding contributions as possible. These could include:</p> <ul style="list-style-type: none"> <li>• Private funding from local communities and business. Contributions from the beneficiaries of measures delivered through the Strategy.</li> <li>• Community Infrastructure Levy (CIL). Locally levied contributions relating to the Local Plan provision based on the contribution of new development to deliver strategic infrastructure (normally identified in the Infrastructure Development Plan).</li> <li>• Section 106 (Town and Country Planning Act 1990). Contributions to measures linked to requirements associated</li> </ul>

Funding source	Overview
	<p>with particular developments.</p> <ul style="list-style-type: none"> <li>• Business Rate Retention. Fund raised through retention of moneys raised through levy of local business rates, enabling authority to target this at measures identified in the local Strategy.</li> <li>• New Homes Bonus. Can be used to assist with funding of infrastructure to support new housing build.</li> <li>• Communities fund. Available for use for delivery of biodiversity projects located within proximity of waste operators.</li> <li>• Big Lottery Fund (Communities Living Sustainably). Available for partnerships that bring together the public, private, voluntary and community sectors to build sustainable and resilient communities to help deal with the potential impact of climate change.</li> <li>• Other internal funds linked to work progressed by other Central Bedfordshire departments.</li> </ul>

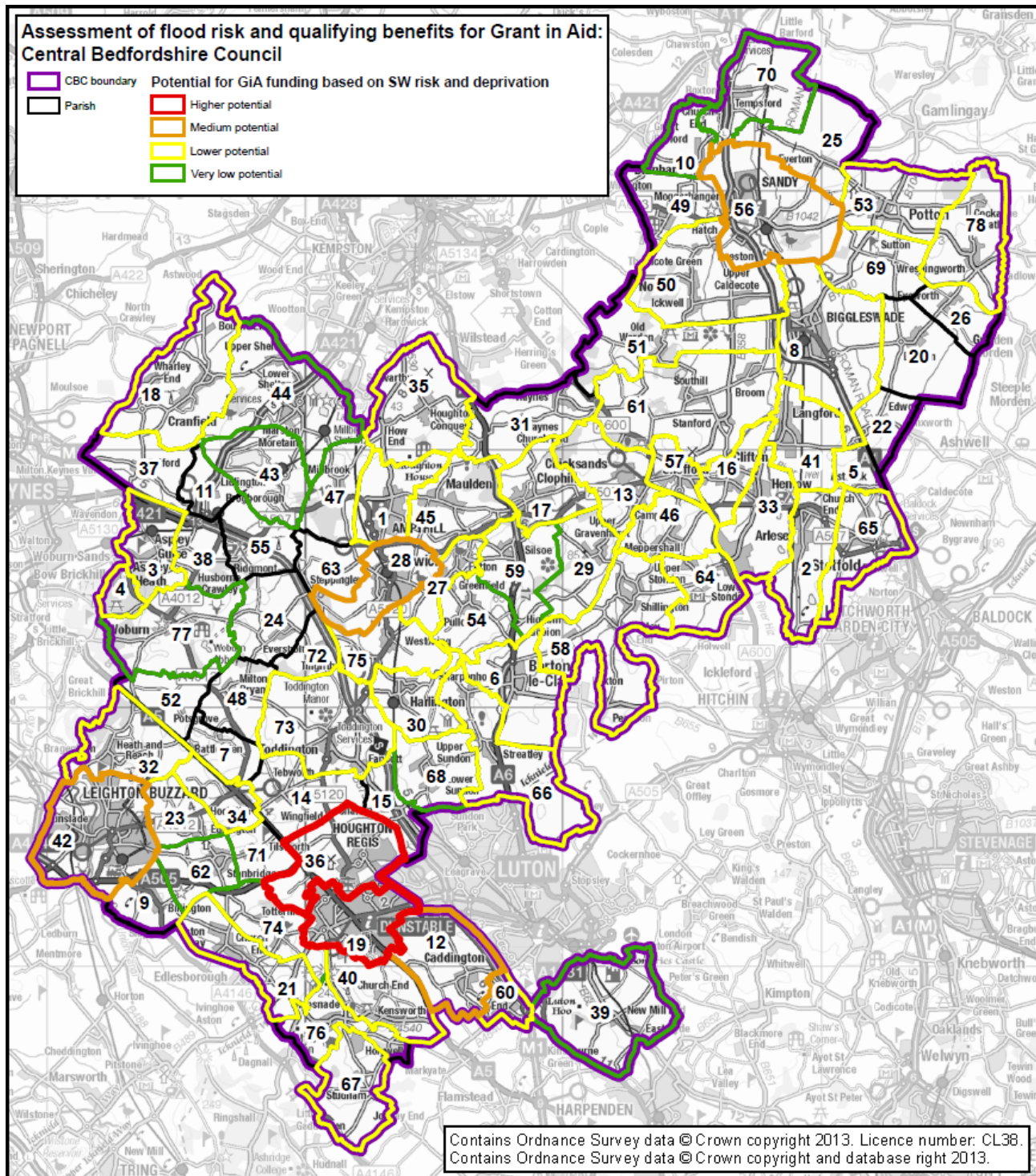
### Assessment for potential Flood Defence GiA across Central Bedfordshire

In chapter 5 we outlined the how the principles used for Partnership Resilience Funding affect the availability of money obtained from FCRMGiA that could be used to implement Flood Risk Management measures. In summary these principles result in FCRMGiA:

- Potentially being available to fund a wide range of worthwhile schemes (but not necessarily fund them completely).
- Give greater priority of funding to measures and schemes at locations where the levels of deprivation are higher. This is achieved by using an assessment that includes an assessment of the Outcome Measures and gives greater weight to locations where the level of deprivation is higher.
- Being available to partially fund schemes that have a high local priority.

Using the principles used for Resilience Partnership Funding we have prepared an assessment that identifies where the greatest amount of funding might be available (based on the number of properties at risk of flooding and the level of deprivation). The results of this analysis are shown in Figure A3-1.

Figure A3-1 – FCRMGiA Opportunity Mapping



ID	Parish Name	ID	Parish Name	ID	Parish Name	ID	Parish Name	ID	Parish Name
1	Amphill	17	Clophill	33	Henlow	49	Moggerhanger	65	Stotfold
2	Arlesey	18	Cranfield	34	Hockliffe	50	Northill	66	Streatley
3	Aspley Guise	19	Dunstable	35	Houghton Conquest	51	Old Warden	67	Studham
4	Aspley Heath	20	Dunton	36	Houghton Regis	52	Potsgrove	68	Sundon
5	Astwick	21	Eaton Bray	37	Hulcote & Salford	53	Potton	69	Sutton
6	Barton-le-Clay	22	Edworth	38	Husborne Crawley	54	Pulloxhill	70	Tempsford
7	Battlesden	23	Eggington	39	Hyde	55	Ridgmont	71	Tilsworth
8	Biggleswade	24	Eversholt	40	Kensworth	56	Sandy	72	Tingrith
9	Billington	25	Everton	41	Langford	57	Shefford	73	Toddington
10	Blunham	26	Eyeworth	42	Leighton Buzzard	58	Shillington	74	Totterhoe
11	Brogborough	27	Flitton & Greenfield	43	Lidlington	59	Silsoe	75	Westoning
12	Caddington	28	Flitwick	44	Marston Moretaine	60	Slip End	76	Whipsnade
13	Campton & Chicksands	29	Gravenhurst	45	Maulden	61	Southill	77	Woburn
14	Chalgrave	30	Harlington	46	Meppershall	62	Stanbridge	78	Wrestlingworth & Cockayne Hatley
15	Chalton	31	Haynes	47	Millbrook	63	Steppingley		
16	Clifton	32	Heath & Reach	48	Milton Bryan	64	Stondon		

## High level summary of priorities

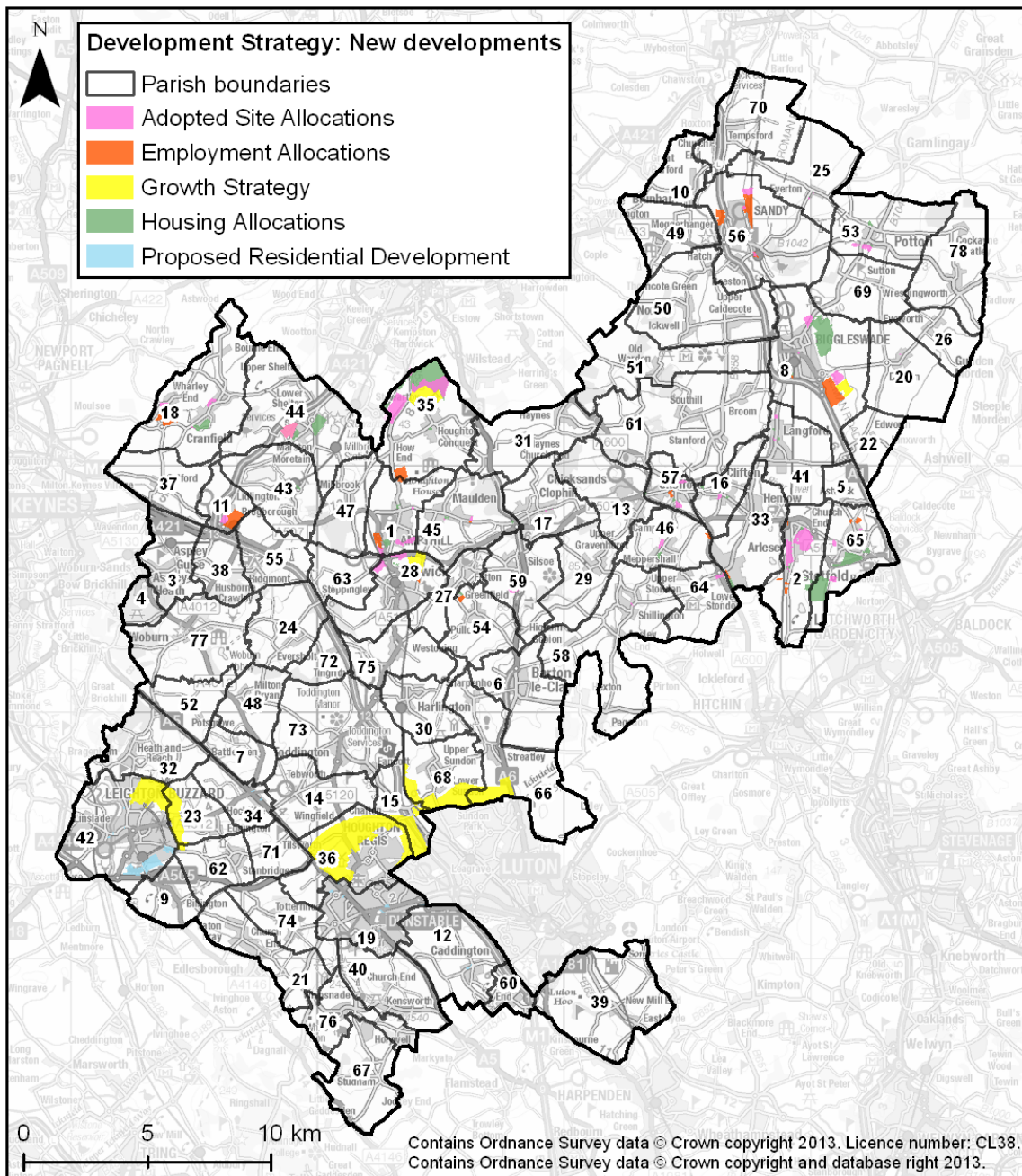
We will use the outline investment strategy to assemble all the information we have on potential sources of funding. This exercise will draw on information obtained from our Partners and other RMAs. We will combine this with our understanding of the flood risk and identify priorities for our action plan.

Using this approach our priorities will not only be based at locations of greatest risk, but will also identify opportunities to deliver outcomes at locations where investment is proposed. Adopting this approach will in the long run enable us to reduce the level of risk for more people over a wider area. The approach relies on working in partnership with other RMAs and partners. The measures identified by the Strategic Investment Plan will not only be for specific schemes, but will also include more detailed assessments and studies where these are necessary to gain an appropriate understanding of flood risk to inform decision making.

An example of where we are looking to prioritise our actions to include opportunities for delivering multiple outcomes is through our internal partnership with our Planning colleagues. A new Development Strategy for Central Bedfordshire is being prepared, and we are using information from this to understand where development is proposed across Central Bedfordshire (Figure A3-2). Having this knowledge will allow us to determine whether there are any opportunities for partnership working and alignment of local flood risk and planning programmes and the corresponding actions that we should take as a priority. Using this approach we may potentially be able to influence planning requirements that provide wider local flood risk benefits outside of those required as a minimum for new development.



Figure A3-2 – Development Strategy Planned Developments



A new Development Strategy for Central Bedfordshire is being prepared and is anticipated that this will be formally adopted in early 2014. Please note that the information presented here may be subject to change.

ID	Parish Name	ID	Parish Name	ID	Parish Name	ID	Parish Name
1	Ampt Hill	17	Clophill	33	Henlow	49	Moggerhanger
2	Arlesey	18	Cranfield	34	Hockliffe	50	Northill
3	Aspley Guise	19	Dunstable	35	Houghton Conquest	51	Old Warden
4	Aspley Heath	20	Dunton	36	Houghton Regis	52	Potsgrove
5	Astwick	21	Easton Bray	37	Hulcote & Salford	53	Potton
6	Barton-le-Clay	22	Edworth	38	Husborne Crawley	54	Pulloxhill
7	Battlesden	23	Eggington	39	Hyde	55	Ridgmont
8	Biggleswade	24	Eversholt	40	Kenworth	56	Sandy
9	Billington	25	Everton	41	Langford	57	Shefford
10	Blunham	26	Eyeworth	42	Leighton Buzzard	58	Shillington
11	Brogborough	27	Flitton & Greenfield	43	Lidlington	59	Silsoe
12	Caddington	28	Flitwick	44	Marston Moretaine	60	Slip End
13	Campton & Chicksands	29	Gravenhurst	45	Maulden	61	Southill
14	Chalgrave	30	Harlington	46	Meppershall	62	Stanbridge
15	Chalton	31	Haynes	47	Millbrook	63	Steppingley
16	Clifton	32	Heath & Reach	48	Milton Bryan	64	Stondon
						65	Stotfold
						66	Streatley
						67	Studham
						68	Sundon
						69	Sutton
						70	Tempsford
						71	Tilsworth
						72	Tingrith
						73	Toddington
						74	Totternhoe
						75	Westoning
						76	Whipsnade
						77	Woburn
						78	Wrestlingworth & Cocksayne Hatley

## **Process for agreeing priorities**

We will establish an annual process to identify priorities and formally agree these with our partners and other RMAs. This process will include identification of specific measures that are needed together with an assessment of their costs and benefits. This process will be used to prepare our action plan and to inform the Environment Agency of the schemes to be included in the Medium Term Plan (MTP).

## **Next steps**

During the course of preparing the local Strategy we will draw together the existing information on funding and flood risk, share this with our Partners and other RMAs and establish the process for annual review of our priorities and assembly of the Action Plan.

## Annex 4: Flood Risk Policies

Under the Flood and Water Management Act, Central Bedfordshire Council as a Lead Local Flood Authority has responsibilities and duties to fulfil.

We have identified policies that define general principles we will adopt so that the local Strategy satisfies our aims and objectives. These policies give us a consistent framework to maintain, apply and monitor our Strategy for local flood risk management, and they will demonstrate how we are actively promoting and fulfilling the duties as set out within the Act. Many of the policies will determine how much it will cost us to manage, monitor and maintain the Strategy.

Where needed we have introduced new or developed existing policies and these are set out below. They will develop overtime, and this annex will be used to document all of the policies that we use.

### Flood Risk Investigations and Recording

The Flood and Water Management Act requires Lead Local Flood Authorities to record and investigate significant floods. Central Bedfordshire Council have decided that normally a threshold of five or more houses being affected by internal flooding in any one location, for any one instance would require investigation.

Central Bedfordshire Council will use an internal evaluation processes to consider possible actions and potential funding options. The general locations where flooding has been recorded will be placed on the council's website.

### Asset Register

The Flood and Water Management Act requires Lead Local Flood Authorities to identify a register of structures and features which are likely to have a significant effect on flood risk in local communities.

Existing records will be collated and stored in an appropriate database system. An inspection programme will be set up and a process will be created to identify the maintenance requirements of both key Central Bedfordshire Council and third party assets. The database will also hold the details of new sustainable assets that are to be adopted as part of the SuDS Approval Body (SAB) process together with designated features that affect flood risk (under Schedule 1 of the Act).

## Drainage Approval and Adoption of SuDS

The Flood and Water Management Act will make us the SuDS Approving Body for Sustainable Drainage systems in new developments from October 2014. We will be responsible for establishing SuDS approval processes to evaluate and approve the design and construction details for SuDS in new developments as well as adopt and maintain SuDS serving more than one property. These duties will be carried out in accordance with the National SuDS Standards

Central Bedfordshire Council is making preparations to take up the SAB duties so that applications can be determined and new flood mitigation assets adopted and maintained as necessary.

A SuDS guidance document is being produced by CBC to identify local requirements which need to be considered when undertaking the design of SuDS measures.

Awareness raising measures of the impacts on resources should continue in readiness for the announcement from Defra that the SAB process will commence on October 2014.

## Consenting and Enforcement

The Flood and Water Management Act transferred the Section 23 powers of the Land Drainage Act to Lead Local Flood Authorities in April 2012.

Central Bedfordshire Council exercises its powers to maintain the discharge capacity and condition of Ordinary Watercourses to address the risk of flooding.

The consenting process to carry out works to ordinary watercourses is arranged through the Bedford Group of Internal Drainage Boards who are a designated flood risk authority under the Act.

The Council is considering the merit of establishing its own byelaws to regulate consenting and the serving of notices to riparian owners.

## Planning Policy

In accordance with the National Planning Policy Framework (NPPF), the accompanying Technical Guidance and the Planning and Compulsory Purchase Act 2004, Central Bedfordshire Council must produce a local plan for the area. A new Development Strategy for Central Bedfordshire is being prepared. It will be the main planning document setting out the overarching spatial strategy and development principles for the area together with more detailed policies to help determine planning applications. The draft version of the Development Strategy was published in January 2013 for public consultation.

The Development Strategy will replace a number of other existing planning policies contained in the Central Bedfordshire (North): Core Strategy and Development Management Plan Document (2009) and the South Bedfordshire Local Plan (2004). The Central Bedfordshire (North): Site Allocations Development Plan Document (2011) will sit alongside the Development Strategy forming part of the Development Plan for Central Bedfordshire.

Please note - in the south, until a new Development Strategy is adopted, the adopted South Bedfordshire Local Plan (2004) and joint Core Strategy (endorsed for Development Management purposes) will continue to set the planning context for decisions on planning applications.

The Local Flood Risk Management Strategy will enshrine the concepts described in the NPPF and accompanying Technical Guidance and relevant local plan documents.

## Annex 5: Flood Legislation

Legislation of relevance to the Local Flood Risk Management Strategy is set out in Table A5-1 below. Please note this list is not exhaustive.

**Table A5-1: Relevant legislation**

Legislation	Where to find the information
The Land Drainage Act (1991)	<a href="http://www.legislation.gov.uk/ukpga/1991/59/contents">http://www.legislation.gov.uk/ukpga/1991/59/contents</a>
Water Resources Act (1991)	<a href="http://www.legislation.gov.uk/ukpga/1991/57/contents">http://www.legislation.gov.uk/ukpga/1991/57/contents</a>
EU Water Framework Directive (2000)	<a href="http://ec.europa.eu/environment/water/water-framework/index_en.html">http://ec.europa.eu/environment/water/water-framework/index_en.html</a>
SEA Directive (2001)	<a href="http://ec.europa.eu/environment/eia/sea-legalcontext.htm">http://ec.europa.eu/environment/eia/sea-legalcontext.htm</a>
Civil Contingencies Act (2004)	<a href="http://www.legislation.gov.uk/ukpga/2004/36/contents">http://www.legislation.gov.uk/ukpga/2004/36/contents</a>
Climate Change Act (2008)	<a href="http://www.legislation.gov.uk/ukpga/2008/27/contents">http://www.legislation.gov.uk/ukpga/2008/27/contents</a>
Flood Risk Regulations (2009)	<a href="http://www.legislation.gov.uk/uksi/2009/3042/contents/made">http://www.legislation.gov.uk/uksi/2009/3042/contents/made</a>
Flood and Water Management Act (2010)	<a href="http://www.legislation.gov.uk/ukpga/2010/29/contents">http://www.legislation.gov.uk/ukpga/2010/29/contents</a>
Conservation of Habitats and Species Regulations (2010)	<a href="http://www.legislation.gov.uk/uksi/2010/490/contents/made">http://www.legislation.gov.uk/uksi/2010/490/contents/made</a>
The Localism Act (2011)	<a href="http://services.parliament.uk/bills/2010-12/localism.html">http://services.parliament.uk/bills/2010-12/localism.html</a>
Water White Paper (2011)	<a href="https://www.gov.uk/government/publications/water-for-life-market-reform-proposals">https://www.gov.uk/government/publications/water-for-life-market-reform-proposals</a>
National Planning Policy Framework (2012)	<a href="https://www.gov.uk/government/publications/national-planning-policy-framework--2">https://www.gov.uk/government/publications/national-planning-policy-framework--2</a>

## Annex 6: Glossary and Abbreviations

### Glossary

Annual Exceedance Probability (AEP)	Annual Exceedance Probability (AEP) is the probability associated with the chance of a flood event of a specified severity (or flood with greater severity) being experienced in each and every year. It is the inverse of return period. Thus, an event of return period 50 years has an AEP of $1/T$ (where $T$ = return period) or 0.02 (2%). The return period of a flood, $T$ , is a measure of its rarity, defined as the average interval in years between occurrence of floods that exceed it. It should be noted that whilst a flood might have a return period of 100 years, it is quite possible for two such floods to be experienced in successive years.
Areas Susceptible to Surface Water Flooding (AStSWF)	Since July 2009, these maps have been available to Local Resilience Forums and Local Planning Authorities, and provided a starting point in understanding the broad areas where surface water flooding is likely to cause problems. They show the areas where flooding might be expected to be experienced as a result of surface water flow resulting from localised heavy rain fall.
Catchment Flood Management Plans (CFMPs)	Catchment Flood Management Plans have been produced by the Environment Agency and are high-level planning tools that set out objectives for flood risk management for each river catchment and estuary. They also identify flood risk management policies that are economically practical, have a potential life of 50 to 100 years, and will aid partnership working to put them in place. CFMPs consider inland risk from rivers, surface water, groundwater and tidal flooding but do not consider sewer flooding. The main rivers in Central Bedfordshire are covered by the Great Ouse CFMP.
Climate Change	A long-term change in the statistical distribution of weather patterns over periods of time that range from decades to millions of years. It may be a change in the average weather conditions or a change in the distribution of weather events with respect to an average, for example, greater or fewer extreme weather events. Climate change may be limited to a specific region, or may occur across the whole planet.
Consenting	Works within a watercourse require prior consent to prevent adverse impact on flood risk and the environment. Permission is granted by the relevant body. If a watercourse is classed as Main River, the Environment Agency must undertake consenting. Following the Flood and Water Management Act in 2010, CBC as Lead Local Flood Authority are responsible for consenting work of watercourses classified as Ordinary Watercourse.
Critical Infrastructure	A term used to describe the assets that are essential for the functioning of a society and economy. Most commonly associated with the term are facilities for: electricity generation, transmission and distribution; gas production, transport and distribution; oil and oil products production, transport and

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distribution; telecommunication; water supply (drinking water, waste water/sewage, stemming of surface water (e.g. dikes and sluices)); agriculture, food production and distribution; heating (e.g. natural gas, fuel oil, district heating); public health (hospitals, ambulances); transportation systems (fuel supply, railway network, airports, harbours, inland shipping); financial services (banking, clearing); and security services (police, military).

Culvert	Is a covered channel or pipe which prevents the obstruction of a watercourse or drainage path by an artificial construction. Typically it is a closed conduit used for the conveyance of water under a roadway, railroad, canal, or other impediment.
Defence (Flood Defence)	A structure that alters the natural flow of water or flood water for the purposes of flood defence, thereby reducing the risk of flooding. A defence may be 'formal' (a structure built and maintained specifically for flood defence purposes) or 'informal'/'defacto' (a structure that provides a flood defence function but has not been built and/or maintained for this purpose).
EU Floods Directive Directive 2007/60/EC	A European Directive on the assessment and management of flood risk that has been transposed to UK law through the Flood Risk Regulations (2009).
Environment Agency (EA)	An Executive Non-departmental Public Body responsible to the Secretary of State for Environment, Food and Rural Affairs. The Environment Agency's principal aims are to protect and improve the environment, and to promote sustainable development. It plays a central role in delivering the environmental priorities of central government through our functions and roles.
Flood and Coastal Erosion Risk Management Grant in Aid (FCERMGiA)	FCERMGiA is a source of funding for flood risk management authorities (RMAs) - that is, the Environment Agency and English local authorities and internal drainage boards (IDBs). Together, they use it to contribute to the cost of a range of activities including schemes that help reduce the risk of flooding and coastal erosion.
Flood	A flood includes any case where land not normally covered by water becomes covered by water, but does not include water from burst water mains or flooding from sewerage systems, unless this is caused by heavy rainfall. Typically a flood is an overflow of an expanse of water that submerges land. Both the Flood and Water Management Act (2010) and the Flood Risk Regulations (2009) state that it doesn't matter whether a flood is caused by: heavy rainfall; a river overflowing its banks or being breached; a dam overflowing or being breached; tidal waters; groundwater; or anything else including a combination of factors.
Flood Maps for Surface Water (FMfSW)	The FMfSW map followed on from the AStSWF maps and provide a more realistic representation of how areas might be affected than the AStSWF maps in many circumstances. The Environment Agency considers this to be the national source of



## Glossary

		information.
Flood Resilience		Actions taken which allow the ingress of flood water through a property but enable swift recovery after the flood event. Flood resilience measures may include (among others) flood-resistant construction materials, raised electricity sockets and water-resistant flooring.
Flood Risk		Flood risk is a combination of two components: the chance (or probability) of a particular flood event occurring and the impact (or consequence) that the event would cause if it took place.
Flood Risk Management Authority (RMA)		RMA's Include: (a) the Environment Agency, (b) a lead local flood authority, (c) a district council for an area for which there is no unitary authority, (d) an internal drainage board, (e) a water company, and (f) a highway authority.
Flood Risk Management (FRM)		A process to reduce the probability of occurrence through the management of land, river systems and flood defences and reduce the impact through influencing development on flood risk areas, flood warning and emergency response.
Flood Risk Management Plan		A plan for the management of a significant flood risk. The plan must include details of: objectives set by the person preparing the plan for the purpose of managing the flood risk; and the proposed measures for achieving those objectives (including measures required by any provision of an Act or subordinate legislation).
Flood Zone 1 Low Probability		Defined as an area only at risk of flooding from flood events with an Annual Exceedance Probability (AEP) of less than 0.1% (1 in 1000). The probability of flooding occurring in this area in any one year is less than 0.1%.
Flood Zone 2 Medium Probability		Defined as an area at risk of flooding from river flood events with an Annual Exceedance Probability (AEP) of between 1% (1 in 100) and 0.1% (1 in 1000). The probability of river flooding occurring in this area in any one year is between 1% and 0.1%. For flooding from the sea it is defined as the area at risk from flood events with an Annual Exceedance Probability (AEP) of between 0.5% (1 in 200) and 0.1% (1 in 1000). The probability of flooding from the sea occurring in this area in any one year is between 0.5% and 0.1%.
Flood Zone 3a High probability		Defined as an area at risk of flooding from river flood events with an Annual Exceedance Probability (AEP) of greater than 1% (1 in 100r). The probability of river flooding occurring in this area in any one year is greater than 1%. For flooding from the sea it is an area at risk of flooding from flood events with an

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	Annual Exceedance Probability (AEP) of greater than 0.5% (1 in 200r).
Flood Zone 3b Functional Floodplain	Defined as land where water has to flow or be stored in times of flood. Usually defined as areas at risk of flooding from flood events with an Annual Exceedance Probability (AEP) of greater than 5% (1 in 20) design event. The probability of flooding occurring in this area in any one year is greater than 5%.
Flood Zones	Defined for use in the National Planning Policy Framework (NPPF) as an area of land that could be flooded for a specified flood probability assuming that there were no flood defences or flood risk management measures in place to provide a degree of protection. Since the flood Zones do not take account of the effect of Flood Risk Management measures they do not portray the actual level of risk in locations where flood alleviation measures have been implemented. The Flood Zones refer to the probability of sea and river flooding only. Flood Zones are divided into four categories: Flood Zone 1 (low probability), Flood Zone 2 (medium probability), Flood Zone 3a (high probability) and Flood Zone 3b (the functional floodplain).
Flood and Water Management Act, 2010 (the Act)	Part of the UK Government's response to Sir Michael Pitt's Report on the Summer 2007 floods, an aim of which is to clarify the legislative framework for managing surface water flood risk in England.
Fluvial	The processes associated with rivers and streams and the deposits and landforms created by them.
Groundwater	Water located beneath the ground surface, either in soil pore spaces or fractures in rock and in direct contact with the ground.
Land Drainage Act 1991	The Land Drainage Act, enacted in December 1991, aimed to consolidate existing water legislation and outlined the duties and powers to manage land drainage for a number of bodies including internal drainage boards and local authorities.
Lead Local Flood Authority (LLFA)	Local Authority responsible for taking the lead on local flood risk management
Local Flood Risk Management Strategy (LFRMS)	A document that describes the approach that the Lead Local Flood Authority will undertake to manage flooding within their area
Main River	All watercourses shown on the statutory main river maps held by the Environment Agency in accordance with Section 113 of the Water Resources Act, 1991 and the Department for Environment, Food and Rural Affairs. This can include any structure for controlling or regulating the flow of water into, in or out of the channel. The Environment Agency has permissive power to carry out works of maintenance and improvement on these rivers.
National Flood and Coastal	The Environment Agency's National Strategy was published in

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Erosion Risk Management Strategy	May 2011 and provides an overview of how flood risk and the risk of coastal erosion will be managed across England. The aims and objectives of the National Strategy have been translated onto a local scale through this Local Strategy for the County Council.
Ordinary Watercourse	Any section of watercourse not designated as a main river.
Pitt Review	Sir Michael Pitt carried out an independent review of the 2007 floods and made a number of recommendations for future flood risk management. In particular, he recommended that local authorities should play a more significant role in tackling local problems of flooding and coordinating all relevant agencies. Many of the recommendations of The Pitt Review have been enacted through the Flood and Water Management Act
Preliminary Flood Risk Assessment (PFRA)	The Preliminary Flood Risk Assessment is a process defined in the EU Floods Directive and Flood Risk Regulations involving an assessment of past floods and the possible harmful consequences of future floods, leading to the identification of Areas of Significant Risk. All LLFAs must prepare a PFRA report in relation to flooding in the LLFA's area every six years. The LLFA is not required to include information about flooding from the sea, main rivers and reservoirs unless the authority thinks that it may affect flooding from another source. The floods to be included are those which had significant harmful consequences for human health, economic activity or the environment (including cultural heritage), or which would have significant harmful consequences for those matters if they were to occur now. The report may ignore past floods of a kind that are not likely to occur now.
Reservoir	Artificial lake used to store water. Reservoirs may be created in river valleys by the construction of a dam or may be built by excavation in the ground or by conventional construction techniques such a brickwork or cast concrete. Reservoirs greater than 10,000m <sup>3</sup> are governed by the Reservoirs Act.
Sewer	A sewer is a pipe which carries and removes either rainwater (surface) or foul water (or a combination of both) from more than one property. A sewer can also be categorised as being a private or public sewer and can carry surface or foul water. <ul style="list-style-type: none"><li>• A Private Sewer is solely the responsibility of the occupiers/owners of the properties that it serves.</li><li>• A Public Sewer is a sewer that has been adopted and maintained by a Sewerage Undertaker.</li></ul>
Sewer flooding	The consequence of sewer systems exceeding their capacity during a rainfall event.
Surface Runoff	Rainwater (including snow and other precipitation) which: is on the surface of the ground (whether or not it is moving); and has not entered a watercourse, draining system or public sewer. The FMfSW identifies areas that suffer a depth of greater than 0.1m are considered to be at risk of surface water flooding. Flooding that is greater than 0.3m deep is classed as being at

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Sustainable Drainage Systems (SuDS)	risk of deep surface water flooding. SuDS involve a sequence of management practices, control structures and strategies designed to efficiently and sustainably drain surface water, while minimising pollution and managing the impact on water quality of local water bodies. It includes the application management practices and control structures that are designed to drain surface water in a more sustainable manner than some conventional techniques.
The Flood Risk Regulations, 2009	The Flood Risk Regulations were enacted in December 2009 to implement the requirements of the EU Floods Directive, which aims to provide a consistent approach to managing flood risk across Europe. The regulations outline the roles and responsibilities of the various authorities consistent with the Flood and Water Management Act 2010 and provide for the delivery of the outputs required by the directive. The Directive requires Member States to develop and update a series of tools for managing all sources of flood risk.
Tidal	Processes relating to or affected by tides.
UK Climate Projections 2009 (UKCP09)	The UK Climate Projections (UKCP09) provide climate information designed to help those needing to plan how they will adapt to a changing climate. The data is focussed on the UK.
updated Flood Map for Surface Water (uFMfSW)	The Environment Agency are currently updating national surface water mapping and will soon be releasing the Updated Flood Map for Surface Water (uFMfSW). The uFMfSW aims to provide an improvement on the representation of surface water flood risk across England and Wales. The uFMfSW are due to be released by the end of 2013.
Water Resources Act 1991	The Water Resources Act 1991 (WRA) is an Act of the Parliament of the United Kingdom that regulates water resources, water quality and pollution, and flood defence. Part II of the Act provides the general structure for the management of water resources. Part III then explains the standards expected for controlled waters; and what is considered as water pollution. Part IV then provides information on mitigation through flood defence.

## **Abbreviations**

*(additional to those listed in the glossary)*

AW	Anglian Water
BBC	Bedford Borough Council
BGIDB	Bedford Group of Internal Drainage Boards
CBC	Central Bedfordshire Council
Defra	Department for Food and Rural Affairs
EU	European Union
FCERM	Flood and Coastal Erosion Risk Management
FCRMGiA	Flood and Coastal Risk Management Grant in Aid
IDB	Internal Drainage Boards
MKC	Milton Keynes Council
NPPF	National Planning Policy Framework
RFCC	Regional Flood and Coastal Committee
SEA	Strategic Environmental Assessment
TW	Thames Water